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A strategic path to study IT use through users' IT culture and IT needs: A mixed-method grounded theory

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ABSTRACT

We consider recent research in IS, as well as recent advances in the fields of psychology and sociology. As an alternative to existing models, we propose a new strategic path to study IT use through users' IT culture and IT needs. Our contributions are (1) theoretical: we investigate the predictive value for IT usage of several new constructs and show that both expectancy-based and needs-based theories of motivation should be taken into account in acceptance models, (2) methodological: we adopt an exploratory, mixed-method, grounded theory approach and use both quantitative and qualitative data and methods, an unusual approach in IS research that allows new perspectives, and (3) practical: our results highlight the fact that highly IT-acculturated users may hinder (rather than facilitate) new-IT acceptance if their situational IT needs are ignored. Therefore, when the strategic decision of implementing new IT is made, managerial attention must be focused on these users in order to drive toward the alignment of their IT needs and managerially-perceived organizational IT needs.

Our work opens the way to numerous avenues for future research.

1. Introduction

Within the context of today's global business exchanges, information technologies (IT) are implemented in firms to guarantee immediate access to relevant strategic information to support overall cost mastering (Wang et al., 2011), revenue growth (Mithas et al., 2012) and ubiquity (Watson et al., 2011). The acceptance and resulting use of these technologies by intended end-users, thus, remains an essential challenge for most firms, and a major concern in information systems (IS) research (Schwarz and Chin, 2007; Sykes et al., 2009; Venkatesh et al., 2012).

Globalization and information are, however, intertwined with culture (Leidner, 2010), i.e., the set of values espoused by individuals, which must be taken into account in acceptance models (Abraham and Junglas, 2011; Kappos and Rivard, 2008). "Information technology is not values neutral" (Leidner and Kayworth, 2006, p. 371) and IT culture (the subset of IT-related values espoused by individuals) is an important emerging concept in the IS literature (Leidner and Kayworth, 2006, p. 371). To our knowledge, research about the possible linkages between IT culture and IT usage remains, however, very limited.

Users' IT culture may be investigated through their universal needs fulfilled by IT usage and their motivation to use IT (Walsh et al., 2010), as the concepts of needs and motivation have been shown to be interrelated with the concept of values (Rokeach, 1973). Needs are a means to take into account cultural influences (Deci and Ryan, 2008); they are driving behavioral forces (Maslow, 1954). There are, however, two types of needs: universal needs common to all human beings (e.g., power needs or self-accomplishment needs: Maslow, 1954), and other specific needs (e.g., IT needs: Walsh et al., 2010) that

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may be perceived by individuals as they socialize and work. Users' IT needs have been shown to be linked to their IT culture and usage (Walsh et al., 2010) although the relationships between these different constructs have not been fully elucidated.

In organizations, IT investments are mostly decided and validated by managers. Even when the so-called 'social dimension' of strategic alignment is taken into account, IT strategy is mostly aligned with business needs, as perceived by business or IS executives (see, for instance, Heart et al., 2010; Lee et al., 2008; Reich and Benbasat, 2000; Tan and Gallupe, 2006). However, the roles of both governing and working human agencies (and hence their needs) have been recognized as essential in strategic IS research (Besson and Rowe, 2012). Beyond addressing managerially perceived needs, addressing the concern of end-users' acceptance of new IT through the investigation of their own needs is an essential element pertaining to strategic alignment, as it provides a strategic path to IT use; this has not yet been fully explored in the literature (Walsh et al., 2013).

In this article we, therefore, address the following research question: *how do users' IT culture and IT needs influence IT usage?*

As we propose to study a strategic path leading to IT usage, we cannot ignore the Technology Acceptance Model (TAM: Davis, 1989; Davis et al., 1989), which has received substantial empirical support in IS research (e.g., Adams et al., 1992; Agarwal and Karahanna, 2000; Karahanna et al., 2006; Venkatesh et al., 2003). This model and its two main constituting beliefs (perceived usefulness and perceived ease of use) have given rise to a multitude of studies during the last two decades, but empirical results have sometimes been contradictory (see Wu and Du's, 2012 meta-analysis). Furthermore, there are two critical gaps that the TAM does not address: the linkage between intention and actual use, and the motivational content in reasons for acting (Bagozzi, 2007). Also, the importance of the artifact design is not taken into account (Benbasat and Barki, 2007). Finally, it is essential to include in measures of usage "what users actually do in and around the notion of system use" (Benbasat and Barki, 2007, p. 215). In order to move IS research forward, Benbasat and Barki (2007) and Bagozzi (2007) propose to go beyond expectancy-based theories of motivation (Ajzen, 1991), which are the theoretical anchors of the TAM.

Following Benbasat and Barki's (2007) call to investigate IT design, there has been an essential impetus in the IS research community in recent years to unfold the features of different IT designs and to investigate their related specific properties that influence people's perceptions and use. Some works in past literature do not, however, study specific software and designs; they consider IT as a variable in itself. One may, therefore, consider these two streams of research within the IT usage literature: one stream investigates specific systems and their situational task-related design (e.g., Maier et al., 2013, who study an e-recruiting system); and the other stream investigates computers, software and more generally IT understood as generically defined (e.g., Andersen, 2001; Newkirk et al., 2003, who study IS/IT planning) and, in some cases, as context-related (e.g., Tarafdar and Vaidya, 2006, who study IT assimilation in Indian organizations). Both these streams of research are important and should be taken into account in new models.

In this article, we consider recent research in the IS field as well as recent advances in the fields of psychology and sociology: among various other works found in the literature, we more specifically use and move forward Walsh et al.'s (2010) grounded theory (GT) qualitative work; we also ground our reflection in the recent and ongoing works of Deci, Ryan, Vallerand and their teams. This allows us to address some of the challenges set by Bagozzi (2007) and Benbasat and Barki (2007) in their criticism of the TAM, although we choose a path to IT use that is tangential to those proposed by these authors.

We take into consideration in our work the users' different types of motivation – expectancy-based motivation (in which the desirability of an outcome determines behavior: Vroom, 1964) and needs-based motivation (in which needs are an internal force that guides behavior: Maslow, 1954) – as well as their different types of needs – universal needs (common to all human beings) and IT needs (task-related, context-related and global needs for IT as perceived by users) – and apply them to study the path leading from IT culture to IT use. Our research design paves the way for a multi-level perspective on the concept of IT usage: a global perspective linked to the user's personality, a contextual perspective linked to the relevant context investigated (e.g., work in a given organization), and a situational perspective linked to a specific system design. We propose new variables that provide new perspectives on the path leading to IT usage. Three of the variables proposed (individual IT culture, global IT needs, and contextual IT needs) relate to IT as a variable in itself, 'IT' being used in this instance as a generic term. We are, however, also concerned here with the actual use of (and not the intention to use) some specific IT: an e-learning exchange platform used by students and professors in the context of a European business school. The fourth variable (situational IT needs) relates to this specific IT. Our results show that situational IT needs constitute a direct explanatory variable, with very good predictive value, for the use of the investigated platform. The explanatory power of this variable for the actual use of the platform is more robust across samples than the TAM constructs. The other variables that we propose as antecedents of users' situational IT needs allow us to investigate how and why user profiles, usually perceived as facilitating "ambassadors" (Thomson et al., 2011) during new-IT project implementation, may turn into Nemesis-type[1] profiles if these users perceive that their situational IT needs are not fulfilled by the proposed software. These users may then jeopardize the implementation of strategic IT in organizations.

The new path to IT use that we propose through users' IT culture and needs allows new insights about some generative mechanisms (Bhaskar, 1979, 1989, 1998, 2002) leading to IT acceptance and usage. The methodological approach adopted in the present work is rather unusual in empirical IS research and is, as such, another contribution of the present study. In a critical realist stance, we use an exploratory GT mixed-method approach with both qualitative and quantitative data and methods. For the quantitative data set, we investigate a population of 282 participants (198 students and 84 professors);

[1] Nemesis is the Greek remorseless goddess of revenge. (*Source*: http://en.wikipedia.org/wiki/Nemesis_%28mythology%29)

where possible (depending on sample size), we effect multi-group comparisons. For the qualitative data set, we use multiple interviews conducted with seven participants.

The article is organized as follows: we first review the theoretical foundations of our work and show why we used a GT framework. We then explain in detail our mixed-method GT approach. In the third section, we give our results, which we discuss in the final section before concluding.

2. Theoretical background

In this section we investigate: (1) expectancy-based and needs-based motivational theories; (2) how needs have been studied in the IS literature; and (3), more specifically IT culture and IT needs.

2.1. Expectancy-based and needs-based motivational theories

Expectancy-based theories of motivation rely on the fact that people are motivated and driven by what they believe will happen if they do certain things; the desirability of an outcome determines behavior selection (Vroom, 1964). The Theory of Reasoned Action (TRA: Fishbein and Ajzen, 1975) and the Theory of Planned Behavior (TPB: Ajzen, 1985), which are at the root of the TAM research stream, are examples of expectancy-based theories.

Needs-based theories of motivation rely mostly on the works of Alderfer (1969), Herzberg et al. (1959), McClelland (1965) and Maslow (1943) (Au et al., 2008). When a perceived need is not satisfied, the individual will act in such a way that they will be able to satisfy that need. Needs are, thus, seen as an internal force that guides behaviors (Maslow, 1954). Some needs are "universal", that is common to all human beings (Deci and Ryan, 2008) – e.g., self-accomplishment need, affiliation need and power need; these universal needs must be satisfied "for effective functioning and psychological health" (p. 183). Needs are at the root of values; they are processed through group norms to turn into values (Rokeach, 1973): individuals will act to satisfy their needs but these needs will turn into values only in so far that they do not violate the individuals' social-group norms. The concept of human needs is, thus, extremely useful "because it provides a means of understanding how various social forces and interpersonal environments affect [...] motivation" (Deci and Ryan, 2008, p. 183): it allows one to take into account group cultural influences at the individual level. The environment matters not *per se* but in what it means functionally in terms of supporting people's universal needs (Vallerand et al., 2008). In order to fulfill universal needs, other specific needs (e.g., IT needs) develop as the individual socializes; these specific needs depend on the individual's personality, contexts and/or situations.

Research on individuals' motivation to use IT is a well-established topic in IS research; motivation has been shown to be an important predictor for technology acceptance (see, for instance, Davis et al., 1992; Malhotra et al., 2008; Venkatesh, 1999, 2000; Venkatesh et al., 2003). However, we found only one work (Walsh et al., 2010) that takes an integrative perspective, inclusive of all possible dimensions and sub-dimensions of this construct – i.e., intrinsic motivation (to know, to accomplish, and to experience stimulation: Vallerand, 1997, 2001) and extrinsic motivation (with integrated, identified, introjected, and external regulations: Ryan and Deci, 2000). Some dimensions of the motivation construct are rooted in the fulfillment of universal needs (e.g., intrinsic motivation to know); other dimensions (e.g., extrinsic motivation through external regulation) are driven by the wish to obtain a separable outcome: Ryan and Deci, 2000). These different types of motivations have been integrated in self-determination theory as a "macrotheory of human motivation" (Deci and Ryan, 2008, p. 182), which places the different sub-dimensions of the motivation construct along a continuum of self-determination (Gagné and Deci, 2005). The various ongoing works of Deci, Ryan, Vallerand and their teams may, thus, be seen as providing a conceptual bridge between expectancy- and needs-based perspectives. Needs satisfaction leads to more self-determined motivation, which is different from, and in some cases complementary to, expectancy-based motivation (Vallerand, 2001).

2.2. Needs in IS research

Needs have been widely investigated in the IS literature, as this broad concept is either implicitly or explicitly omnipresent in many works in IS research. Some users' specific needs linked to given contexts and/or situations have been more specifically investigated. For instance Benbasat et al. (1980) investigate managers' and analysts' skill needs in an IS environment context; and Munro and Davis (1977) investigate managers' information needs in decision-making situations. In recent years, user needs are more broadly investigated – e.g., through solicited and unsolicited feedback (Bragge and Merisalo-Rantanen, 2009) or through the user-developer communication process (Gallivan and Keill, 2003). Users' needs have been shown to be constantly evolving and a source of valuable information that should not be discarded (Bragge and Merisalo-Rantanen, 2009; Fundin and Bergman, 2003). Each user may have needs that differ critically from their peers' (Gallivan and Keill, 2003), and many different factors (education, experience, company size, etc.) are shown to affect these needs (Post et al., 1999).

When one investigates the seven top-tier journals of the IS research field (European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of the Association for Information Systems, Journal of Management Information Systems, Journal of Strategic Information Systems, and Management Information Systems Quarterly), it

is, therefore, surprising to find that needs theory, and so-called 'universal needs', appear to have been little mobilized as such, and only at all in fairly recent years. A rapid search on the terms "need theory (ies)" or "needs theory (ies)" anywhere in the text of the seven journals reveals only five works that actually call upon needs theory as theoretical framework: two of these works (Turel and Serenko, 2012; Xu et al., 2012) investigate addiction; Jiang and Klein (2002) are preoccupied with IS employees' career orientations; Au et al. (2008) investigate the relationships between the fulfillment of some of the users' universal needs and users' IS satisfaction. Finally, Walsh et al. (2010) open the way to studying the actual path between the fulfillments of users' universal needs, their perceived IT needs and IT usage. We are more specifically interested in this last work as it uses the works of Vallerand, Deci, Ryan and their teams in a holistic, integrated approach without *ex ante* eliminating any universal need or dimension of the motivation construct. Furthermore, and unlike other works that study different types of specific needs (e.g., skill needs and information needs: see above), this work also investigates specific IT needs (at the global, contextual and situational levels).

2.3. Users' IT culture and IT needs

Walsh et al. (2010) consider IT usage as a phenomenon that is socially constructed through a progressive IT acculturation process; this process is a cultural learning process resulting from exposure to, and experiences with, IT (Walsh, 2010). To explore the path leading to usage, they propose a construct that they name Individual IT culture (IITC). This construct assesses a pan-national, cross-organizational phenomenon that is a dimension of an individual's identity and is related to an individual's value system, and hence to the individual's culture; it allows the assessment of an individual's level of IT acculturation at a given moment in time. Walsh et al. (2010) investigate users' IT culture by assessing their universal needs satisfied through IT use and their motivations, as the concepts of needs and motivation have been shown to be interrelated with the concept of values (Rokeach, 1973). They show that different users may satisfy different universal needs (which they name 'fundamental') through their use of IT: power needs, affiliation needs, self-accomplishment needs and primary needs. Using self-determination theory (Deci and Ryan, 1985, 2008; Ryan and Deci, 2000) as well as Vallerand's (1997, 2007) work on intrinsic motivation, they also explore the different sub-dimensions of extrinsic and intrinsic motivations to use IT.

The IT culture user profiles (Dodger, Constrained, Disenchanted, Frightened, Disciplined, Dangerous, Passionate, Interested and Studious) that result from their study are shown to be clearly linked to IT usage: the more IT acculturated the users are, the more their fundamental needs are satisfied through IT usage, the more developed are their needs for IT and the more self-determined their IT usage becomes. As they become more and more IT-acculturated, individuals develop perceptions of certain new needs (IT needs) that are different, yet linked to, those fundamental and common to all human beings. The IITC construct is shown to be related to different levels of user IT needs. These IT needs are perceived by users; they may be fulfilled, or not, and will influence IT usage, directly or indirectly.

