

# IMPLEMENTATION THROUGH FORCE OR MEASURE? HOW INSTITUTIONAL PRESSURES SHAPE NATIONAL EHEALTH IMPLEMENTATION PROGRAMS

Philipp Klöcker

*University of Augsburg, Augsburg, Germany, kloecker@is-augsburg.de*

Rainer Bernnat

*University of Augsburg, Augsburg, Germany, bernnat@is-augsburg.de*

Daniel Veit

*University of Augsburg, Augsburg, Germany, veit@wiwi.uni-augsburg.de*

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# IMPLEMENTATION THROUGH FORCE OR MEASURE? HOW INSTITUTIONAL PRESSURES SHAPE NATIONAL EHEALTH IMPLEMENTATION PROGRAMS

*Complete Research*

Klöcker, Philipp, University of Augsburg, Augsburg, Germany, kloecker@is-augsburg.de

Bernnat, Rainer, University of Augsburg, Augsburg, Germany, bernnat@is-augsburg.de

Veit, Daniel, University of Augsburg, Augsburg, Germany, veit@wiwi.uni-augsburg.de

## **Abstract**

*Theoretical contributions on ‘user resistance’ have recently received increasing attention with regards to explaining the failed integration of various types of information systems. Unlike the yet more widespread technology acceptance theories, user resistance offers an alternative view to system-related antecedents by taking into account antecedents at the level of the user and their perceived organizational environment. However, previous models have ignored the possible influence of institutional pressures, namely coercive, mimetic and normative pressure, on an individual user’s decision to resist a technology. These are particularly applicable in national IS implementation programs like e.g. large-scale eHealth programs, where factors outside the organization, such as government pressure or public opinion, affect user behaviour. Our study focuses on the introduction of the German Electronic Health Card, an eHealth program, which has been resisted by resident medical doctors for years. The authors introduce an extended ‘Status Quo Bias Model’ and test it amongst a sample of 351 German doctors examining the effects of coercive, mimetic and normative pressures on resistance to this eHealth program. We add a quantitative analysis to the literature on national eHealth programs and user resistance theory, two areas of study, which are predominantly based on findings from case study data.*

*Keywords: eHealth, User resistance theory, Institutional theory.*

## **1 Introduction and definitions**

In a recent literature overview on the trends within eHealth research Romanow et al. (2012) have pointed out the increasing importance of both eHealth within the overall information systems literature as well as the literature concerning user resistance within this field. This prominent coverage stems to a significant extent from the growing practical relevance of eHealth programs across the world as well as the difficulties often associated with their implementation. As such, Bhattacharjee and Hikmet (2007) and Lapointe and Rivard (2005) offer recent analyses on user resistance within the eHealth context. Indeed, user resistance in this sector might not come as a surprise as doctors in most countries have traditionally benefitted from great liberties with regards to how they conduct their work (Walter and Lopez, 2008). The introduction of new technologies requires healthcare practitioners to alter their

working processes while integrating technologies that either the hospital management or the government force upon them. As a result, especially in the healthcare sector, a high degree of process virtualization as discussed by Overby (2008) might be met with considerable *resistance* (Avison and Young, 2007; Barth and Veit, 2011).

The Oxford English Dictionary defines *resistance* as the action of resisting, i.e. withstanding an action or effect and trying to prevent it by action or argument. The relevant IS literature uses varying definitions of user resistance to information systems. Lapointe and Rivard (2005) use a semantic analysis to summarize these. They name five common themes of the concept, which can be used as a basic definition: resistance behaviours, object of resistance, perceived threats, initial conditions, and subject of resistance. Indeed, the authors of what are generally regarded as the key conceptual studies on user resistance (please see chapter 2.2.) analyse a number of independent variables leading to it, i.e. one's own feeling of a loss of power, feelings of resentment due to the introduction of a new information system or the influence of colleague opinion. Noticeably, these factors concern either the individual user itself or the user's perceived organizational climate. These are factors *internal* to the organization. To our knowledge, *external* independent variables, i.e. the user's perceived environmental climate, have only marginally been accounted for in the literature.

However, when looking at the implementation of national IS programs, such as large-scale eHealth programs, one cannot ignore the influence of such *external* forces on individual user behaviour (Currie and Guah, 2007). The relevant literature explains these forces in the form of institutional pressure defined as coercive, mimetic and normative pressures (Currie, 2012; DiMaggio and Powell, 1983; Mignerat and Rivard, 2012): coercive pressure is formal and informal pressure exerted on organizations by other organizations on which they are dependent as well as by cultural expectations in the society within which this organization functions (DiMaggio and Powell, 1983). Within the healthcare sector the regulating government can exert coercive pressure as it pushes for the national rollout of eHealth technologies (Jensen et al., 2009). Mimetic pressure is the tendency to imitate the actions of structurally equal organizations perceived as successful. In the eHealth context, mimetic pressures can be a powerful force as medical doctors feel the need to have best practice treatment or latest-standard technology. This is true particularly when they are faced with high uncertainty regarding the political background and practical implementation of often highly complex eHealth infrastructures (Currie, 2012). Finally, normative pressure corresponds to the "institutional norms regarding an IS implementation shaped by members of an organizational field like suppliers, customers, consultants" (Liang et al., 2007). Normative pressures in the context of eHealth are for example technological trends which doctors will follow for compliance reasons (Jensen et al., 2009).

