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### ► To cite this version:

Marie-Laurence Caron-Fasan, Nicolas Lesca, Céline Perea, Sarah Beyrouthy. Adoption of enterprise social networking: Revisiting the IT innovation adoption model of Hameed et al. *Journal of Engineering and Technology Management*, 2020, 56, pp.101572 -. 10.1016/j.jengtecman.2020.101572 . hal-03490777

**HAL Id: hal-03490777**

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Submitted on 22 Aug 2022

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**Adoption of enterprise social networking:  
Revisiting the IT innovation adoption model of Hameed et al.**

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## **Abstract**

Enterprise social networking (ESN) is still an underused IT innovation; although its advantages are widely recognized, its adoption remains a challenge. This research aims to study the characteristics involved in the adoption process of ESN by using the integrative conceptual model of Hameed et al., which combines the individual/organizational dimensions of adoption with the three-phase adoption process dimensions (i.e., pre-adoption, adoption, and post-adoption). Based on exploratory qualitative research, our research question is twofold: What are the specific characteristics of the adoption of IT innovation involved in the adoption of ESN? What new insights into the adoption of IT innovation does ESN reveal? We identify that “security”—already well known as a characteristic of the IT innovation factor that influences adoption—is a characteristic of the organizational factor too. Eighteen characteristics identified are in line with the conceptual model but not present in the corresponding phases of the adoption of IT innovation. In terms of the innovation factor, we identify that “compatibility” and “security” are new characteristics in the pre-adoption phase, and that “business process re-engineering” is a new characteristic in the pre-adoption and adoption phases. Regarding the organizational factors, we identify that “image” and “information-sharing culture” are new characteristics in the pre-adoption phase, and that

“security” is a new characteristic in all three phases. For the environmental factor, we identify that “partners support” is a new characteristic of the post-adoption phase. Finally, for the user acceptance factor, we identify that “perceived usefulness” and “attitude towards use” are new characteristics in the pre-adoption phase, “perceived playfulness” is a new characteristic in the pre-adoption and adoption phases, “user involvement” is a new characteristic in the pre-adoption and post-adoption phases, and “user age” is a new characteristic in all three phases. Overall, we underline that the most critical stage is pre-adoption: this is the period in which most of the characteristics are concentrated, and in which most of the challenges of adopting ESN arise.

**Keywords**

Adoption, IT innovation, enterprise social networking, integrative model

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Enterprise social networking (ESN) is still an underused IT innovation; although its advantages are widely recognized, its adoption remains a challenge. This research aims to study the characteristics involved in the adoption process of ESN by using the integrative conceptual model of Hameed et al., which combines the individual/organizational dimensions of adoption with the three-phase adoption process dimensions (i.e., pre-adoption, adoption, and post-adoption). Based on exploratory qualitative research, our research question is twofold: What are the specific characteristics of the adoption of IT innovation involved in the adoption of ESN? What new insights into the adoption of IT innovation does ESN reveal? We identify that “security”—already well known as a characteristic of the IT innovation factor that influences adoption—is a characteristic of the organizational factor too. Eighteen characteristics identified are in line with the conceptual model but not present in the corresponding phases of the adoption of IT innovation. In terms of the innovation factor, we identify that “compatibility” and “security” are new characteristics in the pre-adoption phase, and that “business process re-engineering” is a new characteristic in the pre-adoption and adoption phases. Regarding the organizational factors, we identify that “image” and “information-sharing culture” are new characteristics in the pre-adoption phase, and that “security” is a new characteristic in all three phases. For the environmental factor, we identify that “partners support” is a new characteristic of the post-adoption phase. Finally, for the user acceptance factor, we identify that “perceived usefulness” and “attitude towards use” are new characteristics in the pre-adoption phase, “perceived playfulness” is a new characteristic in the pre-adoption and adoption phases, “user involvement” is a new characteristic in the pre-adoption and post-adoption phases, and “user age” is a new characteristic in all three phases. Overall, we underline that the most critical stage is pre-adoption: this is the period in which most of the characteristics are concentrated, and in which most of the challenges of adopting ESN arise.

### **Keywords**

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## 1. Introduction

Since its inception in 2007, social networking as an information technology (IT) innovation has created convenient opportunities for delivering and sharing information, both inside and outside of an organization, and the use of multifaceted social networks in professional spheres is spreading at an increasingly rapid rate. Initially adopted in relatively closed private circles, social networking first caught the attention of reputable organizations and prestigious academic communities (Leonardi et al., 2013), and it was not too long before companies started harnessing its power to cement better relationships and communication with customers (Lee et al., 2012; Godes and Mayzlin, 2004; Liebana-Cabanillas and Dos Santos, 2017) and professional clients (Wu, 2016). In doing so, such companies have been able to gather feedback (Huang et al., 2010), identify lead users (Bream and Bilgram, 2015), predict customer expectations (Durkin et al., 2013), monitor and enhance brand image, market products (Kim and Ko, 2012; Gonzales et al., 2015), and increase innovativeness (Hinz et al., 2014).

