

2010

Why do they Resist? – An Empirical Analysis of an Individual's Personality Trait Resistance regarding the Adoption of New Information Systems

Sven Laumer

Otto-Friedrich University Bamberg, sven.laumer@uni-bamberg.de

Christian Maier

Otto-Friedrich University Bamberg, christian-engelbert.maier@stud.unibamberg.de

Andreas Eckhardt

Goethe-University Frankfurt, eckhardt@wiwi.uni-frankfurt.de

Follow this and additional works at: <http://aisel.aisnet.org/ecis2010>

Recommended Citation

Laumer, Sven; Maier, Christian; and Eckhardt, Andreas, "Why do they Resist? – An Empirical Analysis of an Individual's Personality Trait Resistance regarding the Adoption of New Information Systems" (2010). *ECIS 2010 Proceedings*. 31.
<http://aisel.aisnet.org/ecis2010/31>

This material is brought to you by the European Conference on Information Systems (ECIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ECIS 2010 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.



**WHY DO THEY RESIST? – AN EMPIRICAL ANALYSIS OF AN
INDIVIDUAL’S PERSONALITY TRAIT RESISTANCE
REGARDING THE ADOPTION OF NEW INFORMATION
SYSTEMS**

Journal:	<i>18th European Conference on Information Systems</i>
Manuscript ID:	ECIS2010-0294
Submission Type:	Research Paper
Keyword:	User behavior, Individual characteristics/individual differences, Information technology acceptance, Theory of reasoned action



WHY DO THEY RESIST? – AN EMPIRICAL ANALYSIS OF AN INDIVIDUAL'S PERSONALITY TRAIT RESISTANCE REGARDING THE ADOPTION OF NEW INFORMATION SYSTEMS

Laumer, Sven, University of Bamberg, Centre of Human Resources Information Systems, Feldkirchenstraße 21, 96045 Bamberg, Germany, sven.laumer@uni-bamberg.de

Maier, Christian, University of Bamberg, Centre of Human Resources Information Systems, Feldkirchenstraße 21, 96045 Bamberg, Germany, christian-engelbert.maier@stud.uni-bamberg.de

Eckhardt, Andreas, Goethe-University, Centre of Human Resources Information Systems, Grüneburgplatz 1, 60323 Frankfurt am Main, Germany, eckhardt@wiwi.uni-frankfurt.de

Abstract

In their ISR article 2008 Deveraj et al. asked “How Does Personality Matter?” This article builds upon the discussed idea that an individual's personality traits has an influence on the technology acceptance and usage intention by empirically analyzing and discussing whether the personality trait resistance has an impact on an individual's intention to use an information system or not. Therefore the article adopts a scale developed in psychology research to measure dispositional resistance of individuals. The data analysis of 199 research participants who declared that they do not want to use a particular information system in future shows 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 an information system, the subjective norm of important others and mediated through attitude on the intention to use this system.

Keywords: Resistance, Resistance to Change, Theory of Reasoned Action, Personality, IT Adoption

1 INTRODUCTION

Although, thanks to the most modern information technology, new applications are constantly appearing and simplifying the work of users in the relevant field – or even making it possible to automate tasks in a way which was previously unthinkable – there are, nevertheless, an astonishing number of people who are not prepared to adopt these technologies (Johansen et al., 1996; Moore, 1999; Norman, 1999; Wiener, 1993). This apparently paradoxical behavior has also been recognized and thematized in the research community (Venkatesh et al., 2001; Bhattacharjee et al., 2007a). In these works the problem of resistance has been presented and discussed as one of the most frequently encountered reasons for the non-use of innovations. The phenomenon itself has long been recognized, as more than half a century ago psychology researchers identified in people a natural tendency to prefer keeping to what is well-known and familiar rather than to accept innovation, and thus the unknown (Lewin, 1947). Since that time the main subject of research has been resistance on the part of people within organizations, since in the organizational context workers' resistance towards innovations can be critical in terms of success and vital to survival (Waddell et al., 1998). According to this way of thinking, if a new (IT) project is to be implemented in a company for reasons of economic sustainability, the staff must first be prepared for the changes, since otherwise there is the risk of protest, and refusal to use the innovative ideas may endanger the results that were intended. Consequently, the level of resistance of a company's staff and, as a reaction to this, the measures taken by a company to reduce the effect of this reaction, decisively affect a company's long-term success. Since resistance connected with the non-use of information systems is often claimed to be the main reason for failed projects (Lyytinen et al., 1987; Dowling et al., 1980; Lucas, 1975; Gladden, 1981; Maurer, 1996) problems of this kind play a major role in research (Hirschheim, 2007; Venkatesh et al., 2007; Williams et al., 2009) and is also regarded by the CIOs of top American companies as a particularly important subject. The management of change and the resistance connected with it is rated in the current survey of the Society for Information Management (SIM) as the seventh most important challenge for CIOs (Luftman et al., 2008). Nevertheless, there is still no unified definition of what resistance regarding the implementation of a new information system actually is (Vithessonthi, 2007), which is mainly due to the many differing forms it takes (Hirschheim et al., 1988). This is because of signs of resistance can be shown by the most varied groups of personnel – such as shop-floor workers, technical staff, management, and boards of directors (Dickson et al., 1970) – and the resultant modes of behavior can differ to a very large extent (Ferneley et al., 2006; Dickson et al., 1970). These can be expressed openly or covertly (Hirschheim et al., 1988), and range from aggressive behavior (Dickson et al., 1974), through projection (Newman et al., 1985) to a complete refusal to use the technology in question (Schmitt et al., 1978). In addition to this, the causes leading to this behavior are just as divergent (Hirschheim et al., 1988; Gray, 2002; Martinsons et al., 1999; del Val et al., 2003).