Mignerat and Rivard (2012) and Daniels et al. (2002) argue that institutional pressures influence an individual's behaviour. This is of particular importance as the ultimate users of eHealth technologies are not the government or hospital management often responsible for the rollout, but the individual doctors, be it in their own practice or within a hospital. "It is therefore important to examine the content of institutional logics, by investigating the specific belief systems as they are understood and interpreted by field members" (Currie and Guah, 2007; Scott, 2001). Finally, failure to account for the influence of institutional pressures can cause adverse reaction amongst users. Oliver (1991) show that firms may engage in defensive action due to institutional pressure while Currie and Guah (2007) point out that doctors perceive their key task as treating patients not perform administrative tasks. eHealth technologies which require them to increasingly do the latter might not fit their self-perceived professional role leading to user resistance.

The aim of this paper is to measure the influence of institutional pressures on individual user resistance. We use data on the implementation of the Electronic Health Card ('eGK') in Germany. The case of the 'eGK' is a particularly emotive one, as the introduction of this technology has been met with considerable resistance amongst medical doctors for more than ten years, not the least due to its reforming nature of the general German healthcare market as well as overall costs for the rollout

already reaching 1 billion €. We therefore examine the following research question: How do institutional pressures influence individual user resistance and how do they shape national IS implementation programs, such as large-scale eHealth programs?

Following, in section 2 we will separately review the literature on the role of institutional pressures in national eHealth programs as well as the literature on user resistance theory. On this basis, our hypotheses regarding the influence of several independent variables on individual user resistance are discussed in section 3. We explain Kim and Kankanhalli's (2009) 'Status Quo Bias Model' to which we add institutional factors as independent variables. This allows us to test their effect on individual user resistance, which, to our knowledge, we are the first to do in a quantitative resistance model. The results are shown in section 5. The model aims to explain the case of the German eHealth program, the 'eGK', and will provide a foundation for extrapolating explanations for other national information system implementation programs as described in sections 6 and 7.

## **2 Theoretical background**

### **2.1 Literature on the role of institutional pressures in national eHealth programs**

Strikingly most studies within the literate landscape on eHealth lay their focus on implementation programs at an organizational level, i.e. a hospital. We have conducted a systematic literature review building on Romanow et al.'s (2012) literature review on the topic of eHealth within IS. We have thereby used their exact search criteria and have updated their study with another 14 papers published since in one of the most influential journals of the IS field (Basket of Eight Journals – Association for Information Systems, 2011). Our screening of all 232 papers for those that examine large-scale eHealth programs beyond just a limited number of organizations or hospitals shows, that just 33 papers use a so-called macro-economical perspective examining eHealth implementation on a national scale. As such, these 33 papers look at countrywide eHealth programs in e.g. the U.K., the U.S., Denmark and several emerging countries. They furthermore offer an extensive but not always coherent list of explanations why such large-scale programs can fail: high initial expectations (Sauer and Willcocks, 2007), long-term immobility of large stakeholders (Aanestad and Jensen, 2011), the failure to standardize information infrastructures (Braa et al., 2007) or the failure to understand the wider socio-political and inter-organizational environment (Currie, 2012) to name some. Besides, institutional pressures were often named as drivers of large-scale eHealth implementation programs. As Davidson and Chismar (2007) explain, institutional and technological changes are often closely related. We have identified 7 papers within the 33, that examine the effects of institutional factors (Currie, 2012; Currie and Guah, 2007; Jensen et al., 2009; Mekonnen and Sahay, 2008; Miscione, 2007; Noir and Walsham, 2007; Sahay et al., 2009). Noticeably all 33 papers on national eHealth programs are case studies based on qualitative data. To our knowledge the influence of institutional factors has not been examined using quantitative data in the context of national eHealth programs.

### **2.2 Literature on resistance theory**

Information systems research has focused heavily on technology acceptance, adoption or diffusion with 345 articles published over the past 20 years to be found within the Science Citation Index or within the Social Science Citation Index (Dwivedi et al., 2011; Williams et al., 2009). A variety of models ranging from TRA, TAM, TPB, IDT to UTAUT and their combination have been employed by researchers to explain these phenomena (Venkatesh et al., 2003). Nonetheless, user resistance and its power to undermine the implementation of information systems should not be ignored. Despite being often considered as the opposite of acceptance (Venkatesh et al., 2003; Venkatesh and Davis,

2000), user resistance has also been identified as a separate success factor in information system research as early as the 1980s (Markus, 1983). Indeed, more recent studies show that acceptance and resistance cannot be treated as bare opposites as the inhibitors to system usage, i.e. perceptions about a system’s attributes, often differ from positive beliefs about the same system. The absence of beliefs therefore does not necessarily encourage system usage (Cenfetelli, 2004).

We have conducted a systematic literature review in order to single out the theoretical contributions on user resistance within the information systems literature building on Okoli and Shabram (2010) and Webster and Watson (2002). We first used a keyword search identifying nine relevant articles from the most influential IS journals. After that we conducted a round of cross-referencing and found another four relevant articles. These 13 papers, as shown in table 2, therefore also include those, which Lapointe and Rivard (2005) classify as the papers that have “opened the black box and proposed theoretical explanations of how and why resistance occurs”. They also match the research discussed by Dwivedi et al. (2011) in their chapter on user resistance.

