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# Why do People Reject Technologies? – Towards a Unified Model of Resistance to IT-Induced Organizational Change

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## ABSTRACT

Based on Oreg (2006) this paper proposes a unified model of technology resistance including resistance as a behavior or behavioral intention (Kim and Kankanhalli 2009), a tri-dimensional construct of resistance to change (Piderit 2000) as an extension to Bhattacharjee and Hikmet (2007) and resistance as a personality trait (Oreg 2003) in order to enable a unified understand why people reject technologies. The evaluation of the model with a study of a new human resources information system shows that the resistance behavior of the researched 106 recruiters could be explained by their affective, behavioral and cognitive resistance to change as well as their individual personality trait resistance. Several implications for future research are discussed.

## Keywords (Required)

Resistance Behavior, Resistance to Change, User Personality, Technology Adoption, Change Management

## INTRODUCTION

Technology adoption research so far has provided a lot of insights on the decision processes of an individual confronted with a new technology. In general research on individual-level IT acceptance and adoption provides rich theories and explanations for the determinants of adoption and use (Venkatesh and Davis 2000; Venkatesh et al. 2003; Venkatesh 2006; Venkatesh et al. 2007; Venkatesh and Bala 2008). With the Technology Acceptance Model (Davis et al. 1989) and its extensions (for a detailed discussion see Venkatesh et al. (2003)) several solid models are available to explain an individual's intention to use an information system (Lee et al. 2003). While the individual acceptance of technology is broadly observed, the phenomenon of user resistance towards the use of information technology is an under researched field as Lapointe and Rivard (2005) identified only four articles opening the black box of technology resistance by individuals. According to them, information systems (IS) non-adoption, rejection or resistance was the research objective of IS researchers in the early beginning of the discipline (Keen 1981; Markus 1983; Hirschheim and Newman 1988) with few articles in the 1990s (Joshi 1991; Marakas and Hornik 1996) and at the beginning of the new century (Cenfetelli 2004; Ferneley and Sobreperez 2006; Bhattacharjee and Hikmet 2007). Nonetheless, there is a lot of knowledge about why people adopt technologies, there is still an astonishing number of people who are not prepared to adopt these solutions and consequently reject them (Venkatesh and Brown 2001; Bhattacharjee and Hikmet 2007).

Especially IT-induced organizational change projects are marked with a high failure rate as individuals do not behave and use technologies as expected (Venkatesh and Bala 2008). Consequently, the management of change and the resistance connected with it is rated as the seventh most important challenge for CIOs in a survey of the Society for Information Management (SIM) (Luftman and Kempaiah 2008). In this context, resistance to change has been presented as one of the most frequently encountered reasons for the non-use of innovations during the last two decades. The failure of many major change initiatives can be attributed to employees' resistance to change (Maurer 1996; Clegg and Walsh 2004). However, there is still no unified understanding about the impact and form of resistance to change during IT-induced organizational change projects (Vithessonthi 2007). Additionally, research on change management processes specifically in relation to individual technology adoption is limited (Venkatesh 1999; Ruta 2005). Only few approaches have been developed within IS research beside the

already mentioned ones that discuss user resistance in more detail. For example, Bhattacharjee and Hikmet (2007) proposed and evaluated a first approach of integrating micro-organizational change and technology resistance research. Kim and Kankanhalli (2009) focused on resistance as dependent variable within their model of user resistance.

In contrast to IS research, change management literature has used the term resistance to change frequently, usually as an explanation why efforts to introduced large-scale changes in technology, production methods, management practices or compensation systems fall short of expectations, or fail altogether (Oreg 2006). Oreg (2006) provides in this context an integrative model of personality, context and resistance which will be adapted and extended for the purpose of this study to integrate micro-level organizational change and technology resistance research.

Within this research paper we will investigate an individual's resistance to IT-induced organizational change and contribute to research by providing a next step towards a Unified Model of Technology Resistance. The model could represent a first step to answer the research question: *Why do people reject IT-induced organizational change?* This should be achieved by integrating different approaches to explain resistance as discussed by prior research within one Unified Model of Technology Resistance. The proposed research model is based on Oreg (2006) and integrates resistance as a behavior or behavioral intention (Kim and Kankanhalli 2009), a tri-dimensional construct of resistance to change (Piderit 2000) as an extension to Bhattacharjee and Hikmet (2007) and resistance as a personality trait (Oreg 2003).

The reminder of this paper is as follows. First, the theoretical background of technology resistance and micro-level organizational change research will be presented. Second, the proposed Unified Model of Technology Resistance will be introduced. In a third step, the model will be evaluated using data collected during the introduction of a new human resources information system within a German automotive supplier. Afterwards the results will be discussed and the implications for theory and future research highlighted.

## THEORETICAL BACKGROUND

The proposed Unified Model of Technology Resistance integrates technology resistance and organizational change research in order to provide insights into the enduring question why people reject technologies and especially IT-induced organizational change. Therefore the theoretical background of technology resistance and micro-organizational change research is presented within this section.