In previous research approaches resistance was always regarded as behavior in a characteristic situation arising from changes in aspects of that situation (Coch et al., 1948; Tichy, 1983). Kim and Kankanhalli (Kim et al., 2009) or Bhattacharjee and Hikmet (Bhattacharjee et al., 2007a) provide recent examples of this kind of conceptualization of resistance in the information systems context. In the latter publication, for example, doctors were asked if changes in their working routine conditioned by new computer systems were acceptable. In this context resistance was tested in the IS field and interpreted as loss of control. In psychological research resistance was firstly analyzed from an individual perspective (Mumford et al., 1993; Judge et al., 1999) and secondly defined as a fundamental character trait (Oreg, 2006). Because resistance is so complex and many-faceted (Waddell et al., 1998; Ansoff, 1988), this paper pursues the goal of developing further these previous valuable insights into the way resistance towards information systems works, by investigating the effects of the individual character trait resistance and its importance for fundamentally decisive factors in the area of information systems usage.

For this purpose we intend to test empirically with the aid of a causal analysis whether the character trait resistance can explain the determinants within the Theory of Reasoned Action (Ajzen et al., 1980;

Fishbein et al., 1975) and therewith non-users intention towards a particular information system. Secondly, we also intend to analyze ‘how’ and ‘whether’ there is a causal relationship between the character trait resistance and an individual’s intention. In this context it is particularly important to discover whether resistance directly or indirectly, or even both directly and indirectly, influences non-users’ intention towards using a particular information system.

Before the results are presented and discussed in Sections 4 and 5, we first provide an introduction to the knowledge required for an understanding of the themes of Theory of Reasoned Action (TRA) and resistance, based on the relevant research findings. In Section 3 we formulate our central hypotheses, based on this information, and provide a short overview of the data-set on which they are tested.

2 BACKGROUND KNOWLEDGE AND LITERATURE REVIEW

After these introductory remarks we will now explicitly deal with the theories that are relevant to our topic such as the TRA, describing adoption models as Technology Acceptance Model (Davis, 1989; Davis et al. 1989) together with a look at inhibitors and enablers, as well as several central aspects of previous research into resistance related to IS acceptance. Finally we will present the character trait resistance, previous research on this theme and a suggested mode of measuring this character trait in IS research.

2.1 Theory of Reasoned Action, IT Adoption Research and IT Inhibitors

Several models have been used in the attempt to understand and explain the use and non-use of information systems. In previous adoption research, which mainly sought to discover factors which encourage usage, they generally began from the premise that the presence of such factors will lead to the adoption of a technology, and that if no benefit is taken of these the result will be that the technology will not be used. The most frequently used explanatory model in the IT field (Williams et al., 2009) is admittedly the Technology Acceptance Model (TAM) (Davis, 1989; Davis et al., 1989), yet the other considerations in this paper are based on the Theory of Reasoned Action (TRA) (Ajzen et al., 1980; Fishbein et al., 1975), which itself underlies the TAM. The reason for this is Benbasat and Barki’s (2007) demand that we should free ourselves from the TAM and in future research return to its roots, since the original TAM has fulfilled its purpose and is also limited for further research approaches. Another factor favoring the use of the TRA is the fact that its origins, as well as those of personality research, lie firmly in the research field of psychology. The TRA explains individual behavior by the intention of the individual to carry out a specific behavior, where intention is a function of the two antecedents attitude (ATT) and subjective norm (SN) (Ajzen et al. 1980; Fishbein et al., 1975).

Within adoption research, current research efforts have been able to demonstrate that, on the one hand, there are factors which can both encourage and hinder the acceptance of a particular information system (e.g. the two factors of TAM), and that, on the other hand, there are factors which exclusively drive non-adoption and thus have no positive influence on usage. These latter influences are defined as inhibitors, and those that can influence an adoption decision in either direction are called enablers (Cenfetelli, 2004). At present, inhibitors with their asymmetrically negative effect are becoming much more the focus of research and are being analyzed within various adoption research models, with the argument that inhibitors can have both a direct effect on the intention to use a specific information system as well as an indirect effect mediated through enablers. So far research has been unable to show whether inhibitors’ indirect effect comes through partial or full mediation. One of the inhibitors already identified in IS research is resistance to change linked with the introduction of an information system (Bhattacharjee et al., 2007a).

2.2 Resistance to Change and IT-Adoption Research

Within IS research it has been recognized that the acceptance of a technology is often preceded by resistance to the new information system and the changes resulting from it and that this must first be

overcome by potential users (Bhattacharjee et al., 2007a). Accordingly, research has focused even more strongly on resistance in the context of technology adoption models, since it is only after inertia (Keen, 1981) has been overcome that innovations can replace the status quo. This means that resistance is also understood in the IS context to be an unwanted disadvantageous reaction to planned changes (Hirschheim et al., 1988). Yet compared with other IS themes, there are at the moment only a few research papers dealing with this problem. A glance at the most important shows that there are solely two publications from a top journal as MIS Quarterly (Kim et al., 2009; Lapointe et al., 2005). We now examine these approaches together with some other current publications with the aim of seeing what research methods they have used when dealing with this topic. Among them we have, first of all, five case studies. The most recent study (Lapointe et al., 2007) looked at resistance at the group level with the aid of the political variant of interaction theory (Markus, 1983), and was able, like another study published two years earlier by the same authors (Lapointe et al., 2005), to show that perceived threats, such as, for example, unfairness or loss of status or of power can give rise to resistance just as much as anxiety can. Prior to this Markus had also come to this conclusion (Markus, 1983) using interaction theory, as a result of identifying the fact that poor system quality can lead to resistance behavior just as much as loss of power or unfairness, if the costs or extra efforts involved seem to outweigh the estimated benefits. A further recent case study is that of Ferneley et al. (Ferneley et al., 2006), who were able to demonstrate that discipline, enforced proceduralisation, non-engagement with the system as well as organizational and personnel issues can lead, in spite of positive resistance factors such as peer pressure, deception, or inappropriate targets, to negative resistance factors such as avoidance of inappropriate procedures or professional judgment. Here they identified not only the causes of resistance but also activities that can follow resistance. Independent of the resistance factor concerned and its causes, three modes of behavior can be distinguished. These are Harmless Workaround (indolence, sub-tasking or stockpiling); Hindrance Workaround (predictive operating or sabotage); and finally resistance behavior in the form of batch processing or non-use of system as a marked form of Essential Workaround. It was also possible to identify further potential causes of resistance, such as innate conservatism, poor technical quality or redistribution of resources as well as organizational invalidity or minimal training in a further case study (Hirschheim et al., 1988).

