

# The influence of change-related stress on user resistance when an enterprise system is implemented: a longitudinal field study

*Completed Research Paper*

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## Abstract

*When an enterprise system is implemented employees often respond with user resistance behavior. As employees' work environment are changed significantly they also experience stress during an implementation. However, neither technostress nor user resistance research have focused on the stress related to the change induced by an enterprise system implementation. Hence, it is not known how change-related stress results in user resistance behavior and thus prevents organizations from managing the implementation process sufficiently. Therefore, we provide a research model that theorizes the influence of change characteristics, such as change complexity, switching costs and switching benefits, on change-related work overload and role ambiguity as change stressors, which in turn determines employees change-induced exhaustion. When this exhaustion is perceived as a threat user resistance behavior will occur. Using a longitudinal field study with 273 employees during an enterprise system implementation we provide empirical evidence for the proposed model.*

**Keywords:** Technostress, user resistance, information systems implementations, enterprise content management, change-related stressors

## Introduction

Enterprise systems (ES) are comprehensive commercial software packages with embedded industry best practice business processes (Bala and Venkatesh 2013). An increasing number of organizations implement these systems as they enable operational efficiency and promise strategic advantages (Strong and Volkoff 2010). However, ES implementations are challenging because they require changes to existing work environments (Morris and Venkatesh 2010) and are often the target of user resistance (Kim and Kankanhalli 2009; Laumer et al. 2016; Lee and Joshi 2016).

When there is a change in the work environment, employees experience stress, which has negative consequences for both the individual and the organization. In a case study of an ES implementation (Laumer et al. 2012, p. 7) an employee reports:

*“I felt totally stressed by all the changes that I asked my doctor what I could do. He advised me to stay a few days at home, just to relax and to forget about all these negative things at work.”*

Indeed, the organization in this case study reported as a consequence of employees' stress when the ES was implemented an overall increase in the number of employee sick days during and after the ES implementation. Hence, when ES implementations change employees' work environment, this may have an adverse impact on employees if the change related to the ES implementation is perceived as stressful and may thus negatively affect employees' health and performance (Laumer et al. 2012).

Technostress research provides significant evidence that stress related to IT usage decreases individuals well-being and performance (Tarafdar et al. 2010; Tarafdar et al. 2011). However, this research has only focused on stress during IT use such that a review of the technostress literature reveals as a gap in research to provide an explanation for and an analysis of the consequences of employees' stress when an ES is implemented (Maier et al. 2015c; Srivastava et al. 2015). Moreover, although user resistance research has investigated why and how employees resist ES implementations and how organizations can manage their perceptions and behaviors during ES implementation (Lapointe and Rivard 2005; Rivard and Lapointe 2012), no studies in this research stream have investigated the role of stress during an ES implementation as well (for reviews see Laumer et al. 2016; Laumer and Eckhardt 2012; Lee and Joshi 2016). This is unexpected because organizations' inability to understand and manage employees' perceptions of changes during ES implementations has been recognized as a key reason for implementation failures (Markus 2004; Rivard and Lapointe 2012). Therefore, understanding the stress induced by an ES implementation and how this stress influences user resistance is an important research gap in both streams of research.

Therefore, the goal of this research is to better understand employees' change-related stress when an ES is implemented and how that stress is related to employees' resistance to the ES implementation. Based on technostress and user resistance literature, we develop a research model that enables us to explain the different change-related stresses during an ES implementation and their influence on user resistance. Consequently, this paper poses the research question:

*How do employees' perceptions of change-related stress during an ES implementation influence user resistance to a new ES implemented in an organization?*

To answer the research question, we build on the transactional model of stress and coping (Lazarus and Folkman 1984) to develop a theoretical model of the influence of change-related stress on user resistance during an ES implementation. In particular, we show that several change characteristics have an influence on change-related stressors, and in turn change-induced exhaustion and user resistance. We conducted an empirical study during an ES implementation to test and support our theoretical arguments empirically comprised of three surveys to capture employees' stress and resistance. We observed the implementation of an enterprise content management system at a financial service provider and surveyed a total of 273 employees to provide empirical evidence for our theoretically derived research model.

The remainder of this paper is as follows. In the next section we will present our theoretical background of ES implementations, including user resistance research, and technostress. Afterwards, we will develop and evaluate our research model. Then the results are presented before we discuss the limitations of our study and its implications for theory and practice.

## Theoretical background

In this section we will discuss the research related to our research question, including ES implementation research, technostress research, and the transactional model of stress and coping (Lazarus and Folkman 1984), which serves as our theoretical basis.

### **Enterprise system implementation**

Scholars refer to an enterprise system (ES) implementation as an organizational change “*directed toward diffusing appropriate information technology within a user community*” (Cooper and Zmud 1990, p. 124). IS research provides a rich body of knowledge about ES implementation (Bala and Venkatesh 2013). In general, research has demonstrated how ES implementation positively affects firm performance (Melville et al. 2004; Seddon et al. 2010). In order to better understand how to achieve these benefits, research has focused on the implementation process and user resistance to these implementations.

### **The enterprise system implementation process**

IS research focuses on the implementation process itself (e.g., Cooper and Zmud 1990). The ES implementation process can be generally divided into the *pre-implementation* phase of IS implementation, which is the period before the new IS is available for use in the organization (Cooper and Zmud 1990; Meissonier and Houzé 2010), the *implementation* phase, which is the period when the new IS has been implemented and employees are starting to use it up to the point when routine use has been achieved (Bruque et al. 2008), and the *post-implementation* phase, which is the period when the new IS is becoming or has become part of the organization and employees use it in a routine way (Li et al. 2013; Rodon et al. 2011). From an employee’s point of view the implementation phase is the first phase in which employees are fully involved and use the ES for the first time (Markus and Tanis 2000). This phase may range from three months to a year (Morris and Venkatesh 2010; Wei et al. 2005). The effects of ES implementation on both the individual and the organization are often negative during the implementation phase and these early negative effects frequently result in an ES implementation failure (Alvarez 2008; Hakkinen and Hilmola 2008).

Therefore, it is important to understand the implementation phase and how challenges of this phase influence employees’ perceptions (Morris and Venkatesh 2010; Sykes et al. 2014). However, the majority of research in this area has not focused on the implementation phase itself. Instead, they focus on pre- or post-implementation issues (Sykes et al. 2014). Therefore, we will focus on this phase to understand how the stress related to the changes introduced in this phase by a new ES influences user resistance.

