Individually Perceived IS Slack Resources and Innovating with IT

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Abstract
Despite significant work in post-adoption IT use, scant attention has been given to the phenomenon where users proactively innovate using IT. A proactive user behavior voluntarily steps out of the defined job requirements and creates a new application of IT in the work. This paper conceptualizes the notion of innovating with IT (IwIT) as a post-implementation behavior. It refers to user-initiated process or product innovations that are proactively performed with new IT in the work. We draw on the proactivity literature to develop a model in which we analyze how “slack resources” provided to users might facilitate IwIT. Using an analytical induction method, we explore and modify the propositions that were developed based on the literature. This paper contributes to IS research, specifically to post adoption behaviors, by studying the important yet understudied phenomenon of innovating with IT.

1. Introduction
Individuals are increasingly viewed as technology savvy users who not only adopt the technology, but also actively engage in different innovative behaviors with technology. Yet, while we know a lot about how users react to new technology or re-invent it, very limited attention has been given to the phenomenon where users proactively innovate in their work process or deliverables using IT. A proactive user behavior is the one that is not expected from job requirement perspective. It happens when a user proactively steps out of the comfort zone of routine IT use, discovers opportunities for improvement in his or her work domain, and employs IT to implement his or her novel ideas. Accordingly, we conceptualize a new concept called innovating with IT (IwIT) as a proactive, post-implementation behavior which refers to user-initiated process or product innovations that are proactively performed with new IT in one's work. As a proactive behavior, IwIT is important because it can lead to higher effectiveness, productivity improvement, and creation of new and high value-adding products and services [31,46].

While antecedents of reactive adaptations with IT has received some attention in IS research, less attention has been dedicated to understand how organizational users may become proactive when using IT during post-adoption stages [2,17,38,50]. Thus, we reviewed adaptation literatures for its antecedents and compared it with antecedents of proactive behavior which is key in the conceptualization of IwIT. Our review shows several contextual antecedents of adaptation that are under management control: organizational encouragement for innovation [35,50], autonomy [2,32], user emotions (e.g., excitement, anxiety) [7,50], technology-related factors (e.g., restrictiveness and perceived ease of use) [28,47], and work overload [2,35]. On the other side, while several antecedents of proactive behavior are similar to antecedents of adaptation (e.g., organizational encouragement, autonomy, emotions), proactivity literature also points to another factor in adaptation research: slack resources. These studies argued that the need to have some free, extra resources (e.g., time or cognitive resources) over and above what is necessary for role accomplishment fosters proactive behaviors [20,39].

A recent survey of educated, full-time employees across 16 global markets—from North America to Asia and Australia—identified slack in time as one of the top three conditions necessary to foster innovation in organizations [16]. In a similar vein, Google argues that more than half of their new products and services originate from the employee’s innovations during the 20% innovation-time-off period [36].

Despite scant attention in IS research, the relationship between slack and innovation has been studied in management and strategy literature. Generally speaking, as a critical, yet underappreciated concept, management literature has differentiated the concept of slack and its consequences from the mere “resources” that are normally required for keeping business operations...
In such innovations, IT is perceived degree of surplus in user’s work process, the innovation does not save user’s time and effort to deliver is an example of user-initiated process innovation with script that integrates two separate applications and deliverables and outcomes. For instance, writing a program to read his test data, run his program, and outputted results. Results were then fed through a statistical package for analysis and the final output was visually displayed using graphic editor (p. 211).". In contrast to other definitions of IS slack at organizational level [e.g., 42], it is limited to individual level (not groups or organization), and is defined as a user perception. We initially disaggregate user’s perceived IS slack resources into four meaningful subcomponents: technological, knowledge, IT support personnel, and time. We selected these types based on two criteria. First they should be a resource type, perceived at the individual level. Second, they should be directly used by individuals for accomplishing a task with IT (e.g., cash slack is eliminated). These dimensions are not limited to technological (say IT) slack resources and includes other types of IS resources peripheral to the core disruptive IT and the work. In addition to technological resources (e.g., IT features and functionalities), other types of resources such as knowledge of IT, time, and IT support personnel are necessary for role accomplishment. This preliminary classification will be revised based on a qualitative case study.

