Why People Reject or Use Virtual Processes: Understanding the Variance of Users' Resistance

Completed Research Paper

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Abstract

The globalization and the continuing growth of internet-based processes and services makes it necessary to examine the emerging user resistance phenomenon from a new theoretical perspective. In order to verify the user resistance's core claims, we designed a research model and subsequently developed measurement instruments to empirically analyze and test why people reject or use a process in a virtual environment. Therefore we investigated the "airport check-in" process as our process of interest and conducted a questionnaire-based survey with 183 participants in total. The survey was carried out at Frankfurt Airport as well as at Leipzig Airport in Germany. The results indicate that perceived process characteristics, service quality and net benefit play an important role in user resistance towards conducting a process virtually. We provide empirical evidence for the validity of user resistance, and demonstrate that our model is statistically significant and well constructed.

Keywords: User resistance, process characteristics, process virtualization theory, service quality, net benefit

Introduction

The ongoing growth of world-wide globalization and the possibility to use new innovations of the digital economy result in the fact that more and more processes and services are being virtualized. (Overby 2008). In this new era of E-business, IT has enabled, and in some cases has forced companies to redefine their business models and to reorient their strategy to build more efficient operations and supply chains that reduce time-to-market and costs (Aburukba et al. 2009). Consequently, more and more processes, previously performed traditionally via physical channels, were virtualized via IT in the last decade (Barth and Veit 2011a; Barth and Veit 2011b; Overby 2008). For example, purchasing and shopping processes are virtualized via E-commerce with the effect that nowadays customers can order their products from their home without having to visit the physical store, meet any seller or touch the respective goods (Barth and Veit 2011b). Furthermore, banking and traveling processes, previously carried out over the counter, are performed increasingly on Internet platforms (Balci et al. 2013; Fox and Beier 2006; Pikkarainen et al. 2004). Despite the steady transfer of physical processes into virtual environments, some processes have proven to be more qualified for virtualization than others (Overby 2012). For example, in the private sector electronic shopping of clothes is far less popular than E-commerce of books (Barth and Veit 2011a).

However, despite a fast-growing marketplace and significant efforts made by companies, there is still a widespread reluctance, particularly in the end-user community, to use all those virtual environments. While previous research has proposed a variety of measures of IT-value–productivity, business profitability, and consumer surplus (Hitt and Brynjolfsson 1996), there is a paucity of published research from the perspective of the end-user. Nevertheless, the phenomenon of user resistance with regard to development and implementation of computer-based information systems is extensively studied in academic literature and documented in various forms. User resistance is judged by many IS professionals as the primary reason for the failure of many information systems (Dwivedi et al. 2015; Hirschheim and Newman 1988; Kim and Kankanhalli 2009; Laumer and Eckhardt 2012). In the field of IS, understanding of the realization of a successful implementation of IT systems is a major concern. Users' resistance is one of the key factors, due to the many problems of implementation (Jiang et al. 2000). While all models deal with the concept of loss and risk as a key element for user resistance, it is not clear how users evaluate change related to a new information system and decide to resist it (Kim and Kankanhalli 2009).

Thereby IS researchers analyze the use of IT and user resistance from two perspectives. On the one hand, they try to predict (ex ante) whether a process can be transferred into a virtual environment (Balci et al. 2013; Overby 2012). On the other hand, IS researchers examine (ex post) the reasons why individuals use or reject a virtual process (Overby and Konsynski 2010). So far, there is a need to fill the gap between both perspectives in order to understand what kind of factors actually affect the user resistance to reject technology mediated processes virtually. This leads to our central research question in this paper: *What factors and characteristics of a process affect users to reject the process virtualization?*

In order to address this question, this study aims to integrate the most important factors identified in the existing IS literature into a unified research model in order to enhance the understanding of the phenomenon of "*user resistance towards conducting a process virtually*". For this purpose, we analyzed user resistance from two major points of view: (a) Process characteristics and its influence on user resistance and (b) service quality and net benefit as well as its influence upon user resistance. These two parts of our research will allow us to analyze the reason for the user's resistance to conduct a process virtually from a personal process participant's perspective and from a quality and net benefit perspective. This allows us to detect the reasons for rejection of a process, especially while comparing different virtual processes which all have to serve the same purpose; e.g., different forms of the airport check-in process.

In order to answer our research question, we conducted a questionnaire-based survey with 183 participants in total. The survey was carried out at Frankfurt Airport as well as at Leipzig Airport in Germany. Researchers and practitioners may use our model and findings to better understand the factors that affect user resistance.

The remainder of the paper is structured as follows. At the beginning, we provide an overview of user resistance and its core concepts. Afterwards, we develop and present our extended research model. Then, we describe our research methodology and the data collection process as well as the measurement scales that we developed. We validate the collected data, present our result and discuss which improvements can be made.

Related Work and Theoretical Background

User resistance is an aspect of human behavior, which critically affect the acceptance of technology (Kim and Kankanhalli 2009). The introduction of new technology often brings changes for the user, from the nonessential simple redesign of the interface to profound system modifications. The reactions of the users are all different. Some of them welcome the changes, while others behave resistant (Hirschheim and Newman 1988).

