Association for Information Systems
AIS Electronic Library (AISeL)

Wirtschaftsinformatik Proceedings 2013 | Wirtschaftsinformatik

2013

The Effect of Private IT Use on Work Performance - Towards an IT Consumerization Theory

Björn Niehaves
Hertie School of Governance, E-Governance and Innovation, Berlin, Germany, niehaves@hertie-school.org

Sebastian Köffer
University of Münster, European Research Center for Information Systems, Münster, Germany, sebastian.koeffer@ercis.uni-muenster.de

Kevin Ortbach
University of Münster, European Research Center for Information Systems, Münster, Germany, kevin.ortbach@ercis.uni-muenster.de

The Effect of Private IT Use on Work Performance - Towards an IT Consumerization Theory

Björn Niehaves[1], Sebastian Köffer[2], and Kevin Ortbach[2]

[1] Hertie School of Governance, E-Governance and Innovation, Berlin, Germany
niehaves@hertie-school.org
[2] University of Münster, European Research Center for Information Systems, Münster, Germany
{sebastian.koeffer, kevin.ortbach}@ercis.uni-muenster.de

Abstract. IT consumerization – defined as the use of privately-owned IT resources for business purposes – is steadily growing, thus creating new challenges for enterprises. While numerous practitioner studies suggest a positive effect of this trend on employee work performance, IS research still lacks a systematic understanding of the forces underlying this relationship. In order to close this research gap, we derive three major effects of IT consumerization on employees: 1) an increased workload 2) an elevated autonomy and 3) a higher level of competence. Drawing on cognitive stress model and self-determination theory, we develop an innovative theoretical model of the relationships between IT consumerization and work performance. We then conduct an embedded single-case study, in order to evaluate the constructs and relationships of our structural model by means of qualitative research. Subsequently, the implications for th organizing and practicing IT consumerization are discussed and suggestions on further developing this study are presented.

Keywords: IT Consumerization, Individual IS, Stress, Self-determination Theory, Work Performance

1 Introduction

Consumerization of information technology (IT) refers to privately-owned IT resources, such as devices or software that are also used for business purposes. IT consumerization is regarded as a significant driver which is redefining the relationship between employees (in terms of consumers of enterprise IT) and the IT organization and "will present one of the biggest tests […] for business and IT executives within the next five years" [1]. Gartner views consumerization as one of five major IS trends and argues that although the topic has been discussed for a decade, the big wave of changes is still to come [2]. Accordingly, Fenn and LeHong state that this trend cannot be stopped [3]. Picking up on this topic and revealing its practical importance, numerous practitioner studies about IT consumerization have recently been conducted.

11th International Conference on Wirtschaftsinformatik,
27th February – 01st March 2013, Leipzig, Germany

A fundamental element of IT consumerization is a shift of business-owned standard processes and technologies to more consumer-driven ones. Today, employees are more aware of technology in the workplace and able to choose software and devices that are optimally suited to their work. As a result, there is an conspicuous change in the IT innovation paradigm from a top-down to a bottom-up approach [4]. In this context, Andriole states that "[…] there's a reverse technology-adoption life cycle at work: employees bring experience with consumer technologies to the workplace and pressure their companies to adopt new technologies" [5]. This trend is perceived as contributing significantly to work performance. Many studies report that employees are more productive when able to choose IT tools on their own (e.g. [6], [7]), suggesting that it is worth adjusting corporate policies in this direction. However, it remains unclear as to what constitute the underlying forces that promote IT consumerization and under which circumstances they may be considered beneficial [8].

From an IS research perspective, a rigorous application of methods and theory to help practitioners understand the phenomenon of IT consumerization in general, and its implications for employee performance in particular, remains lacking. While gains in work performance are generally associated with the trend in practice, research in the field lacks a systematic evaluation of the underlying forces leading to these increases. However, without a clear understanding of these forces, organizations are unable to reveal the full potential of IT consumerization and are more likely to just see the negative aspects. For instance, Gens et al. found that currently, 80% of IT departments agree that IT consumerization will increase their workload [9]. Regarding the focus of IS research in this context, Sawyer and Winter stated that "[…] the consumerization of ICT is growing at the very same time that the IS field is struggling" [10]. Due to the fact that IT consumerization has only recently become a research focus, the body of IS(-related) journals is unable to provide a specific vocabulary and theory to grasp the phenomenon. However, several well-established theories in the IS context cover different aspects of IT consumerization and often directly address work performance. For instance, recent IS top-basket research has focused on the acceptance of consumer technology [11], the influence of autonomy on motivation and task effort [12] or task-technology fit for mobile information systems [13].

