

A combined variance and process perspective on IT culture and IT usage leading to the concept of IT acculturation

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ABSTRACT

We adopt a mixed-design grounded-theory approach to investigate the relationships between IT culture and different facets of IT usage – effective use and expectable use – as well as the emergence and increasing level of IT needs perceived by users in their everyday life. We use cross-sectional quantitative data from 666 respondents, which we analyze from a variance perspective. We also use longitudinal qualitative data from six individual case studies, which we analyze from a process perspective. Combining the two perspectives, we highlight and explain some causal loops between constructs and a process that we name ‘IT acculturation’. Our contributions are theoretical and methodological. Our results help enrich the understanding of IT usage and how its evolution may be supported through the monitoring and nurturing of users’ IT acculturation.

Keywords: *Expectable use, Effective use, IT acculturation, IT culture, IT needs, IT usage.*

RÉSUMÉ

Nous adoptons une approche enracinée dans les données, avec un design de recherche mixte, pour étudier les relations entre la culture numérique des utilisateurs et les différentes facettes de leur usage des TI – usage effectif et usage prévisible – ainsi que l’émergence et le développement de leurs besoins numériques dans la vie de tous les jours. Nous utilisons les données quantitatives transversales, relatives à un moment précis, de 666 participants, que nous analysons dans une perspective variance. Nous utilisons également les données qualitatives longitudinales de 6 études de cas individuelles, que nous analysons dans une perspective process. En combinant ces deux perspectives, nous mettons en lumière et expliquons des boucles causales entre construits et un processus que nous nommons « acculturation numérique ». Nos contributions sont théoriques et méthodologiques. Nos résultats enrichissent la compréhension de l’usage des TI et comment son évolution peut être soutenue par le monitoring et le développement de l’acculturation numérique des utilisateurs.

Mots-clés : *Acculturation numérique, Besoins numériques, Culture numérique, Usage prévisible, Usage effectif, Usage des TI.*

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1. INTRODUCTION

Most firms still invest heavily and quite regularly in new IT, often at very high cost. The return on these investments depends on employees effectively using these IT. However, while some users appear to have a high capacity to adapt to any new IT tool (Beaudry and Pinsonneault, 2005), others refuse even to acknowledge any need for such tools. Some ‘digital immigrants’ (Prensky, 2001, 2009, 2012) – sometimes with few academic qualifications – are ready to investigate and to attempt to solve issues relating to some IT functionalities or to the adaptation of new software, while other users (who are sometimes academically qualified to a high level) just comment, ‘It doesn’t work,’ and refuse to use it. Is usage driven by the users’ experience, ability, affect, training, or values – or are we talking about a broader cultural phenomenon, which integrates many of these aspects and could perhaps be nurtured? Many managers in firms ponder upon these questions in order to optimize their strategic IT investments.

The black box of IT usage has started to be opened during the last decade or so (Burton-Jones and Gallivan, 2007; Burton-Jones and Grange, 2012; Burton-Jones and Straub, 2006; Walsh *et al.*, 2016). These authors argue IT usage has become part of our identity and that it is rooted in our IT values (i.e., enduring IT beliefs: Rokeach, 1973) that make up our IT culture (Leidner and Kayworth, 2006). Usage has to be considered in terms of not only whether or not one uses a specific piece of IT, but also how one tackles any type of IT (digital devices or software). Thus, different facets of IT usage have been investigated and linked to users’ IT culture: ‘effective use’ i.e., ‘using a system in a way that helps attain the goals for using the system’ (Burton-Jones and Grange, 2012, p. 633) and ‘expectable use’

i.e. ‘user’s disposition, or inclination, to use any IT’ (Walsh, 2016, p. 178).

IT culture is a concept that has been emerging in mainstream IS literature for the last couple of decades. It is a multilevel construct, which is made up of the set of IT values espoused by an individual (Koch *et al.*, 2013; Walsh *et al.*, 2010, 2016), a group (Abubakre *et al.*, 2017; Kaarst-Brown, 2017; Leidner, 2010), or an organization (Bi and Yu, 2008; Kaarst-Brown and Robey, 1999; Kohli and Melville, 2009; Leidner and Kayworth, 2006). Even though the linkages between IT culture and usage have started being investigated in recent years (Walsh *et al.*, 2016) *how and why IT culture builds up and evolves together with IT usage, remains mostly unstudied and is the focus of the present article.*

This article is part of a broader research project covering a cultural approach to IT usage. The whole project, including the present work adopts an exploratory grounded-theory (GT) stance. This leads us in the present study to highlight the process of *IT acculturation*, which emerged from our data as the core category. We use the term ‘*IT acculturation*’ to refer to this little-investigated phenomenon through which individuals change their behaviours and attitudes with respect to IT over time, sometimes seemingly unexpectedly. When exposed to some ITs, over time, the individual’s IT culture builds up, conditioned by their context, cognition and affect, IT values are espoused and individuals accept, adopt, and appropriate new ITs in different ways. We draw on both cross-sectional quantitative data and longitudinal qualitative data to illuminate this phenomenon that involves a causal loop between IT culture and usage, and that leads to the development of users’ global IT needs, i.e., the perceived needs for IT in various aspects of one’s life.

In this work, and as proposed by Burton-Jones, McLean and Monod (2015), we shift

from the traditional dichotomy between variance and process theoretical perspectives, which have been mostly used in past IS research and were considered as mutually exclusive. To gain some deeper insights on the investigated phenomena, we use a combined variance-process perspective, where each of the two perspectives are used in a complementary fashion.

The present article is organized as follows. We first investigate in the literature the concepts of IT culture and IT usage. We then describe our methodology before giving the results of our investigations and discussing the theory that emerged from our data. Finally, we detail the limitations of our work, possible avenues for future research, and our contributions, before concluding.

2. LITERATURE REVIEW

In this section, we investigate the literature on IT culture, IT usage and their linkage. Even though this review was done mainly *ex-post* after our theory had started emerging, we present it *ex-ante*, as propose by Suddaby (2006).

2.1. IT culture: a multi-level construct used by different schools of thought

Hofstede's (2001) work envisaged culture, and its link with IT adoption, at the national level. However, James and Jones (1974) distinguished between group culture and individual culture that interact recursively. In more recent years, culture has been shown to be a multilevel construct that may be conceptualized at the individual level, the group level and the organizational level (Chao, 2000; Klein and Koslowski, 2000; Meyerson and Martin, 1987). In the present article, we are more particularly interested

in the individual level. At this level, culture may be conceptualized as multilayered and the product of the individual's various identities resulting from group affiliations, e.g., gender, race, nationality, occupation, organization (Karahana *et al.*, 2005; Straub *et al.*, 2002). Each layer plays a specific role in shaping beliefs, norms and behaviors of an individual in given circumstances. One of these layers has been proposed to be IT culture made up of espoused IT values (Leidner and Kayworth, 2006).

A great variety of terms that might be perceived as close in meaning to 'IT culture' may be found in the literature outside the IS field. These include for instance 'digital culture' (Prensky, 2001, 2009; Turkle, 2011; White and Le Cornu, 2011); 'numerical culture' (Millerand *et al.*, 2001), 'information culture' (Serres, 2007), and 'technoculture' (Cooper, 2002; Robins and Webster, 1999). Walsh (2010) investigated several concepts that could be considered as related to IT culture e.g. technoculture or technological cultivation. Here, we focus our review on 'IT culture', which is the term used most in mainstream IS research. We aim to extend Leidner and Kayworth's (2006) literature review on this theme, from 2006 through to 2017.

Leidner and Kayworth (2006, p. 371) identified only two pre-2006 works that studied IT culture (Kaarst-Brown, 2004; Kaarst-Brown and Robey, 1999). These works investigate IT culture at the group level – i.e., 'the values attributed to IT by a group', within organizations and how cultural aspects of IT interfere with IS management and governance. They use the allegory of the magic dragon (IT) and wizards (some users) to illustrate archetypal IT cultures; these archetypes are rooted in the organizational IT cultural assumptions that are embedded in IT management. IT is considered to be a 'symbolic artifact open to social interpretation' (Kaarst-Brown and Robey, 1999, p. 192).

We summarize in Table 1 the works on IT culture that we identified as published after 2006 in research journals. These works may be differentiated as belonging to two main streams of thought conceptualizing IT culture

as: (1) relevant only to some individuals/groups/organizations due to their IT occupation; or (2) a dimension of the broader concept of culture, and therefore relevant to any individual/group/organization.

Table 1. The concept of IT culture as investigated in the literature.

Citation	Conceptualization of IT culture		Level of analysis			
	As an occupational culture	As a dimension of culture	Individual	Group	Organization	Country
Chase, 2008	✓		✓			
Guzman and Stanton, 2009	✓		✓	✓		
Guzman and Stanton, 2008	✓			✓		
Guzman <i>et al.</i> , 2008	✓			✓		
Jacks and Palvia, 2014	✓			✓		
Baker and Thomas, 2007	✓				✓	
Meissonier and Houzé, 2007	✓				✓	
Wijayawardena <i>et al.</i> , 2017	✓				✓	✓
Abubakre <i>et al.</i> , 2017		✓	✓	✓		
Walsh <i>et al.</i> , 2016		✓	✓	✓		
Walsh <i>et al.</i> , 2010		✓	✓	✓		
Walsh, 2014		✓	✓	✓		
Koch <i>et al.</i> , 2013		✓	✓		✓	
Leidner and Kayworth, 2006		✓	✓		✓	
Kaarst-Brown and Robey, 1999		✓		✓	✓	
Kaarst-Brown, 2017		✓		✓	✓	
Nord <i>et al.</i> , 2007		✓		✓		
Bi and Yu, 2008		✓			✓	
Bookhamer and Zhang, 2016		✓			✓	
Kohli and Melville, 2009		✓			✓	
Petrie, 2014		✓			✓	
Leidner, 2010		✓	✓	✓	✓	✓

In both streams, different levels of analysis are used to study IT culture: the individual level (e.g., Chase, 2008; Guzman and Stanton, 2009; Leidner, 2010; Walsh *et al.*, 2010), group level (e.g., Guzman and Stanton, 2008; Leidner and Kayworth, 2006), organizational level (e.g., Baker and Thomas, 2007; Kohli and Melville, 2009), and national level (e.g., Leidner, 2010; Wijayawardena *et al.*, 2017). Only one work envisages IT culture at all four levels (Leidner, 2010). In the literature, when IT culture is considered as an occupational culture, IT professionals (software developers, computer engineers, etc.) and/or IT firms are investigated, focusing in particular on their espoused IT values. In this framework, IT culture can and should be managed to introduce and sustain change (Baker and Thomas, 2007), which is relentless and continuous in the IT field (Chase, 2008). Differences and similarities in IT cultures are witnessed across genders and nationalities (Guzman and Stanton, 2008), and between IT and non-IT personnel (Guzman *et al.*, 2008). Technical expertise is found to be insufficient to ensure IT success (Meissonier and Houzé, 2007); conflicts between IT occupational subcultures and other extant subcultures are highlighted (Guzman *et al.*, 2008).

Some other works in the literature investigate the IT values espoused by individuals, groups of individuals (whatever their occupation), or organizations as a subset of their value system (a dimension of their culture). A move towards this conceptualization of IT culture can be noted in recent years; we even found one author (Guzman) who previously considered IT culture as the occupational culture of IT workers (Guzman *et al.*, 2008), and subsequently extended it to any individual (see Kaarst-Brown and Guzman, 2010). IT usage has now become a pervasive part of people's social practices (Jouët, 2000), including work practices (Orlikowski and Scott, 2008). The cultural chasm between IT professionals

and business professionals (Nord *et al.*, 2007) has thus been gradually diminishing during the last decade. Baker and Thomas (2007) argue that as IT became part of most business operations, IT culture first spread from IT workers to business workers, and then to the population at large through agile IT memes (an idea that spreads and is replicated from one person to another in a manner comparable to how genes are replicated – Dawkins, 1989). IT culture has thus nowadays become a feature of most individuals in all strata of our society.

