THE IMPACT OF PERCEIVED PROCESS CHARACTERISTICS ON PROCESS VIRTUALIZABILITY

Complete Research

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Abstract

Due to the growing world-wide globalization and the possibility to use new innovations of the digital economy, more and more processes and services are being virtualized. Recently, Process Virtualization Theory has been suggested as one way for understanding factors that affect the behavior of process participants when they face a virtual process. In order to verify the theory’s core claims, we design a research model and subsequently develop measurement instruments to empirically analyze and test why different process participants use or do not use this process in a virtual environment. Therefore we develop measurement instruments and conduct a questionnaire-based survey study carried out in Frankfurt Airport as well as at the Leipzig Airport in Germany with 183 participants in total. The results indicate that process characteristics in the form of requirements affect individual attitudes towards using airline check-in processes, which can be conducted virtually by checking in online via a website, or physically by checking in at the counter at the airport. We provide empirical evidence for the validity of Process Virtualization Theory, and demonstrate that our model is statistically significant and well constructed.

Keywords: Process Virtualization Theory, PVT, Process Characteristics, Process Use, Process Virtualizability.

1 Introduction

The emergence of the so-called “information age” is based on the wide-spread availability of information technology (IT), which successively gained more and more importance and now infuses all layers of society (Fang, 1997). Even though virtualization, namely the migration of processes from physical to virtual environments, does not necessarily rely on IT only and is still emerging, it has already become indispensable in everyday life for some people and plays a decisive role in business (Overby, 2008). Barth and Veit (2011) draw our attention to the fact that already Benjamin Franklin published the world’s first mail-order catalogue in 1744, enabling of how to execute a process without having the necessity of being in person on the spot. A nearly ideal example to observe and record the impact of virtualization is the stock exchange. A century ago, every stock exchange transaction was conducted manually, whereas today the majority of processes within the stock exchange are migrated to virtual environments and are automated by the use of IT (Stoll, 2006). The increased availability of IT that cost less and less had the effect that companies increased their efficiency and effectiveness leveraging IT-based process support, process automation, and process virtualization, which on the one hand led to a noteworthy development of the economy, particularly in the US (Oliner and Sichel, 2000), and, on the other hand, facilitated and considerably changed for nearly everybody as well how processes from everyday life are conducted (e.g., e-commerce and online services).
However, the rapid advances in Technology and related increasing uncertainty and dynamics surrounding digital businesses call for a new concept to address the widening gap between strategy and business processes (Al-Debei and Avison, 2010). Scholars and scientists have begun to be concerned with, examine, and write literature about this process of virtualization since the late 1980s, using various underlying frameworks and engaging into various perspectives and domains. Most existing research has addressed the phenomenon of virtualization at an early stage of development. Examples are the advantages of IT exemplified by electronic markets and electronic transactions (Malone et al., 1987) or the assessment of the fit between task at hand and capability of the technology (Goodhue and Thompson, 1995). But forward-looking research has existed as well, for example, concerning the potential of e-commerce (Schuster and Sporn, 1998), the challenges and limitations of virtual teams (Jarvenpaa and Tractinsky, 1999), the effect of improvements in IT for business processes (Sofranec, 2000), or the more recent debates on productivity (Brynjolfsson and Hitt, 1998) and automatization (Brynjolfsson and McAfee, 2011).