Against the background of this significant research gap, we explore the *relationship between IT consumerization and (employee) work performance*. We specifically intend to find out whether and, if so, which theories in the IS context can increase our understanding of this relationship. Our methodology is presented in detail in the next section. In order to address the research objective, the present paper draws on a comprehensive review of practitioner literature (Section 3) in which we use open coding technique to identify major themes with respect to the effects of IT consumerization. These themes are then used to identify and exploit potential theories in the IS context and to derive a structural model of IT consumerization (Section 4). In section 5, the constructs and relationships of this model are briefly validated using an embedded single-case study. Our paper concludes with a brief discussion of both the contributions and limitations of the study and gives an outlook on future research.

2 Methodology

We developed this study following a three-step approach. As there is only little scientific research explicitly in the area of IT consumerization, the first step was a systematic analysis of practitioner literature, as proposed by Webster and Watson [14] to identify the advantages and disadvantages of consumerization from both employee and organizational perspectives. Most available studies on the topic take a quantitative approach and were executed by consulting firms or market research institutes. Our search process resulted in a set of 22 studies, each specifically addressing IT consumerization. An initial screening revealed that 13 of these studies contribute to our research in order to explain the effects of IT consumerization on the work performance of individuals. We used iterative open coding [15] to break down the study data line by line. Thereafter, open coding continued by conducting workshop meetings, where all researchers shared their thoughts about the codes. Looking for inner-group similarities and intergroup differences [16], the original 115 codes could be clustered into three argumentative constructs (explained in section 3).

In the second step of this study we developed a research model, illustrating the relationship between IT consumerization and work performance. Drawing on related theory, we established relationships between our argumentative constructs. Inspired by Sarker et al. [17], we looked for broad theoretical frameworks, which are not related to the substantive area of research. This was first done individually by each researcher and then consolidated in a workshop. We identified cognitive model of stress and self-determination theory as relevant to explain our causal relationships and building up the model (see section 4).

In the last step we used an embedded single-case study [18] to perform an initial check of both the constructs and the relationships within our research model. Comparing our emergent relationships with practical evidence from the case enhanced confidence their validity [16]. The case company “CouplingCo” (name changed to protect anonymity) was selected because they operate internationally, have a firm-wide IT infrastructure and recently started a program on policy development with regard to IT consumerization. CouplingCo is a medium-size manufacturing enterprise focusing on the development of coupling technology. It has more than 2000 employees worldwide and created a turnover of over $400 million in 2011. A total of 13 semi-structured expert interviews were conducted within the firm (60,000 words of transcript). We collected data at both the corporate level as well as in different sub-units. Interview partners included the CEO, CFO, CIO, as well as sub-unit executives and employees. The data was again analyzed using open coding methodology [15]. This time, we coded the different aspects of the research model using the argumentative constructs from step one as a-priori framework. Consistent with Eisenhardt, we measured our constructs accurately to prove if they provide an empirical grounding for the emerging theory [16]. The results of this analysis are presented in section 5.

3 Aspects of IT Consumerization

After finishing the process of open coding of the practitioner literature, we were able to derive three distinct arguments from the codes that address the relationship between IT consumerization and work performance: 1) an increased workload, 2) elevated employee autonomy and 3) a higher level of perceived competence in the context of IT.

Workload. Although a considerable part of the workforce appreciates flexible working procedures [19], they may also lead to heavier workloads for employees [20]. The Aerospace Industries Association frankly states that member associations may benefit from longer employee work hours as a consequence of IT consumerization [21]. For instance, if employees use their private devices for business-related communication, private time is no longer clearly defined and the boundary between private life and working hours dissolves. In this scenario, managers know that employees are able to work off-hours and are thus more likely to give them work tasks during these times. In many cases, IT consumerization leads to a pressure to work longer hours and employees are "less able to switch off from work" [20]. As a consequence, Volkswagen, for instance, reacted to this development by restricting its mobile device access after work hours [22]. Thus, we derive increased workload as first potential effect of IT consumerization.

Autonomy. On the positive side, consumerization is often associated with ‘greater freedom’ or ‘new freedoms’ for employees [23], [24]. Consequently, there is an increased autonomy and independence for employees, as they may make IT decisions on their own or provide technical support for themselves [1], [25]. Greater responsibilities for employees, particularly younger ones [26], are closely related to more autonomy. A Cisco study showed that students prefer to have a budget to purchase their own notebook or mobile device [27]. It seems plausible that especially capable workers may enhance their earning potential if provided with greater autonomy [24]. Furthermore, freedom of choice regarding work organization and structure contributes to the happiness of knowledge workers [8], [28]. Dell and Intel found in their study that six out of ten employees enjoy work more, if they are able to use their own technologies [20]. Gens et al. state that half of the IT organizations name employee satisfaction as a primary benefit of IT consumerization [9]. Therefore, we identify a higher level of autonomy as the second potential effect of IT consumerization.