### **User resistance to enterprise system implementations**

User resistance research investigates employees’ reactions to IS implementation to explain why and how employees resist IS implementation and how organizations can address and influence employees’ reactions (Lapointe and Rivard 2005; Rivard and Lapointe 2012). In general, user resistance is a subjective process based psychologically at the individual level (Jermier et al. 1994). This subjective process starts with an interaction between initial individual conditions and an object related to the newly implemented ES. An individual develops perceptions of these objects, which determines the extent of user resistance behavior (Lapointe and Rivard 2005). User resistance can be overt (open and expressive) or covert (concealed or hidden) resistance, and take an active (originating action) or a passive (inert or not acting) form (Kim and Kankanhalli 2009).

User resistance research has focused on several objects of resistance including the ES itself, the change from the status quo, work routines, the legacy system and the loss of power (see for a review Laumer et al. 2016; Lee and Joshi 2016). Regarding the change from the status quo, which is the focus of our study, empirical research studies have identified resistance to change (Bhattacharjee and Hikmet 2007; Laumer et al. 2015), switching benefits (Kim and Kankanhalli 2009), and switching costs (Kim and Kankanhalli 2009) as direct antecedents of user resistance.

Thus, employees’ stress in the implementation phase and consequently employees’ perception of stress related to the change during to an ES implementation as an object of resistance has not been focused on so

far. However, it has been shown that changes in an employees work environment induce stress (Sykes 2015), so the next section focuses on technostress research before we develop our research model based on user resistance and technostress research.

### ***Transactional model of stress and technostress research***

In general, stress is an individual response when expecting that one is unable to respond adequately to demands in a given context. This assumes an expectation that an inadequate response will have substantial negative consequences (McGrath 1976). Hence, stress is a psychological response to an imbalance between an individual's abilities and the demands placed by the environment, which thereby threatening the individual's well-being (Cooper et al. 2001).

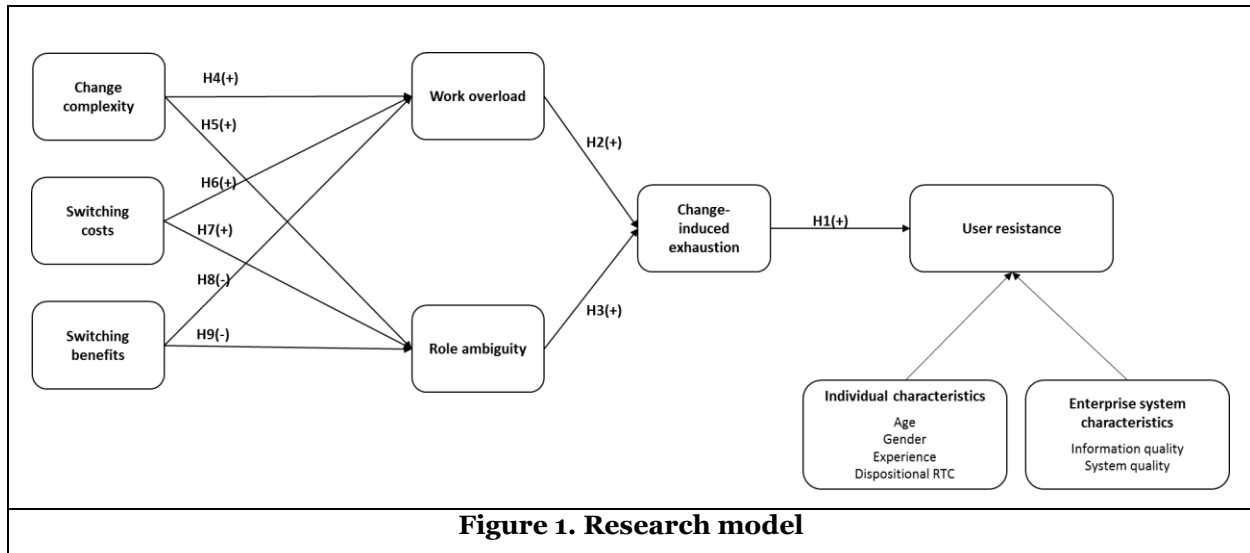
To explain the influence of change-related stress during an ES implementation, we utilize the transactional model of stress and coping, which posits that stress is the combination of a stimulating condition and an individual's response to it (Lazarus and Folkman 1984). The stimulating conditions are stressors, which are "*events or properties of events (stimuli) encountered by individuals*" (Ayyagari et al. 2011, p. 834). The concept of stressors is based on the assumption that there is an equilibrium relationship between an individual and the environment (Cooper et al. 2001; Edwards and Cooper 1990) that is dependent on various characteristics of the environment (Ayyagari et al. 2011). When an individual perceives that the relationship is out of equilibrium because the demands placed by the environment exceed the individual's capabilities, individuals perceive stressors (Ayyagari et al. 2011), which will lead to strain (Tarafdar et al. 2010). According to this model, therefore, the term stress refers to this transactional process, which can lead to further outcomes (Ayyagari et al. 2011) such as employee turnover (Ragu-Nathan et al. 2008).

Based on the transactional model of stress and coping (Lazarus and Folkman 1984), technostress research has investigated the stress experienced by individuals using information and communication technology (Ragu-Nathan et al. 2008). In previous research, technostress has been mainly investigated when employees are using IT in the workplace (Maier et al. 2015c) and has focused primarily on technology characteristics which lead to the perception of techno-stressors (Ayyagari et al. 2011). Techno-stressors include techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty (Ragu-Nathan et al. 2008), work-home conflict, invasion of privacy, work overload, role ambiguity, and job insecurity (Ayyagari et al. 2011). The perception of these stressors decreases employees' productivity (Tarafdar et al. 2007; 2010; 2011; 2015), job and end-user satisfaction (Ragu-Nathan et al. 2008; Tarafdar et al. 2010; 2011), and increases employees' exhaustion (Ayyagari et al. 2011; Srivastava et al. 2015). In a private, voluntary IT use context, similar techno-stressors have been revealed leading to reduced satisfaction and discontinuous usage (Maier et al. 2012; 2015b; Maier et al. 2015a). In this context, it has also been shown that employees are stressed when they stop using IT and that they are also stressed by switching to different alternatives. Transition costs, sunk costs and replacement overload have been revealed as antecedents of switching exhaustion (Maier et al. 2015c).

In summary, prior technostress research has focused mainly on the use of technologies in organizations, whereas a focus on stress when a new ES is implemented that changes the work environment has not taken so far. The following section develops a research model that enables us to analyze employees' change-related stress when a new ES is implemented and how this stress impacts user resistance to the ES implementation.

