Towards a New Personal Information Technology Acceptance Model: Conceptualization and Empirical Evidence from a Bring Your Own Device Dataset

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Towards a New Personal Information Technology Acceptance Model: Conceptualization and Empirical Evidence from a Bring Your Own Device Dataset

Full paper

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Abstract

By considering recent findings from cognitive dual process theories, I propose a new technology acceptance model for situations in which IT is used everyday. The so-called "Personal Information Technology Acceptance Model" (PITAM) will be applied to the IT-consumerization area and it will be evaluated by a Bring Your Own Device (BYOD) dataset from 171 working professionals aged from 18 to 68 years. As a result I found empirical evidence for the speculation that BYOD user behavior is primarily driven by Perceived Enjoyment as a System 1 IS construct and System 2 IS constructs such as Perceived Usefulness are results of post hoc constructions/justifications of (intended) BYOD usage.

Keywords

Technology Acceptance, Bring Your Own Device, BYOD, IT-Consumerization, Dual Process Theories, DPT, System 1, System 2, IS Theorizing, PITAM.

Introduction

Research on technology acceptance has been dominated by rationalist approaches such as the Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM+), Unified Theory of Acceptance and Use of Technology (UTAUT+), IS Continuance Model (CM), Multi Attribute Utility Theory (MAUT) etc., in which intention to use and actual usage is thought to be caused by rational reasoning, i.e. influenced by rational constructs such as Perceived Usefulness or Perceived Ease of Use.

Significant criticisms of a pure rational conceptualization have recently occurred. Risk analysis research has shown that humans may perceive and act on the basis of instinctive and intuitive reactions or by a logical analysis and deliberation as two fundamental different ways (Slovic and Peters 2006). Research in decision sciences from clinical, physiological, and other subfields of psychology have emphasized that emotional reactions in decision situations often diverge from cognitive assessments of the situation (Loewenstein et al. 2001). Intuitive and emotional reactions – not the cognitive calculus – often drive behavior. Findings from morale judgement have shown that human reasoning is usually a post hoc construction after the judgement of a situation and not the driver of behavior (Haidt 2001). Findings from neuroscience has highlighted the importance of incorporating emotional processes within models of human choice (Sanfey et al. 2003) while research indicates the primary role of emotional processes (De Martino et al. 2006). Cognitive psychologists found two distinctively separate cognitive systems underlying thinking and reasoning (Stanovich and West 2000) – crystallized in dual process theories (DPT) of cognition (Evans 2008). DPT conceptualizes *System 1* as the rapid, parallel and automatic driver of behavior and *System 2* as the slow and sequential post hoc construction instance justifying behavior (Evans 2003).

These doubts about a pure rational conceptualization of technology acceptance have been strengthened by technology usage observations within the growing IT-Consumerization trend. Nowadays the users perceive a smartphone as an extension of their self and use it in a very intuitive and automatic manner (French et al. 2014; Niehaves et al. 2012) – also in the workplace (Eddy 2013; Köffer et al. 2014; Schalow et al. 2013). While information systems (IS) scholars validated the driver role of *System 1* IS constructs such as Perceived Enjoyment especially within IT-Consumerization phenomena (Constantiou et al. 2014; French et al. 2014; Niehaves et al. 2012; Schalow et al. 2013), in the past IS researchers have analyzed the "Bring Your Own Device" (BYOD) phenomena only on the basis of the traditional pure rational technology acceptance approaches (e.g., Lebek et al. (2013) based on TRA and TAM; Hopkins et al. (2013); Lee et al. (2013); Ortbach et al. (2013) based on TPB; Cruz et al. (2014); Loose and Weeger (2013) based on UTAUT). IS research consequently lacks an approach integrating the recent DPT results from psychology and neuroscience concerning intuitively driven acting. Since DPT conceptualizes the driver role of *System 1* constructs such as Perceived Enjoyment (Haidt 2001) and this driver role was also found by IT-Consumerization scholars (Constantiou et al. 2014; French et al. 2014; Niehaves et al. 2012; Schalow et al. 2013), using DPT for IT-Consumerization theorizing could be very fruitful.

The author gives reasons for considering the hypothesis that rational reasoning does not cause everyday use personal information technology acceptance; rather, reasoning about usefulness and other rational constructs is a post hoc construction – generated after the intuitive building of a usage intension.

That is why I propose the so-called "Personal Information Technology Acceptance Model" (PITAM) which integrates the distinction between *System 1* and *System 2* IS constructs and the typical causal relationship between both systems in everyday situations according to DPT. The PITAM model will be evaluated by an empirical BYOD data set. BYOD is ideally suited since smartphones or tablets belong to daily use consumer information technology (IT) (Constantiou et al. 2014). People do not spend a lot of time reasoning when using it, instead they use it automatically and intuitively.