Competence. Firstly, end users perceive their consumer applications and devices as easier to use and more intuitive [1], [23]. This seems obvious, as the employees are working with tools they purchased themselves. Secondly, employees use their IT not only in a business setting, but also privately and are therefore more familiar with it. Consequently, it can be assumed that individuals benefit personally from greater competence, i.e. being able to solve problems more easily [20], when using private IT. In contrast, existing corporate IT infrastructures create innovation barriers and lead to frustration among employees [29]. Thus, if employers introduce consumer

tools into their organizational portfolio, they can expect existing technological competence among their employees to accelerate the adoption of new technologies [30]. Hence, we derive a higher level of perceived competence as the third major effect related to IT consumerization.

Table 1 provides an overview of practitioner studies which contribute to these three lines of argument (indicated by an "x"). In the following section, we use both psychological and IS theories to build upon and integrate the causal relationships suggested by the practitioner studies and to create a preliminary theoretical model of IT consumerization.

Table 1. Advantages and disadvantages for individuals according to the studies analyzed

Study	**Concept 1:** Workload	**Concept 2:** Autonomy	**Concept 3:** Competence
Aerospace Industry Association [21]	x		
Avenade [26]		x	
Cisco [27]		x	
Dell and Intel [20]	x	x	x
Dell and Intel [24]		x	x
Gens et al. [9]		x	
Harris et al. [1]		x	x
Harris, Junglas, and Long [31]			x
Moschella et al. [29]			x
Murdoch et al. [23]		x	x
Prete et al. [30]			x
Price Waterhouse Coopers [25]		x	
Vile [8]		x	
Sum	2	9	7

4 Theory development

4.1 Cognitive Model of Stress

In their cognitive model, Lazarus and Folkman define stress as the result of an interaction between an individual and the environment, including stressful situations or conditions, which they refer to as "stressors" [32]. Especially in an organizational context, stressors emerge when individuals cannot cope with new technologies or a high workload [33]. As a result, the individual's well-being and hence the organizational productivity is influenced negatively [34]. Within the IS literature, the effects of stress have recently been discussed in the context of turnover intention [35], [36], job satisfaction [37], [38] and innovation with IT [39]. Recently, a couple of authors have discussed the concept of "technostress", i.e. the role played by information and communication technology in creating higher stress levels of individuals [40], [41].

Technostress is the result of constant multitasking, relearning and insecurity, as a consequence of frequent IT paradigm changes [42].

Numerous studies have demonstrated the influence of stressors on employee stress perception. Our (practical) literature review revealed that an increase in workload and greater autonomy are familiar effects of the IT consumerization trend. High workloads and a lack of autonomy are essential stressor variables in both the psychological [43], [44] and IS literature [36], [39]. Tarafdar et al. mention that telecommunicating and constant connectivity have extended the workplace into other areas of life, leading to a sometimes dangerously higher workload [41]. Ahuja and Thatcher note that contemporary work environments are characterized by both work overload and autonomy, providing workers with more freedom, but simultaneously with greater responsibilities [39].

As regards workload our literature review shows that IT consumerization comes along with work extension [20], [21]. Through corporate influence on private IT, the workplace is extended into the private sphere and there are higher expectations concerning connectivity and willingness to work, which extend into what would normally be off-hours [24]. Hence, we propose:

P_1: Employees who use private IT for business purposes experience a higher workload.

While it is plausible that, after all, higher workloads lead to a higher work performance, the downside of work extension is potential work overload, especially in the long run. Workload changes become work overload, if, amongst other factors, an individual perceives that there are critical resources lacking to fulfill a particular task [39]. It is likely that the consumerization of IT also contributes to this development. Based on the above considerations, we propose two distinct effects of workload:

P_2: Workload has a positive influence on work performance.

P_3: If workload becomes overload, it raises the stress level at work.

Hackman and Oldham define autonomy as “the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out” [45, p. 5]. As IT consumerization is considered to provide employees with greater autonomy, for instance, by allowing them to choose their own IT equipment, e.g. [23], hence:

P_4: Employees, who are given the choice of using private IT for work purposes, perceive a greater autonomy at their workplace.

Ahuja and Thatcher found in their study an interactive relationship between autonomy and overload [37]. Following demand-control theory [46], they propose that joint effects of overload and autonomy predict higher work outcomes. Further evidence can

be derived from psychological literature, which suggests that a higher job control of individuals, a variable similar to autonomy, lessens stress perception and, consequently, increases work outcomes [43, 46]. Based on the above, we propose:

P_5: Autonomy lowers the stress level at work.