There remains no conventional definition of “social network” (also referred to, for example, as “corporate social software,” “corporate social network” or “enterprise social networking”) (Whener et al., 2017). As defined by Boyd and Ellison (2007) and revised by Patroni et al. (2015), we define social networks here as “*platforms that are bounded within a particular organization and allow employees to (1) construct (semi-) public profiles within the organizationally bounded system, (2) articulate lists of other employees with whom they are connected, and (3) view and traverse both their lists and those made by others within the organization*” (Patroni et al., 2015, p.1).

Recent years have seen companies adopting enterprise social networking (ESN); a mine of information that can be used as an internal collaboration tool to improve innovation management (Holtzblatt et al., 2013) and provide social collaboration. Within such companies, employees use ESN to express their ideas and thoughts, to access information easily and to build relationships with colleagues in other countries (Gonzalez et al., 2013; Deans, 2011; Patel and Jasani, 2010). In principle, ESN has allowed users to improve their productivity (Sparrowe et al., 2001), and to communicate and share knowledge more effectively (Meng and Berger, 2013; Norris and Porter, 2011) through supported collaboration, strengthened social connection and facilitated knowledge management (Holtzblatt et al., 2013). Moreover, ESN helps companies improve their corporate culture by

allowing employee integration to be facilitated within the existing organizational culture, thus increasing levels of trust among such employees (Leidner et al., 2010; Patel and Jasani 2010). According to ESN level of use, Richter and Riemer (2013, p.10) distinguish three “primary use cases”: (1) at the team level, ESN is used for work coordination, status updates, and problem-solving; (2) at the project level, ESN is used for work coordination, discussion and the sharing of opinions, and for organizing meetings; and (3) at the enterprise level, ESN is used for discussion and the sharing of opinions, problem-solving, and the generation of input.

Although the advantages of ESN are widely recognized, its adoption still appears to be a challenge (Wehner et al., 2017). Many companies implemented ESN expecting it to be adopted naturally in the same way as personal social networks, and yet it remains underutilized (Chin et al., 2015). There are also several risks involved in adopting ESN; these are primarily linked to individual and organizational factors rather than technical factors (Meske and Stieglitz, 2013), and range from security concerns to employee resistance and misuse (Turban et al., 2011). Although successful adoption is not impossible, it typically only occurs in large businesses (Sharma, 2014). As such, there is a need for more research in the field of ESN adoption in order to identify the factors and their associated characteristics in the adoption process.

Most previous studies on adoption are restricted to a single phase of adoption or level of analysis; for example, at individual, organizational or technical levels (Whener et al., 2017). However, in view of the innovativeness of ESN and the challenges involved in its adoption, studies in this field could become more integrative by combining levels of analysis and adoption phases. The challenges preventing adoption of ESN need to be better understood; as such, studies should adopt a theoretical lens that encompasses its innovative features. In this way, we consider ESN as an IT innovation that differs from the classical route to adoption.

Since Rogers (1983) and Kimberly and Evanisko (1981), the adoption of IT innovation has been widely addressed by academics through a number of multiple, varied and distinct theoretical lenses. More recently, Hameed et al. (2012) developed a new comprehensive conceptual model of adoption that embraces most previous theoretical frameworks. While adoption is commonly divided into two levels (individual and organizational), they suggest that the adoption of IT innovation is a process that should be studied on both levels simultaneously. As such, they propose an integrated conceptual model that allows a better understanding of each phase of the adoption process (i.e., pre-adoption, adoption, and post-

adoption), as well as the factors and characteristics that influence them. However, this conceptual model has never been tested and validated, nor has it been empirically proven as robust, complete and useful in gaining a better understanding of the adoption phenomenon. Further research is therefore needed to apply this new conceptual model to empirical situations, so that its usefulness and completeness in proving a better understanding of adoption can be evaluated.

Given these observations (i.e., the barriers to ESN adoption and a new integrated conceptual model of adoption), our research question is twofold: What are the specific characteristics of the adoption of IT innovation involved in the adoption of ESN? What new insights into the adoption of IT innovation does ESN reveal? Our results contribute by determining the challenges associated with the adoption of IT innovation and ESN. In particular, they reveal that “security”—already well known as a characteristic of the IT innovation factor influencing adoption—is also a characteristic of the organizational factor. They also identify 18 characteristics that are in line with the model but not present in the corresponding phases of the adoption of IT innovation.