The present study is in the legacy of this second stream of thought, and is specifically interested in investigating this phenomenon at the individual level. Taking into account Gallivan and Srite's (2005) holistic vision of culture, and competing sets of values (Leidner and Kayworth, 2006), an integrative model of individual culture that includes IT culture as the set of IT values espoused by an individual has been proposed by Walsh and Kefi (2008); IT values are enduring IT beliefs that span across situations and apply broadly to any IT. Thus, IT culture is one of the many layers that make up individual culture, and is made up of the set of IT values espoused by the individual. We adopt this value-based conceptualization of culture and IT culture.

Walsh *et al.* (2010) identify different archetypal IT-culture user profiles or user ideal types (Weber, 1968), differentiated by their universal needs satisfied by IT usage and by their motivations (intrinsic and extrinsic) to use IT; some needs are 'universal' (also termed 'fundamental' needs by some authors), being common to all human beings, and must be satisfied 'for effective functioning and psychological health' (Deci and Ryan, 2008, p. 183). The concept of human needs is important 'because it provides a means of understanding how various social forces and interpersonal environments affect [...] motivation'

(Deci and Ryan, 2008, p. 183): it thus allows one to take into account group cultural influences as perceived at the individual level. The environment matters not in itself but in what it means functionally in terms of supporting people's universal needs (Vallerand *et al.*, 2008). In order to fulfil universal needs, other specific needs – e.g., IT needs – develop as the individual socializes.

The IT-culture user ideal types identified in the literature are: Dodgers, Constrained, Disenchanted, Frightened, Players, Disciplined, Interested, Dangerous, Passionate, and Studious (Walsh *et al.*, 2016). In 'real life', any user is a mix of several ideal types, but most users have a dominant type. These ideal types are shown to be clearly linked to IT usage and IT needs: the more the users' fundamental needs are satisfied through IT use and the more developed their IT needs, the more self-determined their IT usage becomes and the more it is perceived as a facilitating influence by managers. The different profiles identified by these authors belong to one of three attitudinal groups, which are mutually exclusive: the refusal group (individuals refuse to use any IT), the passive group (individuals accept some IT, but their use is limited to learned behaviours), and the proactive group (individuals appropriate the IT at their disposal, and their IT usage is investigative and customized). This proactive group, who plays a facilitating role during the implementation of new IT, is shown to have a high level of global IT needs (perceived needs for IT in various aspects of one's life).

The body of work on IT culture that we reviewed shows that this phenomenon can be nurtured in organizations (Baker and Thomas, 2007; Bi and Yu, 2008) in

order to eliminate conflicts of values and to lower resistance. Different IT cultures may help or hinder organizational life (Leidner, 2010), and the link between IT culture and organizational performance is highlighted. However, if and how users' IT culture can be nurtured and made to evolve towards enhanced usage requires further investigation.

2.2. IT usage and its link with IT culture

Even though Walsh *et al.* (2010) do highlight among their interviewees a couple of cases of cultural migration from one profile to another, simply hinting at possible modifiable/modified IT usage, their results lack generalizability². In the meantime, the literature on IT usage has been enriched: see Walsh *et al.*, 2016 extensive review on the subject. These authors propose to differentiate utilization and usage, whereas these two terms had previously often been used interchangeably. They argue that, on the one hand, the term 'Utilization' should be used to describe behaviors (e.g., frequency, duration) related to some specific IT being used and can be assessed through direct, and rather objective measures. On the other hand, the term 'Usage' describes a broad multi-faceted, multi-level social construct. Effective use (using a system in a way that helps attain the goals for using the system: Burton-Jones and Grangé, 2013) and expectable use (user's disposition or inclination to use any IT: Walsh *et al.*, 2016) are two of its facets. The former describes reasoned actions related to a specific IT. It is induced by conscious and reasoned goals related to this IT and can be assessed objectively. The latter describes affective, cognitive and behavioral elements related

²As advised by Pascal *et al.* (2018), it might be useful here to precise that, in terms of philosophical positioning, we are critical realist. As such we believe in an "intransitive" domain (Bhaskar, 1989), independent of the researcher's perception. As such, generalizability is an important element in our research.

to any IT, which are induced by the user’s personality, past experiences, context and group influence, and are assessed mostly subjectively. Expectable use is an aggregate construct made up of 6 dimensions (Walsh *et al.*, 2016): Extensive use (use of IT in most aspects of one’s life); Fearful use (use of IT with anxiety); Opportunistic use (use of IT to improve self-efficiency); Self-enhancing use (use of IT to fulfill self-accomplishment needs); Self-indulging use (use of IT to fulfill needs for power and prestige) and Socializing use (use of IT to fulfill affiliation needs).

Walsh (2014) investigates the relationship between IT culture and IT utilization and, contrary to previous works, identifies the construct of global IT needs as being separate from IT culture. However, she only investigates the link between IT culture

and IT utilization, and not IT usage as such. Walsh *et al.* (2016) propose some causal links between IT culture, effective use and expectable use. However, these authors neither verify their propositions nor inform us on how and why a user IT culture builds up and evolves together with IT usage. Still, and in accordance with these previous works, it is important to do so because if, in firms, IT culture is to be nurtured (Baker and Thomas, 2007; Bi and Yu, 2008), towards enhanced usage (Walsh *et al.*, 2010) and the effective use of strategic IT, one has to understand in depth the relationships between these constructs. In the present work, we aim to fill this gap.

The elements related to the concepts of interest in the present work are summarized in Table 2.

Table 2. The concepts called upon in the present work.

Concept	Definition	Source
IT value	Enduring IT belief that spans across situations and apply broadly to any IT	Leidner and Kayworth (2006); Rokeach (1973)
Individual IT culture	The set of IT values espoused by an individual	Leidner and Kayworth (2006); Walsh <i>et al.</i> (2010)
Global IT needs	Perceived needs for IT in various aspects of one’s life	Walsh (2013); Walsh <i>et al.</i> (2010)
Utilization	Behaviors	Walsh <i>et al.</i> (2016)
Effective use of a specific system	Using a system in a way that helps attain the goals for using the system	Burton-Jones and Grange (2012)
Expectable use of any IT	User’s disposition or inclination to use any IT	Walsh <i>et al.</i> (2016)

3. METHODOLOGY

In this section, we detail the successive and complementary variance and process perspectives as well as the GT approach we adopted (Glaser and Strauss, 1967; Glaser, 1978), the ‘theoretical sampling’ (Glaser and Strauss, 1967), data collection, and data coding.

3.1. A Grounded theory approach with a combined variance-process perspective

GT, which is an exploratory research approach, is also particularly helpful in developing new or complementary perspectives on well-established theoretical research areas (de Sousa and Hendriks,

2006). Even though the literature recognizes that IT beliefs and values (hence, IT culture) do evolve (Ye and Johnson, 1995) and are linked to IT usage (Walsh *et al.*, 2010, 2016), it does not inform us on why and how a user's IT culture evolves/changes together with IT usage. This imposed on us an exploratory stance. Therefore, to gain new insights, we use an exploratory GT approach in our research and let the data speak for themselves (Glaser, 1978).

As highlighted by Walsh (2014), "two main distinct variants of GT may be found in the literature; one of these variants is favored by Glaser and the other by Strauss" (page 150). Our stance is in the legacy of Glaser's approach, which we consider hinders the least the researcher's creativity, as argued by Walsh *et al.* (2015). GT has been popularized as a qualitative research method (Holton, 2008). It is, however, an inductive methodology that can be used with any data, and in any combination. This has been stated by Glaser a number of times (e.g., Glaser, 2008). Thus, GT is compatible with research that uses both quantitative and qualitative data, methods, and/or techniques (Walsh, 2015). Quantitative measures support generalization but sometimes block some reality and tend to hinder new theoretical development (Glaser, 2008). Qualitative data provide interpretation and meaning; they help the study of some issues in depth and detail (Patton, 2002). Both 'meaning' and 'counting' are essential to facilitate theory emergence (Walsh, 2015): when research combines both qualitative and quantitative data and methods, it puts 'qualitative flesh on quantitative bones' (Tarrow, 1995), and GT "provides the conceptual overview with grounded interpretation" (Glaser, 2003, p. 118). In the present work, neither qualitative nor quantitative data/methods were sufficient in themselves to provide sufficient insights and allow us to theorize; all were necessary. It was only when all our data analyzed together made full sense that we

reached theoretical saturation. The mixed research design of the present study was not pre-planned. It emerged as data (both quantitative and qualitative) were collected, and as the emerging theory guided our theoretical sampling towards the collection of further data in the drive for theoretical saturation.

As suggested by Burton-Jones, Klein and Monod (2015), we did not adopt exclusively a variance perspective with a focus on co-variation between constructs or a process perspective with a focus on sequences of events. We rather adopted a combined sequential variance-process perspective as proposed by these authors to gain deep insights. To reach a full understanding of the studied phenomena, we first adopted a variance perspective with quantitative data to investigate relevant constructs and their possible relationships, followed by a process perspective with qualitative data to understand better the interrelationships between concepts and their reciprocal effects, with time as a significant variable.

The need to collect longitudinal qualitative data emerged after the analysis of the results obtained with the quantitative data, which we had difficulties explaining. More particularly, causal loops and reciprocal relations were identified, which we could not understand nor explain fully, based solely on our quantitative data. Even though we used both quantitative and qualitative data in our work, all data were analyzed as one set, together with elements from the literature, which are also considered as data ('all is data' being Glaser's well-known dictum). This was done through constant comparative analyses towards theorization and the final model of IT acculturation that is proposed in this study. The process of 'constant comparative analysis' (Glaser and Strauss, 1967) of our full data set is summarized in Figure 1.

In terms of the merging of mixed method research with GT and based on

the differentiation of the various possibilities of mixed GT designs proposed by Johnson and Walsh (2019), the research design of the present study may be globally summarized as an “explanatory sequential mixed GT design: QUAN GT → QUAL GT” (page 525): data were collected sequentially; we conducted a quantitative GT study followed by a qualitative GT study; and all data

(quantitative and qualitative) were analyzed and constantly compared all through the research process. In the present work, when we deal with quantitative data and analysis techniques, we write in a quantitative format e.g., acronyms for constructs. When we deal with qualitative data and analysis techniques, we write in a qualitative format e.g., full names for constructs.