Research Question: Can we find empirical evidence for an IS theory that user behavior is primarily driven by System 1 IS constructs and System 2 IS constructs are the result of post hoc constructions/justifications of (intended) system usage?

The PITAM model may substantially extend the technology acceptance theories – at least in situations when IT is intuitively used every day – which is often the case within IT-Consumerization. Since PITAM integrates prior DPT knowledge from psychology it turns pure rational technology acceptance approaches upside down and gives initial indications that technology acceptance may not be driven by *System 2* constructs such as Perceived Usefulness but by *System 1* constructs such as Perceived Enjoyment. Furthermore, PITAM and its first empirical evaluation by the BYOD dataset indicate that cognitive *System 2* constructs are mainly a result of post hoc constructions/justifications of system usage or alternatively an intuitive usage intention.

The most important contributions from PITAM are:

1. Cognitive *System 2* technology acceptance constructs (e.g., Perceived Usefulness) can be understood as a result of post hoc constructions/justifications of (intended) system usage.
2. Cognitive *System 2* constructs (e.g., Perceived Usefulness) are not the main driver of technology acceptance in everyday IT usage situations.
3. Intuitive *System 1* constructs (e.g., Perceived Enjoyment) are the primary technology acceptance drivers, at least in everyday IT usage situations.

The paper is organized as follows: Next I span the research background from dual process theories via the role of *System 1* and *System 2* in IS research to the BYOD as intuitive everyday use IT. After that the research methodology is presented, including the research model and the hypotheses as well as the sampling strategy and all measurements. Then the results including sample characteristics, the evaluation of the measurement model, the structural model results and the hypotheses evaluation outcomes will be presented before discussing the results with limitations and future research are discussed.

Research Background

Dual process theories - two cognitive systems in one brain

Dual process theories of cognition[1] were evolved during the last 40 years from psychology and contain the idea that there are two distinctively separate cognitive systems underlying thinking and reasoning. In fact, in recent years psychologists, physicians and neuroscientists found a lot of evidence that there are two distinct kinds of reasoning in the human brain (Evans 2008). Stanovich and West (2000) specified these kinds of reasoning by the neutral terms *System 1* and *System 2*. While *System 1* is characterized by acts that are "rapid, parallel and automatic in nature" and "only the final product is posted in consciousness", *System 2* "is slow and sequential" (Evans 2003, p. 454). Hard evidence for this separation came in particular from psychology (e.g., belief bias effect (Newstead et al. 1992) and Wason's selection task (Evans 1999; Wason and Johnson-Laird 1972)) and from neuroscience using fMRI (e.g., Goel et al. (2000); Goel and Dolan (2003)) or EEG (e.g., Sessa et al. (2014)), but also from related disciplines such as religious studies (Gervais and Norenzayan 2012).

System 1 processes are so heavily grounded that to simply encourage slowing down and increasing attention to achieve analytical thinking is insufficient to increase the accuracy of cognitive reasoning (Norman et al. 2014).

Finally, Kahneman (2011) pushed the main ideas from dual process theories to general public in his famous book "Thinking, Fast and Slow".

The very important point for IS theorizing is the speculation that item-responses from *System 1* could be different from those of *System 2* as indicated by recent results from psychology (Böckenholt 2012). There is a long history of famous tests in psychology underpinning this speculation. Frederick (2005) showed by his "Cognitive Reflection Test" inventory that responses significantly differ depending on the activation of *System 1* or *System 2*. There are typical tasks such as "finding $\sqrt{19.163}$ to two decimal places without a calculator" (Frederick 2005, p. 26) which can be only found by *System 2* without any role of *System 1*. By contrast, other tasks trigger intuitive answers caused by *System 1*. Alter et al. (2007) demonstrated that the activation of *System 2* depends on the expected task difficulty. If the expected task difficulty is low, *System 2* will not be activated and responses only come from *System 1*. Strack et al. (1988) showed that priming *System 2* influences *System 1* item-responses. In addition, Gervais and Norenzayan (2012) found that a high *System 2* activation overrides intuitive *System 1* beliefs.

System 1 and System 2 in Information Systems Research

Interestingly, despite the substantial scientific success of dual process theories in human sciences, IS research largely neglects these findings with a few exceptions: Mishra et al. (2013) revealed *System 1* (intuitive) and *System 2* (analytic) modes of thinking when using decision support systems. The work of van der Heijden (2013) showed that priming *System 1* influences the user evaluation of *System 2* constructs. Hong et al. (2011) analyzed the user acceptance of agile IS distinguishing cognitive *System 2* factors (i.e., perceived usefulness, perceived ease of use, social influence, facilitating conditions) and affective *System 1* drivers (i.e., satisfaction, comfort with change). They revealed that "a notable unique driver of agile IS acceptance is users' level of comfort with the constant changes" (Hong et al. 2011, p. 266). That means that the affective dimension (*System 1*) primarily influences use acceptance. Prior literature identified perceived hedonic quality (Hassenzahl 2001) such as perceived enjoyment (e.g., van der Heijden (2004)) and perceived affective quality (Zhang 2013; Zhang and Li 2004) such as visual attractiveness (e.g., Lavie and Tractinsky (2004)) as typical *System 1* constructs.

