Summer 6-15-2016

# EXPLORING PSYCHOLOGICAL OWNERSHIP OF IT: AN EMPIRICAL STUDY

Michael Klesel
*University of Siegen*, michael.klesel@uni-siegen.de

Martin Ndicu
*Mississippi State University*, mng120@msstate.edu

Björn Niehaves
*University of Siegen*, bjoern.nieahves@uni-siegen.de

# EXPLORING PSYCHOLOGICAL OWNERSHIP OF IT: AN EMPIRICAL STUDY

*Research*

Klesel, Michael, University of Siegen, Siegen, Germany, michael.klesel@uni-siegen.de

Ndicu, Martin, Mississippi State University, Starkville, USA, mng120@msstate.edu

Niehaves, Björn, University of Siegen, Siegen, Germany, bjoern.nieahves@uni-siegen.de

## Abstract

*Psychological ownership of Information Technology (POIT) is becoming an increasingly relevant phenomenon in theory and practice since privately-owned consumer technologies and bring-your-own-device (BYOD) strategies effectively shaping today's workplaces. While Information Systems (IS) research is in the beginning to explore POIT, the full complexity of the ownership phenomenon has not yet been understood. Here, we draw on psychological ownership theory to propose an extended view on POIT. Choosing a grounded theory methodology, we gathered original data (20 expert interviews, 5 and more years of work experience) and discovered "Appreciation of Technology" as a key characteristic of psychological ownership which has not been considered so far. Additionally, we identified three new antecedents ("Freedom of Choice", "Multi-Context Use" and "Surveillance") and one new effect ("Exception Handling") of psychological ownership of IT. Along with previous studies, our extended view provides a new lens through which ownership and technology acceptance can be viewed and BYOD phenomena better understood. Based on these new insights, we derive several implications for theory and practice.*

*Keywords: Psychological Ownership of IT, Theory Development, IT Acceptance, System Use.*

# 1 Introduction

Technological advancement has led to significant changes in how technologies are used in organizations. These advancements have facilitated diverse use patterns such as collaboration in groups (Desanctis and Gallupe, 1987), computer mediated communication (Wasko et al., 2011) and new workplace characteristics such as mobile work (Ahuja et al., 2007). Consumer technologies have come with increased computing power, convenient and easy-to-use interfaces and are able to handle a multitude of applications and functionalities due to technology convergence. These factors have led to changes in use patterns and reformation of the IT organization.

With information technology becoming ubiquitous (Lyytinen and Yoo, 2002), it is common place to find employees using both enterprise and private technology in whichever ways that suit their work purposes. As a result of these changes, Information Systems (IS) researchers have investigated various affective aspects of technology use such as enjoyment (Igbaria et al., 1995), absorption (Agarwal and Karahanna, 2000), playfulness (Hackbarth et al., 2003), intrinsic motivation (Venkatesh, 2000), and psychological ownership (Barki et al., 2008) to explain and predict how these psychological factors influence technology use and the ultimate outcomes of technology use.

Ownership of technology is one of the factors that has been shown to have significant influence on technology use (Köffer et al., 2015b). Two conceptualizations have emerged in IS research; legal ownership and psychological ownership. Legal ownership (Brynjolfsson, 1994) is anchored on a socio-legal system which attributes rights and responsibilities. The Bring-Your-Own-Device (BYOD) strategy is based on legal ownership that is completely in hand of the employee. On the other hand, psychological ownership (Pierce et al., 2001, Pierce et al., 2003) refers to a state of mind in which individuals feel as though the target of ownership or a piece of it is "theirs" (i.e., "it is MINE"). This feeling of possessiveness and being psychologically tied to an object has implications for technology adoption and use.

BYOD leverages ownership to offer distinct advantages in terms of some user behavior such as usability, self-efficacy and emotional attachment. However, security and control concerns are major hurdles from an organizational perspective. To counter these, companies have changed tact to pursue the Company-Owned, Personally-Enabled (COPE) strategy (BlackBerry, 2013). The success of this strategy is hinged on the organizations ability to manipulate employees' psychological ownership to attain positive outcomes. In order to adopt the concept of psychological ownership in the IT context, Barki et al. (2008) introduced psychological ownership of IT (POIT) which is defined as '*the sense of ownership an individual feels for an IT or IS'* (p. 270). To further analyze the extent to which POIT can be manipulated and what outcomes to expect, a deep conceptual understanding of the construct is necessary. Barki et al. (2008) note that *"[…] much still needs to be done to explore the POIT construct's potential role in varied contexts and to further explicate its relationships with other implementation and acceptance constructs*" (p. 278).

We carefully note that some work has been done in extant literature as there are studies of the effects of POIT that explain user behavior in relations to information system security (Anderson and Agarwal, 2010), acceptance of IT (Barki et al., 2008) and use intention in virtual worlds (Lee and Chen, 2011). However, a comprehensive exploration of the construct POIT is still missing (Barki et al., 2008) as there is a dearth of literature that explores the concept itself to understand more of its antecedents and what it predicts.

As such, we seek to bridge that gap by undertaking an explorative study whose objective is to uncover and to a lesser extent corroborate some antecedents of the POIT construct. We build on the foundation laid by Pierce et al. (2001), Pierce et al. (2003) and extend current research as we expound on the predictors, and outcomes of psychological ownership. The research question central to this study is, what are the antecedents of psychological ownership?

The significance of seeking to pursue this research question is two-fold; first, the key studies in IS that focus on POIT (Barki et al., 2008, Lee and Chen, 2011) have managed to explain only 49% and 30% of POIT respectively. This is an indication that there are aspects of POIT that need to be explained. Secondly, we respond to calls made in extant literature to enhance knowledge about psychological ownership of IT because it is a complex phenomenon. Although further theory testing has been done, little has been done to build theory around POIT.

By answering this research question, we contribute to the current body of knowledge in psychological ownership of information technology literature by proposing an integrated and comprehensive explanation of POIT that supplements extant literature. We also contribute to practice by offering practical implication of the findings from this study.