A key contribution to explain the phenomenon of virtualization is Process Virtualization Theory (PVT) (Overby, 2008), which has evolved into a major research stream. Overby’s and others’ research has resulted in a theoretical advancement of PVT Overby and Konsynski, (2008), a research agenda for further work (Overby et al., 2010), and a first empirical test in the wholesale automotive market (Overby and Konsynski, 2010). Although these papers are fundamental, extant contemporary studies by other researchers also shed light on the role of virtualized processes, for example, in the e-commerce sector (Czamecki et al., 2010), by applying PVT in various fields such as mobile telecommunication technologies (Singh and Hackney, 2011), by giving thought to the consequences of virtualization to and create a framework for ‘green IT’ (Bose and Xin, 2011), or are concerned with the effect of virtualization on global knowledge networks (Van Geenhuizen and Nijkamp, 2012). Other work also comprises notions about the implications and limitations of the migration of processes, for example, some studies address specifically which aims can be achieved with virtualized processes (Vaccaro et al., 2009), investigate the consequences and constraints of an already successfully completed virtualization (Yakhlef, 2009), examine the motivations and incitements with regard to use and rejection of virtual processes (Balci et al., 2013), or have upgraded PVT’s base model by adding further concepts for specific domains such as e-government (Barth and Veit, 2011).

Though all these studies refer to diverse areas, one notion is common in their results: the migration of processes from physical to virtual environments is a continuous feature of the information age, providing essential and helpful advancements in the life of companies and individual users. However, gaps and shortcomings as regards PVT still exist; the intensive examination of the subject started recently and only a relative small amount of literature addresses the topic in an immediate and substantial way. There is also an absence of a significant empirical database and findings within this area. Therefore, additional empirical studies of PVT are necessary in order to understand how different process characteristics influence the intention of process participants to conduct processes virtually. This leads us to our central research question in this paper: “What is the impact of perceived process characteristics on process virtualizability?”

For the purpose of achieving this research aim, we propose a research model that is based on PVT and use this model to investigate perceived process characteristics from the users’ perspective. Furthermore we demonstrate that these characteristics influence process virtualizability. The expected contribution of our research is to prove the empirical applicability of PVT. Therefore we want to improve the understanding of why some processes are more likely to be conducted virtually than others. This can help companies to implement better and more efficient strategies for process virtualization. For this reason we examine factors which have an influence on process virtualizability from the view of users as customers.

The rest of the paper is organized as follows. Section 2 introduces theoretical background and related work that serves as a fundament for the research model and the empirical study. Section 3 illustrates
the research model, our hypotheses, and the underlying constructs. Afterwards, we describe our research methodology and our data collection process as well as the measurement scales that we used for conducting a survey. Then we present the results of the data analysis. In the concluding section, we summarize and discuss the most relevant findings in detail and give an outlook on further research.

2 Process Virtualization Theory

The foundation of PVT consists of the work of Eric Overby who introduces and establishes a respective model with regard to process virtualization. The major rationale underlying Overby’s work is that some processes are more suitable to become virtualized than others (Overby, 2008, p. 277). This characteristic trait is defined as process virtualizability. A process is any “set of steps to achieve an objective” (Overby, 2008, p. 278). PVT then specifies the influencing technical as well as individual-related factors leading to or constraining a process’ virtualizability (Overby, 2012; Overby, 2008). Process virtualizability is thus a crucial variable within PVT, as it is the dependent variable describing process virtualization success, enabling to assess whether a process can be successfully migrated from a physical to a virtual environment or not. A successfully virtualized process should thus be correspondently adopted over time and be an improved version of the base (physical) process. However, successful virtualization is an abstract term and thus needs a more precise definition in this case. In order to know how to evaluate and interpret this parameter, Overby proposes two exclusive measures. A proper assessment of process virtualizability can post-hoc be made by either examining the sustained adoption or the process outcomes (which can be composed of values such as output quality or participant satisfaction). Bearing these notions in mind, PVT does not posit that virtualization can only be based on IT. Even though IT is very important and beneficial for virtualizing a process, it is not ultimately necessary. Virtualization mechanisms can be different; an example of this is catalogue selling which is basically a virtualized process as the physical interaction is removed without the aid of IT.