The influence of stress on human performance has been widely discussed in the psychological literature [47–49]. Following the theoretical work of Lazarus et al. [32], stressor can either be associated negatively with threat or hindrance or positively with challenge [50]. Drawing on this concept many authors support an inverted-U shaped relationship between stress and performance, meaning moderate stress is optimal for employee performance, because it is stimulating and challenging. By contrast, very low and very high stress level trigger boredom and anxiety respectively, which impacts negatively on performance [51]. As our study focuses on work overload as essential stressor, we consider perceived stress as detrimental to work performance, in line with negative linear stress models. Conceivably, overload can be perceived as challenge stressor, when high performers take on more tasks because of their motivation to perform them well [47]. However, grounded in the practitioner reports analyzed, we see overload as a clear hindrance stressor in the context of our study. This is supported by Gilboa et al., who besides other considerations of hindrances and challenges still expects the relationship between stressor and performance to be negative [47]. Hence, we posit:

P_6: High stress levels have a negative influence on work performance.

4.2 Self-determination Theory

IT consumerization affects user autonomy and choice to select and to use IT tools in the work context. The practitioner literature suggests that this increased autonomy enhances work performance, because users select devices and software with which they are familiar and are able to handle more productively [20], [27]. This direct relationship is also supported by recent IS research. For instance, Elie-Dit-Cosaque et al. stated that "[…] autonomy is what enables individuals to cope effectively with changing work conditions, including those from IT" [52] while Ahuja and Thatcher found a significant correlation between autonomy and IT innovativeness [39]. Hence,

P_7: Perceived autonomy exerts a direct positive effect on work performance.

From a psychological perspective, the relationship between autonomy and performance can be explained using self-determination theory (SDT). Autonomy is an commonly cited construct in the context of intrinsic motivation [53], [54]. For instance, Deci and Ryan stated that "[...] the experiences of competence and autonomy are essential for intrinsic motivation" [54]. In turn, intrinsic motivation leads to more

excitement and interest towards the particular subject and thus to higher performance [54]. On the other hand, if a high level of external control is imposed, performance may decline, for example due to task monotony [55]. In the IS literature, little attention has so far been paid to SDT in the context of performance research. While several studies have elaborated on the effects of autonomy on technology acceptance [56], [57], few have directly addressed the relationship between autonomy and performance. One exception is Ke and Zhang, who found that satisfying needs for autonomy may raise motivation and task effort in the context of open software development [12]. Thus, we expect:

P_8: *Perceived autonomy raises intrinsic task motivation.*

P_9: *Higher intrinsic motivation positively influences work performance.*

In addition to an increase in autonomy, the practitioner literature also suggests a positive influence of IT consumerization on competence, because private devices are generally easier to use and existing knowledge and skills gained through their usage may be easily transferred to and utilized in a work context [30]. This is underlined by a recent IS study that found a significant positive correlation between perceived competence and perceived ease of use [57]. Thus, if a technology is perceived as easier to use, the general perceived competence with regard to this technology will also rise. Hence, we propose:

P_{10}: *The use of private IT for business purposes exerts a positive effect on perceived competence.*

In this context, perceived competence is closely related to the concept of computer self-efficacy. Compeau and Higgins define computer self-efficacy as "[…] an individual's perceptions of his or her ability to use computers in the accomplishment of a task […] rather than reflecting simple component skills" [58]. This resembles definitions of perceived competence from self-determination theory [54]. Also, very similar to perceived competence, IS studies have revealed a positive correlation between computer self-efficacy and ease of use [59]. The concept has a clear task focus and, in IS theory, is often directly related to task performance [58], [60]. Computer self-efficacy affects choices about how to behave and act, as well as the persistence and effort exerted when facing obstacles [61]. Thus, if people feel more self-confident in the use of IT, it is likely that they will find more innovative and faster ways for dealing with a particular task and will thus be more productive. Therefore, we propose:

P_{11}: *Perceived competence exerts a direct positive effect on work performance.*

In addition, SDT suggests an indirect relationship between competence and performance, with motivation as an intermediary construct [62]. In this context, cognitive

evaluation theory – a sub-theory within SDT – claims that social-contextual factors leading to a feeling of competence may positively increase intrinsic motivation towards the task [54]. This relationship has also been validated with respect to IS-based tasks [12]. Thus, task performance may not only increase because of a more effective IT tool selection, i.e. the task-technology fit, but also due to an elevated level of intrinsic motivation. Hence, we propose that:

P_{12}: Increased perceived competence raises intrinsic motivation.