The remainder of this paper is organized as follows. In the next two sections, we first review the literature on the adoption of IT innovation and the adoption of ESN, and present the theoretical framework adopted for this research based on the conceptual model of Hameed et al. (2012). The research context and methodology are described in the following section. We then present our results and discuss the contributions and limitations of our research.

## **2. Literature review**

### **2.1. Adoption of IT innovation**

In the past two decades, the adoption of IT innovation has attracted considerable attention from researchers, with the result thus far being “a large but also fragmented body of literature” (Van Oorschot et al., 2018). As it stands, four distinct dimensions have been the focus: (1) the level of analysis of adoption, either individual or organizational (these levels are rarely studied at the same time); (2) the phases of the adoption process (i.e., pre-adoption, adoption, and post-adoption), which are mostly studied separately and rarely together as a whole process; (3) the dynamics of strategic alignment and convergence between business

and IT; and (4) the determinants of adoption: antecedents, factors, and characteristics, which are defined by the authors in accordance with their theoretical frameworks.

### ***2.1.1 Individual versus organizational levels of analysis***

The adoption of IT innovation is studied from multiple perspectives at different levels of analysis (Damanpour and Schneider, 2009). At the organizational level, the adoption of IT innovation is seen as a process resulting in the assimilation of a product or a service (Damanpour and Wischnevsky 2006), the alignment between business and IT (Henderson & Venkatraman, 1993), and the convergence between operational technology and IT (Agarwal and Brem, 2015), through which the overall performance of the organization is analyzed (Slappendel, 1996; Agarwal and Brem, 2015). Studies in this area are very diverse. At the individual level, the adoption of IT innovation mainly focuses on the behavior of the individual; more precisely, it “measures the user acceptance and the actual use of innovation” (Hameed et al., 2012).

Hameed et al. (2012) showed that studies at the organizational level were more numerous than studies at the individual level (111 compared to 35, respectively). In terms of the former, only 18 studies focused exclusively on the organizational factor, while the latter was explored through the user acceptance factor only. The other studies took into accounts several factors by combining either the innovation or environmental factors with the organizational factor, or, in some very rare cases, by adding the chief executive officer (CEO) factor.

### ***2.1.2. Phases of the adoption process of IT innovation***

The adoption of IT innovation has been widely recognized as a phase-based process and more specifically as a three phases process.

After a deep analysis of the adoption processes of IT innovation, Hameed et al. (2012) identify three distinct phases: initiation, adoption-decision and implementation. In the literature on information systems (ISs), these three phases are more often referred to as pre-adoption, adoption, and post-adoption.

While the literature agrees on three distinct phases, more recent works have sought to define each phase more precisely. Building on the existing literature (Klonglan & Coward, 1970; Rogers, 1983; Kwon & Zmud, 1987; Cooper & Zmud, 1990; Fichman, 2001; Rai et al., 2009; Burton Swanson & Ramiller, 2004; Zhu et al., 2006), Lesca et al. (2015) define pre-adoption



as a phase of realization and recognition of a need, information gathering, and evaluation of whether ITs are able to respond to the need; adoption is a phase of decision-making and implementation; and post-adoption is a phase of routinization and assimilation of IT innovation.

Based on Rogers (1995), Gopalakrishnan and Damanpour (1997), and Meyer and Goes (1988), Hameed et al. (2012) define pre-adoption as the initiation phase during which a need is recognized, knowledge or awareness is acquired, an attitude towards the innovation is formed and innovation for adoption is proposed. They define adoption as the decision-making phase during which an idea is evaluated; if such an idea is accepted, the options for its acquisition and implementation are then explored. Post-adoption is considered by the authors as the implementation phase during which an innovation is acquired; the organization is then prepared to use the innovation, and a test is implemented to confirm its effectiveness. This is then followed by acceptance of the innovation by the users, and the pursuit of the actual use of the innovation.

Of the 111 studies analyzed by Hammed et al. (2012), only five studies focused exclusively on the pre-adoption phase, 16 exclusively on the adoption phase, and 67 exclusively on the post-adoption phase. 24 studies cover several phases of the adoption process.

