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Information Technology Identity: A Key Determinant of IT Feature and Exploratory Usage[1]

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Creative information technology usage by employees is the critical link between business technology investments and competitive advantage in a digital economy. However, to realize anticipated benefits, organizational leaders need a richer understanding of what drives individuals' innovation with incumbent organizational technologies. In support of that aim, this study theorized the processes by which a new concept in IS research, IT identity, motivates different forms of IT usage in the post-adoption context. We mapped these processes to two variance models and validated IT identity's influences for two different technologies. For theory, our results demonstrate IT identity's role as a key determinant of IT feature and exploratory usage, refine understanding of the nomological net of IT use, and create new opportunities to understand individuals' interactions with IT in the post-adoption context. For practice, this study offers actionable suggestions for how organizational leaders can encourage employees to leverage IT more effectively in their work. In doing so, this study opens the door for future investigations into the reciprocal relationship between individual IT usage and organizational and/or societal outcomes.

Keywords: IT identity, feature usage, exploratory usage, control beliefs, post-adoption

Introduction

In 2018, businesses spent more than $3.65 trillion dollars on IT, including enterprise software and devices, because they anticipate these investments will support revenue growth (StreetInsider.com 2019). However, since many technologies embody "best practices" and make the same features available to all adopting organizations, leveraging IT differently from competitors is key to organizations gaining a competitive edge (Brynjolfsson and Hitt 1998; Porter and Millar 1985). Indeed, there is longstanding evidence that while IT does add business value, implementation and acceptance are not enough to sustain competitive advantage (Mata et al. 1995). Competitive advantage is realized through new processes,

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products, and services that are empowered by "creative deployment of IT" (Mandel and Swanson 2017, p. 2). At the organizational level, creativity requires structures and processes in place that promote innovation. At the individual level, creativity requires utilization of IT by motivated "tech fluent" employees who are knowledgeable about the capabilities of organizational IT, alert to their value and possibilities, and proficient in exploring novel ways of using them (Stephan et al. 2017). Creative—as opposed to routine—use of IT by tech fluent employees is the critical link between business technology investments and competitive advantage (Devaraj and Kohli 2003; Stephan et al. 2017).

When employees utilize IT in creative or novel ways, the aggregate effects of their efforts help create dynamic production environments that benefit organizations more than process improvements resulting from fixed practices of technology use (Dutton and Thomas 1984). Conversely, when employees learn and use IT in fixed or routine ways, organizations are constrained from accruing additional benefits from technology investments obtained through more creative uses of technology (Maruping and Magni 2015; Nevo et al. 2016; Venkatesh and Goyal 2010). Yet, post-adoption research indicates that those who have had the most time to develop the skills needed to utilize IT creatively—experienced IT users—are least likely to do so (Caroll and Rosson 1987; Limayem et al. 2007; Nambisan et al. 1999). As people become more experienced with IT, they develop "habits of use" that allow them to interact with technology efficiently but lead to fewer autonomous attempts at exploration (Jasperson et al. 2005; Murray and Häubl 2007; Schmitz et al. 2016). Resolving the tension between creativity and experience is important for organizations because benefits arising from IT usage quickly reach a limit when employees stop seeking novel ways of applying technology in the workplace (Dutton and Thomas 1984).

To realize positive IT-enabled change in organizational processes and support firm performance, organizational leaders need a richer understanding of what drives employees' creativity with incumbent organizational technologies. Consequently, while early research investigated acceptance and initial use of IT, current studies examine antecedents of IT usage in post-adoption contexts (Burton-Jones et al. 2017). These studies highlight a need for alternative theoretical perspectives and concepts to build knowledge of social, technological, and individual factors motivating richer forms of IT use (Nevo et al. 2016; Robert and Sykes 2017; Schmitz et al. 2016). In support of that aim, recent work introduced a new theoretical concept, *IT identity*, to complement and extend current understanding of predictors of individuals' post-adoption IT feature and exploratory usage (Carter and Grover 2015). IT identity, representing positive self-identification with use of an IT one is familiar with, has the potential to stimulate creative IT usage. IT as a concept exists at different levels, such as *all* information technologies or *classes* of IT (e.g., social media, wearables, etc.). Yet, in the original formulation of IT identity, "IT" refers an *instance* or "unit of technology (hardware device, software application, or software application environment) that an individual consciously engages with, as an end user" (Carter and Grover 2015, p. 932). Consistent with these theoretical underpinnings, this study adopts the latter, narrower perspective.

Crucially, identities can be fostered or interrupted through interventions (Burke and Stets 2009); thus, investigating IT identity's role in explaining post-adoption IT feature and exploratory usage may yield actionable guidelines for organizations seeking to glean more value from IT investments. Still, while theory suggests that understanding IT identity holds promise for offering organizations' guidance on encouraging IT-enabled value creation, its utility has yet to be established in empirical work. To do so requires IT identity's explanatory power to be theorized and investigated within the nomological net of IT use. Additionally, some IT may be more amenable to IT identity construction and maintenance than others (Carter and Grover 2015). As such, nuanced understanding requires examination of IT identity's influences vis-à-vis different types of technology. This leads to the following research question: *Within the nomological net of IT use, what is IT identity's role in explaining post-adoption IT feature and exploratory usage for different types of technology?*

To address our question, this study pursues three objectives. First, we extend theoretical understanding of the nature of IT identity and the processes in which it motivates different forms of post-adoption IT usage. Second, we link these processes to two variance models that empirically examine IT identity's role in the context of a dominant theory of technology acceptance and initial use: the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al. 2003). Third, following practices recommended by MacKenzie et al. (2011), we examine the stability of IT identity's influences for two different technologies. In doing so, this work contributes to theory and practice. For theory, by articulating the processes in which IT identity motivates different forms of IT usage, this research extends Carter and Grover's (2015) initial theoretical model and refines understanding of the nomological model of IT use. Further, the work creates new opportunities to understand individuals' post-adoption interactions with IT. For practice, this study enriches understanding and offers suggestions for organizational leaders to design interventions that encourage employees to use IT more effectively in their work.

The paper unfolds as follows. Next, we offer theoretical background on IT identity and identity in the IS domain. Then, we develop our research models and hypotheses. Following model development, we provide information about our research method, data analyses, and results. Finally, we discuss the implications of our findings for IS theory and practice.

Theoretical Background

What Is Identity?

Extensive attention afforded to the study of the self and identity across the social sciences has led to considerable variation in the conceptual meaning of these concepts (Stryker and Burke 2000). At the collective level, psychological approaches of studying identity focus on individuals' membership in multiple social groups (e.g., political party, sports team, organization) (Hogg et al. 1995). Social (or collective) identities reflect "we, as a group" (e.g., we, as the group, Anonymous), and define people in terms of "oneness" with other group members (Tajfal and Turner 1986). At the individual level, sociological perspectives explain how the networks of roles and relationships in which people are embedded influence their self-perceptions and behaviors relative to others (Owens 2003). In this domain, structural symbolic interactionist theories of identity[2]—henceforth, termed *identity theories*—distinguish between notions of the self-concept and identity. From this viewpoint, people have *one* current self-concept containing the totality of beliefs that they hold about themselves, including the many identities they claim (Stets and Burke 2005). The self-concept emerges over time as people observe and categorize themselves (i.e., form identities) relative to others based on their goals, their perceptions of how others respond to them, and their self-evaluations (Stets and Burke 2005).

With their emphasis on social roles and relationships, identity theories often focus on role and person identities. Role identity reflects "me, as a role" (e.g., me, as a nurse). Person (or personal) identity reflects "me, independent of others" (e.g., me, as a responsible person) (Burke and Stets 2009). However, in recent years, researchers have proposed material objects (e.g., places, personal possessions) as an important source of reflexivity that give rise to the question, "Who am I, in relation to [some material object]" (e.g., in relation to a car) (Clayton 2003; Dittmar 2011; Proshansky et al. 1983). Role identities define people in terms of what they do. Person identities define people in terms of who they are as distinct entities (Burke and Stets 2009). Material identities define people in terms of their interactions—and the control they exert over those interactions—with material objects (Dittmar 2011).

Regardless of focus, identities are established through a process in which individuals, as social objects, situate themselves together (self-identification) or apart (self-disidentification) from other social objects (McCall 2003; Stets and Burke 2005). Social objects are people, categories, processes, material objects, roles, relationships, or any *thing* around which social networks form (Latour 2005). People learn and internalize shared meanings and behavioral expectations associated with social objects from the cultures in which they exist (Burke 2004). Once established, identities subsequently act as "benchmarks" for individuals' attitudes and behaviors (Burke and Stets 2009; Clayton 2003; Stets and Burke 2000). Identities, then, are tools that people use to organize understanding of their personal social worlds within their self-concepts (Clayton 2003). Identities contain information about who people are—and how they should behave—in their social groups, in their roles, in their interactions with material objects, and in the norms, values, and characteristics they claim for themselves (Burke and Stets 2009; Dittmar 2011). Understanding which identities are salient in social situations sheds light on how and why people behave in the ways they do (Clayton 2003).

Identity in the IS Domain

The central role of IT in all aspects of daily life and social interactions has drawn IS researchers' attention to identity issues within the IS domain. To that end, IS researchers have often investigated relationships between IT usage and social, role, or person identities from one of three vantage points: (1) IT usage as a medium for communicating and protecting identities; (2) IT implementation and usage as a determinant of identity, or (3) identity as a determinant of IT acceptance and usage (Boudreau et al. 2014; Carter and Grover 2015; Whitley et al. 2014).

IT usage as a means for communicating and protecting identities has been explored in the contexts of organizational virtual environments (Thatcher et al. 2017), social networking (Underwood et al. 2011; Van Dijck 2013), mobile sharing applications (Abokhodair et al. 2017), assistive technologies (Shinohara and Wobbrock 2016), e-commerce (Kim et al. 2012), and online communities (Da Cunha and Orlikowski 2008; Vaast and Levina 2015). These studies demonstrate IT's role in mediating the processes of self-presentation and self-protection.

[2]Identity theory (Stryker 1980), role-identity theory (McCall and Simmons 1978), and identity control theory (Burke and Reitzes 1981; Burke and Stets 2009) are examples of structural symbolic interactionist theories.

Researchers have also investigated IT implementation and usage as a determinant of identity. In this stream, several studies have demonstrated IT implementations' potential for negatively impacting social and role identities by changing practices and places in which people work (e.g., Alvarez 2008; Mishra et al. 2012; Piszczek 2017; Van Akkeren and Rowlands 2007). Conversely, new IT may present opportunities to enhance existing, or construct new, identities (e.g., Lamb and Davidson 2005; Lamb and Kling 2003; Stein et al. 2013; Trier and Richter 2015). For example, in a longitudinal case study, Boudreau et al. (2014) illuminated processes by which librarians constructed a new collective identity through IT usage. More recently, Piszczek et al. (2016) theorized the potential for people to develop role identities as IT users. These IT user identities contain shared meanings and behavioral expectations associated with IT usage in given social situations. These studies indicate that IT's role as a determinant of identity cannot be separated from the social context in which implementation and use occur.

Existing social and role identities are often viewed as shaping IT acceptance and usage. In this stream, researchers have leveraged social identity theory (Tajfal and Turner 1986) to shed light on team processes (Hinds and Mortensen 2005), online communities (Liu and Chan 2010; Ren et al. 2012; Spaeth et al. 2014; Tsai and Bagozzi 2014), technology acceptance (Lee et al. 2006; Schwarz and Watson 2005) and the relationship between culture and individual IT usage (Walsh 2014; Walsh et al. 2010). Variation based on gender, in people's experiences with IT, has also been demonstrated (Trauth 2002, 2006; Trauth et al. 2009). More recently, research on different forms of social media use has found that social identities are more oriented to richer use and role identities are more oriented to routine use (Pan et al. 2017).

Works exploring relationships between IT usage and social, role, or person identities highlight identity's importance in the IS domain. By treating IT and identity as discrete, these works maintain theoretical continuity with identity theories that have traditionally disregarded material objects as identity (Carter and Grover 2015; Clayton 2003). At the same time, doing so overlooks that technological objects (e.g., mobile devices, social media) have transformed into social objects (Srivastava 2005)—and that people learn and internalize cultural and normative expectations associated with social objects as *identities* (Carter and Grover 2015; Floridi 2010).

To address this concern, Carter and Grover (2015) conceptualized IT identity as a new form of material identity and fourth perspective of identity within the IS literature. From this perspective, individuals' IT usage is motivated by positive self-identification with use of information technologies they are familiar with; whereby, those who strongly self-identify with an IT are more likely to engage in richer IT usage (i.e., feature and exploratory usage) than those who do not identify with the technology (Carter and Grover 2015).

IT identity has already served as a theoretical basis for behavioral research in diverse contexts, including robotics (You and Robert 2018), consumer behavior (Oyedele and Simpson 2017), and IT for development (Gomez 2016). These works suggest that IT identity holds rich promise for extending understanding of human behavior in an increasingly digital world. Still, the construct's theoretical influences have yet to be validated in empirical work that examines its predictive power and position within the nomological net of IT use. To that end, the following sections conceptually review IT identity and its influences on different forms of IT usage.

What IT Identity Is

MacKenzie et al. (2011) recommend articulating the general type of property (e.g., thought, feeling, perception, action, etc.) to which a focal construct refers and the entity (e.g., person, task, organization, etc.) to which it applies. We use these criteria to outline what IT identity is and what IT identity is not.

Drawing on structural symbolic interactionist identity theories, Carter and Grover (2015, p. 938) conceptualized IT identity as

> the extent to which a person views use of an IT as integral to his or her sense of self, where a strong IT identity represents positive self-identification—"use of the [target IT] is integral to my sense of self (who I am)"—and a weak IT identity represents self-disidentification—"use of the [target IT] is unrelated to my sense of self (who I am)."

From this perspective, "target IT" refers to an *instance* of technology "that an individual consciously engages with, as an end user" (Carter and Grover 2015, p. 932). Thus, IT identity focuses on a person's (*entity*) positive self-identification with use of a hardware device, software application, or software application environment (*general property*). Since the entity to which IT identity applies is the person, the *level of analysis* to which the construct is tied is the individual. Because positive self-identification (or self-disidentification) results from interacting with a material social object, IT identity is appropriately classified as a material identity (Dittmar 2011).

As formulated, IT identity does not contain an answer to the question, "Who am I, through use of a [target IT]?" Rather, Carter and Grover's approach is consistent with Belk (1988), who notes that "research probably considerably underestimates the extent to which [material objects are incorporated into the self]," because researchers "attempt to find a correspondence between perceived characteristics of these objects and perceived characteristics of the self" (p. 140). Instead of trying to find correspondence between attributes of IT and attributes of the individual, Carter and Grover focus on positive self-identification and self-disidentification as *manifestations* of identity processes. These manifestations are reflected in individuals' emotional responses (emotional energy, relatedness, and dependence) to thinking about themselves in relation to the IT they interact with (Carter and Grover 2015). This is akin to seeing (and being able to measure) ripples in a pond, but being unable to see (or measure) the object that created the ripples.

Individuals' emotional responses to themselves in relation to IT vary based on the extent to which they self-identify or self-disidentify with a technology. This is consistent with other material identities, such as environment identity (Stets and Biga 2003). With their focus on the self, rather than attributes of IT, individuals' expressed levels of emotional energy, relatedness, and dependence are technology agnostic. Further, these emotional responses—as reflections of self-identification and self-disidentification—make IT identity comparable (measurable) across individuals and applicable to different technologies (Carter and Grover 2015).