In addition to these insights six previously carried out empirical studies also help to derive our hypotheses. These studies can be divided into three categories, depending on the observed direction in which the factor resistance acted. They showed a significant negative correspondence between resistance and perceived ease of use. Three further publications focused on factors which can give rise to resistance (Kim et al., 2009; Enns et al., 2003; Jiang et al., 2000). They demonstrated that, for example, pressure (Enns et al., 2003), uncertainty and the loss of status or power can tip the balance as much as perceived values or switching costs (Kim et al., 2009). Two studies can be assigned to the third category which shows that other factors can influence resistance both as cause and as effect (Bhattacharjee et al., 2007a; Bhattacharjee et al., 2007b). Here there is evidence that perceived threat has a significant effect on resistance, and also that resistance is a factor exerting significant influence on central elements of IS adoption. For example Eckhardt et al. (Eckhardt et al., 2009) were able to show what groups exert a social influence on the decision of an individual not to use a specific technology.

2.3 “Resistance” as Personality Trait

Although it was possible to show that drivers of resistance vary depending on the underlying system (Jiang et al., 2000), there has only been one attempt in IS research to thematize character traits and its importance for technology acceptance behaviour (Deveraj et al. 2008). Given the under-researched area of technology resistance this suggests that it would be interesting to investigate whether “troublemakers” (Markus, 1983), i.e. people in companies who, for example, resist changes, are fundamentally inclined not to accept change, since the fact that the relevant character can be a potential reason for resistance has frequently been assumed in previous work (Markus, 1983), yet (as

far as we are aware) no investigation has yet been undertaken in the field of IS adoption research using the character trait resistance to make it possible to explain an individual's intention.

To measure the differences in the personality trait resistance which are necessary for this purpose, a scale is adopted which directly captures people's individual inclination to react to change with resistance (Oreg, 2003). To capture this completely, four dimensions have been identified: routine seeking (RS), emotional reaction (ER), short-term focus (STF) and cognitive rigidity (CR). With the aid of these, resistance can be measured as a second-order construct. The basic assumption is that those individuals in whom the character trait resistance is most strongly present will be less disposed to initiate changes for themselves and develop more of a negative attitude toward changes with which they are confronted. Oreg captures the character trait resistance in four different dimensions, defined as follows: Routine seeking "involves the extent to which one enjoys and seeks out stable and routine environments", emotional reaction "reflects the extent to which individuals feel stressed and uncomfortable in response to imposed change", short-term focus "involves the degree to which individuals are preoccupied with the short term inconveniences versus the potential long-term benefits of the change" and cognitive rigidity "represents a form of stubbornness and an unwillingness to consider alternative ideas and perspectives" (Oreg, 2003).

This structure and its validity have been demonstrated with the aid of several studies in various contexts and cultural areas (Oreg et al., 2008). In order to rely on a unified understanding of the concept of resistance, we base ourselves on a definition produced by Piderit which concurs with the measurement system applied here (Piderit, 2000). It understands the "worldwide phenomenon" (Child, 1984) of resistance to be multi-dimensional behavior in response to change, containing affective, cognitive and conative components.

In what follows we will now transfer the measurement of the personality trait resistance to the context of adoption research and investigate how far individuals who demonstrate this character trait to a more marked degree have a negative attitude to new information systems. For this purpose we develop a research model in the next section which is based on the Theory of Reasoned Action (Ajzen et al., 1980; Fishbein et al., 1975 and contains Oreg's suggested second-order construct for measuring and defining resistance (Oreg, 2003).

3 RESEARCH MODEL

The research model is made up of three TRA constructs, ATT, SN, and INT together with a second-order construct resistance (RES). As a result of previous research into the Theory of Reasoned Action (Fishbein et al., 1975; Ajzen et al., 1980), suggesting that intention can be explained by SN and ATT, the following two correlations are expected:

H1: Subjective norm (SN) has a direct positive influence on intention (INT).

H2: Attitude (ATT) has a direct positive influence on intention (INT).

Beyond this, we are mainly interested in how intention is influenced by the individual's personality trait resistance. Since the presence of individual strong resistance implies little likelihood of adoption (Oreg, 2003), while on the other hand the presence of weaker resistance does not necessarily lead to the adoption of a technology, resistance can be understood as an inhibitor (Cenfetelli, 2004). Consequently there should be a direct negative relationship between resistance and an individual's intention. Additionally, inhibitors are distinguished by an indirect effect on intention through typical enablers (Cenfetelli, 2004). Accordingly, the two enablers found in the model, subjective norm and attitude, are negatively influenced by resistance and thus take on the role of a mediator between resistance and intention. The three hypotheses resulting from this are as follows:

H3: Resistance (RES) has a direct negative effect on subjective norm (SN).