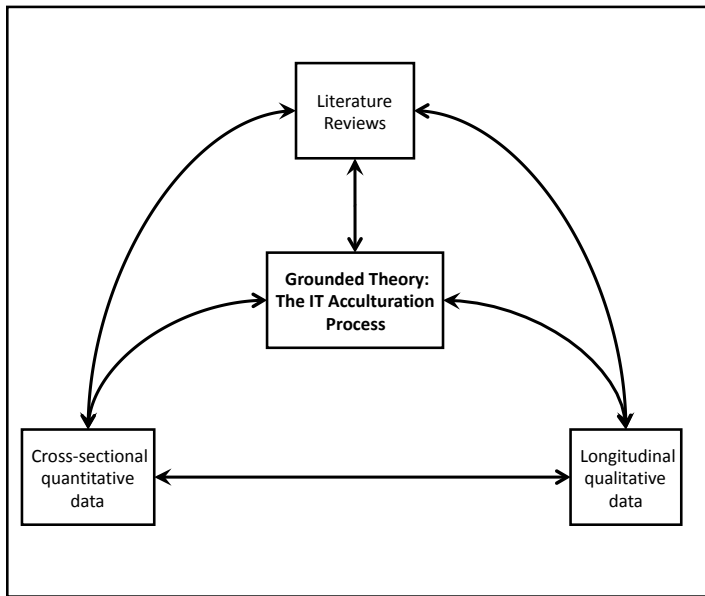


Figure 1. The comparative analysis of our full data set

3.2. Theoretical sampling, data collection, and coding

Data used in the present study were collected from 2007 until 2018. We used secondary qualitative and quantitative data, and primary qualitative data. The first slice of qualitative data is a subset of data collected between 2007 and 2009 for another study (Walsh, Kefi and Baskerville, 2010) through interviews. We collectively designate this first set of interviews ‘I1’. Quantitative data were collected in 2012 through a survey originally designed for another study (Walsh *et al.*, 2016), although

some of the data collected then and used in the present work have not been previously investigated. The second slice of qualitative data was collected from 2012 till 2016 through interviews. We collectively designate this second set of interviews ‘I2’. The last slice of qualitative data was collected in 2018. We collectively designate this third set of interviews ‘I3’. Similar questions were asked for the three sets of interviews and were related to interviewees’ positioning with regard to IT, their usage of IT and possible evolution they had experienced. All interviewees for I2 and I3 had already been interviewed for I1, thus providing a

longitudinal perspective to our research. Beside the time at which data were collected, it might be important to highlight the fact that, for the present study, we first started with quantitative data; then, we

added secondary qualitative and primary qualitative data slices. This is summarized in Table 3. Iterations with the literature started as soon as the core category (IT acculturation) started emerging.

Table 3. Data slices

Data slices	Qualitative: I1	Quanti	Qualitative: I2	Qualitative: I3
Data collection dates	2007-2009	2012	2012-2016	2018
Primary/Secondary	Secondary	Secondary	Primary	Primary
Chronology of the present research	2	1	3	4

It might be useful here to precise that provided classic GT precepts are scrupulously applied, using secondary data does in no way jeopardize a GT approach. Glaser’s doctoral dissertation, which is at the source of classic GT (Holton and Walsh, 2016), is solely grounded in secondary quantitative data. Furthermore, in their 1967 seminal book, Glaser and Strauss also confirm that secondary data are suitable to use and develop a theory grounded in these data.

The first slice of secondary qualitative data (I1) we had available, had previously helped us illuminate the interrelations between interviewees’ IT culture and the use they made of any IT at their disposal (Walsh *et al.*, 2010). It also had highlighted the emergence of IT needs. However, the causal relationships between the various constructs were not clear and there appeared to be reciprocal effects between constructs. This drove us to first use quantitative data (secondary) in the present research and then, collect further qualitative data slices (I2 and I3) to obtain a longitudinal perspective. Therefore, and even though our broader research project covering a cultural approach to IT usage is globally qualitatively driven, the present research is quantitatively driven.

We aimed at ‘formal grounded theory’ (Glaser, 2007) and, more specifically, at

‘substantive formalization’ (Holton and Walsh, 2016 p. 22). Therefore, and in order to ensure the external validity and generalizability of our results, we wished to include and consider in the theoretical sampling (Glaser and Strauss, 1967) for both our quantitative and qualitative data sets, as many different user profiles as possible, and to diversify the studied population as much as possible in terms of all socio-demographic variables. Details relating to our participants may be found in Appendix A (Appendix A1 for quantitative data and Appendix A2 for qualitative data).

The slice of quantitative data was used to try and investigate all possible causal paths and relationships between IT culture, expectable use, and global IT needs. The available cross-sectional data was deemed acceptable for our quantitative investigations because it has been highlighted in the literature that this type of design might be more appropriate to estimate reciprocal effects with very short time lags (Finkel, 1995; Kline, 2011; Wong and Law, 1999), which preliminary investigations pointed at. These quantitative data were collected by students from an international, Europe-based business school. They received instructions to choose (from their circles of acquaintances) IT users as diversified as possible in terms of social background,

age, gender, position, and education. The sampling effected was therefore close to a 'strata and quota' sampling (see Appendix A1). Students were invited first to administer the questionnaire to their parents in order to obtain their approval before administering it to other people. The questionnaire was discussed with students *ex ante*; they were informed about our research, trained to administer the questionnaire, asked to administer it themselves and discuss it if needed with their respondents to make sure items were properly understood by all concerned. Concerning the presentation of the administered questionnaire and possible answers, seven-point Likert-type response options were used, where 1 = 'not true at all' and 7 = 'completely true'. Demographic categorical variables (gender, age, position, etc.) were also included in the questionnaire; this allowed us to keep track of the population in our quantitative data set. We had 676 respondents for our quantitative investigations. Ten cases were identified as having data missing from one of the variables we wished to investigate, and so were removed. This left us with 666 respondents. For all constructs, we used measures developed and verified in the literature. Further details about these measures as well as the items used in the questionnaire can be found in Appendix B1. Statistical elements relating to the validity and reliability of the measures we used are provided in Appendix B2. We quantitatively coded and analysed our quantitative data: path modeling may be assimilated to theoretical coding (Walsh, 2015). We investigated the relationships between three of the investigated constructs, which had been validated in the literature (individual IT culture: IITC, expectable use, and global IT needs – GLOBITNEE) in an exploratory manner. For the theoretical coding of our quantitative data, we used a partial-least-squares approach and bootstrapping as a resampling technique (500 random

samples) to generate t-statistics (Chin, 1998) with the SmartPLS software (Ringle *et al.*, 2005). PLS analysis was preferred because it is generally viewed more as an exploratory, soft-modelling approach rather than as a confirmatory one (Gefen *et al.*, 2011; Hair *et al.*, 2012; Ringle *et al.*, 2012; Vinzi *et al.*); 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). All possible nested models involving the three variables of interest were investigated. The two that were retained and presented in the results section are those that made sense when combined and analyzed with our qualitative results (constant comparative analysis: Glaser and Strauss, 1967; Glaser, 1978).

As we had some difficulty to fully explain our quantitative results, "to gain complementary perspectives" and "obtain a complete picture" of investigated phenomena (Venkatesh, *et al.*, 2013), in order to understand our quantitative results in depth and to theorize, we then decided to collect further qualitative data to obtain a longitudinal qualitative data set. From the first slice of secondary qualitative data, we theoretically sampled six interviewees to investigate as in-depth longitudinal case studies. These individuals – of different ages, educational backgrounds, and nationalities – were selected for two reasons: first, they belong to our close circle, and we had the opportunity to observe them all throughout our research; second, from preliminary observations, they appeared to represent an interesting array of IT-culture migration. Finally, they were also selected because they were 'pairs' (husband and wife, father and daughter, and brother and sister: see Appendix A2); this was useful for triangulation purposes. Three of the six corresponding I1 semi-structured interviews were taped and transcribed. For the other three, as the interviews could not be

taped, notes and memos were transferred in digital format for coding.

Thus, we proceeded to conduct two further sets of interviews and collected the last two slices of primary qualitative data related to the six longitudinal individual cases theoretically sampled. All I2 interviews were taped and relevant elements transcribed. I2 interviews started by asking interviewees to recall and relate when, how, and why they had started using IT. This information was triangulated with data previously collected and with the partners of each pair of I2 interviewees. Interviewees were then asked to compare this initial usage with their current IT usage. The same approach was adopted for the collection of the last qualitative data slice (I3). As we collected the last two slices of qualitative data, we first open-coded (e.g. “change of IT culture profile”, “cultural migration”, “attitudinal change”, “influence of context”, etc.) then once IT acculturation had emerged as core category, we more specifically coded around this concept (i.e., selective coding: Glaser, 1978) and its two main phases: (1) Initial exposures to IT – Emergence of IT culture (Time T0 to T1) and (2) Emergence and development of global IT needs – Cultural migration) (Time T2 to T3). We also searched for and coded relationships between the investigated constructs or their dimensions (theoretical coding: Glaser, 1978). The qualitative data helped us bring into our quantitative nomological framework the concept of effective use (Burton-Jones and Grange, 2012) and understand the processual quality of the phenomenon we were studying, together with the reciprocal relationships and recursive causal loops between several constructs.

As preliminary theoretical coding of our qualitative data, the transcripts and memos

were first hand-coded and sorted out on the floor of an office (because of the space needed), while being compared and analyzed with our quantitative results; the final model was modified and readjusted until all data (qualitative and quantitative) appeared to converge (see Appendix C1). As some interviews were conducted in a language other than English, verbatim excerpts were then translated, and the coding was finalized in a tabular format. Some illustrations of our coding are provided with our results. Further examples of the coding of collected qualitative data for each of the six investigated longitudinal cases are provided in Appendix C2. All our data were coded and recoded a number of times.

4. RESULTS

In this section, we detail the results of quantitative and qualitative investigations.

4.1. Quantitative investigations: A variance theoretical perspective

As we had access to the data collected for Walsh *et al.* (2016), and some propositions had been highlighted by these authors, we first investigated quantitatively these propositions in a causal perspective. However, we did not limit ourselves to unilateral causation: independent variables were also investigated as dependent variables. Based on previous literature, we did expect some effects between IITC, expectable use, and GLOBITNEE. However, results in previous published studies were not consensual. Therefore, we could not lay down definite hypotheses³. We therefore remained in an exploratory grounded stance

³ For instance, some studies (e.g., Walsh *et al.*, 2010) include the construct of IT needs as a dimension of the IT culture construct. Subsequent studies exclude IT needs from the IT culture construct (e.g., Von Stetten *et al.*, 2011; Walsh, 2014), position that we adopted here, grounded in our data.

and investigated all possible paths. Those models that were retained and are presented in this section, are those that made

the most sense when analyzed together with our qualitative data slices. Results are summarized in Figure 2 and 3.

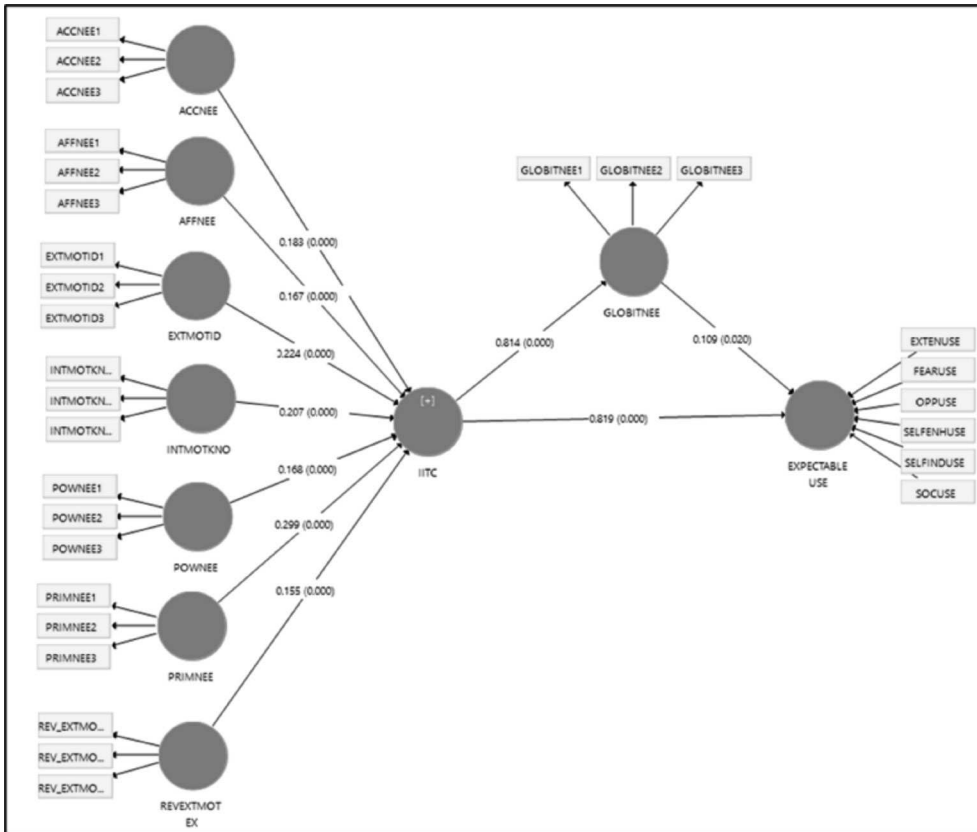


Figure 2. Nested Model 1

4.1.1. Preliminary verification

As a preliminary stage, we checked for common-method variance using Harman’s single factor test with the SPSS 20 software – i.e., we ran a factor analysis without any rotation, while constraining the number of factors to one. This factor accounted for 36.388% of the covariance among the measures. We also did an exploratory factor analysis, based on eigenvalues greater than 1 that did not yield a single factor. This analysis yielded six factors for Expectable use and seven factors for IITC, which tends to show that common-method variance is unlikely to be an issue in the present study (Podsakoff *et al.*, 2003).