While the specific meanings that people attach to IT usage may differ based on their personal experiences, those with strong IT identities have an innate need to demonstrate enactive mastery[3] over a technology's feature set (Carter and Grover 2015). To that end, theory on IT identity suggests that IT with broad application across social situations (e.g., mobile devices) are most likely to foster IT identity. Social networks that form around these technologies (Srivastava 2005)—enabled by synchronous exchange, accessibility, reachability, and portability (Basole 2004; Dennis et al. 2008)—have created new social contexts for use (Carter and Grover 2015) as well as new expectations for managing social relations (Jones and Karsten 2008). These new contexts and expectations provide opportunities for individuals to manipulate and explore broader-use technologies and may result in enactive mastery experiences. As suggested by research on material possessions, repeated successful interactions could lead to the use of IT with broad application becoming increasingly entangled with a person's self-concept (Furby 1991; Pierce et al. 2003).

[3]Knowledge and control, gained through repeated performance accomplishments (Gist 1987).

While IT with broad application present more opportunities for enactive mastery experiences, narrower-use technologies, such as spreadsheets, encourage repeated interactions with a relatively unchanging set of available features. When regularly evoked by important others (e.g., supervisors) or in a context (e.g., work) that is highly significant, interactions that allow a person to exercise control over the IT's feature set may also be internalized into the self-concept (Carter and Grover 2015; Granberg 2011). In both technology contexts, ensuing feelings of personal efficacy bolster individuals' IT identities (Carter and Grover 2015).

What IT Identity Is Not

IT identity does not encompass negative self-identification. Carter and Grover acknowledged the potential for situating oneself in opposition to IT, but the definition of IT identity takes a positive perspective. Still, while the authors did not theorize an "anti-IT identity," they speculated that such a construct would focus on a person's (*entity*) negative self-identification with use of an IT (*general property*)—that is, "use of the [target IT] is in opposition to who I am." Thus, a weak IT identity (self-disidentifying with use of an IT, i.e., "use of the [target IT] is unrelated to who I am") is *not* the same as having an anti-IT identity.

IT identity is not psychological ownership. The *general property* of psychological ownership is the sense of possession that a person (*entity*) feels for a material object or immaterial target (Pierce et al. 2001, 2003). According to Pierce et al., it is possessiveness (i.e., "this is mine") that distinguishes psychological ownership from self-identification. Still, self-identification with a material object can give rise to psychological ownership (Dittmar 1992; Jussila et al. 2015). Regarding IT identity, this implies that as a person reflects upon and positively self-identifies with use of an IT, s/he may begin to experience a sense of ownership over the technology. Exploring the interplay between IT identity and psychological ownership may be helpful to understanding individuals' decisions to buy, upgrade, or dispose of consumer technologies, as well as resistance to new IT in organizational contexts.

IT identity is not IT culture. Like IT identity, the *entity* to which IT culture applies is the person. Unlike IT identity, IT culture is a social identity (Walsh et al. 2010). As such, its *general property* refers to shared meanings and expectations for IT usage that a person expresses and that identifies them as a member of an IT user group—for example, "dangerous users" or "interested users," among others (Walsh 2010, 2014; Walsh et al. 2010). IT culture provides a context (i.e. institutional and relational structures) for the processes involved in IT identity formation and maintenance. Consequently, a strong IT identity may be constituted within, and help to constitute, IT culture in the context of an IT users' group, but these two concepts are distinct.

IT identity is not identity communicated through IT. Recent work has explored how identity communication processes in virtual environments differ from face-to-face interactions (Thatcher et al. 2017). From this perspective, identity communication refers to the act of transmitting identity information, where effective identity communication occurs when information about one's identity is "communicated and received as intended by the sender" (Thatcher et al. 2017, p. 802). Thus, the *general property* of identity communication is the act of communicating, displaying, or projecting an identity, and the *entity* to which it applies is the person. Where IT identity refers to positive self-identification with use of an IT, identity communication refers to the processes through which self-identification and associated behavioral expectations are conveyed to others. Identity communication, then, provides a means of uncovering individuals' answers to the question, "Who am I, through use of a [target IT]?"

Having described what IT identity is and is not (summarized in Table 1), we turn to articulating how IT identity influences different forms of IT usage.

Model Development

We explain IT identity's relationships with IT usage within the nomological net of UTAUT (Venkatesh et al. 2003). From this perspective, individuals' technology use decisions are based on their beliefs about the ease associated with using an IT (*effort expectancy*), the extent to which doing so could enhance job performance (*performance expectancy*), the influence of important others (*social influence*), and the availability of organizational and technical support (*control beliefs*[4]). Effort expectancy, performance expectancy, and social influence are determinants of individuals' intentions to use an IT, while control beliefs and behavioral intentions influence IT usage (Venkatesh et al. 2003). UTAUT has been applied extensively over several years (Venkatesh et al. 2016). As such, it offers a robust nomological net to conduct a rigorous examination of IT identity's utility to IS research.

As originally formulated, effort expectancy and performance expectancy represent individuals' beliefs about a target IT prior to use (Venkatesh et al. 2003). These beliefs influence individuals' behavioral intentions, which subsequently influence behavior. Consequently, most applications of UTAUT have focused on individuals' adoption decisions and initial use (Venkatesh et al. 2016). However, several studies have shown that beliefs change over time (e.g., Gruzd et al. 2012; Liao et al. 2009; Pynoo et al. 2011; Venkatesh and Goyal 2010). This occurs because post-adoption beliefs about effort expectancy and performance expectancy necessarily reflect individuals' personal histories of interacting with (a subset of) features in the IT's overall feature set (Jasperson et al. 2005).

Research suggests that over time, the ease associated with using an IT and its potential to enhance performance may be taken for granted, such that IT usage is determined by other internal mechanisms (Liao et al. 2009). In identity theories, these mechanisms are the reciprocal processes through which repeated behaviors are internalized as identities, which subsequently motivate future behaviors (Charng et al. 1988; Granberg 2011). This temporal aspect makes UTAUT a particularly appropriate nomological net to theorize and examine IT identity's role in two contexts of IT usage: (1) extended and extent of use of a subset of features in a target technology's feature set (feature usage) and (2) initial use of new features of that technology (exploratory usage). These distinct contexts are discussed in two explanatory models.

Model 1 (M1) explains IT identity's influences on use of a subset of features in a target technology's overall feature set, namely: the number of features used (*extended use*; Saga and Zmud 1994) and the degree to which different features are employed (*extent of use*; Lucas and Spitler 1999). The model indicates that IT identity mediates the effects of social influence, effort expectancy, and performance expectancy on extended and extent of use. Further, we hypothesize that IT identity's relationships with these behaviors depend on control beliefs. Behavioral intention is purposefully omitted, since our goal is to understand individuals' current and ongoing feature usage. Predicting individuals' motivation and plans to engage in those same behaviors is rendered meaningless in this context.

Model 2 (M2) examines IT identity's influences on individuals' "willingness and purpose to explore a new technology" (*intention to explore*; Nambisan et al. 1999, p. 373) and behavioral attempts to find new ways of utilizing an IT (*trying to innovate*; Ahuja and Thatcher 2005). In this model,

[4]In research on acceptance and initial use of IT (e.g., UTAUT; Venkatesh et al. 2003), control beliefs have been called "facilitating conditions." However, in a recent article examining antecedents of post-adoption use, Robert and Sykes (2017) revealed this labeling to be inconsistent with the notion of facilitating conditions articulated in the theory of interpersonal behavior (Triandis 1971, 1979). From this perspective, "[facilitating conditions] represent *external objective* factors …, whereas [control beliefs] are *perceptions* that can represent *internal* and *external* controls" (Robert and Sykes 2017, p. 85). To incorporate this new understanding, we have relabeled the construct, formerly called facilitating conditions within UTAUT, as control beliefs in our models.

Table 1. What IT Identity Is and What IT Identity Is Not

Focal Construct	Nature of the Construct's Conceptual Domain
IT identity (Carter and Grover 2015)	Entity = person General property = *positive* self-identification with use of a hardware device, software application, or software application environment
Anti-IT identity (Carter and Grover 2015)	Entity = person General property = *negative* self-identification with use of a hardware device, software application, or software application environment
Psychological Ownership (Pierce et al. 2001, 2003)	Entity = person General property = a feeling of *possessiveness* toward a material or immaterial target
IT Culture (Walsh 2010, 2014; Walsh et al. 2010)	Entity = person General property = the *shared meanings and expectations* for IT usage, expressed by a person, that identifies them as a member of an IT user group
Identity Communication (Thatcher et al. 2017)	Entity = person General property = the act of *communicating*, displaying, or projecting an identity

IT identity is hypothesized to prime individuals' beliefs about using *new features*[5] to perform current or additional tasks. Additionally, IT identity is expected to exert an influence on intention to explore and trying to innovate, over and above the effects of beliefs about using new features.

The Role of IT Identity in Explaining Feature Usage (M1)

IT identity influences feature usage through the identity verification process; whereby, people actively look for opportunities to enhance self-esteem and reinforce identities that are integral to the self (Swann et al. 2003). Individuals verify social and role identities by seeking out activities (e.g., participating in political rallies) and roles (e.g., jobs) that allow them to behave in ways that are consistent with their preferences and priorities (Piszczek et al. 2016). Similarly, a person who positively identifies with an IT will look for opportunities to apply features of a technology that they have mastered to any number of life's situations. This follows because a material object becomes, and remains, part of the self to the extent that a person can exercise control over it (Furby 1978; McClelland 1951).

Figure 1 outlines the IT identity verification process. Using the figure, assume a person's Adobe Photoshop® identity sets a goal (termed the *identity standard*; Burke and Stets 2009) for the nature of her interactions with the software. IT identity is verified when the person exercises enactive mastery over a subset of features ($f_1 - f_n$) within that technology's overall feature set (FS) (Carter and Grover 2015). While, theoretically, it is possible for a person with a strong IT identity to exercise complete mastery over all (n) features, typically IT identity is manifested through a subset of features that are routinely utilized by the individual.

In the identity verification process, individuals continually adjust their behaviors to keep their perceptions of how others view them, as well as how they view themselves, congruent with their identity standards (Burke and Stets 2009). When this is achieved through feature usage, IT identity is verified and self-esteem is protected or enhanced. Enhanced self-esteem, in turn, encourages further attempts at identity verification (Burke and Stets 1999; Cast and Burke 2002). Thus, so long as someone perceives they are demonstrating enactive mastery in their interactions with Photoshop, they will actively look for opportunities to apply familiar features ($FS_{(f1 - fn)}$) to problems that arise.

Research on identity offers strong evidence that identity is the primary motivator of a wide range of behaviors, including: continuing in college (Biddle et al. 1987), donating blood (Charng et al. 1988), exercise (Theodorakis 1994), food choice (Armitage and Conner 1999; Dennison and Shepherd 1995; Sparks and Guthrie 1998; Sparks et al. 1995), recycling (Stets and Biga 2003; Terry et al. 1999), and voting (Granberg and Holmberg 1990). Thus, following the logic of identity-verification (i.e., people will seek out opportunities to verify identities that are integral to the self), we expect IT identity to be a key determinant of feature usage.

Preliminary evidence supports IT identity's influence on feature usage (Carter 2013; Carter et al. 2013). For example, in

[5]Based on Bagayogo et al. (2014), we define new features as *formerly unused or new sets of available features* (including third-party "apps").

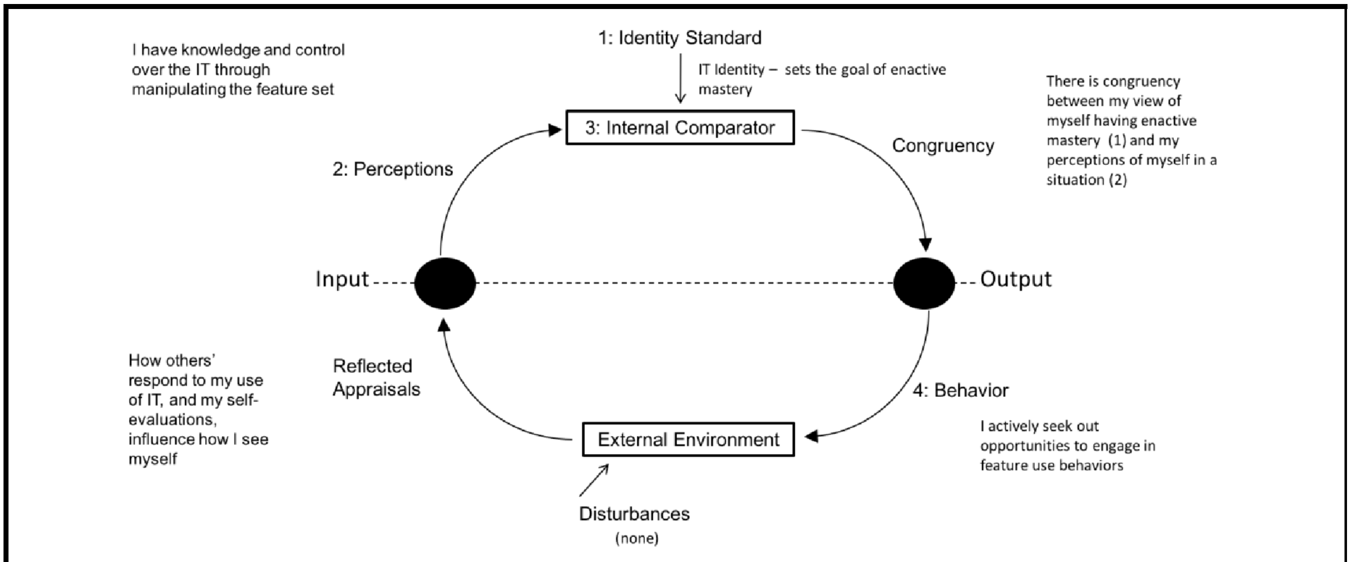

Figure 1. IT Identity Verification and Feature Usage

one (non-peer reviewed) study (Carter et al. 2013) reported that young adults' self-identification with cellphones was positively related to *embeddedness* (as the extent to which participants interacted with different phone features or interacted with their phones across situations) of cellphone use in their daily lives. Moreover, participants who positively self-identified with cellphones reported missing a part of themselves when they gave up the devices to researchers for 24-hours:

> Once the phones were back in their possession, these participants felt more alive, more competent, and more in control of daily activities—or as one wrote, " had gained a part of myself back and I was back in business" (Carter et al. 2013, p. 160).

Accordingly, absent any environmental disturbance (e.g., technological or organizational changes) during the identity-verification process, utilizing a wider range of IT features represents a behavioral manifestation of individuals' positive self-identification with a target IT. Those with strong IT identities demonstrate this by embracing as many features of the IT's overall feature set as they can (extended use), as extensively as they can (extent of use). Formally stated,

H1: *In M1, IT identity will positively influence (a) extended use and (b) extent of use of features in a target IT's overall feature set.*

The Role of Beliefs about a Target IT in Explaining Feature Usage (M1)

Carter and Grover assert that feedback effects exist between outcomes of individuals' prior feature usage and IT identity. Consistent with this logic, we propose that social influence, effort expectancy, and performance expectancy associated with prior feature usage will influence individuals' self-identification with a target technology (IT identity).