Figure 1 shows our theoretical model including the individual propositions. For each concept, it is specified whether it is grounded in theory and/or found in the practitioner literature.

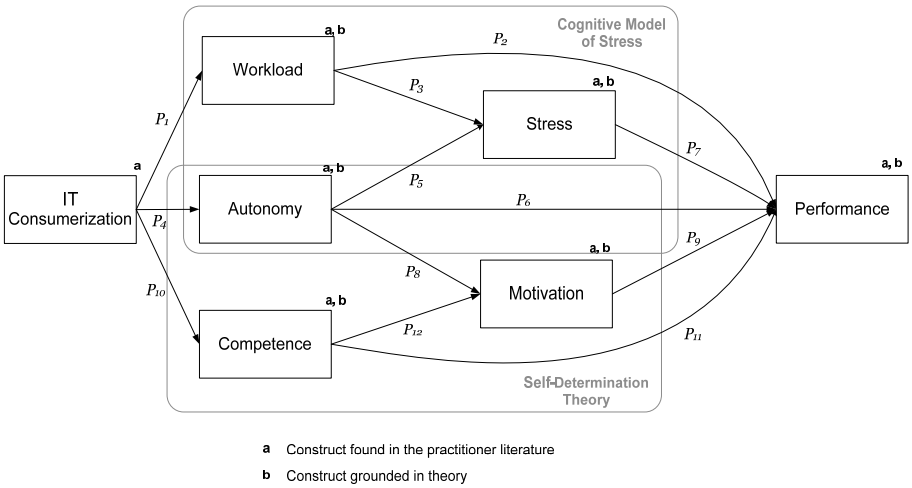

Fig. 1. Theorizing IT Consumerization

5 Case Study: Preliminary Results

Drawing on the related theory, the investigated case offered a variety of insights to perform an initial check of the proposed research model. With regard to workload, we could find supporting evidence for our propositions P_1 and P_2 within the case. Several interviewees conceded that by using private devices, they tend to extend working time. Exemplary, one employee stated:

"Inevitable, I spend a lot of time at 'dead places' where I am not able to do anything except working with my smartphone. By using it, I can start working on open tasks."

Similarly, the private life of employees is affected by work extension, indicating an advancing work-life overlap. One unit manager stated that some employees with high IT-capability put some work tasks in their briefcases on Friday, solve the problems at

home with their private tools over the weekend, and show up on Monday with the results. Several employees consider that as a negative consequence of consumerization, indicating work overload and supporting P_3. A service manager stated:

"It leads to a state where free time is not really free anymore, and you always feel connected to work, think about work issues and even work on some stuff during your off-times."

However, few interviewees had a negative perception of this trend. Instead, they appreciated the increased flexibility to schedule work times and the chance to carry just one device for private and work purposes. The freedom of hardware and software choice is not a decisive factor for most employees, because the current IT infrastructure of CouplingCo is satisfying. In general, the positive effect of increased autonomy was far more strongly supported in the case than the negative aspects related to workload and stress, thus supporting our propositions P_4 and P_5. The CIO stated:

"If employees can decide themselves which tools to use, they will commit to tasks that, I guess, we wouldn't even have time for otherwise."

Moreover, the case supports the general perception that IT consumerization leads to a higher level of employee motivation (P_8). However, the interviewees did not elaborate on the reasons of this increase in motivation (P_{12}). An IT project manager stated:

"The possibility of using private IT will certainly have a positive effect on motivation. Whether this effect is high or low will depend on the people. Some would cut corners, if they were told that they could do everything they wanted with their android device."

The proposed positive influence of the use of private IT on competence (P_{10}) was also evident in the case. Employees use private IT tools to perform work tasks, because they enable the exploitation of privately gained competences and thus enhance performance. An employee stated:

"Concerning performance, usability, and speed, I could work better with my private device because I am used to it and can carry out standards"

Overall, we found evidence to support most of our theoretical constructs and relationships. However, while we have found several statements about motivation, stress levels and employee competence employees, we were not able to distinguish between different effects from the qualitative study on work performance (P_6, P_7, P_9 and P_{11}). Nonetheless, we found substantial evidence to support the positive relationship of IT consumerization on work performance. Interviewees talked frequently about practices and scenarios, where the use of their private hardware and software enabled them to work faster or more efficiently. Examples included checking business E-Mails from private devices at home, continuing with work tasks after hours on the private PC,

using private cameras to take pictures of the production process and bringing along the private tablet PC to business meetings or on business trips.