Besides the potential driver role of *System 1* it should be emphasized that IS constructs can be individually evaluated intuitively without mental effort. In contrast, the evaluation of *System 2* constructs is more conscious and more analytical (Table 1). For instance, the evaluation of the usefulness of information requires more effort than answering the question if a person likes a specific IS or if it is fun to use an IS. E.g., Kayhan and Bhattacherjee (2009) argued that the assessment of the quality of information is a

[1] The term "dual process theories" is widely used in the sciences. Here I refer to the dual process theories of cognition/reasoning etc., e.g. Evans (2003); not the others such as the dual process theory of normative and informational influence from Deutsch and Gerard (1955).

System 2 process since it "involves scrutinizing the merits of that information, which is an effortful, conscious, deliberate, and rule governed process" (Kayhan and Bhattacherjee 2009, p. 4).

	System 1	*System 2*
Characteristics (Evans 2008)	unconscious, implicit, automatic, low effort, rapid/fast, high capacity, default process, holistic/perceptual, nonverbal, associative, pragmatic, parallel	conscious, explicit, controlled, high effort, slow, inhibitory, analytic/ reflective, language-linked, rule based, abstract, logical, sequential
Specific *System 1/2*-related IS constructs, identified by Chu et al. (2014); Hong et al. (2011); Lavie and Tractinsky (2004); van der Heijden (2004)	• Perceived Enjoyment • Perceived Visual Attractiveness • Perceived Satisfaction • Perceived Comfort • System Usage	• Perceived Usefulness • Perceived Ease of Use (Integration) • Perceived Social Influence • Perceived Facilitating Conditions (Company Support) • Intention to Use

Table 1. Specific System 1 and System 2 IS constructs

IS researchers recently began to differentiate *System 1* and *System 2* IS constructs and found that integrating *System 1* constructs in some cases beat traditional pure rational technology acceptance approaches. For instance, Chu et al. (2014) analyzed the misuse of IS resources in the workplace and found that integrating *System 1* constructs provides a better explanation of volitional or unethical behavior than pure *System 2* models such as TPB do. However, integrating the current knowledge from DPT means not only identifying the driver role of *System 1* constructs but also the clarification of the role of *System 2* constructs – what is part of the next section.

Bring Your Own Device as Intuitive Everyday Use Information Technology

IS scholars on hedonic systems (van der Heijden 2004), agile IS (Hong et al. 2011), recurring misuse of IS resources in the workplace (Chu et al. 2014) and especially on smartphones (Constantiou et al. 2014; French et al. 2014; Niehaves et al. 2012; Schalow et al. 2013) validated the driver role of *System 1* IS constructs, in particular of Perceived Enjoyment.

The investigation of the user acceptance of smartphones in terms of DPT is very interesting because smartphones evolved into a frequently and intuitively used tool for personal and work issues. 67.8 percent of smartphone users use theirs for work (Eddy 2013). As French et al. (2014) pointed out, *"smart mobile devices have emerged as an extension of the self…they have become closely tied to the personal behaviors and preferences of the people who own them"* (French et al. 2014, p. 192). Due to the close and intimate connection between the user and its smartphone the use of it is very automatic and intuitive. *"End users perceive their consumer applications and devices as easier to use and more intuitive"* (Niehaves et al. 2012, p. 5). Due to the increased blurring of the boundaries between work-related and personal smartphone use (Köffer et al. 2014; Schalow et al. 2013), employees use their smartphone also in the workplace more and more intuitively.

Constantiou et al. (2014) investigated the use of locations-based services (LBS) of smartphones by interviewing users and found that intuitive processes were very prominent. Due to the lack of intuitively driven conceptualisations within the existing technology acceptance approaches they call for new approaches. *"Existing technology adoption or use models, due to their deterministic nature, do not allow for studying actual LBS use in everyday life where LBS compete with other technological or non-technological means for acquiring location-related information. Therefore, new approaches are required to investigate user behaviour"* (Constantiou et al. 2014, p. 522).