To investigate the structural paths between the two second-order molar constructs (IITC and expectable use: see Appendix B1), we used a two-stage approach in order to obtain the ‘true’ average variance explained (AVE) (Ringle *et al.*, 2012). The indicator reuse approach (Lohmöller, 1989) was applied during the first stage. For the explained molar construct, the latent variable scores for the lower-order components obtained during the first stage then served as manifest variables for the higher-order components during the second stage. During this last stage, the construct GLOBITNEE was incorporated in the structural model. Crossloadings for all reflective constructs may be found in Appendix B2. These should be

greater than .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. Only one item (REV_SELFENH2) has a loading below this value (See crossloadings, Appendix B2, probably because it was negatively worded. We decided not to discard it from the analysis as our goal was a strong nomological network and this item does not significantly crossload with other items (Chin, 2010). Except for REV_SELFENH2, the loadings for items of each block were similar in their representation of the underlying construct (see crossloadings in Appendix B2), confirming convergent validity. Discriminant validity was ensured through each construct square root of the AVE, which has to be greater than its correlation with other factors (Gefen *et al.*, 2000): see intercorrelations in Appendix

B2. 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; it is a closer estimate of reliability (Chin, 2010). Both Cronbach's alphas and CR should be greater than 0.70 (Nunnally, 1978) and AVE should be greater than 0.50, meaning that a variance of 50% or more should be accounted for (Fornell and Larcker, 1981). All criteria were largely met (see reliability, Appendix B2). These results support the validity and reliability of the various scales we used. To test for multicollinearity, we checked variance inflation factors (VIFs). These were found to be overall between 1.264 and 3.733 – that is, less than the conservative threshold of 5 (Venkatesh *et al.*, 2012). This indicates that multicollinearity is not an issue in the present study.

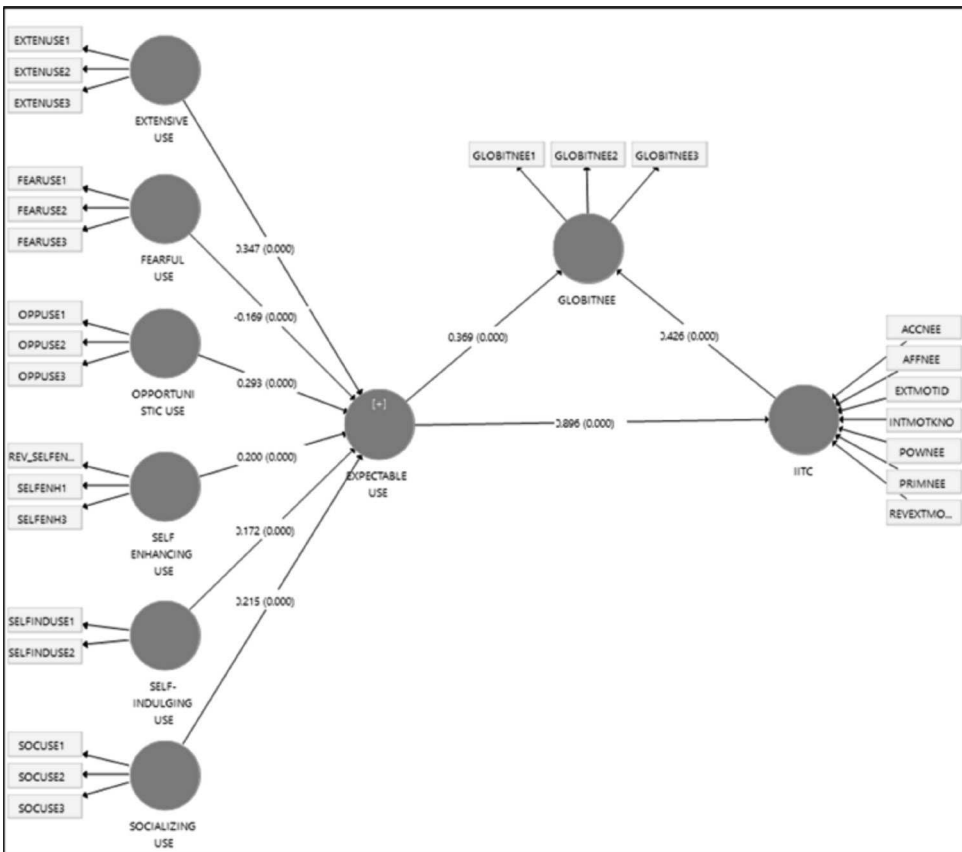


Figure 3. Nested Model 2

4.1.2. Structural models

The models that finally emerged from our quantitative investigations include some 'feedback loops' (Martens and Haase, 2006, p. 879). The two paths that make up each of these loops had to be investigated separately and included in different nested models, as SmartPLS does not allow a two-way path in a single model. Two nested models, treated as two different structural models, are presented here, even though other possibilities were investigated.

In Nested Model 1 (see Figure 2), IITC is the predictor variable, and Expectable Use is the outcome variable. All paths are confirmed with $p < 0.001$. In Nested Model 2 (see Figure 3), Expectable Use is the predictor variable and IITC the outcome variable.

All paths are confirmed with $p < 0.001$ except for one path in the first nested model, which is confirmed with $p < 0.05$. The repeated indicators are not shown in the figures in order to not overload them, and ease readability and understanding. Further information about all constructs in Figures 2 and 3 are provided in Appendix B1.

Our quantitative results lead to the illumination of reciprocal causation between IITC and Expectable use and between GLOBITNEE and Expectable use. Each of these variables can be considered in turn as an independent or dependent variable illustrating two causal loops. Based on the literature, IT culture (IITC) is conceptualized and assessed as a state at a given moment in time, and the causal loops that were revealed by our quantitative analyses seem to reveal a process that causes IITC to evolve, with time as a possibly significant variable. Using only quantitative data, we found it difficult to explain how and why these loops occurred, what they meant, and why the path linking Expectable use and GLOBITNEE was confirmed in one direction when Expectable use is the predictor

variable to IITC and in the other direction when it is the outcome variable.

Therefore, in order to fully investigate, understand, and explain our quantitative results, we adopted a process perspective through the analysis of our longitudinal qualitative data to complement the variance perspective adopted with our quantitative data set (Burton-Jones *et al.*, 2015).

4.2. Qualitative investigations: A process theoretical perspective

To avoid unnecessary length, we cite only when needed (using italics) some verbatim that we consider as most illustrative. In these verbatim, we sometimes translated some terms used by the interviewees into our own terms. For instance, 'digital technologies', 'information technologies', 'ICT', etc. were all transcribed as 'IT'. After each quote, we indicate the interviewee, the data slice (I1, I2, I3), and any relevant extracts from the researcher's memos. When we coded our data, we were more specifically theoretically sensitized about the paths supported by our quantitative data. However, we remained in an exploratory grounded stance and let our qualitative data 'speak' for themselves, thus highlighting some constructs and paths that could not be suspected based solely on the secondary quantitative data that we had used. When we coded selectively around the core category (the IT acculturation process), several categories finally emerged as significant in this process and/or as being an actual part of it. They are described and discussed in this section.

4.2.1. The role of context, entourage and training

Individual beliefs/values (hence, IT culture) are strongly influenced by the individual's first exposure to IT, which is often linked to her entourage as well as to the context and her training:

I started using IT as a child to play on the family computer, then to do some of my academic work when I was a student. Then, my work context made my use of IT evolve. Today I cannot work without a computer and a smartphone (P4- I3).

The fact that I had access to computers at home played a significant role in my starting to use IT. Also, we had classes about IT at school. So, I had access to computers at school and at home. (P2-I2).

Thus, individuals start using some specific IT either voluntarily or mandatorily, motivated to do so by their context and/or entourage. Effective use of some IT might, for instance, be prompted by watching close relations using this IT, by wanting to satisfy one's curiosity when confronted with a new tool used by colleagues or relatives, or by needing to fulfil work obligations:

Ten years ago, some of my colleagues at work showed me how to assemble a computer, so I went to buy parts and I assembled them; that's how I started, partly out of curiosity and partly to keep myself informed for my work. (P5-I2, referring to his job as a crypto-operator in the army).

When I first used IT, it was for my work. (P1-I1) and some years later, I first started using IT during the late '80s because I had to, at the time, for my job as an accountant ... but what I did with it was very limited: I just 'filled boxes' on a screen. (P1-I2).

Individuals' context, entourage and training also impact their expectable use of any IT negatively or positively:

Due to some bad experiences at work, I used to avoid using IT at all costs; now, I use it as little as possible but I use it ... As I have to use it more, and the systems are more reliable, I am more comfortable with it than at the beginning ... At one time, I used to be sure I'd never want a personal computer or a mobile phone; now,

I have both and I use them for work and my personal life. (P1-I2, with expectable use changing overtime from non-use to opportunistic use).

I don't have much education, I don't know about these things (P6- I1) and, some years later, he (her husband) is very much into computers and the likes. So I got used to seeing these things around. Then, as the children grew up and started playing with video games, so did I. That's how I started (P6-I2, with expectable use changing overtime from non-use to self-indulging use). And again, some years later: He (her husband) has been teaching me to do 'things' with IT. Now, I sometimes shop online (P6-I3, with expectable use changing overtime from self-indulging use to opportunistic use).

4.2.2. From effective use to IT culture

The first-effective use of some IT initiates the process of IT acculturation, and users' IT culture starts to build up. When individuals first start using some IT, their effective use of this IT starts shaping the type of user they will become, through the beliefs they develop about this IT, which eventually turn into IT values when the beliefs become enduring and related to any IT – i.e., it shapes their IT-culture user profile:

When I first started using a computer, it was at work ... The software I had to use was so inefficient and time-consuming that this probably influenced the way I now view any IT. If my first experience had been better, I perhaps would have got used to IT faster but, in any case, I am rather 'backward' when it comes to IT and I object to spending time on a computer. When I have the choice, I prefer to do what I have to do in other ways, manually. I find it is actually faster for me. For instance, I have a good mind for calculation; it is more time-consuming for me to fill in an Excel spreadsheet with calculations done

automatically by the software than doing the whole thing on paper by hand and the calculations by myself. (P1-I2, who migrated from Dodger to Constrained IT culture profile over time).