### Technology Resistance

Already in the 1980ties first IS researchers indicated the challenges of information systems non-adoption, rejection or resistance (Keen 1981; Markus 1983; Hirschheim and Newman 1988). Interestingly in the following decades the topic remained a sparsely field of research as argued by Lapointe and Rivard (2005). Within their literature review on technology resistance they found only four relevant articles dealing and opening the black box of technology resistance until 2005. In total 43 articles in 20 IT related journals recognizing and outlining resistance as a critical variable were found over a period of 25 years. *"Better theories of resistance will lead to better implementation strategies and hopefully to better outcomes"* was the outlined objective of researchers trying to explain why people resist technology (Markus 1983). Resistance in general has been defined as *"opposition, challenge or disruption to process or initiatives"* (Jermier et al. 1994; Ferneley and Sobreperez 2006). The term can be classified into two different forms of behavior: a negative resistance as the rationale to oppose or deceive (Marakas and Hornik 1996) and a positive one as the rationale to support or improve (Joshi 1991). The possible occurring resistance behaviors range from lack of cooperation on one side to deliberate sabotage on the other side (Waddell and Sohal 1998; Prasad and Prasad 2000; Lapointe and Rivard 2005). A further categorization was provided by (Ferneley and Sobreperez 2006) who came up with three different resistance behaviors individuals can perform to reject a specific information system: compliance, resistance, and workaround. Based on their qualitative research they built an approach containing compliance, resistance, and workaround which defines workaround as *"a related but separate and distinct phenomena from that of resistance"*. Therefore they distinguished between two resistance phases. The first phase contains the individual cognitive or emotional process that results in a non-adoption or resistance decision. The second phase is the actual resulting behavior of the individual which could be compliance, negative or positive resistance or workaround (Ferneley and Sobreperez 2006). A conceptualization of perceived threats leading to an individual's resistance behavior was provided by Cenfetelli (2004). These threats are especially important during the first emotional or cognitive resistance phase. Lapointe and Rivard (2005) identified five basic components of resistance: behaviors, object, subject, threats, and initial conditions. The authors mentioned that during a system introduction, users will first assess the system according to the interplay of its features and their initial conditions and tasks. Over the last four years the general idea of technology resistance has been extended and predominately used to explain physicians' resistance towards IT used in the healthcare sector (Bhattacharjee

and Hikmet 2007; Ilie et al. 2007; Lapointe and Rivard 2007) or to observe social influence as driver for the non-adoption by individuals (Brown and Venkatesh 2005; Eckhardt et al. 2009).

In the context of physicians' resistance towards IT Bhattacharjee and Hikmet (2007) presented a theoretical model by integrating technology acceptance and resistance to change literature using the dual-factor model of technology usage by Cenfetelli (2004). Bhattacharjee and Hikmet (2007) argued that incorporating resistance to change into theoretical models of technology acceptance will enable researchers to better understand why individuals resist using technologies. They pointed out that *"while acceptance behavior is targeted at a specific IT and driven by user perceptions related to that IT, resistance is a generalized opposition to change engendered by the expected adverse consequences of change. Resistance is therefore not focused so much on a specific IT, but on the change from the status quo caused by IT usage."*(p. 727). Bhattacharjee and Hikmet (2007) based their explanation why people resist technologies not in the technology itself but in the change caused by the introduction of an information system in the workplace. The model introduced by Bhattacharjee and Hikmet (2007) is based on Lewin's (1947) idea of opposing forces and the dual factor model of IT usage (Cenfetelli 2004). The core argument pointed out is that *"IT usage considerations among potential users is based on a simultaneous examination of enabling and inhibiting factors, similar to Lewin's (1947) notation of opposing forces"* (p. 728). In general their model is one of the first ones that theoretically integrated resistance to change and technology acceptance literature within a model of IT usage to explain physicians' reactions to IS in healthcare.

Regarding resistance as a particular behavior Kim and Kankanhalli (2009) defined *"user resistance as opposition of a user to change associated with a new IS implementation"* (p. 568) and established their study on Status Quo Bias Theory (Samuelson and Zeckhauser 1988). Using the idea of status quo bias Kim and Kankanhalli (2009) made use of the Theory of Planned Behavior (Ajzen 1991) to integrate Status Quo Bias Theory in an equity implementation model (Joshi 1991) in order to explain user' resistance prior to a new IS implementation. As dependent behavioral variable Kim and Kankanhalli (2009) developed the construct user resistance based on (Bovey and Hede 2001). This variable distinguishes between *"overt (open and expressive)" and covert (concealed or hidden) resistance and between active (originating action) and passive (inert or not acting) resistance"* (p. 575). The degree of resistance is considered to increase from covert passive (e.g. ignoring or indifference) to overt active (e.g. obstructing) behaviors.