The remainder of the paper is structured as follows: Section two include the related work on psychological ownership and its use in information systems research. Chapter three describes our research method. The findings are shown in section Four. We will integrate our findings with existing literature (Section five). We discuss our findings with implications for theory and practice (Section six) and conclude by propounding the limitations of our research and giving an outlook for future research.

## 2 Related Work

The concept of psychological ownership (PO) refers to a state of mind in which an individual perceives a target of ownership as "theirs" (Pierce et al., 2003). It is defined as the "psychologically experienced phenomenon in which an employee develops possessive feelings for the target" (Van Dyne and Pierce, 2004). Isaacs (1933) explains that psychological ownership emerges when "what is mine becomes (in my feelings) part of me". As such, it has important implication on behavior and therefore has found wide spread application in various research areas, including management science (e.g. Pierce et al., 2001), consumer behavior (e.g. Belk, 1988) and Information Systems (e.g. Barki et al., 2008).

Pierce et al. (2003) propose three motives upon which psychological ownership is rooted: *efficacy and effectance, self-identity* and *having a place*. Efficacy and effectance constitute the individuals' need to be in control of objects. Self-identity reflects the individuals' need to extend their self-identity to others, for example having a place reflect the individuals' need to possess a place which they refer as 'home'. Based upon this general assumption Pierce et al (2003) identify three key experiences, which enable the rise of PO (Figure 1): *controlling the ownership target, coming to intimately know the target* and *investing the self into the target*. Control of target ownership is considered a key experience that precedes psychological ownership.

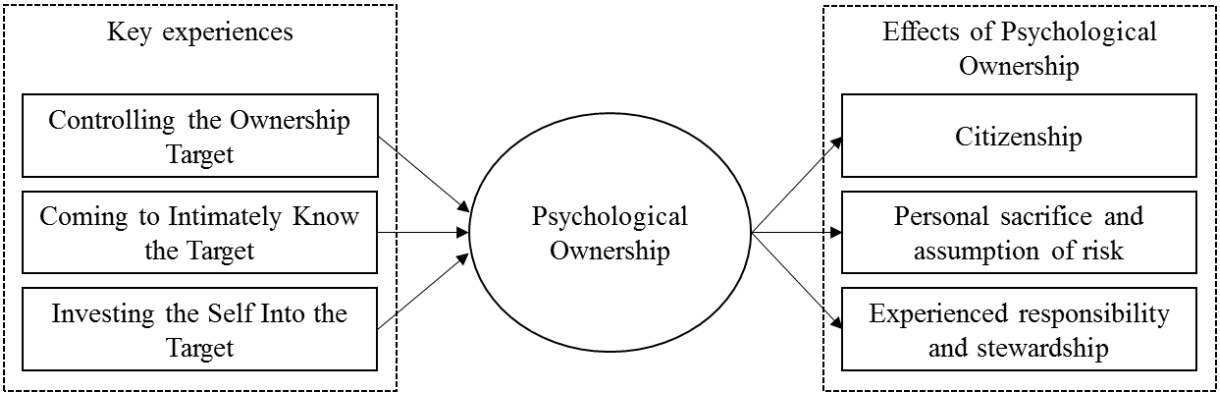


*Figure 1. Psychological Ownership (Source: Pierce et al. 2003)*

McClelland (1951) asserts that control over material possessions can lead to self-attribution much like the ownership that people feel because they can control their body parts. Intimate knowledge of the target emerges when people develop feelings for objects. Finally, investing the self into the target of ownership can be described as the result of when people "*create, shape, or produce*" objects (Pierce et al., 2003 p. 93).

Psychological ownership has been operationalized in various IS contexts such as system design (Barki et al., 2008), system use (Lee and Chen, 2011), social media (Karahanna et al., 2015), and user security behavior (Anderson and Agarwal, 2010). Barki et al. (2008) call it the Psychological Ownership of Technology (POIT); which in their model influences the users' acceptance and use of the system (see Figure 2). POIT is defined as '*the sense of ownership an individual feels for an IT or IS*" (p. 270). Since IT as an object is able to satisfy all three motives (i.e. *efficacy and effectance*, *self-identity* and *having a place)* Barki et al. (2008) adapted the general definition of PO for IT. They posit that participation leads to the development of POIT because by being actively engaged, the users feel that the resultant solution embodies approaches or solutions that reflect their assumptions and objectives. Accordingly, that sense of inclusion is likely to enhance their feelings of control, intimate knowledge, and investing oneself.

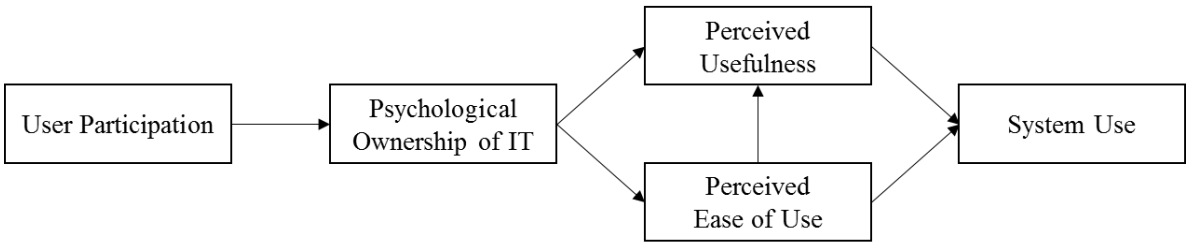


*Figure 2. Psychological Ownership of IT (adapted from Barki et al., 2008 p. 271)*

The sense of ownership described by POIT can exist without formal ownership. Karahanna et al. (2015) advance this aspect of POIT in social media as they explain that social media users don not have to own the social media infrastructure in order to have a sense of connection to their virtual belongings, contributions, and communities within the platform. They invoke two natural senses; that humans want "to have" because growth of possessions produces a positive and uplifting effect (James, 1890), whereas the loss of possessions leads to "shrinkage of our personality" (Formanek, 1994). These two fundamental assumptions behind psychological ownership are similar to the basic tenets of endowment effect (Loughran Dommer and Swaminathan, 2013) and loss aversion dimensions of prospect theory (Kahneman and Tversky, 1979). We make further contribution to this notion in our theory development section (section5)

In the context of user security behavioral intentions Anderson and Agarwal (2010) use PO to better understand security related behavior, whereby the efficacy/effectance and self-identify motives are the focus of their study. They found a positive correlation between psychological ownerships and the intention to perform security-related behavior. Internet users who felt a sense of ownership towards the internet exhibited more "conscientious cybercitizenship"; a phenomenon that Anderson and Agarwal (2010) attribute to the level of closeness (psychological ownership) which affects their security behavior.