As people effectively use some specific IT tools to help them attain some goals, their beliefs and values evolve i.e., their IT culture builds up, and their profile sometimes evolves (“IT culture creep”: Walsh *et al.*, 2010):

I have some friends who can't do without IT. Myself, I can completely do without it (P4-I1). And, several years later, the same person indicates: *My stance regarding IT evolved a lot as the years went by: I first used computers only to play games when I was young, then it was to exchange and stay in touch with friends (it's important when you're young and you aren't allowed to go out much) then I used it a little for my work in high school and a lot, a lot ... for my studies in university ... Today, I spend at least ten hours a day in front of my computer ...* (P4-I2) Then again, some years later: *At work to do my job and when I go home, I look at my emails and I do personal things on my computer. It takes a huge place in my day-to-day life ... When I started, I used to do what I was shown in order to do the jobs to be done; then I did what I had to; now, I experiment.* (P4-I3, who migrated over time from Player to Disciplined to Interested IT culture profile).

4.2.3. The influence of expectable use on IT culture

A user's disposition or inclination to use IT (expectable use) influences the set of IT values she espouses (IT culture).

At the beginning, I didn't like it, I didn't want to use it, even though I sometimes needed it for my work. I was afraid to make mistakes, to make it crash or break it. I started using this new tool while being insufficiently trained. Therefore, I used

it as little as I could and was slow to use any other IT (P6-I2: Fearful expectable use inducing a frightened IT culture profile).

At the beginning, I had a phase when I was really curious about it ... It was something new; I liked it ... I am curious by nature and this played a role in the way I used IT and the development of my IT competences (P2-I2: Self-enhancing expectable use inducing a studious IT culture profile).

4.2.4. Feedback loop between IT culture and expectable use

The users' IT-culture profile i.e., their IT values influence their expectable use. For instance, somebody who believes IT is unreliable will use any IT with fear if constrained to do so:

I started on systems that were much too heavy and complex and not very reliable. As a result, I became frightened of IT and was very reluctant to use any other IT, even though I knew that sometimes software at my disposal could help me do my job more easily (P1-I1: Dodger then constrained IT culture profile inducing fearful expectable use).

I started using a computer and some software for my first job. It was not easy at the time as I wasn't very good at it. Little by little, I started using other software and 'it' [my IT usage] grew as a habit, a comfort ... I now know what I would miss if I did not use IT. (P3-I2, who migrated from constrained to disciplined IT culture profile leading to opportunistic expectable use).

4.2.5. Global IT needs and its causal loop with expectable use

In our exploratory quantitative analyses, we found that the path between Expectable use and global IT needs changed direction depending on whether expectable use was considered as the independent or outcome variable with respect to IT culture.

Through our qualitative data, we found that when people first start effectively using some IT, their usage remains at the behavioral level (i.e., relates to trying a new experiment or fulfilling a given task). They use these IT, even though they sometimes might not perceive any real need for them. As people effectively use different IT, their IT beliefs become IT values: through time, users eventually become affected cognitively and affectively by their effective use of IT; their IT culture emerges and evolves, which impacts their expectable use and in turn expectable use leads to the emergence and development of Global IT needs. In time, Global IT needs eventually impact back Expectable use.

I first used IT a lot to keep in touch with my family and this then created some needs on a daily basis. (P2-I2, socializing expectable use leading to the emergence of global IT needs).

I started using IT when I was eight to nine years of age to play Tetris with my brothers ... Little by little, you understand how it works and you are more inclined to use any IT that is available. The more you use it, the easier it gets... Then, you start using it for everything. Today, I need it on a daily basis. There is not a day that I don't turn on my computer or my iPhone or my iPad. I am always connected. IT is indispensable for me. (P4-I2, witnessing the development of her global IT-needs overtime).

The more I am willing to use it, the more I use it and the more I need it. (P3-I2, witnessing extensive expectable use leading to high global IT needs).

As people use IT (with fear, with self-indulgence, etc. i.e., expectable use), this further influences their global IT needs, sometimes leading to dependence:

Today, I use it all the time and enjoy it. I can't do without it anymore. Now, I need IT like you need drugs. (P5-I2: High

global IT needs inducing self-indulging expectable use).

4.2.6. Users' influence on their entourage

As users' IT culture evolves and builds up, users may in their turn influence their entourage:

Once I had assembled my first computer and started to use some software ... I showed my kids, and my wife – even though she did not want to touch it at first. Now she uses some software on a regular basis (P5-I3).

As I got better at it, I started helping my father, who regularly gets stuck: he often goes into a panic when he has to use a computer. I show him what to do... I try and teach him what I have learned (P4-I2).

Based on our qualitative data, we found and coded different cases of cultural migration amongst the six individual case studies (see Appendix C2 for further quotes, with a summary of IT culture profile migrations the last right-hand column). The two complementary perspectives (variance and process: Burton-Jones, McLean and Monod, 2015) that we adopted in our work lead us to a processual entity (IT acculturation) with its own properties, which is discussed in the next section.

4.3. The process of IT acculturation: Combining the variance and process theoretical perspectives

In this section, we interpret all our data as one set and report on the phenomenon that emerged as the 'core category' (Glaser and Strauss, 1967) in our study – i.e., IT acculturation, which is summarized in Figure 4 and discussed below.

Rudmin (2009) reminds us that the phenomenon of acculturation, though already discussed by Plato, was coined only in 1880

when Powell described the improvements in mental processes and the behavioral changes in individuals after their contact with advanced technologies. However, in the literature, the concept of acculturation suffers from a lack of consensus as to its definition. Many disciplines in the social sciences have defined this concept with very different approaches, each definition influencing the way this concept

was understood and used (Thomson and Hoffman-Goetz, 2009). For many years, the dominating paradigm in the acculturation field of research was its interpretation of acculturation as an adaptation to a new environment (Berry, 1980; Chirkov, 2009). However, his paradigm mostly ignores the complex socio-cultural and psychological nature of the acculturation process (Chirkov, 2009; Schonpflug, 1997).

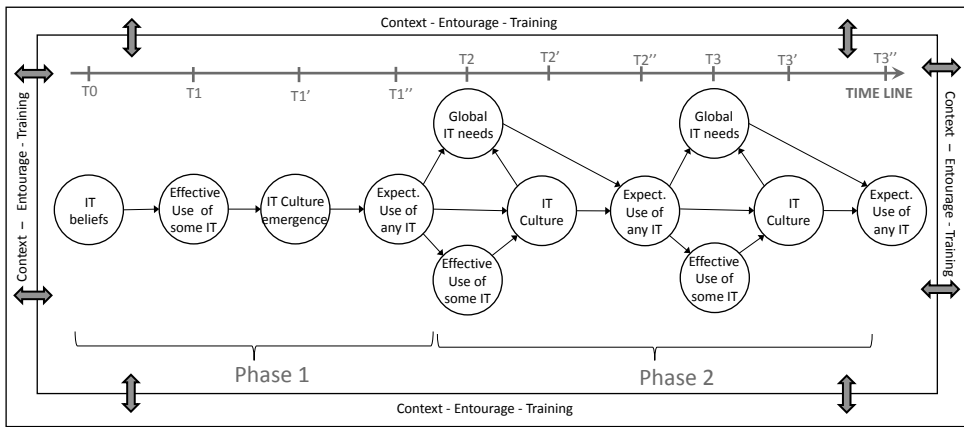


Figure 4. The IT-acculturation process

The term ‘acculturation’ itself, comes from the field of intercultural research, where this concept describes the process through which an individual, or a group, changes some of its behaviours and attitudes to be more like those of a host society. It is influenced by context, entourage, cognition and affect. Adapted to the IS field, IT acculturation is the process through which individuals change their behaviours and attitude with respect to IT over time. In this definition, IT’ is used as a generic term designating any IT (digital device or software).

Even though Jouët (1993) briefly mentions in her work what she names “numerical acculturation”, this phenomenon has hardly ever been studied as such in IS research. Loch *et al.* (2003) studied the role of a phenomenon they named “technological culturation” in the diffusion of the Internet

in the Arab world. Technological culturation was modelled by these authors as a latent construct that “refers to the cultural exposure and the experiences that individuals have with technology originally developed in other countries”; it “translates into a greater acceptance of a new technology” (Loch *et al.*, p. 46). This conceptualization is limited by its link to differing developer/user national cultures. Furthermore, the construct studied by these authors is assessed as a state at a given moment in time, and assesses experiences and exposure to IT. Based on our work, we understand the broader concept of IT acculturation as a *process* through which IT values are espoused to build IT culture up; as this process matures, it generally translates into faster and easier acceptance of any IT with which one is in contact, and it drives towards its appropriative and proactive usage.

The cross-sectional design of our quantitative analyses and our longitudinal qualitative data allowed us to highlight and delve into the continuous process of IT acculturation. The interactions between IT culture and expectable use, as well as between expectable use and global IT needs, are in constant play. These constructs are so intimately linked that the time lag involved may be extremely short: virtually synchronous, in fact. Also, the construct 'Effective use' (Burton-Jones and Grange, 2012) emerged as a partial mediator between expectable use and IITC.

Using a variance perspective, complemented by a processual perspective (Burton-Jones *et al.*, 2015), the process model that emerged from our work and is described below shows that there is not only unilateral causation between the investigated variables: some independent variables can in turn be considered as dependent variables. The study of the interrelations between the variables of our model leads us to an entity (IT acculturation) with its own properties that evolve over time.

Using all our data (quantitative and qualitative) as one set, we were able to model the process of IT acculturation, which is summarized in Figure 3. T0 marks the first contact with IT. T1, T2 and T3 indicate chronological periods of time, which are not fixed and depend on users, contexts, and circumstances. T1', T2' and T3' come a fraction of time after T1, T2 and T3 respectively. T1'', T2'' and T3'' then follow, another fraction of time later. These periods of time are a heuristic device to help us describe what we saw in our data. From one person to the next, the duration of each period will be different as well as the end result. IT acculturation is a continuous process with two main phases that emerged as representative of recurring patterns in our sequential data, after trying several alternative process models: (1) From initial

exposure to IT to the emergence of IT culture and (2) Emergence and development of global IT needs.

The first phase (see Phase 1, Figure 4) includes the initial exposure to some ITs inducing some IT beliefs, the effective use of these ITs until the related IT beliefs turn into IT values (enduring IT beliefs, related to all ITs). These IT values make up the user's IT culture, which will help explain the individual's disposition with respect to any IT (expectable use).

The emergence of global IT needs (Perceived needs for IT in different aspects of one's life) signals the second phase of the IT acculturation process (see Phase 2, Figure 4). After significant exposure to IT, and the effective use of various specific ITs in work, home and/or leisure settings, the user's IT culture builds up together with her expectable use and global IT needs emerge and develop inducing cultural migration.

Phase 1: From initial exposure to IT to the emergence of IT culture

Influenced by her context and entourage, the individual's IT beliefs start building up (time T0) and she starts effectively using some specific IT for a given task (work or leisure) at a given moment (time T1). Her context/entourage and the effective use of some new IT help build up the person's system of IT values (enduring IT beliefs), hence her IT culture (time T1'), which in turn leads to some expectable usage of any IT (time T1'').