H4: Resistance (RES) has a direct negative effect on attitude (ATT).

H5: Resistance (RES) has a direct negative effect on intention (INT).

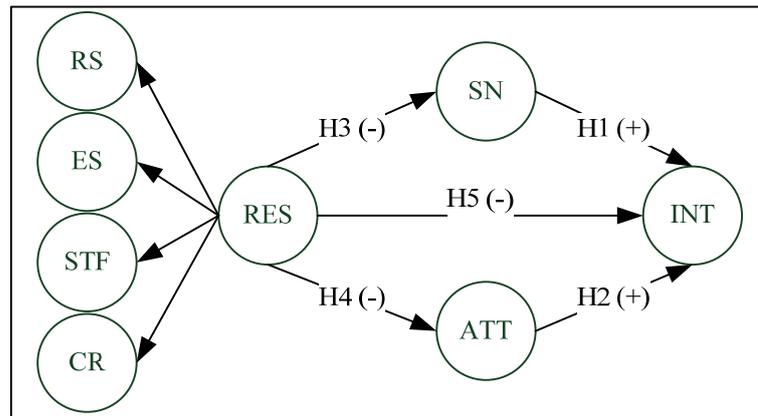


Figure 1: Research Model

The data necessary to produce the constructs required here was collected by an online survey. The general purpose of the study was to explain an individual's usage behaviour in social networking platforms such as LinkedIn or Facebook.com. In order to reach individuals with different backgrounds an online survey seemed to be the most appropriate form for the study. The participating individuals were invited using an e-mail invitation containing a link to the online survey website. In order to achieve usable results from these questions we made use of SPSS Statistics 17.0 and SmartPLS (Ringle et al., 2005). After discarding those questionnaires which gave inconsistent answers in terms of demographic data or which had given incomplete answers to the relevant questions, we ended up with 199 individuals who did not use social networking platforms. 56.5 per cent of these were male. As a result of this heterogeneity, this survey was taken from among trainees (16), students and graduates (35), employees (82), self-employed (13), unemployed (39) and senior management (23).

4 RESULTS

In this section we validate our research model, consisting of 199 data sets from all the people surveyed who do not use social networking platforms, with the aid of a measurement model and a structural model.

4.1 Measurement model

The TRA constructs SN, ATT and INT were measured as in prior research (Taylor et al., 1995; Davis, 1989), 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). Four possible ways to measure the second-order construct RES exist in theory (Jarvis et al., 2003). In the process RES and the four connected first-order constructs are operationalized reflectively, as in Oreg's contributions (Oreg, 2003; Oreg et al., 2008). Since this results in a reflective measurement model for the four factors content validity, indicator reliability, construct reliability and discriminant validity must be validated (Bagozzi, 1979).

4.1.1 Content validity

In setting up the questionnaire the aim was to refer to methods of measurement which had already been used in empirical research. Thus subjective norm was tested using a 5-point Likert scale (Taylor et al., 1995). We also reverted to previously existing items for attitude and intention (Taylor et al., 1995). To capture resistance independent of the domain Oreg's set of 17 items was used (Oreg, 2003). The questions had to be slightly modified due to the IS context, ultimately producing 18 questions,

each of these had 5 possible answers. We tested the items used with students in our IS department to ensure content validity.

4.1.2 *Indicator reliability*

Indicator reliability shows the proportion of the variance of an indicator which derives from the relevant latent variables. Since those loadings that are less than 0.4 must be removed for reflective indicators (Hulland, 1999), some indicators in the measurement for resistance had to be eliminated. All indicator variables should be greater than 0.7 to ensure that at least 50 per cent of the variance of a latent variable is explained by the used indicators (Carmines et al., 2008). The loadings of all items can be seen in Figure 2. It is clear from this figure that the required value was not reached in only three cases, and then by very little. But if new scales are implied to research this is acceptable (Hulland, 1999) and they all pass the frequently recommended threshold of 0.6. The significance level of all loadings at $p \leq 0.001$ is highly significant and was calculated using the bootstrap method with 5000 samples (Henseler et al., 2009).

4.1.3 *Construct reliability*

Quality assessment at the construct level was carried out using Composite Reliability (CR) and Average Variance Extracted (AVE) (Fornell et al., 1981). For this purpose CR should have a value higher than 0.7 and AVE should be over 0.5 (Bagozzi et al., 1998). As Figure 2 shows these criteria are fulfilled by the data collected.

4.1.4 *Discriminant validity*

Discriminant validity describes the extent to which measurements differ from others which theoretically should not be equal (Campbell et al., 1959). This involves examining the cross-loadings, which must be smaller than the root of the corresponding AVE (Hulland, 1999; Fornell et al., 1981). Since this is also the case as presented in Figure 2, discriminant validity is completely confirmed.