Overby defines four process characteristics, or rather requirements, which affect the practicability of the virtualization of processes: sensory requirements, relationship requirements, identification and control requirements, and synchronism requirements. Sensory requirements depict the necessity for enjoying sensory experiences of a process, more precisely the five senses (seeing, hearing, smelling, touching, tasting.). This also includes overall sensations, such as excitement, depression, and so forth, which cannot be solely measured by being perceived by one of the five senses. Relationship requirements refer to the need of interacting with each other both socially as well as professionally as interaction establishes relationships and enables trust development. Identification and control requirements correspond to the notions of who the user is interacting with and to which degree he or she has control over the process as it provides the user with (a sense of) security. Identification is insofar a relevant issue as it is important to know who is engaging in an activity in order to check whether one is interacting with the right person or is being scammed. For example, it may become handy to see who also participates in auctions and thus to check whether shill bids are existent (Overby and Konsynski, 2010). Synchronism requirements are concerned with the velocity of interaction (i.e., how urgent the user needs the output of the process). An example of this is the synchronicity difference between a face-to-face conversation and a conversation via e-mail. While the participants get an immediate response in the first case, a delay can occur in the latter one. For example, in a shopping process, this means that when a user buys a commodity in a store, he or she will be in immediate possession of the very same, whereas buying the same commodity online means that the customer has to wait a few days before receiving it. But for commodities with the need of urgent possession, such as medicaments or fruits, the process becomes less amenable to virtualization.

Overby (2012; 2008) describes a negative correlation between the amenability of a process for virtualization and these four requirements. The more a process relies on one (or more) of these requirements, the harder it will be for it to become successfully virtualized. However, this negative
correlation can be (partially) mitigated by making use of three factors related to the capabilities of IT: reach, representation, and monitoring. *Reach* increases the range of process participation, permitting users on the one hand to gain access to the process from different locations and, on the other hand, broadening the spectrum of the process itself. Dating sites, for example, profit from this virtual characteristic by increasing potential relationship partners for users as it enables them to meet not only local people and spend time with but also to interact with persons who are located far away and therefore this increased reach ultimately affects relationship and synchronism requirements. *Representation* refers to how information is represented (e.g., via acoustic, optical, etc. signals), consequently enabling to satisfy some of the sensory requirements. The *monitoring* capability of a medium facilitates to verify participant identities and to control the courses of action. This characteristic allows mitigating the impact of identification and control requirements on process virtualizability.

### 3 Research Model

Figure 1 presents and summarizes our research model, which shows the main constructs and their impact on process virtualizability. The research model is derived directly from PVT and describes which process is suitable for a virtual conduct. The main dependent variable in the investigated research model is process virtualizability. This describes how well a process is suitable to be conducted without physical interaction between people or between people and objects (Overby, 2008, p. 279).

In this case, this is the airline check-in process, which can be conducted virtually by checking in online via a website, or physically by checking in at the counter at the airport.

![Research Model Diagram](image)

**Figure 1. Research Model**

According to PVT, the independent variables in the form of the requirements have a negative effect on process virtualizability. For this reason, from a user’s point of view, if a process is not amenable to virtualization, this will have a negative effect on process virtualizability. For example, sensory...
requirements play an important part while shopping for vegetables or fruits because the customer would like to take the product into the hand and would like to smell it before purchase. Therefore, a process is less suitable for a virtualization if these factors are especially high. On the other hand, if the sensory requirements are too low, this will in turn lead to a more effective use of virtual systems. This leads to the following hypotheses:

\[ H1a. \text{The higher the sensory requirements of a process, the less suitable is a process for being conducted virtually.} \]

\[ H1b. \text{The lower the sensory requirements of a process, the more suitable is a process for being conducted virtually.} \]

Accordingly, the virtual process option (here: online check-in) is only used when the sensory requirements are not high. In addition, it is assumed that relationship requirements also have a negative effect on process virtualizability. The reason for this is that the physical interactions between people which lead to an interpersonal warmth are removed by the virtualization of processes. If a user has high interpersonal requirements for a process, it is difficult to virtualize the process. Thus, there is a negative relationship between the variables. Therefore, the following hypotheses can be derived:

\[ H2a. \text{The higher the relationship requirements of a process, the less suitable is a process for being conducted virtually.} \]

\[ H2b. \text{The lower the relationship requirements of a process, the more suitable is a process for being conducted virtually.} \]