For instance, if someone is born in a family of geeks, hooked on IT, and always "connected", who believe that IT is essential for 'everything', it is most probable she will develop the same beliefs (T0). She will probably start using the web at an early age to do many chores and errands (T1) and will use IT to play and, broadly, for her leisure activities (T1'). In these conditions, there is a fair chance that she will

welcome and start using willingly any new IT (T1"). *A contrario*, if someone evolves in surroundings where using IT is looked upon as unnecessary, unreliable and/or time-consuming (T0), it is most likely that she will be reluctant to start using some new IT (T1), will be rather constrained if some IT use is mandatory (T1') and will be inclined not to use any IT if given the choice (T1").

If someone is afraid of IT because she has had little exposure to it and lacks basic IT training, it is most probable that she will consider that she does not particularly need IT on an everyday basis (Context-Entourage-Training → IT beliefs). She will welcome and effectively use any new IT at work with reluctance as she considers that she can do better without it (IT beliefs → Effective use). However, if the use of this new IT at work is mandatory and efficient training provided as customized for her type of IT culture profile, she will eventually effectively use it. If the experience is pleasant and successful, it might help her IT culture evolve (Effective use → IT culture).

If someone has had bad previous experiences with some unreliable IT, that lead her to nearly lose her job, her IT use will probably be quite constrained (Effective use → IT culture), which in turn will likely induce future IT use to be cautious and fearful (IT culture → Expectable use). However, if a user has had successful and enjoyable previous experiences with some IT that lead her to improve her productivity and be promoted, she will probably be willing to try out and feel fairly at ease with new IT (Effective use → IT culture). In turn, this will influence her expectable use (IT culture → Expectable use) and future effective usage of other IT (Expectable use → effective use) and she will start perceiving some global IT needs (Expectable use → Global IT needs).

Phase 2: Emergence and development of global IT needs (Cultural migration)

Phase 2 is initiated when the user starts perceived global IT needs (T2). If the context is propitious and training adequate, the person's expectable use of any IT, and effective use of some new IT can induce an evolution of IT culture (time T2'), which in turn will cause an evolution of expectable use of any IT (time T2"). Once global IT needs have started emerging, they will influence future expectable use of any IT.

For instance, continuing on a previous example, if the originally frightened person discovers that using a new proposed IT at work, actually makes her work easier and faster, she will gradually look upon IT with less fear and reluctance (Effective use → IT culture), then she will probably come to think she needs IT in her work (IT culture → Global IT needs), and be less fearful when she uses other IT (IT culture → Expectable use).

The IT acculturation process goes on indefinitely (time T3, etc.) as long as the individual is exposed to and effectively uses different IT (software and/or hardware). This process is influenced over time by the user's context, entourage and training. Our work helps understanding how and why an individual's IT culture emerges, develops, and interplays with both expectable and effective usage of specific IT, while her global IT needs evolve accordingly overtime.

5. LIMITATIONS, FUTURE AVENUES FOR RESEARCH, AND CONTRIBUTIONS

In this section, we discuss the limitations of our work as well as the avenues left open for future research and our contributions.

5.1. Limitations and future research

Our results need to be confirmed in different substantive areas and contexts, and with different participants to drive towards further 'substantive formalization' of our GT (Glaser and Strauss, 1967; Holton and Walsh, 2016).

In the present work, we studied only the emergence of global IT needs through the process of IT acculturation. These needs may emerge if the user's IT culture is sufficiently developed – i.e., if and when the process of IT acculturation is sufficiently advanced to impact usage at the cognitive and affective levels. Furthermore, IT needs as defined by Walsh *et al.* (2010) also include situational IT needs (which are task-related) and contextual IT needs (which are context-related). Through our qualitative data, we found that it would probably be also useful to investigate these two types of IT needs, and their possible relationships with global IT needs and possible causal influence on IT culture and IT usage. This would allow contextual and task specificities to be taken into account in greater detail in the IT-acculturation process and might be particularly important for firms in a professional set-up. Future research could specifically aim to investigate further the means of nurturing the process of IT acculturation in organizational contexts towards 'enculturation' – i.e., purposeful, guided, and positive acculturation (Levina and Orlikowski, 2009).

The main limitation of our work is probably its heavy reliance on Walsh and colleagues' works and the cultural framework they use to investigate IT usage. It might be fruitful for future researchers to investigate whether other fields that used slightly different terms (e.g., digital culture) attempted to model and study the corresponding acculturation process. In the IS field, Utesheva *et al.*,

(2016) showed that, in order to adapt to digital disruption in organization, identity renegotiation is required for an organization's survival. Future research could study the possible relationships between the IT-acculturation process and the building-up of an IT identity (Carter and Grover, 2015), as well as between users' level of IT acculturation, their IT culture profile and their adaptive capacity to cope with new/disruptive IT (Beaudry and Pinsonneault, 2005; Elie-Dit-Cosaque and Straub, 2011).

One further limitation is methodological. It is induced by the fact that the data were coded and recoded by the same person, which creates a bias.

5.2. Theoretical contribution

We have highlighted the process of IT acculturation as a cultural learning process. We studied how this process unfolds through causal loops between IT culture, expectable use and global IT needs. Our results help advance our understanding of IT usage and how it may be nurtured to evolve. This could lead us to reconsider some fundamental concepts, such as IT acceptance, adoption, or appropriation. If one envisages IT usage as a cultural phenomenon, developed through progressive IT acculturation, then the IT-usage vocabulary should perhaps be closer, at least in its significance, to the vocabulary used for and applied to cultural issues. Some researchers already tacitly accept this element and such terms as 'digital natives' and 'digital immigrants' are now commonly used in IS research (e.g., Utesheva, *et al.*, 2016; Te'eni, 2017). Then, our model of the IT-acculturation process could be enlightened by those in other social sciences that cover the acculturation phenomenon. For instance, Kim and Abreu's (2001) model – from the intercultural field of research, proposing three structuring levels of

acculturative change (behavioral, cognitive, and affective) – could begin to inform and guide us. IT acceptance could perhaps be understood as behavioral acceptance of a new culture: IT is accepted as being part of one’s everyday life. IT adoption could then imply a cognitive change: IT is integrated into one’s cognitive schemes, being cognitively mastered but with usage remaining mostly prescribed and not affecting one’s basic assumptions. Finally, IT appropriation could imply a change at the affective level: IT could become a cognitive extension of individuals, who would adapt the developers’ cognitive schemes to their own. IT usage is then specific to each individual, though it is often constructed from and grounded in prescribed and learned usage. IT acculturation at the individual level could then be understood as the process through which an individual progressively accepts, adopts, and appropriates IT. When the three levels of IT acculturative change (behavioral, cognitive, and affective) are reached, the individual’s IT culture is then fully structured and has intermingled with other pre-existing cultural layers; it has affected and modified the individual’s global mindset and basic assumptions.

Mandatory-versus-voluntary use has been studied in the literature (e.g., Brown *et al.*, 2002; Devaraj and Kohli, 2003; Hartwick and Barki, 1994) and related specifically to the intention–use relationship. Through our qualitative data, we found that whether one starts voluntarily or mandatorily utilizing IT may play a significant role in the IT-acculturation process. It appears that when first usage is mandatory and perceived as unsatisfactory, it may leave an enduring imprint with some users: the IT-acculturation process is then often slowed down. In this situation, when the IT acculturation process eventually reaches the affective level, even if the user cognitively realizes the necessity to use some IT, the impact tends to be lastingly negative.

However, we also found that if a proposed new IT is fully tested and aligned with key users’ expectations, mandatory use may help some reluctant users’ cultural migration. In the case of previous negative experiences with IT, it may also help revert the previously negative imprint.

Even though first IT usage, context, and entourage are important to ignite the IT acculturation process, users’ personality also plays a significant role in their thoughts, feelings, behaviours, and actions (Maddi, 1989). McElroy *et al.* (2007) showed that personality predicted the use of – and willingness to use – the Internet. Based on our results, individuals’ dispositions and personalities appear also to significantly explain the speed of their IT acculturation. Hence, although IT memes are ‘agile’ (Baker and Thomas, 2007), they spread at different speeds from one person to the next, depending on personality as well as on the context of first-effective and subsequent usage. While some users do have some natural dispositions to use IT, and others do not (Walsh *et al.*, 2016), their IT dispositions may be nurtured, managed, and developed through the (sometimes mandatory) effective use of – and socialization around – efficient and well-tested IT, and customized training.

5.3. Methodological contribution

From a methodological perspective, we have used a mixed-design GT approach in the present study; this approach is seldom used in IS research. Even though as mentioned earlier in this paper, we are indeed critical realist, we enroll in the fourth mixed-method IS community highlighted by Pascal, *et al.* (2008). This community is still scarcely populated. It does not ignore philosophical issues, does not use the researcher’s philosophical positioning as a means of justification for using mixed

methods, data and techniques, and does not try to reconcile incompatible paradigms. Rather, it uses mixed methods, data and techniques simply when the need to do so emerges from the research itself, in order to obtain results that might be considered as robust.

Furthermore, the use of a GT approach with mixed-design, cross-sectional quantitative data, and longitudinal qualitative data to investigate a causal loop between constructs has – to our knowledge – never before been attempted in IS research. More generally, two-way paths between constructs are seldom studied in the literature.

Finally, and while remaining in an exploratory stance all through our research, we used a variance perspective, complemented by a process perspective (Burton-Jones *et al.*, 2015). To our knowledge, the two perspectives are rarely adopted complementarily, and more particularly in an exploratory stance, within the same study in mainstream IS literature.

5.4. Managerial implications

In firms, our results tend to indicate that when reluctant users are confronted to mandatory use of some new IT, even when they do not perceive the need for this specific IT, positive cultural migration through IT acculturation may take place. This is the case if the proposed IT is well adapted and well-tested, and if training is perceived by users as adequate and adapted to their IT culture profile. When new IT is implemented in firms, more particularly when its use is strategic and mandatory, we would recommend that (1) key users be part of the *ex-ante* IT evaluation process to ensure its alignment with their situational and contextual needs, (2) any new IT be extensively tested before implementation and (3) users' IT culture profile be identified before and after training to verify that

this training was adapted and sufficient to help IT acculturation and cultural migration to drive toward effective use of this new strategic investment by all prospective users. This could ensure that return on investment is not dampened through non-use or non-effective use.

Understanding the IT-acculturation process is also important for IS practice as it helps bring into focus the fact that IT usage is not a simple, linear phenomenon. Even though proactivity in IT usage appears to be somewhat linked to users' personality and dispositions, understanding the process of IT acculturation helps managers identify possible paths to guide users' IT acculturation through socialization centered around IT, leading to users' increased IT needs being more aligned with organizational IT needs (Urwiller and Frolick, 2008). Project managers in firms could be encouraged to nurture, with careful supervision, the intrinsic motivation of those 'would-be' proactive users through the development of specific work conditions – e.g., the freedom to experiment with new IT.

6. CONCLUSION

During the last couple of decades, the concept of IT culture has been emerging in the IS literature and has been shown to be linked to IT usage. However full investigation of the linkage between the two constructs, why and how this linkage is built over time, was missing and has been addressed in the present work. Using a GT approach and mixed methods, combining both variance and process theoretical perspectives, we have shown that users' IT culture may evolve, depending on the context and entourage, as well as the training and experiences users have, related to IT. We have theorized on the IT-acculturation process through which IT culture evolves together with the dispositional facet of IT

usage. The present work helps further our understanding of IT culture and usage and their linkages. It delves into cognitive and affective dimensions of these phenomena that help explain differences between users; these differences go beyond obvious behavioral elements. We open possible paths to nurture IT culture and IT usage in organizations through purposeful IT acculturation toward the fulfillment of organizational IT needs and optimization of the ROI of strategic IT investments.