	Item	Loading	Mean	AVE	CR	Latent Variable Correlations						
Intention	INT-1	0.974	2.46	0,9609	0.9866	0.9803						
	INT-2	0.983	2.41									
	INT-3	0.983	2.43									
Attitude	ATT-1	0.907	3.05	0,8213	0.9484	0.6677	0.9063					
	ATT-2	0.888	2.94									
	ATT-3	0.934	2.56									
	ATT-4	0.896	2.48									
Subjective Norm	SN-1	0.745	2.17	0,5625	0.8851	0.4192	0.5083	0.7500				
	SN-2	0.769	2.74									
	SN-3	0.805	1.73									
	SN-4	0.748	2.18									
	SN-5	0.704	3.17									
	SN-6	0.724	3.13									
Resistance	RS-1	0.759	1.99	0,572	0.8878	-0.1581	-0.1812	-0.1547	0.7563			
	RS-2	0.709	3.02									
	RS-3	0.854	2.09									
	RS-4	0.861	1.98									
	RS-5	0.708	2,46									
	RS-6	0.618	2.39									
	ES-1	0.872	2.94	0,5631	0.7912	0.016	-0.0471	0.0094	0.289	0.7504		
	ES-2 ^{Rev}	0.744	2.50									
	ES-3 ^{Rev}	0.613	2.88									
	STF-1	0.877	1.80	0,7323	0.8454	-0.1807	-0.263	-0.1632	0.4785	0.2741	0.8557	
	STF-2	0.834	2.24									
	CR-1	0.886	3.34	0,6108	0.8229	-0.1388	-0.0951	-0.1422	0.1737	-0.0213	0.1351	0.7815
	CR-2	0.778	3.39									
	CR-3	0.664	2.77									

Note: All loadings are significant at $p \leq 0.001$; Square Root of AVE is listed on diagonal by Latent Variables Correlation

Figure 2: Indicator reliability, Construct reliability and Discriminant validity

4.2 Structural model

After testing the validity of the measurement model, the structural model is now tested using the coefficient of determination (R^2) and the significance levels of the path coefficients (Chin, 1998). First the coefficient of determination is used, and it shows, as can be seen from Figure 3, that 45.5 per cent of the variance of intention can be explained by attitude, subjective norm and resistance. If this value is compared with other studies focusing on resistance (e.g. Bhattacharjee et al., 2007a), the absolute explanatory power of our model is good.

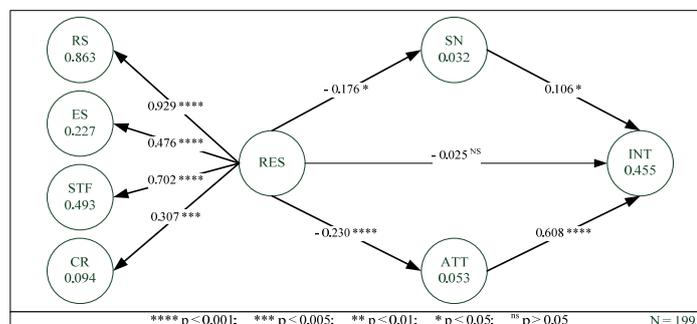


Figure 3: Structural Model

There is a significant correlation between almost all the constructs. The only exception is the correlation between resistance and intention which is not significant. But since the correlation between resistance and intention is negative, as we hypothesized, we need to investigate whether we can demonstrate a mediation effect of the resistance via the two enablers attitude and subjective norm.

Before we look at this more closely in the next section, we present the second-order measurement of resistance on the left-hand side of Figure 3. This shows that there is a significant correlation between each of the four first-order constructs and resistance.

4.3 Mediation test

Among the first researchers examining mediators were Baron and Kenny (Baron et al., 1986). According to them, a mediator means a variable which explains the relationship between a predictor and a result (Baron et al., 1986; Holmbeck, 1997; James et al., 1984). Depending on whether, in spite of the addition of a mediator, a reduced correlation between a predictor and a prognostic variable remains or completely disappears, one talks of partial or complete mediation respectively.

If we were to test the way the inhibitor resistance affects intention by means of two mediators, correlations could arise showing a different form of mediation than when there was only one mediator in the model under test. Therefore we first need to carry out two separate mediation tests, each containing one mediator. This will test whether subjective norm or attitude functions as a mediator in the relationship between resistance and intention. This is tested using the method suggested by (Iacobucci et al., 2003) (see Figure 4).

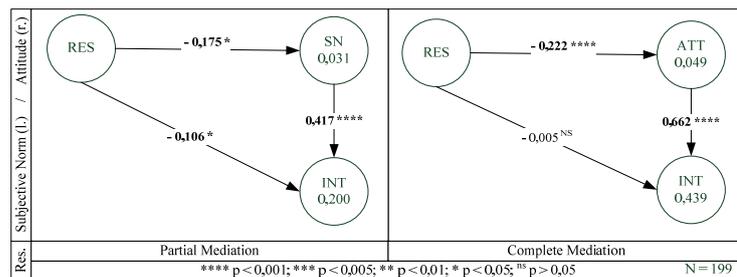


Figure 4: Mediation Test

The left-hand side of the figure shows clearly that RES has a significant effect on SN. It also demonstrates a significant causal relationship between SN and INT. It should also be noted that there remains a significant and direct influence of RES on INT, in spite of a mediated relationship via SN, which leads to the conclusion that there is partial mediation. Finally, using the Sobel Test ($z = -3.51$; $p < 0.0005$) (Sobel, 1982) and the Goodman I-Test ($z = -3.53$; $p < 0.0005$) (Goodman, 1960) the results show that the null-hypothesis on which they are based, according to which there is no indirect effect, can be rejected. In sum, we can state that the character trait RES both directly influences INT and also effects INT indirectly through SN. The extent of RES's indirect effect on INT via SN can be clearly defined using the value of VAF (Variance accounted for), which shows that about 45 per cent of the total effect of RES on INT occurs via SN.

In the right-hand side of Figure 4 the relationship between INT, RES and ATT is tested. Here it is noticeable that, in contrast to the preceding model, the relationship between RES and INT is not significant. This indicates complete mediation of RES on INT via ATT. In this case, too, the indirect effect was demonstrated using the Sobel Test ($z = -3.05$; $p < 0.0005$) and the Goodman I-Test ($z = -3.06$; $p < 0.0005$). The strength of the indirect effect of RES on INT via ATT is also shown by the VAF value, which is almost 97 per cent. Since SN partially mediates the effect of RES on INT, and ATT does so completely, another mediation test was applied which was intended to show if RES still has a direct influence on INT when two enablers are present in a model. The way in which RES affects INT in the context of TRA was thus tested, showing that the direct influence of resistance on intention

is not significant, and therefore we have complete mediation in this context. It was possible to show that the effect of RES on INT is partially mediated by SN and completely mediated by ATT.