In earlier work, social influence (i.e., the extent to which individuals' acceptance and use decisions are swayed by the views of important others) has been found to affect behavioral intentions in the initial stages of use (Venkatesh et al. 2003); however, the role of social influence in the post-adoption context is less clear (Hsieh et al. 2008; Karahanna et al. 1999; Venkatesh et al. 2011). Identity theories provide evidence that the effect of social influence on intentions and behaviors is mediated by identities that link people to the social structures in which they are embedded (Nuttbrock and Freudiger 1991; Stryker and Serpe 1994; Theodorakis 1994). From this perspective, an identity's importance or salience is determined by the extent to which a person's many social relationships (or a few very strong relationships) depend upon that individual possessing the identity (Granberg 2011; Stryker and Burke 2000). Thus, in the same way that society shapes self (Mead 1934), when individuals associate prior feature usage with maintaining important social relationships, they will believe that others would want them to use the same features in the future. This belief will positively influence IT identity. Formally stated:

> H2: *In M1, a person's evaluation of the social influence associated with prior use of features in a target IT's overall feature set will positively influence their IT identity.*

In a study using interviews and qualitative content analysis to examine scholarly use of social media, Gruzd et al. (2012) found that effort expectancy "had more to do with keeping up with and adapting to the constantly changing features, functionalities and usage policy" (p. 2345) than learning how to use the tool. Thus, consistent with research on material objects and the self (e.g., Dittmar 2011; Furby 1978; McClelland 1951; Pierce et al. 2003), we hypothesize that effort expectancy associated with prior feature usage will positively influence IT identity. There is long-standing evidence to support this relationship. As Pierce et al. (2003, p. 89), citing (Furby 1991, p. 460) note, "possessions and self become intimately related" through interactions that "result in exercise of control" over an object. These interactions—corresponding to enactive mastery experiences—subsequently lead to feelings of competence and a belief in one's ability to manipulate the object.

Other studies have shown that people are more likely to identify with material objects that they can manipulate than those they are unable to exercise control over (Dixon and Street 1957; Prelinger 1959). For example, a person who customizes a house is more likely to identify with the house than one who cannot. On this basis, we hypothesize that when a person associates prior feature usage with exercising control over an IT, the resulting feelings of competency will give rise to an (effort) expectancy of being able to keep up and adapt to the technology's changing feature set. This evaluation will, in turn, positively influence that individual's self-identification with the technology. Formally stated:

> H3: *In M1, a person's evaluation of the ease associated with prior use of features in a target IT's overall feature set (effort expectancy) will positively influence their IT identity.*

Regarding performance expectancy, people require "certain material resources [and internal gratifications] to maintain pursuit of various enterprises" (McCall and Simmons 1978, p. 78). Identities whose enactment have materially benefitted or provided individuals with intrinsic enjoyments are more likely to be integral to the self than those that have gained a person little or nothing. Hence, identity theories suggest that the strength of positive self-identification with an IT will be positively influenced by the level of benefits associated with its past use (McCall and Simmons 1978). IS research offers some evidence to support this view. In the post-adoption context, performance expectancy reflects the actualized net benefits that a person associates with prior feature usage rather than beliefs about the potential benefits of utilizing a target IT prior to initial use (Gruzd et al. 2012). These actualized net benefits have been shown to be positively associated with perceived dependence on an IT (one of the emotional responses that reflects IT identity) (Rai et al. 2002). Further, use of organizational IT has been found more likely to be incorporated into the self-concept when past interactions have enhanced a person's self-image (Van Akkeren and Rowlands 2007). On this basis, we hypothesize that individuals' evaluations of performance expectancy, as this relates to prior feature usage, will positively influence their IT identities. Formally stated,

> H4: *In M1, a person's evaluation of the benefits associated with prior use of features in a target IT's overall feature set (performance expectancy) will positively influence their IT identity.*

The Moderating Role of Control Beliefs (M1)

In the organizational context, feature usage involves interactions with organizational and technical resources that support use of IT (Jasperson et al. 2005). Lacking such an environment, use would necessarily be limited. To that end, individuals' perceptions of organizational and technical resources (control beliefs) influence IT usage in the post-adoption context (Bhattacherjee et al. 2008; Pynoo et al. 2011; Robert and Sykes 2017; Workman 2014).

Control beliefs may also exert a moderating influence on IT identity's relationship with feature usage. Identity theories suggest that while the importance of an identity to the self is trans-situational, situations themselves vary in the degree to which they are open to enacting one identity rather than another (Stryker and Serpe 1994). Sometimes, people enact less important identities based on the extent to which they perceive that doing so will be advantageous in a given situation (Burke and Stets 2009). To that end, organizations can create conditions (e.g., policies, infrastructures, interpersonal or technological ties) that make it more or less beneficial for a person to act in accord with an IT identity (Carter and Grover 2015). Thus, we hypothesize that IT identity's ability to influence feature usage depends on control beliefs. Formally stated,

> H5: *In M1, control beliefs positively moderate IT identity's influence on (a) extended use of features and (b) extent of use of features in a target IT's overall feature set.*

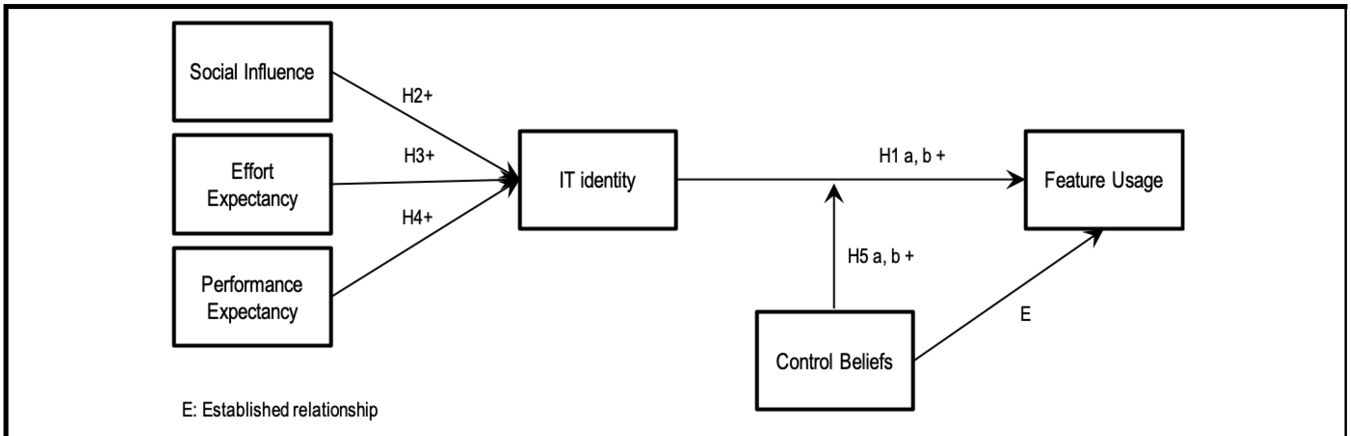

Figure 2. IT Identity and IT Feature Usage (M1)

Figure 2 shows IT identity's hypothesized role in explaining feature usage based on past interactions with a subset of familiar features in a technology's overall feature set. Next, we articulate IT identity's influences on individuals' exploratory usage of IT.

The Role of IT Identity in Explaining Exploratory Usage (M2)

When the external environment introduces some disturbance into the identity verification process, exploratory usage is triggered. This disturbance could be (1) some new task or (2) discovery of new technology features. Both cases challenge a person's sense of enactive mastery and trigger exploratory usage by preventing IT identity from being verified.

In the context of Adobe Photoshop, the process is as follows: As before, a person's Adobe Photoshop identity sets the goal of enactive mastery. Regarding (1), an environmental disturbance occurs when individuals do not know how to complete a new task using the set of features ($FS_{(f1 - fn)}$) that they normally use. This gives rise to self-perceptions that do not match the identity standard's goal of demonstrating her knowledge and control over the technology's feature set (Burke and Stets 2009). Consequently, to resolve the discrepancy and verify her Adobe Photoshop identity, the person explores and manipulates new Photoshop features and/or new ways of using existing features to complete the project.

In the case of (2), introduction of new technology features also create an environmental disturbance. While the focus is different (technology rather than task), the identity verification process is the same. As noted, it is unnecessary to have knowledge or control over an IT's entire feature set to identify with the technology. For example, a person could identify with an Android smartphone (or MS Excel), without ever using (or being aware of) Google Daydream (or MS Excel Sparklines). Because IT identity's behavioral goal is enactive mastery, introducing a person with a strong IT identity to new or unfamiliar features creates a discrepancy between her self-perceptions and the identity standard. This discrepancy compels her to explore the new features, and what can be realized through use of them, as a means of achieving congruency and verifying her IT identity. Figure 3 outlines the identity verification process when a disturbance in the external environment triggers exploratory usage.[6]

To examine the relationship between IT identity and individuals' exploration of new features in an IT's overall feature set, we developed a second model (M2) that includes intention to explore and trying to innovate as behavioral outcomes of self-identification with use of the target technology. Intention to explore, defined here as a person's willingness and purpose to innovate with new features in support of a work role, is an important predictor of individuals' exploratory usage (Nambisan et al. 1999). Trying to innovate refers to a person's behavioral attempts to find novel ways of using the target IT in one's work (Ahuja and Thatcher 2005). From an identity perspective, when a person's self-perceptions do not match the goal of demonstrating enactive mastery, the individual will develop an intention to explore new features as a way of resolving the discrepancy. Having a purpose and being motivated to innovate with new features will, in turn, encourage the person to try finding novel ways of applying the IT to work tasks. The notion of trying recognizes that such attempts may or may not result in successful outcomes (Bagozzi and Warshaw 1990).

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[6]The strength of IT identity causes the person to perceive this discrepancy and to seek to resolve it. If discrepancies come up repeatedly, which cannot be resolved, this will eventually weaken the IT identity itself.

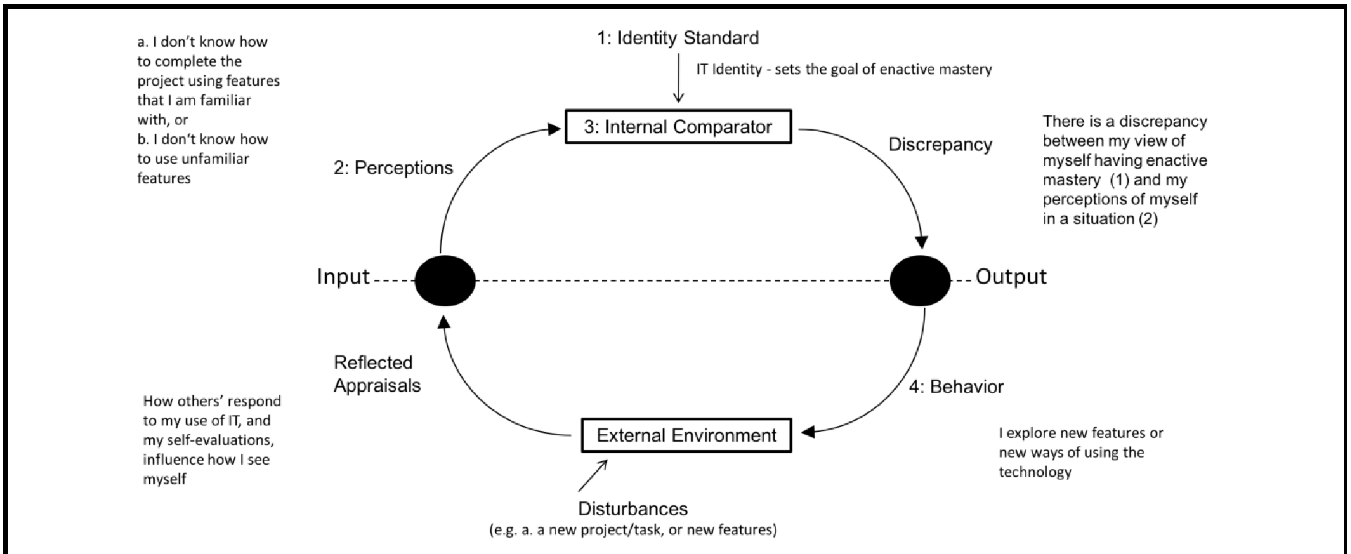

Figure 3. An Environmental Disturbance Triggers Exploratory Usage

While situations are more or less open to enactment of an identity, identities themselves are trans-situational; thus, individual behavior is, at least in part, independent of situational factors (Stryker and Serpe 1994). Consequently, while environmental disturbances during the identity verification process may trigger exploration and learning, those with strong IT identities are more likely to engage in these behaviors than individuals with weak IT identities, regardless of the situation. Because IT identity guides how individuals approach life's situations, it has been asserted that those having IT identities are most likely to explore new features of an IT and find additional situations in which to apply a technology (Carter and Grover 2015). Consequently, we propose that IT identity will influence individuals' intention to explore and exploratory usage (trying to innovate). Formally stated,

H6: *In M2, IT identity positively influences a person's intention to explore new features of a target IT.*

H7: *In M2, IT identity positively influences a person's exploratory usage of a target IT.*

IT identity is expected to positively influence individuals' beliefs that important others would want them to use new features. We have already made the case that, in today's digital world, IT have become social objects around which networks of roles and relationships form. To that end, a person's readiness to act in accord with an IT identity—termed *identity salience* (Stryker and Burke 2000)—in response to new technology features or new tasks will be influenced by the extent to which relationships with others in that individual's social network depend on mastery of the target IT. When individuals' past use of technology has been relevant to maintaining important social relationships, their IT identities are likely to be highly salient and lead them to believe that important others would think they should use new features as they becomes aware of these features or as work situations dictate.