2.2. Individually Perceived IS Slack Resources

We define Individually Perceived IS slack (IPIS) as the “perceived degree of surplus in user’s surrounding IS resources that are beyond what s/he knows as generally necessary to accomplish his or her work roles”. In particular to the concept of user’s surrounding IT could fundamentally change individual’s cognitive schema from a risk-averse, passive follower of the routines to an active problem-solver and seeker of opportunities who is likely to divergently think about IT and work for improvement. The paper initially conceptualizes IwIT and individually perceived IS slack resources. Subsequently, the relationship between perceived IS slack resources and IwIT is explored by employing a qualitative approach. After elaborating on the methodology, findings are discussed. This paper contributes to IS research by presenting a new and complementary approach to existing research on IT use by conceptualizing the notion of IwIT and exploring its antecedent, perception of slack resources.

2. Conceptual Development

2.1. IwIT

We define Innovating with IT (IwIT) as a proactive, post-implementation behavior which refers to user-initiated process or product innovations that are performed with new IT in the task environment. IwIT is a proactive behavior in that it is voluntarily and not expected from job requirement perspective. IwIT can be classified in two groups: user-initiated process innovation and product innovation.

Users may conduct user-initiated process innovations that emphasize making modifications and refinements in the process of generating existing user deliverables and outcomes. For instance, writing a script that integrates two separate applications and saves user’s time and effort to deliver is an illustration of user-initiated process innovation with IT. Finding a new set of features that accomplishes the same task in a more efficient way is another example of this category of user innovations. When IwIT in the work process, the innovation does not generally change user deliverable and capitalizes on improving the process of generating existing user products. However, users may deviate from their existing outcomes and come up with innovations that target extending user products and deliverables. Using IT to improve the quality of existing user deliverables, introduce novel solutions to an organizational problem (i.e., not immediately user’s mandate) are some examples of user-initiated product innovation. In such innovations, IT is employed to creatively introduce a novelty in the user product that were not previously existent and extend the existing user products and deliverables.

Despite the focus of literature on user-initiated process innovations, our conceptualization of IwIT roots in the existing IS research and some footprints of user product innovation can be found. For instance, Desouza et al (2007) bring up an example of IwIT a new user product is created when a developer “was frustrated with the default setup for running tests on IDE [integrated development engine]. His frustration led him to compose a macro that read his test data, ran his program, and outputted results. Results were then fed through a statistical package for analysis and the final output was visually displayed using graphic editor (p. 211)”. 
Technological IS slack is defined as the cushion of functionalities given to an organizational user that goes beyond the certain functionalities that are optimally necessary for doing his or her job with IT. We define Knowledge IS slack as the degree to which user knowledge goes beyond the step-by-step procedural knowledge necessary to be followed to do his or her job with IT. Support personnel IS slack is conceptualized as the cushion of IT support personnel surrounding an IT that are beyond what is optimally necessary by a user for doing his or her job with that IT. Organizations may allocate cushion of IT support personnel to individuals involved during and after IT implementation [e.g., 34]. Finally, time IS slack is the user’s cushion of time for doing his or her job with IT that is beyond what is optimally necessary for achieving it.

3. IS Slack and IwIT

In the context of post-implementation of IS, we argue that what is crucial for facilitating user’s innovation with IT is not just the possession of sufficient resources for routine job accomplishment, yet the availability of slack IS resources in user’s surrounding work environment. It is argued that the resources necessary for exploration and experimentation with IT is the “IS slack resources”, and not the sufficient resources necessary for job accomplishment. According to our review of the antecedents of proactive behaviors, this occurs through two categories of factors: cognitive and affective factors.

Cognitive predictors consist of beliefs, thoughts or perceptions of conditions supporting a user’s experience of IT implementation. Autonomy and perceived competence (or self-efficacy) are among the cognitive factors that facilitates a user’s decision to step out of the box and get proactively involved with IwIT. Perceived autonomy refers to “the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out” [26:258]. With respect to competence, creative IT self-efficacy is defined as the user’s belief that s/he can creatively apply IT in work roles and processes. Creative IT self-efficacy is not the feeling of competence in “doing a predefined task”, but it is the feeling of competence in “being creative”. In addition, it is not a general feeling of competence, yet the feeling of competence to be creative with IT.