Paper	Technology examined	Independent variables connected to user’s...		
		...own characteristics	...perceived organizational environment	...perceived institutional environment
Bhattacharjee and Hikmet (2007)	eHealth systems	X		
Cenfetelli (2004)	N/A	N/A – Theoretical contribution		
Eckhardt et al. (2009)	CV databases	X	X	X
Ferneley and Sobreperez (2006)	1. automated order system, 2. public sector reporting system	X	X	
Joshi (1991)	1. clinical laboratory system, 2. banking system	X	X	
Kim and Kankanhalli (2009)	Enterprise portal and knowledge mgmt. system	X	X	
Klaus and Blanton (2010)	Various enterprise systems	X	X	
Lapointe and Rivard (2005)	eHealth systems	X	X	
Lapointe and Rivard (2012)	Various enterprise systems	N/A		
Marakas and Hornik (1996)	Unspecified enterprise system	X	X	
Markus (1983)	Financial information system	X	X	
Martinko et al. (1996)	Unspecified enterprise system	X	X	
Meissonier and Houzé (2010)	Enterprise resource planning system	X	X	

Table 1. Theoretical contributions to user resistance within IS literature

All of the above authors offer theoretical explanations of user resistance and explain resistance pre, during and post implementation of a new information system. While doing so, all studies examine the influence of independent variables on user resistance, which are connected to either the individual system user or their perceived organizational environment. Independent variables connected to the individual user itself for example include one’s self-efficacy for change, one’s own resentment to a technology or one’s prior experience with other system implementations. On the perceived organizational level, i.e. what the individual user perceives the organizational climate to be, independent variables include colleague opinion or organizational support. Only Eckhardt et al. (2009) point out the importance of social influence on adoption and non-adoption taking into account antecedents on the individual, perceived organizational as well as arguably the perceived institutional level, the latter by examining the effect of customers on user resistance.

### **3 Model development**

The theoretical model in this study extends the current resistance theory by measuring the influence of a user's perceived institutional environment on her disposition to resist a new technology. We extend the 'Status Quo Bias Model' used by Kim and Kankanhalli (2009) by testing for the effects of coercive, mimetic and normative institutional pressures on user resistance. The 'Status Quo Bias Model' builds on the notion that people have a "preference for maintaining their current status or situation" (Kim and Kankanhalli, 2009). According to Samuelson and Zeckhauser (1988) this holds true because of three reasons: rational decision making, cognitive misperceptions or psychological commitment. Respectively, an individual therefore rationally selects the alternative with the highest expected utility, is likely to weigh potential losses incurred from a switch higher than potential gains and is psychologically influenced by sunk costs in her decision making. All this leads her to favour the status quo over a potential change. Further support for this approach can be found by the fact that "social systems share with biological systems the characteristic of "homeostasis", or the tendency to maintain status quo by resisting change and reverting back to the original state" (Bhattacharjee and Hikmet, 2007). Finally, we have chosen the 'Status Quo Bias Model' as it is, while building on well-established constructs and items applicable to IS implementation in varying contexts, particularly fitting to the context of eHealth wherein doctors take pride in their traditional ways of working and therefore have a strong inclination to retain their status quo: "Because IT (such as clinical decision support systems) may, to certain degree, codify expert knowledge possessed by physicians and the problem-solving process previously known only to physicians, physicians may perceive it as threatening to their professional autonomy" (Walter and Lopez, 2008).

By extending the model through the integration of institutional forces as independent variables we follow Kim and Kankanhalli's (2009) call to look at how normative forces affect resistance behaviour. We go further to also account for coercive and mimetic forces in order to measure the influence of collective institutional forces on individual user resistance (Currie, 2012; DiMaggio and Powell, 1983; Liang et al., 2007). We also reason our model, from the literature on national eHealth programs that has recurrently stated the importance of institutional factors: "Recognizing that coercive, mimetic and normative pressures have led to organizational practices and procedures in the [UK National Health Service] to become institutionalized over several decades, new pressures to deinstitutionalize working practices, particularly from external forces, are likely to produce disruptive change, environmental jolts or even industry unrest" (Currie and Guah, 2007; Meyer et al., 1990; Scott et al., 2000).

#### **3.1 Contextual background**

National eHealth implementation programs have been discussed in the context of various countries. Still the introduction of the German 'eGK' technology offers a particularly interesting case for deducing further insights on the difficulties associated with such implementation programs. In 2002, with first national eHealth programs globally rolled out, the lead associations of payors (health insurers) and providers (doctors) decided to collectively implement the German health card, the 'eGK', to allow patients to benefit from technologies such as electronic medical records (EMR) or personal health records (PHR). In 2004, the law to modernize the public German health insurance system (§ 291 Abs. 2a SGB V) was changed to take into account the 'eGK'. A special purpose vehicle, the 'gematik', was founded in 2005 to carry out the conceptual and operational realization of the 'eGK'. Importantly, the 'gematik' is governed to equal parts by both the lead associations of payors and providers to ensure an equal say in any decision-making process.