Identities are also central to understanding how people develop positive beliefs and attitudes toward the social objects they interact with (Charng et al. 1988; Sparks et al. 1995; Stets and Biga 2003). For example, in an investigation of the relationship between environment identity and environmental attitudes and behaviors, Stets and Biga (2003) found that where past behaviors, such as contributing to an environmental preservation society, had been guided by a person's environment identity, the identity promoted a positive attitude toward enacting pro-environment behaviors, like paying higher consumer prices to protect the environment, in the future. IT identity's influence on effort expectancy and performance expectancy regarding new features also result from a person's past interactions with a technology. When a person associates past interactions with exercising control over a technology's existing feature set, her feelings of competency will prime her beliefs about her ability to adapt to and master new features. Similarly, when prior feature usage has resulted in intrinsic or extrinsic rewards, that individual may come to believe that using new features could enhance her job performance or provide other material benefits. This view is supported by empirical evidence that role and social identities predict individuals' perceptions of ease of use and usefulness in virtual learning environments (Lee et al. 2006) and social

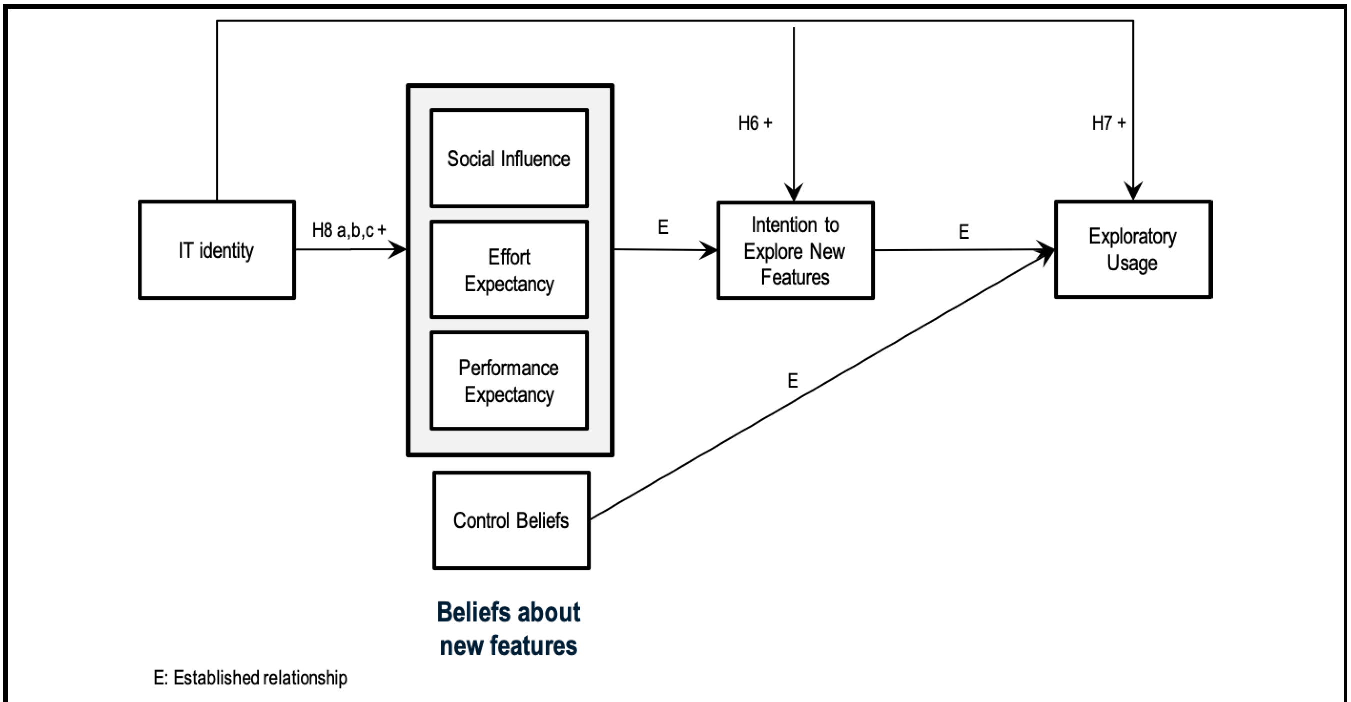

Figure 4. IT Identity and Exploratory Usage (M2)

networking services (Kwon and Wen 2010). On this basis, we hypothesize that IT identity is an antecedent of individuals' beliefs about social influence, effort expectancy, and performance expectancy, as these relate to using new features of a target IT. Formally stated,

H8: *In M2, IT identity positively influences a person's beliefs about the (a) social influence, (b) effort expectancy, and (c) performance expectancy related to using new features of a target IT.*

In M2, UTAUT relationships are included for nomological completeness. UTAUT has been applied extensively to technology acceptance and initial use (Venkatesh et al. 2016) and we have no reason to expect that the relationships will behave any differently in the context of using new features of an IT. Consequently, rather than reiterating well-understood arguments, we do not present a set of hypotheses relating to the main effects of social influence, effort expectancy, and performance expectancy on behavioral intentions, or the influence of control beliefs on exploratory usage.

Additionally, we do not propose control beliefs as a moderator of the relationship between IT identity and exploratory usage. Consistent with research tying mastery to creative problem solving (e.g., Hirst et al. 2009), individuals with strong IT identities are intrinsically motivated to explore new or unfamiliar features, to learn new skills and maintain congruity between the identity standard—that is, what they believe about themselves (having enactive mastery of a task or how to use a particular IT feature). This compulsion means that regardless of organizational support or resources, those with strong IT identities are more likely to learn new and creative ways of using IT than individuals with weak IT identities. Consequently, we do not expect control beliefs to affect the relationship between IT identity and exploratory usage.

Figure 4 shows IT identity's hypothesized role in explaining individuals' beliefs, intention to explore, and behavioral attempts to innovate with new features of an IT with which they are already familiar.

Research Method

Sample Data and Item Measurement

Data Collection Procedures

We examined the research models empirically using a longitudinal survey research design with data collected via a web-based survey in two waves. Because Carter and Grover (2015) suggest that people can develop IT identities in relation to narrower- and broader-use IT, we sought to examine the stability of IT identity's influences vis-à-vis different types of technology. Thus, we conducted two separate surveys: (1) users of a narrower-use technology (i.e., MS Excel) in the workplace, and (2) users of broader-use technology (i.e., a smartphone) in the workplace. Our sampling frame included only those individuals who, at the time of data collection, were working full-time; used MS Excel or smartphones to complete work tasks, and expressed a willingness to complete a survey at two separate time points. Screening questions were developed to ensure that respondents matched our target sample frame. Respondents were matched across the two surveys via unique ID numbers. The survey included two attention check questions to reduce the potential for poor quality responses due to inattention.

We used a market research company to recruit and administer the online survey to separate representative samples of MS Excel and smartphone users. In the first wave of data collection, the market research company randomly sampled individuals that were employed full-time. In all, 824 individuals accessed each survey. A total of 506 individuals completed the first wave of the MS Excel survey; 509 individuals completed the smartphone survey. In the second wave of data collection, the market research company invited individuals whose wave 1 responses had been retained for analysis to complete a follow-up survey. Of these individuals, 313 completed the wave 2 survey for MS Excel and 329 completed the wave 2 survey for smartphones; an effective response rate of 62% and 65%, respectively.

We screened the data for unusual responses (e.g., "straight-lining" or "speeders") in both waves. Then, we conducted preliminary analyses on the remaining data, including tests for outliers, non-response bias, skewness, and kurtosis (Tabachnick and Fidell 2007). Our resulting samples comprised 303 respondents for the MS Excel survey and 320 respondents for the smartphone survey. The respondents for MS Excel tended to be more heavily weighted towards women and older adults compared to those who responded to the smartphone survey. Table 2 presents sample characteristics of respondents across both surveys.[7]

[7]To test for non-response bias, we examined if there were significant differences in age, gender, experience, and education between those who responded to the wave 2 survey and those who only responded in wave 1. In the MS Excel study, education was significantly higher for those who completed both waves of the survey. In both the MS Excel and smartphone studies, men were more likely than women to participate in wave 1 and in wave 2.

Measures

Items for each of the constructs were developed from existing measures (see Appendix A, Table A1). In the first wave of data collection, we collected data to test M1, the independent variables in M2, and control variables. For M1, participants answered questions about social influence, effort expectancy, performance expectancy, and control beliefs associated with prior feature usage, IT identity, and their current feature usage (extended use and extent of use). For M2, we first asked participants about their familiarity with features of MS Excel or smartphones that are unknown to most people. In the MS Excel survey, participants were asked if they had used the following features: Sparklines; Name Manager; auditing formula functions; Bubble Charts, and Goal Seek. Participants in the smartphone study were asked if they had used the following operating system-agnostic features: voice commands to turn Wi-Fi on or off; voice commands for search; airplane mode to speed up device charging; a third-party app to track work expenses, and a third-party dictation app for typing or note-taking. After exposing participants to features that were more likely to be "new" to them, we asked about their perceptions of social influence, effort expectancy, performance expectancy, and control beliefs about using new features. We also asked about their intention to explore new features for MS Excel or smartphones.

Experience, age, gender, and voluntariness were included as controls and potential moderators (consistent with Brown et al. (2012) and Venkatesh et al. (2012)) in the first wave of data collection. Prior research in the post-adoption context has found that assumed relationships between existing IS constructs and post-use intentions attenuate over time (Liao et al. 2009), which suggests that experience with a target technology could exert similar effects with respect to behavior. Participants identified their experience with MS Excel and smartphones using ranges based on their length of experience in years and months (Liao et al. 2009). We controlled for age and gender, since these have been shown to affect technology acceptance decisions (Venkatesh et al. 2003) and may impact individuals' willingness to engage with different features of technologies. Voluntariness was measured by a single item asking respondents to identify the accuracy of the statement, "My use of a smartphone/MS Excel is voluntary (as opposed to [being] required by my superiors or job description)" (Moore and Benbasat 1991).

In the second wave of data collection, collected three weeks after the first wave, participants answered questions about their exploratory usage (trying to innovate) with the target IT. Trying to innovate is the dependent variable for M2.

Table 2. Sample Characteristics

Variable	Value	MS Excel Frequency	MS Excel % Respondents	Smartphones Frequency	Smartphones % Respondents
Gender	Man	136	44.9	181	55.0
	Woman	166	54.8	147	44.7
	Transgender	0	0.0	0	0.0
	I do not identify as a man, woman, or as transgender	0	0.0	0	0.0
	Prefer not to say	1	0.3	1	0.3
Age	21 and under	0	0.0	68	20.7
	22 to 34	57	18.8	92	28.0
	35 to 44	58	19.1	80	24.3
	45 to 54	80	26.4	78	23.7
	55 to 64	95	31.4	11	3.3
	65 and older	13	4.3	0	0.0
Experience with Technology (i.e., Excel or Smartphones)	< 6 months	3	1.0	2	0.6
	≥ 6 months and < 1 year	2	0.7	14	4.3
	≥ 1 year and < 2 years	4	1.3	19	5.8
	≥ 2 years and < 3 years	4	1.3	29	8.8
	≥ 3 years	290	95.7	265	80.5
Education	Less than High School	0	0.0	0	0.0
	High School	13	4.3	17	5.2
	Some College	38	12.5	55	16.7
	Associate's Degree	27	8.9	22	6.7
	Bachelor's Degree	157	51.8	133	40.4
	Professional Degree	66	21.8	87	26.4
	Doctorate	2	0.7	15	4.6
Total Subjects		**303**		**320**	

Analysis and Results

We used SmartPLS Version 3 (Ringle et al. 2015) to evaluate the measurement and structural models because we wanted to examine multiple interaction terms (Chin et al. 2003) and to examine the variance explained by our theoretical models using similar methods to prior studies that have examined UTAUT (e.g., Venkatesh et al. 2003; Venkatesh et al. 2012).

Appendix A provides results of the measurement model analysis and tests for common method variance. Cronbach's alpha and composite reliability were 0.70 or higher for all constructs, demonstrating high levels of reliability for each construct (Table A2). All items loaded significantly on their respective constructs with loadings of 0.70 or higher (Tables A3 through A6). Average variance extracted (AVE) was greater than 0.50 for all constructs, and the AVE for each construct was greater than the squared correlations of each construct, demonstrating discriminant validity (Tables A7 through A10). We found no strong evidence of common method variance among our measures as noted in the final paragraph of Appendix A.

To assess the structural model, we analyzed the hypothesized relationships and included the control variables of age, gender, experience, and voluntariness. We also modeled two-way interaction terms found to be significant in previous UTAUT studies (e.g., Maruping et al. 2017; Venkatesh et al. 2008; Venkatesh et al. 2003; Venkatesh et al. 2012). We determined the significance for each of the structural paths using p-values obtained via bootstrapping with 5,000 sub-samples (Hair et al. 2014). Table 3 identifies the path coefficients (Coeff.) and p-values for M1, which examines IT identity's influences on extended and extent of use. Appendix B provides the path coefficients and p-values for the theoretical models with direct effects only, the theoretical models with direct effects and controls, and the theoretical models with direct effects, controls, and interaction effects. As Tables B1 and B2 indicate, the IT identity construct exhibits stability across both technologies. Further, adding controls

Table 3. Results of Hypothesis Tests for M1—Feature Usage

	MS Excel		Smartphone	
Hypothesis	**Coeff. (p-value)**	**Supported?**	**Coeff. (p-value)**	**Supported?**
H1a: ITID → XTND	0.358 (0.00)	**YES**	0.283 (0.00)	**YES**
H1b: ITID → XTNT	0.414 (0.00)	**YES**	0.310 (0.00)	**YES**
H2: SI → ITID	0.264 (0.00)	**YES**	0.137 (0.01)	**YES**
H3: EFF EXP → ITID	0.381 (0.00)	**YES**	0.452 (0.00)	**YES**
H4: PERF EXP → ITID	0.226 (0.00)	**YES**	0.252 (0.00)	**YES**
H5a: CB * ITID → XTND	0.075 (0.03)	**YES**	0.077 (0.04)	**YES**
H5b: CB * ITID → XTNT	0.114 (0.00)	**YES**	0.082 (0.03)	**YES**
E: CB → XTND	0.125 (0.03)	**YES**	0.057 (0.17)	NO
E: CB → XTNT	0.174 (0.00)	**YES**	0.102 (0.04)	**YES**
Controls	**Coeff. (p-value)**	**Significant?**	**Coeff. (p-value)**	**Significant?**
AGE → XTND	0.035 (0.48)	NO	-0.114 (0.04)	**YES**
AGE → XTNT	0.038 (0.42)	NO	-0.125 (0.03)	**YES**
EXP → XTND	0.016 (0.76)	NO	0.053 (0.33)	NO
EXP → XTNT	0.021 (0.63)	NO	0.040 (0.45)	NO
GDR → XTND	-0.198 (0.00)	**YES**	-0.180 (0.00)	**YES**
GDR → XTNT	-0.148 (0.00)	**YES**	-0.162 (0.00)	**YES**
VOL → XTND	-0.067 (0.17)	NO	0.001 (0.98)	NO
VOL → XTNT	-0.092 (0.07)	NO	-0.002 (0.97)	NO
CB * AGE → XTND	-0.013 (0.79)	NO	0.144 (0.01)	**YES**
CB * AGE → XTNT	0.009 (0.86)	NO	0.096 (0.04)	**YES**

Legend: E = Established Relationship; SI = social influence; ITID = IT identity; EFF EXP = effort expectancy; PERF EXP = performance expectancy; CB = control beliefs, XTNT = extent of use; XTND = extended use; EXP = experience; GDR = gender status; VOL = voluntariness

and interaction effects to the theorized models does not reduce IT identity's influence on feature usage.

All hypothesized relationships were supported. Together, social influence, effort expectancy, and performance expectancy explain 49% of the variance (i.e., R^2) in IT identity for MS Excel and smartphones. For extended use, M1 explains 20% of the variance for MS Excel and 15% for smartphones. For extent of use, M1 explains 26% of the variance for MS Excel and 17% for smartphones.

As hypothesized, IT identity's relationship with feature usage is positively affected by availability of organizational support and resources; however, as illustrated in Appendix C, examination of the simple slopes indicates that this effect is not uniform at all levels of IT identity. Specifically, at low levels of IT identity, increasing organizational resources and support does not amplify IT identity's influence on feature usage.

Q^2 provides an indication of the predictive relevance of the model. To calculate the Q^2, we used blindfolding with an omission distance of nine for both data sets. All Q^2 values for M1 are greater than zero, which suggests the model has predictive relevance (Hair et al. 2014).

To examine if IT identity serves as a mediator within M1, we followed Baron and Kenny's (1986) approach: after confirming significance of path estimates, we performed the Sobel (1982) test for the various mediating relationships. Sobel test results indicate that IT identity significantly mediates the relationships between social influence, effort expectancy, and performance expectancy and feature usage for MS Excel and smartphones. We also confirmed our mediation analysis using more contemporary approaches (Iacobucci et al. 2007; Zhao et al. 2010). IT identity was found to exert an indirect-only mediation effect (Zhao et al. 2010), which provides further support for IT identity's hypothesized theoretical position within M1.