A further approach towards resistance was presented by Laumer et al. (2010) who build upon the idea that resistance as an individual's personality trait has an influence on the technology acceptance and usage intention. Therefore the article adopts a scale developed in psychology research to measure the dispositional resistance of individuals. Their data analysis showed that the personality trait resistance modeled with the four dimensions routine seeking, emotional reaction, short-term focus and cognitive rigidity has significant impacts on an individual's attitude towards using an information system, the perceived subjective norm of important others and mediated through attitude on the intention to use this system

All discussed models of user resistance have in common that they consider resistance to be neither good nor bad and they assume that resistance results from the mutual adjustment of several antecedents. Regarding the research objective of this paper it is interesting to see that resistance was according to this literature review conceptualized as a part of the behaviors and outcomes (Enns et al. 2003), different perceived threats (Jiang et al. 2000), in relation to organizational change literature (Bhattacharjee and Hikmet 2007), as a personality trait (Laumer et al. 2010) or the intention not to comply with the change introduced (Kim and Kankanhalli 2009). However beside all these ideas no approach of technology resistance and organizational change could be found combining all these ideas within one unified model.

### **Micro-level Organizational Change**

Organizational change is linked to a change in recipients' beliefs, interpretive schemata, paradigms, and behaviors (Smollan 2006; Walinga 2008; Elias 2009). The failure of many major change initiatives can be directly related to employees' change resistance (Maurer 1996; Clegg and Walsh 2004). Therefore, it is very important to understand the role of the affective, cognitive and behavioral processes among change recipients (Smollan 2006). The body of IS literature focus on understanding and managing employee reactions to change (Venkatesh 2006; Venkatesh and Bala 2008). In this context Agarwal and Karahanna (2000) stated that IS acceptance and usage are determined by change recipients' beliefs and attitudes.

Usually, individual resistance can be expressed both in an active and a passive way (Dervitsiotis 1998), hindering change efforts, lowering morale and productivity, increasing turnover and as a result, increasing the likelihood of organizational failures (Dervitsiotis 1998; Abrahamson 2000; Stanley et al. 2005). Additionally, Heath et al. (1993) posited that the psychological process of experiencing change leads to negative reactions because humans prefer a known situation over an unknown future. While change involves both gain and loss, individuals tend to experience the pain of loss with greater

intensity than they experience the pleasure of gain. Also people tend to see existing entitlements as greater than they actually are. The sense making processes of change recipients causing them to first evaluate the personal significance of a change initiative and then extend their appraisal to cover the impact of the change initiative on other change recipients and the organization itself (Weick and Roberts 1993; Weick and Quinn 1999). Their secondary appraisal includes the examination of the causes of change, the change agents, and potential coping strategies (Rousseau and Tijoriwala 1999; Jordan et al. 2002; Jordan et al. 2007).

Nord and Jermier (1994), Jermier et al. (1994) and Piderit (2000) argued that the term resistance to change is often used to cover all these aspects and dismiss the multitude of legitimate reasons for objecting to a change rather than trying to understand and resolve real organizational problems. For that reason, within recent change management literature resistance to change is modeled as a tri-dimensional conceptualization of change recipients' affective, cognitive, and behavioral responses to change (Oreg 2006; Smollan 2006). For example George and Jones (2001) suggest in their model that resistance to change comprises both cognitive and affective components that come into play at different stages of the resistance process. Additionally Piderit (2000) states that resistance may often involve a sense of ambivalence whereby employees' feelings, behaviors and thoughts about the change may not necessarily coincide. Accordingly she proposes that resistance should be viewed as a multidimensional attitude towards change, comprising affective, cognitive and behavioral components. Oreg (2006) provided in this context an integrative model of personality, context and resistance which will be adapted and extended for the purpose of this study to integrate micro-level organizational change and technology resistance research within one unified model.

The development of a Unified Model of Resistance to IT-Induced Organizational Change with the purpose of a better understanding why people reject technology and how individuals might react to IT-induced change in organizations based on Oreg (2006) will be presented in the next section.

## RESEARCH MODEL AND DESIGN

### A Unified Model of Technology Resistance

In order to provide a unified understanding of resistance to IT-induced organizational change this section proposes a research model integrating the approaches presented in the previous section. The model is based on Oreg (2006) and consists of three parts: resistance as personality trait (Oreg 2003), resistance to change (Piderit 2000; Oreg 2006; Bhattacharjee and Hikmet 2007) and resistance behavior or behavioral intention (Kim and Kankanhalli 2009).

#### *Resistance as a Personality Trait*

In general, demographic differences of individuals (e.g. age, gender, tenure, educational background), which are independent from the technology in question, influence the evaluation and attitude towards the IT-induced organizational change (Venkatesh and Morris 2000). In this context a number of studies found that employees' openness to experience and especially organizational change can be predicted through traits such as self-esteem (Wanberg and Banas 2000), risk tolerance (Judge et al. 1999), need for achievement (Miller et al. 1994), and locus of control (Chung-Ming and Woodman 1995). Although these traits are related to how people react to change, they have not been conceptualized with the purpose of assessing the dispositional inclination to resist change. In this context, Oreg (2003) established the concept of dispositional resistance to change and designed a measure for the personality component of resistance to change (Oreg 2003). People high on dispositional resistance to change, which is conceptualized as a stable personality trait, are less likely to voluntarily incorporate changes into their life, and when change is imposed upon them they are more likely to experience negative reactions, such as anxiety, anger and fear (Oreg 2003; Oreg 2006). Therefore we expect for personality in general and for dispositional resistance to change in particular that there is a positive correlation with employees' behavioral, affective and cognitive resistance to change (Oreg 2006). Therefore our hypotheses are:

*H1: Resistance as a personality trait has a positive, direct impact on the affective resistance to change of individuals.*

*H2: Resistance as a personality trait has a positive, direct impact on the behavioral resistance to change of individuals.*

*H3: Resistance as a personality trait has a positive, direct impact on the cognitive resistance to change of individuals.*

### *Resistance to Change*

The main part of the model is a tri-dimensional resistance to change construct (Oreg 2006). Resistance to change is defined according to Piderit (2000) as a tri-dimensional attitude towards change, which includes affective, behavioral and cognitive components. These components reflect three different manifestations of people's evaluation of an object or situation (Mcguire 1985; Smollan 2006). The affective component regards "how one feels about the change (e.g. angry, anxious)" (Oreg 2006, p. 76), the cognitive component involves "what one thinks about the change (e.g. Is it necessary? Will it be beneficial?)" (Oreg 2006, p. 76) and the behavioral component involves "actions or intention to act in response to the change (e.g. complaining about the change, trying to convince others that the change is bad)" (Oreg 2006, p. 76). Of course, the three components are not independent of one another, and what people feel about a change will often correspond with what they think about it and with their behavioral intention in its regard. However, the components each highlight a different aspect of the resistance phenomenon (Oreg 2006).

Oreg (2006) pointed out that using a tri-dimensional attitude towards change will on one side make the investigation of antecedents and consequences more complex compared to earlier resistance studies. However, it will on the other side enable "a higher resolution that highlights the particular resistance that is associated with each of the antecedents and consequences" (Oreg 2006, p. 76) like technology use and acceptance. Furthermore a tri-dimensional attitude of resistance to change related to attitude towards technology and processes will enable researchers to provide deeper insights into technology implementation phenomena. Therefore the tri-dimensional resistance to change construct is the foundation of our proposed model, it is influenced by an individual's personality and will influence the resulting resistance behavior. Therefore our hypotheses, concerning affective, behavioral and cognitive resistance to change, are:

*H4: Affective resistance to change of individuals has a positive, direct effect on individual resistance behavioral intention.*

*H5: Behavioral resistance to change of individuals has a positive, direct effect on individual resistance behavioral intention.*

*H6: Cognitive resistance to change of individuals has a positive, direct effect on individual resistance behavioral intention.*

### *Resistance Behavior and Behavioral Intention*

As a consequence of the affective, cognitive and behavioral reactions to IT-induced organizational change individuals could perform different behaviors related to the introduced technology or develop different behavioral intentions regarding the acceptance of the introduced technology (Burton-Jones and Straub 2006). In mandatory usage settings, individuals could resist the expected behavior, comply with it or work around (Ferneley and Sobreperez 2006). In this context, Kim and Kankanhalli (2009) developed based on Bovey and Hede (2001) the construct "user resistance" as a dependent variable describing behavior. The variable distinguishes between "overt (open and expressive" and covert (concealed or hidden) resistance and between active (originating action) and passive (inert or not acting) resistance" (p.575). The degree of resistance is considered to increase from covert passive (e.g. ignoring or indifference) to overt active (e.g. obstructing) behaviors.

The proposed construct "resistance behavior" is different form behavioral resistance as discussed in the previous section. The dependent variable of the research model as proposed by Kim and Kankanhalli (2009) focuses on the intention to comply with the IT-enabled organizational change and the proposed behavioral resistance (Oreg 2006) captures the behavioral reactions of an individual when the change is introduced (e.g. complaining about the change, trying to convince others that the change is bad). One might complain about the IT-induced change and in combinations with affective and cognitive reactions develop an intention to resist and consequently perform resistance behavior in relation to the change introduced (e.g. not using the technology in question). Moreover in a mandatory usage setting an individual might use the technology introduced, but still perform resistance behavior in terms of complaining about the change. Therefore the two constructs used in the research model are different ones as the first one is designed to measure the behavioral resistance to change component and the second one to measure the behavior or behavioral intention in relation to technology use or non-use.

The overall research model explaining user resistance behavior is illustrated in **Figure 1**.