While initial plans aimed for a full rollout of the 'eGK' technology by January 2006, little progress had been made by then. Both payors and providers agreed on a re-evaluation of the costs and benefits. The result was positive stating substantial cost saving potential associated with the new ways of

working with the ‘eGK’. In 2007, the technology was tested in a first field-test including 10,000 patients in six test regions across Germany. However, the results did not show the desired outcome: first signs of user resistance emerged as registered doctors complained about technology- and process-related problems. In 2009, still no progress had been made as payors and providers struggled to agree on technological standards, functionality and costs. The payor lead association called for a disentanglement of the technological complexity. However, open resistance to each other’s demands did not decrease. To date, with yet another re-evaluation aiming to further reduce the technological complexity commissioned in 2010, the current state of the ‘eGK’ technology has not even been tested. At the same time, recently published figures estimate the overall cost of the project around 1 billion €.

### 3.2 Hypotheses of the ‘Extended Status Quo Bias Model’

Based on these findings we have chosen to extend the ‘Status Quo Bias Model’ as used by Kim and Kankanhalli (2009) in order to test for individual user resistance to the ‘eGK’ amongst German doctors. Below we present our hypotheses:

Like Kahneman and Tversky (1979) and Kim and Kankanhalli (2009), we conceptualize *perceived value* as the “perceived net benefits relative to the costs of a new IS-related change”. Users will therefore always evaluate their benefits from switching to the new technology against their costs. Thus, if the perceived value of the new technology is low, users are more likely to resist it as they tend to maximize their value in their decision making process. We propose:

*H1: Perceived value has a negative effect on user resistance.*

We conceptualize *switching costs* as the “perceived disutility a user incurs by switching from the status quo to the newly introduced information system” (Kim and Kankanhalli, 2009). As per status quo bias theory this includes transition costs, uncertainty costs, and sunk costs (Samuelson and Zeckhauser, 1988). Switching costs are likely to directly affect user resistance as all three types of costs bias a user to the status quo through transient costs, the feeling of incompetence and lastly the resistance to forgo past investments made. Thus:

*H2: Switching costs have a positive effect on user resistance.*

Switching costs will also indirectly affect user resistance through perceived value. One can therefore expect higher switching costs to decrease the net benefit of changing to the new IS, negatively affecting the perceived value of IS (Kim and Kankanhalli, 2009). Therefore:

*H3: Switching costs have a negative effect on perceived value.*

We define *switching benefits* as the “perceived utility a user enjoys by switching from the status quo to the new IS” (Kim and Kankanhalli, 2009). Benefits include for example an enhanced personal performance and further rewards associated with the switch. This will increase the value of switching:

*H4: Switching benefits have a positive effect on perceived value.*

The ease with which users can master the challenges or avoid the threats associated with the switch to the new IS are represented by *self-efficacy for change*, i.e. an individual’s confidence in his or her own ability to adapt to the new situation (Bandura, 1997; Klaus and Blanton, 2010; Martinko et al., 1996). A person more comfortable with her own capabilities will therefore less likely resist the introduction of a new technology. At the same time, high self-efficacy for change means that users are less anxious or uncertain about a switch to a new system and will tackle their adaption and learning in a focused manner. High self-efficacy for change will therefore very likely decrease uncertainty and transition costs (Kim and Kankanhalli, 2009). Therefore:

*H5: Self-efficacy for change has a negative effect on user resistance.*

*H6: Self-efficacy for change has a negative effect on switching costs.*

Like Kim and Kankanhalli (2009) we define *colleague opinion* as the “perception that colleagues favour the changes related to a new IS implementation“. Colleagues influence users in a normative fashion. As a user sees colleagues with the new technology she might either see the need for companionship or might fear being sanctioned for non-compliance (Ajzen 2002; Lewis et al. 2003):

*H7: Favourable colleague opinion has a negative effect on user resistance.*

User’s perception of switching costs and benefits will further be altered as they internalize the information obtained from their colleagues (Burnkrant and Cousineau 1975). Colleagues’ positive opinion can therefore reduce a user’s uncertainty over the new IS and decrease perceived switching costs or equally lead to an increase in perceived benefits of switching. Thus:

*H8: Favourable colleague opinion has a negative effect on switching costs.*

*H9: Favourable colleague opinion has a positive effect on switching benefits.*

As Liang et al. (2007) point out “external forces, no matter how strong they are, will have no effect on the behaviour of an organization without first affecting the behaviour of human agents within the organization“. External factors can therefore be seen as directly influencing individual user behaviour. Indeed, a user’s perception of switching costs and benefits will be altered as they internalize the information obtained from others. For example, a colleague’s positive opinion can reduce a user’s uncertainty over the new IS and decrease perceived switching costs as described above (Burnkrant and Cousineau, 1975; Kim and Kankanhalli, 2009). This argument about the internalization of information also holds as users internalize the information they receive from outside an organization i.e. through institutional pressures such as the opinion of the broader public. As such, *favourable coercive pressure*, for example through government regulation, influences a user to switch to a new system. We therefore argue:

*H10: Favourable coercive institutional pressure has a negative effect on switching costs.*

*H11: Favourable coercive institutional pressure has a positive effect on switching benefits.*

As above, we build on the argument about the internalization of information and argue that favourable *mimetic institutional pressure* will affect individual user behaviour. Accordingly, individuals copy the choices, which their competitors make. They will therefore use a new technology either because the majority of their competitors are using it or because they perceive their key competitors to be more successful as a result of using the technology (Teo et al., 2003). Furthermore, users might feel the need to use a new technology in order to reach the latest standards, especially in a context of political ambiguity as well as ambiguity about the practical execution of the IS program (Currie, 2012). Thus:

*H12: Favourable mimetic institutional pressure has a negative effect on switching costs.*