In the literature there are several studies on user resistance. Researchers in the field of IS have been investigating the implementations of IT based processes since the 90s and have come to the conclusion that successes were potentially undermined by user resistance (Marakas and Hornik 1996). In IS research user resistance is conceptualized as a resistive response of a user towards new IS systems (Hirschheim and Newman 1988). Kim & Kankanhalli (2009) explain user resistance as resistance of a user regarding IT-based change. Markus (1983) explains the user resistance in terms of the interaction between system characteristics and the social context of its use. The interaction is considered mainly in the change of intra- organizational power distribution due to the new system, whereby the power loss can lead to resistance of the users group. Marakas and Hornik (1996) explain resistance as reactions to threats that are associated with a new system. In their remarks they lay the focus in-particular on the hidden resistance to implement IT processes. Here they define Passive Resistance Misuse (PRM) as "hidden, awkward behavior" as a consequence of anxiety and stress, which has its cause in the penetration of new technology into the world of the user. Martinko, Henry and Zmud (1996) assume that the individual responses to a new IS are due to internal and external influences. Internal factors involve information and prejudice from past personal experiences. External influences refer to the existing variables in the immediate environment that have an effect on the perceived expectation. These effects are manifested mainly by actors from the social environment of the user. The results are therefore efficacies which involve negative expectation values for user resistance. In their investigations the main focus is the impact of experiences on successful or failed technologies on the resistance of individual users compared with modified or new technologies. According to Joshi (1991) people often do attempt to estimate changes. Conveniently classified changes do not lead to resistance and thus are desirable, while expensive changes are expected to cause resistance.

The discussion of these studies shows a summary of the IS research which offers various concepts for the user resistance and researches the phenomenon from two perspectives (Laumer 2012). On the one hand, there are studies on the causes of resistance (Cenfetelli 2004; Klaus and Blanton 2010). On the other hand, the resulting behaviors that result from the refusal of participants regarding the system use will be explored (Ferneley and Sobreperez 2006; Kim and Kankanhalli 2009). Additionally, there are few publications that explain theoretically how and why resistance occurs (Lapointe and Rivard 2005). The majority of these studies focuses on the behavioral aspects of user resistance and discuss some user resistance as an attitude (Laumer 2011). Furthermore, the majority of these publications mainly relates (Joshi 1991; Kim and Kankanhalli 2009; Lapointe and Rivard 2005; Marakas and Hornik 1996; Markus 1983) to the resistance of compulsory IT implementations within an organizational workplace scenarios at the individual level or the group level (Barth and Veit 2011b; Laumer 2011). In addition, these models do not account for specific process or product properties, but focus on personal, social and organizational factors such as position of power or threats (Barth and Veit 2011b). To summarize, we conclude that any increase of net benefits users perceive concerning the virtualized process variants has a negative effect on user resistance against the process virtualization.

Research Model and Hypothesis Development

Generally, user resistance can be defined *"as the action of resisting, which means withstanding an action or effect and trying to prevent by action or argument"* (Balci et al. 2013, p. 4). In our context user resistance refers to the user's rejection to perform a specific process virtually. Accordingly, it is the purpose of this study to address *resistance towards conducting a process virtually* with the physical alternative and to include it as a dependent variable in the research model. To facilitate the understanding and to illustrate the user's perspective of the independent variables the supplement "*perceived*" is added to each construct (Barth and Veit 2011b, p. 4).

Despite the increasing importance of virtual environments and process virtualization, only a few studies have tried to empirically uncover the effects of different process characteristics that influence people in their perceptions, attitudes, beliefs, and usage of (virtual) processes (Barth and Veit 2011b), or have tried to investigate the reasons why people use or do not use a specific (virtual) process (Overby 2012). For this purpose, Process Virtualization Theory (PVT) has been developed by Overby (2008) in order to explain this variance. PVT provides a theoretical framework which studies the influences on the transformation and migration of a physical process into a virtual environment (Overby 2012). A process is defined as a series of steps that strives to achieve a goal (Overby 2008). However a virtual process is characterized by the removal of the physical interaction (Balci et al. 2013). Thus, an electronic service delivery can be distinguished from the conventional counterpart by the lack of physical interaction between people or people and objects (Overby 2008).

The core of PVT is based on the premise that "*some processes are more amenable to virtualization than others*" (Overby 2008, p. 277). For instance, E-commerce for books has proven very successful to virtualization, whereas online shopping of groceries has proven less well-suited (Overby 2012).

According to the theory, a target group will use a process more often in a virtual manner without causing significant or considerable resistance if the process is more qualified to virtualization (Barth and Veit 2011a; Barth and Veit 2011b). In contrast, the user group will not (or less frequently) execute a process virtually, if the process is less qualified for virtualization (Barth and Veit 2011a; Barth and Veit 2011b). In most cases the users decide whether they perform a process virtually or physically (Barth and Veit 2011a). For that reason, Overby (2008) analyzes the "*virtualizability"* of a process from the user's perspective and not from provider's point of view.

Thereby the dependent variable of the PVT is defined as "*process virtualizability"*, which describes whether and to what extent a process can be carried out virtually "*after the traditional physical interaction between people or between people and objects has been removed*" (Overby 2012, p. 111). The independent variables of the PVT are described as process characteristics, which include four requirements: (a) *sensory requirements*, (b) *relationship requirements*, (c) *synchronism requirements* and (d) *identification and control requirements* (Overby 2008). The first construct *sensory requirements* refers to "the need for process participants to be able to enjoy a full sensory experience of the process and the other process participants and objects" (Overby 2008, p. 280). "The need for process participants to interact with one another in a social or professional context" is defined by the *relationship requirements* (Overby 2008, p. 281). According to Overby (2008, pp. 281-282) the third construct *synchronism requirements* defines "the degree to which the activities that make up a process need to occur quickly with minimal delay". *Identification and control requirements* are the fourth construct proposed to affect *process virtualizability* negatively (Overby 2008). It is defined as "the degree to which the process requires unique identification of process participants and the ability to exert control over/influence their behavior" (Overby 2008, p. 282).