In particular, these authors show that three types of IT needs (global, contextual and situational) emerge, as perceived by users. 'Global IT needs' refer to any IT, the term 'IT' being used generically; these are needs for IT in most aspects of everyday life. One could do without IT but not without discomfort and, if one has the choice, one would prefer not to do without IT. Global IT needs, thus, represent the perceived overall need for IT in one's everyday life beyond any immediate practical need. Contextual IT needs are related to the context (work, leisure, etc.) that is being investigated – e.g., the need for IT in order to meet the overall requirements of a job in a given organization. Situational IT needs are task-related and may be investigated in relation to some specific IT in a given situation; they are needs for some specific IT that is proposed to the user in order to fulfill some given tasks, e.g., the need for a new Enterprise Resource Planning (ERP) system to fulfill customers' expectations, or the need for an e-learning platform to promote professor–student exchanges.

The main concepts developed by Walsh et al. (2010) and called upon in the present study are summarized in Table 1.

Walsh (2009) includes the three identified types of IT needs (global, contextual and situational) within a single construct. These IT needs, however, appear to impact on different levels of generality, i.e., personality, life domains and situations (Vallerand, 1997, 2001). Therefore, in our understanding, these three types of IT needs should not be studied as a single construct. Furthermore, relationships between the three types of IT needs are not stated clearly in Walsh et al.'s (2010) work and require further investigation – as do the relationships between the users' IT culture, the various IT needs constructs and IT usage.

Table 1
The various concepts called upon in the present study.

Concept	Acronym	Definition
Individual IT culture	IITC	A dimension of an individual's identity. It assesses the individual's level of IT acculturation through the fulfillment by IT use of universal needs and through motivations to use IT
Global IT needs	GLOBITNEE	The perceived overall need for IT in one's everyday life beyond any immediate practical need (IT = generic term)
Contextual IT needs	CONITNEE	The context-related perceived needs for IT, e.g., in order to meet the overall requirements of a job in a given organization (IT = generic term)
Situational IT needs	SITITNEE	The task-related perceived needs for some specific IT in a given situation

As we did not find sufficient elements in the literature to allow us to draw up a research model that explains usage and involves the various concepts called upon in the present study (see Table 1), a GT framework imposed itself on the present exploratory work. While using Walsh et al.'s (2010) work as grounding for our own, we instead chose to follow the same path as Vallerand in his various ongoing works on motivation and propose to study the three types of IT needs separately and not as a single construct.

3. A mixed-method grounded theory design

In this section, we detail our research design that was not set at the beginning of our study; this instead emerged as our research was conducted, and was guided by the emerging theory.

3.1. The GT framework

If one does not take into account any paradigmatic consideration, two main distinct variants of the GT framework may be found in the literature. One of these variants is favored by Glaser and the other by Strauss (Melia, 1996; Urquart et al., 2010), with main disagreements involving coding issues and the role of extant literature. Our stance is closest to Glaser's but – beyond any difference of opinion between Glaser and Strauss over the years, and if one goes back to their original (1967) common work – Urquart et al. (2009) showed that four main characteristics should be found in a GT study: (1) emergence of both research design and outcome must be rooted in data and not preconceived/imposed on data; (2) constant comparative analysis of the data must take place, i.e., data are constantly compared to previously collected and analyzed data, looking for similarities and differences to help toward conceptualization and theorization; (3) there must be theoretical sampling, i.e., sampling is directed by the emerging theory and continues until the saturation of concepts, categories, properties and relationships; and (4) the ultimate aim of GT must be theory building, substantive or formal theory, i.e., discovering and constructing (rather than verifying) theory is the end purpose of a GT study.

3.2. A mixed-method approach

In his 2008 work about quantitative GT, Glaser uses Lazarsfeld's work and his techniques of quantitative analysis for discovery. Lazarsfeld "insisted on the combining of qualitative and quantitative analysis" (Glaser, 2008, p. 6), leading to a mixed-method approach. A mixed-method design includes different quantitative and/or qualitative methods, which combine with and supplement each other within a single project. In our work, we did not use qualitative data and methods to draw hypotheses that we verified through quantitative data and methods; this would be what we understand to be a multi-method approach (Morse, 2003). In our research, neither qualitative nor quantitative data/methods were sufficient in themselves to theorize; all were necessary. This article combines qualitative and quantitative data and research methods in a mixed-method GT approach.

We used both secondary data (from the existing literature) and primary data (collected for the present study). When we collected primary data (quantitative and/or qualitative), we did so as we needed them to move the emerging theory forward and also to allow for triangulation. Qualitative data were collected when we needed rich description of the emerging relationships between concepts. Quantitative data were collected when we needed to move back from details and obtain a synthetic perspective to move away from our substantive area of investigation and along the path toward formal GT – i.e., toward finding a theory that reaches beyond any substantive area (Glaser, 2007). All data (qualitative and quantitative) were analyzed as one set.

3.3. Study context, sample and data collection

The software that we more specifically investigated is an open source e-learning software platform, Moodle (Modular Object-Oriented Dynamic Learning Environment), which may be used by both professors and students in third-level education and training contexts. We investigated the use of this platform in a European business school, where this software is mostly used as an exchange platform for professors and students. Professors can (if they wish) upload their class materials. Their students have direct and unlimited access to this, and can download what they need. The platform also allows student to submit assignments, and grading may be done online by the professors. It also provides facilities for instant messaging, and online news, announcements, timetable details, etc. The use of the platform is not institutionally mandatory but its use is presented as a great help for both students and professors in fulfilling their tasks; it is, therefore, strongly recommended by administrators for both professors and students. "Well, it's on Moodle, you can find it for yourself" is a recurring answer from some administrative staff when either students or professors ask questions. Most full-time professors use it at least to provide course materials, and students may feel compelled to use it to gain access to these materials, although they could also obtain them from other students if they do not want to use the platform. Some professors might, however, insist that students upload their homework on the platform in order to obtain grades.

Our sampling was guided by the emerging theory. Information about our theoretical sampling is provided in Appendix A (A1 for quantitative slices of data, and A2 for qualitative slices of data).

The slices of quantitative data were collected through surveys administered at the end of a school year (June 2012). Therefore, the participants in these surveys (see Appendix A.1) had had the opportunity to directly access the investigated exchange platform for a significant amount of time (at least two semesters) and had been offered voluntary training sessions at the beginning of each semester.

The qualitative slices of data were collected through interviews conducted between September 2011 and September 2012 with both students and professors. As we were part of the institution investigated, we also used participant observation. We used Walsh et al.'s (2010) typological work to guide us in our theoretical sampling. We identified users that fitted some of the ideal types highlighted by Walsh et al. (2010) (see Appendix A.2). More interviewees than the seven we report on were involved; we retained for the present study and report on only those users whose IT culture profile we could identify with sufficient precision, and who were different in terms of age, nationality and background to allow for different perspectives. Professors who were interviewed were colleagues that we worked with, sharing classes, chores or research projects (but not the present one) with them. Students who were interviewed were those with whom we had an above-average amount of exchanges as we supervised their master's degree dissertations. Interviewees were treated as case studies rather than as simple interviewees. For the first slice of qualitative data, several extensive interviews were conducted with each interviewee between September 2011 and May 2012; notes were taken and memos written up.

Two surveys (one for professors and one for students) – very similar but with some questions adapted to the different end-users – were put online, and emails were sent to faculty and students to invite them to respond in May and June 2012. Emails were sent to 375 faculty members (85 full-time professors and 290 part time professors) and 1076 students. 84 professors and 198 students answered the surveys, i.e., the response rates were respectively 22.4% and 18.4%. All received answers were used, and no outliers removed. We verified our results with early and late respondents' data with no significant difference. This indicates that non-response bias should not be a problem in the quantitative data collected for the present study (Armstrong and Overton, 1977).

Illustrations and examples of the coding procedures of the qualitative data may be found in Appendix B. Quantitative data were analyzed with the help of Partial Least Squares (PLS) Structural Equation Modeling (SEM), applied in an exploratory manner. The transcripts of the qualitative data were hand-coded a number of times and sorted out on a table (see Appendix B.1), in parallel with our quantitative investigations. After we had started to explore our quantitative slices of data, together with the qualitative data already collected, we conducted further interviews in July and September 2012 with the seven participants theoretically sampled for the present study, in order to verify our interpretation of the qualitative and quantitative data already collected and to expose this to their perspectives. These last interviews with each interviewee were recorded and relevant elements transcribed. During these, and only then, we briefly described to interviewees details of the research that was being conducted, and also introduced them to such terms as 'IT acculturation' or 'IT culture' and the distinction we drew between the two terms "IT utilization" and "IT use", which follows Walsh's (2010) definition of these two terms.[2] Had we not done so, and as these terms were part of our own vocabulary, we risked biasing their answers through the way we asked our questions. Also as some respondents were of different nationalities and spoke different native languages (see Appendix A.2), some of the interviews were conducted in English and others in French. In order to translate adequately important words such as "usage" and "utilization" from one language to the other, the meaning of the terms used had to be fully understood by respondents, and our interpretations/translations verified. We, therefore, chose to inform interviewees about the meanings we attribute to these terms in order to avoid misinterpretation on our part of the qualitative data collected. Further notes were made and memos were again written up immediately after these last interviews took place as, in most instances, these final conversations continued after the interviews were recorded. Qualitative data were first open-coded on concepts (e.g., IITC, utilization, global IT needs, contextual IT needs, and situational IT needs) and then theoretically-coded in terms of the relationships between these concepts (e.g., individual IT culture → global It needs, position → contextual IT needs, situational IT needs → utilization) (see Appendix B.2).

Secondary data (from the literature), primary data (collected for the present study), quantitative data (collected through surveys) and qualitative data (collected through interviews and participant observation) – were analyzed together and, in a critical realist stance, we opted for the relationships between concepts that appeared to best fit our whole data set, while considering at the same time broader perspectives reaching beyond our substantive area, in order to start driving toward formal GT.

In order not to confuse the reader, and although many different paths were investigated that are not reported on due to space allocation, we present in the results section only the final models that emerged from and were congruent with our whole data set. As quantitative and qualitative investigations and analyses were done simultaneously, while taking into account all data as one set, and constantly comparing and analyzing all data as they were collected (see Fig. 1), we justify our models with previous works from the literature and/or quotes from interviews, and/or quantitative reports. Using mixed methods allowed us to avoid the "Texas sharpshooter approach"[3] (Biemann, 2012), a bias that plagues many quantitative studies and that results mostly from their authors' quest for publication (Biemann, 2012).

[2] "We define IT-utilization as the actual, objectively assessed, use of an IT, and IT-usage as a socially constructed ... phenomenon." (Walsh, 2010, p. 8)

[3] "The fabled 'Texas sharpshooter' fires a shotgun at a barn and then paints the target around the most significant cluster of bullet holes in the wall. Accordingly, the Texas sharpshooter fallacy describes a false conclusion that occurs whenever *ex post* explanations are presented to interpret a random cluster in some data." (Biemann, 2012, p. 2)

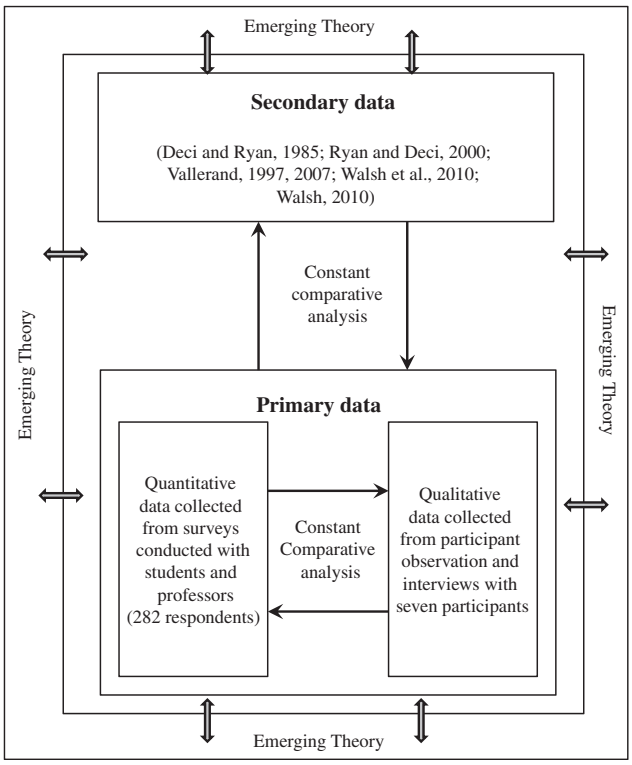

Fig. 1. Using all our data as one set.

Throughout the present research, we openly remain in an exploratory stance and iterate between all data. For instance, some relationships were investigated and confirmed through quantitative methods with our substantive quantitative data set, but we did not retain nor report on them as they did not make sense in our complete data set. Conversely, some other relationships that were not completely confirmed through our quantitative data are discussed, as – from information obtained through our qualitative data set – they could be important for further research in other substantive areas with different, and less specific, targeted sampling.

3.4. Quantitative measures

All research variables were quantitatively modeled as reflective using multi-item Likert-type scales (ranging from 1 = 'not true at all' to 7 = 'completely true'), except for the variables POSITION, IITC and UTILIZATION.

Reflective measures for the constructs global IT needs (GLOBITNEE), contextual IT needs (CONITNEE), and situational IT needs (SITITNEE) were developed specifically for the present study (see Appendix C). To ensure content validity, we used qualitative data from the interviews that were conducted, as well as Walsh et al.'s (2010) qualitative GT work and its detailed online coding appendices. Reflective measures for ease of use (EOU) and usefulness (U) were adapted from Davis (1989). Benbasat and Barki (2007) stressed the "need to make sure usefulness is measured beyond perceptions where possible" (p. 216). The perceptual aspect of usefulness was minimized, as we studied usefulness and ease of use as assessed by users after they had had time to be trained and to test and access the investigated software for a significant period of time.

The control variable POSITION was dummy-coded ('Professor' = 1 and 'Student' = 2).