Similar results are reported by Lee and Chen (2011) who study the influence of PO within the context of virtual worlds. Activities such as developing sharable artifacts, "attending" social gathering/meetings, casting votes, and decorating avatars, require frequenting a virtual world site. Lee and Chen (2011) found that establishing PO towards a certain virtual world site led to more participation with these activities (see Figure 3). They therefore concluded that there is a positive relationship between PO and future visit / use intention of a virtual world. In this study, cognitive

appraisal, perceived control and affective appraisal were considered significant precedents of psychological ownership.

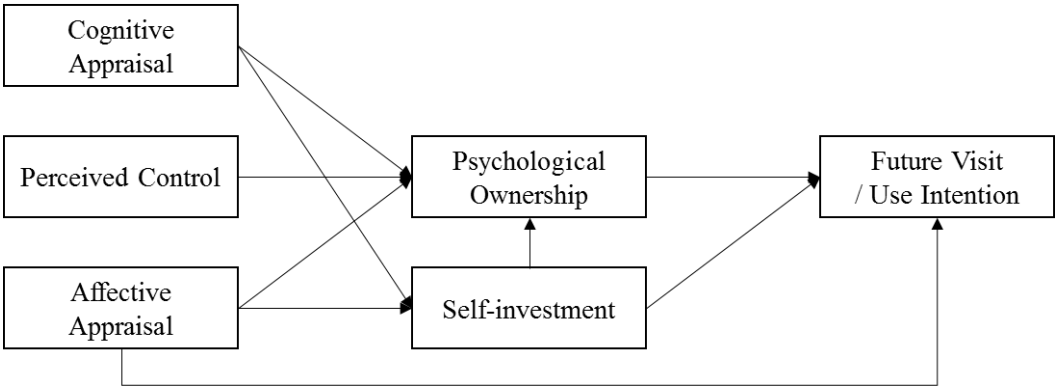


*Figure 3. Psychological Ownership (adapted from Lee and Chen, 2011 p. 291)*

It is also worthwhile to distinguish psychological ownership from some closely related concepts such as extended self as advanced by Belk (1988) and legal ownership. Extended self is anchored on the primacy of an atomized individual self who radiates out through tangible possessions and other people who one feels connected to. While psychological ownership lays primacy on the connection between a person and a target, extended self focuses on the self whose identity is transmitted through the target and the connection is secondary.

There is a distinct differentiation between legal ownership and psychological ownership. Legal ownership is mainly recognized by the society and is part of a legal system whereby the latter one is primarily perceived by individuals. Therefore, psychological ownership relates to individuals and exist without the existence of a legal system (Pierce et al., 2003, Furby, 1980). Furthermore, Pierce et al. (2001) indicate that these might be related but are distinctly different.

# 3 Methodology

*Method selection.* The objective of this paper is to further understand the concept of psychological ownership of information technology by revealing new antecedents and identifying overlaps with existing theories. Strong arguments have been made that grounded-theory approach is suitable (Glaser and Strauss, 1967, Corbin and Strauss, 1990, Urquhart et al., 2010) for explorative research. Studies abound in IS that propound an explorative approach (see for instance Orlikowski, 1993, Gregory et al., 2015) Adopting a grounded theory approach is most promising for at least two major reasons: first, it fits well with the overall explorative objective of our research and second, to ground our research specifically in the IS context (Birks et al., 2013). This is also in line with Urquhart et al. (2010) who stated that "*grounded theory has proven to be extremely useful in developing context-based, process-oriented … explanations*" (p. 358).

*Data collection.* We conducted 20 interviews for the conceptualization of POIT. We collected the data in two phases. In the first stage, we had a convenient sample of interviewees (Patton, 2005) including eight interviews. In this first step, we developed an initial conceptualization of POIT. We used an open-ended questionnaire including questions about what role technology plays and when they would consider technology as 'theirs'. In response, we obtained further directions to explore POIT. Built on these initial insights we developed a more comprehensive interview guide in a semi-structured way. For example, we include a question asking to what extend these people appreciate technology beyond a functional tool. In order to capture business-related aspects, we exclusively interviewed industry experts with at least 5 years work experience. To further include data from all hierarchies we asked

both manager and employees. For the purpose of this study, we considered employees who are provided with technology by their organization (i.e. the organization is the legal owner of the technology). Following snowball sampling (Patton, 2005) we asked the interviewees at the end of the official interview to refer their colleagues who are provided with technology by the organization. In our sample we included interviewees from manufacturing industry and service industry (including high-tech, government and health service). An overview of the interviewees is given in Table 1.

| **Industry** | **Position** | **Number of Interviewees** | **Average age** |
|---|---|---|---|
| Manufacturing | Manager | 7 | 51.2 |
| | Employee | 6 | 40.5 |
| Service | Manager | 3 | 42.6 |
| | Employee | 4 | 27.5 |
| **Overall** | | **20** | **42** |

*Table 1. Overview of Interviewees*

The forms and types of information technology provided to employees varied significantly. Some employees were provided with a smartphone / tablet or a computer (laptop), others with both. The following table (Table 2) summarize interviewees by type of information technology they received from their employers.

| **Information Technology** | **Industry** | **Interview (Employee)** | **Interview (Manager)** |
|---|---|---|---|
| Smartphone/Tablet and Computer (Laptop) | Manufacturing | 3,11,18,19 | 2,7,10,12,20 |
| | Service | 1,8,9 | 4,16 |
| Smartphone/Tablet or Computer (Laptop) | Manufacturing | 13,15 | 14,17 |
| | Service | 6 | 5 |

*Table 2. Overview of provided technologies*

*Data analysis.* In line with our grounded theory-approach, we analyzed the data following general principles of grounded theory. Two researchers started the analysis simultaneously with *open coding* (Corbin and Strauss, 1990, Glaser and Strauss, 1967) identifying concepts. Similar codes in terms of their meaning were grouped into categories (*axial coding*). In the second step, we interpreted the identified categories through a process known as *selective coding*. At this point, we continuously interplayed between the phase of open coding and selective coding (Urquhart et al., 2010). We stopped our process of analysis when all researchers agreed that we achieved a point of saturation and there is only little chance that new essential concepts emerge. Since our data only highlights key aspects of POIT and their importance, we further enrich our findings with insights from literature. To ensure a theoretical integration of our findings we relate our results with existing literature. The integration is shown in the discussion part (section 6).