### **Research model**

The research model is designed to explain the influence of change-related stress on user resistance during an ES implementation. Based on the model of resistance to IS implementations (Lapointe and Rivard 2005), we argue that user resistance will occur when the change-related to an ES implementation is perceived as a threat because employees are exhausted from it (change-induced exhaustion). Based on this transactional model of stress and coping (Lazarus and Folkman 1984), we also argue that this change-induced exhaustion is an employee's psychological reaction to the perception that the equilibrium between the demands related to the change and his or her abilities is thrown off balance (change stressors). Hence, an employee's change-induced exhaustion is influenced by change-related stressors, which are determined by the characteristics of the change (change characteristics). Figure 1 illustrates our research model.



### ***The influence of change-induced exhaustion on user resistance***

User resistance is an employee's opposition to change induced by a new ES (Kim and Kankanhalli 2009). This behavioral response is the outcome of a subjective process that starts with an interaction between initial individual conditions and an object related to new ES. When this interaction is perceived as a threat, user resistance behavior will occur (Lapointe and Rivard 2005).

When employees are exhausted from the change related to an ES implementation, they perceive the change as a threat and try to remove themselves from this situation. Consequently, they will resist the ES implementation to minimize these negative consequences (Bala and Venkatesh 2016; Beaudry and Pinsonneault 2005; Kim and Kankanhalli 2009). Thus, the exhaustion experienced due to the changes during an ES implementation can lead to user resistance (Lapointe and Rivard 2005). Consequently, we assume based on the model of resistance to IS implementations (Lapointe and Rivard 2005) that employees resist an ES implementation when they perceive the change related to an ES implementation as a threat as they are exhausted by it:

*H1: The more employees are exhausted by the change induced by an ES implementation, the more they will respond with user resistance.*

### ***The influence of change-related stressors on change-induced exhaustion***

The change-induced exhaustion is the outcome of the transactional process of stress and coping (Lazarus and Folkman 1984). It is triggered by change-related stressors, which are events related to the change during the ES implementation encountered by individuals. The theoretical relationship between stressors and strain is well established in the stress literature (Tarafdar et al. 2010) and research has shown that techno-stressors cause techno-exhaustion (Ayyagari et al. 2011). We therefore argue that the more employees perceive change-related stressors, the more they are exhausted by the change during an ES implementation.

To identify stressors that reflect the influence of the change during an ES implementation, we rely on previous technostress research. As outlined above, technostress studies have identified several stressors related to the general use of IT in organizations. The stressors included in the present study are chosen based on the appropriateness of those stressors focused on by prior research that reflect the context of an ES implementation and the relation of the stressor to the change during an ES implementation. Table 1 provides an overview of stressors revealed by previous technostress research and explains why only two of the six stressors, work overload and role ambiguity, were selected in the present study.

<b>Table 1. Choice of change-related stressors</b>		
<b>Stressor</b>	<b>Decision and rationale for inclusion or exclusion</b>	
<b>Work overload</b> <i>“Perception that assigned work exceeds an individual’s capability or skill level”</i> <i>(Ayyagari et al. 2011, p. 834)</i>	Incl.	When an ES implementation changes the work environment, employees need to put effort into adapting to these changes, which might exceed the resources available. If employees perceive that the additional work assigned to them because of the change exceeds their capability, they will be exhausted. Consequently, this stressor is included in this study.
<b>Role ambiguity</b> <i>“Unpredictability of the consequences of one’s role performance”</i> <i>(Ayyagari et al. 2011, p. 834)</i>	Incl.	When an ES is implemented, this automatically creates change-related work for employees which needs to be done in parallel to their regular work and can exceed their resources. Hence, an employee has to decide whether to focus on the change-related issues or on their regular work. If employees perceive that the uncertainty related to this ambiguity exceeds their capability, they will be exhausted. Consequently, this stressor is included in this study.
<b>Work–home conflict</b> <i>“An individual’s perceived conflict between the demands of work and family”</i> <i>(Ayyagari et al. 2011, p. 834)</i>	Excl.	A work-home conflict is typically related to communication technologies that enable employees to work from home. Thus, it is not typical for an ES implementation to induce conflicts between the demands of work and family. Therefore, this stressor is not included in this study as (1) it focuses on communication technologies in general and not on ES in particular and (2) it focuses on the imbalance between work and family as an object of resistance and not on the change related to an ES implementation.
<b>Invasion of privacy</b> <i>“Perception that individual’s privacy has been compromised”</i> <i>(Ayyagari et al. 2011, p. 834)</i>	Excl.	An ES is related to work and not to private information. Consequently, as personal information is not the focus of ES, employees are unlikely to feel that their privacy will be compromised by an ES implementation. Therefore, this stressor is not included in this study as (1) it focuses on an individual’s privacy as an object of resistance and (2) it focuses on technology use in general.
<b>Job insecurity</b> <i>“An individual’s perception of threat of job loss”</i> <i>(Ayyagari et al. 2011, p. 834)</i>	Excl.	An ES implementation changes the job but does not make the job obsolete. There might be a general perception that technologies will take over jobs performed by individuals, but in the particular situation of an ES implementation, the change induced will change the job but does not trigger an organization to fire employees. Hence, this stressor is not included in this study as (1) the consequences reflected by this stressor are related to the general long term effects of technology usage, (2) it focuses on technology use in general and (3) it focuses on the technology as an object of resistance.
<b>Techno-overload</b> <i>“Too much”</i> <b>Techno-invasion</b> <i>“Always connected”</i> <b>Techno-complexity</b> <i>“Difficult”</i>	Excl.	The focus of this study is on stressors related to the change when an ES is implemented. The five techno-stressors are related to the use of technologies in general and the general perception that technologies in the long run forces people to work more and faster, to be always available online for work purposes, and to use complex technologies, as well as the perception that technologies will take over jobs currently done by people and that technologies constantly provide new features. Hence, they are not included in this study as (1) they focus on the technology

<p><b>Techno-insecurity</b>  <i>“Uncomfortable”</i></p> <p><b>Techno-uncertainty</b>  <i>“Too often and unfamiliar”</i>  <i>(Ragu-Nathan et al. 2008; Tarafdar et al. 2011, p. 113)</i></p>		<p>as an object of resistance and not on the change related to an ES implementation, (2) they focus on technologies in general and not on a particular one, and (3) the consequences of IT use reflected by these stressors tend to be long-term.</p>
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The first stressor, **work overload**, is an individual's perception that the work required to adapt to the change during an ES implementation exceeds an individual's capability or skill level. When individuals perceive that dealing with the change during an ES implementation requires additional effort and employees do not have the required resources, they perceive a change-induced work overload. As the general demands for additional work lead to the perception of exhaustion (Ayyagari et al. 2011), we argue based on the general stressor strain relationship (Tarafdar et al. 2010), that additional work related to the change during an ES implementation results in employees' exhaustion, such that we hypothesize