For the IITC construct, we used as a starting point the measure proposed by Walsh (2009) and verified by Von Stetten et al. (2011), which we aimed at improving. We modeled IITC as a first-order reflective, second-order formative construct (see Appendix C), and followed the guidelines provided by Diamantopoulos et al. (2008). The first-order latent reflective variables we started with were accomplishment needs satisfied through IT usage (ACCNEE), affiliation needs satisfied through IT usage (AFFNEE), primary needs satisfied through IT usage (PRIMNEE), power needs satisfied through IT usage (POWNEE), intrinsic motivation to know IT (INTMOTKNO), extrinsic motivation to use IT through identified regulation (EXTMOTID), and extrinsic motivation to use IT through external regulation (EXTMOTEX). The items of this last construct were worded negatively and had to be reverse-coded to obtain the new variable REV_EXTMOTEX. However, Von Stetten et al. (2011) found that this sub-construct – proposed by Walsh (2009) – did not have a significant influence on IITC. We verified and confirmed this point in our preliminary investigations and did not include this sub-construct in the final measurement model of IITC, as we found theoretical reason not to do so: if one considers the self-determination continuum proposed by Gagné and Deci

(2005), all sub-constructs of IITC are on the positive end of this continuum except for the questioned variable EXTMOTEX, which rather appears to capture some elements of amotivation (Pelletier et al., 1997). Even recoding and inverting this variable does not solve this theoretical issue, as it has not been proven that amotivation is the reciprocal function of motivation. This is why we chose not to include this sub-construct in the IITC measurement model. Measures of the other dimensions were adapted to improve reliability – and content validity was ensured through the study of various scales in the psychosociological field of research, which we adapted for our purpose.[4]

Concerning the assessment of use, there is a lack of consensus in the literature on how to measure system usage/utilization – and a vast array of measures for it, as highlighted by Burton-Jones and Straub (2006). Wu and Du (2012) categorized the existing measures found in the literature as actual usage, reported usage, and measured usage. Actual usage (e.g., the measures used by Devaraj et al., 2008, or Venkatesh et al., 2002) involves objectively collected measures – computer logs, for instance. The other two categories (reported and measured usage) imply subjective self-reported measures. Reported usage (e.g., the measures used by Adams et al., 1992; Keill et al., 1995; Taylor and Todd, 1995) involves measures of duration and frequency that aim at objectivity even though these measures are reported by the users themselves: for instance, the number of hours spent on a system per day. Assessed usage (e.g., the measures used by Davis, 1989; Igbaria and Parasuraman, 1989; Karahanna et al., 2006) involves ordinal measures of intensity and extent, the ordinal scale being the main element of differentiation of this type of assessment. Over the years, other elements of differentiation that involve the user's subjective cognitive abilities were added. As a result of their investigations, Wu and Du (2012) propose the use of rich measures of assessed usage through multiple dimensions that mix different measures. Originally, we had wished to assess IT utilization as defined by Walsh (2010) – i.e., "the actual, objectively assessed, use of an IT". As actual measures extracted from computerized reports were vetoed by our faculty, we opted for self-reported ordinal measures of utilization (see Appendix C). We included in our measure of utilization the number of functionalities used that assessed the extent of utilization (UT_FUNCT), and the frequency of utilization that assessed the intensity of utilization (UT_FREQ). We also wanted to assess the type of utilization – i.e., whether users' perception of the platform led them to a self-determined or constrained utilization (variable UT_TYPE). For instance, if a user goes on the platform "as little as possible" or only when they feel "it is absolutely necessary", their utilization might be considered closer to mandatory than voluntary, and with differing degrees of self-determination. We, therefore, specifically developed for the present study a three-dimensional formative measure of utilization that included the dimensions UT_TYPE, UT_FREQ, and UT_FUNCT. The construct UTILIZATION was specified as formative, since changes in any of the three indicators would lead to changes in utilization but, conversely, a change in utilization does not imply a change in each of the three indicators.

All measures were pretested with 25 students in a postgraduate class and with a selected sample of 20 faculty members, in order to obtain comments and feedback before the pilot test was finally conducted. After the pretest, the wording of some items was readjusted, and one item deleted from three of the reflective scales (EXTMOTID, GLOBITNEE and CONITNEE) in order to improve reliability; these three scales were, thus, reduced from three to two items each. As these scales were for reflective constructs and we aimed at a parsimonious instrument, this was deemed acceptable.

The measurement models, as well as the relationships between all variables, were analyzed using a PLS approach, and bootstrapping as a resampling technique (500 random samples), to generate t-statistics (Chin, 1998). We used the SMARTPLS software (Ringle et al., 2005). PLS analysis was preferred because it does not require data with a normal distribution (Fornell and Cha, 1994), and it supports both reflective and formative constructs (Gefen et al., 2000). It was also preferred because our research objectives were exploratory (Gefen et al., 2011; Hair et al., 2012; Ringle et al., 2012). PLS analysis is particularly suitable in situations of high complexity, with low theoretical information (Jöreskog and Wold, 1982): we had an important number of variables and little theoretical backup on the relationships we wanted to investigate. Another advantage of the PLS approach is its ability to work with small sample size (Ringle et al., 2012; Urbach and Ahlemann, 2010).

Elements related to the validity and reliability of the final quantitative instrument are provided in Appendix D, together with all relevant preliminary analyses conducted with the quantitative data related to our main emerging model.

4. The emerging research models

As advised by Glaser (1978, 2008), we let our data "speak" and guide the emerging theory. The propositions highlighted in this section could not have been developed if all data had not been interpreted as one set, and if both qualitative and quantitative methods and analyses had not been applied in combination.

Our stance is critical realist (Bhaskar, 1979; 1989; 1998; 2002). Although a debate about critical realist precepts is beyond the scope of the present article, before we present our models and propositions, it is, however, essential to clarify what causality is for a critical realist. The notion of causality as a "generative mechanism" is a core and defining feature of critical realism (Bhaskar, 2002). Generative mechanisms are best understood as "tendencies", as their activation is highly context-dependent (Bhaskar, 2002). In contrast with the Humean vision of causality ("A causes B"), commonly accepted in IS traditional quantitative positivist circles, a generative mechanism can be reformulated as "A generates B in context C"

[4] The investigated scales were: the determination scale (Sheldon et al., 1996), basic psychological needs satisfaction scales (currently being researched by a team of researchers including Deci and Ryan), global motivation scale (Guay et al., 2003), and the fundamental needs satisfaction scale in the context of sports (Gillet et al., 2008).

(Cartwright, 2003; Smith, 2010). For a critical realist causality is, thus, a process of how causal powers are actualized in some particular context: a process in which the generative mechanisms of that context (C) shape (modulate, dampen, etc.) the particular outcomes. For instance, building on Tsang and Kwan (1999)'s example, a car will drive adequately if it has four wheels and an engine, but only if somebody also turns on the ignition and a nail does not puncture one of its tires. Therefore, the arrows in the diagrams proposed in this section do not illustrate causality as traditionally understood; they illustrate the activation of causal powers as revealed in the substantive area (the use of the Moodle platform by students and professors) and the context (a European business school) that were investigated. The paths that are reported in the models summarized in Figs. 2 and 3 are those that best fitted our set of data (qualitative and quantitative) within the substantive area and the context that were being investigated. Where possible, however, we used a reflexive approach and extended our results in order for them to be applied in further research in other substantive areas and contexts. When we understood the collected data as sufficient to demonstrate that a proposition would apply whatever the substantive area and context investigated, we added the word 'mostly' in the wording of the corresponding proposition. 'Mostly' is, however, used only as a heuristic device, and should not be taken at face value. It means that, based on the data we collected, the proposition appears to extend to other substantive areas and other contexts beyond those researched for the present study; this would, of course, need to be verified in further research. When 'mostly' is not used in the wording of a proposition, it indicates that the corresponding proposition may hold true only within our substantive area and investigated context.

As our main concern was to investigate the path between users' individual IT culture and their utilization of the e-learning platform, and how the various constructs related to their perceived IT needs (global, contextual and situational) fitted in this path, we first describe in this section the new path to IT use that we propose through these new concepts (see Fig. 2). We then embed one of our newly defined variables in the TAM nomological framework (see Fig. 3) to position our work with respect to past literature.

Qualitative and quantitative analyses were embedded, and our results emerged through constant iterations between quantitative and qualitative data as they were collected and through the analysis of all our data as one set. Therefore, for each model, we present our results in a logical sequence that relates our findings as closely as possible to how they were arrived at.

For each proposition, we detail elements from the literature (if available) and/or qualitative clues that led us to it. To avoid unnecessary length, we cite only when needed some verbatim that we consider as most illustrative for our arguments. Further examples of collected qualitative data are provided in Appendix B.2. We also report on the quantitative results that were obtained as we explored the various quantitative paths between the newly defined variables. We report on these through (i) the standardized coefficients β of the investigated paths, which indicate the strength of the relationships between each pair of variables, and have values between 0 and 1, (ii) the significance of these paths, obtained through the bootstrapping

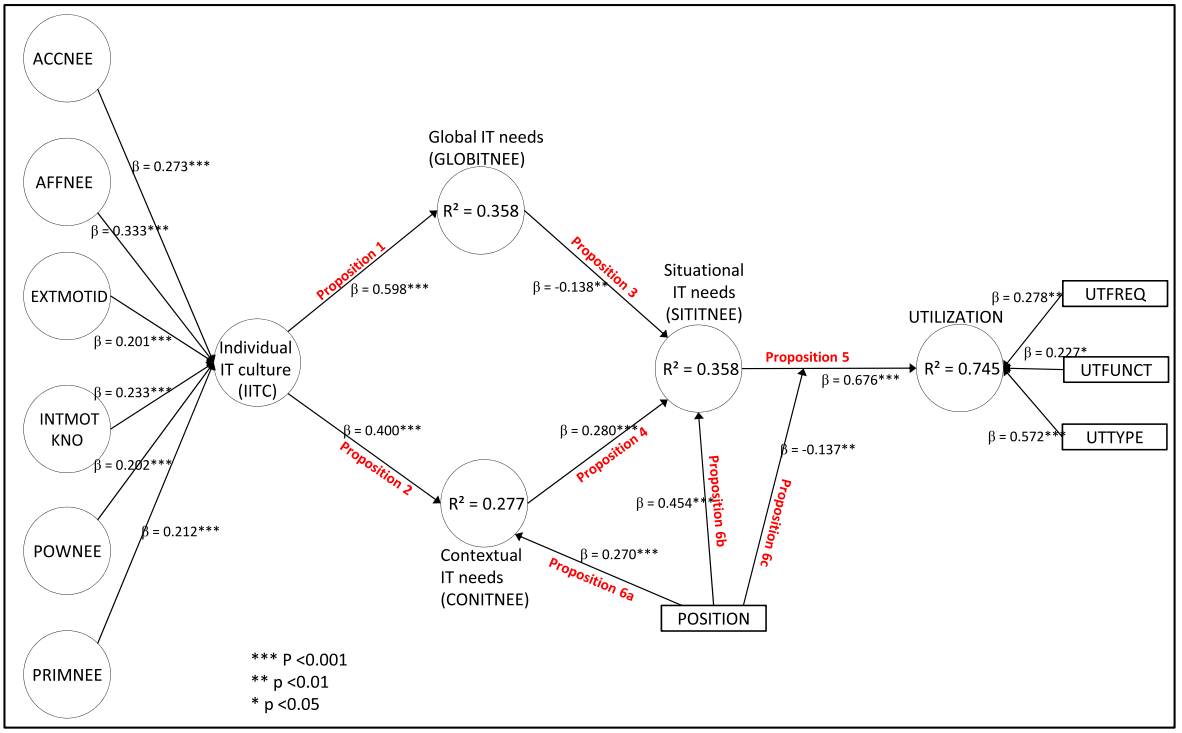

Fig. 2. A new path to IT use.

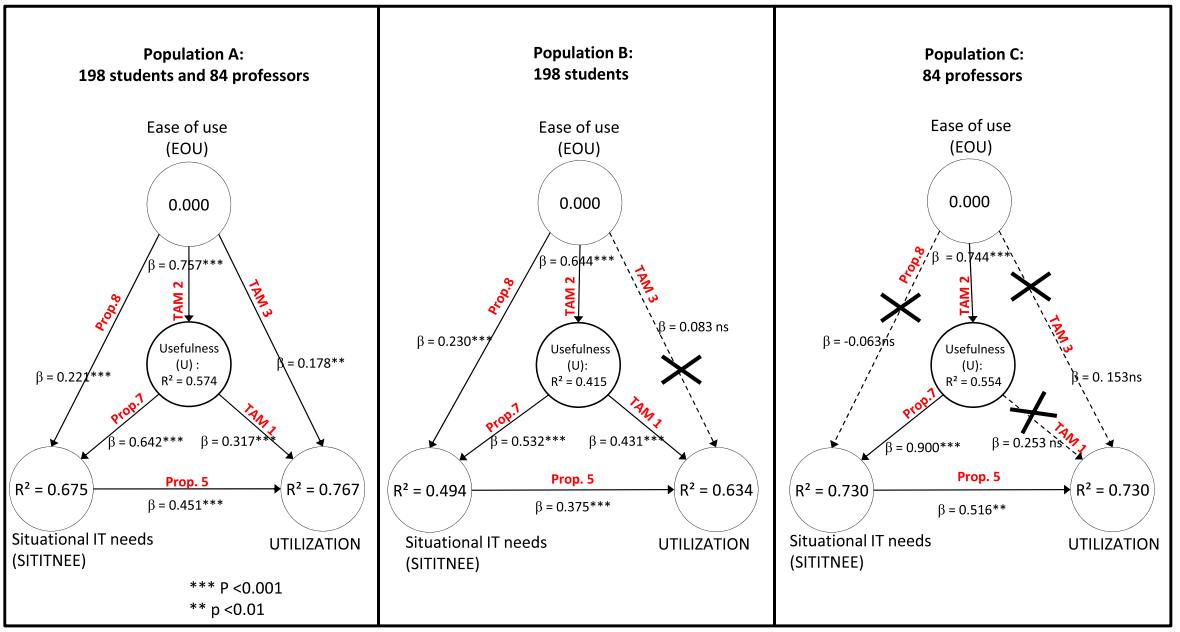

Fig. 3. Situational IT needs and the TAM constructs. (Dotted lines in the diagrams indicate the paths that were not confirmed as significant. Full lines indicate paths confirmed as significant.)

procedure and expressed by the probability p that the hypothesis underlying this path might not be verified, and (iii) the R^2 values for each variable, which inform us how much of its variance is explained by its antecedent(s).

4.1. A new path leading to the utilization of a specific IT

We first summarize the proposed model that emerged from our data. We then detail each of our propositions and report on the elements (in our whole data set) that lead us to it.

We included the variable POSITION in this model as, due to the sample size of the professor population (84), we could not quantitatively test the model separately in each of the three populations: full population, student population, and professor population (Barclay et al., 1995; Chin, 1998; Urbach and Ahlemann, 2010).

With the help of our whole data set, we found that individual IT culture mostly positively influences the global IT needs perceived by users (Proposition 1). In our substantive area and investigated context, individual IT culture also happened to positively influence the contextual IT needs perceived by professors and students (Proposition 2). Both global IT needs and contextual IT needs were found to mostly influence the situational IT needs perceived by users for a given IT proposed in their work context and supposed, by deciding instances, to be of some help in fulfilling some of the users' tasks (Propositions 3 and 4). These perceived situational IT needs in turn mostly significantly explain the use of this IT (Proposition 5). The position held by an individual within an organization will mostly influence their contextual and situational IT needs (Propositions 6a and 6b); in our substantive area and investigated context, it also moderated the effect of the perceived situational IT needs on the actual utilization of the investigated IT (Proposition 6c). These elements are graphically summarized in Fig. 2, together with relevant quantitative results.

Proposition 1. *Individual IT culture mostly has a positive influence on the individual's global IT needs.*

Walsh et al. (2010) found three main attitudinal user groups (proactive, passive and refusal). These groups include different user profiles, with differing degrees of IT acculturation. These authors found that the most IT-acculturated users are proactive. They are perceived by managers as having a facilitating influence during the implementation of new IT in organizations. They are also those users with high levels of global IT needs, whereas passive users have lower levels of global IT needs and refusal users have none.

This link between users' level of IT acculturation and their global IT needs also emerged through our qualitative data. For example interviewee S1, who is a mature research master's student and also the CEO of an IT consultancy firm, claimed: "For me, there is a clear link between an individual's level of IT acculturation and the need they perceive for IT in their life."

In our work, we quantitatively assessed respondent's level of IT acculturation through their IITC score. This score includes measures of universal needs fulfilled through IT use; we saw that specific needs result from the fulfillment of universal needs. We, therefore, quantitatively investigated the path IITC → GLOBITNEE and found: $\beta = 0.598$, significance: $p < 0.001$, R^2 for GLOBITNEE = 35.8% (see Fig. 2 and Appendix D.1).

Proposition 2. *Individual IT culture has a positive influence on contextual IT needs.*

Walsh et al. (2010) found that the users who were highly IT-acculturated also had high levels of contextual IT needs.

When we investigated the path IITC → CONITNEE, we found $\beta = 0.400$, significance: $p < 0.001$ (see Fig. 2 and Appendix D.1).