*H13: Favourable mimetic institutional pressure has a positive effect on switching benefits.*

According to social contagion literature, stakeholders within the institutional field, i.e. suppliers and customers, often set new market standards as they make use of a new technology. As an organization learns more and more about a new technology and the benefits and costs associated with it, it will eventually be persuaded to assimilate (Burt, 1982; DiMaggio and Powell, 1983). Within the healthcare context, medical technology providers can for example exert the relevant *normative institutional pressure* through the continuous development of such new technologies. Although patients nowadays also take a greater part in the healthcare governance system we do not treat patients as the equivalent of consumers as “attempts to treat the patient as consumer further departed from institutional norms” Currie (2012). In fact, the doctors themselves are the consumers of the new technologies. Again building on the above argument about the internalization of information we argue that:

*H14: Favourable normative institutional pressure has a negative effect on switching costs.*

*H15: Favourable normative institutional pressure has a positive effect on switching benefits.*



Finally, unlike Kim and Kankanhalli (2009), we do not test for *organizational support*, the “perceived facilitation provided by the organization to make users’ adaptation to new IS-related change easier“ as doctors in Germany are usually self-employed and therefore represent the organization itself.

## 4 Research Methodology

### 4.1 Sample, data collection procedure and measurement of constructs

Given that the goal of this study is to empirically test for the influence of institutional pressures on German doctors’ resistance to the ‘eGK’ technology we aimed at reaching both a large as well as representative sample. We thus collected data through a broad field study involving German doctors who will be supplied with the ‘eGK’ technology. All constructs are reflective measures. The items were translated into German so that all participants could answer in their mother tongue in order to achieve face and content validity of the scales (Moore and Benbasat, 1991). They were furthermore rephrased to fit the subject of the ‘eGK’ system. Given that the constructs had to be translated into German, we conducted two rounds of item sorting, whereby two independent groups of judges, both academic researchers as well as subject experts, were asked to place the items to the corresponding constructs. This ensured inter-rater reliability (Moore and Benbasat, 1991). The measurement items were anchored on a seven-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’.

To achieve a comparability of results to Kim and Kankanhalli’s (2009) original framework, we based our scales for user resistance, perceived value, switching benefits and costs, self-efficacy for change and colleague opinion closely on theirs, which are in turn based on validated scales. For the measures of coercive and normative pressure we built on Liang et al. (2007). For mimetic pressure we built on Liang et al. as well as Teo et al. (2003). Where applicable we added items to create a better contextual fit to our study. For reasons of consistency along our questionnaire, we also placed these items on a seven-point Likert scale as oppose to the five-point scale used by Liang et al. (2007). (Please see Appendix for detailed description of scales and items). We have conducted a pilot study to evaluate and refine our measures (Moore and Benbasat, 1991). We distributed the study to 1,000 doctors receiving 85 responses. Of these n=53 completed questionnaires were used to test the hypotheses. Although the sample of the pilot study was relatively small, all computed reliabilities of the scales showed that they were appropriate for the use in a larger study (Brown and Venkatesh, 2005).

The data of the subsequent main study was collected using an online survey distributed to 7,000 doctors of different specializations across Germany. The email addresses were purchased from a specialized provider ensuring a representative sample across specialized profession (for example general practitioner, surgeon, oculist etc.), gender and region. In total, 590 doctors responded to the questionnaire, out of which 351 doctors answered the questionnaire in full. Only fully answered questionnaires were used to test the hypotheses of our model. 81% of the 351 doctors were male. To evaluate the possibility of response bias we examined how well the data represented the German population of doctors. The average respondent was between 45 and 59 years old corresponding to the average age of doctors in Germany. Overall, doctors of more than 20 specializations participated in the survey, of which approximately 50% were general practitioners. Importantly all doctors answered themselves, none had their receptionist answer for them.

### 4.2 Analysis

Smart PLS Version 2.0.M3 was used to analyse the data (Ringle et al., 2005). Typically, PLS models are assessed in two stages, the first being the analysis of the “reliability and validity of the measurement model” and the second being the analysis of the structural model itself (Hulland, 1999). In order to test the validity of our model we performed tests also recommended by prior researchers

using partial least squares analysis (Brown and Venkatesh, 2005; Chin, 1998; Gefen and Straub, 2005; Hulland, 1999). The results are summarized in Table 3. As such, convergent item validity is measured using three criteria: First of all, each item should load significantly on their respective constructs with the threshold of the loading often described at 0.70 or above (Gefen and Straub, 2005). Secondly, Hulland (1999) suggest that the composite reliabilities should be greater than 0.70, while thirdly, the average variance extracted (AVE) for each construct should be greater than 0.50 (Bhattacharjee and Premkumar, 2004). All these criteria are met by our data.