In summary, PVT postulates that each of the four process characteristics presented has a negative effect on the virtualizability of a process, since stronger perceived requirements make it more difficult to transfer a physical process into a virtual environment (Balci et al. 2013). We conclude that process characteristics which have a negative effect on virtualizability, lead to an increase of resistance.

Therefore, these four independent variables are assumed to have a direct positive influence on the dependent variable "*resistance towards conducting a process virtually"* (Balci et al. 2013; Barth and Veit 2011b). Thus, process participants who perceive higher "*sensory requirements"*, "*relationship requirements"*, "*synchronism requirements"*, or "*identification and control requirements"* tend to act resilient towards conducting the respective process virtually (Balci et al. 2013). Consequently, we propose the following hypotheses for our quantitative study:

H1a: The greater the perceived sensory requirements of a process, the higher is the users' resistance towards conducting this process virtually.

H1b: The greater the perceived relationship requirements of a process, the higher is the users' resistance towards conducting this process virtually.

H1c: The greater the perceived synchronism requirements of a process, the higher is the users' resistance towards conducting this process virtually.

H1d: The greater the perceived identification and control requirements of a process, the higher is the users' resistance towards conducting this process virtually.

In addition, we postulate that the *"net benefit"* will affect the "*resistance towards conducting a process virtually"* negatively. Net benefit can be understood as the extent to which IS are contributing to the success of individuals, groups, organizations, industries, and nations (Petter et al. 2008). This definitely leads to leverage users' perceived net benefits such as their increased productivity and an enhanced job performance, etc.. Therefore, we can assume that those users who perceive positive net benefits likely tend to continue to use the virtual processes. For this reason, we also propose:

H2: The higher the perceived net benefit of a process, the lower is the users' resistance towards conducting this process virtually.

Additionally, we postulate a negative relationship between the "*service quality*" and the "*resistance towards conducting a process virtually"*. The user as an essential part of a service process decides through his or her satisfaction with the quality of services (Parasuraman 2002). Often, when quality has been understood as a degree of excellence, it has been equated with *"performance"* and *"effectiveness"* or *"efficiency"* and *"productivity"*; measurement is largely erratic (cf. Shenhav et al. 1994 for a detailed discussion in organization studies). Accordingly, service quality is defined as how well a delivered service level matches customer's expectation (Anupindi et al. 2006, p. 234). It can be described as a parameter of how a service adapts and fits to customer requirements. (Chakrabarty et al. 2007). The researchers use the service quality to analyze the user evaluations and the practitioners use the service quality to means of creating competitive advantages and user loyalty (Iacobucci et al. 1995). Therefore, user acceptance and usage of new technologies strongly depends on the general attitude towards technology (Zeithaml 2000). Consequently, we conclude that service quality can have a strong influence on the resistance towards conducting a process virtually. Therefore, we hypothesize that:

H3: The higher the perceived service quality of a process, the lower is the users' resistance towards conducting this process virtually.

However, higher levels of data and service quality are associated with higher levels of net benefits (Wixom and Watson 2001). The expected positive impact of the *"service quality"* regarding the *"net benefit"* is formulated as follows:

H4: The higher the perceived service quality of a process, the higher is the perceived net benefit of this process.

Based on the hypotheses described above, Figure 1 summarizes the research model of our empirical study.