However, this path was investigated with quantitative data obtained within an academic context and a highly-computerized organization. Some elements resulting from our qualitative data set alerted us. For instance, interviewee P4 is a young assistant professor with a couple of previous teaching experiences and who has started a new job in X school; she grew up in a computerized home environment with a father who is an IT engineer. She told us:

> "I certainly could not do my job in X school without IT. This was not the case in my previous institution, although I personally feel I need IT to do my job as a professor [...] for instance, it's the first time I have been asked to use PowerPoint slides to teach. In my old school, nobody ever used PowerPoint."

Thus, this professor did not perceive the same contextual IT needs when she thought in an old-fashioned, IT-conservative university as when she teaches in a forward-looking, highly-computerized university. This more generally suggests that the same person with a given level of IT acculturation may perceive different contextual IT needs, depending on the organization they work in.

In the wording of the items for the construct of contextual IT needs (see Appendix C), it is quite clear that we specify the organization that we refer to. Therefore, in the present study, the influence of the organization is included in the construct of contextual IT needs and explains why this path was quantitatively supported; it might not be so in a different organization and Proposition 2 might not extend to other substantive areas and other contexts. This is the reason why we did not include the word 'mostly' in this proposition.

Proposition 3. *Global IT needs mostly influence situational IT needs, positively or negatively.*

Vallerand (1997, 2001) showed that motivation at the situational level results from the effects of both global motivation and "social factors at the appropriate level of generality" (Vallerand, 1997, p. 275). Hence, both global IT needs and the position held by an individual should influence situational IT needs. Both paths GLOBITNEE → SITITNEE and POSITION → SITITNEE were investigated with our quantitative data set. The latter path is reported on below. As for the former path ($\beta = -0.138$), its significance was confirmed ($p < 0.01$): see Fig. 2 and Appendix D.1.

However, this negative path (i.e., the more users perceived high global IT needs, the less they perceived situational IT needs for the platform) appeared to contradict the literature and we could not make sense of it until we investigated our qualitative data set. Interviewee P2 – who is a young IS assistant professor, obviously highly IT-acculturated and very dependent on IT in her day-to-day life – helped us to start understanding this negative path: "I have fairly important IT needs; for example, I have several computers and I need always to be connected through the web. When I travel abroad, I remain connected even if it costs me a lot of money [...]. You evaluate the platform and how it helps you fulfill needs linked with your responsibilities. I found that Moodle helped only with uploading the files that I wanted the students to have, and I found other functionalities inadequate, so I use the platform only minimally. I think that those who are less 'hooked' on IT will probably utilize the platform for all the functionalities that were shown to them without wondering if and how they could do better. As I know a lot about IT, I am more demanding than the average person with little experience."

While further investigating our qualitative data, we confirmed that those users who were highly IT-acculturated and had high global IT needs were often more demanding than other users. For instance, interviewee P5 (an associate professor, in his own words "addicted to IT") was quite open about this: "Globally, I have high IT needs [...] I think I am more demanding because I know about IT. I'll easily move to some other software if I don't like the proposed software." Interviewee P5 provided us with further clues: "I have used this type of platform before and I know it can be very helpful. When they told me about it, I was curious and very willing to try it [...] I need this kind of tool, but if I see that the specific tool at my disposal does not fulfill my needs, I don't utilize it! If it's only to share slides with students, it's easier to use a 'drop box' ..." Thus, P5 needs the type of platform that is proposed but not really the specific platform we are investigating, which he will probably use very little (if at all), as he finds that its proposed functionalities are very limited or do not fit the needs he perceives for this type of tool.

Thus, if individuals have strong global IT needs, they will most probably welcome any specific software supposed to be of help for their given tasks: they will be ready to try it out. These users with high global IT needs are, however, quick to find out about software's possible shortcomings. If these are not corrected, they consequently will need it less because they know possible better alternatives and are more inclined to dismiss it.

Therefore, global IT needs will, indeed, influence situational IT needs, but they will do so either positively or negatively.

Proposition 4. *Contextual IT needs have a positive influence on situational IT needs.*

We found no element in the literature that linked contextual IT needs and situational IT needs. In the substantive area and context investigated, we found through our quantitative data set and analyses that contextual IT needs, resulting partly from the organization's IT needs (Urwiller and Frolick, 2008) and partly from the user's level of IT acculturation, will affect an individual's IT needs at the situational level (CONITNEE → SITITNEE: $\beta = 0.280$, significance: $p < 0.001$; see Fig. 2 and Appendix D.1).

If individuals perceive that they have a high need for IT to do their job within a given organization, it is reasonable to think that they will be more inclined to perceive situational IT needs for a specific IT that is presented to them as a help to fulfill some of their tasks. For instance, interviewee S2 – who is just finishing an Executive Master of Business Administration (EMBA) course – told us: "The link between the need for IT that I perceived as related to the school where I did my EMBA, and the need for the specific tool that was proposed to help us in our tasks as students is significant [...]. It was made clear to us, from the beginning of the course that we were supposed to be IT-proficient."

Prior research on user participation often assumes that communication between users and developers ensures that systems implemented in organizations are designed to meet users' situational IT needs (Gallivan and Keill, 2003). However, this communication process is not always successful (Gallivan and Keill, 2003). Furthermore, most software in organizations are still chosen and validated by managers to fit their own managerial IT needs, regardless of users' IT needs (Walsh et al., 2013). It is, therefore, possible that end-users might consider some proposed software as not needed while, at the same time, perceiving the need for IT in their work context. Therefore, and as we did not have enough information on this path to extend it beyond our substantive area and investigated context, we did not add the word 'mostly' to Proposition 4.

Proposition 5. *Situational IT needs, related to some specific system or software, mostly have a positive influence on the use of this specific system or software.*

If users perceive needs for some specific IT in order to fulfill given tasks, they will be driven to fulfill these needs (Maslow, 1954) and hence use this specific IT. This was confirmed through our quantitative analyses when we tested the path SITITNEE → UTILIZATION ($\beta = 0.676$, significance: $p > 0.001$; see Fig. 2 and Appendix D.1).

Proposition 6a. *The position held by an individual within a given organization mostly affects the individual's contextual IT needs.*

Post et al. (1999) show that organization size and users' academic education influence the level of users' contextual IT needs. We also found through our qualitative data that the position held by individuals does impact their contextual IT needs:

> "I have done several summer jobs during my studies – from stable work with horses, through factory work, to helping candidates in local elections; obviously, I did not have the same needs for IT in all these jobs. It is probably in my current teaching position that I need IT the most" (interviewee P4).

Whether one is a gardener or a secretary within any given organization, would most probably lead to the perception of different contextual IT needs within this workplace.

As we investigated the path POSITION → CONITNEE we found through our quantitative data that this also applied to professors and students in our substantive area and investigated context ($\beta = 0.277$, significance: $p > 0.001$, R^2 for CONITNEE explained by IITC and POSITION = 27.7%; see Fig. 2 and Appendix D.1).

Proposition 6b. *The position held by an individual within an organization mostly affects their situational IT needs.*

The individual's position will define the tasks that they must accomplish and will, therefore, influence their needs for a specific piece of IT. For instance, in a given firm, a typist will most probably feel less need for some customer relationship management (CRM) software than commercial staff in the same firm.

This was congruent with quantitative results when we tested the path POSITION → SITITNEE ($\beta = 0.454$, significance: $p < 0.001$, R^2 for SITITNEE explained by CONITNEE, GLOBITNEE and POSITION = 35.8%; see Fig. 2 and Appendix D.1).

Proposition 6c. *Position has a moderating influence between situational IT needs and utilization.*

In our qualitative data set, some highly IT-acculturated professors recognized the need for Moodle (or at least for this type of platform), but still chose to use it minimally because they found it was not 'user-friendly' (see quotes from interviewee P2 above) and that its use was time-consuming. Other professors perceived the need for it but still chose not to use it. For instance, interviewee P1 – who shares his time between consulting and teaching in business schools, and who feels, as he says so himself, "constrained to utilize IT" – clearly states: "I teach in several schools and I am not very much into IT. If I were to get used to all the different IT tools in the different schools where I teach, it would take me hours that I don't have. Unless I am 'officially' obliged to utilize a platform, I will not do it even if I need it [...] even if it would make my exchange with the students somehow easier." But students have less freedom of choice: if a professor requires them to log in and upload their homework, they have to do so in order to obtain grades: "If professors utilize the platform, we are more-or-less obliged to do so [...]. When we first attended your class, we did not realize that we had to upload our homework on Moodle; to gain time, some thought they could give it to you during class, but we soon realized [after receiving the first grades] that we had no choice and had to utilize Moodle" (interviewee S2).

Hence whether a user is a teacher or a student – i.e., the variable 'POSITION' – obviously has some influence on utilization.[5] In order to decide whether to propose a direct influence of position on utilization or a moderating influence on the path

[5] Whether the user feels the use of the platform is truly voluntary or, rather, mandatory also appears to have an influence. Originally, we had included in our framework variables to measure mandatory and voluntary use, but we found that the variable POSITION brought a richer understanding of our substantive area and context. The complementary information brought by these other variables did not justify complexifying the model further.

Table 2
Comparing possible models.

		R^2 for UTILIZATION	F2	F1
	Model without moderating or direct effect of position on UTILIZATION	0.698	**0.184314**	0.05098
Model A	Research model with POSITION as moderator between SITITNEE and UTILIZATION	0.745		
Model B	Model with direct effect of POSITION on UTILIZATION	0.732		

between situational IT needs and utilization, we used our quantitative data set (see Table 2) and carried out quantitative analyses with and without the interaction construct.

We applied Chin et al.'s (2003) recommendations and followed a hierarchical process: we tested the results of two models (A and B) with and without the interaction construct (see Table 2). Based on the hierarchical difference test, the interaction effect F2 was found to have an effect size close to medium (Chin et al., 2003; Cohen, 1988). We, thus, quantitatively found that POSITION moderates the path SITITNEE → UTILIZATION:

$\beta = -0.137$, significance: $p < 0.01$, R^2 for UTILIZATION explained by SITITNEE and moderated by POSITION = 74.5% (see Fig. 2 and Appendix D.1). The explained variance for UTILIZATION is hence substantial.

4.2. Embedding situational IT needs in the TAM nomological framework

We wished to confront our newly defined variables with the existing and well-established TAM constructs, as one could anticipate some conceptual overlap. Among the newly defined IT-need variables, the only one that investigates IT at the same level as the TAM constructs (i.e., the level of a specific IT) is that relating to situational IT needs. We, therefore, investigated the relationships between usefulness, ease of use, situational IT needs and utilization across all three populations: the full population of 282 participants (Population A), and the two sub-populations (Population B = 198 students; and Population C = 84 professors). The TAM-based hypotheses are preceded by the letters 'TAM'. New propositions follow the chronological order used in our main model, described in the previous section.

We found only one of the three TAM hypotheses (TAM2: *Ease of use has a positive influence on usefulness*) supported across all populations, whereas the predictive value of situational IT needs for utilization (Proposition 5) was supported in all instances, as well as the positive influence of usefulness on situational IT needs (Proposition 7). Essential quantitative results[6] are summarized in Fig. 3.

We first mobilized the literature and our qualitative data set in order to position situational IT needs in relation to the TAM constructs.

Proposition 7. *Usefulness mostly has a positive influence on situational IT needs.*

Usefulness (U) is the degree to which a person finds that using the investigated software enhances job performance (Davis, 1989).

A clear link of causality between usefulness and situational IT needs emerged from our qualitative data: "Its [Moodle's] usefulness for some of our classes created the need for it" (interviewee S1). If a person perceives a system as useful to perform some required tasks, then this system will be perceived as needed to perform these tasks.

When the path U → SITITNEE was tested, it was supported across populations A ($\beta = 0.642$, significance: $p < 0.001$), B ($\beta = 0.582$, significance: $p < 0.001$) and C ($\beta = 0.900$, significance: $p < 0.001$).

We also tentatively decided to investigate the path induced by the following proposition:

Proposition 8. *Ease of use has a positive influence on situational IT needs.*

Then, and as the TAM was mostly investigated quantitatively, we used our quantitative data set to test the new model across all three populations. We decided to report on this second model separately from the first, mainly because sample size prevented us from quantitatively comparing an aggregate of the two models across all three populations. The often-cited rule of thumb for minimum sample size, based on the greatest number of predictors involved in the multiple regressions, multiplied by ten (Barclay et al., 1995; Chin, 1998; Urbach and Ahlemann, 2010), gives us a required minimum sample size of 170 participants if we had aggregated the two models. The sample size of our full population (282 participants) was, therefore, not problematic, and nor was the student population (198), but the professor population (98) may have been. In any case, the full aggregate model might well have been excessively complex, and the resulting risk of overfitting could induce the possibility of rendering insignificant otherwise significant paths (Bagozzi, 2011).[7]

After carrying out the various quantitative analyses summarized in Fig. 3, we then further mobilized our qualitative data to make sense of our findings as, during the last interview with the seven interviewees, we had more specifically asked them

[6] In order not to lengthen the present article unduly, and as the TAM constructs are a well-known concern in IS research, we did not include in appendices the traditional reliability and validity results for this second model. Full quantitative results for this model, together with SmartPLS extractions, are available from the authors upon request.

[7] This is also the reason why, as we could not compare our main model across all three populations, we included the variable POSITION in it.

Table 3
Mediating effect of SITITNEE.

Population	Paths	β	P
A (Full)	U → SITITNEE	0.642	<0.001
	SITITNEE → UTILIZATION	0.451	<0.001
	U → UTILIZATION	0.317	<0.001
B (Students)	U → SITITNEE	0.532	<0.001
	SITITNEE → UTILIZATION	0.375	<0.001
	U → UTILIZATION	0.431	<0.000
C (Professors)	U → SITITNEE	0.9	<0.001
	SITITNEE → UTILIZATION	0.515	<0.01
	U → UTILIZATION	Non-significant	

to relate their perceived needs for some software, for instance Moodle, with its usefulness and ease of use – and the use they made of it. We first present each of our propositions. We then proceed to explain them either with elements from the literature (if available) and/or with qualitative clues; we also provide quantitative results.

Hypothesis TAM1. *(Usefulness has a positive influence on utilization)* was not quantitatively verified across all populations. When we investigated the path U → UTILIZATION, we found in Population A: $\beta = 0.317$, $p < 0.001$; in Population B: $\beta = 0.481$, $p < 0.001$; and in Population C: β non-significant.

We propose to replace TAM1 by the following proposition:

Proposition 7b. *Situational IT needs mostly have a mediating influence between usefulness and utilization. This mediation will be total or partial depending on the population investigated.*

The fact that a person finds that a system enhances performance (i.e., is useful) in some respects does not exclude the possibilities that it might, for example, be time-consuming (see quotes from interviewee P1 in the previous section) and they might decide not to use it. Usefulness has been shown a number of times in the literature to be an antecedent to intention to use, but the variance for the actual use of a system (explained by its usefulness) shows great discrepancies from one study to the next (Wu and Du, 2012). In our substantive context, we quantitatively found that – depending on the position held by a user (student or professor) – situational IT needs either fully mediate the relationship between usefulness and utilization in the professor population or only partially mediate this relationship in the student population. If professors feel they do not need the platform, they are inclined not to use it (“Even if I think that some software may be useful, I would only use it if I have [need] to do something with it”: interviewee P1).

However, if students think the platform is useful – e.g., to obtain grades or to collect course material – even if they feel they do not really need it, they might still use it (“Even though my need for the platform is fairly limited, I do use it as it is useful for some courses where the professors bother to use it themselves and put their PowerPoint slides online”: interviewee S1). In the case of the student population, situational IT needs account for some, but not all, of the relationship between usefulness and utilization, since there is also a significant direct relationship between these variables, as evidenced by our quantitative results summarized in Table 3.