# 4 Findings

Based on the insights we gained through the interviews, we outline the emerged concepts. More specifically, we first describe the concept and how it can be defined. We then underline this concept by offering representative vignettes from our data. Finally, we integrate our findings with existing theories on psychological ownership in the discussion section.

## 4.1 Psychological Ownership of IT

The feeling of psychological ownership, i.e. the feeling of "this is mine!" (Pierce et al., 2003) can also exist for technology since three motives of PO can be satisfied through technology (Barki et al., 2008). One employee literally adopt this attitude:

> *"Well, I do feel, that this is my notebook. If someone would drop it, I would say: 'Hey! That's my notebook"* [Interview 15]

The most important characteristic of POIT is the "*possessive feeling*" (Pierce et al., 2003). Beyond this feeling, our data also reveal that the feeling of ownership can also be characterized in terms of appreciation towards technology. The general nature of appreciation towards technology is illustrated in the following:

> *"Well, I think that's a basic human behavior. You appreciate everything you own more than what the company provides you for work."* [Interview 11]

That people also appreciate technology is illustrated in the next extract:

> *"I appreciate [my technology] very much, especially the value it comes with. Within a defined scope I was allowed to choose my notebook on my own. I paid attention to certain things such as battery runtime and others. That was crucial for me that I get exactly what I want. That's my laptop and I appreciate and value it."* [Interview 15]

The appreciation of technology comes with the feeling of ownership and can be used to further describe PO and POIT. This emergence of appreciation can be understand as a concrete characteristic based on the endowment effect (Beggan, 1992, Beggan and Brown, 1994).

## 4.2 Antecedents of Psychological Ownership of IT

**Freedom of Choice** is the ability that employees are able to choose their own technology. This might be enabled by the organization by offering a variety of devices and software from which employees are able to choose or by allowing them to use their own IT (i.e. *Bring-Your-Own-Device* Strategy). Our data suggest that freedom of choice is an important antecedent of POIT. One employee explains:

> *"I see a phone as mine if I can choose it myself. For example, if I wanted an IPhone 6, however, the company wouldn´t want to give me that IPhone but instead got me another phone, I would not see it as mine."* [Interview 9]

Although the freedom of choice is a central aspect, the interviewee also explains that:

> *"On the other hand, if I bought a phone that I liked and I plugged my company´s sim card in it, then, of course, I would call it mine."*[Interview 9]

We reviewed the literature to find additional insights towards the affection of freedom of choice. In fact, Murray and Häubl (2011) analyzed the freedom of choice in the interaction with the website. Although they do not include PO in their study, it shows a positive relationship towards the users' perception of efficiency.

**Multi context use** arises when technology is used within different context such as private and business. Multi contextual use comes with the Dual Use of Technology which is defined as „the use of a single IT device or application for both private and work activities" (Köffer et al., 2015a p. 4). Either people use private technology to fulfill business tasks (e.g. sending emails with private device) or using business technology for private purposes (e.g. using company notebook for private purpose), we refer to dual use of technology. As suggested by our data this dual use has an influence on the perception of ownership. One interviewee state that:

> *"[The sense of ownership] is paradoxical, not true for my laptop, because this device is not portable enough. Further, I use my laptop primarily for business purposes. This is different with my cell phone, which I have with me every day. It accompanies me always. Another reason is that I am*

> *responsible for our Facebook editing. If there are questions when I am on the way, I have my device [cell phone] ready on hand, whereby the laptop is either at home or at work. […] I use Facebook for both private and for business and there is a blurring between both."* [Interview 1]

Although existing literature already provides insights with regard to dual use of technology (e.g. Köffer et al., 2015a), we did not find a study relating POIT with multi context use.

**Surveillance** is the degree toward which employees' use of technology is tracked by the organization (e.g. D'Arcy et al., 2009, Stanko and Beckman, 2015). Common examples include the record of itemized bills or the record of the internet access. The amount of control influences the behavior of the employees and the perception of ownership. One employee explained:

> *"[…] For me it is still a company device. Of course, I set the device up myself, but you never know what the employer installed on the device before in the background. I am very careful with bank account information."* [Interview 9]

> *"It might be the case that I have to leave the company from one day to the next or I have to return my cell phone and there is private data on the phone, which is not the company´s concern. That's why I do not install private things on my cell phone."* [Interview 2]

The degree of monitoring does not only influence the feeling of ownership itself but also has a more direct effect on the use:

> *"I would say that I handle it completely differently, maybe more freely. For a phone provided by a company, I get the feeling that I have to comply with the company´s standards, and every time my usage is recorded. Given that, I cannot use my company device as freely as my private device."* [Interview 8]

The amount of control by the organization also influences the dual use of technology as one employee explained:

> *"I like to divide work and private matters and I would never rely on a company phone, because I always have the feeling that the information transferred through my company device runs through the company´s networking system."* [Interview 6]

**Control**[1] can be described as the freedom to adapt and adjust technology to his personal preferences. With regard to technology control is mostly perceived if new software can be installed (e.g. new apps on a cell phone) without a formal process with the IT department. The amount of control has a link towards ownership as one employee states:

> "*I can install every app [on my cell phone] in contrast to my laptop. […] I have even more control than my organization has […] If I did not have the freedom [to install apps] and I had to ask an administrator then [the sense of ownership] would not be there. I am much more free to install, uninstall [on my cell phone] than I am on my notebook.*" [Interview 1]

In contrast, where this control is missing, it influences the feeling of ownership. One employee states:

> *"That means in terms of applications for example, I want to download them or conduct modification at the hardware and software, as I imagine and as I would do with my private technology. And there are good reason why I cannot do this with company owned technology."* [Interview 20]

**Self-investment** is the amount of time people spend with technology. Pierce et al. (2001) define self-investment as the "*investment of an individual's energy, time, effort, and attention into objects*" (p. 302). We adapt this definition whereby the object of interest is any kind of Information Technology such as cell phones or software. One employee describes his investment as follows:

[1] Consistent with prior literature (Lee and Chen 2011), we do not distinguish between perceived control and actual control, we use both terms interchangeably in this study.