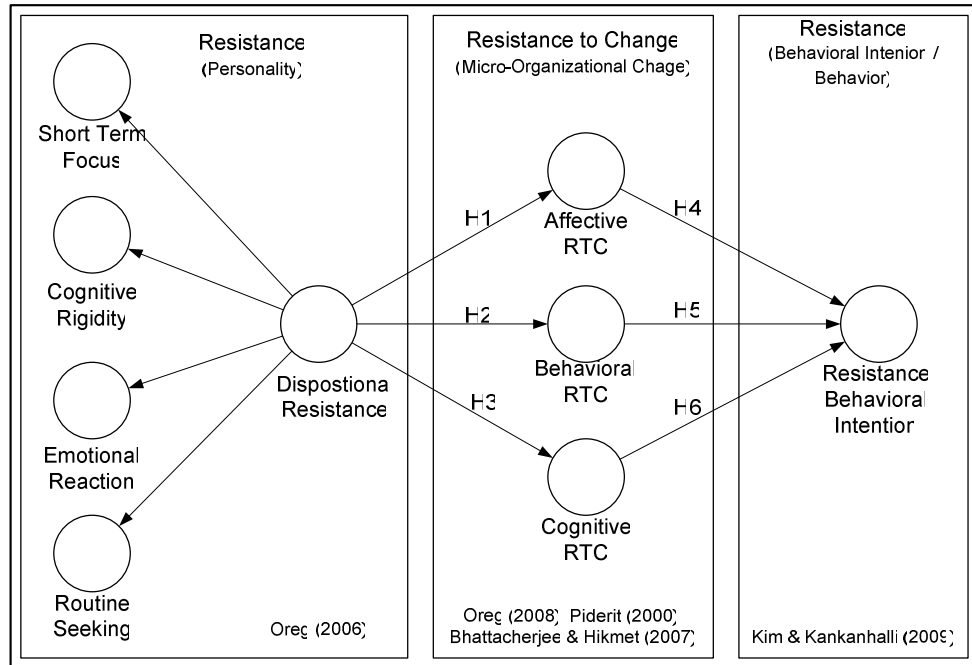


Figure 1. A Unified Model of technology Resistance

**Research Design**

To validate our research model we collected data within one company in Germany. The company is a German automotive supplier with its headquarters in southern Germany and approximately 61,000 employees at over 180 locations in more than 50 countries worldwide who generated total revenues of 7.3 Billion Euros in 2009. The project observed is the implementation of a new human resources information system aimed to support the company’s recruiting process and run by 150 recruiters. The project started in January 2010 and the system will be completely implemented until July 2010. In order to get a broader idea of user resistance we have conducted an empirical survey in the pre-implementation phase from mid May to the end of June 2010 to validate the proposed model with empirical data. In total 106 out of 150 recruiters participated in our study. The demographic information about the research participants is presented in Table 1. We used structural equation modeling and the Partial Least Squares (PLS) approach (Bagozzi and Yi 1988; Chin 1998) to validate the proposed research model. We used SmartPLS 2.0 M3 for calculation (Ringle et al. 2005).

**Table 1. Demographics<sup>1</sup>**

Gender	male	23.6%
	female	62.3%
Age	older 45	16.0%
	36 to 45	25.5%
	25 to 35	23.6%
	under 25	11.3%
Tenure	less than 5 years	23.6%
	5 to 10 years	22.6%
	11 to 15 years	13.2%
	more than 15 years	12.3%

<sup>1</sup> The depicted results represent participants’ actual answers. Participants who did not indicate their gender, age and tenure are not visualized within the table.

## RESEARCH RESULTS

Within this section, the proposed Unified Model of Technology Resistance will be validated using the data of 106 recruiters from the observed company in Germany. We start the validation by evaluating the measurement model.

### Measurement Model

The tri-dimensional resistance to change as well as resistance behavioral intention was measured as in prior research (Oreg 2006; Kim and Kankanhalli 2009), so that the relationship between the latent and the manifest variable is vectored and changes in the latent variable influence all the indicators (Hulland 1999). Oreg's dispositional resistance to change was measured according to Oreg (2003), Oreg et al. (2008) and Laumer et al. (2010) as a second order construct modeled with the four formative dimensions routine seeking, emotional reaction, short-term focus and cognitive rigidity. Thus for the reflective measurement model four factors – content validity, indicator reliability, construct reliability and discriminant validity – need to be validated (Bagozzi 1979), while formative constructs can be evaluated using two phases (Petter et al. 2007). Phase I includes content validity, and phase II the observation of model weights and the testing for multicollinearity (Chin 1998; Diamantopoulos and Winklhofer 2001; Diamantopoulos and Siguaw 2006).

#### *Content validity*

In setting up the questionnaire the aim was to refer to methods of measurement which had already been used in empirical research as described above. We tested the items in a two step process. After a first test with students in our IS department, we refined the questionnaire by interviews with HR professionals to ensure content validity. The used measurement items are illustrated in Table 2.

#### *Indicator reliability*

Indicator reliability shows the proportion of the variance of a single indicator which derives from the relevant latent variables. All loadings should be greater than 0.7 to ensure that at least half of the variance of a latent variable is explained by the indicators used (Carmines and Richard 1979). As one can see in Table 3 the loadings were above the recommended thresholds. The significance level of all loadings at  $p \leq 0.001$  is high and was calculated using the bootstrap method with 500 samples (Henseler et al. 2009).

#### *Construct reliability*

Quality assessment at the construct level was evaluated using composite reliability (CR) and average variance extracted (AVE). As Table 3 indicates the estimated values were above the recommended thresholds of 0.7 for CR and 0.5 for AVE (Bagozzi and Yi 1988).