In **Hypothesis TAM 2**. (*Ease of use mostly has a positive influence on usefulness*), ‘ease of use’ is the degree to which a person finds that using the investigated software is free of effort (Davis, 1989). This has been shown a number of times in the literature to positively influence usefulness. It was also confirmed by our quantitative analyses in our substantive context, and in our qualitative data: “If some software is easy to use, I would probably find it easier to think it might be useful, but even so I would use it only if I needed it …” (interviewee P1).

Hypothesis TAM3. (*Ease of use has a positive influence on utilization*) was not verified in either the student or professor populations in our quantitative data set. When we investigated the path EOU → UTILIZATION, we found in Population A: $\beta = 0.178$, $p < 0.01$, but in Populations B and C: β non-significant. This was not surprising as the direct influence of ease of use on intention to use or actual use has been questioned in the literature (for a full review and analysis of the literature, see Wu and Du, 2012). We also confirmed this element through our qualitative data: “It is certainly not because any software is easy to use that I am going to use it” (interviewee P2).

We propose to replace the TAM 3 hypothesis and Proposition 8 (*Ease of Use has a positive influence on situational IT needs*) which was not verified across all populations by the following proposition:

Proposition 8b. *Usefulness mostly has a mediating influence between ease of use and situational IT needs. This mediation will be total or partial depending on the population investigated.*

It might be surmised that if a person finds some software easy to use, it is unlikely that this will influence whether or not they perceive this instrument as needed to fulfill appointed tasks (“Whether some software is easy to use or not is irrelevant. It is whether you need it or not that is relevant: if you need it, you use it”: interviewee P4). Hence, it could have been sur-

mised that Proposition 8 should be completely rejected. Our quantitative data set, however, pointed at the fact that this proposition was verified in some populations (Population A: $\beta = 0.221$, $p < 0.001$; and Population B: $\beta = 0.280$, $p < 0.001$): ease of use might help gradually develop situational IT needs if the instrument is perceived as useful and, perhaps, also if it is perceived as mandatory – which appeared to be more the case in the student population (Population B).

Through our quantitative analyses, we found that usefulness either fully mediates the relationship between ease of use and situational IT needs (in Population C: if professors feel the platform is not useful, they will not need it even if it is easy to use) or only partially mediates this relationship (in Population B: if students think the platform is easy to use, this will help build up their need for it).

In the case of the professor population there is, thus, a double mediation (usefulness and situational IT needs) between ease of use and utilization. In the case of the student population, usefulness accounts for some, but not all, of the relationship between ease of use and situational IT needs, as there is also a significant direct relationship between ease of use and situational IT needs.

As a last quantitative test, we removed the variable SITITNEE and tested the TAM with the global population (A) of 282 participants. The resulting R^2 for UTILIZATION was 70.51% – i.e., an insignificant delta of 0.71% (with a worrying common-method variance of 71.97%!)[8] – when compared to the R^2 of 69.80% for UTILIZATION (see Table 2) when SITITNEE is used as the sole explanatory variable for UTILIZATION in the first model (not taking the effect of POSITION into account) without the TAM constructs, and without any worrying issue concerning common-method bias.

5. Discussion

In this section, we discuss our results and their limitations, and investigate what the new proposed path to IT use may bring for future research and for practice.

5.1. The new path to IT use

The main model that we propose (Fig. 2) provides a new path to IT use that explains 74.5% of its variance without common-method bias (CMV = 28.57%). In the reduced model that includes the TAM construct (Fig. 3), the path between the variable SITITNEE and UTILIZATION is verified across the three populations investigated, unlike several other paths that were empirically supported in previous works.

The newly-modeled IT needs variables provide an interesting new path from IT culture to utilization. We have identified one variable (SITITNEE) that has a more robust explanatory power across samples than usefulness (U); we also have identified some of its antecedents (GLOBITNEE, CONITNEE, POSITION) which explain 35.8% of its variance. Understanding what variables influence situational IT needs, and how/if one can act upon these antecedents, are important issues in managerial terms, aiding the strategic alignment of users' and organizations' IT needs. If, for instance, organizational IT needs (Urwiller and Frolick, 2008) are considered significantly high by managers – i.e., reaching the level of "paradigm shifting" (Urwiller and Frolick, 2008) – adequate communication on the subject should be ensured so that prospective users' perceived contextual IT needs are attuned to this managerial vision.

A lot of work, however, still remains to be done to fully explore the new constructs proposed in the present research.

To move this substantive mixed-method GT research toward formal GT, further testing of the explanatory power of the variable SITITNEE and its antecedents is required with different populations of respondents and different IT used in work contexts (e.g., use of an ERP system) and social contexts (e.g., use of a social network). Future research could also focus on testing and enriching our main model using longitudinal data. When the implementation of new strategic IT is considered, the evolution of users' situational IT needs could be assessed in longitudinal studies, for instance before and after training, and/or before and after software upgrading. A quantitative comparison of the resulting scores for SITITNEE (which we would expect to evolve) and resulting effect on usage and usage continuance would be extremely interesting to investigate.

Beyond users' situational IT needs, we propose paying strong attention to its antecedents – i.e., to users' IT culture, and their perceived global IT needs and contextual IT needs. Their direct explanatory power on the intention to use new software would be interesting to investigate. Based on our work, we would hypothesize that, in such a substantive context, users' IT culture and their global IT needs would have a positive influence on intention to use. If one or both hypotheses are confirmed, it would then be interesting to verify the subsequent actual utilization of the software investigated, depending on the level of perceived situational IT needs, once the proposed software has actually been tested by users.

It is also important for research and practice to verify the effects of managerial IT needs and organizational IT needs (Urwiller and Frolick, 2008) – which we would expect to be significant – as well as of organizational IT culture (Kaarst-Brown and Robey, 1999) on the contextual IT needs perceived by users.

With the quantitative data that we collected, we did find that POSITION had a direct effect on the variable CONITNEE, but did not have a moderating influence on the path between IITC and CONITNEE, whereas we would have theoretically expected the opposite. This result could be explained by the fact that our sample of respondents was not sufficiently diversified. In

[8] The problem of common-method bias in TAM studies, has been raised a number of times in the literature. See for instance, Straub and Burton-Jones, 2007; Malhotra et al., 2006; Sharma et al., 2009.

further research investigating an organization, it would be interesting to include all staff and some software available to everyone; or, to widen the scope, one could investigate the same software in several organizations and involve all staff.

To refine and verify our results, we compared the two populations (professors versus students) through descriptive statistics of the two groups (see Appendix E). The mean scores of all latent variables were found to be fairly homogeneous across the two populations, except for the variables SITITNEE and UTILIZATION. The results tended to confirm that many professors did not perceive situational IT needs for the platform; their resulting utilization of it was consequently lessened. Despite the institutionally non-mandatory use of the investigated platform, we found (through our qualitative data) that professors who used the platform had a strong influence on the students' use of it. This fits to an extent with the literature on "subjective norm" (i.e., the social pressure perceived to perform a given behavior: Ajzen, 1991; Davis et al., 1989; Fishbein and Ajzen, 1975; Taylor and Todd, 1995), and its influence on users' behavior. Students were pressurized by some professors to use the platform. If pressure was sufficient (e.g., no grades were awarded if the platform was not used), then students did use the platform (thinking, for instance, that they needed to do so to pass their exams).

The original questionnaire that was administered included some items to assess mandatory and voluntary usage, as these constructs could have been important to explain usage (Venkatesh et al., 2003). In our substantive area and investigated context, we found, however, that the variable POSITION yielded a greater explained variance than when replaced by the other variables. When all variables were included in the model, it yielded a delta in R^2 of 1.5% for UTILIZATION. This was deemed insufficient to justify complexifying the model further. In different contexts – for instance, in firms where many different hierarchical positions might be involved – reintroducing variables such as mandatory/voluntary use might, however, be useful.

Since the measure of utilization we have developed for the present work includes some cognitive and behavioral elements, it might also be interesting to investigate the results obtained with different measures for this construct. Although this is beyond the scope of the present article, we did do preliminary tests while removing the UTTYPE dimension (which includes some cognitive features) from the utilization construct. In this instance also, our results were confirmed – as was the explanatory power of SITITNEE. In future research, further objective measures of utilization, appraised by independent raters, could be combined with the measure we proposed in order to provide an assessment that does not rely solely on users' subjective reports and allows for sharper comparison across samples (Straub et al., 1995; Wu and Du, 2012).

5.2. Ambassador or Nemesis?

Two important results of the present research were counter-intuitive. Had we not conducted a mixed-method research within a GT framework, these results most probably could not have been explained. They resulted from the quantitative investigations conducted with the first model without the TAM constructs: (1) the non-significance of the direct path between IITC and UTILIZATION and, more importantly and (2) the negative path between GLOBITNEE and SITITNEE.

IITC was found to be an important variable in explaining the antecedents of SITITNEE (accounting for 35.8% and 27.7% respectively of the variances of GLOBITNEE and CONITNEE). Based on previous literature (Walsh et al., 2010; Walsh, 2010), one could have surmised a significant direct path between IITC and UTILIZATION. However, this was not the case and, when IT needs were investigated, it was found that users' IT culture did influence their utilization of the platform but only through the mediating effects of IT needs, which is in line with Vallerand's findings about motivation (1997, 2001, 2007) and highlights the importance of these new IT needs constructs.

We could not test our main model across the three populations A, B and C due to sample size, which is one of the limitations of the present study. The construct IITC has a total of 17 indicators, implying a minimum sample size of 170 (Barclay et al., 1995; Chin, 1998; Urbach and Ahlemann, 2010) – and we had only 84 participants in Population C (professors). Beside the general population (Population A), we also, however, tested the main model with Population B (198 students and so over the minimum sample size required of 170). All paths were supported, with the notable difference of the path from GLOBITNEE to SITITNEE being positive. Based on qualitative clues about this path, this was not surprising as 'dissidence' was mostly witnessed through qualitative data obtained from professors.[9] The negative path between GLOBITNEE and SITITNEE was particularly symptomatic of the fact that the software investigated was perceived by very highly IT-acculturated users as not fulfilling their situational IT needs. They judged many of the software's functionalities to be inadequate and uselessly time-consuming. Even though we did not quantitatively assess the fulfillment of perceived situational IT needs, it was made quite clear through our qualitative data that users might be very highly IT-acculturated and have high global IT needs, but not perceive any need at the situational level and choose not to utilize some software proposed within their work context if their perceived situational needs were not satisfied.

The literature has shown that it is essential to take into account the insights of end-users regarding their situational IT needs (Bragge and Merisalo-Rantanen, 2009). Furthermore, Thomson et al. (2011) studied the importance of "ambassadors" or opinion leaders in ensuring the success of new IT implementation and in fostering knowledge-sharing between users. It appears from our results that the highly IT-acculturated users with high global IT needs, who could have been seen as 'would-be' ambassadors, also have high expectations. They, thus, might act as great facilitators if the proposed

[9] As a matter of curiosity, and even though the number of participants in this population was not deemed sufficient, we also tested several times the main model in Population C (84 professors, so less than the minimum sample size required of 170). Depending on the bootstrapping procedure, the path between GLOBITNEE and SITNEE was or was not confirmed as significant, but it was always negative.

software satisfies their situational IT needs. Previous works often focus on the positive aspects of people of this profile (e.g., Lawless and Price, 1992; Thomson et al., 2011; Walsh et al., 2010). Through our qualitative data, however, we found that such individuals might prove difficult to drive and – worse than refusing to use the software – even turn into Nemesis-type characters and hinder the implementation of strategic IT, if their situational IT needs are not satisfied. This is especially acute if these people are authority figures, as were the professors: "Miss X [who is an IS professor] does not use the platform because she finds it redundant and says so 'loud and clear'. This does not really encourage students to start using it" (interviewee S1).

In managerial terms, this element has to be seriously considered. Walsh et al. (2010) showed that understanding of how an IT user culture changes, enables management to strategically influence the directions of this change. They showed that IT culture "creeps" and creates trends within an organization; they also showed that highly IT-acculturated proactive user profiles are part of a reference group with a positive self-image. If these opinion leaders are not listened to and their situational IT needs not taken into account in the strategic alignment process, they may well jeopardize this process. People of this profile may be fruitfully used as beta testers within organizations when preparing for the purchase of a new IT solution considered as a strategic investment. After they have tried the planned software, the positive or negative path between their global IT needs and their situational needs related to this software will provide a simple and easily readable answer as to their own assessment of it and the use they may or will make of it. Within the process of strategic alignment, managerially perceived IT needs and users' IT needs have somehow to meet; they, thus, have to be guided toward alignment. This result meets with recent literature (Walsh et al., 2013).

These elements lead us to one major limitation of our work: the quantitative variable SITITNEE is insufficiently refined and does not provide us with enough information. In future quantitative research, two variables at the situational level might prove useful: first, one that assesses the user's need for the type of IT that is proposed and, second, the variable SITITNEE (developed for the present work), which assesses the need for the specific IT investigated. In this last configuration, SITITNEE could also be complemented or replaced by a variable that assesses the fit between the specific IT proposed and the need perceived for this 'type' of IT. From the qualitative data that we collected, such a variable would most probably have a moderating or mediating effect on several of the paths that we studied. Future research might profitably look into the task–technology fit (TTF) construct (Goodhue and Thompson, 1995) to help model such a variable. However, our concerns are user-centered – and what Goodhue and Thompson (1995) identified as a TTF appears centered partly on organizational issues (e.g., see items referring to the construct "authorization" in the proposed questionnaire: Goodhue and Thompson, 1995, p. 234) and partly on training issues (e.g., items referring to "locatability": Goodhue and Thompson, 1995, p. 234). Further research on the question of the fulfillment of users' situational IT needs is necessary, perhaps by adapting the TTF construct. Other constructs such as "end user satisfaction" (Au et al., 2008) or "inhibitors" (Cenfetelli and Schwarz, 2011) might also prove interesting to investigate. The results obtained in the present study confirm the necessity to continue conducting research on this important issue.

5.3. TAM or no TAM?

When we included the variable SITITNEE in the TAM nomological framework and tested the resulting reduced model across populations, we found that two of the TAM-based hypotheses were not supported in the professor population (Population C), and one in the student population (Population B). University professors have quite a high degree of freedom in the way they plan their courses, and the instruments they choose to use. Irrelevant of the usefulness (e.g., for the students, and for communicating change in timetables, etc.) or the ease of use of the platform, professors will use it if they feel they actually need it to accomplish some of the tasks they consider they have to fulfill.

These elements – coupled with the low average level of situational IT needs for the platform perceived by professors and the fairly high level perceived by students (see Appendix E), and the resulting corresponding levels of utilization of the platform – point at the important mediating effect of the variable SITITNEE between usefulness and utilization (having a partial effect in populations A and B, and a total effect in Population C) as well as between ease of use and utilization (partial effect in Population A, total in Population B, and double mediation of usefulness and situational IT needs in Population C).

The path between the variables EOU and UTILIZATION was found to be significant ($p < 0.01$) in Population A, whereas it is non-significant ($p > 0.05$) in Populations B and C. The full statistical explanation of this phenomenon is beyond the scope of the present article. However, this may be briefly explained by the fact that the correlations between the latent variables are smaller in Populations B and C than in Population A, due to a different pattern in the measurement model of the latent variable UTILIZATION. This confirms why we believe it is particularly important to mix qualitative and quantitative data and methods in order to properly understand and explain statistical results and ensure global coherence.