Construct	Mean	STD	CR	AVE	1	2	3	4	5	6	7	8	9
Coercive pressure	5.50	1.63	.88	.72	.85								
Colleague opinion	1.72	1.02	.92	.79	-.38	.89							
Mimetic pressure	2.49	1.37	.89	.74	-.20	.43	.86						
Normative pressure	5.90	1.39	.96	.89	.48	-.19	-.04	.94					
Perceived value	2.02	1.52	.96	.88	-.43	.64	.49	-.21	.94				
Self-efficacy for change	3.68	1.89	.93	.81	-.21	.25	.17	-.06	.30	.90			
Switching benefits	1.89	1.39	.98	.91	-.42	.67	.51	-.20	.87	.26	.95		
Switching costs	5.16	1.74	.92	.78	.38	-.49	-.30	.17	-.59	-.50	-.55	.89	
User resistance	5.09	1.88	.92	.74	.39	-.46	-.37	.20	-.69	-.25	-.63	.60	.86

Note: STD: standard deviation, CR: composite reliability, AVE: average variance extracted

Table 3. Correlations and measurement information

Discriminant validity is established by ensuring that the square root of AVE of a construct exceeds the correlations between this construct and the other constructs of the model (Bhattacharjee and Premkumar, 2004; Fornell and Larcker, 1981; Gefen and Straub, 2005). As shown in Table 3, the square roots of all constructs are larger than the correlation of that construct with others (with the square root of the construct’s AVE reported on the main diagonal, the off-diagonal cells showing the correlation between that construct and the others).

## 5 Results of hypothesis testing

We tested the hypotheses behind our model by examining the significance of the parameter estimates. We used bootstrapping with  $m = 1,000$  samples and  $n = 351$  cases. The results confirm H1, the negative effect of perceived value on user resistance ( $\beta = -0.526, p < 0.01$ ) as well as H2, the positive effect of switching costs on user resistance ( $\beta = 0.327, p < 0.01$ ). Besides, switching costs and switching benefits were measured to have a significant effect on perceived value ( $\beta = -0.156, p < 0.01$ ) and ( $\beta = 0.783, p < 0.01$ ) respectively, also confirming H3 and H4. These findings are also in line with Kim and Kankanhalli’s (2009) original ‘Status Quo Bias Model’. As suggested by H6, self-efficacy for change showed a significant negative effect on switching costs ( $\beta = -0.372, p < 0.01$ ). Just as in the original model, self-efficacy for change has no direct significant effect on user resistance. The effects of colleague opinion also mirror those found in the original model, with significant effects measured on switching costs ( $\beta = -0.300, p < 0.01$ ) and switching benefits ( $\beta = +0.482, p < 0.01$ ), but no significant direct effect on user resistance.

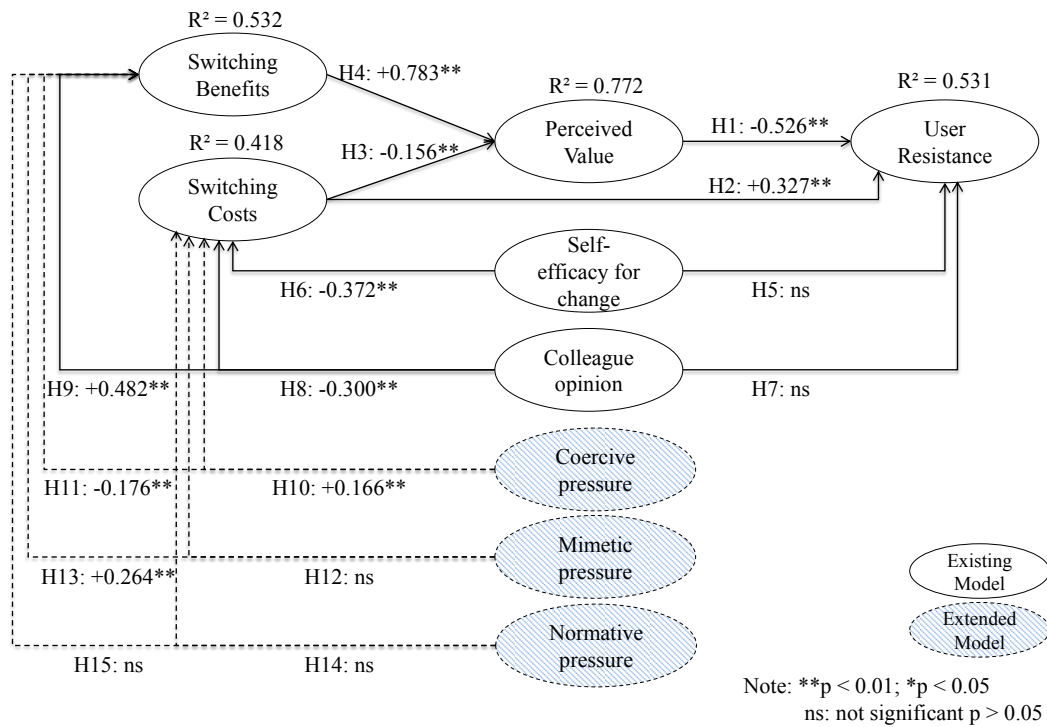


Figure 1. Research model: 'Extended Status Quo Bias Model'

With regards to the three institutional pressures, coercive pressure was found to have a significant effect, both on switching costs ( $\beta = +0.166$ ,  $p < 0.01$ ) and switching benefits ( $\beta = -0.176$ ,  $p < 0.01$ ). Yet, while we hypothesised a negative effect of favourable coercive pressure on switching costs, H10, and a positive effect of favourable coercive pressure on switching benefits, H11, these effects were in fact inversed. Mimetic pressure was found to have a significant effect on switching benefits ( $\beta = +0.264$ ,  $p < 0.01$ ) but not on switching costs. We therefore accept H13, but reject H14. Normative pressure had no significant effect on switching benefits and costs and we reject H14 and H15 based on our sample. Overall, the model was able to explain a substantial proportion of the variance of doctors' user resistance to the 'eGK' technology ( $R^2 = 0.531$ ).