5 DISCUSSION

In sum, the answer to the first question – whether the character trait resistance has an influence on intention in the context of TRA (Ajzen et al., 1980; Fishbein et al., 1975) – could be answered positively. The answer to the second question about the way in which this influence occurs must be looked at in a more detailed way because when assessed separately, subjective norm is seen to be a partial mediator and attitude a complete one. However, looking beyond the pure data and interpreting the results produced, it can be seen that people with a resistant nature have a fundamentally more negative attitude to new technologies, like social networking platforms. Initially this is not surprising, and yet it could be shown empirically that people whose basic attitude is more resistant are at first negative in their response to new technologies and changes in modes of behavior. The measurement system used in order to capture completely the four dimensions of resistance defined by Oreg (routine seeking, emotional reaction, short-term focus and cognitive rigidity) shows that more resistant people can be characterized by all of the four dimensions introduced by Oreg in their attitude to the use of information systems. Those individuals who are negatively inclined towards the introduction and use of new information systems are accordingly also distinguished by a very strongly characterized determination to stick to their current routines. They feel that nothing positive can be gained from change, are fixated on short-term expense and effort rather than long-term benefits and refuse fundamentally to be open to new ideas. Our results thus complement the research on resistance with reference to IS adoption in that they show that resistance is not only a behavior in a characteristic situation which results from a change in some aspects of that situation (Coch et al., 1948; Tichy, 1983) but can also be a general personality trait of some individuals which then affects their attitude and intention with regard to the use of information systems.

We further see that those around these resistant individuals, in the context tested here mainly rely on the norms of their circle of family and friends, do not expect that they will make use of innovations. This can be explained by the fact that more resistant people start from the premise that those around them understand them well, and that since they did not use previous innovations they are not expected to do so in the case of further innovations. Another possible explanation may be that individuals strongly characterized by resistance also have far less self-confidence, and that one could thus investigate a further construct, such as self-esteem (Rosenberg, 1965) between resistance and subjective norm.

The general mediation tests for the effect of the personality trait ‘resistance’ on the intention to use an information system show that this effect is above all an indirect one. Nevertheless one cannot propose the general conclusion that resistance always affects intention indirectly since the results in Figure 4 show that for the enabler subjective norm there is partial mediation and for the enabler attitude there is complete mediation. Consequently, the effect-relationship between resistance, intention and the enablers depends in each case on the enabler under consideration as well as the particular context. Future research could examine which classic adoption-factors like, for example, perceived ease of use and perceived usefulness (Davis, 1989; Davis et al., 1989) mediate the effect of the character trait ‘resistance’ on intention.

We focused on non-users in this study in order to demonstrate that there is a greater disposition among this group of people to be opposed to change. Yet the questions used to capture the character trait resistance as in the original version, it might be possible in the form of semantic differential scales (Chin et al., 2008) to capture its opposite, namely fundamental openness towards, or readiness to accept, change. If one were to investigate further groups of people with reference to the underlying point of time at which adoption takes place one might be able to show, expanding the previous results, that the time at which adoption takes place is dependent on inborn or learnt character traits. Here the five-factor model (“Big Five”) so well-known in the psychology of personality might also produce

interesting results (Norman, 1963). The concept of resistance to change that is widely accepted in IS research, linking it with a characteristic situation, could be expanded in a new second-order construct including the personality trait 'resistance' in order to make it possible to produce even more meaningful statements, since resistance in the IS field has in general been the subject of very little research (Lapointe et al., 2005).

As well as the possible opportunities for further research and future adoption and resistance theory, this paper also has some elements which could be important in the practical field. We have shown that in some individuals the personality trait resistance leads to a negative attitude to information systems and their use. However, in companies new information systems can only be beneficial if they are used by the relevant staff. Improvements can only be achieved if responsible managers themselves investigate where there are problems and initiate change. As work from the field of design science has shown, companies should, in order to develop functional and value-creating information systems, encourage a culture in the company which supports and encourages creativity (Cooper, 2000). If, however, there are too many people in the company with resistance as a strongly marked personality trait, this would not be very beneficial for this process. Recruitment departments in companies should therefore attempt to encourage a healthy mix of staff both in IT and in other technical departments. The results also show that users of information systems, who may be a company's customers, are characterized by various differing personality traits which may have an effect on purchasing or usage behaviour. Strategies aimed at addressing resistant customers could help businesses bind this group of customers to the company in an even more effective way.