*H2: The more employees perceive work overload due to the change related to an ES implementation, the more they will be exhausted from this change.*

The second stressor, **role ambiguity**, is an individual's perception of the unpredictability of the consequences of one's role performance and lack of information needed to perform the role when an ES is implemented. When individuals perceive that there is conflict between the demands of the ES implementation and the demands of the regular work based on the limited resources available and they need to decide whether to focus on the change related issues or on their regular work. If employees perceive that the uncertainty related to this ambiguity exceeds their resources, they will be exhausted (Ayyagari et al. 2011). Consequently, we assume based on the general stressor strain relationship (Tarafdar et al. 2010)

*H3: The more employees perceive role ambiguity due to the change related to an ES implementation, the more they will be exhausted from this change.*

### ***The influence of change characteristics on change-related stressors***

Employees perceive stressors when the balance between the environment and an individual is thrown off (Cooper et al. 2001; Edwards and Cooper 1990). On the one hand, this can occur when employees perceive a misfit between environmental demands, which is an employee's subjective evaluation of the requirements placed on the person, and his or her abilities, including individual's skills, knowledge, time and energy. On the other hand the misfit can be perceived between individual's values, which are conscious desires held by the employee, including preferences and interest, and the supplies provided by the environment to fulfill these values (Ayyagari et al. 2011; Edwards 1996). These misfits are reflected by the perception of environmental characteristics and result in the perception of stress.

Hence, when employees experience the characteristics of the change as threatening and are not able to deal with these challenges appropriately, they perceive that the equilibrium relationship between themselves and their environment is out of balance (Cooper et al. 2001; Edwards 1996; Edwards and Cooper 1990). Therefore, we assume that the perception of change characteristics during an ES implementation generally has an influence on the perception of change-related stressors.

To identify change characteristics relevant in the context of an ES implementation, we rely on previous user resistance and technostress research. As outlined above, several user resistance studies have identified characteristics of the change from the status quo as an object of resistance. From a technostress point of view, the change process has not been considered in an organizational context. However, in the context of voluntary usage of technology in a private environment, it has been revealed that switching from one technology to another is stressful (Maier et al. 2015c). In this context transition costs, sunk cost and replacement overload are examples of change characteristics (Maier et al. 2015c).

<b>Table 2. Choice of change characteristics</b>	
<b>Change characteristics</b>	<b>Decision and rationale for inclusion or exclusion</b>
<p><b>Change complexity</b></p> <p><i>reflects an employee's perception that the change related to an ES implementation is difficult to handle.</i></p> <p>(based on Bala and Venkatesh 2013)</p>	<p>Incl. If employees perceive that it is difficult to adapt to the changes related to an ES implementation, this might influence the equilibrium relationship between an individual and the change because additional efforts are required to master difficulties and pose an additional challenge. Hence, an individual's perception of the complexity of adapting to the change related to an ES implementation is included as a change characteristic in this study.</p>
<p><b>Switching costs</b></p> <p><i>"are the perceived disutility a user would incur in switching from the status quo to the new ES."</i></p> <p>(Kim and Kankanhalli 2009, p. 572)</p>	<p>Incl. When an employee perceives that additional effort is required to deal with the change related to an ES implementation, this additional effort can be perceived as negative and might influence the equilibrium relationship between an individual and the change. Therefore, switching costs are included as a change characteristic in this study (Kim and Kankanhalli 2009; Maier et al. 2015c; Polites and Karahanna 2012)</p>
<p><b>Switching benefits</b></p> <p><i>"are the perceived utility a user would enjoy in switching from the status quo to the new ES."</i></p> <p>(Kim and Kankanhalli 2009, p. 573)</p>	<p>Incl. Aside from having potential negative consequences, a change might also provide some value for employees. Hence, if employees perceive that a change during an ES implementation provides benefits they will be less threatened. Hence, the benefit of switching is included as a change characteristic in this study.</p>
<p><b>Resistance to change</b></p> <p><i>is a general perception of change from the status quo which reflects that employees do not want an ES to change their work environment.</i></p> <p>(based on Bhattacharjee and Hikmet 2007; Laumer et al. 2015)</p>	<p>Excl. Resistance to change refers to an employee's overall resistance and inertia related to the status quo. Thus. it is not a characteristic of the change, but rather an overall evaluation of an employee's resistance to change the status quo, which is influenced by several characteristics (Bhattacharjee and Hikmet 2007; Laumer et al. 2015). Hence, it is not included in this study as (1) it is not a specific characteristic of a change that influences the equilibrium relationship between an individual and the environment (2) it rather reflects an employee's openness for the changes during an ES implementation, and (3) it is rather related to the status-quo as it reflects the status quo bias in ES implementations (Lee and Joshi 2016).</p>
<p><b>Replacement overload</b></p> <p><i>"reflects a negative perception when an individual has to use too many different (non-) technological alternatives to replace the functionalities of a certain technology."</i></p> <p>(Maier et al. 2015c, p. 282)</p>	<p>Excl. When an ES is implemented, one alternative is provided for one or more legacy systems and employees do not have to use too many alternatives. Hence, this characteristic of a change is not included in this study.</p>



The change characteristics appropriate for this study are those that will influence the two identified change-related stressors, work overload and role ambiguity, to cause the relationship between an individual and the change to get out of equilibrium. As shown by Table 2, change complexity, switching costs, as well as switching benefits are relevant in the context of an ES implementation.