The direct path from SITITNEE to UTILIZATION was found significant across all populations. Situational IT needs, thus, offer a more robust explanation for utilization than usefulness across samples. Our results might help in explaining some of Wu and Du's (2012) meta-analysis results, especially the low level of explained variance for usage when considering all TAM studies, including unpublished ones. This suggests that we must make use of the latest advances in psycho-sociological research and that combining needs-based and expectancy-based motivational theories may help IS research move forward beyond the TAM and its limitations. In future models, it will be important to include the newly defined variables GLOBITNEE, CONITNEE and SITITNEE, and to investigate further the relationships between IT culture, IT needs and utilization.

Information technologies are now everywhere in and outside organizations and most human tasks can be assisted by IT. The concept of ease of use may still be relevant in some contexts and situations. The issue of usefulness, however, appears no longer to be sufficient (at least as defined so far in the literature) to explain the acceptance and use of a specific IT: many IT may be considered useful in some way, but this does not mean people will use them. A more relevant issue nowadays appears, rather, to be whether (and why) some investigated IT is (or is not) perceived as needed by prospective users. In today's globalized and computerized world, the concept of needs makes more practical sense in a mostly international context: it allows us to take better account of both group cultural influences and individual specificities.

6. Conclusion

The present work contributes to strategic IS research as it sheds some new light on the acceptance and adoption of new IT in organizations. It provides some new clues on strategic IS management within organizations. More specifically, our contributions are threefold: theoretical, methodological, and practical.

In a competitive landscape that is "networked" (Merali et al., 2012), and with IT now being "everywhere" (Nolan, 2012), we found that it is important to adapt and shift the strategic approach to IT acceptance and usage. In today's organizations, usefulness appears no longer to be a relevant issue in investigating IT acceptance and usage. Our work shows that usefulness, as a concept limited to a situational level, is no longer either reliable or sufficient in explaining IT usage; this phenomenon now includes global, contextual and situational aspects and causes that the concept of usefulness neglects, and that the newly defined concepts and proposed corresponding constructs start capturing.

In our work, we studied not intention but actual utilization (this removes the issue of the linkage between intention and actual use, raised by Bagozzi, 2007), and developed a rich formative measure for this (taking into account in our measure of usage various elements that go beyond the actual use or non-use of a system, as advised by Benbasat and Barki, 2007). We also addressed the issue of motivational content in reasons to use through various new constructs (individual IT culture, global IT needs, contextual IT needs, and situational IT needs) that we have operationalized and tested: these constructs take into account recent developments in the fields of sociology and psychology that integrate both expectancy-based and needs-based motivational theories.

Furthermore, we have integrated two streams of IS research: (1) we took into account the design and specificities (as advised by Benbasat and Barki, 2007) of an exchange platform that was more specifically investigated through the users' situational IT needs, which were shown to have a very good predictive value for IT utilization and to be robust across samples, unlike usefulness and (2) we have considered IT as a variable in itself through the constructs of individual IT culture, global IT needs and contextual IT needs, as important antecedents of the variable situational IT needs; we have shown through these that holistic issues related to end-users' contextual needs and IT culture also made users perceive a system as needed and, thus, drove them toward using it.

We have obtained what may be considered as a parsimonious result. Even though, our main model might not seem parsimonious at first sight, situational IT needs may be assessed through three simple items while being at the same situational level as the TAM constructs. The other variables in our model address the antecedents of situational IT needs, irrelevant of specific IT designs; they complete and explain further our parsimonious results at the situational level.

In methodological terms, although it has long been recognized in the literature (e.g., Galliers, 1991, 1993, 1994; Landry and Banville, 1992; Lee, 1991; Mingers, 2001) that mixing qualitative and quantitative methods within a single research project provides a richer understanding of a given topic, it has also been lamented that "researchers seldom combine approaches or, if they do, the implications are not highlighted in their reports" (Smithson, 1991, p. 368 cited in Mingers, 2001). Furthermore, there are (to our knowledge) very few mixed-method studies in IS research that use a GT framework. We have attempted in the present work to be as explicit as possible about our GT emerging research design and substantive results. In this way, we have shown that using quantitative data and methods does not forcibly confer a hypothesis-testing positivist stance. Being clear and open about the way we conducted our mixed-method research helped us remain true to our own paradigm/worldview – i.e., critical realism. Using mixed methods also helped us fight against the bias of the "Texas sharpshooter approach" (Biemann, 2012).

Finally, on the practical side, we have shown how some of our newly defined variables may be important in managerial terms as some may be acted upon. We also have opened a Pandora's box about the so-called ambassadors that may turn into Nemesis-like characters if their opinions regarding software to be used are not 'heard' and not encouraged to be voiced. If IT is to be strategically aligned with business, and intended users' tacit resistance avoided, firms' environments, which are increasingly dynamic and constantly changing (Galliers et al., 2012), should not lead managers to obliterate the fact that micro-practices, revealed through users' IT culture and IT needs, are important variables to be taken into consideration and managed.

With this article, we hope to have opened numerous paths for further research.

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Appendix A. Theoretical sampling

A.1. Demographic statistics for quantitative data

		Frequency	Percentage	Valid percentage	Cumulative percentage
Age					
	15–20	15	5.3	5.3	5.3
	21–30	169	59.9	59.9	65.2
	31–40	24	8.5	8.5	73.8
	41–50	46	16.3	16.3	90.1
	51–60	22	7.8	7.8	97.9
	61+	6	2.1	2.1	100.0
	Total	282	100.0	100.0	
Third-level education					
	2 years	8	2.8	2.8	2.8
	3 years	59	20.9	20.9	23.7
	4 years	76	27.0	27.0	50.7
	$\geqslant$5 years	139	49.3	49.3	100.0
	Total	282	100.0	100.0	
Gender					
	Men	139	49.3	49.3	49.3
	Women	143	50.7	50.7	100.0
	Total	282	100.0	100.0	
Position					
	Students	198	70.2	70.2	70.2
	Professors	84	29.8	29.8	100.0
	Total	282	100.0	100.0	

A.2. Details of participants for qualitative data (P = professor; S = student)

Participants	P1	P2	P3	P4	P5	S1	S2
User profile (Walsh et al., 2010)	Constrained	Studious	Frightened	Disciplined	Studious	Interested	Disciplined/ Interested
Position	Professor-consultant	Assistant professor	Assistant professor	Assistant professor	Associate professor	Research master's student	EMBA student
Age	60	28	35	29	32	41	45
Nationality	Irish	Tunisian	French	French	Italian	German/ French	French
Has used Moodle for at least one year	No	Yes	Yes	No	Yes	Yes	Yes

Appendix B. Illustrations and examples of our coding procedures

B.1. Coding and recoding our data

B.2. Some examples of coding- qualitative data slice

IITC	My father is a computer engineer and I am quite IT-acculturated. I grew up with computers around me at home. (P4) I started playing games on computers when I was five years of age … It's more than a need; it's an addiction that is excessive. (P5) I don't really like computers or anything to do with them. I am always kind of afraid to 'lose' what I was working on and to have to start all over again (P3)
GLOBITNEE	I need a computer for my work and for my personal life. I need to be in touch with my acquaintances; therefore, I have to stay connected. If I cannot get connected, I feel uncomfortable. I need my phone, which is an iPhone. It's more than a phone; it's like a small computer. Basically, I need IT for most of what I do every day. (P2) I have fairly high global IT needs (P5)
CONITNEE	I need IT to teach, to entertain students with videos, because they are lazy and need to be entertained; that's my opinion! … I need IT because of my job. I would need it wherever I teach. If necessary, I bring my own technology. (P5) When you start in a new job, you have to master the new work environment, and this includes the information systems (P4)
SITITNEE	I need Moodle to organize my courses. It could have been some other software but I would have needed this type of software, anyhow. (P4) I look for the functionalities that fulfill my needs (P5)
UTILIZATION	We get to the stage where some students won't use it … One student downloads from Moodle and then he uploads it on Facebook. It's easier for the others. (S1) We were not informed about the platform before you told us about it. We put up with it because we had to. We did not see the point. We found it cumbersome. So we used it only when we had to, to upload our homework, for example (S2)
POSITION → CONITNEE	The need is linked to the type of job and to the type of organization. In my own small firm, I need IT a lot on a day-to-day basis. When I was employed by a multinational firm, the assistants did whatever needed to be done, and I needed IT much less, even though my position was the same. (S1) I have done some internships during my studies; I was also an accounting assistant, a volleyball referee … My needs for IT in a work situation depended, of course, on the position I held (P5)
POSITION → SITITNEE	Depending on the job you do, you will need different software (P2)
POSITION → UTILIZATION	As a professor, you obviously have some degree of freedom to use or not to use the platform. But if a professor asks us, students, to upload our homework and gives grades based on this, we have no real choice. We must use it (S2)

(*continued on next page*)

GLOBITNEE → SITITNEE	I feel I need IT for my work, my family life, for just about everything. If I am offered some software to help with my work, I would probably use it unless it is no good. (P5) IT is not an important part of my life, even though I need some (to send emails, for example). I certainly do without it whenever I can, even if I have tools made available to me (P1)
CONITNEE → SITITNEE	The linkage is important between the need I feel for IT in the context of my studies in X school and the need for Moodle, which is a specific tool that is made available to us for our studies (S2)
SITITNEE → UTILIZATION	I use Moodle as a repository, but do not integrate it a lot in my teaching, because I don't need it (P5)
SOCIAL NORMS	Some students expect us to use Moodle, to upload our course material. But, as a professor, I don't see any added value to it (P5)
U → SITITNEE	If I feel that it might be useful and that it is easy to use, this might increase my need for it. (P2) If I need a software, by definition this means it is useful for me (P1)
EOU → SITITNEE	If a piece of software is easy to use, I would probably find it easier to think that it might be useful, but even so I would only use it if I needed it (P1)
EOU → U	With some professors, it was easy to use Moodle because they gave us all relevant information. The platform was therefore useful. With other professors, it was not so because they got muddled themselves, forgot their password, etc. (S1)
EOU → UTILIZATION	I use computers very little; my needs for IT are very limited, so the ease of use of software does not really matter to me. In any case, I am not inclined to use IT if I can avoid it (P1)
U → UTILIZATION	From the information about Moodle that I was given, I felt that this software could be useful. Therefore, I tried it. I found that it was not user-friendly and I didn't like using it. So even if I think it could be useful, I use it as little as possible. I use only the functionalities that I cannot find elsewhere (P2)

Appendix C. Items in survey administered to students

Construct	Description	Items	Source
IITC first-order reflective second-order formative	Affiliation needs satisfied through IT usage	AFFNEE1: Having a computer allows me to stay in touch with my work group and/or with my entourage AFFNEE2: Using a computer allows me to have exchanges with people with whom I work and/or people I like AFFNEE3: With my computer, I can communicate and exchange with people	Adapted from Deci and Ryan (in press), Gillet et al. (2008), Guay et al. (2003), Sheldon et al. (1996), Von Stetten et al. (2011), Walsh (2009) Walsh et al. (2010)
	Accomplishment needs satisfied through IT usage	ACCNEE1: I obtain satisfaction when I improve my mastery of software I use ACCNEE2: Mastering new software gives me satisfaction ACCNEE3: Even if I have to spend hours mastering new software that I have to use, the satisfaction I get from doing so is worth it	
	Extrinsic motivation with identified regulation to use IT	EXTMOTID1: IT use improves the quality of my work EXTMOTID2: I have to use IT if I want to do some of my tasks correctly	
	Intrinsic motivation to know IT	INTMOTKNO1: I like to discover new software INTMOTKNO2: I find some aspects of IT interesting INTMOTKNO3: IT interests me	

Appendix C (*continued*)

Construct	Description	Items	Source
	Power needs satisfied through IT usage	POWNEE1: I like to show that I have good knowledge about computers, as this allows me to be better respected by my entourage POWNEE2: Being good with computers gives me some authority with the people that are close to me, and I like that POWNEE3: Being good with computers gives me a feeling of superiority that I like	
	Primary needs satisfied through IT usage	PRIMNEE1: When I am using my computer, I don't see time passing by and I find it hard to stop PRIMNEE2: I find it hard to control the time that I spend on my computer PRIMNEE3: I spend a lot of time on my computer	
CONITNEE reflective	Context-related IT needs	CONITNEE1: I need to use IT to study in X school CONITNEE2: My studies at X school necessitate the use of IT	Developed for the present research
GLOBITNEE reflective	Global IT needs	GLOBITNEE1: IT is part of my day-to-day life, and I would rather not do without it GLOBITNEE2: I need IT in all aspects of my life, and I don't wish to do without it	
SITITNEE reflective	Task-related IT needs	SITITNEE1: I need Moodle to do some of my tasks as a student in X school SITITNEE2: Some of my tasks as a student in X school necessitate the use of Moodle SITITNEE3: For some of my tasks as a student in X school, I need to use Moodle	
UTILIZATION formative	Type of use	I use Moodle (only one answer possible): • Never • Only when I am obliged to do so • Only when I feel it is absolutely necessary • For all classes where the professor uses Moodle	
	Frequency of use	During school term, I visit the Moodle platform (only one answer possible): • Never • Only when I receive a notification to do so (for example, email from the professor or recommendation from one of my colleagues) • On average once a month • On average once a week • On average every day	

(*continued on next page*)

Appendix C (*continued*)

Construct	Description	Items	Source
	Number of functionalities used	I use Moodle (several answers may be chosen, except if the last option is selected): • To consult documents put online by the professors • To upload the pieces of work that I am supposed to do • To exchange information with the professors/students • For other purposes • I do not use Moodle	
U reflective	Usefulness	U1: Globally, I find Moodle useful U2: It is logical for me to use Moodle U3: Moodle is useful for me	Adapted from Davis (1989)
EOU reflective	Ease of use	EOU1: I find Moodle easy to use EOU2: I find Moodle clear to use and understand EOU3: I find it easy to do what I want with Moodle	

Appendix D. Preliminary quantitative analyses

Prior to quantitatively investigating our model, we tested our quantitative data for CMV using Harman's single-factor test with SPSS 20 software – i.e., we ran an exploratory factor analysis without any rotation. CMV would be a problem if only one factor emerged, or if one factor accounted for most of the covariance between measures (Podsakoff et al., 2003). Seven factors emerged that explained 72.83% of the covariance between the measures. The largest variance explained by one factor was 28.57%, showing that CMV was unlikely to be a problem.

The validity and reliability of all reflective constructs were first investigated. For reflective constructs, crossloadings should be greater than 0.707 for all items representing the same latent variable. If this is so, it shows that more than half of the variance is captured by the constructs. After verification, the loadings for items of each block were similar in their representation of the underlying construct (see Appendix D.1), confirming convergent validity.

Discriminant validity was ensured through each construct square root of the AVE (Average Variance extracted), which has to be greater than its correlation with other factors (Gefen et al., 2000). This was also verified (see Appendix D.2).

Reliability was assessed using Cronbach's alphas, composite reliability (CR) and the AVE. Unlike Cronbach's alpha, CR does not assume that all indicators are equally weighted, and is a closer estimate of reliability (Chin, 2010). Both Cronbach's alphas and CR should be greater than 0.70 (Nunnally, 1978), and AVE greater than 0.50, meaning that 50% or more variance should be accounted for (Fornell and Larcker, 1981). All criteria were largely met (Appendix D.1).

These results support the validity and reliability of the various scales used for all reflective constructs.

Indicator validity for both formative constructs (IITC and UTILIZATION) was also assessed (Henseler et al., 2009). As the construct IITC was modeled as first-order reflective, second-order formative, the indicator-reuse approach (Lohmöller, 1989; Ringle et al., 2012) was applied, whereby all indicators of the lower order components are reused in the higher-order component (see Appendix D.3). For both IITC and UILIZATION, the significance of the indicator weights was verified by means of bootstrapping, and all path coefficients were found to be greater than 0.200, ensuring indicator validity (Chin, 1998). To further verify indicator validity, we checked the variance inflation factors (VIFs), that is how much of an indicator's variance is explained by the other constructs' indicators (Diamantopoulos and Siguaw, 2006). For IITC, the highest VIF was 2.172 – and for UTILIZATION, VIFs were between 1.995 and 3.233 – i.e., well below the 10-mark indicated as acceptable (Urbach and Ahlemann, 2010).