Besides sensory and relationship requirements, the synchronism requirements also have a negative influence on process virtualizability. The basis of this assumption is the fact that physical processes usually allow no or only a very small time delay of the process steps. With virtual processes, however, activities can lead to longer terms. This can lead to a time delay which the user judges as negative. From this follows:

\[ H3a. \text{The higher the synchronism requirements of a process, the less suitable is a process for being conducted virtually.} \]

\[ H3b. \text{The lower the synchronism requirements of a process, the more suitable is a process for being conducted virtually.} \]

Lastly, it is assumed that identification and control requirements also have a negative effect on the Process virtualizability. This hypothesis can be deduced by the fact that it is difficult for virtual process participants to identify other process participants. Particularly important are these requirements, for example, when shopping through the online shop. There is a high potential for fraud. This leads to the following hypothesis:

\[ H4a. \text{The higher the identification and control requirements of a process, the less suitable is a process for being conducted virtually.} \]

\[ H4b. \text{The lower the identification and control requirements of a process, the more suitable is a process for being conducted virtually.} \]

4 Research Methodology

4.1 Data Collection

Up to now, the PVT has not yet been adequately tested and no primary standard measurement scales for PVT exist (Balci et al., 2013; Barth and Veit, 2011; Overby, 2012). Due to this, our strategy was to study one specific process in depth, which exists in both physical and virtual versions. Therefore, we
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selected the “airport check-in” process as our process of interest, which allowed us to analyze the process characteristics for different variants of the same process. The first part of passengers at any airport is to check-in for their flight; that is, identity registration (this includes tickets, invitation letters, passports, visas, etc.), baggage registration, seating registration and to get the boarding pass for the airplane. In order to simplify the check-in process, the airlines offer passengers several flight check-in options, both physical and virtual: 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). However, to highlight the research model, we choose only two check-in option in this study: check-in counter and online check-in (e.g., via Internet websites). We have made this decision because of the following three reasons. First, these selected check-in options are most widely used and practiced check-in processes. Second, these selected check-in options allow us to analyze the process characteristics for different variants of the same process, with different degrees of physicality and virtuality. Third, although several check-in opportunities are offered, there are still a lot of users, who make the check-in by the counter.

In order to test our research model, we conducted a questionnaire-based survey study (Straub et al., 2004). Our primary goal was to validate our research model. We collected data through a questionnaire-based survey carried out in Frankfurt Airport as well as at the Leipzig airport in Germany. We were able to obtain 183 responses of which 169 were answered completely. However, only 146 usable surveys were retained for data analysis, providing a response rate of 80%.

Table 1 summarizes the profile of the respondents. As can be observed, the respondents include 43% of higher education and over 56 per cent held A-levels or less qualification. Only 1% of respondents have no education. The respondents ranged from 15 to 70 years of age with 48.3% male compared to 51.7% female respondents.

<table>
<thead>
<tr>
<th>Age:</th>
<th>Mean = 45</th>
<th>Range = 15 - 70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender:</td>
<td>Male = 48.3%</td>
<td>Female = 51.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No formal education:</td>
<td>1.12%</td>
</tr>
<tr>
<td>Certificate of Secondary Education:</td>
<td>3.93%</td>
</tr>
<tr>
<td>General Certificate of Secondary Education:</td>
<td>23.60%</td>
</tr>
<tr>
<td>A-levels - General qualification for university entrance:</td>
<td>28.65%</td>
</tr>
<tr>
<td>Higher education:</td>
<td>34.83%</td>
</tr>
<tr>
<td>Ph.D.:</td>
<td>7.87%</td>
</tr>
</tbody>
</table>

Table 1. Profile of respondents

4.2 Measurement

According to Overby, process virtualizability can be measured either as adoption of the virtual process or the quality of the outcomes of the virtual process (Overby, 2008, p. 279). Therefore, process virtualizability is measured in this study by measuring the use of both a virtual process option and the use of a physical process option for the same process.