6 Discussion

With this paper, we lay the basis for an integrated and specific IT consumerization theory. The phenomenon of IT consumerization, defined here as the co-use of privately-owned IT resources for business purposes, is gaining immense attention in practice. IS research, however, has yet to provide the necessary vocabulary and a systematic understanding of this important phenomenon. Our paper contributes to closing this research gap. On the basis of a comprehensive, practice-oriented literature review, we extracted potential (direct) effects of IT consumerization, namely increased workloads, perceived autonomy, and perceived competence. We then connected IS theory, namely the cognitive model of stress and self-determination theory, with these lines of argument and concepts. While both theoretical perspectives originate from the field of psychology, they have already been applied effectively in IS. Our resulting theoretical model of IT consumerization and its effects on individual work performance consists of seven constructs and twelve hypothesized relationships. In an initial effort to test and to potentially extend this model, we conducted an embedded case study at CouplingCo that relied on 13 semi-structured interviews as the primary source of data. The results of this initial case study (pre-test) encourage us to proceed with the given model for two reasons. Firstly, we found the major case study concepts and arguments to be covered by our theoretical model and, secondly, the data supports the majority of the hypothesized relationships. One exception is the negative relationship of stress and performance which is, however, dealt with comprehensively in the literature. We assume this discrepancy to be a result of employee self-assessment and self-reported information. Overall, we contribute to the IS body of knowledge, an initial theoretical model for understanding IT consumerization and, specifically, its multi-facetted consequences for individual work performance.

On the basis of this paper, we plan a quantitative analysis as the next major step. CouplingCo has committed to send out a survey questionnaire to its employees in (still to be determined) selected departments, such as sales or R&D. The measurement model we need to develop for this endeavor will be able to rely on the academic literature and can be complemented by qualitative information/quotes from the case study. For instance, the IS literature does not yet provide a measurement instrument for IT consumerization as a theoretical concept and our qualitative data can help to develop just this. Moreover, we assume that a quantitative-empirical analysis will be able to contribute to solving still prevailing discrepancies between theory and qualitative interview data (e. g., the stress-performance relationship). In addition, a sound definition of constructs and corresponding measurement instruments can potentially help to overcome “under-defined” statements in the practitioner literature. For instance, motivation, stress, productivity, and other (psychological) aspects relevant for IT consumerization are often “laundry-listed” in the practitioner literature, rather than being formulated in terms of a systematic relationship. Only a systematic understand-

ing of the relationship between IT consumerization and individual work performance will enable a positive manipulation of specific effects. In turn, enabling organizations to benefit from the full performance-related potential of IT consumerization, despite concerns about, for instance, security and maintenance [9].

Nonetheless, our approach is limited in several respects, which opens up the field for additional future research. The current model has been developed on the basis of IS practice literature as well as IS theory. However, this is certainly not exhaustive and other theoretical perspectives could potentially contribute to explaining how IT consumerization relates to work performance. We hope that, in such contexts, our model can serve as a viable starting point and general framework that is open to extension. Moreover, we identified individual autonomy as one of the key concepts relevant to IT consumerization. Privately-owned hardware and software are, by definition, part of ongoing information system individualization. Baskerville [60] calls for research revolving around "individual IS" and we note that consumerization thoroughly embodies this phenomenon in prevailing IS practice. We see a potentially fruitful avenue for future research in investigating the relationship between consumerization and the individualization of information technology/information systems.

7 Acknowledgements

This paper was written in the context of the research project WeChange (promotional reference 01HH11059) which is funded by the German Federal Ministry of Education and Research (BMBF).

References

1. Harris, J.G., Ives, B., Junglas, I.: The Genie Is Out of the Bottle: Managing the Infiltration of Consumer IT Into the Workforce. Accenture Institute for High Performance (2011)
2. Gartner: Gartner Says the Personal Cloud Will Replace the Personal Computer as the Center of Users' Digital Lives by 2014, http://www.gartner.com/it/page.jsp?id=1947315
3. Fenn, J., LeHong, H.: Hype Cycle for Emerging Technologies, Gartner, Stamford, (2011)
4. Moore, G.: Systems of Engagement and The Future of Enterprise IT - A Sea Change in Enterprise IT. AIIM, Silver Spring, Maryland (2011)
5. Andriole, S.J.: Managing Technology in a 2.0 World. IT Pro. 50–57 (2012)
6. Brousell, L.: Exclusive Research Shows CIOs Embrace Consumerization of IT, http://www.cio.com/article/694609/Exclusive_Research_Shows_CIOs_Embrace_Consumerization_of_IT
7. Schadler, T.: How consumerization drives innovation - an Empowered Report, (2011)
8. Vile, D.: The Consumerisation of IT. Freeform Dynamics, New Milton, Hampshire,(2011)
9. Gens, F., Levitas, D., Segal, R.: 2011 Consumerization of IT Study: Closing the Consumerization Gap. IDC, Framingham (2011)
10. Sawyer, S., Winter, S.J.: Special issue on futures for research on information systems: prometheus unbound? Journal of Information Technology. 26, 95–98 (2011)