The first change characteristic included in the study is **change complexity**. When an ES is implemented, employees have to adapt to the changes related to the implementation and might perceive this adaptation as complex. For example, when employees do not know enough about the changes or if they find it too complex to adopt, to the changes this might exceeds employees' abilities. Hence, they will perceive that the equilibrium relationship between the environmental demands and individual's abilities is out of balance (Cooper et al. 2001; Edwards and Cooper 1990) as additional work is required to deal with these environmental demands. Consequently, we assume

*H4: The higher the complexity of the change during an ES implementation, the higher the work overload perceived by employees related to an ES implementation.*

Moreover, when an ES implementation requires a complex change, employees not only have to deal with the demands of their regular work, but also with the demands of the change during an ES implementation (Bala and Venkatesh 2016). For example, an employee has to focus on both learning how to process new work routines and dealing with customer requests and may perceive that his or her resources are insufficient for both. Hence, an employee has to decide whether to focus on the change related issues or on his or her regular work, which is reflected by the stressor role ambiguity, when employees are unsure how to proceed. Consequently, the complexity of the change throws the equilibrium relationship between the general work and change demands and individuals' abilities out of balance, such that we assume

*H5: The higher the complexity of the change during an ES implementation, the higher the role ambiguity of employees related to an ES implementation.*

The second change characteristic included in his study is **switching costs**, which refer to "the perceived disutility a user would incur in switching from the status quo to the new IS" (Kim and Kankanhalli 2009, p. 572). Switching costs include the time and effort required to adapt to a new situation (Kim and Kankanhalli 2009; Polites and Karahanna 2012). For example, employees might perceive that extra time and efforts are required to adapt to the changes during an ES implementation (Polites and Karahanna 2012) or to deal with the uncertainty of the change (Kim and Kankanhalli 2009). Hence, when employees perceive that they need to invest additional time and effort to adapt to the change that exceeds their resources, they will perceive that the equilibrium relationship between the demands of the change during an ES implementation and their abilities is out of balance. Therefore, we assume

*H6: The higher the switching costs related to the ES implementation, the higher the work overload perceived by employees related to an ES implementation.*

In addition, due to the change during an ES implementation employees have to invest additional effort over and beyond the effort required to meet the demands of their regular work (Lee and Joshi 2016). When employees are unsure whether they have the abilities required to meet the demands related to the change and to their regular work, they perceive role ambiguity. Consequently, we assume

*H7: The higher the switching costs in terms of (a) transition, (b) uncertainty and (c) sunk costs, the higher the role ambiguity of employees related to an ES implementation.*

The third change characteristic included in this study is **switching benefits**. If employees find the change related to an ES implementation useful, they will be able to work more efficiently and effectively (Leonardi 2013), which reduces the perception of the general workload (Ayyagari et al. 2011). Moreover, the switch to a new ES might provide benefits in form of performance enhancements for individuals. It might also remove the challenges associated with the status quo and release tied-up resources. Hence, when employees perceive that additional resources are available and benefits will be realized when using the new ES (Leonardi 2013), they perceive that the demands related to the change do not exceed their abilities. Therefore, we assume

*H8: The higher the switching benefits related to the ES implementation, the lower the work overload perceived by employees related to an ES implementation.*

One benefit of switching may be increased abilities for employees (Ayyagari et al. 2015) to help them better deal with the demands of their regular work (Sykes 2015). This can decrease their uncertainty over whether they have sufficient abilities to deal with both demands (Leonardi 2013), such that we assume

*H9: The higher the switching benefits related to the ES implementation, the lower the role ambiguity of employees related to an ES implementation.*

### ***The influence of control variables on user resistance***

In addition to measuring the effects of the influence of employee's change related stress on user resistance to an ES implementation, we also controlled for the effect of individual characteristics on user resistance: age, gender, work experience, and dispositional resistance (Laumer et al. 2015). Furthermore, we controlled for the influence on enterprise system characteristics on user resistance itself. Therefore, we include information and system quality (DeLone and McLean 2003) in our research model as control variables assuming that the better these characteristics are perceived the lower is user resistance behavior (Bhattacharjee and Hikmet 2007).

## **Research methodology and results**

In order to test the validity of the proposed research model, an empirical study was conducted at a financial service provider that was implementing an enterprise content management (ECM) system as a new ES. The following section provides details about the research method used to investigate the ECM system implementation and the results of the validation of our research model based on this study.

### ***Research context and survey instrument***

Our research observes and evaluates phenomena related to the implementation of an ECM system. ECM users use an ECM system to access information required to perform work that directly or indirectly provides a product or service to a customer (Alalwan 2012; Grahlmann et al. 2011; Laumer et al. 2013). ECM systems provide an information backbone for the entire organization, but the areas of application and how the systems are used and handled vary across organizations (Tyrväinen et al. 2006).

The ECM system investigated by our study is implemented by a financial service provider with approximately 900 employees and total assets of EUR 3.2 billion. We accompanied the organization during the implementation process. The new ECM system was implemented using a guided evolution approach (Gibson 2003). Hence, employees were able to participate during the implementation process as they were interviewed about the ECM system, were involved as key users to test prototypes or change agents to give advices to other users during the implementation process. On the one side, the organization wanted to encourage and motivate employees, but on the other side also to follow a fixed and rigid overall plan. Before the go-live of system trainings were conducted such that all employees were able to see and test the new system. Additional information was provided in a blog that illustrates the basic features and tips and tricks how to use the new system. After the go-live of the system change agents supported users when being challenged to use the new system. The go-live of the system was conducted as a big bang approach. From one day to another the old system was shut down and the new system was available to use. The go-live day was announced to employees several weeks before.

In order to validate the proposed research model, we collected data within the observed organization by conducting three survey before and during the implementation of the ECM system. One survey was conducted before the implementation process started to capture individual characteristics. Change-related variables were measured two weeks after the go-live of the system. Finally, user resistance and ES characteristics were measured three months after the go-live of the system. We invited 813 employees and managers of the organization who use the ECM system by e-mail to take part in these surveys. As an incentive, the organization raffled dinner vouchers among survey participants. All three surveys were conducted within twelve weeks. In total, 273 employees participated in the three surveys with less than 50 per cent missing values for the variables included in our research model (response rate 34 percent). The demographics of the survey participants are illustrated in Table 3. In order to control for non-response bias we compared the demographics of the participants with those of the entire organization and found that the participants are a representative sample of the employees working at the organization.

<b>Table 3. Demographics (N=273)</b>					
<b>Gender</b> (in percentage)		<b>Age (<math>\bar{X}</math> 36.8)</b> (in percentage)		<b>Area</b> (in percentage)	
Female	61.9	17 - 25	25.1	Back office	23.2
Male	38.1	26 - 35	19.6	Management	9.8
		36 - 45	27.9	Sales	67.0
		46 - 55	20.7		
		56 - 65	6.7		

### **Measurement model validation**

To validate the proposed research model, we transferred it into a structural equation model (Chin 1998) and used the partial least squares (PLS) method and SmartPLS 3.2.3 (Ringle et al. 2015). We used the case-wise deletion algorithm to compensate for missing values.