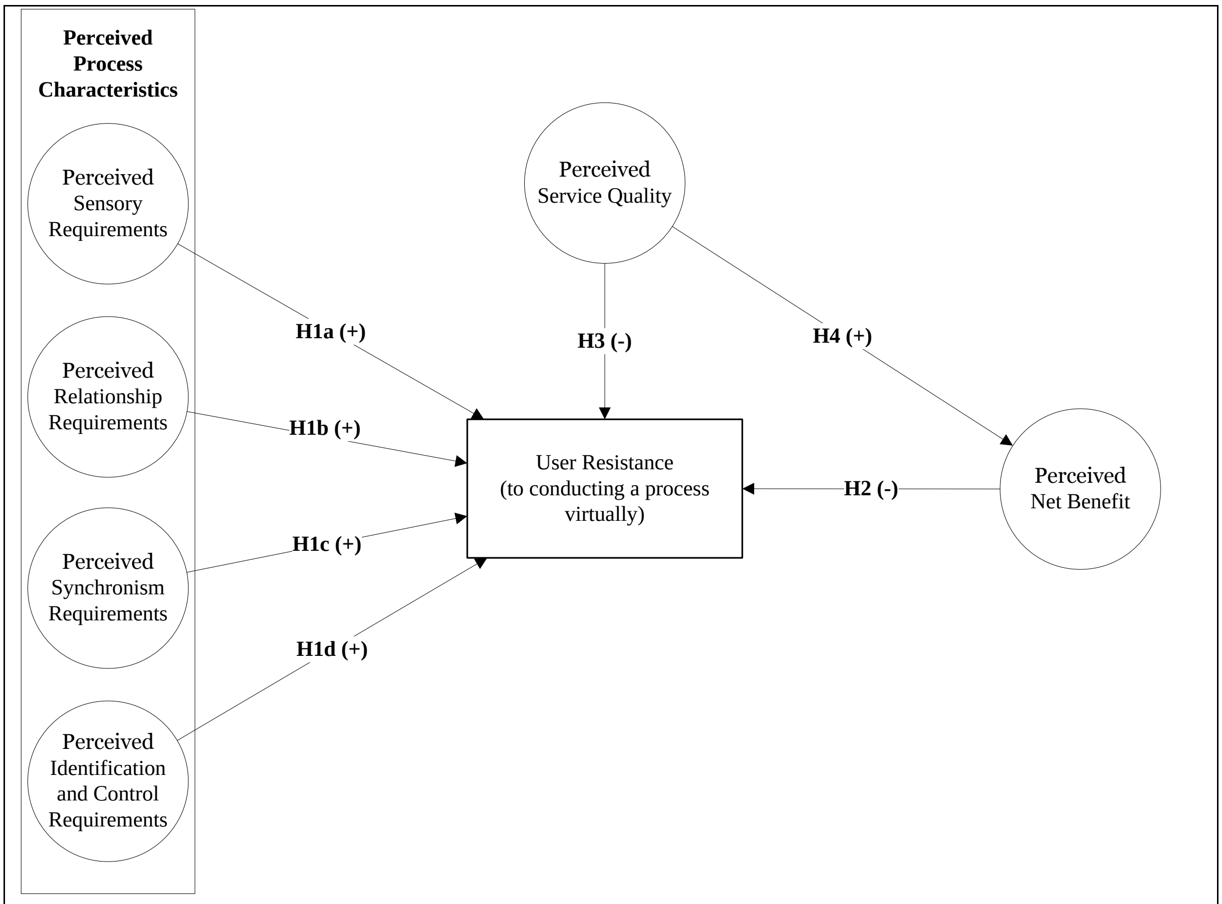

Figure 1. Research Model

Research Methodology

Data Collection

At the current stage of research, studies of user resistance are rare and empirical testing of user resistance is still emerging (Balci et al. 2013; Barth and Veit 2011b; Kim and Kankanhalli 2009). Therefore it was our intention to examine a process in depth, which exists in both physical and virtual variations. One process which suits this requirement very well is the "*airport-check-in*". This process consists of identity registration, baggage registration, seating registration and in receiving the boarding pass for the airplane. We gathered our data by asking informants who were familiar with the check-in process referring to the physical and virtual parts of this process. These days it is possible to conduct the airport check-in in various different ways: via check-in counter, check-in machine (self-service), check-in by telephone or text message, online check-in (e.g., via Internet websites), or mobile check-in (e.g., via mobile application). Table 1 summarizes the key characteristics of these four process variants and classifies them with regards to the degree of virtualization.

Variant	**Type of Process**	**Description**
Check-in counter	Mostly physical	The check-in counter is the process normally handled by an airline representative or a handling agent working on behalf of the airline; the passenger can check-in at the counter, buy or confirm the ticket, get a boarding pass, and check in the luggage.
Check-in machine	Combination of virtual and physical (e.g., ticket is printed, personnel can assist, …)	The check-in machine is a process normally handled directly at the airport. The passengers can check-in themselves using a self-service machine or terminal and any other passengers travelling with them. The passengers can select their seats via the seat plan and obtain their boarding passes as print-outs. Luggage still has to be checked-in mostly manually.
Online check-in	Mostly virtual	The online check-in is the process by which passengers check-in for a flight via the Internet. The passenger can check-in online from 23 hours before departure and is only required to state name and certificate number (e.g., ticket number or PNR code). Passengers can select their seats and go through the check-in formalities. Then passengers can print the boarding pass on paper using ordinary printers. Luggage still has to be checked-in mostly manually.
Mobile check-in	Mostly virtual	The mobile check-in is the process by which passengers use their Internet-enabled mobile phone to check-in for their flight. The boarding pass is then sent by e-mail or mobile message to the passengers' mobile phone and they do not need to print it because it can be scanned. Luggage still has to be checked-in mostly manually.

Table 1. Selected Options (Variants) of the Airport Check-in Process

There are several reasons for choosing the *"airport check-in"* as our process of interest. First of all, it allows us to investigate the user resistance for the exact same process in several shades of physicality and virtualization. Secondly, the process is widely used and in practice. The third reason is that although several kinds of alternatives to the purely physical process have existed for a number of years, there are still users which prefer to check in by the counter. For this reasons the airport check-in is an interesting process to examine for our research.

We tested our research model by conducting a questionnaire-based survey (Straub et al., 2004). The survey was carried out directly at the Frankfurt Airport as well at the Leipzig airport, both located in Germany. We managed to find 183 volunteers of which 181 answered the questionnaire completely. Table 2 shows the characteristics of this sample. 43% of the respondents have a higher education and over 56% have an education which is abitur (A-Levels - General qualification for university entrance) or less. Only 1% percent of our sample has no formal education at all. The age of the respondents is between 15 and 70 years and the sample is divided into 48.3% male and 51.7% female respondents.

Age: Mean = 45 Range = 15 - 70	
Gender: Male = 48,3% Female = 51,7%	
Education:	
No formal education:	1,12%
Certificate of Secondary Education:	3,93%
General Certificate of Secondary Education:	23,60%
Abitur (A-levels) - General qualification for university entrance:	28,65%
Higher education:	34,83%
Ph.D.:	7,87%

Table 2. Profile of respondents

Measurement

To test the hypotheses empirically we used data gained from a questionnaire-based survey, which we designed by reviewing the relevant literature. Following established guidelines we aligned the wording of our measurement scales to our setting and ensured content validity (Moore and Benbasat 1991; O'Leary-Kelly and Vokurka 1998). Table 3 shows the items we used for the questionnaire. These items were taken and adapted from existing studies to ensure that the initial items have already been tested for every construct. Furthermore, in the literature, service quality is often used as a second-order construct (Jiang et al. 2012; Ladhari 2009; Parasuraman et al. 2005). Therefore, following the guidelines of Wright et al. (Wright et al. 2012), we conceptualized service quality as a multi-dimensional, second-order construct (Jiang et al. 2012; Parasuraman et al. 2005). We also ran second-order confirmatory factor analysis in which we modeled the latent first-order dimensions as reflective indicators of a second-order overall service quality construct. All relevant references are mentioned in Table 3. To rate the items we used reflective seven-point Likert Scales that cover a continuum from “strongly agree” (1) to “strongly disagree” (7). In order to evaluate the properties of our measurement model as well as to test our structural model we used the partial least squares method (PLS) (Ringle et al. 2005). PLS was performed with the software application smartPLS 2.0 (Ringle et al. 2005).