References

- Ajzen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall
- Ansoff, H. I. (1988). *The new corporate strategy*. Rev. ed. New York: Wiley
- Bagozzi, R. P. (1979). The Role of Measurement in Theory Construction and Hypothesis Testing: Toward a Holistic Model. In Ferrell, O. C., Brown, S. W. & Lamb, C. W. (Eds.). *Conceptual and theoretical developments in marketing*, pp.15–32. Chicago, Ill. American Marketing Assoc.
- Bagozzi, R. P. & Yi, Y. (1998). On the Evaluation of Structural Equation Models. *Journal of the Academy of Marketing Science*. 1, pp.74–94
- Baron, R. M. & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*. 6, pp.1173–1182
- Benbasat, I. & Barki, H. (2007). Quo vadis, TAM? *Journal of the Association for Information Systems*. 4, pp.211–218
- Bhattacharjee, A. & Hikmet, N. (2007a). Physicians' resistance toward healthcare information technology: a theoretical model and empirical test. *European Journal of Information Systems*. 6, pp.725–737
- Bhattacharjee, A. & Hikmet, N. (2007b). Physicians' Resistance toward Healthcare Information Technologies: A Dual-Factor Model. *Hawaii International Conference on System Sciences*
- Campbell, D. T. & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*. 2, pp.81–105
- Carmines, E. G. & Zeller, R. A. (2008). *Reliability and validity assessment*. Newbury Park, Calif.: Sage Publ.
- Cenfetelli, R. T. (2004). Inhibitors and Enablers as Dual Factor Concepts in Technology Usage. *Journal of the Association for Information Systems*. 11-12, pp.472–492
- Child, J. (1984). *Organization . A guide to problems and practice*. 2nd ed. London: Paul-Chapman-Publ.
- Chin, W. W. (1998). The Partial Least Squares Approach to Structural Equation Modeling. In Marcoulides, G. A. (Ed.). *Modern methods for business research*, pp.295–336. Mahwah N.J. u.a. Erlbaum

- Chin, W. W., Johnson, N. & Schwarz, A. (2008). A fast form approach to measuring technology acceptance and other constructs. *MIS Quarterly*. 4, pp.687–703
- Coch, L. & French, J. R. P., Jr. (1948). Overcoming resistance to change. *Human Relations*. 4, pp.512–532
- Cooper, R. B. (2000). Information Technology Development Creativity: A Case Study of Attempted Radical Change. *MIS Quarterly*. 2, pp.245–276
- Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology. *MIS Quarterly*. 3, pp.319–340
- Davis, F. D., Bagozzi, R. P. & Warshaw, P. R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*. 8, pp.982–1003
- del Val, M. Pardo & Fuentes, C. M. (2003). Resistance to change: a literature review and empirical study. *Management Decision*. 41, pp.148–155
- Dickson, G. & Simmons, J. (1970). The behavioural side of MIS: some aspects of the people problem. *Business Horizons*. 4, pp.59–71
- Dickson, G., Simmons, J. & Anderson, J. (1974). Behavioural reactions to the introduction of a management information system at the US Post Office; some empirical observations. In Sanders, D. H. & Birkin, S. J. (Eds.). *Computers and management in a changing society*, pp.410–421. New York. McGraw-Hill
- Dowling, A. F., Jr. (1980). Do hospital staff interfere with computer system implementation? *Health Care Management Review*. 4, pp.23–32
- Eckhardt, A., Laumer S. & Weitzel, T. (2009). Who influences whom Analyzing workplace referents' social influence on IT adoption and non-adoption. *Journal of Information Technology*. 1, pp.11–24
- Enns, H. G., Huff, S. L. & Higgins, C. A. (2003). CIO Lateral Influence Behaviors: Gaining Peers' Commitment to Strategic Information Systems. *MIS Quarterly*. 1, pp.155–176
- Ferneley, E. H. & Sobreperez, P. (2006). Resist, comply or workaround? An examination of different facets of user engagement with information systems. *European Journal of Information Systems*. 4, pp.345–356
- Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention and behavior . An introduction to theory and research*. Reading, Mass.: Addison-Wesley
- Fornell, C. & Larcker, D. F. (1981). Evaluating Structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*. 1, pp.39–50
- Gladden, G. R. (1981). Stop the life-cycle, I want to get off. *Software Engineering Notes*. 2, pp.35–39
- Goodman, L. A. (1960). On the Exact Variance of Products. *Journal of the American Statistical Association*. 292, pp.708–713
- Gray, C. (2002). Entrepreneurship, resistance to change and growth in small firms. *Journal of Small Business and Enterprise Development*. 1, pp.61–72
- Henseler, J., Ringle, C. M. & Sinkovics R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, pp.277–319
- Hirschheim, R. (2007). Introduction to the Special Issue on "Quo Vadis TAM - Issues and Reflections on Technology Acceptance Research". *Journal of the Association for Information Systems*. 4, pp.203–205
- Hirschheim, R. & Newman, M. (1988). Information Systems and User Resistance: Theory and Practice. *The Computer Journal*. 5, pp.398–408
- Holmbeck, G. N. (1997). Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: examples from the child-clinical and pediatric psychology literatures. *Journal of Consulting and Clinical Psychology*. 4, pp.599–610
- Hulland, J. S. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal*. 2, pp.195–204
- Iacobucci, D. & Duhachek, A. (2003). A. Mediation Analysis. Round Table ACR 2003. Toronto.
- James, L. R. & Brett, J. M. (1984). Mediators, moderators, and tests for mediation. *Journal of Applied Psychology*. 2, pp.307–321