The variables used in our research model are based on prior research, including first-order constructs and one second order construct (dispositional resistance to change). All first-order constructs were measured using reflective indicators, so content validity, indicator validity, construct reliability and discriminant validity had to be assessed to validate the measurement model (Bagozzi 1979). Dispositional resistance to change was modeled as a first-order reflective, second-order reflective construct (based on Oreg 2003). Therefore, it was evaluated by assessing the item loadings, reliability, AVEs, and correlation of constructs for the first-order reflective model. Then it is included as a second-order reflective construct in our research model as suggested by Wright et al. (2012).

### **Common method bias**

In order to address the concern that our data can be biased by using perceived and subjective measures only (Podsakoff et al. 2003) we conducted our study using three different surveys. Hence, already by the design of our study we addressed the concern that only using perceived and subjective measures at one point of time might bias our results. Furthermore, to test ex-post whether our results are affected by common methods bias we used Harman's single factor test (Harman 1976) and the approach suggested by Williams et al. (2003). The results of the Harman's single factor test show that one factor explains 39.1 per cent of the variance. Therefore, we can conclude that our data is not influenced by a common method bias. Moreover, we added an additional factor into the PLS model, which contains each indicator of the origin model. The remaining factors are transformed into single-item constructs, and the ratio of  $R^2$  with the CMB factor is compared with the  $R^2$  without the CMB factor. The CMB factor explains an average  $R^2$  of 0.008 so that a ratio of 1:91 is received. Thus, we can state that no signs of CMB influence are observed (Liang et al. 2007) in consideration that this method is subjected to several flaws (Chin et al. 2012). Hence, our ex-ante survey design and ex-post evaluation reveals that we cannot observe any sign that our data might be affected by common method bias.

### **Content validity**

A survey instrument was developed based on the proposed research model and on prior research (see Appendix - Table 4 for measurements items used and their sources). The measurement items were adapted to the ECM implementation context of the organization. For example, change exhaustion, work overload and role ambiguity were measured based on Ayyagari et al. (2011), whereas the items were modified by replacing information and communication technology in general as the object of exhaustion, the reason for work overload or the reason for role ambiguity by the change related to the ECM system implementation. In making these adjustments, the survey instrument for the well-studied constructs used in our study was discussed intensively with employees of the organization as well as with the steering committee and the IT

managers responsible for the ECM system implemented. In total, 20 employees were involved in the pre-test of the survey instrument.

The first survey was conducted before the ECM implementation to capture employee's demographic characteristics. The second survey was conducted during the ECM implementation to capture employee's perception of change characteristics, change-related stressors, and change exhaustion. The third survey was conducted to capture employees perceived of enterprise system characteristics and user resistance behavior.

### **Indicator reliability**

The rate of variance of an indicator that comes from the latent variables is indicated by indicator reliability. In order to explain more than 50 percent of the variance of a latent variable by the indicators, each value must be above 0.707 (Carmines and Zeller 1979), which was the case in our study except one item of the dispositional resistance to change scale, which is still above 0.6 and can remain in the measurement model. Moreover, each loading has a significance level of at least 0.001. We tested this using a bootstrap method with 500 samples. Concerning the second order constructs all first-order reflective and the second-order reflective items have loadings above the recommended threshold of 0.707. Hence, the reliability condition is fulfilled for all indicators (see Appendix - Table 4).

### **Construct reliability**

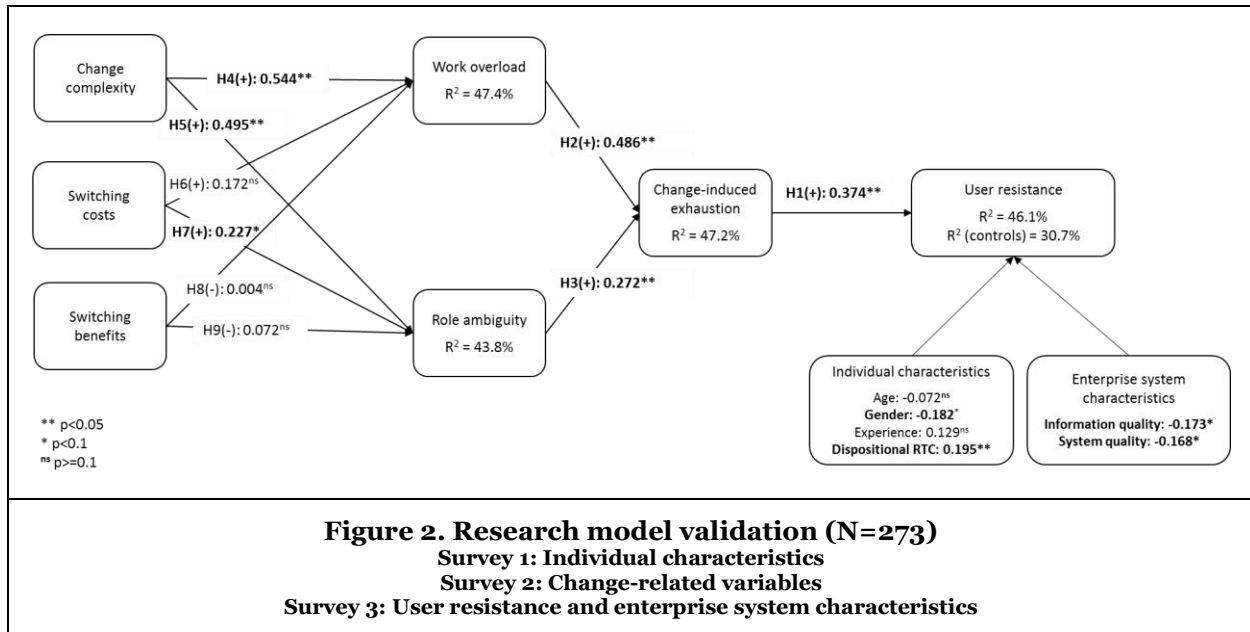
Composite reliability (CR) and average variance extracted (AVE) are used to specify quality at the construct level (Fornell and Larcker 1981), whereby CR has to be at least 0.7 and AVE has to be higher than 0.5. Both criteria are fulfilled in our study (see Appendix - Table 4).

### **Discriminant validity**

Discriminant validity describes the extent to which measurement items differ from one another (Campbell and Fiske 1959). To test for this, the square root of AVE is included on the diagonal of latent variable correlation. Since these values are greater than the corresponding construct correlations (Fornell and Larcker 1981; Hulland 1999), we conclude that the measurement model is valid (see Appendix - Table 4). We also investigated the heterotrait-monotrait (HTMT) ratio of correlations (Henseler et al. 2015). Based on the absolute  $HTMT_{0.85}$  criterion, we conclude that discriminant validity is not an issue in our research as the highest value is 0.831.