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APPENDIX A: OUR THEORETICAL SAMPLING

Appendix A1: Quantitative data: demographic statistics

Position					
		Frequency	%	Valid %	Cumulative %
Valid	1. Employee	120	17.8	17.9	17.9
	2. Top management	61	9.0	9.1	27.0
	3. Middle Management	100	14.8	14.9	41.9
	4. Student	271	40.1	40.4	82.3
	5. Teacher/professor	31	4.6	4.6	86.9
	6. Retired	30	4.4	4.5	91.4
	7. Unemployed	21	3.1	3.1	94.5
	8. Other	37	5.5	5.5	100.0
		Total	671	99.3	100.0
Missing	System	5	.7		
Total		676	100.0		
Gender					
		Frequency	%	Valid %	Cumulative %
Valid	Male	309	45.7	45.7	45.7
	Female	367	54.3	54.3	100.0
	Total	676	100.0	100.0	
Age					
		Frequency	%	Valid %	Cumulative %
Valid	[15–20]	74	10.9	10.9	10.9
	[21–30]	351	51.9	51.9	62.9
	[31–40]	50	7.4	7.4	70.3
	[41–50]	77	11.4	11.4	81.7
	[51–60]	92	13.6	13.6	95.3
	61+	32	4.7	4.7	100.0
		Total	676	100.0	100.0
Education					
		Frequency	%	Valid %	Cumulative %
Valid	No academic qualifications	5	.7	.7	.7
	High-school graduation	90	13.3	13.4	14.1
	High-school diploma	70	10.4	10.4	24.6
	1 year of tertiary education	25	3.7	3.7	28.3
	2 years of tertiary education	90	13.3	13.4	41.7
	3 years of tertiary education	126	18.6	18.8	60.4
	4 years of tertiary education	132	19.5	19.6	80.1
	≥ 5 years of tertiary education	134	19.8	19.9	100.0
		Total	672	99.4	100.0
Missing	System	4	.6		
Total		676	100.0		

*Appendix A2: Qualitative data: details
of the six investigated cases*

Participants	P1	P2	P3	P4	P5	P6
Position at time of last interview	Professor/ consultant	Student/ secretary	Sales staff in an IT firm	Public relations in a movie- production firm	IT technician	Housekeeper/ childminder
Relationship with other interviewees	Father of P4 and P3	Wife of P3	Husband of P2 and brother of P4	Daughter of P1 and sister of P3	Husband of P6	Wife of P5
Age at time of last interview	60	27	32	24	40	45
Birth country	Ireland	Brazil	Ireland	France (metropolitan)	France (island of Martinique)	France (metropolitan)
Education at time of last interview (2012)	Master's degree in international business	Two years at university studying for a bachelor's degree in law	Two-year vocational degree in business	Master's degree in communication	Bachelor's degree in IS	Limited academic education; left school during third year of high school

APPENDIX B: QUANTITATIVE DATA

Appendix B1: Details of constructs and items on the administered questionnaire

Construct	Dimensions	Wording	Source
IITC Individual IT culture 1 st -order reflective 2 nd -order formative	ACCNEE Accomplishment needs satisfied through IT usage	ACCNEE1: I feel satisfaction when I improve my mastery of the software I use. ACCNEE2: Mastering a new computer program gives me satisfaction. ACCNEE3: Even if I have to spend hours mastering new software that I have to use, the satisfaction I get from it is worth the effort.	Adapted from Von Stetten <i>et al.</i> (2011), Walsh (2009), and Walsh <i>et al.</i> (2010)
	AFFNEE Affiliation needs satisfied through IT usage	AFFNEE1: Having a computer allows me to keep in touch with my work group and/or certain people in my entourage. AFFNEE2: Using a computer allows me to communicate with the people I work with and/or the people I like. AFFNEE3: IT allows me to communicate and socialize with certain people.	
	EXTMOTID Extrinsic motivation with external regulation	EXTMOTID1: Using a computer improves the quality of my work. EXTMOTID2: IT is a work tool that allows me to be more productive, and I think I must know how to use this tool if I want to be efficient. EXTMOTID3: I have to use IT if I want to carry out certain of my tasks correctly.	
	EXTMOTEX Extrinsic motivation with identified regulation to use IT	EXTMOTEX1*: I am obliged to use IT but it's arduous for me. EXTMOTEX2*: I don't like IT but I am obliged to use it. EXTMOTEX3*: Having to use a computer is something I see as an arduous constraint.	
	INTMOTKNO Intrinsic motivation to know IT	INTMOTKNO1: I like discovering new software. INTMOTKNO2: I find IT interesting. INTMOTKNO3: I find some aspects of IT captivating.	
	POWNEE Power needs satisfied through IT usage	POWNEE1: Being good with computers gives me a sense of importance towards those closest to me and I like that. POWNEE2: I like to show that I have good IT knowledge because this allows me to be better appreciated by my entourage. POWNEE3: Knowing how to use a computer well gives me a feeling of superiority, which I appreciate.	
	PRIMNEE Primary needs satisfied through IT usage	PRIMNEE1: When I am using my computer, I don't see the time go by and I find it hard to disconnect. PRIMNEE2: I have difficulty controlling the time I spend on my computer. PRIMNEE3: I spend a lot of time on my computer and I like that.	

Construct	Dimensions	Wording	Source
<p>GLOBITNEE Global IT needs Reflective</p>		<p>GLOBITNEE1: I could perhaps do without IT but it would be difficult and uncomfortable for me. GLOBITNEE2: IT has become an implicit part of my everyday life and I would prefer not to have to do without it. GLOBITNEE3: I need IT in every aspect of my life and I don't want to have to do without it.</p>	<p>Adapted from Walsh (2014)</p>
	<p>Expectable Use 1st-order reflective 2nd-order formative</p>	<p>FEARUSE Fearful use</p>	<p>FEARUSE1: When I use IT, I am always afraid of making mistakes. FEARUSE2: When I use a computer, I'm always afraid to hit the wrong key and lose all my data. FEARUSE3: When I use a computer, there is always a moment when I panic because I have done something that I shouldn't have.</p>
<p>SELFINUSE Self-indulging use</p>		<p>SELFINUSEE1: My IT know-how gives me a certain prestige and I like that. SELINUSEE2: I appreciate the power that my IT knowledge gives me.</p>	
<p>OPPUSE Opportunistic use</p>		<p>OPPUSE1: IT allows me to save time. OPPUSE2: I am faster in some of my tasks when I use IT. OPPUSE3: IT allows me to be more efficient.</p>	
<p>EXTUSE Extensive use</p>		<p>EXTUSE1: I use IT in all aspects of my life. EXTUSE2: I consider IT essential in every aspect of my life. EXTUSE3: I use my computer so much and for so many things that I don't want to do without it.</p>	
<p>SELFENHUSE Self-enhancing use</p>		<p>SELFENHUSE1: If I can't manage to use some software, I try and understand why. SELFENHUSE2*: If I can't manage some software, I won't bother to find out why. SELFENHUSE3: When I am confronted with a problem I don't understand, I like to find solutions for myself.</p>	
<p>SOCUSE Socializing use</p>		<p>SOCUSE1: I use IT to communicate. SOCUSE2: I use IT to socialize with certain people. SOCUSE3: I use IT to keep in touch with certain people without being physically face-to-face.</p>	
<p>*These items have been negatively worded and had to be reverse coded before treatment in SmartPLS.</p>			

Appendix B2: Statistical results

CROSS-LOADINGS

Nested Model 1	ACCNEE	AFFNEE	EXTMOTID	GLOBITNEE	INTMOTKNO	POWNEE	PRIMNEE	REVEXTMOTEX
ACCNEE1	0.891	0.216	0.329	0.445	0.586	0.455	0.519	0.299
ACCNEE2	0.909	0.210	0.347	0.411	0.642	0.516	0.499	0.300
ACCNEE3	0.858	0.244	0.343	0.457	0.704	0.502	0.470	0.364
AFFNEE1	0.260	0.928	0.335	0.401	0.322	0.194	0.361	0.296
AFFNEE2	0.206	0.917	0.294	0.387	0.288	0.180	0.376	0.270
AFFNEE3	0.214	0.858	0.254	0.345	0.259	0.135	0.315	0.305
EXTMOTID1	0.332	0.300	0.900	0.487	0.338	0.240	0.305	0.185
EXTMOTID2	0.401	0.301	0.886	0.506	0.406	0.304	0.349	0.234
EXTMOTID3	0.249	0.253	0.829	0.389	0.258	0.183	0.190	0.078
GLOBITNEE1	0.375	0.334	0.414	0.796	0.405	0.270	0.506	0.320
GLOBITNEE2	0.444	0.400	0.448	0.892	0.500	0.364	0.624	0.389
GLOBITNEE3	0.438	0.339	0.499	0.866	0.473	0.367	0.598	0.344
INTMOTKNO1	0.726	0.251	0.365	0.482	0.881	0.514	0.520	0.415
INTMOTKNO2	0.616	0.287	0.331	0.509	0.900	0.454	0.517	0.507
INTMOTKNO3	0.546	0.309	0.323	0.416	0.823	0.364	0.449	0.365
POWNEE1	0.551	0.164	0.251	0.364	0.500	0.929	0.457	0.142
POWNEE2	0.447	0.185	0.275	0.356	0.432	0.885	0.469	0.155
POWNEE3	0.517	0.170	0.254	0.361	0.475	0.921	0.441	0.133
PRIMNEE1	0.456	0.320	0.230	0.548	0.422	0.400	0.877	0.300
PRIMNEE2	0.458	0.315	0.267	0.568	0.480	0.449	0.903	0.325
PRIMNEE3	0.550	0.385	0.364	0.644	0.588	0.461	0.858	0.467
REV_EXTMOTEX1	0.324	0.279	0.160	0.366	0.433	0.127	0.368	0.895
REV_EXTMOTEX2	0.338	0.279	0.152	0.363	0.448	0.174	0.392	0.859
REV_EXTMOTEX3	0.291	0.287	0.214	0.354	0.421	0.110	0.343	0.873

Nested Model 2	EXTENSIVE USE	FEARFUL USE	GLOBITNEE	OPPORTUNISTIC USE	SELF-ENHANCING USE	SELF-INDULGING USE	SOCIALIZING USE
EXTENUSE1	0.912	-0.242	0.712	0.582	0.421	0.455	0.400
EXTENUSE2	0.901	-0.200	0.741	0.509	0.391	0.467	0.387
EXTENUSE3	0.875	-0.249	0.747	0.565	0.407	0.501	0.335
FEARUSE1	-0.253	0.929	-0.258	-0.367	-0.476	-0.181	-0.195
FEARUSE2	-0.186	0.846	-0.192	-0.238	-0.339	-0.111	-0.107
FEARUSE3	-0.242	0.903	-0.267	-0.309	-0.425	-0.160	-0.203
GLOBITNEE1	0.547	-0.195	0.799	0.436	0.305	0.331	0.302
GLOBITNEE2	0.719	-0.249	0.892	0.509	0.395	0.390	0.367
GLOBITNEE3	0.804	-0.244	0.864	0.540	0.393	0.433	0.353
OPPUSE1	0.541	-0.328	0.502	0.841	0.414	0.343	0.385
OPPUSE2	0.510	-0.323	0.489	0.895	0.426	0.346	0.332
OPPUSE3	0.563	-0.256	0.536	0.881	0.402	0.387	0.297
REV_SELFENH2	0.184	-0.410	0.197	0.227	0.668	0.167	0.070
SELFENH1	0.434	-0.375	0.403	0.436	0.878	0.486	0.201
SELFENH3	0.425	-0.383	0.399	0.441	0.860	0.462	0.204
SELFINDUSE1	0.507	-0.214	0.441	0.415	0.500	0.924	0.263
SELFINDUSE2	0.450	-0.089	0.379	0.325	0.383	0.891	0.219
SOCUSE1	0.389	-0.223	0.352	0.354	0.177	0.244	0.886
SOCUSE2	0.366	-0.172	0.364	0.355	0.194	0.215	0.893
SOCUSE3	0.343	-0.108	0.340	0.308	0.181	0.245	0.853