- Jarvis, C. B., MacKenzie, S. B. & Podsakoff, P. M. (2003). A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research. *Journal of Consumer Research*. 2, pp.199–218
- Jiang, J. J., Muhanna, W. A. & Klein, G. (2000). User resistance and strategies for promoting acceptance across system types. *Information and Management*. 3, pp.25–36
- Johansen, R. & Swigart, R. (1996). Upsizing the individual in the downsized organization . *Managing in the wake of reengineering, globalization, and overwhelming technological change*. Reading, Mass: Addison-Wesley
- Judge, T. A., Thoresen, C. J., Pucik, V. & Welbourne, T. M. (1999). Managerial coping with organizational change: A Dispositional Perspective. *Journal of Applied Psychology*. 1, pp.107–122
- Keen, P. G. W. (1981). Information Systems and Organizational Change. *Communications of the ACM*. 1, pp.24–33
- Kim, H.-W. & Kankanhalli, A. (2009). Investigating User Resistance to Information Systems Implementation: A Status Quo Bias Perspective. *MIS Quarterly*. 3, pp.567–582
- Lapointe, L. & Rivard, S. (2005). A Multilevel Model of Resistance to Information Technology Implementation. *MIS Quarterly*. 3, pp.461–491
- Lapointe, L. & Rivard, S. (2007). A Triple Take on Information System Implementation. *Organization Science*. 1, pp.89–107
- Lewin, K. (1947). *Frontiers in Group Dynamics: Concept, Method and Reality in Social Science; Social Equilibria and Social Change*. *Human Relations*. 1, pp.5–41
- Lucas, H. (1975). *Why information systems fail*. New York: Columbia Univ Pr
- Luftman, J. & Kempaiah, R. (2008). Key Issues for IT Executives 2007. *MIS Quarterly Executive*. 2, pp.99–112
- Lyytinen, K. & Hirschheim, R. (1987). Information systems failures - a survey and classification of the empirical literature. In Zorkoczy, P.(Ed.). (1987), pp.257–309. Oxford. Oxford Univ. Pr.
- Markus, M. L. (1983). Power, Politics, and MIS Implementation. *Communications of the ACM*. 6, pp.430–444
- Martinsons, M. G. & Chong, P. K. C. (1999). The Influence of Human Factors and Specialist Involvement on Information Systems Success. *Human Relations*. 1, pp.123–152
- Maurer, R. (1996). Using resistance to build support for change. *Journal for Quality and Participation*. 3, pp.56–63
- Moore, G. A. (1999). *Crossing the chasm. Marketing and selling high-tech products to mainstream customers*. Rev. ed. New York: HarperBusiness
- Mumford, M. D., Baugham, W. A., Threlfall, K. Victoria, Uhlman, C. E. & Costanza, D. P. (1993). Personality, adaptability, and performance: Performance on well-defined and ill-defined problem-solving tasks. *Human Performance*. 3, pp.241–285
- Newman, M. & Rosenberg, M. (1985). Systems analysts and the politics of organizational control. *Omega*. 5, pp.393–406
- Norman, W.X. (1963). Toward an adequate taxonomy of personality attributes: Replicated factor structure in peer nomination personality ratings. *Journal of Abnormal & Social Psychology*. 66(4), pp 574-583
- Norman, D. A. (1999). *Things that make us smart . Defending human attributes in the age of the machine*. [10. print.]. Reading, Mass.: Perseus Books
- Oreg, S. (2003). Resistance to Change: Developing an Individual Differences Measure. *Journal of Applied Psychology*. 4, pp.680–693
- Oreg, S. (2006). Personality, context, and resistance to organizational change. *European Journal of Work and Organizational Psychology*. 1, pp.73–101
- Oreg, S., Bayazit, M., Vakola, M., Arciniega, L., Armenakis, A., Barkauskiene, R., Bozionelos, N., Fujimoto, Y., González, L., Han, J., Hrebícková, M., Jimmieson, N., Kordacová, J., Mitsuhashi, H., Mlacic, B., Feric, I., Topic, M. Kotrla, Ohly, S., Saksvik, P. Øystein, Hetland, H., Saksvik, I. & Dam, K. (2008). Dispositional Resistance to Change: Measurement Equivalence and the Link to Personal Values Across 17 Nations. *Journal of Applied Psychology*. 4, pp.935–944

- Osgood, C. E., Suci, G. J. & Tannenbaum, P. H. (1978). The measurement of meaning. 4. print. of the paperback ed. Urbana: Univ. of Illinois Press. Available from: <http://www.gbv.de/dms/hebis-mainz/toc/090995678.pdf>
- Piderit, S. K. (2000). Rethinking resistance and recognizing ambivalence: A multidimensional view of attitudes toward an organizational change. *Academy of Management Review*. 4, pp.783–794
- Ringle, C. M., Wende, S. & Will, A. (2005). SmartPLS. 2.0 (beta): University of Hamburg. Available from: <http://www.smartpls.de>
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton Univ. Press
- Schmitt, J. W. & Kozar, K. A. (1978). Management's role in information system development failures: a case study. *MIS Quarterly*. 2, pp.7–16
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In Leinhardt, S.(Ed.). *Sociological Methodology*, pp.290–312. Washington DC. American Sociological Association
- Taylor, S. & Todd, P. (1995). Assessing IT Usage: The Role of Prior Experience. *MIS Quarterly*. 4, pp.561–570
- Tichy, N. M. (1983). *Managing strategic change . Technical, political and cultural dynamics*. New York: Wiley
- Venkatesh, V. & Brown, S. A. (2001). A Longitudinal Investigation of Personal Computers in Homes: Adoption Determinants and Emerging Challenges. *MIS Quarterly*. 1, pp.71–102
- Venkatesh, V., Davis, F. D. & Morris, M. G. (2007). Dead Or Alive? The Development, Trajectory And Future Of Technology Adoption Research. *Journal of the Association for Information Systems*. 4, pp.268–286
- Vithessonthi, C. (2007). Perceptions Affecting Employee Reactions to Change: Evidence from Privatization in Thailand. *Journal of American Academy of Business, Cambridge*. 1, pp.248–255
- Waddell, D. & Sohal, A. S. (1998). Resistance: a constructive tool for change management. *Management Decision*. 8, pp.543–548
- Wiener, L. R. (1993). *Digital woes. Why we should not depend on software*. Reading, Mass: Addison-Wesley Pub. Co
- Williams, M. D., Dwivedi, Y. K., Lal, B. & Schwarz, A. (2009). Contemporary trends and issues in IT adoption and diffusion research. *Journal of Information Technology*. 1, pp.1–10