### **Structural model validation**

In order to evaluate the structural model, coefficient of determination ( $R^2$ ) and significance levels of each path coefficient are used (Chin 1998). We are able to explain an  $R^2$  of 46.1 per cent for user resistance (see Figure 2). The results illustrate a significant effect of change exhaustion on user resistance, which confirms our hypothesis regarding the influence of employees' stress on user resistance during an ES implementation. Moreover, the results illustrate that work overload and role ambiguities due to the changes related to an ES implementation have a significant influence on change exhaustion. Regarding the characteristics, we can confirm the assumed effect of change complexity on work overload and role ambiguity and of switching costs on role ambiguity. We cannot support our hypothesis regarding the influence of switching benefits on work overload and role ambiguity. We also observe that enterprise system characteristics, gender and dispositional resistance to change have a significant effect on user resistance. Regarding effect size ( $f^2$ ) we observe that the stress associated with the change related to an ES implementation has a medium effect on user resistance compared to the control variables ( $f^2 = 0.29$ ;  $R^2(\text{controls only}) = 30.7$  per cent).



## Discussion and implications

The objective of this research is to better understand employees' stress related to changes induced by an ES implementation and how this stress is related to their resistance to the ES implementation. It was motivated by two gaps in the literature: (1) user resistance research has not investigated the role of stress during an ES implementation as a driver of user resistance (Laumer et al. 2016); (2) technostress research has only focused on stress when using an ES that has already been implemented and not on employees' stress during an ES implementation (Maier et al. 2015c). To fill these gaps, we developed a research model based on the model of resistance to IS implementations (Lapointe and Rivard 2005) and on the transactional model of stress and coping (Lazarus and Folkman 1984). We validated this model using an empirical study of an ECM system implementation, which showed that when employees are exhausted from the change related to an ES implementation, they will respond with user resistance behavior. Moreover, this exhaustion is triggered by the two change-related stressors work overload and role ambiguity. These are caused by an imbalance between an employee's abilities and the demands required by the change related to the ES implementation. This imbalance is reflected by an employees' perception of change complexity, switching costs and switching benefits. Our study contributes to both research streams, is limited by several factors and reveals some directions for future research.

First of all, our study contributes to user resistance research by revealing that changes related to an ES implementation induce exhaustion among employees and that exhaustion results in user resistance behavior. In particular, we extend user resistance research by focusing on change during an ES implementation as an object of resistance and by theorizing that employee's exhaustion based on this change influences user resistance behavior. Prior user resistance research has provided evidence for the ES itself as an object of resistance, whereas the change induced by an ES implementation has only been considered by a limited number of research studies (see for a review Lee and Joshi 2016). In these studies, the stress triggered by the change was not considered as a negative perception that could lead to user resistance. In our study, employee exhaustion related to the change during an ES implementation is revealed as a significant determinant of user resistance. Hence, we contribute to user resistance research by theorizing and providing empirical evidence for the theoretical link between employees' change-induced exhaustion during an ES implementation and their resistance to the implementation.

In this context, scholars have stressed the importance of understanding the role of the implementation phase on shaping employee perceptions and job outcomes (Sykes et al. 2014). It has been suggested that research should explore the influence of stress on job satisfaction or other outcome variables in an organization, particularly if it is induced by technological change in the workplace (Morris and Venkatesh

2010). Therefore, our evidence that change exhaustion influences user resistance is a response to these research calls and indicates that the change associated with ES implementation specifically during the implementation phase is an object of resistance and especially that the exhaustion perceived in relation to this object triggers user resistance.

Second, our study also contributes to technostress research (Ayyagari et al. 2011; Ragu-Nathan et al. 2008). As discussed in Section 2, technostress research has focuses mainly on the stress stimulated by using IT in organizations and has not theorized on the stress related to change during an ES implementation. Hence, we contribute to technostress research by revealing that employees are also stressed by change during an ES implementation. Hence, we find that not only IT usage is an object causing stress, but also change during an ES implementation. In particular, we show that change characteristics influence employee's work overload and role ambiguity as change-related stressors during an ES implementation and that these change-related stressors trigger employees' change-induced exhaustion. Consequently, we also contribute by theorizing and providing empirical evidence for work overload and role ambiguity as change-related stressors during an ES implementation. Furthermore, as we theorized and provided evidence for change complexity and switching costs as change characteristics influencing change-related stressors, we contribute by identifying two characteristics of change that influence change-related stressors. Moreover, we reveal that switching benefits do not mitigate the perception of change-related stressors and in our study only perception of negative change characteristics influence change-related stressors. Regarding the general conceptualizing of positive and negative perceptions (Cenfetelli 2004) this result can be explained by the fact that employees pay more attention to the negative side of the change during an ES implementation than the positive side (Ito et al. 1998), which may contribute to our study's evidence that the influence of switching benefits as non-significant .

Beside these theoretical implications, our results have also some implications for practice. An organizations' inability to understand and manage employees' perceptions of changes during ES implementations has been recognized as a key reason for implementation failures (Rivard and Lapointe 2012). Our results imply that employees' resistance is triggered not only by the factors already focuses on by interventions based on the body of user resistance knowledge, but also by the stress perceived related to change during an ES implementation. Hence, in order to reduce this change-related stress, an additional focus on the complexity of the change and on switching costs is required to reduce work overload and role ambiguity. In order to reduce users' perceptions of change complexity, our results illustrate that not only the technology is perceived as complex, but also the efforts require to adapt to the changes related to the ES implementation. Hence, additional resources such as specific change-focused trainings should be provided that enables employees to adapt to the changes with less effort. Moreover, in order to reduce switching costs one might provide resources to help employees easily learn to adapt to the changes required, to reduce the uncertainty of the change, and to transfer rewards from resources they already invested in the status quo. In this context, advice networks, trainings, online support, help desk support, and change management support can help user adapt to change related to an ES implementation (Sykes et al. 2014; Sykes 2015). In summary, in addition to focusing on interventions related to the ES itself, organizations should also provide interventions focusing on the change related to the ES implementation to reduce employees' perception of stress.