The research hypotheses were empirically tested using data collected in a questionnaire-based survey. The survey instrument was created by analyzing the relevant literature. We followed established guidelines to adjust the wording of our measurement scales to our setting and to ensure content validity (Moore and Benbasat, 1991; O'Leary-Kelly and Vokurka, 1998). We used and adapted items from existing studies that have already developed and tested initial items for every construct. Details regarding the items are shown in Table 2 along with the relevant references. All items were rated on reflective seven-point Likert scales with the anchors „strongly agree” (1) and „strongly disagree” (7).
We used partial least squares (PLS) to assess the properties of our measurement model and to test our structural model (Ringle et al., 2005). In this context, we have used the software smartPLS 2.0 (Ringle et al., 2005).

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Factor Loadings</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory Requirements</td>
<td>SR1 While checking in I like to see, speak and hear the airline employees.</td>
<td>0.87</td>
<td>(Barth and Veit, 2011; Overby and Konsynski, 2010)</td>
</tr>
<tr>
<td></td>
<td>SR2 I feel more comfortable when I can hold my ticket in my hand.</td>
<td>0.71</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR3 I would like to conduct the check-in-process, without speaking or hearing airline employees (Reverse).</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>Relationship Requirements</td>
<td>RR1 Personal contact and information interchange with a responsible airline employee is important for myself.</td>
<td>0.82</td>
<td>(Barth and Veit, 2011; Overby and Konsynski, 2010)</td>
</tr>
<tr>
<td></td>
<td>RR2 It is important for me that I will personally be advised by a responsible airline employee.</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RR3 I prefer a personal consultation while I am conducting the check-in-process.</td>
<td>0.91</td>
<td></td>
</tr>
<tr>
<td>Synchronism Requirements</td>
<td>SCR1 It is important for me that I can use the check-in before the day of departure.</td>
<td>0.80</td>
<td>(Barth and Veit, 2011; Overby and Konsynski, 2010)</td>
</tr>
<tr>
<td></td>
<td>SCR2 It disturbs me when the processing of my check-in process does not take place immediately.</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SCR3 It disturbs me if the check-in process takes longer.</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td>Identification and Control</td>
<td>ICR1 The check-in procedure requires the disclosure of personal data.</td>
<td>0.76</td>
<td>Self-developed.</td>
</tr>
<tr>
<td>Requirements</td>
<td>ICR2 At the check-in procedure I have no control over the storage and treatment of my personal data.</td>
<td>0.89</td>
<td></td>
</tr>
<tr>
<td>Virtual Process (Online Check-in)</td>
<td>VP1 I use online check-in every time.</td>
<td>0.96</td>
<td>(Cenfetelli et al., 2008; Davis, 1989; Kankanhalli et al., 2005; Lin and Huang, 2008)</td>
</tr>
<tr>
<td></td>
<td>VP2 I often use the possibility of online check-in when flying.</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VP3 I use online check-in full amount.</td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td>Physical Process (Check-in at the Counter)</td>
<td>PP1 I use check-in at the counter every time.</td>
<td>0.95</td>
<td>(Cenfetelli et al., 2008; Davis, 1989; Kankanhalli et al., 2005; Lin and Huang, 2008)</td>
</tr>
<tr>
<td></td>
<td>PP2 I often use the possibility of check-in at the counter when flying.</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PP3 I use check-in at the counter to the fullest amount.</td>
<td>0.95</td>
<td></td>
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</tbody>
</table>