INTERCORRELATIONS BETWEEN REFLECTIVE SUB-CONSTRUCTS AND RELIABILITY

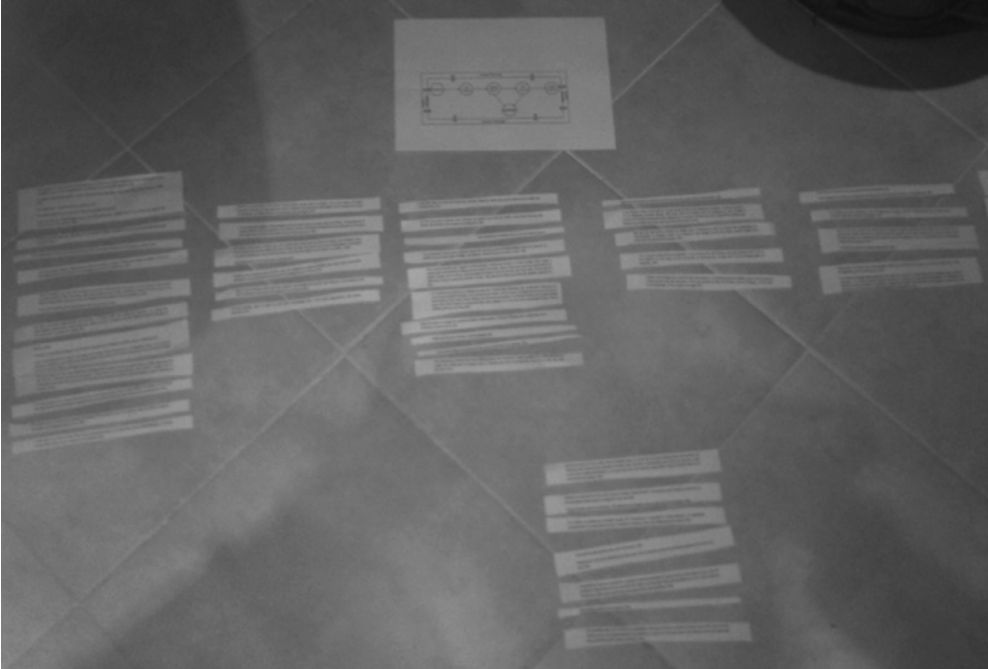
RELIABILITY

Nested Model 1	ACCNEE	AFFNEE	EXTMOTID	GLOBITNEE	INTMOTKNO	POWNEE	PRIMNEE	REVEXTMOTEX
ACCNEE	0.886	0.252	0.384	0.494	0.728	0.555	0.559	0.363
AFFNEE	0.252	0.901	0.328	0.420	0.323	0.190	0.390	0.321
EXTMOTID	0.384	0.328	0.872	0.534	0.391	0.285	0.332	0.200
GLOBITNEE	0.494	0.420	0.534	0.852	0.542	0.395	0.679	0.412
INTMOTKNO	0.728	0.323	0.391	0.542	0.869	0.515	0.572	0.496
POWNEE	0.555	0.190	0.285	0.395	0.515	0.912	0.499	0.157
PRIMNEE	0.559	0.390	0.332	0.679	0.572	0.499	0.879	0.421
REVEXTMOTEX	0.363	0.321	0.200	0.412	0.496	0.157	0.421	0.876
Nested Model 2	EXTENSIVE USE	FEARFUL USE	GLOBITNEE USE	OPPORTUNISTIC USE	SELF-ENHANCING USE	SELF-INDULGING USE	SOCIALIZING USE	
EXTENSIVE USE	0.896	-0.257	0.818	0.617	0.454	0.529	0.418	
FEARFUL USE	-0.257	0.893	-0.271	-0.347	-0.468	-0.172	-0.193	
GLOBITNEE	0.818	-0.271	0.852	0.584	0.431	0.454	0.401	
OPPORTUNISTIC USE	0.617	-0.347	0.584	0.873	0.475	0.411	0.387	
SELF-ENHANCING USE	0.454	-0.468	0.431	0.475	0.808	0.491	0.210	
SELF-INDULGING USE	0.529	-0.172	0.454	0.411	0.491	0.908	0.267	
SOCIALIZING USE	0.418	-0.193	0.401	0.387	0.210	0.267	0.878	

Nested Model 1 - Reflective constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)	Nested Model 2 - Reflective constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
ACCNEE	0.863	0.916	0.785	EXTENSIVE USE	0.877	0.924	0.803
AFFNEE	0.884	0.929	0.813	FEARFUL USE	0.874	0.922	0.798
EXTMOTID	0.844	0.905	0.761	GLOBITNEE	0.812	0.888	0.727
GLOBITNEE	0.812	0.888	0.727	OPPORTUNISTIC USE	0.843	0.906	0.762
INTMOTKNO	0.837	0.902	0.755	SELF-ENHANCING USE	0.736	0.848	0.653
POWNEE	0.898	0.937	0.831	SELF-INDULGING USE	0.788	0.903	0.824
PRIMNEE	0.854	0.911	0.773	SOCIALIZING USE	0.851	0.909	0.770
REVEXTMOTEX	0.848	0.908	0.767				

APPENDIX C: CODING OUR QUALITATIVE DATA

Appendix C1: Preliminary coding of our qualitative data



Appendix C2: Some illustrations of theoretical coding of the qualitative data

Context/encouragement->	Effective use->IITC	IITC -> Expectable use	Expectable use -> IITC	Expectable use and IITC -> GLOBITNEE	Expectable use -> Effective use	Usage-> Context/Encouragement	Cultural migration
<p>It was because of my encouragement that I started using a personal computer.</p> <p>P1</p>	<p>I first started using some IT during the late '80s because of my job at the time as an accountant but it was very limited. I just filled 'boxes' on a screen...</p> <p>I bought a mobile phone when I started travelling abroad for work, to communicate with the firm without being dependent on customers</p>	<p>My bad initial experiences left an enduring imprint on me. As a result, I avoided using IT as much as I could</p>	<p>As soon as I started using emails, it became a more sophisticated means to communicate for me. At the time I was looking for a job and I was probably hoping to widen my potential scope for contacts through this. As this seemed to work well for me, I was kind of less 'against' it and more at ease with IT after that.</p>	<p>I then started using Google to look for information. I have realized what a fabulous source of information it is. It was somebody from my family who showed it to me. This is when I started thinking I might come to actually need IT.</p>	<p>I am a bit more comfortable with IT now but still use it as little as I can. For instance, I use IT to prepare for my travels, I book my train and plane tickets through the web. Before we used to go through travel agencies but they don't exist anymore...</p>	<p>Usage-> Context/Encouragement</p>	<p>Dodger-> Constrained</p>
<p>My mother had one of the first personal computers. It was connected on the web through a modem that made little 'screechy' noises... The fact that I had access to computers at home played a big role in my starting to use IT.</p> <p>P2</p>	<p>I got better through use. For instance, at the beginning I was uncomfortable with excel because it was unknown territory and I could see it was complex. I read a lot on forums, I practised more and more, I mastered it and I don't find it complex any more.... In fact I am quite comfortable with it.</p>	<p>It was something new, I liked it... I am curious by nature (INTIMOTKNO) and this played a role in the development of my IT competences and the way I approach any IT (EXPULSE)</p>	<p>I didn't find it complicated. It's the way people look at it that will make them find it more or less complicated.</p>	<p>I used IT a lot to keep in touch (SOCUSE) and this created some needs on a daily basis... Today I need IT in my everyday life. I can't even imagine doing without it (GLOBITNEE)</p>	<p>Now if I can't do something, I know that there is somebody somewhere in the world who knows and I can ask them...</p>	<p>When I master some new software, I like to help other people and show them how to use it</p>	<p>Studios</p>
<p>I really started using a computer for my first job.</p> <p>P3</p>	<p>It was not easy at the time as I wasn't very good at it and I didn't like this feeling (POWNEE)</p>	<p>I only used it at work and did only what people asked me to do after they showed me</p>	<p>Now as soon as I arrive at my work I turn on my computer. In my personal life, I use my iPhone a lot, I surf on the web with it. I only use my computer to write letters or things like that...</p>	<p>The more I use it the more I need it. I need it every day...</p>	<p>Now it is a comfort, a habit. I know what I would miss if I did not use it</p>	<p>When I find interesting websites, I like to show them to my friends</p>	<p>Constrained-> Disciplined</p>

Context/encouragement-->	Effective use-->IITC	IITC --> Expectable use	Expectable use --> IITC	Expectable use and IITC --> GLOBITNEE	Expectable use --> Effective use	Usage--> Context/Encouragement	Cultural migration
Through my mother I had the opportunity to have computers at home since I am very young. I remember we had the very first computers, they were very big when nobody had them. It was something familiar for me and that's why I naturally started using IT	As I was young, for me at the time, it was for playing. I started using IT when I was 8-9 yrs of age to play Tennis with my brothers		My stance regarding IT (Expectable Use) evolved a lot as years went by: I first used computers only to play games when I was young, then it was for conversations and to stay in touch with friends, MSN etc. (it's important when you're young and you aren't allowed to go out much)(SOCUSE), then I used it a little for my work in high school and a lot, for my studies at university and even more for my work (EXTMOTID)	There is not a day that I don't turn on my computer or my iPhone or my iPad. Today I need it on a daily basis. I am always connected. IT is indispensable for me.	Today I spent at least 10 hours in my work day in front of my computer... when I go home, I look at my emails and I do personal things on my computer. It takes a huge place in my day to day life... When I started I used to do what I was shown, then what I had to do, now I experiment	As I got better at it, I started helping my father who regularly gets stuck ...	Player--> Disciplined--> Interested
10 years ago, I worked in the army to code messages and decipher codes, I was a 'crypto operator'. Some of my colleagues at work showed me how to assemble a computer, so I went to buy parts and I assembled them. That's how I started...	First it was intuitive. It became easier as I used it for work. I started using it also in my private life (to place orders through the web, to book hotel rooms, to go on holidays, to follow my bank accounts, etc.)...			Today I can't do without it any more. I need it like you need drugs. None of us can, it is everywhere.		I started bringing some of it at home and I showed my kids and my wife, even though she didn't want to touch it at first	Disciplined --> Interested/ Studious
I started using it because my husband installed it at home but I prefer the big one as I can't see properly on the little one. At the beginning my husband showed me but he wasn't patient. As my son was with my husband all the time since he was small, he had learned a lot about computers. So I asked my son to teach me	At the beginning I didn't like it, I didn't want to use it, I was afraid to make mistakes, to block it or break it		I still preferred to physically go to the agency, but now I don't have the choice any more (EXTMOTEX).	It became easier as I used it, now it's a habit and I quite like it, I need it... The more I use it, the easier it gets, the more I realize what I can do with it, and why I need it. I couldn't do without it today	I use it to look for work and I also like to look for things, places to go to, addresses, phone numbers, I miss it when I don't use it	As I don't have much education, I use it to help my children do their homework. I first check on the web to make sure I am not mistaken. It is easier to look on the web than in a dictionary... If I don't understand, I ask my husband to help them.	Frightened--> Player--> Disciplined