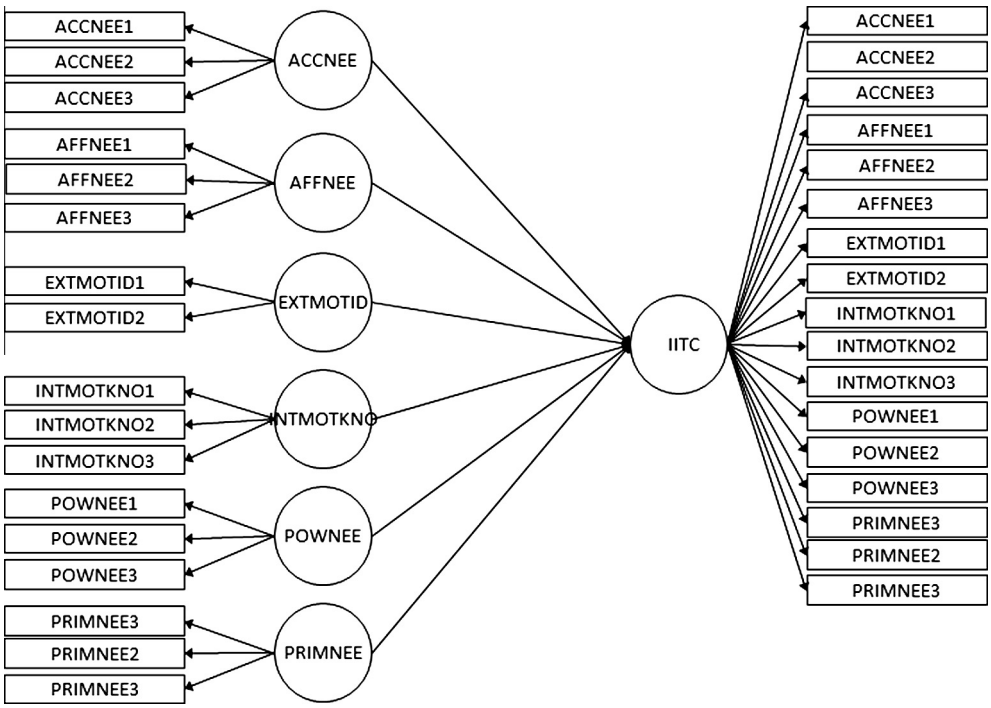
	ACCNEE	AFFNEE	CONITNEE	EXTMOTID	GLOBITNEE	INTMOTKNO	POWNEE	PRIMNEE	SITITNEE	UTILIZATION	AVE	CR	Cronbach's Alpha	R^2
ACCNEE1	**0.8105**	0.3567	0.2249	0.3022	0.427	0.5205	0.2564	0.1218	0.0316	0.0112	0.7094	0.8797	0.7947	N/A
ACCNEE2	**0.8821**	0.3216	0.2847	0.3281	0.3423	0.6109	0.3892	0.1853	0.1563	0.1309				
ACCNEE3	**0.8326**	0.3209	0.1839	0.3487	0.3067	0.5989	0.4214	0.2098	0.1353	0.085				
AFFNEE1	0.3221	**0.8729**	0.4284	0.4591	0.4421	0.301	0.1486	0.2805	0.2139	0.1258	0.7888	0.918	0.8663	N/A
AFFNEE2	0.271	**0.9032**	0.3566	0.5157	0.4265	0.3243	0.1008	0.2881	0.1847	0.0495				
AFFNEE3	0.4446	**0.8881**	0.419	0.5226	0.4528	0.4674	0.1267	0.2884	0.1573	0.0735				
CON_ITNEE6	0.2289	0.3367	**0.9393**	0.2513	0.2879	0.1407	0.1919	0.3075	0.3498	0.2273	0.9034	0.9493	0.8944	0.2765
CON_ITNEE7	0.2874	0.5061	**0.9616**	0.3605	0.3474	0.2173	0.2058	0.3526	0.3921	0.2751				
EXTMOTID1	0.3938	0.4857	0.2472	**0.8997**	0.4086	0.4085	0.1887	0.1673	0.0294	−0.0549	0.8004	0.8891	0.7507	N/A
EXTMOTID3	0.2986	0.5229	0.3416	**0.8896**	0.442	0.3023	0.1473	0.2545	0.0626	−0.081				
GLOB_ITNEE3	0.3931	0.5557	0.3259	0.4636	**0.926**	0.3841	0.1947	0.3935	0.0399	−0.0292	0.8131	0.8968	0.7732	0.3581
GLOB_ITNEE6	0.3685	0.3132	0.2784	0.3861	**0.8768**	0.3263	0.2129	0.3022	−0.0778	−0.0947				
INTMOTKNO1	0.6607	0.193	0.1032	0.192	0.2663	**0.7892**	0.2711	0.1864	0.0568	0.0586	0.6565	0.8514	0.7404	N/A
INTMOTKNO2	0.4974	0.5219	0.2752	0.5071	0.3614	**0.8062**	0.1967	0.2304	0.085	0.0235				
INTMOTKNO3	0.5239	0.2501	0.0616	0.2261	0.3264	**0.8347**	0.31	0.1534	0.003	0.0014				
POWNEE1	0.422	0.1828	0.2373	0.2166	0.228	0.2659	**0.8687**	0.2799	0.0898	0.0664	0.779	0.9136	0.8583	N/A
POWNEE2	0.3743	0.1091	0.1747	0.1482	0.2006	0.3203	**0.9118**	0.3641	0.0828	0.0662				
POWNEE3	0.3243	0.074	0.1358	0.1276	0.1593	0.2432	**0.8667**	0.3331	0.0503	0.012				
PRIMNEE1	0.1335	0.2592	0.2961	0.0923	0.2956	0.1427	0.3136	**0.8632**	0.221	0.2057	0.6938	0.8716	0.7863	N/A
PRIMNEE2	0.1149	0.1675	0.2429	0.0486	0.1454	0.0899	0.3408	**0.7949**	0.2343	0.2372				
PRIMNEE3	0.2378	0.3396	0.3195	0.3663	0.4632	0.3098	0.2813	**0.8394**	0.1488	0.1355				
SIT_ITNEE1	0.107	0.1829	0.3568	0.0153	−0.028	0.044	0.0686	0.2263	**0.9211**	0.7921	0.8805	0.9567	0.932	0.3576
SIT_ITNEE2	0.1311	0.1974	0.3717	0.0615	0.0199	0.042	0.0642	0.2152	**0.9463**	0.7793				
SIT_ITNEE3	0.1303	0.203	0.3755	0.0658	−0.03	0.091	0.1081	0.2133	**0.9473**	0.7753				
UTFREQ	0.0573	0.0692	0.2452	−0.0841	−0.0604	0.0019	0.0778	0.1794	0.782	**0.914**	N/A	N/A	N/A	**0.7448**
UTFUNCT	0.0944	0.124	0.206	−0.0402	−0.0723	0.0981	0.0227	0.2511	0.7121	**0.8418**				
UTTYPE	0.0963	0.0791	0.2654	−0.0756	−0.054	0.0189	0.0522	0.1989	0.7939	**0.9694**				

D.2. Latent variables correlations

	ACCNEE	AFFNEE	CONITNEE	EXTMOTID	GLOBITNEE	INTMOTKNO	POWNEE	PRIMNEE	SITITNEE
ACCNEE	0.8423	0	0	0	0	0	0	0	0
AFFNEE	0.3942	0.8881	0	0	0	0	0	0	0
CONITNEE	0.2747	0.4527	0.9505	0	0	0	0	0	0
EXTMOTID	0.3881	0.5632	0.3278	0.8947	0	0	0	0	0
GLOBITNEE	0.4227	0.4965	0.3373	0.4749	0.9017	0	0	0	0
INTMOTKNO	0.6866	0.4151	0.1925	0.3985	0.3966	0.8102	0	0	0
POWNEE	0.4261	0.1412	0.2098	0.1883	0.2241	0.3146	0.8826	0	0
PRIMNEE	0.2065	0.3218	0.3495	0.2346	0.3907	0.2382	0.3679	0.8329	0
SITITNEE	0.131	0.2073	0.3923	0.051	−0.0132	0.0628	0.0855	0.2325	0.9383

Diagonal elements are square roots of AVEs and off-diagonal elements are correlations.

D.3. The individual IT culture (IITC) measurement model



Appendix E. Descriptive statistics of the two sub-populations

POSITION	IITC	GLOBITNEE	CONITNEE	SITITNEE	UTILIZATION
Professors					
Mean	5.0377	5.7663	5.4057	2.8674	2.0586
N	84	84	84	84	84

Appendix E (*continued*)

POSITION	IITC	GLOBITNEE	CONITNEE	SITITNEE	UTILIZATION
Std. deviation	.95123	1.45570	1.87121	2.13887	1.18742
Grouped median	5.3018	6.0156	6.3052	2.1716	1.7260
Minimum	2.07	1.00	1.00	1.00	1.00
Maximum	6.53	7.00	7.00	7.00	4.46
Students					
Mean	5.4100	5.9405	6.3886	5.3949	3.5170
N	198	198	198	198	198
Std. deviation	.79156	1.27433	.80654	1.63341	.68612
Grouped median	5.5026	6.3189	6.5541	5.7791	3.7211
Minimum	2.60	1.49	2.00	1.00	1.00
Maximum	7.00	7.00	7.00	7.00	4.46
Total					
Mean	5.2991	5.8886	6.0959	4.6420	3.0826
N	282	282	282	282	282
Std. deviation	.85768	1.33070	1.30118	2.13601	1.09222
Grouped median	5.4283	6.2627	6.5026	5.3212	3.5005
Minimum	2.07	1.00	1.00	1.00	1.00
Maximum	7.00	7.00	7.00	7.00	4.46

References

Abraham, C., Junglas, I., 2011. From cacophony to harmony: a case study about the IS implementation process as an opportunity for organizational transformation at Sentara Healthcare. Journal of Strategic Information Systems 20 (2011), 177–197.

Adams, D., Nelson, R., Todd, P., 1992. Perceived usefulness, ease of use, and usage of information technology: a replication. MIS Quarterly 16 (2), 227–247.

Agarwal, R., Karahanna, E., 2000. Time flies when you're having fun: cognitive absorption and beliefs about information technology usage. MIS Quarterly 24 (4), 665–694.

Ajzen, I., 1985. From intentions to actions: a theory of planned behavior. In: Kuhl, J., Beckmann, J. (Eds.), Action Control: From Cognition to Behavior. Springer Verlag, New York, pp. 11–39.

Ajzen, I., 1991. The theory of planned behavior. Organizational Behavior and Human Decision Processes 50, 179–211.

Alderfer, C.P., 1969. An empirical test of a new theory of human needs. Organizational Behavior and Human Performance 4, 142–175.

Andersen, T., 2001. Information technology, strategic decision making approaches and organizational performance in different industrial settings. Journal of Strategic Information Systems 10 (2), 101–119.

Armstrong, J.S., Overton, T.S., 1977. Estimating nonresponse bias in mail surveys. Journal of Marketing Research 14 (3), 396–402.

Au, N., Ngai, E., Cheng, T., 2008. Extending the understanding of end user information systems satisfaction formation: an equitable needs fulfillment model approach. MIS Quarterly 32 (1), 43–66.

Bagozzi, R., 2007. The legacy of the technology acceptance model and a proposal for a paradigm shift. Journal of the Association for Information Systems 8 (4), 244–254.

Bagozzi, R., 2011. Measurement and meaning in information systems and organizational research: methodological and philosophical foundations. MIS Quarterly 35, 261–292.

Barclay, D., Higgins, C., Thompson, R., 1995. The partial least squares (PLS) approach to causal modeling: personal computer adoption and use as an illustration. Technology Studies 2 (2), 285–309.

Benbasat, I., Barki, H., 2007. Quo vadis, TAM? Journal of the Association for Information Systems 8 (4), 211–218.

Benbasat, I., Dexter, A., Mantha, R., 1980. Impact of organizational maturity on information system skill needs. MIS Quarterly 4 (1), 21–34.

Besson, P., Rowe, F., 2012. Strategizing information systems-enabled organizational transformation: a transdisciplinary review and new directions. Journal of Strategic Information Systems 21, 103–124.

Bhaskar, R., 1979. The Possibility of Naturalism. Harvester Press, NY.

Bhaskar, R., 1989. Reclaiming Reality. Verso, London.

Bhaskar, R., 1998. Philosophy and scientific realism. In: Archer et al. (Eds.), Critical Realism. Routledge, London, pp. 16–47.

Bhaskar, R.A., 2002. Reflections on Meta-Reality: A Philosophy for the Present. Sage, New Delhi.

Biemann, T., 2012. What if We are Texas Sharpshooters? A New Look at Publication Bias. Academy of Management Conference, Boston.

Bragge, J., Merisalo-Rantanen, H., 2009. Engineering E-collaboration processes to obtain innovative end-user feedback on advanced web-based information systems. Journal of the Association for Information Systems 10 (Special Issue), 196–220.

Burton-Jones, A., Straub, D., 2006. Reconceptualizing system usage: an approach and empirical test. Information Systems Research 17 (3), 228–246.

Cartwright, N., 2003. Causation, One Word, Many Things. Centre for Philosophy of Natural and Social Science, London.

Cenfetelli, R., Schwarz, A., 2011. Identifying and testing the inhibitors of technology usage intentions. Information Systems Research 22 (4), 808–823.

Chin, W.W., 1998. The partial least squares approach to structural equation modeling. In: Marcoulides, G.A. (Ed.), Modern Methods for Business Research. Erlbaum, Mahwah, NJ, pp. 295–358.

Chin, W.W., 2010. How to write up and report PLS analyses. In: Vinzi, V.E., Chin, W.W., Henseler, J., Wang, H. (Eds.), Handbook of Partial Least Squares: Concepts, Methods and Applications in Marketing and Related Fields. Springer, Berlin, pp. 655–690.

Chin, W., Marcolin, B., Newsted, P., 2003. A partial least squares latent variable modeling approach for measuring interaction effects: results from a Monte Carlo simulation study and electronic-mail emotion/adoption study. Information Systems Research 14 (2), 189–217.

Cohen, J., 1988. Statistical Power Analysis for the Behavioral Sciences, second ed. Lawrence Erlbaum Associates, Hillsdale, NJ.

Davis, F.D., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly 13 (3), 318–339.

Davis, F., Bagozzi, R., Warshaw, P., 1989. User acceptance of computer technology: a comparison of two theoretical models. Management Science 35 (8), 982–1003.