As with all empirical studies, our results are also limited by several factors. First of all, our study was conducted in one organization within one cultural setting and with a focus only on an ECM system implementation. The results might be different for organizations of different sizes, in different cultural settings and when implementing different types of ES like enterprise resource planning or customer relationship management system. In this context, future research can focus on the concept of frames (Leonardi 2013) to investigate how different kind of information influence the overall transactional stress model when an ES is implemented. In addition, we only captured the stress-related variables using subjective measurements. In addition, we did not test any variables related to different object of resistance and whether these objects might also trigger employee's perception of stress. Future research studies extending our results might focus on employees' stress related to different objects of resistance and compare the strength of effect on user resistance. Furthermore, we only rely on change-related stressors and characteristics already identified in prior research. Although, we discussed why we consider this selection of change-related stressors and characteristics appropriate for our study, there might be additional stressors and characteristics not focused on by our study or prior research. Based on our results that changes related to an ES implementation trigger employees' change-related exhaustion, future research

might take an exploratory approach to reveal additional change-related stressors and characteristics we were not able to identify taking an explanatory approach.

Despite these limitations, our study extends prior user resistance and technostress research by theorizing and revealing the influence of employees' change-related stress on user resistance when implementing an ES.

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Appendix - Table 4. Measurement model validation

Variable	Item	Loading	AVE	CR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Reference		
1	User resistance	I will not comply with the change to the new way of working with the ECM system.	0.796	0.73	0.91	0.85																Kim and Kankanhalli 2009	
		I will not cooperate with the change to the new way of working with the ECM system.	0.897																				
		I oppose the change to the new way of working with the ECM system.	0.849																				
		I do not agree with the change to the new way of working with the ECM system.	0.862																				
2	Change-induced exhaustion	I feel drained from activities that require me to adapt to the changes related to the ECM system implementation.	0.732	0.76	0.93	0.46	0.87															based on Ayyagari et al. 2011	
		I feel tired from activities related to the changes induced by the ECM system implementation.	0.932																				
		Adapting to the changes related to the ECM system implementation is a strain for me.	0.903																				
		Adapting to the changes related to the ECM system implementation stresses me out.	0.900																				
3	Work overload	The change related to the ECM system implementation creates many more requests, problems, or complaints in my job than I would otherwise experience.	0.910	0.73	0.84	0.31	0.64	0.85														based on Ayyagari et al. 2011	
		I feel busy or rushed due to the change related to the ECM system implementation.	0.793																				
4	Role ambiguity	I am unsure whether I have to deal with adapting to the changes related to the ECM system implementation or with my work activities.	0.911	0.81	0.94	0.43	0.56	0.60	0.90													Ayyagari et al. 2011	
		I am unsure what to prioritize: dealing with the changes related to the ECM system implementation or my work activities.	0.924																				
		I can NOT allocate time properly for my work activities because my time spent on adapting to the changes related to the ECM system implementation	0.897																				
		Time spent focusing on changes related to the ECM system implementation takes time away from fulfilling my work responsibilities.	0.863																				
5	Change complexity	I do not know enough about the changes related to the ECM system implementation to handle my job satisfactorily.	0.930	0.87	0.93	0.47	0.66	0.67	0.65	0.93												based on Bala and Venkatesh 2013	
		I find it too complex for me to understand and adapt to the changes related to the ECM system implementation.	0.936																				
6	Switching costs	Learning how to adapt to the changes related to the ECM system implementation takes much time.	0.917	0.76	0.91	0.38	0.61	0.60	0.61	0.80	0.87											Polites and Karahanna 2012	
		Becoming skillful at adapting to the changes related to the ECM system implementation is not easy for me.	0.879																				
		There are uncertainties with the changes related to the ECM system implementation.	0.823																				
7	Switching benefits	Changing to the new way of working with the ECM system would enhance my effectiveness on the job than working in the current way.	0.976	0.95	0.98	-0.29	-0.33	-0.30	-0.25	-0.45	-0.36	0.98										Kim and Kankanhalli 2009	
		Changing to the new way of working with the ECM system would enable me to accomplish relevant tasks more quickly than working in the current way.	0.977																				
8	System quality	Overall, the new ECM system is easy to use.	0.969	0.91	0.97	-0.41	-0.27	-0.24	-0.18	-0.34	-0.26	0.49	0.96									Cenfetelli and Schwarz 2011	
		I think that the usability of the new ECM system is of high quality.	0.942																				
		I would give the interaction with the new ECM system a high rating.	0.955																				
9	Information quality	I think the quality of the information provided by the ECM system is very good.	0.776	0.77	0.91	-0.37	-0.17	-0.10	0.01	-0.16	-0.18	0.31	0.55	0.88								Cenfetelli and Schwarz 2011	
		The ECM system provides me with high quality information.	0.933																				
		Overall, I would give the quality of the information provided by the ECM system a high rating.	0.918																				
10	Age	How old are you?	Single item			0.04	0.12	0.26	0.09	0.18	0.15	0.02	-0.16	0.12	1.00								
11	Gender	Please indicate whether you are female or male?	Single item			-0.25	0.01	0.19	-0.08	0.01	0.05	0.17	0.11	0.02	0.30	1.00							
12	Experience	How many years are you working for this organization?	Single item			0.19	0.02	0.01	-0.07	0.06	0.08	0.00	-0.15	-0.03	0.31	-0.22	1.00						
13	Routine seeking	I generally consider changes to be a negative thing.	0.905	0.74	0.85	0.31	0.17	0.25	0.23	0.21	0.20	-0.06	0.03	0.07	0.28	0.15	0.10	0.86					
		I like to do the same old things rather than try new and different ones.	0.807																				
14	Emotional reaction	If I were to be informed that there's going to be a significant change regarding the way things are done in my organization I would probably feel stressed.	0.831	0.71	0.88	0.35	0.24	0.23	0.26	0.25	0.24	-0.08	-0.18	-0.25	-0.04	-0.01	0.00	0.47	0.84				
		When I am informed of a change of plans, I tense up a bit.	0.916																				
		When things don't go according to plans, it stresses me out.	0.772																				
15	Short-term focus	When someone pressures me to change something, I tend to resist it even if I think the change may ultimately benefit me.	0.726	0.65	0.88	0.24	0.16	0.22	0.17	0.14	0.02	0.01	-0.11	-0.02	0.00	0.01	-0.11	0.55	0.74	0.80			
		I sometimes find myself avoiding changes that I know will be good for me.	0.732																				
		Changing plans seems like a real hassle to me.	0.805																				
		Often, I feel a bit uncomfortable even about changes that may potentially improve my life.	0.939																				
16	Cognitive rigidity	Once I've come to a conclusion, I'm not likely to change my mind.	0.676	0.71	0.82	-0.23	-0.11	-0.07	0.03	-0.09	-0.02	0.02	0.16	0.24	-0.30	-0.08	-0.16	-0.28	-0.30	-0.38	0.84		
		I don't change my mind easily.	0.979																				