Construct	Item		Factor Loadings	Source
Perceived Sensory Requirements	SR1	While checking in I like to see, speak to and listen to the airline employees.	0.80	(Barth and Veit 2011b; Overby and Konsynski 2010)
	SR2	I feel more comfortable when I can hold my ticket in my hand.	0.83	
	SR3	I would like to conduct the check-in-process, without speaking or hearing airline employees (Reverse).	0.76	
Perceived Relationship Requirements	RR1	Personal contact and information interchange with a responsible airline employee is important for myself.	0.80	(Barth and Veit 2011b; Overby and Konsynski 2010)
	RR2	It is important for me that I will personally be advised by a responsible airline employee.	0.85	
	RR3	I prefer a personal consultation while I am conducting the check-in-process.	0.88	
Perceived Synchronism	SCR1	It is important for me that I can use the check-in before the day of departure.	0.74	(Barth and Veit 2011b;

Requirements	SCR2	It disturbs me when the processing of my check-in process does not take place immediately.	0.80	Overby and Konsynski 2010)
	SCR3	It disturbs me if the check-in process takes longer.	0.79	
Perceived Identification and Control Requirements	ICR1	The check-in procedure requires the disclosure of personal data.	0.87	Self-developed.
	ICR2	At the check-in procedure I have no control over the storage and treatment of my personal data.	0.81	
	ICR3	During the check in I must release a necessary part of my personal data.	0.87	
User Resistance (to conducting a process virtually)	UR1	If I had the choice, I would prefer to conduct my check-in-process on-site at the check-in desk.	0.92	(Barth and Veit 2011b; Oreg 2003)
	UR2	I prefer the personal care/treatment on site at the check-in desk, instead of online-check-in.	0.93	
	UR3	I can imagine to use online-check-in in the future. (reverse)	0.87	
Perceived Net Benefit	NB1	Overall, my preferred check-in possibility facilitates the travel by plane.	0.92	(DeLone and McLean 1992; Wixom and Watson 2001)
	NB2	Thanks to my preferred check-in option I save time in managing my flight.	0.93	
	NB3	My preferred check-in option facilitates the check-in process.	0.94	
	NB4	Thanks to my preferred check-in option I save time in comparison to other check-in procedures.	0.92	
Assurance	ASS1	I am satisfied to have chosen the online-check-in.	0.91	(Cenfetelli et al. 2008; Devaraj et al. 2002; Parasuraman et al. 1988)
	ASS2	I feel comfortable with the data transfer during online check-in.	0.92	
	ASS3	The online-check-in-process has answers to all of my questions.	0.85	
Empathy	EMP1	I think that the online check-in can respond to the specific needs of individual customers.	0.88	(Cenfetelli et al. 2008; Devaraj et al. 2002; Parasuraman et al. 1988)
	EMP2	I am satisfied with the service selection (e.g. seat selection, upgrades) during the online-check-in-process.	0.93	
Reliability	RELIAB1	I believe that online check-in is reliable.	0.95	(Cenfetelli et al. 2008; Devaraj et al. 2002; Parasuraman et al. 1988)
	RELIAB2	I believe that I get all my required performance during online check-in.	0.96	
	RELIAB3	I think that the online check-in is done correctly.	0.98	
	RELIAB4	I trust the online check-in that I am checked-in in time.	0.95	

Responsive-ness	RESP2	I think that online check-in provides me with immediate assistance when something goes wrong.	0.93	(Cenfetelli et al. 2008; Devaraj et al. 2002; Parasuraman et al. 1988)
	RESP3	Concerns and requests that occur during online check-in are answered by the Customer Service.	0.94	
Tangibles	TANG1	I think online check-in is up to date.	0.87	(Cenfetelli et al. 2008; Devaraj et al. 2002; Parasuraman et al. 1988)
	TANG2	Online check-in is visually appealing.	0.92	
	TANG3	Online check-in is neat, concise and well structured.	0.93	
	TANG4	The online check-in corresponds to my expected performances.	0.91	

Table 3. Measurement Scales

Data Analysis and Results

Measurement Model

We assessed internal consistency and convergent validity for each reflective measure by assessing item loadings, composite reliability, and average variance extracted (AVE). First, we checked convergent validity and looked at the factor loadings of every item. In line with the recommended threshold of 0.7 (Hair et al. 2011), all factor loadings are significant (Table 3). The next step is to check for internal consistency. For that purpose we measured composite reliability (CR) and the average variance extracted (AVE) (Fornell and Larcker 1981). Table 4 shows that all CR exceed 0.8 and all AVE values 0.5. That implies that our measurements are reliable and the latent construct is able to explain at least 50 % of the variance in the items (Straub et al. 2004). The next step is to verify discriminant validity using the criteria of Fornell and Larcker (1981). Therefore we compared the correlations between each pair of latent variables with the square root of AVE (Fornell and Larcker 1981). As can be seen in Table 4 all square roots exceed the correlations and therefore comply with the criteria.