*"Yes, I use a smartphone on a day to day basis. In other words, I look at my cell phone often, even if I am not at my work place. I check my emails or my appointments, because all that information is available on my cell phone. Especially because I am traveling a lot and I do not stay at one work place, I consider the smartphone as my [preferable] device. In fact, I have two work places and the other electric devices stay at these places, thus, I would not consider them as mine."* [Interview 7]

### 4.3 Effects of psychological ownership of IT

**Exception Handling** denominates the employees capability to handle malfunctions or misbehavior of technology (e.g. Perrow, 1967, Strong, 1997, Klein and Dellarocas, 1999). This might either occur based on technical or functional issues. As our data suggest the feeling of ownership has an effect on how people behave with their technology in terms of exception handling. Meaning, they invest more time and energy to find solutions. One employee describes the general perception as follows:

*"If you choose the technology yourself, then the complications that sometimes occur are taken with more calmness. On the other hand, if I get a machine [from my employer] and I do not like its operating system and it is also erroneous, then the factor of angriness will be very big."* [Interview 4]

The perception of ownership not only influences the emotional state such as angriness but also enables proactive behavior such as trying to fix an issue. One employee explains his behavior:

*"I would not tolerate as many mistakes with my private phone than with the phone provided by my company. At least I would deal with fixing the problems differently. For my private phone I would do everything to get it repaired; whereas repairing the company phone is not much of my concern, I would most likely give it to a helpdesk and tell them to take over the problem of fixing the phone."* [Interview 8]

**Use** is the actual use of technology. As the central construct in technology acceptance literature, use and intention to use has gained a lot of attention in the past two decades (e.g. Davis, 1989, Venkatesh et al., 2003). The degree of POIT does influence the actual use of technology. The feeling that someone owns technology psychologically stimulates the use of technology, which the following excerpts illustrate:

*"Well, if I have the feeling that this is my device, I also have the feeling that I can use it. I would say that I use my smartphone much more intensively, also in my daily life, in contrast to my notebook."* [Interview 1]

*"You have a different expectation and identification to the device which you chose yourself, which you consider your own. There is a higher motivation to cope with the device in contrast to a device which is not yours or you did not consider it yours, because you have a longer inner distance to it."* [Interview 12]

## 5 Theory development

Markus and Robey (1988) poignantly highlight the prominence of theory in research by stating that, "*Good theory guides research, which, when applied, increases the likelihood that information technology will be employed with desirable consequences for users, organizations, and other interested parties.*" (p. 583). Accordingly, this section expounds on how the current study advances IS theory by integrating our contribution with existing literature.

Theory serves different purposes in information systems research; it can be used to describe, explain, predict, or design actions (Gregor, 2006). Psychological ownership theory is used to explain and predict behavior related to human interactions with technology and therefore our development of an extended view of the psychological ownership include new constructs that advance theory in IS. With this extended view, more constructs are availed for theory testing. Theory development should

explicate three components; "*the what*", "*the how*" and "*the why*" (Whetten, 1989), and theory testing focus on temporal and contextual factors which set the limits of generalizing the theory. "The what" component refers to the focal factors – variables, constructs or concepts – which logically provide an explanation of the phenomenon of interest. "The how" deals with the relationship between these focal factors and deals with causalities. And "the why" component addresses the rationale or underlying dynamics which explain the logic behind the theory/model.

We use a concept that is explained in extant literature - psychological ownership of IT construct - as a pivot, to extend how psychological ownership theory is applied in information systems research and enhance its power to describe, explain, and predict IS phenomena. We leverage the findings presented by Barki et al. (2008) because they adopted PO for IT and thus perfectly fits to our objective. Furthermore, we integrate the study by Lee and Chen (2011) because they also operationalize PO for information systems research.

Data was collected qualitatively because that is the appropriate strategy for exploration and theory development (Anderson and Miller, 2003, Morrison and Teixeira, 2004). After analysis and processes discussed in section 4, we identify existing, and some new POIT constructs; three new antecedents (freedom of choice, multi-context use and surveillance), and one new outcome (exception handling). This addition advances scientific knowledge (Straub et al., 1994) and provides new lenses through which information systems phenomena can be viewed. Karahanna et al. (2015) reports that the antecedents and outcomes presented by Pierce et al. (2001), (Pierce et al., 2003) and have been studied over time and found to be stable. We therefore heed to the call for new constructs that are closely related to the existing set but provides further explanation about psychological ownership.