While in the past IS researchers have analyzed the BYOD phenomena on the basis of the traditional pure rational technology acceptance approaches (e.g., Lebek et al. (2013) based on TRA and TAM; Hopkins et al. (2013); Lee et al. (2013); Ortbach et al. (2013) based on TPB; Cruz et al. (2014); Loose and Weeger (2013) based on UTAUT) this work will consequently implement the driver role of *System 1*. Findings from psychology (Haidt 2001) and neuroscience (De Martino et al. 2006) etc. indicated that in automatic everyday use situations *System 1* primarily causes behavior and *System 2* acts as a post hoc construction instance – only justifying behavior. That is why I will go one step further than Constantiou et al. (2014)

and conceptualize a cause relationship *Stimulus → System 1 → Behavior → System 2 → Justifying Results* within the proposed Personal Information Technology Acceptance Model.

Methodology

Research Model and Hypothesizing

The DPT based research model implements the idea of a *System 1* and a *System 2* in the IS user's brain. As Haidt (2001) and De Martino et al. (2006) emphasized, *System 1* takes over the driving seat and *System 2* constructs reason in order to justify the behavior. That is why I consider the DPT-based cause relationship (*Stimulus → System 1 → Behavior → System 2 → Justifying Results*) in PITAM – which is counter to what has been proposed in pure rational models such as TRA/TPB, TAM+, UTAUT+ etc. In addition to this rudimentary cause relationship I consequently implement the seven IS constructs as a result of the intersection of constructs known from the mostly used consumer IT acceptance model UTAUT (Venkatesh et al. 2012) and the specific BYOD-related *System 1* and *System 2* IS constructs from table 1 identified by prior IS research (Chu et al. 2014; Hong et al. 2011; Lavie and Tractinsky 2004; van der Heijden 2004).

DPT showed that the users run in *System 1* mode when they are doing daily intuitive and automatic tasks (Evans 2008). Using the smartphone is one such daily activity (French et al. 2014). Perceived Enjoyment is a feeling or rather an emotion and subsequently according to DPT (Evans 2008) a *System 1* activity. Against this background, I hypothesize that:

H_1: Perceived Enjoyment will be positively associated with the Usage Intensity.

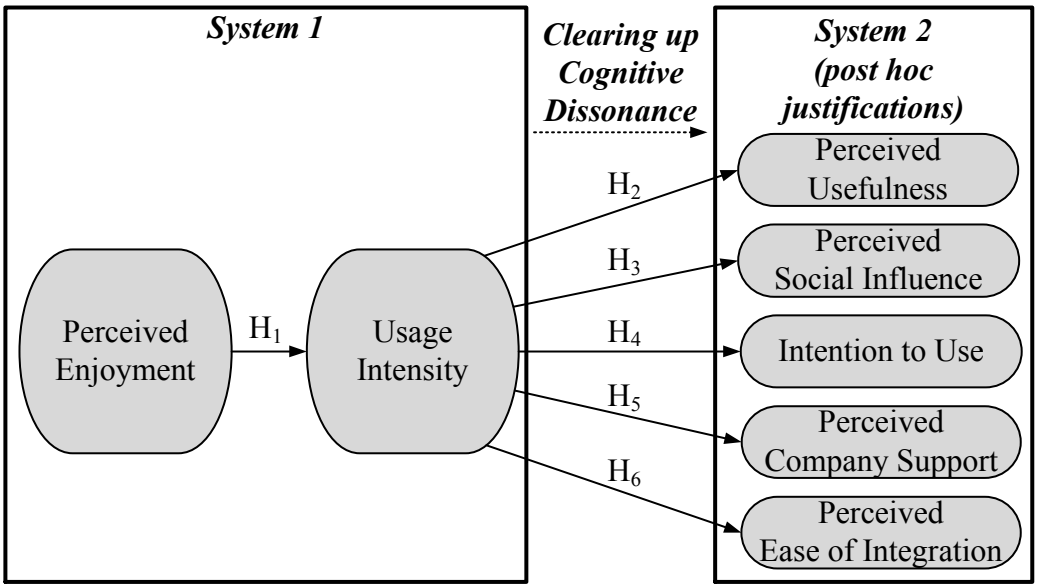

Figure 1. Personal Information Technology Acceptance Model (PITAM)

Prior IS research identified Perceived Usefulness, Perceived Social Influence, Intention to Use, Perceived Company Support and Perceived Ease of Integration as *System 2* IS constructs (Chu et al. 2014; Hong et al. 2011; Lavie and Tractinsky 2004). DPT found that *System 2* will be activated for post-hoc justifications (Haidt 2001). *System 2* searches for reasons and resolves within a clearing up process potential cognitive dissonances (Festinger et al. 1956). Against this background, I hypothesize that:

H_2: Usage Intensity will be positively associated with Perceived Usefulness.

H_3: Usage Intensity will be positively associated with Perceived Social Influence.

H_4: Usage Intensity will be positively associated with Intention to Use.