Affective predictors refer to emotional reactions initially activated by IT implementation. From an affective perspective, emotions motivates innovative behaviors (for review see Beaudry & Pinsonneault, 2010) [e.g., 3]. A substantial amount of research suggests that positive affect improves intrinsic motivation and accordingly innovativeness among individuals [29,45]. In contrast, research shows that high degree of negative affect deteriorates intrinsic motivation [18,44]. We selected the emotions that are future-oriented (i.e., emotions in which IT users feel to have control over) and are also influenced by perceived slack resources: playfulness and anxiety. Playfulness emotion is defined as the emotion of tendency to interact spontaneously with an IT application [25]. Anxiety emotion refers to “the tendency of individuals to be uneasy, apprehensive, or fearful” [8:692] of deviating from routines and exploring new areas with IT.

All in all, we make a link between individually perceived IS slack resources and their IwIT based on the mediating role of the affective and cognitive factors. Thus, it is generally proposed that:

\[ P: \text{When IT users perceive to possess IS slack resources, they become less emotionally concerned about deviation from routine use of IT and more cognitively flexible in exploring and experimenting new ideas. This will increase user innovation with IT in one’s work processes and products.} \]

UPIS→Anxiety→IwIT. We argue that perception of slack would increase user innovation with IT through diminishing their anxiety to explore. First, perceived IS slack negatively affects user’s anxiety through its antecedents: perceived degree of threat, perceived lack of control, and perceived ambiguity and complexity [10,13,30]. Perception of abundance in IS resources could grant user an increased perception of competence and control over the technology, task environment, and the consequences of exploring with IT in the work. In addition, presence of slack generally decouples tightly integrated tasks and decreases perceived ambiguity and complexity in the work context. These could enhance user’s psychological safety and accordingly diminish anxiety [53].

Anxiety negatively affects proactive behaviors by diverting attention from the innovative process [48]. It also reduces intrinsic motivation by deterring one from taking an active role in using IT and would therefore, negatively influences user’s motivation [12,49] to innovate. Thus we propose:

\[ P_x: \text{When IT users perceive to possess IS slack resources, their feeling of anxiety about deviating from routine IT use is decreased. This will have a positive influence on users’ innovation with IT in their work processes and products.} \]
UPIS→Playfulness→IwIT. Perception of slack would increase IwIT through diminishing user playfulness. First, when IT users perceive to possess IS slack resources, they feel to have the fuel necessary to drive deviating, innovative behaviors. For playing with system and exploring it, certain types of slack resources are required to enable such explorations (e.g., time and access to features). In addition, perception of possessing slack may lead to the perception of higher degree of control over the consequences of deviance from work routines. In fact, slack resources are necessary to minimize the risks associated with such exploratory behaviors. The perception of extra resource coupled with higher sense of control may itself fuel user’s curiosity and intention to play and accordingly boost playfulness.

On the other hand, playfulness emotion enhances users’ duration of interaction and familiarity with IT [25], and increase their openness to other possibilities by IT [52]. It is also shown to boost computer usage [4] and user innovativeness [54] through augmenting experimentation and curiosity [51,52,54], which are some antecedents of innovative behavior. Thus we suggest:

\[ P_c: \text{When IT users perceive to possess IS slack resources, their feeling of playfulness with IT in novel domains is increased. This will have a positive influence on users' innovation with IT in their work processes and products.} \]

UPIS→Autonomy→IwIT. We argue that perceived IS slack enhances IwIT through the mediating role of perceived autonomy. Autonomy provides users with freedom and flexibility to minimize the stress and work exhaustion through making own decision in managing the workload and schedule [1]. When users are provided with IS slack resources, they perceive to have more independence, authority and discretion over determining the schedule and method of accomplishing the task with IT. That is because IS slack resources provide additional free space and choices over the methods one can take as well as the pace he or she can accomplish the work. Thus, a positive relationship between perceived IS slack resources and perceived autonomy is expected.