Davis, F., Bagozzi, R., Warshaw, P., 1992. Extrinsic and intrinsic motivation to use computers in the workplace. Journal of Applied Social Psychology 22, 1111–1132.
Deci, E., Ryan, R., 1985. Intrinsic Motivation and Self Determination in Human Behavior. Plenum, New York.
Deci, E., Ryan, R., 2008. Facilitating optimal motivation and psychological well-being across life's domain. Canadian Psychology 49, 14–23.
Devaraj, S., Easley, R.F., Crant, J.M., 2008. How does personality matter? Relating the five-factor model to technology acceptance and use. Information System Research 19 (1), 93–105.
Diamantopoulos, A., Siguaw, J.A., 2006. Formative versus reflective indicators in organizational measure development: a comparison and empirical illustration. British Journal of Management 17 (4), 263–282.
Diamantopoulos, A., Riefler, P., Roth, K.P., 2008. Advancing formative measurement models. Journal of Business Research 61 (12), 1203–1218.
Fishbein, M., Ajzen, I., 1975. Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research. Addison-Wesley, Reading, MA.
Fornell, C., Cha, J., 1994. Advanced Methods of Marketing Research. Blackwell Business, Cambridge, Massachusetts.
Fornell, C., Larcker, D.F., 1981. Evaluation structural equation models with unobservable variables and measurement errors. Journal of Marketing Research 18, 39–50.
Fundin, A.P., Bergman, B.L.S., 2003. Exploring the customer feedback process. Measuring Business Excellence 7 (2), 55–65.
Gagné, M., Deci, E., 2005. Self-determination theory and work motivation. Journal of Organizational Behavior 26, 331–362.
Galliers, R.D., 1991. Choosing appropriate information systems research approaches: a revised taxonomy. In: Galliers, R. (Ed.), Information Systems Research: Issues, Methods and Practical Guidelines. Blackwell, Oxford, pp. 144–162.
Galliers, R.D., 1993. Research issues in information systems. Journal of Information Technology 8, 92–98.
Galliers, R.D., 1994. Relevance and rigour in information systems research: some personal reflections on issues facing the information systems research community. IFIP Transactions A – Computer, Science and Technology 54, 93–101.
Galliers, R.D., Jarvenpaa, S.L., Chan, Y., Lyytinen, K., 2012. Strategic information systems: reflections and prospectives. Journal of Strategic Information Systems 21, 85–90.
Gallivan, M., Keill, M., 2003. The user–developer communication process: a critical case study. Information System Journal 13, 37–68.
Gefen, D., Straub, D.W., Boudreau, M.-C., 2000. Structural equation modeling techniques and regression: guidelines for research practice. Communications of the AIS 1 (7), 1–78.
Gefen, D., Rigdon, E.E., Straub, D.W., 2011. Editors' comment: an update and extension to SEM guidelines for administrative and social science research. MIS Quarterly 35 (2), iii–xiv.
Gillet, N., Rosnet, E., Vallerand, R.J., 2008. Développement d'une échelle de satisfaction des besoins fondamentaux en contexte sportif. Revue Canadienne des Sciences du Comportement.
Glaser, B., 1978. Theoretical Sensitivity: Advances in the Methodology of Grounded Theory. The Sociology Press.
Glaser, B., 2007. Doing Formal Grounded Theory. Sociology Press.
Glaser, B., 2008. Doing Quantitative Grounded Theory. Sociology Press.
Glaser, B., Strauss, A., 1967. The Discovery of Grounded Theory: Strategies for Qualitative Research. Aldine, New York.
Goodhue, D., Thompson, R., 1995. Task-technology fit and individual performance. MIS Quarterly 19 (2), 213–236.
Guay, F., Mageau, G., Vallerand, R., 2003. On the hierarchical structure of self-determined motivation: a test of top-down, bottom-up, reciprocal, and horizontal effects. Personality and Social Psychology 29 (8), 991–1004.
Hair, J.F., Sarstedt, M., Ringle, C.M., Mena, J.A., 2012. An assessment of the use of partial least squares structural equation modeling in marketing research. Journal of the Academy of Marketing Science (forthcoming).
Heart, T., Maoz, H., Pliskin, N., 2010. From governance to adaptability: the mediating effect of IT executives' managerial capabilities. Information Systems Management 27 (1), 42–60.
Henseler, J., Ringle, C., Sinkovics, R., 2009. The use of partial least squares path modeling in international marketing. Advances in International Marketing 20, 277–320.
Herzberg, F., Mausner, B., Snyderman, B., 1959. The Motivation to Work. John Wiley, New York.
Igbaria, M., Parasuraman, S., 1989. A path analytic study of individual characteristics, computer anxiety and attitudes toward microcomputers. Journal of Management 15 (3), 373–388.
Jiang, J., Klein, G., 2002. Information system personnel turnover. Journal of Management Information Systems 19 (2), 249–272.
Jöreskog, K., Wold, H., 1982. The ML and PLS technique for modeling with latent variables: historical and comparative aspects. In: Jöreskog, K.G., Wold, H. (Eds.), Systems Under Indirect Observation, Part I. North-Holland, Amsterdam, pp. I263–1270.
Kaarst-Brown, M., Robey, D., 1999. More on myth, magic and metaphor: cultural insights into the management of information technology in organizations. Information Technology and People 12 (2), 192–217.
Kappos, A., Rivard, S., 2008. A three-perspective model of culture, information systems, and their development and use. MIS Quarterly 32 (3), 601–634.
Karahanna, E., Agarwal, R., Angst, C., 2006. Reconceptualizing compatibility beliefs in technology acceptance research. MIS Quarterly 30 (4), 781–804.
Keill, M., Beranek, P., Konsynski, B., 1995. Usefulness and ease of use: field study evidence regarding task considerations. Decision Support Systems 13 (1), 75–91.
Landry, M., Banville, C., 1992. A disciplined methodological pluralism for MIS research. Accounting, Management and Information Technology 2, 77–97.
Lawless, M., Price, L., 1992. An agency perspective on new technology champions. Organization Science 3 (3), 342–355.
Lee, A., 1991. Integrating positivist and interpretivist approaches to organizational research. Organization Science 2, 342–365.
Lee, S., Kim, K., Paulson, P., Park, H., 2008. Developing a socio-technical framework for business-IT alignment. Industrial Management and Data Systems 108 (9), 1167–1181.
Leidner, D., 2010. Globalization, culture, and information: towards global knowledge transparency. Journal of Strategic Information Systems 19, 69–77.
Leidner, D., Kayworth, T., 2006. Review: a review of culture in information systems research: toward a theory of information technology culture conflict. MIS Quarterly 30 (2), 357–399.
Lohmöller, J.-B., 1989. Latent Variable Path Modeling with Partial Least Squares. Physica, Heidelberg.
Maier, C., Laumer, S., Eckhardt, A., Weitzel, T., 2013. Analyzing the impact of HRIS implementations on HR personnel's job satisfaction and turnover intention. Journal of Strategic Information Systems 22 (3), 193–207.
Malhotra, N.K., Kim, S.S., Patil, A., 2006. Common method variance in IS research: A comparison of alternative approaches and a reanalysis of past research. Management Science 52, 1865–1883.
Malhotra, Y., Galleta, D., Kirsch, L., 2008. How endogenous motivation influences user intentions: beyond the dichotomy of extrinsic and intrinsic user motivations. Journal of Management Information Systems 25 (1), 267–299.
Maslow, A.H., 1943. A theory of human motivation. Psychological Review 50 (3), 370–396.
Maslow, A.H., 1954. Motivation and Personality. Harper, New York.
McClelland, D., 1965. Toward a theory of motive acquisition. American Psychologist 20, 321–333.
Melia, K., 1996. Rediscovering glaser. Qualitative Health Research 6, 368–373.
Merali, Y., Papadopoulos, T., Nadkarni, T., 2012. Information systems strategy: past, present, future? Journal of Strategic Information Systems 21 (2), 125–153.
Mingers, J., 2001. Combining IS research methods: towards a pluralist methodology. Information Systems Research 12 (3), 240–259.
Mithas, S., Tafti, A., Bardhan, I., Goh, J., 2012. Information technology and firm profitability: mechanisms and empirical evidence. MIS Quarterly 36 (1), 205–224.
Morse, J.M., 2003. Principles of mixed methods and multimethod research design. In: Tashakkori, A., Teddlie, C. (Eds.), Handbook of Mixed Methods in Social and Behavioral Research. Sage, Thousand Oaks, CA, pp. 189–208.

Munro, M., Davis, G., 1977. Determining management information needs: a comparison of methods. MIS Quarterly, 55–67.
Newkirk, H., Lederer, A., Srinivasan, C., 2003. Strategic information systems planning: too little or too much? Journal of Strategic Information Systems 12 (3), 201–228.
Nolan, R., 2012. Ubiquitous IT: the case of the Boeing 787 and implications for strategic IT research. Journal of Strategic Information Systems 21 (2), 91–102.
Nunnally, J.C., 1978. Psychometric Theory. McGraw Hill, New York (NY).
Pelletier, L., Tuson, K., Haddad, N., 1997. Client motivation for therapy scale: a measure of intrinsic motivation, extrinsic motivation and amotivation for therapy. Journal of Personality Assessment 68 (2), 414–435.
Podsakoff, P., MacKenzie, S., Jeong-Yeon, L., Podsakoff, N., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. Journal of Applied Psychology 88 (5), 879.
Post, G., Kagan, A., Keim, R., 1999. A structural equation evaluation of CASE tools attributes. Journal of Management Information Systems 15 (4), 215–234.
Reich, B., Benbasat, I., 2000. Factors that influence the social dimension of alignment between business and information technology objectives. MIS Quarterly 24 (1), 81–113.
Ringle, C.M., Wende, S., Will, S., 2005. SmartPLS 2.0 (M3) Beta. <http://www.smartpls.de>.
Ringle, M., Sarstedt, M., Straub, D., 2012. A critical look at the use of PLS-SEM in MIS quarterly. MIS Quarterly 36 (1), iii–xiv.
Rokeach, M., 1973. The Nature of Human Values. The Free Press, Macmillan, New York.
Ryan, R., Deci, E., 2000. Intrinsic and extrinsic motivations: classic definitions and new directions. Contemporary Educational Psychology 25, 54–67.
Schwarz, A., Chin, W., 2007. Looking forward: toward an understanding of the nature and definition of IT acceptance. Journal of the Association for Information Systems 8 (4), 230–243.
Sheldon, K., Ryan, R., Reis, H., 1996. What makes for a good day? Competence and autonomy in the day and in the person. Personality and Social Psychology Bulletin 22, 1270–1279.
Smith, M., 2010. Testable theory development for small-N studies: critical realism and middle-range theory. International Journal of Information technology and Systems Approach 3 (1), 41–56.
Smithson, S., 1991. Continuing different approaches. In: Nissen, H.-E., Klein, H., Hirschheim, R. (Eds.), Inform. Systems. Res.: Contemporary Approaches and Emergent Traditions. North Holland, Amsterdam, The Netherlands, pp. 365–369.
Straub, D., Limayem, M., Karahanna-Evaristo, E., 1995. Measuring system usage: implications for IS theory testing. Management Science 41 (8), 1328–1342.
Straub, D. W., and Burton-Jones, A. 2007. Veni, Vidi, Vici: Breaking the TAM Logjam, Journal of the AIS, (8:4, April), pp. 223–229.
Sykes, T., Venkatesh, V., Gosain, S., 2009. Model of acceptance with peer support: a social network perspective to understand employees' system use. MIS Quarterly 33 (2), 371–393.
Tan, F., Gallupe, R., 2006. Aligning business and information systems thinking: a cognitive approach. IEEE Transactions on Engineering Management 53 (2), 223–237.
Tarafdar, M., Vaidya, S., 2006. Information systems assimilation in Indian organizations: an examination of strategic and organizational imperatives. The Journal of Strategic Information Systems 15 (4), 293–326.
Taylor, S., Todd, P., 1995. Assessing IT usage: the role of prior experience. MIS Quarterly 19 (4), 561–570.
Thomson, T.H., Nishant, R., Goh, M., Agarwal, S., 2011. Leveraging collaborative technologies to build a knowledge sharing culture at HP analytics. MIS Quarterly Executive 10 (1), 1–18.
Tsang, E., Kwan, K., 1999. Replication and theory development in organizational science: a critical realist perspective. The Academy of Management Review 24 (4), 759–780.
Turel, O., Serenko, A., 2012. The benefits and dangers of enjoyment with social networking websites. European Journal of Information Systems 21, 512–528.
Urbach, N., Ahlemann, F., 2010. Structural equation modeling in information systems research using partial least squares. Journal of Information Technology 11 (2), 5–40.
Urquart, C., Lehmann, H., Myers, M., 2009. Putting the theory back into grounded theory: guidelines for grounded theory studies in information systems. Information Systems Journal 20 (4), 357–381.
Urwiller, R., Frolick, M., 2008. The IT value hierarchy: using Maslow's hierarchy of needs as a metaphor for gauging the maturity level of information technology use within competitive organizations. Information Systems Management 25, 83–88.
Vallerand, R., 1997. Towards a hierarchical model of intrinsic and extrinsic motivation. Advances in Experimental Social Psychology 29, 271–360.
Vallerand, R., 2001. Deci and Ryan's Self- Determination Theory: A View From the Hierarchical Model of Intrinsic and Extrinsic Motivation. Laboratoire de Recherche sur le Comportement Social. Université du Québec à Montréal, pp. 312–318.
Vallerand, R., 2007. Les fondements de la psychologie sociale. Ed. Gaëtan Morin.
Vallerand, R., Pelletier, L., Koestner, R., 2008. Reflections on self-determination theory. Canadian Psychology 49 (3), 257–262.
Venkatesh, V., 1999. Creation of favorable user perceptions: exploring the role of intrinsic motivation. MIS Quarterly 23 (2), 239–260.
Venkatesh, V., 2000. Determinants of perceived ease of use: integrating control, intrinsic motivation, and emotion into the technology acceptance model. Information Systems Research 11 (4), 342–366.
Venkatesh, V., Speier, C., Morris, M., 2002. User acceptance enablers in individual decision making about technology: toward an integrated model. Decision Science 33 (2), 297–316.
Venkatesh, V., Morris, M., Davis, G., Davis, F., 2003. User acceptance of information technology: toward a unified view. MIS Quarterly 27 (3), 425–478.
Venkatesh, V., Thong, J., Xu, X., 2012. Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. MIS Quarterly 36 (1), 157–178.
Von Stetten, A., Wild, U., Chrennikow, W., 2011. Adopting social network sites – the role of individual IT culture and privacy concerns. In: Proceedings of the Seventeenth Americas Conference on Information Systems (AMCIS), Detroit, Michigan.
Vroom, V., 1964. Work and Motivation. John Wiley & Sons, Inc., New York.
Walsh, I., 2009. Development of an instrument to assess individual IT-culture. In: Proceedings of the 15th Americas Conference on Information Systems (AMCIS), San Francisco (CA).
Walsh, I., 2010. Investigating the cultural dimension of IT-usage: IT-acculturation, an essential construct in IS research. In: Proceedings of the 31st International Conference on Information Systems (ICIS). St. Louis (MO).
Walsh, I., Kefi, H., Baskerville, R., 2010. Managing culture creep: toward a strategic model of user IT culture. Journal of Strategic Information Systems 19 (4), 257–280.
Walsh, I., Renaud, A., Kalika, M., 2013. The translated strategic alignment model: a practice-based perspective. Systèmes d'Infomation et Management 18 (2), <http://www.revuesim.org/sim/article/view/509/236>.
Wang, S., Wang, W., Huang, C., Chen, S., 2011. Improving inventory effectiveness in RFID-enabled global supply chain with Grey forecasting model. Journal of Strategic Information Systems 20 (3), 307–322.
Watson, R., Boudreau, M.-C., Chen, A., Sepúlveda, H., 2011. Green projects: an information drives analysis of four cases. Journal of Strategic Information Systems 20 (1), 55–62.
Wu, J., Du, H., 2012. Toward a better understanding of behavioral intention and system usage constructs. European Journal of Information Systems, http://dx.doi.org/10.1057/ejis.2012.15.
Xu, Z., Turel, O., Yuan, Y., 2012. Online game addiction among adolescents: motivation and prevention factors. European Journal of Information Systems 21, 321–340.