H_5: Usage Intensity will be positively associated with Perceived Company Support.

H_6: Usage Intensity will be positively associated with Perceived Ease of Integration.

Measurements

All constructs of the research model (figure 1) were operationalized by proven and established measurement instruments (see table 2). Since the survey was conducted in Germany, all items were translated and adjusted to meet the specific requirements of the German language according to Brislin (1970). Each item was measured using a 7-point Likert scale.

Perceived Enjoyment: Perceived Enjoyment is characterized by having fun when using a system (Brown and Venkatesh 2005) as an intrinsic human activity (Venkatesh 2000). Perceived Enjoyment has been found to be an important determinant of technology acceptance and use in consumer (Brown and Venkatesh 2005) and hedonic contexts (van der Heijden 2004) but also in the workplace (Davis and Bagozzi 1992). I adapted the items from Venkatesh et al. (2012) to measure the latent IS construct Perceived Enjoyment (PENJ).

Usage Intensity: The actual frequency of use is characterized by Usage Intensity (UI). According to Venkatesh et al. (2012) I measured the UI with three items concerning usage frequency.

Perceived Usefulness: As shown by many researchers the TAM (Davis 1989) was proven numerous times before to have a high level of construct reliability (Hess et al. 2014). Cronbach's α was often above 0.9 which indicates redundance of the used items. I selected and adapted three items for the Perceived Usefulness (PU) construct from Davis (1989, p. 340).

Perceived Social Influence: According to Lewis et al. (2003) social influence comes from organizational peers (e.g., department colleagues), an informal circle (e.g., friends) and professional peers (e.g. colleagues outside the department). Ortbach et al. (2013) found that colleagues and friends are the most influential referents affecting the IT consumerization intention. That is why I integrated the social support indicators PSI-1, PSI-2 and PSI-3 with respect to colleagues within and outside the department and friends. However, later PSI-3 were deleted due to reliability concerns (item loading = .693 < .707).

Intention to Use: The volitional purpose to use was conceptualized by the Intention to Use (ITU) construct. The ITU items were adapted from Venkatesh and Bala (2008, p. 314).

Perceived Company Support: Company support as a part of facilitating conditions directly influences Usage Intensity (Venkatesh et al. 2003). Since there are as many advantages for organizations as disadvantages (Niehaves et al. 2012), it is a question of the company's strategy if and how much it supports its employees when implementing BYOD. Due to this I integrate the PCS-2 item in my questionnaire. The studies of Putri and Hovav (2014) and Ortbach et al. (2013) demonstrated the importance of having an IT support team for BYOD. As Putri and Hovav (2014) pointed out, the company support *"refers to the availability of an IT support team to deal with technical issues related to employees' personal devices"* (Putri and Hovav 2014, p. 5). Ortbach et al. (2013) found that *"perceived technical support during usage were significantly correlated with IT consumerization intention"* (Ortbach et al. 2013, p. 13). Having a good BYOD-related IT-Support is a strategic decision of the top management since BYOD creates a lot of conflicts for the IT departments (Koch et al. 2014). That is why I integrated the two company support indicators PCS-1 and PCS-3 concerning the BYOD-related availability of the IT-Support or rather the IT-Hotline.

Perceived Ease of Integration: Bailey and Pearson (1983) emphasized the important role of easy to integrate IT-systems on user satisfaction (e.g., data synchronization). Because of the manifold BYOD-variants potential technical integration problems are increased. That is why I measure Perceived Ease of Integration (PEI) concerning integration, smooth service and synchronization.