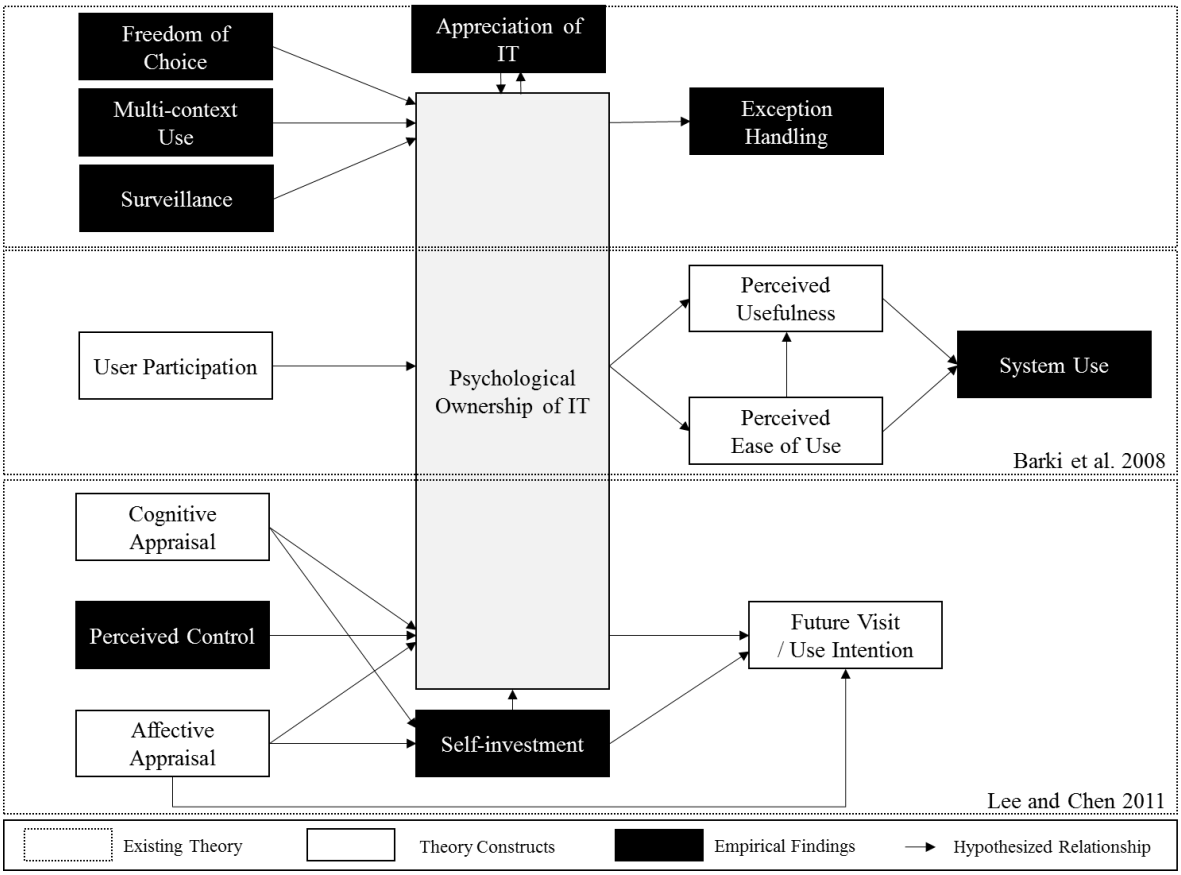


*Figure 4. Extended View on Psychological Ownership*

Figure 4 shows models in existing literature (Barki et al; 2008 and Lee & Chen; 2011) and the results of this study – separated by the dotted lines. POIT is at the center of these models, and the constructs that emerged from this study are marked with a dark background.

# 6 Discussion

In this paper, we aim to extend the conceptualization of psychological ownership of IT. By using a grounded theory methodology, we found three new antecedents of POIT and one new effect. Moreover, our data reflect several constructs that have been already used in existing theories. Based on our findings we derive implications for theory and practice and conclude with limitations and future research.

*Implications for Theory.* Our study expands the findings of Barki et al. (2008) who focused on POIT as a mediator of system use. Furthermore, we contribute to the conceptualization of POIT by adding the characteristic of appreciation of technology. Based on this study, appreciation of technology can be understand as a side benefit of psychological ownership. Therefore, the development of a possessive feeling towards ownership also evolves in terms of appreciation. However, it cannot be excluded that appreciation of technology is either an antecedent of ownership or an effect. It is also possible that there is a reciprocal effect between ownership and appreciation. Meaning that the increase of POIT has a positive effect on appreciation of technology, which vice versa influences POIT. Since we did not ask the interviewees for that kind of relationship, further investigation is necessary.

Our study revealed three new constructs (Freedom of Choice, Multi-context use and Surveillance). Pierce et al. (2003) argue that "*build an object*" is the most obvious appearance of "*Investing the Self Into the Target*". It is even suggested that buying an object is also a form of creating an object (Sarte, 1943). We argue that the freedom of choosing a device has a similar effect and can be interpreted as part of "*Investing the Self Into the Target*". Therefore, this construct is in line with the conceptualization by Pierce et al. (2003). With regard to the multi context use, we argue that this is in line with more intense use of the technology. As such we argue that it can be referred to "*Coming to Intimately Know the Target"* (Pierce et al., 2003). Finally, we revealed surveillance as an antecedent of POIT. Since it reduces the control of an object, meaning it is controlled by someone else, it can be interpreted as part of "*Controlling the Ownership Target*" (Pierce et al., 2003). In summary, all of the identified antecedents can be assigned to the key experiences of the ownership theory. With regard to exception handling, which we identified as an effect, it can be classified as "*experiences responsibility and stewardship*" (Pierce et al., 2003) because individuals take responsibility to fix issues or maintain hardware.

Since we applied psychological ownership within the context of IS, our study contributes to the original theory of ownership as proposed by Pierce et al. (2003). For each of the proposed experiences offered by ownership theory, this study provides examples for IS specific constructs. This has implications in both directions: it further strengthens the theory of ownership and it also strengthens the findings of this study. However, our study should be only be seen as a point of departure for future research to explore more constructs and apply them in various scenarios.

Moreover, this study extends the findings by (Barki et al., 2008) because it demonstrates existing knowledge, i.e. the relationship between POIT and system use and it further enriches existing knowledge by adding new constructs. The same applies to the study of Lee and Chen (2011) since two central antecedents of their theory (Perceived Control and Self-Investment) were highlighted.

Finally, this study opens the door for more research on psychological ownership of IT since it provides new constructs which needs to be further validated. Especially the role of '*Appreciation of IT*' might

be a strong characteristic to better understand IS phenomena. Particularly with regard to IT acceptance and adoption this might be an important aspect.

*Implications for Practice*. Ownership is gaining importance since BYOD is progressively utilized. Due to the fact that employees increasingly use technology for multiple purposes and in various contexts (Köffer et al., 2014) ownership has an effect on the individuals' behaviour. Based on our study organizations are able to influence the ownership of IT in various aspects: First, freedom of choice as an antecedent of POIT can mostly be influenced by the organizations IT department. A suitable approach to expand the freedom of choice is the implementation of a Choose-Your-Own-Device (CYOD) strategy.