Table 2. Measurement Scales
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. Results indicate that all factor loadings are significant (Table 2) and lie above the recommended threshold of 0.7 (Hair et al., 2011). At the next step, we calculated values for composite reliability (CR) and the average variance extracted (AVE) (Fornell and Larcker, 1981). Composite reliabilities (CR) are above 0.8 and each AVE is above 0.50 (Straub et al., 2004) (Table 3), indicating that the measurements are reliable and the latent construct can account for at least 50 percent of the variance in the items. Finally, we assessed discriminant validity using the criterion of Fornell and Larcker (1981). Discriminant validity was also achieved since the correlations between each pair of latent variables are less than the square root of AVE (Fornell and Larcker, 1981).

We also tested for common method bias. In order to check it, we conducted a Harman’s One Factor Test (Podsakoff and Organ, 1986). The results show that common method bias was not a threat to the validity of our study (38%).

Table 3. Reliabilities and Correlation Matrix

Table 4 presented the loadings and cross-loadings for all items. 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).
Table 4. Item Loadings and Cross-Loadings

<table>
<thead>
<tr>
<th></th>
<th>VP 1</th>
<th>VP 2</th>
<th>VP 3</th>
<th>PP 1</th>
<th>PP 2</th>
<th>PP 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP 1</td>
<td>-0.44</td>
<td>-0.40</td>
<td>-0.34</td>
<td>-0.07</td>
<td>0.96</td>
<td>-0.73</td>
</tr>
<tr>
<td>VP 2</td>
<td>-0.43</td>
<td>-0.38</td>
<td>-0.40</td>
<td>-0.16</td>
<td>0.98</td>
<td>-0.72</td>
</tr>
<tr>
<td>VP 3</td>
<td>-0.40</td>
<td>-0.37</td>
<td>-0.40</td>
<td>-0.12</td>
<td>0.97</td>
<td>-0.71</td>
</tr>
<tr>
<td>PP 1</td>
<td>0.49</td>
<td>0.40</td>
<td>0.35</td>
<td>0.10</td>
<td>-0.72</td>
<td>0.95</td>
</tr>
<tr>
<td>PP 2</td>
<td>0.49</td>
<td>0.44</td>
<td>0.35</td>
<td>0.13</td>
<td>-0.72</td>
<td>0.95</td>
</tr>
<tr>
<td>PP 3</td>
<td>0.47</td>
<td>0.41</td>
<td>0.32</td>
<td>0.10</td>
<td>-0.68</td>
<td>0.95</td>
</tr>
</tbody>
</table>

5 Data Analysis and Results

The results of the structural model are presented in Figure 2. The explanatory power of the research model was assessed by examining significance levels of path coefficients.

![Figure 2. Summary of Model Results (R² are reported in parentheses, Path Significance: ***p<0.001, **p<0.01, *p<0.05)](image)

In support of Hypothesis 1a, sensory requirements have a significant negative impact on behavioral intention to use virtual process (online check-in) ($\beta = -0.20$; $p < 0.05$). Sensory requirements also significantly affect physical process in a positive way (check-in at the counter) ($\beta = 0.30$, $p < 0.001$), which supports Hypothesis 1b. Regarding relationship requirements, they have a significant negative
effect on virtual processes (online check-in) ($\beta = -0.29; p < 0.001$), which supports Hypothesis 2a. Relationship requirements are also significantly affected by physical process in a positive way (check-in at the counter) ($\beta = 0.26; p < 0.001$), thus supporting Hypotheses 2b. As postulated in Hypothesis 3a, synchronism requirements have a significant negative impact on intentions to use virtual process (online check-in) ($\beta = -0.38; p < 0.001$). In support of Hypothesis 3b, synchronism requirements have a significant positive impact on affect physical process (check-in at the counter) ($\beta = 0.33; p < 0.001$). Identification and control requirements, however, was found to have an insignificant impact on virtual process (online check-in); thus, Hypothesis 4a was not supported. Also the relationship between identification and control requirements and physical process (check-in at the counter) is not significant, thus, Hypothesis 4b was not supported.