Table 4 provides results of hypothesis tests for M2, which examines IT identity's position in the nomological net of UTAUT and influences on exploratory usage. The results of the hypothesis tests for M2 were consistent for both MS Excel and smartphones; whereby, all hypothesized relationships were significant at a p-value of 0.05 or lower. For MS Excel, M2 explains 62% of the variance in intention to explore and 36% of the variance in trying to innovate. For smartphones, 55% of the variance in intention to explore and 33% of the variance in trying to innovate are explained. All Q^2 values are

Table 4. Results of Hypothesis Tests for M2 – Exploratory Usage

	MS Excel		Smartphone	
Hypothesis	**Coeff. (p-value)**	**Supported?**	**Coeff. (p-value)**	**Supported?**
H6: ITID ➔ INTX	0.103 (0.02)	**YES**	0.165 (0.00)	**YES**
H7: ITID ➔ TRY	0.133 (0.02)	**YES**	0.115 (0.02)	**YES**
H8a: ITID ➔ NF SI	0.320 (0.00)	**YES**	0.312 (0.00)	**YES**
H8b: ITID ➔ NF EFF EXP	0.533 (0.00)	**YES**	0.586 (0.00)	**YES**
H8c: ITID ➔ NF PERF EXP	0.534 (0.00)	**YES**	0.530 (0.00)	**YES**
E: NF SI ➔ INTX	0.184 (0.00)	**YES**	0.273 (0.00)	**YES**
E: NF EFF EXP ➔ INTX	0.428 (0.00)	**YES**	0.357 (0.00)	**YES**
E: NF PERF EXP ➔ INTX	0.252 (0.00)	**YES**	0.160 (0.00)	**YES**
E: INTX ➔ TRY	0.410 (0.00)	**YES**	0.423 (0.00)	**YES**
E: NF CB ➔ TRY	0.140 (0.01)	**YES**	0.154 (0.00)	**YES**
Controls	**Coeff. (p-value)**	**Significant?**	**Coeff. (p-value)**	**Significant?**
AGE ➔ INTX	-0.023 (0.55)	NO	0.011 (0.80)	NO
EXP ➔ INTX	-0.064 (0.19)	NO	-0.097 (0.01)	**YES**
GDR ➔ INTX	0.047 (0.18)	NO	-0.057 (0.16)	NO
NF VOL ➔ INTX	-0.013 (0.76)	NO	0.011 (0.80)	NO
NF SI * AGE ➔ INTX	-0.021 (0.70)	NO	-0.023 (0.69)	NO
NF SI * EXP ➔ INTX	-0.018 (0.76)	NO	0.063 (0.25)	NO
NF SI * GDR ➔ INTX	-0.091(0.12)	NO	0.144 (0.01)	**YES**
NF EFF EXP * AGE ➔ INTX	-0.069 (0.12)	NO	-0.055 (0.27)	NO
NF EFF EXP * GDR ➔ INTX	0.044 (0.63)	NO	-0.052 (0.21)	NO
NF PERF EXP * AGE ➔ INTX	0.080 (0.16)	NO	-0.010 (0.88)	NO
NF PERF EXP * GDR ➔ INTX	0.070 (0.24)	NO	-0.020 (0.73)	NO
AGE ➔ TRY	-0.093 (0.06)	NO	-0.023 (0.64)	NO
EXP ➔ TRY	0.016 (0.51)	NO	-0.057 (0.19)	NO
GDR ➔ TRY	0.008 (0.88)	NO	0.001 (0.98)	NO
NF VOL ➔ TRY	-0.048 (0.32)	NO	-0.097 (0.04)	**YES**
NF CB * AGE ➔ TRY	0.029 (0.60)	NO	-0.013 (0.80)	NO
INTX * EXP ➔ TRY	-0.054 (0.29)	NO	0.032 (0.49)	NO

Legend: E = Established Relationship; ITID = IT identity; NF SI = social influence (new features); NF EFF EXP = effort expectancy (new features); NF PERF EXP = performance expectancy (new features); NF CB = control beliefs (new features), INTX = intention to explore; TRY = trying to innovate; EXP = experience; GDR = gender status; NF VOL = voluntariness (new features)

greater than zero, suggesting the model has predictive relevance (Hair et al. 2014).

To examine mediation effects in M2, the Sobel test and Iacobucci et al. (2007) approach confirmed that, for both technologies, IT identity's influence on intention to explore is partially mediated by social influence, effort expectancy, and performance expectancy (as these relate to new features). Social influence, effort expectancy, and performance expectancy are considered complementary mediators (Zhao et al. 2010) of the relationship between IT identity and intention to explore. This means that while IT identity's theorized position and influence on intention to explore are supported, we cannot rule out the potential for omitted mediators in the direct path. Similarly, intention to explore is a complementary mediator (Zhao et al. 2010) of the relationship between IT identity and trying to innovate.

Discussion

Recent theoretical work proposed that a new construct in the IS domain, IT identity, can further understanding of individuals' post-adoption IT usage (Carter and Grover 2015);

however, the construct's utility has yet to be established in empirical work. To that end, our objectives in this study were threefold. First, we sought to extend theoretical understanding of the nature of IT identity and its influences on IT feature and exploratory usage in the workplace. Second, we set out to provide a robust examination of IT identity's predictive power and identify its position within the existing nomological net of IT use. Third, we wanted to explore the stability of IT identity's influence vis-à-vis different types of technology.

Our results indicate that the stronger IT identity is in relation to a target IT, the greater its influence on IT feature usage and exploratory usage. When it comes to using familiar features, social influence, effort expectancy, and performance expectancy reflect individuals' evaluations based on their personal histories of interacting with (a subset of) features in the IT's overall feature set. These evaluations reinforce positive self-identification with the technology, while control beliefs amplify IT identity's influences on feature usage, except when IT identity is weak. Regarding exploratory usage, our research model revealed that IT identity primes perceptions of social influence, effort expectancy, and performance expectancy, and exerts direct effects on intention to explore and trying to innovate.

We note that IT identity exerts remarkably similar effects for MS Excel and smartphones, supporting the view that, with its focus on the self, IT identity is technology agnostic. This follows because IT identity represents the extent to which a person self-identifies with use of an IT. Self-identification indicates that through a history of usage, a person has reached a point of dependence, relatedness and emotional energy when dealing with the IT in question. This is true, regardless of the type of IT. When any individual identifies with use of an IT, the reciprocal relationships with UTAUT and usage constructs are in play, independent of what the IT might be. Thus, IT identity and its effects are comparable across people and across technologies, rendering it as a powerful construct for predicting important technology use behaviors.

Regarding control variables, gender negatively influences feature usage for both technologies, while age is negatively related to individuals' use of smartphone features. Experience and voluntariness of using new features are negatively related to intentions to explore smartphones. Finally, we observed that our research models explained more variance in individuals' new behaviors than in their ongoing use of familiar features.

These are important findings because, despite several years of research on individual IT usage, including increasingly sophisticated models in the post-adoption context (Burton-Jones et al. 2017), we still know relatively little about factors that trigger adaptive and exploratory usage (Nevo et al. 2016; Schmitz et al. 2016).

Limitations

Before discussing the theoretical and practical implications of this study, we note its limitations. First, while this study offers insights into individuals' exploratory usage of new IT features, it does so in the context of familiar technologies. Thus, it is reasonable to ask whether we might expect similar results with a brand new system. With regard to this, we note that the first time a person uses a technology its overall feature set is unfamiliar. Because the familiar feature set is a null set, there is no baseline for expanding IT usage. Consequently, IT identity verification processes (related to the target technology) are not in play. Given that these processes—and hence models M1 and M2—are applicable when a sense of self-identification has formed, the models may not apply throughout the identity formation period. Further, we would speculate that identity formation may differ depending on the type of IT (e.g., broad vs. narrow use) and whether a person has been exposed to similar technologies previously. When some degree of self-identification exists (e.g., with a technology genre, brand, or ecosystem), it may give rise to transference effects. Investigating the nature and influence of these effects would extend understanding of the conditions under which the models are stable.

Second, while participants answered questions about their use of one technology (MS Excel or the smartphone)—and we demarcated each technology's feature set into familiar and novel features—both models were tested with the same set of participants. In M1, participants were asked about their use of familiar features, while M2 was tested after making the same participants aware of novel features. Given this approach, it is possible that participants who considered the novel features as familiar may have overestimated usage measures in M1 and underestimated exploratory usage in M2. We believe our two wave data collection helped minimize the effects of these confounds; still, future work may wish to confirm this assumption by testing the models with separate samples.

Finally, our models explained more variance in initial (exploratory) usage than in ongoing (feature) IT usage. Moreover, we note that the variance explained in feature usage was relatively low. On one hand, this implies a need to develop richer conceptualizations of IT use; on the other, it could be that IT has become so ubiquitous that less variance exists in patterns of IT usage across individuals for the same technologies. For example, there may be considerable overlap in subset of features that experienced users of MS Excel apply to their work tasks. In such cases, developing new, richer measures of use may not address the problem. As this study indicates, investigating the context of IT usage (e.g., familiar features vs. new features) can affect how we structure our models and may yield new insights. This suggests that to understand when IT identity is a more or less salient predictor, more work is needed that probes the boundaries of IT usage. As examples, researchers may investigate IT identity's salience in highly structured vs. less structured situations, the ways in which IT identity shapes technology use decisions in different contexts (e.g., work vs. home), or in the lives of people embedded in different social groups, roles, and relationships.

Implications for Theory and Future Research

We have argued that when employees use IT in creative ways it strengthens the link between IT investments and competitive advantage. Theoretically, our study demonstrates the importance of identity in the use of familiar and new IT features. In doing so, this work makes several contributions to IS research.

First, we articulate how identity verification processes motivate different forms of IT usage. We propose an extension to Carter and Grover's initial theoretical model to illuminate the nature and influence of the self in motivating individuals' use of familiar features within an IT's overall feature set and their behavioral attempts to innovate with new features. We explain how IT identity promotes feature usage as people actively seek opportunities to exercise control over the IT with which they self-identify. Moreover, we respond to calls to extend understanding of factors that trigger novel and creative ways of using IT in the post-adoption context (Nevo et al. 2016). We outline how perceived discrepancies between the goal of demonstrating enactive mastery and individuals' self-perceptions in social situations prompts exploratory usage. This suggests that while those with strong IT identities are more likely to use IT creatively than individuals with weak IT identities, such use may require some "discrepancy intervention" as a trigger. In this regard, a promising avenue for research would be to develop experimental research designs to examine the extent to which IT identity holders' exploratory usage is triggered by a discrepancy intervention versus an inherent desire to develop and refine their skills.

In the nomological network around exploratory IT usage, the discrepancy intervention is an important addition that needs to be studied theoretically and empirically, as it could have many conceptual representations. For instance, changes in a unit of technology (e.g., versioning, innovation, mashups) could be a source of this trigger—nd it would be useful to examine the relative efficacy of technological triggers in promoting creative use of IT. Relatedly, there may be organizational interventions (e.g., training, change programs, IT policy changes) that could give rise to discrepancies between employees' IT identities and their identity standards. Further, technological and organizational discrepancy interventions may have different effects on creative use of IT, as it possible that perceptions of a discrepancy are influenced by its source. Additionally, discrepancy interventions may have a sensitivity range; where, at some point in this range, IT and work role identity verification processes in conflict may become barriers to learning. Integrating these learning barriers within the nomological network of constructs and studying identity conflict offers fertile ground for further theoretical development.

Second, we map IT identity verification processes to two variance models to empirically examine IT identity's predictive power and the temporal aspects of IT usage in the nomological net of UTAUT. Our results show that individuals with strong IT identities demonstrate their positive self-identification with use of an IT by utilizing as many features of the technology as they can, as extensively as they can. This indicates IT identity's important role in motivating individuals to increase (i.e., maximize) their breadth and depth of usage within the overall feature set. In addition, while IS research is becoming increasingly sophisticated in its consideration of IT usage (Burton-Jones et al. 2017), one criticism of post-adoption variance models is that they often disregard, or conceptualize too narrowly, the social contexts in which use occurs (Ortiz De Guinea and Markus 2009; Venkatesh et al. 2008). This may reflect difficulties involved in developing omnibus measures that are applicable across social contexts. Because identities reflect individuals' understanding of shared cultural and normative expectations within the social structures in which they are embedded (Stryker and Serpe 1994), IT identity necessarily takes into account external factors that facilitate or inhibit performance of IT feature and exploratory usage. Thus, IS researchers can strengthen post-adoption variance models of use that examine these behaviors by incorporating the set of theory-based measures for IT identity into their own work.

Third, we extend current understanding of acceptance and use of technology by shedding new light on the temporal aspects of IT usage. Prior research indicates that, over time, individuals' cost-benefit analyses associated with learning and using IT are overtaken by internal mechanisms (Liao et al. 2009). We add to this literature by offering strong theoretical justification and supporting evidence to explains why this shift occurs. We theorize that as experiences become inculcated, individuals' IT identities are reinforced by their beliefs about social influence, effort expectancy and performance expectancy, associated with prior IT usage. Individuals' ongoing feature usage is then driven by a need to exercise enactive mastery over technology features; thereby, verifying IT identity. Absent any environmental disturbance in the identity verification process, IT identity fully mediates the effects of beliefs on ongoing IT usage. While beliefs and intention are in play for exploratory usage, these seem also to be compelled by a desire to exert mastery over an IT through gaining knowledge and control over new features. This raises the question of how outcomes of exploratory usage may promote, reinforce, or diminish individuals' IT identities and their subsequent feature usage of a target technology.

Having an IT identity implies that a person has mastered an IT well enough to exploit a subset of its overall feature set. Mastery is necessarily realized through repeated successful attempts at exploring and gaining control over new features (enactive mastery experiences) that give rise to feelings of computer self-efficacy (Compeau et al. 1999). Computer self-efficacy, in turn, should reinforce IT identity and encourage ongoing feature usage (Carter and Grover 2015). In the future, research that validates the relationships between outcomes of exploratory usage, computer self-efficacy, and IT identity would represent an important step toward understanding how people develop and maintain IT identities. Work in this area could also shed light on the consequences of repeatedly failing in attempts at exploratory usage. Research on IT adaption and reinvention suggests that individuals driven by mastery goals view making mistakes as an acceptable part of learning (Nevo et al. 2016). In contrast, identity theories indicate that repeated failures diminish self-efficacy beliefs and weaken self-identification (Burke and Stets 2009). We believe that when prior experiences have not promoted computer self-efficacy, individuals are more likely to self-disidentify with use of an IT and are less likely to voluntarily seek out future interactions. Research that investigates the potential for attempts at IT adaptation, learning, and reinvention to disturb the identity verification process could shed light on the reciprocal relationship between IT identity and IT usage.