Higher degree of autonomy may lead users to feel free from “rigid schedules or tight control systems” [2:428] and may lead them to use their creative potential in the work environment [48]. In that case, users will perceive their quality of IT use to involve more of the experience of choice (i.e., more self-determined). Self-determination has been shown to increase intrinsic motivation [15,27] which is an antecedent of innovation. Thus we propose:

\[ P_c: \text{When IT users perceive to possess IS slack resources, they perceive to have more independence, authority and discretion over determining the schedule and method of accomplishing the job with IT. This will have a positive influence on users' innovation with IT in their work processes and products.} \]

UPIS→Creative IT self-efficacy→IwIT. We argue that perception of possessing slack resources would positively affect IwIT through the mediating role of creative IT self-efficacy. Perception of competence is predicted by several factors internal and external to an individual [6,23]. Availability of slack resources in the work environment is an external factor that triggers perceived competence in job accomplishment. This is generally the case with innovative behaviors. Innovative behaviors are generally unpredictable and accidental [5], yet require certain resources that help users to explore novel ideas and experiment with them toward finding a useful, workable innovation. IS slack is one among all types of environmental factors that could influence individual’s “assessment of personal and situational resources/constrains” [23:189] and creative ability [19]. Consequently, it affects user’s perception of competence and the belief in his or her capability in creatively using IT in the work (i.e., creative IT self-efficacy).

For creative self-efficacy, perceived competence has been found as an important facilitator of individual’s proactive and innovative behaviors [14,40]. In the context of IwIT, we argue that high degree of creative IT self-efficacy enhances intrinsic motivation to innovate. That is because people’s perception of competence is necessary for personal cognitive or behavioral involvement [15] and the perception of having ability to innovate with IT is likely to increase the motivation for doing so. Thus we propose:

\[ P_c: \text{When IT users perceive to possess IS slack resources, their creative IT self-efficacy is increased through enhancing users' assessment of situational resources and constrains. This will have a positive influence on users' innovation with IT in their work processes and products.} \]

4. Research Method

Building upon the main takeaways from the review of the extant literature and the deductively suggested propositions, this study employs analytic induction approach [41] for its empirical part. It uses qualitative data from interviews to seek evidence that supports the propositions, but also instances of deviance from what has been deductively proposed. In addition,
iterative approach to data analysis allows for any new insights to emerge (regarding types of slack, IwIT and their relationship), which are then used to shape our understanding of this phenomenon.

Thus, to explore the initially proposed types of IPIS and their effects on IwIT, we interviewed several innovative IT users, as the unit of analysis. Multiple interview method is advantageous for this study since in-depth qualitative data can be used to seek support evidence for the proposed model and also the evidence that deviates from what was proposed in the model.

Data collection started by nine in-depth, semi-structured interviews with innovative users in five companies. In order to be included in the study, potential interviewees were approached and initially asked about their type of job with IT and whether they have done any innovation with that IT in their work. Through this process, some potential interviewees were eliminated in that they either did not conduct innovation with IT or the role of IT was not that major in their job to trigger innovation. For instance, a risk analyst of a bank was excluded since his use of IT was so straightforward and standard. Three individuals were accordingly eliminated. We tried to maximize diversity by seeking individuals that are different with respect to industry (energy, insurance, healthcare, telecommunication, and video game), function (research and development, marketing, design, project management, and planning), and technology (ERP, hardware design software, Internet, Video game engines).

The interview sessions were conducted over phone/Skype, audio-taped, transcribed, and coded in Nvivo 9. They, on average, lasted approximately one hour. The interviews began with a general question on the story of user innovation, and continued on to more specific questions on the type of organizational supports they received during that journey, and how it contributed to their innovation. Initial code categories were created based on the salient constructs and relationships contained in the proposed model. As such, during the first round of coding, data elements are broken down and assigned to various concepts that emerged. The result of the analysis of the nine interviews led to some modifications. These modifications include adjustments to the construct dimensions as well as the relationship between the independent and dependent variable.

4.1. Data Collection Contexts

Firm A is active in the up-stream field of oil and gas industries with several oil-well-drilling projects. Interviews were conducted with two innovative ERP users who were working in different functions with entirely different expertise and skills. The first interviewee, Lionel, was in the project management group, specifically expert in risk management in drilling projects. He innovated by suggesting and implementing a new ERP-based calculation method that improved cost estimation per oil-well. The second interviewee, Paolo, was a planning expert in the planning department, which was responsible for organization’s strategic planning, developing work processes and procedures in different departments, customizing best practices for the company, and revising organizational processes and procedures to make them integrated and leaner. He had several innovations in his work process and product including developing a new, usable, illustrative user manual for each department based on their workflows.