Second, as multi context use is relevant for the emergence of psychological ownership as organizations allow the dual use of technology. As a matter of fact, implementing a CYOD strategy in conjunction with a set of rules for dual use, the multi context use can be encouraged. However, this also raise concern with regard to work-life-balance which should not be ignored (Cousins and Robey, 2015, Köffer et al., 2014).

Third, surveillance has also a major influence on how employee perceive ownership. Surveillance is primarily in the sphere of responsibility of the organization, because they can control the degree of surveillance. At this point, we note that surveillance only includes actions of control by the organization and not with regard to individuals' perceived surveillance. Based on our findings, it can be assumed that surveillance has a strong effect on POIT (c.f. Interview 8, p. 9). Therefore, organizations should consider to reduce their surveillance activities. Based on the data we gathered, it seems that the organizations' surveillance activities are not comprehensible communicated to the employees. Therefore, organizations could take a first step and reveal their surveillance activities.

*Limitations and Outlook.* We acknowledge that there are naturally limitations of this qualitative research such as a limited number of interviewees. Unlike quantitative research, qualitative research will have a low number of respondents and may present generalizability challenges. However, our findings lay a foundation for further quantitative analysis.

The perspective taken in this study is that individuals are provided with technology by the organization. Although this is a common practice today, other concepts like BYOD are gaining attention in both practice and research. In this regard, we could not further analyze the differences of the effects with regard to private owned technology and psychological owned technology. However, the analysis of different effects of these competing approaches opens the door for future research. Furthermore, we did not separate between the ownership of hardware and software. For example, an individual can evolve a feeling of ownership to a smartphone (hardware), whereby under the same conditions no feelings emerge in terms of a software. Finally, in terms of the exploration of the POIT construct, we focused on positive outcomes (i.e. positive effects). However, as Pierce et al. (2003) note there are also negative effects related to psychological ownership such as a rejection of sharing objects. This might be also critical for technology and should be addressed in future research.

Besides addressing the aforementioned limitations other fruitful approaches for future research include a further evaluation of the identified constructs within a quantitative study to validate the new constructs.

# 7 Acknowledgements

This paper was written in the context of the research project SUGAR (promotional reference 01FA15003) which is funded by the German Federal Ministry of Education and Research (BMBF).

## References


Agarwal, R. and Karahanna, E. (2000), "Time Flies When You're Having Fun: Cognitive Absorption and Beliefs About Information Technology Usage", *MIS Quarterly,* Vol. 24 No. 4, pp. 665-694-694.

Ahuja, M. K., Chudoba, K. M., Kacmar, C. J., McKnight, D. H. and George, J. F. (2007), "IT Road Warriors: Balancing Work-Family Conflicht, Job Autonomy, and Work Overload to Mitigate Turnover Intentions", *MIS Quarterly,* Vol. 31 No. 1, pp. 1-17.

Anderson, A. R. and Miller, C. J. (2003), "“Class matters”: Human and social capital in the entrepreneurial process", *The Journal of Socio-Economics,* Vol. 32 No. 1, pp. 17-36.

Anderson, C. L. and Agarwal, R. (2010), "Practicing Safe Computing: A Multimethod Empirical Examination of Home Computer User Security Behavioral Intentions", *MIS Quarterly,* Vol. 34 No. 3, pp. 613-643.

Barki, H., Pare, G. and Sicotte, C. (2008), "Linking IT Implementation and Acceptance Via the Construct of Psychological Ownership of Information technology", *Journal of Information Technology,* Vol. 23 No. 4, pp. 269-280.

Beggan, J. K. (1992), "On the social nature of nonsocial perception: The mere ownership effect", *Journal of Personality and Social Psychology,* Vol. 62 No. 2, p. 229.

Beggan, J. K. and Brown, E. M. (1994), "Association as a psychological justification for ownership", *Journal of Psychology,* Vol. 128 No. 4, p. 365.

Belk, R. W. (1988), "Possessions and the Extended Self", *Journal of Consumer Research,* Vol. 15 No. 2, pp. 139-168.

Birks, D. F., Fernandez, W., Levina, N. and Nasirin, S. (2013), "Grounded Theory Method in Information Systems Research: Its Nature, Diversity and Opportunities", *European Journal of Information Systems,* Vol. 22 No. 1, pp. 1-8.

BlackBerry (2013), "Balance End User Satisfaction and Business Productivity - Making the case for COPE. A flexible, secure alternative to BYOD".

Brynjolfsson, E. (1994), "Information assets, technology and organization", *Management Science,* Vol. 40 No. 12, pp. 1645-1662.

Corbin, J. and Strauss, A. (1990), *Basics of Qualitative Research: Grounded Theory Procedures and Techniques,* SAGE, Thousand Oaks, CA.

Cousins, K. and Robey, D. (2015), "Managing work-life boundaries with mobile technologies: An interpretive study of mobile work practices", *Information Technology & People,* Vol. 28 No. 1, pp. 34-71.

D’Arcy, J., Hovav, A. and Galletta, D. (2009), "User Awareness of Security Countermeasures and Its Impact on Information Systems Misuse: A Deterrence Approach", *Information Systems Research,* Vol. 20 No. 1, pp. 79-98.

Davis, F. D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly,* pp. 319-340.

Desanctis, G. and Gallupe, R. B. (1987), "A foundation for the study of group decision support systems", *Management science,* Vol. 33 No. 5, pp. 589-609.

Formanek, R. (1994), "Why they collect: Collectors reveal their motivations", *Interpreting objects and collections,* pp. 327-335.

Furby, L. (1980), "The Origins and Early Development of Possessive Behavior", *Political Psychology,* Vol. 2 No. 1, pp. 30-42.

Glaser, B. G. and Strauss, A. (1967), *The Discovery of Grounded Theory: Strategies for Qualitative Research,* Weidenfeld and Nicholson, London.

Gregor, S. (2006), "The Nature of Theory in Information Systems", *MIS Quarterly,* Vol. 30 No. 3, pp. 611-642.

Gregory, R. W., Keil, M., Muntermann, J. and Mähring, M. (2015), "Paradoxes and the Nature of Ambidexterity in IT Transformation Programs", *Information Systems Research*, Vol. 26 No. 1, pp. 57-80.