## 6 Discussion and implications

### 6.1 Discussion of findings

The goal of this study was to measure the influence of institutional factors on an individual's decision to resist to a new technology. Previous research has suggested that particularly in the healthcare sector, institutional pressures have shaped large-scale IS programs. They can often be longsome and costly, due to their complex nature involving multiple stakeholders. These stakeholders, amongst others institutions such as the government, lead associations of both payors and providers or the medical technology industry exert institutional pressures and therefore play a significant role in shaping individual doctors' opinions on new eHealth technologies, such as the 'eGK'. As a main lesson learnt this paper therefore not only empirically supports this notion but also systematically explains which institutional pressures take which effect on users' behaviour.

Based on our data, the case of the 'eGK' shows that, against initial intuition, *coercive institutional pressures* negatively influence switching benefits and positively influence switching costs. This can be

interpreted as a sort of refusal to obey to rules and regulations. As a result of coercive pressure doctors resist the 'eGK' as they perceive not an increase, but rather a decrease in utility from switching to the new technology. The government or lead associations putting further pressure on them to adopt the new technology in fact stir them further away from doing so. Indeed, in Germany doctors have repeatedly voiced their concerns in reaction to further advancements to roll out the 'eGK' technology, for example at the Congresses for Physicians (Ärztetag) in 2007, 2008, 2009, 2010 and 2012. Similar findings were confirmed in other eHealth contexts too: "Coercive pressures to encourage regional hospitals to become more like teaching hospitals, and for IT literacy to increase among all health practitioners, tended to produce the opposite results insofar as these organizations reiterated their differences" (Currie, 2012).

The positive influence of *mimetic pressure* on doctors' switching benefits has a depleting effect on user resistance. Although the 'eGK' technology is still in its early implementation phase mimetic forces, such as how the government, the industry, patients and even other doctors will perceive a user as the result of employing the technology, will positively influence her utility from a switch to the 'eGK'. This can be the case both because in the long run she perceives the majority of competitors adopting the new technology or because she actually believes that adopters of the new technology will be more successful (Teo et al., 2003). In any case, the implications of the 'eGK' implementation on doctors' ways of working remain unclear at this stage. This uncertainty has shown in other cases to further foster mimetic pressure as it is also likely the case in our study (Currie, 2012). Our results show that at the current stage of the 'eGK' implementation *normative pressures* have no significant effect on user resistance. As such, standards and norms set by the overall healthcare market have not gone as far as to influence doctors' utility or disutility from a switch towards the 'eGK'. This might be explained by the fact that technological development is still in its early stage and doctors do not yet feel the need to comply with the wider social expectations (Jensen et al., 2009).

Throughout the implementation process of the 'eGK' technology and particularly during the first practical tests in 2007, doctors have repeatedly voiced their concerns, naming technological complexity as a key reason for continued resistance to the new technology. Our model supports this notion showing the significant effect of self-efficacy for change on switching costs and benefits. Our study is in line with previous studies on this effect as suggested by Kim and Kankanhalli (2009) and Venkatesh (2000) given that switching costs also include the ease of learning a new IS. Our results furthermore show a significant effect of colleague opinion on a user's switching benefits and costs. While doctors in Germany can work in their own practice with little direct working contact to other doctors the introduction to the 'eGK' has caused the formation of various platforms where doctors directly exchange their opinion of this new technology, for example the platform 'Action: Stop the 'eGK'' (Aktion: Stoppt die 'eGK'). This normative effect is in line with Kim and Kankanhalli's (2009) original findings who argue that the normative informational influence of colleague opinion influences user resistance mediated through perceptions of switching costs and switching benefits.

## 6.2 Theoretical and practical implications

On the theoretical side, this study extends Eckhardt et al.'s (2009) research, who analysed the influence of normative beliefs on adoption and non-adoption. We systematically account for all factors of institutional theory, namely coercive, mimetic and normative pressures. We have found that coercive and mimetic pressures have significant indirect effects on an individual user's decision to resist a technology. Normative pressures do not appear to be significant on the basis of our sample. Further, our study is, to our knowledge, the first to examine the influence of institutional pressures on user resistance based on quantitative data. We have found support for the findings from qualitative studies on the influence of coercive and mimetic pressures on user behaviour within large-scale eHealth implementation programs (Currie, 2012; Jensen et al., 2009).

On the practical side, our study provides an inside on the difficulties governments might be faced with when rolling out large-scale IS infrastructures, particularly in the healthcare sector. It therefore offers an insight into which strategy governments might want to follow as they decide on implementing eHealth technologies. Indeed, they have to weigh up between following a rather coercive push-strategy, whereby they force the technology upon users, or a rather mimetic or normative pull-strategy, whereby they create demand from the users, their customers and their suppliers alike. Our study shows that coercive pressure can be negatively perceived and continued pressure might in fact lead to increasingly adverse reactions and higher user resistance. Instead, governments might therefore want to follow a strategy whereby users start to build up a positive association with the new technology. Positive mimetic pressure created amongst the doctors themselves will subsequently increase their utility from switching towards the new technology. This notion is further supported by the positive effect of colleague opinion on switching benefits as it can also act like a normative force.