Furthermore we tested for common method bias by using a Harman's One Factor Test (Podsakoff and Organ 1986). The calculated results suggest that common method bias wasn't a threat to the study's validity (36%). To assure these findings we also used the Marker-Variable-Technique (Lindell and Whitney 2001; Malhotra et al. 2006) in accordance to the guidelines proposed by Rönkkö and Ylitalo (2011). We combined three items which haven't been included in the model as marker variable. These variables had to meet the requirement to be minimally correlated with the study variables. So as the calculated mean correlation between the marker items and the study items is below 0.05 (Rönkkö and Ylitalo 2011), one can assume that method variance isn't a threat to our measurements. In order to predict each endogenous construct we add the marker variable as an exogenous variable to the PLS model. Despite the addition of the marker variable the significant regression paths of the baseline model are still significant. This implies that variance method isn't an issue to our data. Furthermore the participants were informed that the questionnaire is anonymous, which makes common method bias even more unlikely (Podsakoff et al. 2003). Additionally, we also tested for mediation paths contained in our model between perceived service quality and intensity to perceived net benefit. Therefore, we conducted the Sobel test (Sobel 1982). Then, we evaluated the Variance Accounted For (VAF) statistics (Hair et al. 2013) to classify the mediation effects. The VAF statistic estimates the size of the indirect effect in relation to the total effect. A VAF value smaller than 20% indicates no mediation, 20-80% is classified as a partial mediation and more than 80% is a full mediation (Hair et al. 2013). The results of the Sobel T-statistics (0.043) as well as of the VAF statistics (0.12) show that the effect of the independent variable on the dependent variable through the mediator is not significant for the mediator. Finally, we assessed the cross-loadings for all items (Table 5). All of the items in our measurement model are considerably higher than the cross-loadings on other constructs (Straub et al. 2004). These results indicate that the indicator reliability and discriminant reliability is present in our measurement model (Hair et al. 2011).

Construct	**AVE**	**CR**	**CA**	SR	RR	SCR	ICR	UR	NB	ASS	EMP	RELIAB	RESP	TANG
Perceived Sensory Requirements (SR)	0.64	0.84	0.72	**0.80**										
Perceived Relationship Requirements (RR)	0.71	0.88	0.81	0.44	**0.84**									
Perceived Synchronism Requirements (SCR)	0.61	0.82	0.69	0.20	-0.07	**0.78**								
Perceived Identification and Control Requirements (ICR)	0.72	0.89	0.81	0.19	0.19	0.28	**0.85**							
User Resistance (UR)	0.82	0.93	0.89	0.59	0.47	0.43	0.49	**0.91**						
Perceived Net Benefit (NB)	0.86	0.96	0.94	-0.18	-0.22	-0.28	-0.29	-0.42	**0.93**					
Assurance (ASS)	0.80	0.92	0.87	-0.32	-0.35	-0.37	-0.51	-0.67	0.35	**0.89**				
Empathy (EMP)	0.81	0.90	0.77	-0.23	-0.22	-0.22	-0.48	-0.51	0.31	0.77	**0.90**			
Reliability (RELIAB)	0.92	0.98	0.97	-0.25	-0.25	-0.32	-0.66	-0.55	0.36	0.81	0.80	**0.96**		
Responsiveness (RESP)	0.87	0.93	0.86	-0.16	-0.18	-0.24	-0.34	-0.44	0.22	0.70	0.75	0.74	**0.93**	
Tangibles (TANG)	0.82	0.95	0.93	-0.26	-0.30	-0.29	-0.51	-0.58	0.40	0.74	0.67	0.75	0.64	**0.91**

Diagonal elements represent the square root of the AVE. Off diagonal elements are the correlations.