Hackbarth, G., Grover, V. and Mun, Y. Y. (2003), "Computer playfulness and anxiety: positive and negative mediators of the system experience effect on perceived ease of use", *Information & management*, Vol. 40 No. 3, pp. 221-232.

Igbaria, M., Iivari, J. and Maragahh, H. (1995), "Why do individuals use computer technology? A Finnish case study", *Information & management*, Vol. 29 No. 5, pp. 227-238.

Isaacs, S. (1933), "Social development in young children", *British Journal of Educational Psychology*, Vol. 3 No. 3, pp. 291-294.

James, W. (1890), "The principles of psychology", New York: Dover.

Kahneman, D. and Tversky, A. (1979), "Prospect theory: An analysis of decision under risk", *Econometrica: Journal of the Econometric Society*, pp. 263-291.

Karahanna, E., Xu, S. X. and Zhang, N. (2015), "Psychological Ownership Motivation and Use of Social Media", *Journal of Marketing Theory & Practice*, Vol. 23 No. 2, pp. 185-207.

Klein, M. and Dellarocas, C. (1999), "Exception handling in agent systems", in *Proceedings of the third annual conference on Autonomous Agents*, pp. 62-68.

Köffer, S., Anlauf, L., Ortbach, K. and Niehaves, B. (2015a), "The Intensified Blurring of Boundaries between Work and Private Life through IT Consumerization", in *Proceedings of the Proceedings of the European Conference on Information Systems (ECIS)*.

Köffer, S., Junglas, I., Chiperi, C. and Niehaves, B. (2014), "Dual Use of Mobile IT and Work-to-Life Conflict in the Context of IT Consumerization", *Thirty Fifth International Conference on Information Systems*, Auckland.

Köffer, S., Ortbach, K., Junglas, I., Niehaves, B. and Harris, J. (2015b), "Innovation Through BYOD?", *Business & Information Systems Engineering*, Vol. 57 No. 3, pp. 363-375.

Lee, Y. and Chen, A. N. K. (2011), "Usability Design and Psychological Ownership of a Virtual World", *Journal of management Information Systems*, Vol. 28 No. 3, pp. 269-307.

Loughran Dommer, S. and Swaminathan, V. (2013), "Explaining the Endowment Effect through Ownership: The Role of Identity, Gender, and Self-Threat", *Journal of Consumer Research*, Vol. 39 No. 5, pp. 1034-1050.

Lyytinen, K. and Yoo, Y. (2002), "Ubiquitous computing", *Communications of the ACM*, Vol. 45 No. 12, pp. 63-96.

Markus, M. L. and Robey, D. (1988), "Information Technology and Organizational Change: Causal Structure in Theory and Research", *Management science*, Vol. 34 No. 5, pp. 583-598.

McClelland, D. (1951), "Personality, Holt", *Rinehart and Winston, New York*.

Morrison, A. and Teixeira, R. (2004), "Small business performance: a tourism sector focus", *Journal of Small Business and Enterprise Development*, Vol. 11 No. 2, pp. 166-173.

Murray, K. B. and Häubl, G. (2011), "Freedom of Choice, Ease of Use, and the Formation of Interface Preferences", *MIS Quarterly*, Vol. 35 No. 4, pp. 955-A6.

Orlikowski, W. J. (1993), "CASE tools as organizational change: Investigating incremental and radical changes in systems development", *MIS quarterly*, pp. 309-340.

Patton, M. Q. (2005), *Qualitative research*, Wiley Online Library.

Perrow, C. (1967), "A framework for the comparative analysis of organizations", *American Sociological Review*, pp. 194-208.

Pierce, J. L., Kostova, T. and Dirks, K. T. (2001), "Toward a Theory of Psychological Ownership in Organizations", *Academy of Management Review*, Vol. 26 No. 2, pp. 298-310.

Pierce, J. L., Kostova, T. and Dirks, K. T. (2003), "The state of psychological ownership: Integrating and extending a century of research", *Review of General Psychology*, Vol. 7 No. 1, pp. 84-107.

Sarte, J.-P. (1943), "Being and nothingness: An essay on phenomenological ontology", New York, NY: Washington Square Press.

Stanko, T. L. and Beckman, C. M. (2015), "Watching You Watching Me: Boundary Control and Capturing Attention in the Context Of Ubiquitous Technology Use", *Academy of Management Journal*, Vol. 58 No. 3, pp. 712-738.

Straub, D. W., Ang, S. and Evaristo, R. (1994), "Normative standards for IS research", *ACM SIGMIS Database*, Vol. 25 No. 1, pp. 21-34.

Strong, D. M. (1997), "IT process designs for improving information quality and reducing exception handling: a simulation experiment", *Information & Management*, Vol. 31 No. 5, pp. 251-263.

Urquhart, C., Lehmann, H. and Myers, M. D. (2010), "Putting the 'Theory' Back Into Grounded Theory: Guidelines for Grounded Theory Studies in Information Systems", *Information Systems Journal*, Vol. 20 No. 4, pp. 357-381.

Van Dyne, L. and Pierce, J. L. (2004), "Psychological ownership and feelings of possession: Three field studies predicting employee attitudes and organizational citizenship behavior", *Journal of Organizational Behavior*, Vol. 25 No. 4, pp. 439-459.

Venkatesh, V. (2000), "Determinants of Perceived Ease of Use: Integrating Control Intrinsic Motivation, and Emotion Into the Technology Acceptance Model", *Information Systems Research*, Vol. 11 No. 4, pp. 342-365.

Venkatesh, V., Morris, M. G., Davis, G. B. and Davis, F. D. (2003), "User Acceptance of Information Technology: Toward a Unified View", *MIS Quarterly*, Vol. 27 No. 3, pp. 425-478.

Wasko, M., Teigland, R., Leidner, D. and Jarvenpaa, S. (2011), "Stepping into the internet: New ventures in virtual worlds", *MIS quarterly*, Vol. 35 No. 3, pp. 645-652.

Whetten, D. A. (1989), "What constitutes a theoretical contribution?", *Academy of management review*, Vol. 14 No. 4, pp. 490-495.