The results show that the structural model is capable of explaining 36% of the variance in users’ behavioral intentions to use the virtual process (online check-in). Simultaneously, the structural model explains 39% of the variance in users’ behavioral intentions to use the physical process (check-in at the counter).

6 Discussion and Conclusion

Our research entails important implications on both academics and practitioners as it investigates an important conceptual issue, which also has significant practical value for IT-driven startups. IT is a major enabler of today's digitized world efforts. However, many young and up-and-coming firms are finding it difficult to estimate these technologies effectively in their business model concept. This study addresses this issue by examining the factors which motivate young and up-and-coming firms to use PVT in a business model concept. This will enable them to systematically identify and fulfill further customer needs at an early stage.

This work explains the behavior of users when it comes to virtualization of processes. Especially in times of increasing digitalization, companies must remain competitive in order to survive in a rapidly evolving market environment. Especially in the area of check-in systems, there are many ways to realize the processes. In addition to the classic check-in at the counter, travelers can check in with an app, online or at the self-service check-in machine and therefore can use their preferred process. The success of technology-based check-in is established. It is used by a large number of people daily. The advantage of the increasing virtualization for the airlines is that despite increasing number of passengers the same level of service can be provided without setting additional staff (Lu et al., 2009).

In this context, a structural model was proposed and tested, examining the role of perceived process characteristics on process virtualizability usage from a user’s point of view. The measurement model as well as the structure model has been validated and a first framework has been created for future research in this area. We provided empirical evidence for the validity of PVT, and demonstrated that our model is statistically significant and well constructed. In order that, Overby’s PVT has been empirically proven. Additionally, the current study empirically validates this integrated model in the scenario of process virtualizability. Six of the 8 hypotheses specified in the model were supported. The results attest to the value of this research model.

Process characteristics, which in this study was considered as an individual’s requirements to use virtual processes (online check-in), was found to have a significant negative influence on the intentions of using the virtual process. On the other hand, users who put more importance on the characteristics of the process, was found to have a significant positive influence on the intentions of using the physical process (check-in at the counter). This finding suggests that the more importance the participants put on the characteristics of the process, the less useful becomes a virtualization of the process. The results of the study confirm the importance of perceived process characteristics in the adoption of virtual processes.
An unexpected result is the lack of a direct relation between identification and control requirements and process virtualizability. This at first sight surprising finding is explained by the fact that the perceived identification and control requirements play no important role in this process. One important reason for this may be that the user must submit their personal data for registration through the check-in. This can lead to the situation that the user does not have a feeling of identification and control requirements concerning this process. Consequently, various independent variables such as Sensory Requirements, Relationship Requirements, Synchronism Requirements and Identification and Control Requirements can have quite different effects on process virtualizability.

In general, the paper presented is a contribution to the existing literature in the field of information systems by establishing an important factor that does have an effect on virtual process use. It was also demonstrated that the process characteristics have a different effect on process virtualizability. The results of this study will help companies to understand 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. With a larger scale study, airlines could identify reasons why a special check-in is not or a very frequently used process. In addition processes can be more efficient and using the results of PVT can save resources. Although the used items are very situation-specific, the factors and constructs can also be applied to other business processes and can help researchers and entrepreneurs.

In future studies, the sample should be enlarged and it should be paid attention to the demographic structure of the population to keep the distortion as low as possible. Furthermore, only a special process has been evaluated in this survey. Therefore other processes should be tested for the applicability of the PVT in future studies next to the check-in process.

To summarize it can be said that this work contributes to verify the PVT on their empirical applicability and create a foundation for future studies. Through this study the validity of the structural model could be clearly confirmed.

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References


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Yakhlef, A. (2009). We Have Always Been Virtual Writing, Institutions, and Technology! Space and culture, 12 (1), 76-94.