By examining IT identity's stability as a predictor of IT usage vis-à-vis different types of technology, we offer evidence that while use is not technology agnostic (Workman 2014), measures of IT identity are. As such, IT identity is expected to exert the same influences on behaviors, regardless of technology use contexts (e.g., task- vs. social-orientation, narrow vs. broad application). In this sense, IT identity is similar to UTAUT (Venkatesh et al. 2003). Still, we do not yet know the sources of IT identity for different classes of technology and there is a need to determine whether it is possible to distinguish between IT identities that are verified simultaneously (e.g., when a third-app is accessed on a mobile device). Thus, researchers could further validate our findings by investigating IT identity's relative predictiveness for different classes of IT, particularly when use of one is embedded within use of (one or more) other technologies.

We found that IT identity's relationship with feature usage depends to some extent on control beliefs. On one hand, this suggests that if the goal is to promote IT usage that supports a broader range of work tasks, increasing employees' perceptions of available technical and organizational resources may prove fruitful. On the other, at low levels of IT identity, such interventions may negatively affect the number of features that employees embrace and have little effect on how extensively they use those features. To that end, recent work has identified advice from coworkers as important additional control beliefs that directly predict behavior and moderate the influence of other antecedents (Robert and Sykes 2017). These authors distinguish between perceptions (i.e., control beliefs) and objective external factors in the environment (i.e., facilitating conditions). Thus, identifying perceptions and/or objective obstacles/facilitators that interact with IT identity represents an important area of investigation for researchers and practitioners seeking to design incentives or controls to manage employees' feature usage.

Finally, the non-significant "established" relationship between control beliefs and extended use of a smartphone is worthy of consideration. We have suggested that people self-identify with MS Excel through repeated use of some number of features, mostly at work. Because the number of features used is tightly coupled with a work role, beliefs about having the organizational resources and support necessary to complete tasks using MS Excel will influence a person's behavior, independent of identity processes. Conversely, because a smartphone has application across multiple social contexts, the number of features that a person uses is weakly related to the work context. As such, a person's behavior is more likely to be influenced by identity processes than control beliefs. This finding should be validated in future studies, since it implies that organizations' ability to manage use of consumer IT in the work place may be inversely related to the broad applicability of a technology's feature set. With organizational goals in mind, we turn attention to the implications of this work for practice.

Implications for Practice

Globally, businesses invest trillions in IT, yet often fail to realize anticipated revenues from their investments when employees do not utilize technologies effectively in the workplace. To that end, research suggests that benefits arising from employees' IT usage are likely to reach a limit unless organizations invest in ongoing interventions that encourage employees to find new and creative ways of using corporate technologies (Dutton and Thomas 1984).

In this study, we describe how people with strong IT identities are compelled to use technologies that they identify with in ways that demonstrate their knowledge and control over the feature sets of these IT. For organizations, this indicates that creating environments that are amenable to IT identity construction offers a way of leveraging identity verification processes to manage employees' IT usage more effectively. At the organizational level, a managerial focus on IT identity implies that it is not enough to put formal structures and processes in place that support innovation, or simply to align business and IT strategies. Rather, given that culture and identity are intimately related (Vignoles et al. 2011), it is important to integrate business/IT strategies with organizational culture. Moreover, since knowledge and control are integral to IT identity, creating organizational norms, values, and rituals that embody a philosophy of enactive mastery over organizational systems is essential to this process.

Organizations benefit from employees that internalize mastery goals in two ways: first, these employees adopt an encompassing view of their roles and seek out opportunities to creatively use implemented IT to overcome challenges (Nevo et al. 2016); second, the aggregate effects of employees' creative efforts create dynamic environments that benefit organizations more than process improvements resulting from fixed practices of technology use (Dutton and Thomas 1984). Thus, it is especially important for organizations to cultivate and manage employees' IT identities with regard to technologies that are instrumental to organizational outcomes (i.e., those dealing with core processes, products and customer interactions).

Since organizations go through constant change—nvironmental disturbances—management should communicate the value of finding new ways of using IT to handle these changes, so that employees rely on the technologies they use to accomplish their jobs and to pursue new goals as these arise. A useful starting point in this endeavor would be to identify the gap between individual employees' digital knowledge and the "collective imagination" necessary for the organization to compete effectively in the digital economy. Using this information as a basis for technology education programs that are tailored to different organizational roles and which support continuous learning (Stephan et al. 2017) would help the organization build a culture in which IT identity thrives.

Research suggests that messages communicated by the organization as part of technology education programs send important signals about the types of IT usage valued. Those focused on existing functionality and adhering to the spirit of a technology, encourage fixed patterns of use that deter employees from attempting to find new or creative ways of using IT (Dennis et al. 2001). Broader, forward-looking, messages focused on autonomy and future possibilities can foster a desire to develop different ways of using IT in pursuit of new goals (Nevo et al. 2016). An organization can tailor communications to various roles so that, regardless of whether the purpose is maximizing feature usage or promoting exploratory usage, messages encourage employees to depend on and feel positive about their use of incumbent organizational IT as part of the larger organizational system and its goals.

Building a supportive organizational culture engenders beliefs that organizational leaders support engagement in continuous learning and mastery of IT. However, it is only one step in the process. Even those with strong IT identities will develop and engage in habits of use (i.e., routinely interact with familiar features) unless a perceived discrepancy in the identity verification process triggers autonomous learning (Carter and Grover 2015). When this occurs, our results show that IT identity positively influences individuals' beliefs and activates their willingness to experiment with new IT, such that they actively explore formerly unused or newly available IT features. To that end, designing interventions that trigger autonomous learning is an important consideration. Carter and Grover suggest that inserting carefully designed mildly discrepant feedback (aligned with organizational goals) into the identity verification process can encourage the "right" kinds of innovative behaviors. New work tasks, challenges to resolve, or job requirements requiring employees to expand their knowledge and restore mastery over an IT can provide such discrepancies.

It is worth noting that when the gap between current levels of mastery and the knowledge needed to overcome obstacles is perceived as too large, employees may put off creativity efforts to some other time or abandon their attempts altogether (Nevo et al. 2016). To address this issue, organizational leaders should craft interventions that follow fundamentals of learning (Thorndike 1932): (1) employees must have existing skills to build upon and tasks should be purposeful, (2) rather than "one-off" exercises, interventions should be designed to provide repeated opportunities to practice newly acquired skills, and (3) employees should be able to derive pleasure from the "exploratory challenge" of using new features of an IT to complete a task (McCall and Simmons 1978). Additionally, recent work suggests creating a "buddy system," where employees could harness the expertise of coworkers with similar job descriptions to bridge knowledge gaps

(Robert and Sykes 2017). A buddy system that incorporates fundamentals of learning could help employees avoid repeated failures that weaken self-identification and deter future exploratory usage. Further, as employees become more proficient, comparing and contrasting the nature of their IT usage relative to that of knowledgeable coworkers offers an important frame of reference for identity construction and maintenance (Burke and Stets 2009).

While our results demonstrate that IT identity is a stable predictor of behaviors, the more someone self-identifies with a particular IT, the less inclined s/he will be to try alternatives (Carter and Grover 2015). This is potentially problematic for organizations when they require employees to switch from an incumbent technology. In these instances, IT identity verification processes afford opportunities for organizational leaders to create strongly discrepant events that are aimed at weakening IT identity and encouraging employees to make transitions. Designing interventions that repeatedly result in non-verification of IT identity involves creating tasks or problems that cannot easily be achieved using the incumbent system, thereby increasing uncertainty and reducing the pleasure involved in IT usage. The organization may also withdraw opportunities and support (e.g., from knowledgeable coworkers) for learning new skills; change job requirements so that employees are prevented from using familiar features, and/or reward task completion only when employees complete them using a preferred technology.

Finally, this study shows that IT identity is relevant to and exerts similar influences on IT usage for different technologies. Still, while measures of IT identity are technology agnostic, identity verification processes are not context agnostic. Thus, organizations should consider a technology's purpose, characteristics of its feature set (e.g., broad vs. narrow application) and employees' work roles when managing IT identities. For example, interventions cannot be designed without reference to how IT identities interact with other workplace identities: nurturing IT identities could be challenging where use of an IT has traditionally taken a backseat in performance of a work role. Further, while IT identities tied to different IT exert the same influences once formed, it may be more difficult to foster positive self-identification with narrow-use IT, due to their limited application across social contexts. In these instances, tying IT usage to a diverse set of important social relationships can maximize the number and breadth of technology features that employees need to master to manage their social networks. In situations where there are restricted opportunities to create network effects, organizations may need to expand meanings contained in a salient work role identity. In this regard, potential interventions include changing job descriptions, job titles, retraining, and mandatory, repeated interactions with the technology to complete work tasks.

Conclusions

Creative IT usage by tech fluent employees is the critical link between business technology investments and competitive advantage in a digital economy. However, to realize desired benefits, organizational leaders need a richer understanding of what drives individuals' innovation with incumbent organizational technologies. In support of that aim, this study theorized the processes by which a new concept in IS research, IT identity, motivates different forms of IT usage in the post-adoption context. We linked these processes to two separate variance models, one examining use of familiar features in a technology's overall feature set and another considering exploratory usage. Further, we validated IT identity's stability as a predictor in the nomological net of IT use for two different types of technology. For theory, our results delimit a role for IT identity in explaining individuals' feature usage and decisions to explore new technologies and/or new technology features in the workplace. For practice, this study offers actionable suggestions for how organizational leaders can encourage employees to use IT more effectively in their work. In doing so, this work provides a basis for future investigations into the reciprocal relationship between individual IT usage and organizational and/or societal outcomes.

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Appendix A

Measurement Model Analysis

Table A1 identifies the constructs and items used in this study for Model 1 (M1) and Model 2 (M2). The table also identifies the measurement scale used for each construct as well as the informing sources for the construct and items.

Table A1. Construct Items

Construct	Item	Item Description	Informing Source
Social Influence *7-point Likert scale ranging from Inaccurate to Accurate*	SI1	People who influence my behavior think I should use (MS Excel/a smartphone) for work purposes.	Venkatesh et al. 2003
	SI2	People who are important to me think I should use (MS Excel/a smartphone) for work purposes.	
	SI3	People whose opinions I value prefer that I use (MS Excel/a smartphone) for work purposes.	
Effort Expectancy *7-point Likert scale ranging from Inaccurate to Accurate*	EE1	My interaction with (MS Excel/a smartphone) is clear and understandable.	Venkatesh et al. 2003
	EE2	It was easy for me to become skillful at using (MS Excel/a smartphone).	
	EE3	I find (MS Excel/a smartphone) easy to use.	
	EE4	Learning to operate (MS Excel/a smartphone) was easy for me.	
Performance Expectancy *7-point Likert scale ranging from Inaccurate to Accurate*	PE1	Using (MS Excel/a smartphone) in my job enables me to accomplish tasks more quickly.	Venkatesh et al. 2003
	PE2	Using (MS Excel/a smartphone) improves my job performance.	
	PE3	Using (MS Excel/a smartphone) in my job increases my productivity.	
	PE4	Using (MS Excel/a smartphone) enhances my effectiveness on the job.	
Control Beliefs *7-point Likert scale ranging from Inaccurate to Accurate*	CB1	I have the resources necessary to use (MS Excel/a smartphone) for work purposes.	Venkatesh et al. 2003
	CB2	I have the knowledge necessary to use (MS Excel/a smartphone) for work purposes.	
	CB3	(MS Excel/A smartphone) is compatible with other systems I use.	
	CB4	I have the support necessary to use (MS Excel/A smartphone) for work purposes.	
IT Identity *7-point Likert scale ranging from Strongly Disagree to Strongly Agree*	ITID1	Thinking about myself in relation to (MS Excel/my smartphone), I am dependent on (MS Excel/the smartphone).	Carter and Grover 2015; anonymized for review
	ITID2	Thinking about myself in relation to (MS Excel/my smartphone), I am reliant on (MS Excel/the smartphone).	
	ITID3	Thinking about myself in relation to (MS Excel/my smartphone), I am energized.	
	ITID4	Thinking about myself in relation to (MS Excel/my smartphone), I am enthusiastic.	
	ITID5	Thinking about myself in relation to (MS Excel/my smartphone), I am linked with (MS Excel/the smartphone).	
	ITID6	Thinking about myself in relation to (MS Excel/my smartphone), I am connected with (MS Excel/the smartphone).	

Table A1. Construct Items

Construct	Item	Item Description	Informing Source
Extended Use *Count of the number of features that the individual answered "yes"*	EU_XL	Please indicate which MS Excel features you have used in support of work during the past 3 weeks *Numeric/Mathematical, Statistical, Text, Conditional, Financial, Lookup/Reference, Date & Time, Conversion, Charts & Graphs, Pivot Tables, Database, Add-in or 3rd-Party Apps, VBA Macros, Pictures and Drawing, Cube, Web, Engineering, Information, Logical*	Saga and Zmud 1994
	EU_SP	Please indicate which smartphone features you have used in support of work during the past 3 weeks. *Voice Calls, Text Messaging/MMS, Emails, Instant Messaging, Browser/Search Engine, Calendar, Intelligent Assistant, Address Book, Task List, Calculator, Camera/Video, Music, Podcasts, Location-Based Services, Social Networking, News, Clock, Social Networking, 3rd party software applications, Audio Recording, Attend Meeting, Edit Documents/Note Taking, Present Slideshow*	
Extent of Use *7-point Likert scale ranging from Extremely Light to Extremely Heavy that is averaged based on the number of features used*	EX_XL	For each feature that you selected, please evaluate the extent of your use during the past 3 weeks, on a scale of 1-7: *Numeric/Mathematical, Statistical, Text, Conditional, Financial, Lookup/Reference, Date & Time, Conversion, Charts & Graphs, Pivot Tables, Database, Add-in or 3rd-Party Apps, VBA Macros, Pictures and Drawing, Cube, Web, Engineering, Information, Logical*	Lucas and Spitler 1999
	EX_SP	For each feature that you selected, please evaluate the extent of your use during the past 3 weeks, on a scale of 1-7: *Voice Calls, Text Messaging/MMS, Emails, Instant Messaging, Browser/Search Engine, Calendar, Intelligent Assistant, Address Book, Task List, Calculator, Camera/Video, Music, Podcasts, Location-Based Services, Social Networking, News, Clock, Social Networking, 3rd party software applications, Audio Recording, Attend Meeting, Edit Documents/Note Taking, Present Slideshow*	
New Features Social Influence *7-point Likert scale ranging from Inaccurate to Accurate*	NF_SI1	People who influence my behavior think I should use new features of (MS Excel/a smartphone) for work purposes.	Venkatesh et al. 2003
	NF_SI2	People whose opinions I value prefer that I use new features of (MS Excel/a smartphone) for work purposes.	
	NF_SI3	People who are important to me think that I should use new features of (MS Excel/a smartphone) for work-related purposes.	
New Features Effort Expectancy *7-point Likert scale ranging from Inaccurate to Accurate*	NF_EE1	My interactions with new features of (MS Excel/a smartphone) will be clear and understandable.	Venkatesh et al. 2003
	NF_EE2	It will be easy for me to become skillful at using new features of (MS Excel/a smartphone).	
	NF_EE3	I will find new features of (MS Excel/a smartphone) easy to use.	
	NF_EE4	Learning to operate new features of (MS Excel/a smartphone) will be easy for me.	
New Features Performance Expectancy *7-point Likert scale ranging from Inaccurate to Accurate*	NF_PE1	Using new features of (MS Excel/a smartphone) in my job will enable me to accomplish tasks more quickly.	Venkatesh et al. 2003
	NF_PE2	Using new features of (MS Excel/a smartphone) will improve my job performance.	
	NF_PE3	Using new features of (MS Excel/a smartphone) in my job will increase my productivity.	
	NF_PE4	Using new features of (MS Excel/a smartphone) will enhance my effectiveness on the job.	