#### *Discriminant validity*

Discriminant validity describes the extent to which measurement items which theoretically should not be equal differ from another (Campbell and Fiske 1959). This can be evaluated by looking at the cross-loadings. The loadings of our reflective indicators are higher for the corresponding constructs than for any other (see Table 4 in Appendix). Additionally, the loadings must be smaller than the root of the corresponding AVE. Since this is also the case as presented in Table 3, the discriminant validity of the latent variables is high (Hulland 1999; Fornell et al. 1981; Fornell and Larcker 1981).

#### *Weights and multicollinearity*

As one can see in Table 3 the weights for our formative constructs show that most items are significant. As demanded for formative constructs all non-significant items have to be retained in the measurement model (Bollen and Lennox 1991; Chin 1998). The test for multicollinearity using SPSS Statistics 17.0 indicates that multicollinearity does not cause a problem. All VIF-values for the items used are below the suggested threshold of 3.3 (Diamantopoulos and Siguaw 2006).



Table 2. Measurement Items

RTC(A)-1	I'm afraid of the change.
RTC(A)-2	I have a bad feeling about the change.
RTC(A)-3	I am quite excited about the change.*
RTC(A)-4	I am stressed by the change.
RTC(B)-1	I protest against the change.
RTC(B)-2	I complained about the change to my colleagues
RTC(C)-1	I believe that the change would harm the way things are done in the organization.
RTC(C)-2	I believe that the change would make my job harder.
RTC(C)-3	I believe that I could personally benefit from the change.*
RBI-1	I will not comply with the change to the new way of working with the e-recruiting system.
RBI-2	I will not cooperate with the change to the new way of working with the e-recruiting system.
SF-1	Changing plans seems like a real hassle to me. .665
SF-2	Often, I feel a bit uncomfortable even about changes that may potentially improve my life.
SF-3	I sometimes find myself avoiding changes that I know will be good for me.
CR-1	If my boss changed the criteria for evaluating employees, it would probably make me feel uncomfortable even if I thought I'd do just as well without having to do any extra work.
CR-2	I often change my mind.
CR-3	Once I've come to a conclusion, I'm not likely to change my mind.
CR-4	I don't change my mind easily.
CR-5	My views are very consistent over time.
RS-1	I generally consider changes to be a negative thing.
RS-2	I'll take a routine day over a day full of unexpected events any time.
RS-3	I like to do the same old things rather than try new and different ones.
RS-4	Whenever my life forms a stable routine, I look for ways to change it.
RS-5	I'd rather be bored than surprised.
ER-1	If I were to be informed that there's going to be a significant change regarding the way things are done at work, I would probably feel stressed.
ER-2	When I am informed of a change of plans, I tense up a bit.
ER-3	When things don't go according to plans, it stresses me out.
ER-4	If my boss changed the criteria for evaluating employees, it would probably make me feel uncomfortable even if I thought I'd do just as well without having to do any extra work.
Items marked with an asterik (*) were reverse coded. All items were measured with a 7-point Likart Scale from strongly agree to strongly disagree	

**Table 3. Discriminant Validity**

reflectiv		loadings	AVE	CR	RTC(A)	RTC(B)	RTC(C)	RBI	SF	CR	RS	ER	RES
RTC(A)	RTC(A)-1	0.8633	0.6794	0.8929	0.824								
	RTC(A)-2	0.8752											
	RTC(A)-3	0.6353											
	RTC(A)-4	0.8959											
RTC(B)	RTC(B)-1	0.8373	0.6857	0.8135	0.3958	0.828							
	RTC(B)-2	0.8187											
RTC(C)	RTC(C)-1	0.5938	0.6125	0.8211	0.5583	0.3776	0.782						
	RTC(C)-2	0.7812											
	RTC(C)-3	0.9353											
RBI	RBI-1	0.9471	0.9	0.9474	0.127	0.5347	0.3055	0.948					
	RBI-2	0.9503											
formativ		weights	weights on 2nd order construct										
SF	SF-1	0.5366	0.0634		0.1906	0.4446	0.3055	0.3199	n.a.				
	SF-2	0.5751	0.1444										
	SF-3	0.192	0.0887										
CR	CR-1	0.6972	0.04		0.2648	0.4415	0.2468	0.2625	0.419	n.a.			
	CR-2	0.7615	0.3208										
	CR-3	0.2596	0.1696										
	CR-4	-0.581	-0.1707										
	CR-5	0.2225	0.0023										
RS	RS-1	-0.152	0.0303		0.3553	0.4696	0.3544	0.4952	0.6276	0.5289	n.a.		
	RS-2	-0.1447	-0.0353										
	RS-3	0.7676	0.3051										
	RS-4	-0.1879	-0.0475										
	RS-5	0.3147	-0.0499										
ER	ER-1	0.5561	0.2343		0.5845	0.5488	0.3565	0.5029	0.6573	0.505	0.6705	n.a.	
	ER-2	0.0915	0.1059										
	ER-3	-0.0483	-0.1339										
	ER-4	0.5647	0.3437										
2nd order construct													
RES	RES-SF	0.7599			0.5378	0.6373	0.4399	0.5114	0.7599	0.7044	0.8442	0.9013	n.a.
	RES-CR	0.7044											
	RES-RS	0.8442											
	RES-ER	0.9013											

**Structural Model**

The explanatory power of our structural model could be determined by the squared multiple correlations ( $R^2$ ) and the significance levels of the path coefficients (Chin 1998).