Construct	Abbr.	Item text	Loading	Mean	Std. Dev.	References
Perceived Enjoyment (PENJ)	PENJ-1	I like to use my private smartphone also in my company.	.899	3.74	2.299	According to Venkatesh et al. (2012)
	PENJ-2	Using my private smartphone is enjoyable, also if it is connected to my company IT-network.	.920	3.40	2.249	
	PENJ-3	I am pleased to use my private smartphone also in the working environment.	.869	3.81	2.021	
Usage Intensity (UI)	UI-1	I frequently use my private smartphone within the IT-network of my company.	.989	2.51	2.234	According to Venkatesh et al. (2012)
	UI-2	I make use of my private smartphone within the company IT-network very often.	.976	2.24	2.093	
	UI-3	In fact, I regularly use my private smartphone within the IT-network of my company.	.973	2.48	2.249	
Perceived Usefulness (PU)	PU-1	It is useful for me when I can connect my private smartphone with my business (availability of contact information, etc.).	.927	3.88	2.397	According to Davis (1989)
	PU-2	I see a lot of functional benefits when I can connect my private smartphone with my company (e-mail or calendar synchronization, etc.).	.936	3.99	2.399	
	PU-3	Integrating my private smartphone into my business environment is very useful for me.	.917	3.46	2.125	
Perceived Social Influence (PSI)	PSI-1	My colleagues use their private smartphone within our company IT-network.	.977	3.41	2.223	According to Lewis et al. (2003)
	PSI-2	It is common in our company to use the private smartphone within the company IT-network.	.975	3.14	2.336	
Intention to Use (ITU)	ITU-1	I intend to use my private smartphone in the workplace.	.989	2.80	2.374	According to Venkatesh and Bala (2008)
	ITU-2	For the future I plan to use my private smartphone within my company IT-network.	.977	2.72	2.292	
	ITU-3	I think I will use my private smartphone within the IT-network of my employer.	.990	2.89	2.345	
Perceived Company Support (PCS)	PCS-1	The IT-Support of my company facilitates the use of private smartphones.	.930	3.00	2.319	According to Venkatesh et al. (2003)
	PCS-2	The senior management encourages the use of private smartphones in our company IT-network.	.916	2.69	2.101	
	PCS-3	The IT-Hotline helps me when I have questions concerning the integration of my private smartphone within the company IT-network.	.871	2.96	2.366	
Perceived Ease of Integration (PEI)	PEI-1	The integration of my private smartphone into my company IT-network is easy.	.910	3.83	2.444	According to Bailey and Pearson (1983)
	PEI-2	My private smartphone works very well in my company IT-network.	.960	3.84	2.544	
	PEI-3	The data synchronization between my private smartphone and my company is ideal.	.948	3.34	2.597	

Table 2. Measurement items for constructs

Sampling Strategy

From 12/02/2014 to 01/15/2015 I recruited *working professionals* to take part in a survey concerning the use of private smartphones in companies. The call for participation was sent out by eight students to 327 of their personally known professionals with a link to the online questionnaire (two-stage approach). The survey was conducted anonymously.

Working backgrounds were checked (see next section).

Results

Sample Characteristics

Data were collected via an online-based questionnaire. 210 people clicked on the questionnaire link, 171 completed it (~ 81%). I reached a response rate of $\frac{171}{324}$ = 53%. There was no need to remove any participant from the dataset because no invalid responses (quite similar/equal answer patterns or inconsistent responses) were identified. Thus I used 100% of the completed questionnaires within my analysis.

The participants are aged from 18 to 68 years (M=34.7, S.D.=9.8) and have from 1 to 45 years working experience (M=13.7, S.D.=9.6). 50 of the test persons are female (~ 29%), 120 male. One person did not answer the question concerning sex.

The participants are currently working in 17 different sectors (i.e. information technology (56), finance/insurance (34), telecommunication (19), services industry (11), metal and electrical industries (8), consulting (8), media/communication (5), marketing/retail industry (3), education and research (3), other manufacturing industries (3), gastronomy (3), construction/mining (2), healthcare (2), others (4), n.a. (10)) of any company sizes (1-49 employees (42), 50-99 employees (20), 100-499 (25), 500-4,999 (27), >4,999 (40), n.a. (17); [M=15,027, S.D.=42,441]).

Evaluation of the Measurement Model

Following the guidelines of Hair et al. (2013) and Urbach and Ahlemann (2010) I report internal consistency reliability, indicator reliability, convergent validity and discriminant validity for the evaluation of the measurement model. In addition, following the recommendations of Ringle et al. (2012) I report item wording, scales, scale means and standard deviations (table 2). Please note that within my reflective measurement model all latent constructs use reflective indicators (cf. Petter et al. (2007)).

	AVE	α	CR		PENJ	UI	PU	PSI	ITU	PCS	PEI
PENJ	.8043	.8791	.9250		.8968						
UI	.9587	.9784	.9858		.7108	.9791					
PU	.8589	.9180	.9481		.7726	.6497	.9268				
PSI	.9528	.9505	.9857		.5811	.6843	.5598	.9761			
ITU	9707	.9849	.9900		.5906	.7475	.6261	.5644	.9852		
PCS	.8209	.8909	.9322		.4654	.5711	.4339	.7074	.5916	.9060	
PEI	.8831	.9336	.9577		.6435	.7790	.6619	.8139	.5804	.6593	.9397

Table 3. Quality Criteria of the Measurement Model: Average Variance Extracted (AVE), Cronbach's α, Composite Reliability (CR), Diagonal contains $\sqrt{AVE}$ values

Internal Consistency Reliability: The internal consistency of all constructs is given as both values, Cronbach's α and Composite Reliability *CR*, were greater than .7 for each construct (see table 3, cf. Nunnally and Bernstein (1994); Revelle (1979)).