Table A1. Construct Items

Construct	Item	Item Description	Informing Source
New Features Control Beliefs *7-point Likert scale ranging from Inaccurate to Accurate*	NF_CB1	I have the resources necessary to use new features of (MS Excel/a smartphone) for work.	Venkatesh et al. 2003
	NF_CB2	I have the knowledge necessary to use new features of (MS Excel/a smartphone) for work.	
	NF_CB3	New features of (MS Excel/a smartphone) are compatible with other systems I use.	
	NF_CB4	I have the support necessary to use new features of (MS Excel/a smartphone) for work.	
Behavioral Intention to Explore *7-point Likert scale ranging from Strongly Disagree to Strongly Agree*	BIX1	I intend to explore new features of (MS Excel/my smartphone) for potential application in my work.	Nambisan et al. 1999
	BIX2	I plan to explore new (MS Excel/my smartphone) functions for enhancing the effectiveness of my work.	
	BIX3	I intend to spend considerable time and effort exploring new (MS Excel/my smartphone) features for potential application in my work	
Trying to Innovate *7-point Likert scale ranging from Strongly Disagree to Strongly Agree*	TRY1	I tried to find new uses of (MS Excel/the smartphone).	Ahuja and Thatcher 2005
	TRY2	I tried to identify new applications of (MS Excel/the smartphone).	
	TRY3	I tried to discover new uses for (MS Excel/the smartphone).	
	TRY4	I tried to use (MS Excel/the smartphone) in novel ways.	

We examined reliability for each construct using composite reliability and Cronbach's alpha. Values for both exceeded the minimum threshold of 0.70 for reliability (Nunnally and Bernstein 1994). Table A2 provides reliabilities for the constructs in this study for the MS Excel and smartphone studies. Further, to assess convergent validity, one can examine the AVE value. Heuristics suggest that AVE values greater than 0.5 indicate that a variable is capturing more than half of the variance, relative to measurement error (Henseler et al. 2009). For both samples, all AVE values are greater than 0.5, suggesting sufficient convergent validity.

Table A2. Reliability

	MS Excel			Smartphones		
	Composite Reliability	**Cronbach's Alpha**	**Average Variance Explained**	**Composite Reliability**	**Cronbach's Alpha**	**Average Variance Explained**
Social Influence	0.925	0.879	0.805	0.857	0.947	0.777
Effort Expectancy	0.952	0.934	0.833	0.938	0.955	0.843
Performance Expectancy	0.963	0.948	0.866	0.925	0.926	0.817
Control Beliefs	0.907	0.862	0.709	0.868	0.910	0.717
IT Identity	0.928	0.907	0.683	0.891	0.917	0.648
NF Social Influence	0.899	0.929	0.875	0.922	0.945	0.810
NF Effort Expectancy	0.953	0.934	0.834	0.928	0.948	0.821
NF Performance Expectancy	0.954	0.936	0.839	0.922	0.923	0.810
NF Control Beliefs	0.884	0.827	0.660	0.866	0.909	0.714
Behavioral Int. to Explore	0.959	0.936	0.887	0.920	0.950	0.863
Trying to Innovate	0.948	0.926	0.819	0.893	0.926	0.758

To further assess construct validity, we examined loadings and cross-loadings of each reflective construct. These are summarized in Tables A3 through A6. Each item loaded highest on its own construct and all items had a loading higher than 0.70. The exception was one item in control beliefs (as these relate to new features) for MS Excel, which had a loading of 0.623 on its theoretical construct. To ensure that multicollinearity posed little threat, we examined variance inflation factors and found that none of the inner model variance inflation factors (VIF) were less than three, which is below the recommended threshold.[8]

Tables A7 through A10 identify the mean and standard deviations of each construct, the correlations among constructs, and the square root of the average variance extracted (AVE) for the MS Excel (M1 and M2) and smartphone (M1 and M2) data, respectively. The square root of the AVEs are higher than the correlations of the other constructs in the model (AVEs on the diagonal), which provides further evidence of discriminant validity (Fornell and Larcker 1981).

Table A3. Loading and Cross Loadings for M1: MS Excel

	Social Influence	Effort Expectancy	Performance Expectancy	Control Beliefs	IT Identity
SI1	**0.866**	0.230	0.436	0.303	0.382
SI2	**0.911**	0.243	0.475	0.296	0.439
SI3	**0.913**	0.251	0.492	0.372	0.475
EE1	0.294	**0.880**	0.626	0.711	0.582
EE2	0.224	**0.926**	0.521	0.636	0.511
EE3	0.257	**0.931**	0.579	0.627	0.580
EE4	0.194	**0.914**	0.495	0.576	0.462
PE1	0.430	0.576	**0.911**	0.625	0.497
PE2	0.517	0.554	**0.928**	0.638	0.565
PE3	0.511	0.587	**0.940**	0.679	0.558
PE4	0.481	0.568	**0.942**	0.650	0.592
CB1	0.328	0.614	0.620	**0.887**	0.488
CB2	0.250	0.725	0.646	**0.856**	0.490
CB3	0.274	0.485	0.507	**0.770**	0.377
CB4	0.368	0.530	0.567	**0.849**	0.483
ITID1	0.477	0.532	0.611	0.496	**0.770**
ITID2	0.441	0.528	0.629	0.531	**0.796**
ITID3	0.273	0.351	0.318	0.353	**0.771**
ITID4	0.310	0.478	0.395	0.413	**0.833**
ITID5	0.435	0.511	0.483	0.468	**0.895**
ITID6	0.407	0.479	0.439	0.412	**0.887**

[8]Since our measurement model only consisted of reflective measures, the outer model variance inflation factors are not relevant (Hair et al. 2011).

Table A4. Loading and Cross Loadings for M1: Smartphones

	Social Influence	Effort Expectancy	Performance Expectancy	Control Beliefs	IT Identity
SI1	**0.847**	0.233	0.428	0.318	0.298
SI2	**0.907**	0.275	0.466	0.345	0.379
SI3	**0.889**	0.269	0.492	0.375	0.376
EE1	0.276	**0.913**	0.568	0.687	0.621
EE2	0.271	**0.912**	0.514	0.570	0.569
EE3	0.260	**0.919**	0.482	0.585	0.567
EE4	0.278	**0.927**	0.457	0.561	0.557
PE1	0.440	0.497	**0.879**	0.606	0.529
PE2	0.529	0.483	**0.921**	0.574	0.507
PE3	0.496	0.512	**0.908**	0.590	0.500
PE4	0.437	0.503	**0.907**	0.624	0.529
CB1	0.369	0.597	0.595	**0.886**	0.489
CB2	0.369	0.612	0.556	**0.883**	0.474
CB3	0.292	0.448	0.536	**0.787**	0.365
CB4	0.295	0.560	0.564	**0.827**	0.449
ITID1	0.338	0.476	0.505	0.493	**0.746**
ITID2	0.373	0.499	0.500	0.472	**0.805**
ITID3	0.307	0.484	0.413	0.333	**0.770**
ITID4	0.246	0.531	0.411	0.379	**0.799**
ITID5	0.350	0.546	0.471	0.420	**0.861**
ITID6	0.333	0.509	0.474	0.462	**0.846**

Table A5. Loadings and Cross Loadings for M2: MS Excel							
	New Features Soc Inf	**New Features Eff Exp**	**New Features Perf Exp**	**New Features Fac Cond**	**IT Identity**	**Intention to Explore**	**Trying to Innovate**
NF_SI1	**0.936**	0.408	0.599	0.431	0.284	0.531	0.423
NF_SI2	**0.942**	0.340	0.583	0.351	0.280	0.484	0.416
NF_SI3	**0.928**	0.327	0.599	0.386	0.334	0.483	0.387
NF_EE1	0.332	**0.931**	0.476	0.613	0.471	0.591	0.423
NF_EE2	0.298	**0.926**	0.458	0.617	0.470	0.585	0.421
NF_EE3	0.325	**0.914**	0.517	0.619	0.479	0.590	0.408
NF_EE4	0.428	**0.881**	0.565	0.616	0.517	0.756	0.509
NF_PE1	0.546	0.493	**0.896**	0.503	0.452	0.591	0.431
NF_PE2	0.558	0.513	**0.922**	0.513	0.511	0.610	0.439
NF_PE3	0.623	0.525	**0.920**	0.550	0.486	0.617	0.467
NF_PE4	0.597	0.506	**0.925**	0.512	0.506	0.617	0.441
NF_CB1	0.346	0.538	0.488	**0.878**	0.351	0.448	0.370
NF_CB2	0.361	0.676	0.465	**0.834**	0.386	0.490	0.396
NF_CB3	0.332	0.385	0.508	**0.623**	0.357	0.360	0.186
NF_CB4	0.337	0.548	0.438	**0.886**	0.339	0.432	0.337
ITID1	0.252	0.326	0.395	0.236	**0.704**	0.333	0.204
ITID2	0.213	0.385	0.437	0.292	**0.747**	0.332	0.216
ITID3	0.234	0.475	0.389	0.416	**0.823**	0.458	0.397
ITID4	0.251	0.502	0.457	0.435	**0.873**	0.484	0.408
ITID5	0.313	0.441	0.462	0.350	**0.899**	0.454	0.386
ITID6	0.321	0.493	0.514	0.389	**0.905**	0.508	0.419
BIX1	0.498	0.672	0.640	0.500	0.503	**0.949**	0.549
BIX2	0.483	0.666	0.645	0.520	0.505	**0.950**	0.531
BIX3	0.529	0.635	0.593	0.491	0.472	**0.925**	0.531
TRY1	0.400	0.468	0.428	0.361	0.390	0.508	**0.913**
TRY2	0.365	0.425	0.434	0.370	0.343	0.514	**0.894**
TRY3	0.419	0.417	0.440	0.366	0.393	0.531	**0.906**
TRY4	0.397	0.454	0.455	0.398	0.394	0.513	**0.908**

Table A6. Loadings and Cross Loadings for M2: Smartphones

	New Features Soc Inf	New Features Eff Exp	New Features Perf Exp	New Features Fac Cond	IT Identity	Intention to Explore	Trying to Innovate
NF_SI1	**0.926**	0.305	0.502	0.300	0.258	0.505	0.364
NF_SI2	**0.936**	0.323	0.554	0.320	0.306	0.538	0.398
NF_SI3	**0.927**	0.309	0.535	0.320	0.304	0.517	0.371
NF_EE1	0.245	**0.926**	0.458	0.655	0.527	0.517	0.446
NF_EE2	0.308	**0.911**	0.524	0.597	0.524	0.558	0.427
NF_EE3	0.260	**0.898**	0.443	0.635	0.484	0.534	0.428
NF_EE4	0.391	**0.890**	0.557	0.597	0.582	0.629	0.466
NF_PE1	0.547	0.486	**0.893**	0.571	0.455	0.504	0.356
NF_PE2	0.510	0.492	**0.884**	0.525	0.473	0.559	0.429
NF_PE3	0.511	0.483	**0.908**	0.587	0.475	0.521	0.419
NF_PE4	0.489	0.519	**0.915**	0.589	0.500	0.528	0.423
NF_CB1	0.263	0.573	0.519	**0.899**	0.451	0.387	0.326
NF_CB2	0.294	0.673	0.535	**0.844**	0.482	0.410	0.373
NF_CB3	0.343	0.515	0.605	**0.794**	0.413	0.454	0.357
NF_CB4	0.226	0.537	0.457	**0.840**	0.417	0.380	0.307
ITID1	0.200	0.331	0.411	0.353	**0.699**	0.198	0.103
ITID2	0.213	0.378	0.430	0.379	**0.767**	0.272	0.174
ITID3	0.337	0.555	0.459	0.486	**0.811**	0.571	0.451
ITID4	0.246	0.595	0.418	0.497	**0.836**	0.533	0.415
ITID5	0.235	0.428	0.417	0.364	**0.853**	0.422	0.337
ITID6	0.234	0.441	0.421	0.395	**0.833**	0.370	0.263
BIX1	0.497	0.599	0.543	0.449	0.530	**0.935**	0.522
BIX2	0.526	0.589	0.561	0.476	0.481	**0.944**	0.512
BIX3	0.537	0.541	0.533	0.427	0.448	**0.907**	0.509
TRY1	0.382	0.457	0.427	0.399	0.381	0.506	**0.903**
TRY2	0.288	0.393	0.362	0.275	0.333	0.461	**0.863**
TRY3	0.426	0.390	0.412	0.373	0.299	0.488	**0.836**
TRY4	0.316	0.457	0.373	0.363	0.353	0.472	**0.879**

Table A7. M1: MS Excel – Correlation Table

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. Social Influence	4.86	3.77	**0.90**										
2. Effort Expectancy	5.48	3.30	0.27**	**0.91**									
3. Performance Expectancy	5.86	1.19	0.52**	0.61**	**0.93**								
4. Control Beliefs	5.85	1.19	0.36**	0.70**	0.70**	**0.84**							
5. IT Identity	4.81	1.36	0.48**	0.59**	0.60**	0.55**	**0.83**						
6. Extended Use	5.72	4.09	0.25**	0.27**	0.29**	0.27**	0.38**	**n/a**					
7. Extent of Use	1.55	1.15	0.29**	0.33**	0.35**	0.33**	0.45**	0.94**	**n/a**				
8. Age	2.83	1.19	0.00	-0.10	0.03	-0.05	-0.13*	0.04	0.03	**n/a**			
9. Experience	4.91	0.52	0.10	0.20**	0.17**	0.23**	0.18**	0.10	0.12*	0.02	**n/a**		
10. Gender	n/a	n/a	0.00	0.05	0.07	0.04	0.05	-0.18*	-0.13*	-0.21*	0.01	**n/a**	
11. Voluntariness	3.94	2.04	-0.21**	-0.04	-0.15*	-0.08	-0.06	-0.09	-0.12*	-0.03	-0.10	0.00	**n/a**

Square root of AVEs on the diagonal; **p < 0.01; *p < 0.05

Table A8. M2: MS Excel – Correlation Table

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. NF Social Influence	3.97	1.50	**0.94**										
2. NF Effort Expectancy	4.34	1.34	0.38**	**0.91**									
3. NF Performance Expectancy	4.69	1.21	0.64**	0.56**	**0.92**								
4. NF Control Beliefs	4.62	1.40	0.42**	0.68**	0.57**	**0.81**							
5. IT Identity	4.81	1.36	0.32**	0.53**	0.53**	0.43**	**0.83**						
6. Intention to Explore	3.87	1.54	0.53**	0.70**	0.67**	0.54**	0.52**	**0.94**					
7. Trying to Innovate	3.61	1.50	0.44**	0.49**	0.49**	0.41**	0.42**	0.57**	**0.90**				
8. Age	2.83	1.19	-0.09	-0.15**	-0.08	-0.10	-0.13*	-0.16**	-0.19**	**n/a**			
9. Experience	4.91	0.52	0.12*	0.09	0.11	0.12*	0.17**	0.04	0.09	0.02	**n/a**		
10. Gender	n/a	n/a	-0.06	0.02	0.04	-0.04	0.06	0.06	0.05	-0.21**	0.01	**n/a**	
11. NF Voluntariness	5.35	1.43	-0.20*	0.04	-0.08	0.07	0.06	-0.05	-0.06	0.05	-0.02	0.01	**n/a**