Firm B is a private insurance company with several insurance business lines including getting new customers, dealing with dentists, and maintaining customer service operation for two dental plans. Firm B had a high churn rate; in that every month a high number of clients who lose their eligibility for membership (i.e., being under the poverty line or up to its 250%). Two managers (Fernando and Peter) who innovated with IT were interviewed. Fernando was the chief marketing manager. Peter was a middle-level marketing manager. Their work process included several managerial processes of scanning, controlling, planning of the processes of gaining clients, e.g., contacting the entities that were likely to have several of the potential clients (i.e., hospitals and health clinics). Fernando and Peter contributed in an innovation that was the successful implementation of an entirely new Internet-based campaign that targets potential clients in a radically more efficient as well as effective way.

In Firm C, was a large, international, private corporation. The two interviews (Alex and Eric) where in a research lab, exclusively focused on health sector. Their goal was to find and improve technical pitfalls of current procedures and develop new solutions. Innovation was part of their job. Alex was using IT in design, data collection and analysis. He was working on an innovative product for collecting data patients’ bodies. They used design software programs as well as data analysis software applications. Eric’s application of IT was generally the same to Alex in that he was innovating in health care procedures for clinicians in a hospital (e.g., reducing the time for patient data analysis).
Another two senior engineers were interviewed in Firm D, which is a large, international company active in wireless telecommunication industry. The interviewed engineers (Diego and Gabriel) were in one of the several research and development departments. The R&D center’s mission is to generally improve the signal transmission, reception, and the techniques for such transmissions and receptions. After a novel having idea, they also sit with other colleagues to brainstorm for improving the idea. As senior engineers, Diego and Gabriel goal was to deliver patentable ideas that make technical improvements such as improving the throughput in their existing technology that transfer data among mobile devices, developing new transmission algorithms, and new coding and decoding mechanisms, for example. They used IT as the main tool in several technical innovations in this stream.

Finally, in Firm E, a software developer and the business owner of a small game development company was also interviewed. The company was founded by Ali and another software developer and was in the process of developing a console game for the Play Station 3 and 4. In the company, Ali is taking care of the graphic and anything visual in the game. Others work on programming and the soundtrack. Ali had previously worked for a large company in game industry.

While the above nine interviewed people are different in the industry, level, and nature of the work, they all have innovated in the process of job delivery or its deliverables.

5. Results and Discussion

5.1. Evidence Supporting the Propositions

The analysis of the interviews reveals that our data generally provide evidence in support of the presence of IS slack resources, their types, and their effects on IwIT (Table 1).

With respect to IwIT, several instances of user innovation were brought up in the cases that were consistent with the initial classification of IwIT in two groups of user innovation in process and product. For instance, after ERP implementation in Firm A, Lionel innovated by suggesting an alternative work breakdown structure (WBS) that significantly improved the process of cost estimation in their core operation at the firm level. While this can be considered a process innovation from organizational perspective, it is a product innovation from user standpoint since it is a new, voluntarily developed deliverable by an employee that was not generated before and has now significantly improved an organizational problem. Creating an entirely new marketing campaign by Peter and Fernando is another example of user product innovation. This was an innovation in that it targets a variety of new clients in a completely new way and changed the focus of the company from random targeting of individuals to specific haunting of the clients who were seeking insurance. As an instance of process innovation with IT, Eric clarified on some innovations in his work process. He argued that they “try to improve the accuracy or some performance measures like the timing to make the same thing happen with the same accuracy in shorter time, ... or basically try to reduce the complexity of the workflow.” As another example, Ali elaborated on several innovations at the “micro level” such as in graphic of their game.

With respect to the types of IS slack resources, the presence of the four initially proposed types of IS slack resources were evident in the data. No other type of IS resources were brought up by interviewees. For instance, Lionel emphasized the slack in his knowledge of the ERP application by elaborating on his knowledge of several ERP functionalities beyond his daily use. As an instance of technological IS slack, Paolo indicated that the presence of a temporary database for exploration of novel ideas that was over and above what was necessary to run the ERP on. As an example of time IS slack, Ali pointed to the extra time for the purpose of exploring new movies and games with the hope of getting an idea for his game. Finally, Lionel pointed to slack in IT support personnel by arguing for the availability of ample support from IT personnel for asking questions about ERP and its features.