Indicator Reliability: The variance of a latent construct extracted from a specific item should be greater than .5 which means that the factor loadings of the indicators should be above .7(07) (Carmines and Zeller 1979; Hair et al. 2011). This condition is fulfilled for all indicators with no exception. In addition, the factor loadings were all significant at a $p < .001$ level (nonparametric bootstrapping procedure according to Efron and Tibshirani (1993) with 5,000 samples).

Convergent Validity: In order to evaluate the convergent validity I used the Average Variance Extracted (AVE) values of each reflective construct. In my dataset all AVEs were above .5 (see table 3) which indicates convergent validity (Hair et al. 2013).

Discriminant Reliability: The discriminant validity check in terms of the cross loadings criterion according to Chin (1998) was also successful in my dataset. Finally, the Fornell-Larcker criterion Fornell and Larcker (1981) is also fulfilled as $\sqrt{AVE\ (construct_i)} > CORR_{construct_i,construct_j}$ (table 3).

In summary I can state that the measurement model is valid (cf. Hair et al. (2013)).

Structural Model Results

To investigate the latent structure of the hidden constructs PENJ, UI, ITU, PU, PSI, PEI, and PCS and their causal relations, I conducted a structural equation modeling using smartPLS, version 2.0.M3 by Ringle et al. (2005). The model used the reflective indicators as described in table 2. Conducting the bootstrapping algorithm of smartPLS (Ringle et al. 2005) with n = 5; 000 samples I found that all path coefficients were significant (p < .001).

As a result, figure 2 shows the structural model.

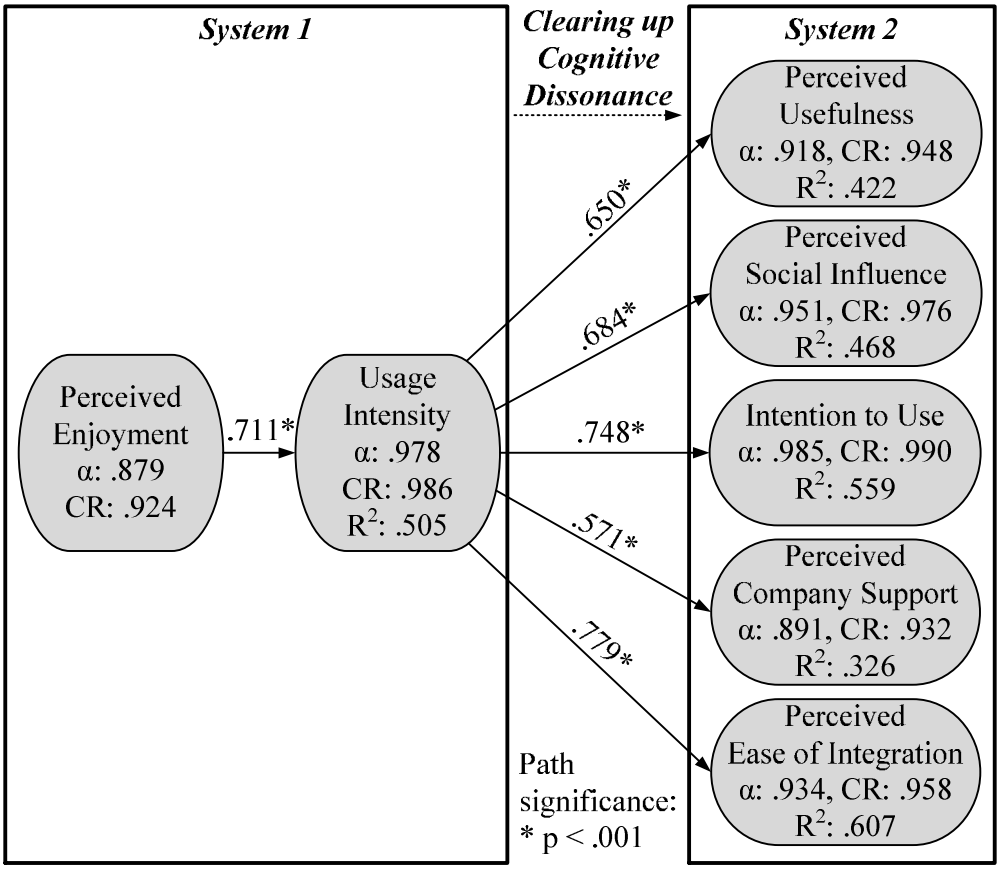

Figure 2. Personal Information Technology Acceptance Model: Empirical Results from the BYOD Dataset

Hypotheses Evaluation

In order to evaluate the PITAM driven hypothesis *H1* I examined the path coefficient and the coefficient of determination of Usage Intensity. I found a strong ($p_{PENJ-UI}$ = .711 ≫ .5) and significant (p < :001) relationship between Perceived Enjoyment and Usage Intensity which supports *H1*. In addition, I found that more than 50% of the usage intensity is determined by Perceived Enjoyment (R^2_{UI} = .505) – also supporting H_1.