NF = New Features; Square root of AVEs on the diagonal; **p < 0.01; *p < 0.05

Table A9. M1: Smartphone – Correlation Table

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. Social Influence	5.01	1.63	**0.88**										
2. Effort Expectancy	6.03	1.25	0.30**	**0.92**									
3. Performance Expectancy	5.61	1.33	0.53**	0.55**	**0.90**								
4. Control Beliefs	5.95	1.20	0.39**	0.66**	0.66**	**0.85**							
5. IT Identity	5.14	1.35	0.40**	0.63**	0.57**	0.53**	**0.79**						
6. Extended Use	11.53	5.60	0.24**	0.22**	0.27**	0.15**	0.29**	**n/a**					
7. Extent of Use	2.78	1.51	0.24**	0.28**	0.30**	0.21**	0.34**	0.95**	**n/a**				
8. Age	2.61	1.15	-0.13*	-0.16**	-0.10	-0.04	-0.18**	-0.13*	-0.16**	**n/a**			
9. Experience	4.64	0.82	0.03	0.20**	0.14*	0.20**	0.08	0.06	0.05	0.24**	**n/a**		
10. Gender	n/a	n/a	0.05	0.12*	0.15**	0.19**	0.12*	-0.13*	-0.10	-0.12*	-0.07	**n/a**	
11. Voluntariness	3.64	2.09	-0.09	0.10	0.10	0.02	0.14*	0.05	0.05	-0.04	0.04	-0.05	**n/a**

Square root of AVEs on the diagonal; $^{**}p < 0.01$; $^{*}p < 0.05$

Table A10. M2: Smartphones – Correlation Table

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. NF Social Influence	4.10	1.65	**0.90**										
2. NF Effort Expectancy	4.97	1.34	0.34**	**0.91**									
3. NF Performance Expectancy	4.84	1.34	0.57**	0.55**	**0.90**								
4. NF Control Beliefs	5.25	1.37	0.34**	0.68**	0.63**	**0.85**							
5. IT Identity	5.14	1.35	0.31**	0.59**	0.53**	0.52**	**0.80**						
6. Intention to Explore	4.12	1.64	0.56**	0.62**	0.59**	0.49**	0.52**	**0.93**					
7. Trying to Innovate	3.98	1.65	0.41**	0.49**	0.45**	0.41**	0.39**	0.55**	**0.87**				
8. Age	2.61	1.15	-0.16**	-0.30**	-0.22**	-0.17**	-0.20**	-0.23**	-0.18**	**n/a**			
9. Experience	4.64	0.82	-0.05	0.03	0.02	0.08	0.07	-0.07	-0.07	0.24**	**n/a**		
10. Gender	n/a	n/a	-0.02	0.04	0.09	0.08	0.11*	-0.02	0.02	-0.12*	-0.06	**n/a**	
11. NF Voluntariness	5.19	1.58	-0.05	0.12*	0.20***	0.20**	0.22**	0.09	-0.01	-0.02	0.06	0.05	**n/a**

NF = New Features; Square root of AVEs on the diagonal; $^{**}p < 0.01$; $^{*}p < 0.05$

One threat to validity in quantitative research is bias arising due to common method variance. One approach to reducing common method bias is to create a temporal separation between measurement of independent and dependent variables (Podsakoff et al. 2003). As noted, for Model 2, independent variables were obtained in the first wave of data collection and the dependent variable (i.e., Trying to Innovate) was collected in wave 2. Further, the scales for the independent variables and dependent variables differed in Model 1, which creates methodological separation, also reducing the threat of common method bias. To test for the potential of common method bias, we used a marker variable (Podsakoff et al. 2003).[9] Using the techniques advocated by Malhotra (2006) and Lindell and Whitney (2001), we examined the revised correlations among the constructs after correcting the correlations for the marker variable. The only correlation that had a significant change resulting from the marker variable correction was the relationship between Control Beliefs and Extended Use in the smartphone data set (p-value of 0.053). Given that there was only one correlation affected by the marker variable and the attention given to the survey design, common method variance is unlikely to pose a strong threat to the results.

[9] Our marker variable asked respondents to respond to their agreement to the statement, "I hope my next car is blue" on a seven-point Likert scale.

Appendix B

Theorized Model Results (M1 and M2)

Table B1. Model Comparison (M1)

	MS Excel			Smartphone		
Hypothesis	**Theorized Model**	**Theorized + Controls**	**Theorized + Controls + Interactions**	**Theorized Model**	**Theorized + Controls**	**Theorized + Controls + Interactions**
H1a: ITID ➔ XTND	0.345**	0.357**	0.358**	0.309**	0.291**	0.283**
H1b: ITID ➔ XTNT	0.406**	0.415**	0.414**	0.337**	0.315**	0.310**
H2: SI ➔ ITID	0.264**	0.264**	0.264**	0.137**	0.137**	0.137**
H3: EFF EXP ➔ ITID	0.381**	0.381**	0.381**	0.452**	0.452**	0.452**
H4: PERF EXP ➔ ITID	0.226**	0.226**	0.226**	0.252**	0.252**	0.252**
H5a: CB * ITID ➔ XTND	0.072*	0.078*	0.075*	0.074	0.073	0.077*
H5b: CB * ITID ➔ XTNT	0.106**	0.111**	0.114**	0.081*	0.079*	0.082*
E: CB ➔ XTND		0.122*	0.122*		0.051	0.057
E: CB ➔ XTNT		0.169**	0.170**		0.099*	0.102*
AGE ➔ XTND		0.034	0.035		-0.113*	-0.114*
AGE ➔ XTNT		0.038	0.038		-0.125*	-0.125*
EXP ➔ XTND		0.017	0.016		0.051	0.053
EXP ➔ XTNT		0.020	0.021		0.038	0.040
GDR ➔ XTND		-0.198**	-0.198**		-0.172**	-0.180**
GDR ➔ XTNT		-0.148**	-0.148**		-0.155**	-0.162**
VOL ➔ XTND		-0.067	-0.067		-0.002	0.001
VOL ➔ XTNT		-0.093	-0.092		-0.004	-0.002
CB * AGE ➔ XTND			-0.013			0.144*
CB * AGE ➔ XTNT			0.009			0.096
R^2 for XTND	16%	20%	20%	9%	13%	15%
R^2 for XTNT	23%	26%	26%	13%	16%	17%
Adjusted R^2 for XTND	15%	19%	18%	8%	11%	13%
Adjusted R^2 for XTNT	22%	25%	24%	12%	14%	15%

Legend: E = Established Relationship; SI = social influence; ITID = IT identity; EFF EXP = effort expectancy; PERF EXP = performance expectancy; CB = control beliefs, XTNT = extent of use; XTND = extended use; EXP = experience; GDR = gender status; VOL = voluntariness
**$p < 0.01$; * $p < 0.05$

Table B2. Model Comparison (M2)						
	MS Excel			**Smartphone**		
Hypothesis	**Theorized Model**	**Theorized + Controls**	**Theorized + Controls + Interactions**	**Theorized Model**	**Theorized + Controls**	**Theorized + Controls + Interactions**
H6: ITID ➔ INTX	0.097*	0.106*	0.103*	0.143**	0.156**	0.165**
H7: ITID ➔ TRY	0.140*	0.133*	0.133*	0.088	0.111*	0.115*
H8a: ITID ➔ NF SI	0.320**	0.320**	0.320**	0.312**	0.312**	0.312**
H8b: ITID ➔ NF EFF EXP	0.533**	0.533**	0.533**	0.586**	0.586**	0.586**
H8c: ITID ➔ NF PERF EXP	0.534**	0.534**	0.534**	0.530**	0.530**	0.530**
E: NF SI ➔ INTX	0.169**	0.173**	0.184**	0.319**	0.307**	0.273**
E: NF EFF EXP ➔ INTX	0.435**	0.260**	0.428**	0.356**	0.353**	0.357**
E: NF PERF EXP ➔ INTX	0.264**	0.433**	0.252**	0.133*	0.142**	0.160**
E: INTX ➔ TRY	0.427**	0.407**	0.410**	0.447**	0.429**	0.423**
E: NF CB ➔ TRY		0.144*	0.140*		0.152**	0.154**
AGE ➔ INTX		-0.031	-0.023		0.001	0.011
EXP ➔ INTX		-0.066	-0.064		-0.083**	-0.097**
GDR ➔ INTX		0.038	0.047		-0.060	-0.057
NF VOL ➔ INTX		-0.017	-0.013		0.004	0.011
NF SI * AGE ➔ INTX			-0.021			-0.023
NF SI * EXP ➔ INTX			-0.018			0.063
NF SI * GDR ➔ INTX			-0.091			0.144**
NF EFF EXP * AGE ➔ INTX			-0.069			-0.055
NF EFF EXP * GDR ➔ INTX			0.044			-0.052
NF PERF EXP * AGE ➔ INTX			0.080			-0.010
NF PERF EXP * GDR ➔ INTX			0.070			-0.020
AGE ➔ TRY		-0.090	-0.093		-0.021	-0.023
EXP ➔ TRY		0.028	0.016		-0.051	-0.057
GDR ➔ TRY		0.012	0.009		0.003	0.001
NF VOL ➔ TRY		-0.054	-0.051		-0.095*	-0.097*
NF CB * AGE ➔ TRY			0.021			-0.014
INTX * EXP ➔ TRY			-0.045			0.033
R^2 for INTX	62%	63%	64%	55%	56%	59%
R^2 for TRY	36%	37%	38%	33%	35%	35%
Adjusted R^2 for INTX	62%	62%	62%	55%	55%	57%
Adjusted R^2 for TRY	35%	36%	36%	33%	33%	33%

Legend: E = Established Relationship; ITID = IT identity; NF SI = social influence (new features); NF EFF EXP = effort expectancy (new features); NF PERF EXP = performance expectancy (new features); NF CB = control beliefs (new features); INTX = intention to explore; TRY = trying to innovate; EXP = experience; GDR = gender status; NF VOL = voluntariness (new features)

**p < 0.01; * p < 0.05

Appendix C

The Moderating Effect of Control Beliefs on Feature Usage (M1)[10]

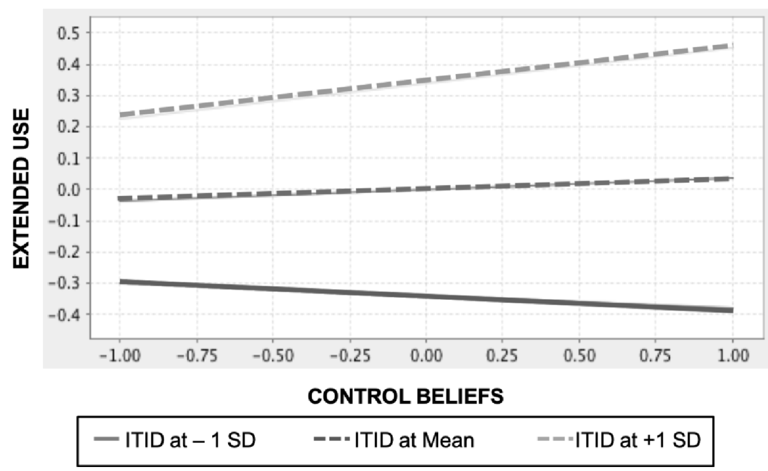

Figure C1. The Influence of IT Identity on Extended Use at Different Levels of Control Beliefs

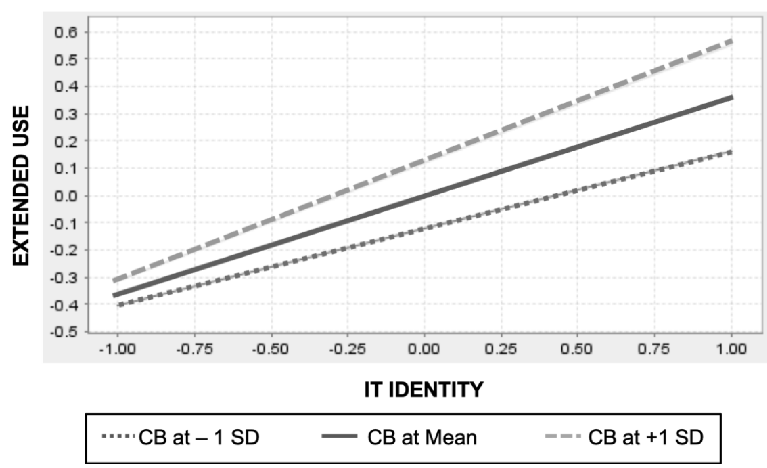

Figure C2. The Influence of Control Beliefs on Extended Use at Different Levels of IT Identity

[10]Simple slopes shown are for MS Excel. A similar pattern was evident for smartphones.

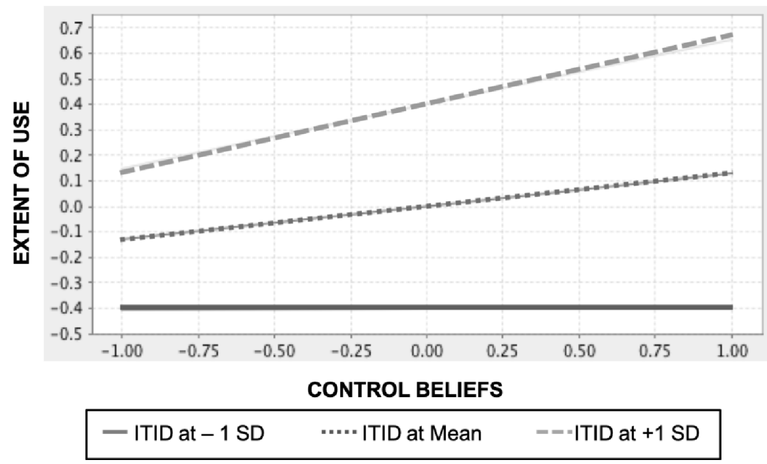

Figure C3. The Influence of IT Identity on Extent of Use at Different Levels of Control Beliefs

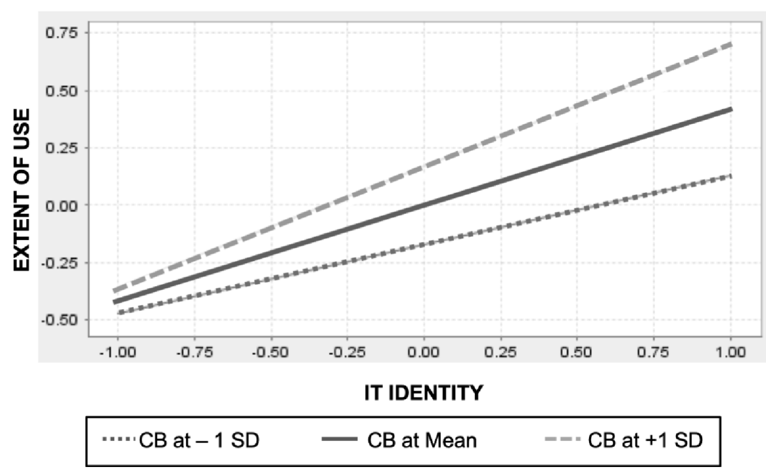

Figure C4. The Influence of Control Beliefs on Extent of Use at Different Levels of IT Identity