CR: Composite Reliability; CA: Cronbachs Alpha

Table 4. Reliabilities and Correlation Matrix

Construct	SR	RR	SCR	ICR	UR	NB	ASS	EMP	RELIAB	RESP	TANG
SR1	**0.80**	0.26	0.09	0.11	0.36	0.01	-0.19	-0.18	-0.16	-0.11	-0.16
SR2	**0.83**	0.36	0.14	0.12	0.46	-0.14	-0.22	-0.19	-0.18	-0.12	-0.19
SR3	**0.76**	0.41	0.21	0.20	0.55	-0.24	-0.34	-0.18	-0.24	-0.14	-0.25
RR1	0.32	**0.80**	-0.08	0.06	0.32	-0.16	-0.23	-0.13	-0.10	-0.08	-0.12
RR2	0.42	**0.85**	-0.11	0.09	0.31	-0.09	-0.23	-0.11	-0.18	-0.12	-0.21
RR3	0.39	**0.88**	-0.01	0.27	0.51	-0.26	-0.39	-0.27	-0.31	-0.21	-0.37
SCR1	0.09	0.09	**0.74**	0.30	0.41	-0.23	-0.32	-0.18	-0.30	-0.17	-0.28
SCR2	0.17	-0.17	**0.80**	0.13	0.26	-0.19	-0.20	-0.13	-0.19	-0.18	-0.15
SCR3	0.21	-0.15	**0.79**	0.18	0.31	-0.22	-0.31	-0.20	-0.23	-0.20	-0.21
ICR1	0.18	0.20	0.25	**0.87**	0.50	-0.35	-0.55	-0.50	-0.68	-0.40	-0.54
ICR2	0.16	0.09	0.23	**0.81**	0.36	-0.14	-0.30	-0.29	-0.42	-0.18	-0.31
ICR3	0.13	0.18	0.23	**0.87**	0.36	-0.21	-0.40	-0.39	-0.54	-0.26	-0.40
UR1	0.51	0.43	0.41	0.46	**0.92**	-0.36	-0.64	-0.46	-0.52	-0.42	-0.55
UR2	0.59	0.50	0.34	0.42	**0.93**	-0.35	-0.61	-0.50	-0.49	-0.38	-0.53
UR3	0.51	0.35	0.43	0.45	**0.87**	-0.44	-0.57	-0.43	-0.49	-0.39	-0.49
NB1	-0.16	-0.17	-0.27	-0.25	-0.34	**0.92**	0.26	0.21	0.28	0.16	0.33
NB2	-0.13	-0.25	-0.27	-0.26	-0.38	**0.93**	0.33	0.31	0.34	0.22	0.38
NB3	-0.09	-0.12	-0.24	-0.25	-0.33	**0.94**	0.28	0.26	0.29	0.19	0.34
NB4	-0.25	-0.26	-0.26	-0.30	-0.47	**0.92**	0.40	0.32	0.39	0.23	0.41
ASS1	-0.38	-0.40	-0.36	-0.55	-0.71	0.36	**0.91**	0.69	0.78	0.58	0.69
ASS2	-0.29	-0.28	-0.34	-0.39	-0.59	0.29	**0.92**	0.66	0.70	0.63	0.66
ASS3	-0.15	-0.23	-0.25	-0.39	-0.43	0.27	**0.85**	0.73	0.68	0.69	0.61
EMP1	-0.17	-0.16	-0.21	-0.35	-0.40	0.24	0.65	**0.88**	0.60	0.66	0.53
EMP2	-0.24	-0.22	-0.20	-0.50	-0.51	0.30	0.73	**0.93**	0.81	0.69	0.66
RELIAB1	-0.25	-0.23	-0.31	-0.63	-0.53	0.33	0.80	0.80	**0.95**	0.72	0.72
RELIAB2	-0.25	-0.24	-0.27	-0.61	-0.53	0.31	0.79	0.82	**0.96**	0.72	0.71
RELIAB3	-0.23	-0.26	-0.29	-0.64	-0.52	0.35	0.79	0.75	**0.98**	0.73	0.75
RELIAB4	-0.24	-0.25	-0.34	-0.65	-0.55	0.37	0.75	0.70	**0.95**	0.67	0.72
RESP1	-0.15	-0.14	-0.23	-0.31	-0.37	0.23	0.65	0.71	0.70	**0.93**	0.61
RESP2	-0.15	-0.19	-0.21	-0.33	-0.44	0.18	0.65	0.69	0.68	**0.94**	0.59
TANG1	-0.21	-0.23	-0.19	-0.45	-0.47	0.29	0.63	0.53	0.63	0.51	**0.87**
TANG2	-0.26	-0.26	-0.25	-0.40	-0.53	0.36	0.63	0.60	0.63	0.57	**0.92**
TANG3	-0.20	-0.27	-0.29	-0.45	-0.50	0.37	0.62	0.58	0.68	0.59	**0.93**
TANG4	-0.26	-0.31	-0.30	-0.52	-0.58	0.42	0.77	0.69	0.78	0.63	**0.91**

Table 5. Item Loadings and Cross-Loadings

Structural Model

Since all reflective constructs were found to be reliable in the previous step, the evaluation of the structural model follows. The bootstrapping routine of SmartPLS was used to calculate the t-values in order to assess statistical significance (Barth and Veit 2011b). We applied structural equation modeling (PLS-SEM) to investigate the measurement characteristics and the measurement of effects of process characteristics, service quality and net benefit on the user resistance. Figure 2 summarizes the results of the analysis of the structural model for the hypotheses H1 to H4, including path coefficients with their statistical significance and the assessment of the R^2 values for all dependent variables.