11. Venkatesh, V., Thong, J.Y.L., Xin Xu: Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. MIS Quarterly. 36, 157–178 (2012)
12. Ke, W., Zhang, P.: The effects of extrinsic motivations and satisfaction in open source software development. Journal of the Association for Information Systems. 11, 784–808 (2010)
13. Gebauer, J., Shaw, M.: Task-Technology Fit for Mobile Information Systems. Journal of Information Technology. 25, 259–272 (2010)
14. Webster, J., Watson, R.: Analyzing the past to prepare for the future: Writing a literature review. MIS Quarterly. 26, xiii–xxiii (2002)
15. Strauss, A.L., Corbin, J.: Basics of qualitative research. Techniques and procedures for developing grounded theory. Sage, Thousand Oaks (1998)
16. Eisenhardt, K.M.: Theories from Case Study Research. Academy of Management Review. 14, 532–550 (1989)
17. Sarker, S., Lau, F., Sahay, S.: Using an adapted grounded theory approach for inductive theory building about virtual team development. ACM SIGMIS Database. 32, 38–56 (2001)
18. Yin, R.: Case study research: Design and Methods. Sage, Beverly Hills (1984)
19. Dynamic Markets: Flexible Working and SMEs. Independent Market Research Report. Avaya, Abergavenny, United Kingdom (2011)
20. Dell, Intel: The Evolving Workforce: The Workflow Perspective. Round Rock, Texas (2011)
21. Aerospace Industries Association: Best practices for exploiting the consumerization of information technologies. , Arlington, Virginia (2011)
22. BBC News: Volkswagen turns off Blackberry email after work hours, http://www.bbc.co.uk/news/technology-16314901
23. Murdoch, R., Harris, J.G., Devore, G.: Can Enterprise IT Survive the Meteor of Consumer Technology? Accenture Institute for High Performance (2010)
24. Dell, Intel: The Evolving Workforce: Expert Insights. Round Rock, Texas (2011)
25. Price Waterhouse Coopers: The consumerization of IT - The next-generation CIO. Center for Technology and Innovation, New York (2011)
26. Avenade: Global Survey: Dispelling Six Myths of Consumerization of IT. (2012)
27. Cisco: Connected World Technology Report. , San José, California, USA (2011)
28. Davenport, T.H., Thomas, R.J., Catrell, S.: The mysterious art and science of knowledge-worker performance. MIT Sloan Management. (2002)
29. Moschella, D., Neal, D., Opperman, P., Taylor, J.: The “Consumerization” of Information Technology. CSC Research White Paper, El Segundo (2004)
30. Prete, C. Del, Levitas, D., Grieser, T., Turner, M.J., Pucciarelli, J., Hudson, S.: IT Consumers Transform the Enterprise: Are You Ready? (2011)
31. Harris, J.G., Junglas, I., Long, B.: The Wide World of Consumer IT: A Crash Course for Executives. Accenture Institute for High Performance (2011)
32. Lazarus, R.S., Folkman, S.: Stress, appraisal, and coping. Springer (1984)
33. Cooper, C.L., Dewe, P., O’Driscoll, M.P.: Organizational Stress: A Review and Critique of Theory, Research, and Applications. Sage, Thousand Oaks (2001)
34. McGrath, J.E.: Stress and behavior in organizations. In: Dunnette, M.D. (ed.) Handbook of industrial and organizational psychology, pp. 1351–1395. Rand McNally (1976)
35. Ahuja, M.K., Chudoba, K.M., Kacmar, C.J., McKnight, D.H., George, J.F.: IT road warriors: Balancing work-family conflict, job autonomy, and work overload to mitigate turnover intentions. MIS Quarterly. 31, 1–17 (2007)