The squared multiple correlations ( $R^2$ ) of resistance behavior is 0.326, for affective resistance to change 0.289, for behavioral resistance to change 0.406 and for cognitive resistance to change 0.193.

For the analysis of the path coefficients in the research model the t-values were evaluated. Significance tests were conducted using the bootstrap routine with 500 samples. All calculated path coefficients and the different significance levels are visualized in Figure 2.

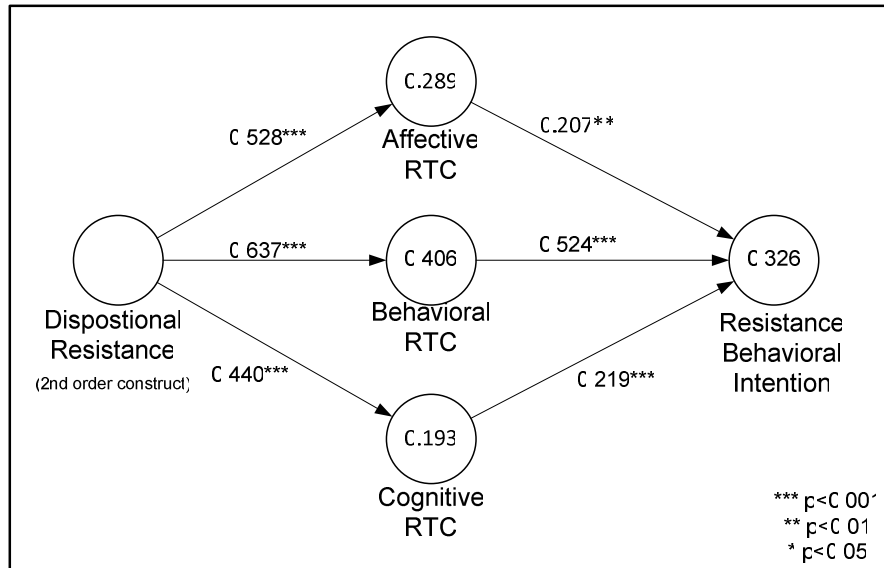


Figure 2. Structural Model Validation

### Limitations

Due to our methodology, our proposed research might have limitations as every empirical study. It might only represent a single example of resistance to one specific IT-induced organizational change project within a specific company, economy, country or cultural region. There might be differences for the resistance to change and the actual resistance behavior within different settings. In addition, as we collected data from participants at the same time using the same survey our results may be affected by common method variance (Podsakoff, 2003). Therefore, we applied methods to avoid common method variance as proposed for example by (Podsakoff, 2003).

In addition, no environmental variables were tested within our research mode. For instance, system complexity, characteristics of the previous system, and the nature of the task may all play important roles in resistance which are not controlled for in the proposed model. However, the objective of the research was to integrate different three different approaches of user resistance in order to provide a first step towards a unified understanding of user resistance, which might be extended by the environmental variables mentioned and already discussed by prior research.

### DISCUSSION AND FUTURE RESEARCH

Based on Oreg (2006) we proposed a unified model of technology resistance and integrated resistance as a behavior and behavioral intention (Kim and Kankanhalli 2009), a tri-dimensional construct of resistance to change (Piderit 2000) as an extension to Bhattacharjee and Hikmet (2007) and resistance as a personality trait (Oreg 2003) in order to provide a unified understanding why people reject technologies. The evaluation of the model showed that the resistance behavioral intention of the observed 106 recruiters in the pre-implementation stage could be explained by their affective, behavioral and cognitive resistance to change as well as their individual personality trait resistance. Therefore, this research has several implications for research as well as opportunities for future research and model extensions.

### Implications for Research

With integrating the three different approaches to explain user resistance this research showed that for a unified understanding of resistance to organizational change four aspects are important:

- 1) What are the characteristics of the change recipients?
- 2) What are the characteristics of the induced change?
- 3) What are the affective, behavioral and cognitive resistance to change reactions of individuals?
- 4) Which kind of resistance behavior (intention) do individuals perform?

As a consequence combining Oreg's (2003) dispositional resistance, Piderit's (2000) tri-dimensional resistance to change and Kim and Kankanhalli's (2009) resistance behavior and behavioral intention is a promising approach to enable a unified

understanding of resistance to IT-induced organizational change. This unified approach will extend the different discussed explanations for user resistance by providing the foundation for a clearer view on user resistance.

However, compared with unified technology acceptance models as the UTAUT (Venkatesh et al. 2003) the explanation power of the proposed model is relatively low. As a consequence, the model still needs extensions to enable a unified understanding of individual reactions to IT-induced organizational change. Therefore, environmental variables like system complexity, characteristics of the previous system, and the nature of the task could be incorporated within the model.