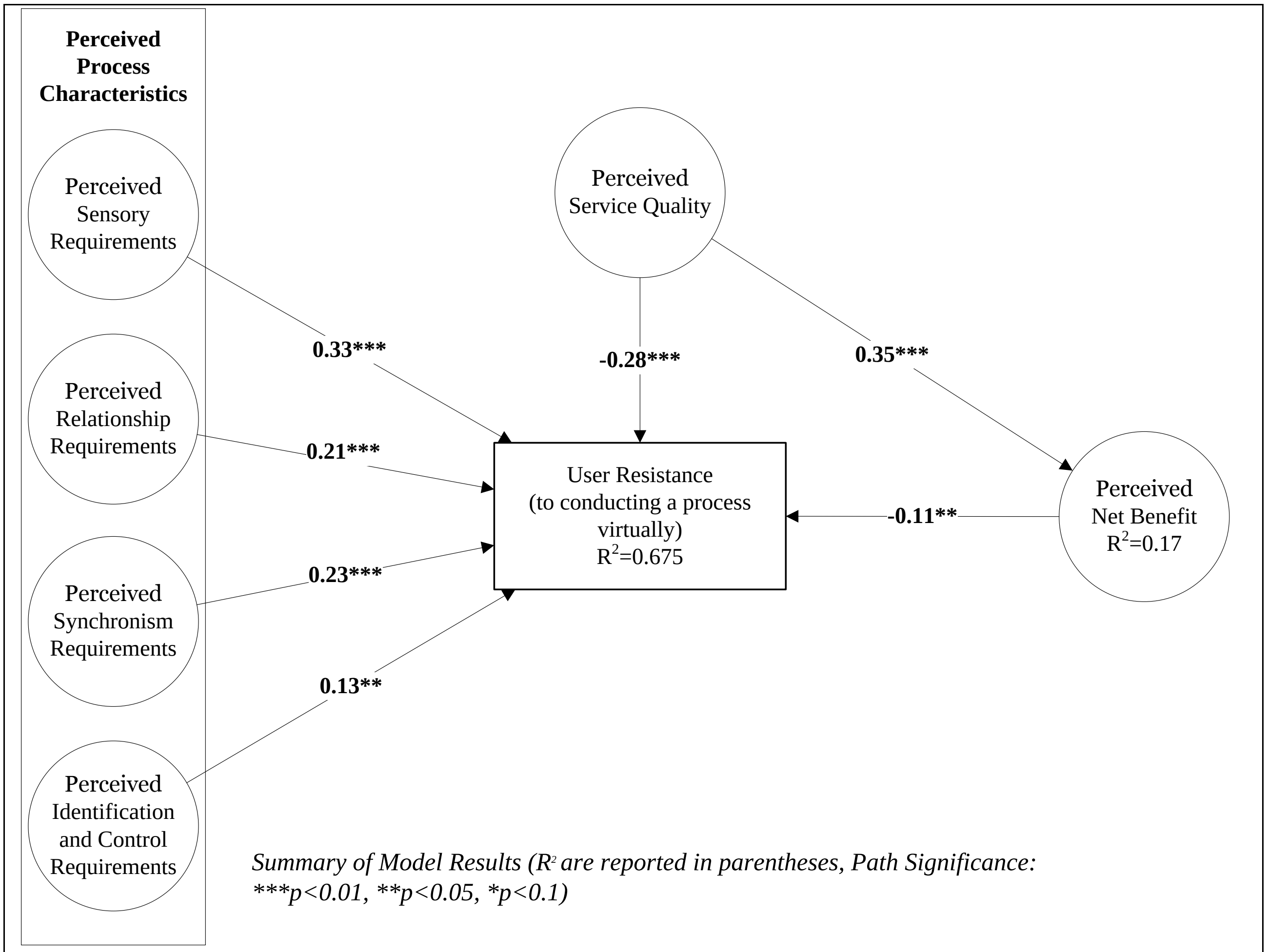

Figure 2. Statistical Results of the PLS-Analysis

As seen in Figure 2, five path coefficients (H1a, H1b, H1c, H3, and H4) were statistically significant at the level of $p<0.01$. However, the positive relationship between the constructs "identification and control requirement" to "*user resistance*" (H1d) and "net benefit" to "user resistance" represented the path coefficient which had a significance level of $p<0.05$ (see Figure 2). Thus, all hypotheses formulated in our research model were supported.

The R^2 values refer to the amount of variance of a dependent variable that is explained by their assigned latent variable(s) (Backhaus et al. 2006). The total theoretical model explains 67.5% of the variance of the "*user resistance*" and 0.17% of the variance of the "*net benefit*" (see Figure 2). According to Chin (1998) R^2 values above 0.19, 0.33 and 0.67 can be considered as "*weak*", "*middling*" and "*substantial*". Consequently, our path model can be assessed as "*substantial*" with respect to "*user resistance*" and "*weak*" in terms of "*net benefit*". Moreover, the R^2 of the user resistance values comfortably exceed the minimum value of 40%, which was formulated as a guideline by Homburg and Baumgartner (1996).

Discussion and Conclusion

Our increasingly digital society makes it necessary to examine this emerging virtualization phenomenon from a new theoretical perspective (Balci et al. 2013). Fostered by IT and technical advances numerous physical processes will have the opportunity to migrate into a virtual environment (Overby 2008). Thereby PVT offers a theoretical framework for IS researchers to examine (ex ante) which processes will be performed in a virtual manner in the future, and to explain (ex post) why historical virtualization initiatives have been either successful or a failure (Overby 2012).

Our study is the first to have empirically tested user resistance in the check-in process and has done preliminary work regarding the integration of further constructs based on the extant IS literature. Thereby this piece of research aimed for integration of the most important determinants of user resistance (Barth and Veit 2011b), process characteristics (Overby 2008), net benefit (Delone and McLean 2003) and Servqual (Parasuraman et al. 1988) into a unified research model in order to enhance the understanding of the phenomenon of '*user resistance*' as key dependent variable (in accordance with Barth and Veit (2011b) and Balci et al. (2013)) and to provide one of the rare empirical tests of user resistance. Furthermore, we have investigated an empirical context which to the best of our knowledge has not been examined yet.

To achieve our research goals, we conducted a questionnaire-based survey over a period of two weeks in September and October 2013. In total, 181 data sets have been used for our empirical validation. In summary, the key propositions of our research model were widely endorsed. Thereby, our model has been able to explain 67.5% of the variance in terms of '*user resistance*'. Moreover, the results have indicated that the process characteristics affect the *resistance towards conducting the process* of check-in in a virtual manner positively (with $p<0.01$). Additionally, the newly introduced constructs of servqual and net benefit have shown further insights regarding the phenomenon of user resistance. For instance, the *servqual* proposition has shown to be a strong predictor for '*user resistance*'. More specifically, it has provided the path coefficient (H3) with the second largest effect in the model regarding "*resistance*".

For practitioners and professionals who consider providing traditional process in a virtual process the theoretical model presented leverages an analytical framework as an assessment base. For instance, the perceived process characteristics and service quality have been identified as the most important predicators of user resistance towards conducting an online check-in (see Figure 2). This observation represents a relevant aspect for practitioners and professionals to understand why people reject or use virtual processes as well as why some processes are better suited for virtualization than others. Further, practitioners are able to implement better and more efficient strategies for process virtualization. Additionally, companies can now predict and compare the virtualizability of processes in nearly any business sector.

Further empirical analyses of our fruitfully integrated research model are required since we have offered the first quantitative test of the user resistance in combination with PVT, service quality and net benefit in relation to a new empirical context. Thus, similar studies should be conducted e.g. in other nations in order to look for cultural differences or similarities. Additionally, further research in other domains and for other specific process types should be performed in order to verify the generalizability of PVT.

However, the results from the present study suggest same implications that will serve as a springboard for our future research. The survey was conducted in a short time and resulting in a single point study. Further research efforts with longitudinal studies (cohort studies) will give a clearer picture of how the users and the relationships among constructs change over time. Nonetheless, the systematic usage of theoretically founded criteria has the potential to enhance the efficiency of IT strategies and thus to bring user resistance initiatives to the next level.

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