### ***2.1.3. Adoption of IT innovation at the individual level***

One of the most popular adoption theories is the diffusion of innovation (DOI) model, developed by Rogers (1983, 1995). Based on solid theoretical foundations, this model introduced five characteristics of innovation: relative advantage, compatibility, complexity, trialability, and observability of the innovation. These characteristics play a key role in each individual's attitude towards innovation adoption and can influence technological innovation in the pre-adoption phase. They were also recently identified as determinants of the innovation adoption phase by Forman (2005) and Hsu et al. (2007). Although the DOI remains a popular theoretical model, one of its major limitations is that it only applies at the individual level, meaning it does not take into account the influence of organizational and environmental factors (Lee and Cheung, 2004). As such, the DOI model does not address the full adoption process of IT innovation.

The theory of reasoned action (TRA), developed by Fishbein and Ajzen (1975), was one of the first of its kind to attempt to explain user acceptance behavior. It identified two influential characteristics: attitude and subjective norms. This theory laid the groundwork for the development of further behavioral theories: the theory of planned behavior (TPB), developed by Ajzen (1991), which recognizes perceived behavioral control as a new characteristic; the technology acceptance model (TAM), proposed by Davis (1989), and its revised versions, TAM2 and TAM3, which all theorize that the perceived ease of use and perceived usefulness affect the use of innovation; and the unified theory of acceptance and use of technology (UTAUT), developed by Venkatesh et al. (2003). This last theory is based on eight models at the individual level of technology acceptance to formulate the UTAUT during the adoption process. These theories provide insights to better understand user acceptance of IT innovation during the post-adoption phase. However, as explained by Hameed et al. (2012), they do not explain the pre-adoption and post-adoption phases, focusing instead on the individual level of the adoption process.

All of these theories and models contribute to explain the adoption of IT innovation at the individual level, but very few researches so far have attempted to mobilize these theories and models to address adoption at the organizational level too. Each theory and model focuses on some factors (e.g. innovation and/or user acceptance factors) and identifies associated characteristics that contribute to influence the adoption process. They provide insights into one or two phases of the adoption process of IT innovation (e.g. pre-adoption, adoption and/or post-adoption), but none of them address together the three phases of the whole adoption process. In short, there was no integrated theoretical model until Hameed et al. (2012) proposed the integration of every characteristics and adoption phases to analyze and explain IT innovation adoption at both individual and organizational level.

#### ***2.1.4. Adoption of IT innovation at the organizational level***

A more limited number of models and frameworks address the adoption of IT innovation at the organizational level. Among these, we can cite the Technology-Organization-Environment (TOE) framework (Tornatzky et al., 1990), the Strategic Alignment model (Henderson & Venkatraman, 1993), and IT-Enabled Business Transformation frameworks (Venkatraman, 1994; Agarwal and Brem, 2015).

The TOE is a useful framework for examining the technological, environmental and organizational factors that influence the adoption of IT innovation within an organization. However, this approach is also incomplete, and is unable to explore the adoption process as a whole. Some studies have combined the TOE framework with complementary approaches. Thong (1999) combines the TOE with the characteristics of the CEO factor (e.g. innovativeness and level of IS knowledge) to study the adoption of IS in small and medium-sized enterprises (SMEs). Karahanna et al. (1999) and Luo et al. (2010) incorporate characteristics of the user acceptance context (e.g. Attitude towards use). Guan and Liu (2007) suggest that the adoption of IT innovation at the organizational level is a key to improving the core complexity and gaining competitive advantage. Based on Ettlie (1988) and Sun and Frick (1999), Guan and Liu (2007) notice that the adoption of IT innovation is an integrative process that links innovative IT potential to organizational capabilities and explain that “technology innovation, especially the core technology innovation, needs corresponding innovation in the organization to absorb, digest, adopt and apply the new innovative technology” (Guan & Liu, 2007, p. 421).

Organizational level adoption frameworks also explore the alignment between business and IT (Henderson & Venkatraman, 1993). Research on IT-enabled business transformation studies how organizations harness the potential of IT by investing in IT and redesigning business process on a long-term trajectory. Based on Venkatraman (1994), a lot of research is trying to understand how the alignment of IT with organizational process progresses through the business and IT levels, improves productivity and develops strategic advantage. Venkatraman (1994, p.74) identified five levels of business transformation stemming from the adoption of IT innovation: “localized exploitation, internal integration, business process redesign, business network redesign, business scope redefinition.” According to this model, the adoption of IT innovation is rather a linear process although there are many different alignment approaches, and it can lead to fundamental changes in business and at different organizational levels.

More recently, Agarwal and Bram (2015) have proposed an IT-enabled business transformation framework to better analyze the new phenomenon of convergence of operational and informational technologies. Their framework expands Venkatraman (1994) framework by combining the organizational dimension (e.g. the transformational dimension) with the Quigfeng et al. (2008) transformation stages. The first empirical results show that

instead of Venkatraman framework, the transformation process may be non-linear and overlap between the stages.