Further, the evidence provides a general support for the core idea of the paper, i.e., the link between the notion of IS slack and IwIT. With respect to the first proposition (P1), IS slack was found to increase IwIT through decreasing user’s anxiety to explore novel scenarios. For instance, Paolo indicated that the presence of a temporary database for training and testing helped him to do some dry-run for his novel idea on a proposed workflow. As a result, he felted safe in experimenting his new idea without the fear of making a problem in the main database. This reduced the risk of innovating and facilitated their idea implementation in the work place: “We also had access to some temporary databases that gave us the chance to get into the system and check all the workflow processes [and test them before the real roll out]”. In addition, Ali argued that when he is under pressure and has anxiety and stress “it affects me and it affects my production. It distracts me from what I’m doing”. He also emphasized that the lack of...
slack in time would decrease his employee’s creative outcome in soundtrack design.

With respect to the second proposition (P₂), the data show that the perception of possessing slack surround technology contributes to their innovations by facilitating users’ playfulness with IT. For instance, Eric pointed to the notion of dedicating a specific time slot to self-initiated, new projects (called “Friday Afternoon Project”) and elaborated on how he spent time to explore and play with whatever idea he likes: “we basically call it a Friday afternoon project and you can spend some time on it every week and try to develop it on your own time ... so it’s just up to you how much time you want to spend on it and how much outcome you want to prepare before submitting the application for getting funding for it. As another instance, when talking about the factors contributed to his innovation, Lionel related his exploration of novel ideas to his slack knowledge of IT and argued that when he was provided access to other features (i.e., technological slack) and learned how to use them (i.e., knowledge IS slack), he was able to be innovative with IT and suggest the revised cost calculation method (i.e., his IwIT): “since I had a good access to several ERP features in different use levels, I explored the system and its new features and learned them”.

With respect to the third proposition (P₃), the positive relationship between IS slack resources and IwIT through job autonomy was also brought up in several occasions. For instance, Diego generally pointed to the lack of IS slack and contended that, as a consequence, he did not feel to possess autonomy on where to go and what to experiment. He was arguing that his innovations became narrowed to the area that was predefined by his manager and cannot go beyond that level. In a similar vein, Gabriel argued that he had limited amount of resources (e.g., time) which led to a lesser extent of innovation in a limited scope. In the context of game industry, Ali stressed on the fact that he provides his employee with slack (e.g., time) which is necessary for innovative jobs. He emphasized that creative works like soundtrack design are “very hard to control” and “I do not force him on something because otherwise ... I’m going to get bad results because I limited him with his time and as you mentioned music is a pure innovative task you can’t force someone to do something within a reasonable timeframe”.

With respect to the fourth proposition (P₄), Lionel directly points to the relationship between knowledge as well as technological IS slack and IwIT through the role of self-efficacy in creative use of IT. He argued that if he has access to several IT features, he would learn them and then, he knows himself as being able to innovate with IT. He was explicitly arguing that “I cannot innovate unless I have a good knowledge of the IT application”. This was also the case with Peter who argued that “I am confident of being innovative” after being provided with slack in time. In fact, when he got a vague idea of using Internet could significantly affect sales, he was confident of his ability to find a solution and finally accomplished it. This confidence was partly resulted from the top management trust associated with time slack provided to Peter for exploring novel scenarios for boosting sales.

In sum, the interviews provide a general support for making a positive relationship between IS slack and IwIT through the mediating role of several cognitive and affective factors.

5.1. Emerging Evidence

While generally confirming the deductively developed propositions, a number of new insights have also emerged from the iterative data analysis process. First, while initially considered as a type of technological IS slack, some interactive technologies (such as YouTube or movies) appears to be a source of knowledge slack that may feed users with novel ideas for their own work. Ali argued that “usually I sit and watch movies everyday ... and try to say okay this is a good idea maybe if I can modify it”. He specifically elaborated on one of his innovations and argued that “from a couple of videos...on YouTube”. This suggests that some interactive features of technology could not be only seen as technological slack, yet also knowledge slack in that it brought the user several close and related ideas about the ways technology be alternatively employed. This observation has some roots in the extant literature. Cohendet and Simon [11] studied a videogame company (VGC) that had an innovative team. For having novel ideas “This team would play videogames, attend international gaming events, read about the industry and generally immerse itself in pop-culture to define the content orientations of VGC (p. 593).” Therefore, slack in passive technological features needs to be differentiated from slack in technological functionalities that can be the source of several related and close ideas about other uses of IT.