The first important components are individual differences and user personality. In general, personality and IS adoption is a new area of IS research, providing some first explanations using the Five-Factor Model of Personality (Devaraj et al. 2008). Using Oreg's dispositional resistance scale provides compared to other personality studies (Junglas et al. 2004) a good explanatory power within the dependent variables of resistance to change.

The second important aspect is the affective, behavioral and cognitive reaction to the introduced change in particular. This tri-dimensional resistance to change understanding extends the first approach by Bhattacharjee and Hikmet (2007) in order to measure different reactions, individuals might show when a change is introduced. In addition, using only the tri-dimensions without any specific technology evaluation constructs one third of the variance in the dependent variable user resistance behavioral intention could be explained.

Moreover using this extended understanding of resistance to change in the pre-implementation phase of an IT implementation project reveals that without having tried the system users develop affective, behavioral and cognitive reactions to the introduced change. Moreover using the multi-dimensional construct of resistance to change and the dispositional resistance to change construct enables an understanding of how the dimensions affect the variables dependent upon them which could lead to a more parsimonious understanding of the resistance phenomenon. For example, cognitive rigidity is highly correlated with all of the tri-dimensional resistance to change measures as well as with resistance behavioral intention. Therefore, a more detailed examination of the dispositional resistance to change components might be beneficial for future research.

The fourth important aspect is the dependent variable. In this model resistance behavioral intention has been measured as conceptualized by Kim and Kankanhalli (2009). It is important to understand at what stages in the implementation process user resistance behaviors occur, and whether the tri-dimensional resistance to change construct is an important predictor in the pre- or in the post-implementation stage of an IT project. With our approach, we could show that within the pre-implementation phase user develop behavioral intentions to resist a particular change, however, we could not control for actual resistance behavior, as the study was conducted before the go-live of the system.

Therefore the approach in this paper is a first step towards to a better understanding of resistance to IT-induced organizational change. Future research should build on the three categories personality, affective, behavioral and cognitive resistance to change as well as resistance behaviors to provide a unified understanding of resistance to change. Therefore two important aspects should be considered. First, the model has still to be tested in the post-implementation phase of an IT project and second, it has to be extended by several aspects as it will be discussed in the following subsection.

### **Future Research**

Beside the already mentioned implications of the proposed model for research, there is still work to do to provide a unified understanding of resistance to IT-induced organizational change.

A first important aspect is, that in addition to the tri-dimensional resistance to change construct a more specific conceptualization of affective and cognitive resistance to change based on technology characteristics of the IT-induced change should be considered within the model. Technology characteristics are based on technology acceptance research. All constructs that model the evaluation of and beliefs about technologies by individuals and which were deeply researched by information systems research fall in this category.

In addition theories and research on resistance to change have primarily addressed the context-specific antecedents of resistance. A large variety of contextual variables have been proposed as related to employees' resistance to change. Whereas, some antecedents have to do with the outcomes of change (e.g. losing or gaining power), others focus on the way in which change is implemented (e.g. the amount of information about the change that is given to employees) (Watson 1971; Tichy 1983; Miller et al. 1994; Wanberg and Banas 2000; Armenakis and Harris 2002; Kotter and Schlesinger 2008). This distinction resembles the distinction between perceptions of distributive and procedural justice (Greenberg and Cropanzano 2001). As outcome factors power and prestige (Tichy 1983), job security (McMurry 1947; Probst 2003) and intrinsic rewards (Hackman and Oldham 1980; Tichy 1983) have been discussed in literature and trust in management (Stanley et al. 2005;

Kotter and Schlesinger 2008), social influence (Gibbons 2004) and information about the change (Miller et al. 1994; Wanberg and Banas 2000) are typical process factors.

Furthermore a number of studies have already found that conditions of change and the change in general could predict organizational outcomes such as job satisfaction, organizational commitment and intention to leave the organization (Wanberg and Banas 2000). Overall, it is expected that positive attitudes towards change will be associated with improved outcomes (Oreg 2006). In response to the work related outcomes technology related outcomes are also important in IT projects. Those outcomes are the different usage behaviors of change recipients. The resistance of change recipients might influence outcomes such as attitude towards technology, intention to use and usage as shown by technology acceptance research in general (Venkatesh et al. 2003).

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## APPENDIX

	RTC (A)	RTC (B)	RTC (C)	Resistance
RTC(A)-1	0.8633	0.4108	0.3677	0.0332
RTC(A)-2	0.8752	0.4191	0.3907	0.0486
RTC(A)-3	0.6353	0.1574	0.5507	0.2258
RTC(A)-4	0.8959	0.3364	0.4631	0.0701
RTC(B)-1	0.4763	0.8373	0.3291	0.4307
RTC(B)-2	0.1718	0.8187	0.2956	0.4556
RTC(C)-1	0.4147	0.195	0.5938	0.1034
RTC(C)-2	0.3552	0.1469	0.7812	0.0707
RTC(C)-3	0.4572	0.4209	0.9353	0.3779
RB-1	0.1674	0.5025	0.3237	0.9471
RB-2	0.075	0.5118	0.2571	0.9503

Table 4. Cross-Loadings for Reflective Measurement