36. Moore, J.E.: On the Road to Turnover: An Examination of Work Exhaustion in Technology Professionals. MIS Quarterly. 24, 141–168 (2000)
37. Joshi, K., Rai, A.: Impact of the quality of information products on information system users' job satisfaction: an empirical investigation. Information Systems Journal. 323–345 (2000)
38. Li, E.Y., Shani, A.B.: Stress dynamics of information systems managers: a contingency model. Journal of Management Information Systems. 4 (1991)
39. Ahuja, M.K., Thatcher, J.B.: Moving Beyond Intentions and Toward the Theory of Trying: Effects of Work Environment and Gender on Post-Adoption Information Techology Use. MIS Quaterly. 29, 427–459 (2005)
40. Ayyagari, R., Grover, V.: Technostress: technological antecedents and implications. MIS Quarterly. 35, 831–858 (2011)
41. Tarafdar, M., Tu, Q., Ragu-Nathan, B., Ragu-Nathan, T.S.: The Impact of Technostress on Role Stress and Productivity. Journal of Management Information Systems. 24, 301–328 (2007)
42. Tarafdar, M., Tu, Q., Ragu-Nathan, T.S.: Impact of Technostress on End-User Satisfaction and Performance. Journal of Management Information Systems. 27, 303–334 (2010)
43. Kahn, R.L., Byosiere, P.: Stress in organizations. In: Dunnette, M.D. and Hough, L.M. (eds.): Handbook of industrial and organizational psychology, pp. 571–650. Consulting Psychologists Press (1992)
44. Maslach, C., Leiter, M.P.: Early predictors of job burnout and engagement. The Journal of applied psychology. 93, 498–512 (2008)
45. Hackman, J.R., Oldham, G.R.: Motivation through the design of work: Test of a theory. Organizational Behavior and Human. 279 (1976)
46. Karasek, R.A.: Job Demands, Job Decision Latitude, and Mental Strain: Implications for Job Redesign. Administrative Science Quarterly. 24, 285–308 (1979)
47. Gilboa, S., Shirom, A., Fried, Y., Cooper, G.: A meta-analysis of work demand stressors and job performance: Examining main and moderating effects. Personnel Psychology. 61, 227–271 (2008)
48. Cohen, S.: Aftereffects of stress on human performance and social behavior: a review of research and theory. Psychological Bulletin. 88, 82–108 (1980)
49. Staal, M.A.: Stress, cognition, and human performance: A literature review and conceptual framework. NaSA technical memorandum (2004)
50. Lepine, J.A., Podsakoff, N.P., Lepine, M.A.: A meta-analytic test of the challenge stressor - hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. Academy of Management Journal. 48, 764–775 (2005)
51. Zivnuska, S., Kiewitz, C., Hochwarter, W.A., Perrewé, P.L., Zellars, K.L.: What is too much or too little? The curvilinear effects of job tension on turnover intent, value attainment, and job satisfaction. Journal of Applied Social Psychology. 32, 1344–1360 (2002)
52. Elie-Dit-Cosaque, C., Pallud, J., Kalika, M.: The Influence of Individual, Contextual, and Social Factors on Perceived Behavioral Control of Information Technology: A Field Theory Approach. Journal of Management Information Systems. 28, 201–234 (2011)
53. Deci, E.L., Connell, J.P., Ryan, R.M.: Self-determination in a work organization. Journal of Applied Psychology. 74, 580–590 (1989)
54. Ryan, R.M., Deci, E.L.: Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. The American Psychologist. 55, 68–78 (2000)

55. Melamed, S., Ben-Avi, I., Luz, J., Green, M.S.: Objective and Subjective Work Monotony: Effects on Job Satisfaction , Psychological Distress , and Absenteeism in Blue-Collar Workers. The Journal of applied psychology. 80, 29–42 (1995)
56. Malhotra, Y., Galletta, D.F., Kirsch, L.J.: How Endogenous Motivations Influence User Intentions: Beyond the Dichotomy of Extrinsic and Intrinsic User Motivations. Journal of Management Information Systems. 25, 267–300 (2008)
57. Roca, J.C., Gagné, M.: Understanding e-learning continuance intention in the workplace: A self-determination theory perspective. Computers in Human Behavior. 24, 1585–1604 (2008)
58. Compeau, D.R., Higgins, C.A.: Computer self-efficacy: Development of a measure and initial test. MIS Quarterly. 19, 189–211 (1995)
59. Brown, S.A., Venkatesh, V.: Model of adoption of technology in households: A baseline model test and extension incorporating household life cycle. MIS Quarterly. 29, 399–426 (2005)
60. Marakas, G.M., Yi, M.Y., Johnson, R.D.: The Multilevel and Multifaceted Character of Computer Self-Efficacy: Toward Clarification of the Construct and an Integrative Framework for Research. Information Systems Research. 9, 126–163 (1998)
61. Compeau, D.R., Higgins, C.A.: Application of Social Cognitive Theory to Training for Computer Skills. Information Systems Research. 6, 118–143 (1995)
62. Baard, P.P., Deci, E.L., Ryan, R.M.: Intrinsic Need Satisfaction: A Motivational Basis of Performance and Weil-Being in Two Work Settings. Journal of Applied Social Psychology. 34, 2045–2068 (2004)
63. Baskerville, R.: Individual information systems as a research arena. European Journal of Information Systems. 20, 251–254 (2011)