Second, in contrast to the assumption regarding the top-down allocation of slack by organizations, some individuals play a very active role in creating slack for themselves. For instance, in order to come up with an innovative idea, Diego argued that “I cannot sit in my cubicle for a long time so I’m a person if I’m thinking about something I need to maybe walk. I may go to kitchen, for example, you
you can’t force someone to do something within a reasonable timeframe (Ali).” In contrast, Lionel and Paolo (project control team member and planning expert in an oil well drilling company) point to some occasions of time pressures and tight deadlines under which they innovated. This contrast came to a compromise by Eric who brought up a novel idea from the “Friday Afternoon Project” (i.e., leaving employees on their own), while emphasizing the importance of having time pressure in straight-forward tasks in daily operation. This conclusion is generally consistent with the literature that argues for the impact of job complexity or ambiguity on innovation. For instance, Ohly et al (2006) showed that job complexity has a positive relationship with individual innovation. They argued that job complexity “enable employees to experiment with new ideas and to develop them (p. 261)” and therefore, it becomes better developed and workable. They also emphasize that employees need time for such a detailed development of an idea. More time may be required for such open-ended, complex tasks. Therefore, we conclude that the effect of slack time on IwIT is moderated by the degree of job complexity and as it is not a focus of our study, we will control for it.

Third, job complexity emerged as an important factor that moderates the relationship between time slack and innovation. For instance, in purely innovative tasks (e.g., in Alex, Eric, and Ali examples) an interviewee indicated that “you can’t force someone to do something within a reasonable timeframe (Ali).” In contrast, Lionel and Paolo (project control team member and planning expert in an oil well drilling company) point to some occasions of time pressures and tight deadlines under which they innovated. This contrast came to a compromise by Eric who brought up a novel idea from the “Friday Afternoon Project” (i.e., leaving employees on their own), while emphasizing the importance of having time pressure in straight-forward tasks in daily operation. This conclusion is generally consistent with the literature that argues for the impact of job complexity or ambiguity on innovation. For instance, Ohly et al (2006) showed that job complexity has a positive relationship with individual innovation. They argued that job complexity “enable employees to experiment with new ideas and to develop them (p. 261)” and therefore, it becomes better developed and workable. They also emphasize that employees need time for such a detailed development of an idea. More time may be required for such open-ended, complex tasks. Therefore, we conclude that the effect of slack time on IwIT is moderated by the degree of job complexity and as it is not a focus of our study, we will control for it.

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6. Conclusion

The importance of innovating with IT is increasingly attended in research and practice. The objective of this research is to extend our understanding of the antecedents of IwIT by employing a slack perspective. While resources-based view have been significantly employed in IS research, availability of optimal or less than optimal amount of resources has been an unspoken assumption in majority of IS research. Less theoretical development and empirical investigation of the consequences of slack in IS resources have been envisaged in IS domain. The paper, first, conceptualizes IwIT as a proactive behavior during post-implementation stage. In addition, individually perceived IS slack resources were conceptualized

### Table 1. Type of IS slack and innovation

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<td>Ti</td>
<td>X</td>
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<tr>
<td>Pressure on routine use (Ti)</td>
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<td>Access to extra features led to innovation in WBS (Tc)</td>
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<td>Availability of support personnel upon request when facing a problem (Hr)</td>
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<td>Slack knowledge of the ERP features contributed to WBS change (Kn)</td>
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| Paolo           |                                    |
| Tc              | ×                                  |
| Kn              | ×                                  |
| Ti              | O                                  |
| Pressure on routine use (Ti)  |                                    |
| Slack for exploration of novel ideas in safe technological platforms (Tc)  |                                    |
| Availability of support personnel upon request when facing a problem (Hr)  |                                    |

Tc: technological slack; Kn: knowledge slack; Hr: IT support personnel slack; Ti: time slack; ✓: supported the hypothesis; ×: did not supported the hypothesis; O: mixed or new findings
with four dimensions. The slack classification sheds light on this phenomenon by better capturing the types of perceived IS slack and how each type may have distinct consequence on user innovation. Second, our study advances our knowledge of IwIT, which is a specific form of user innovation. Not much is known about user innovations that challenge the status quo and generate an entirely new function for IT. A better understanding of the antecedents of IwIT is crucial in today’s innovation-intensive competitive business environment.

7. References