### **6.3 Limitations and further research**

Notwithstanding its contribution this study has some limitations, which should be addressed by future research. Firstly, our response rate to the questionnaire was around 5%. We have conducted our research in a highly professional environment where data is known to be particularly difficult to obtain. Doctors often have very little time while being swamped with surveys and they are concerned about the confidentiality of results (Asch et al., 2000; Kottke et al., 1990; VanGeest et al., 2007). Still, nonresponse bias has been discussed to be less of a concern for physician surveys (Flanigan et al., 2008; Kellerman and Herold, 2001). Further, the overall sample size of  $n = 351$  as well as the fact that we have checked for representativeness using several control variables as described in section 4.1 allowed us to run a meaningful analysis.

The eHealth sector lends itself particularly well to observing institutional pressures on an individual's decision to reject a new technology, given the strong influence of governmental and other regulatory bodies. Further studies should be conducted in the context of other relevant nationwide IS programs. This will help to overcome possible limitations in terms of generalizability of our results. Finally, although Kim and Kankanhalli's (2009) original 'Status Quo Bias Model' was a good initial starting point to test our hypotheses, especially as we were able to confirm the significant relationships established in the model, we would encourage future researchers to further develop our model. As such, they could test for the influence of institutional pressures on user behaviour accounting separately for the influence of different institutional stakeholders.

## **7 Conclusion**

In summary, by testing the 'Extended Status Quo Bias Model' the contribution of our work is threefold: Firstly, we add to the existing literature on national eHealth programs a study that underlines the notion of the strong influence of institutional pressure on eHealth implementation programs as most recently suggested by Currie (2012). Secondly, we contribute to the relatively scarce literature on user resistance a quantitative model that incorporates previously untested independent variables systematically accounting for the effect of institutional pressures on user resistance. Finally, we provide insights to governments as well as managers in the eHealth sector on why users can resist healthcare technologies. This is particularly relevant as this sector has seen an increasing amount of process virtualization while doctors hold on to their liberties in terms of ways of working (Dwivedi et al., 2011; Overby, 2008; Walter and Lopez, 2008).

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## Appendix – Scales and Items

Construct	Item	Source
User resistance	I will not comply with the change to the new way of working with the 'eGK'	Kim and Kankanhalli (2009)
	I will not cooperate with the change to the new way of working with the 'eGK'	
	I oppose the change to the new way of working with the 'eGK'	
	I do not agree with the change to the new way of working with the 'eGK'	
Perceived value	Considering the time and effort that I have to spend, the change to the new way of working with the 'eGK' is worthwhile	Kim and Kankanhalli (2009), Sirdeshmukh et al. (2002)
	Considering the loss that I incur, the change to the new way of working with the 'eGK' is of good value	
	Considering the hassle that I have to experience, the change to the new way of working with the 'eGK' system is beneficial to me	
Switching benefits	Changing to the new way of working with the 'eGK' would enhance my effectiveness on the job than working in the current way	Kim and Kankanhalli (2009), Moore and Benbasat (1991)
	Changing to the new way of working with the 'eGK' would enable me to accomplish relevant tasks more quickly than working in the current way	
	Changing to the new way of working with the 'eGK' would increase my productivity than working in the current way	
	Changing to the new way of working with the 'eGK' would improve the quality of the work I do than working in the current way	
Switching costs	I have already put a lot of time and effort into mastering the current way of working	Kim and Kankanhalli (2009), Jones et al. (2000)
	It would take a lot of time and effort to switch to the new way of working with the 'eGK'	
	Switching to the new way of working with the 'eGK' could result in unexpected hassles	
	I would lose a lot in my work if I were to switch to the new way of working with the 'eGK'	
Self-efficacy for change	Based on my own knowledge, skills and abilities, changing to the new way of working with the 'eGK' would be easy for me	Kim and Kankanhalli, (2009), Taylor and Todd (1995)
	I am able to change to the new way of working with the 'eGK' without the help of others	
	I am able to change to the new way of working with 'eGK' system reasonably well on my own	
Colleague opinion	Most of my colleagues think the change to the new way of working with the 'eGK' is a good idea	Kim and Kankanhalli (2009), Venkatesh and Davis (2000)
	My peers are supportive of the change to the new way of working with the 'eGK'	
	Most people whom I deal with in my job encourage my change to the new way of working with the 'eGK'	
Coercive pressure	The government requires our firm to use the 'eGK'	Liang et al. (2007)
	The lead associations of the payor organisations require our firm to use the 'eGK'	
	Our patients require our firm to use the 'eGK' *	Based on related scales
	I feel pressure from the government to use the 'eGK'	
Mimetic pressure	Our competitors who will adopt the 'eGK' will greatly benefit	Liang et al. (2007) and Teo et al. (2003)
	Our competitors who will adopt the 'eGK' are favourably perceived by other doctors in the same industry	
	Our competitors who will adopt the 'eGK' are favourably perceived by the industry as well as patients	
Normative pressure	The government supports the adoption of the 'eGK'	Authors based on Liang et al. (2007)
	The industry supports the adoption of the 'eGK' **	
	The extend to which the government promotes the 'eGK' influences me to use the 'eGK'	
	The affirmative position of the government encourages me to use the 'eGK'	
Note: *Item dropped as patients are not treated as the equivalent of customers; in fact doctors themselves are customers of eHealth technology (Currie, 2012); ** Item dropped from further analysis for statistical reasons		