Furthermore, I found strong ($p_{UI-[PU,PSI,IU,PCS,PEI]}$ ≫ .5) and significant (p < .001) relationships between Usage Intensity and all *System 2* constructs (PU, PSI, IU, PCS, PEI) which support the hypotheses

H_2, H_3, H_4, H_5, H_6. In addition, each of the *System 2* constructs is of average strength determined by the *System 1* construct Usage Intensity ($R^2 \gg .3$, cf. Chin (1998)) – also supporting $H_{2\ldots6}$.

Discussion

The results from the BYOD dataset are very promising concerning the evaluation of the Personal Information Technology Acceptance Model. In more detail, I could support all the PITAM driven hypotheses $H_{1\ldots6}$ with the given dataset.

While prior IS research linked Perceived Enjoyment (*System 1*) to Intention to Use (*System 2*) I found stronger correlations between Perceived Enjoyment and Usage Intensity ($r_{PENJ-UI}$ = .7108, both are *System 2* constructs) compared to Perceived Enjoyment and Intention to Use ($r_{PENJ-ITU}$ = .5906). This result strongly supports the Personal Information Technology Acceptance Model which distinguishes between *System 1* and *System 2* IS constructs according to DPT.

The work of van der Heijden (2004) hypothesized that "for hedonic systems, perceived ease of use is a stronger predictor of behavioral intention to use than perceived usefulness" (van der Heijden 2004, p. 698). Indeed he found evidence for his hypothesis using empirical data. In my BYOD dataset I found that the correlation between Perceived Ease of Integration and Intention to Use ($r_{PEI-ITU}$ = .5804) is a little bit smaller than the relationship between Perceived Usefulness and Intention to Use ($r_{PEI-ITU}$ = .6261). But the relation between Perceived Ease of Integration and Usage Intensity (r_{PEI-UI} = .7790) is much stronger compared to the correlation between Perceived Usefulness and Usage Intensity (r_{PEI-UI} = .6497). The work of van der Heijden (2004) did not measure Usage Intensity. My results confirm the argument of van der Heijden (2004) that – in hedonic systems – Perceived Usefulness loses its dominant predictive value in favor of Ease of Use (here Ease of Integration) and Perceived Enjoyment. These findings are also in line with the proposed PITAM model.

In addition I found that *System 1* substantially influences *System 2* IS constructs since R^2 values of all *System 2* IS constructs are average-substantial (Chin 1998) while the path coefficients between the *System 1* construct Usage Intensity and all *System 2* constructs are also substantial. These results support the PITAM model as well. Concerning IS theorizing a lot of criticism of TRA, TRB, TAM+, UTAUT+ etc. have developed in the past (e.g., Benbasat and Barki (2007); Lee et al. (2003)). Most of them are related to the need of investigations for investigations into further antecedents, e.g., "…it would be fruitful to investigate the antecedents of usefulness…" (Benbasat and Barki 2007, p. 215). Other IS scholars theorized a mediation role of *System 1* constructs. For instance, Zhang and Li (2004) analyzed the role of perceived affective quality on users' cognitive reactions and consequently theorized a mediation role for Perceived Usefulness and Perceived Ease of Use between affects and Behavioral Intention. Agarwal and Karahanna (2000) also theorized a mediation role of Perceived Usefulness and Perceived Ease of Use between *System 1* constructs such as enjoyment and Behavioral Intention. Davis (1993) theorized that TAM fully mediated the effects of system characteristics on usage behavior. However, to the best of my knowledge I am the first to subsequently theorize the distinction of *System 1* and *System 2* and the driver role of *System 1* in situations where IT is used (intuitively) everyday.

Besides the importance of the results for IS theorizing this work has major practical implications. Instead of giving lengthy reasoning and persuading their employees of the BYOD advantages, companies that would like to support BYOD are advised to motivate their employees to use their own devices by strongly fostering *System 1* constructs, e.g., the increase of actual usage by removing usage barriers or the enhancement of enjoyment by offering easy to use games or employee portals (Buettner 2015a).

Limitations of the work are related to the measurement model, i.e. potentially redundant items, since Cronbach's α for three of seven constructs was above .95 (cf. Nunnally and Bernstein (1994)), and to the missing cause-effect proof (also known from existing technology acceptance theories). Both issues will be addressed in future work. The missing cause-effect proof will be initially addressed by a pupillary based mental workload assessment (Buettner 2013, 2014, 2015b; Buettner et al. 2013, 2015) in order to show empirical evidence for the separation of *System 1* and *System 2* IS constructs while these constructs are evaluated by the users. In addition, replications of the study with larger sample sizes and various construct operationalizations as well as CMB checks are needed.

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