All these models and frameworks contribute to explain the adoption of IT innovation at the business and organizational level, but they do not address the individual level as well. They identify stages, trajectories and alignment approaches at several levels (e.g. business, IT, OT) which contribute to explain the adoption process and organizational transformation. They focus on the organizational level of the adoption process, but they do not explain the pre-adoption and post-adoption phases at the individual level.

## 2.2. Adoption of Enterprise Social Networking

In the early 2010s, large firms decided to implement Enterprise Social Networking (ESN) to promote internal collaboration. Since then, ESN adoption and use has become a growing trend (Cao et al., 2013). Firms aim to construct and develop working project groups, communities of interest, and communities of practice (Gibbs et al., 2015; Treem and Leonardi, 2012). They also seek to encourage the emergence of new ideas resulting in the development of innovation. ESN is not only applicable to large firms; rather, it is available to all collaborators at operational or strategic levels (Gibbs et al., 2015).

Despite the advantages of ESN, its adoption seems to be a challenge. Indeed, ESN remains underutilized (Chin et al., 2015), due to employee resistance and misuse (Turban et al., 2011). Since successful adoption is not impossible (Sharma, 2014), there is a need for more research in the field of ESN adoption.

As mentioned in the literature, there is a need to study the adoption of IT innovation at both the individual and organizational levels. An analysis of publications in the field of ESN indicates a split between these two levels during analysis (Whener et al., 2017). For instance, at the organizational level, Turban et al. (2011) use the fit-viability model to find facilitators during the adoption phase, while Leftheriotis and Giannakos (2014) rely on a knowledge perspective to shed light on the contributions of ESN at these two levels. The authors point out that these two levels of analysis should be combined in order to study the adoption of ESN. Chin et al. (2015) also encourage the study of multiple levels of adoption factors by studying the TOSI factors: technology, organizational, social, and individual.

In addition, studies on the adoption of ESN achieve different results and are limited to a single adoption phase. Many studies have investigated the adoption of ESN factors; for instance, Meske and Stieglitz (2013) study factors that facilitate and harm the adoption phase. More specifically, a number of researchers have studied ways of going beyond the pros and cons of the adoption of ESN during the deployment phase, thanks to managerial support (Sharma, 2014; Turban et al., 2011). Other research has focused on the post-adoption phase; for instance, Leftheriotis and Giannakos (2014) empirically show that the motivation to continue using ESN is linked to utilitarian and hedonistic values. Razmerita et al. (2014) identify the advantages of ESN in terms of knowledge management. Fewer studies have focused on the pre-adoption phase; from this limited pool, the study of Zemaitaitiene et al. (2016) is particularly noteworthy in that it identifies the factors behind deciding whether to adopt or to reject ESN.

As mentioned by Wehner et al. (2017, pp. 129), previous studies have mainly focused on a single phase of adoption (“ex-ante, ongoing, [and] ex-post”), and hence do not distinguish between factors affecting the different adoption phases. However, Meske and Stieglitz (2013) underline the need to study companies that have already adopted ESN and those that have rejected it. These two phases (pre-adoption and adoption) correspond to the reality of ESN propagation in its early phases —when many companies are early adopters and others are users— without neglecting companies that are more reluctant to adopt novel solutions.

ESN is a specific, emergent form of IT due to its “malleable” uses in different contexts, such as “team-level, project-level, [and] enterprise-level” (Richter and Riemer, 2013, p.11). Consequently, factors affecting the traditional adoption of IT innovation may vary in this case (Chin et al., 2015).

Following these authors recommendations and Zemaitaitiene et al. (2016) call for analyzing the adoption of ESN via innovation diffusion frameworks, we adopted the Hameed’s model in this research because it is dedicated to the diffusion of IT innovations, it encompasses both the individual and the organizational levels of adoption, and places emphasis on the three phases of the adoption process (e.g. pre-adoption, adoption and post-adoption). This integrated model is also appropriate to our study since the adoption of ESN is relatively new and poses a challenge at every phase of adoption. As such, crossing Hameed’s model and the adoption of ESN offers an opportunity to study the important characteristics at every phase of adoption, with a particular focus on determining which of them are more similar and which

are more different across various phases. However, Hameed's model does not encompass the Strategic Alignment model and the IT-Enabled Business Transformation frameworks. Thus, future research will be necessary to better understand the organizational transformation the adoption of ESN may provoke.

### **3. Theoretical framework**

#### **3.1. Hameed's model<sup>1</sup>**

The Hameed's model is a combination of the DOI, TRA, TAM, TPB, and TOE frameworks. It also incorporates the characteristics of technology/innovation, organization and environment, and CEO. It covers the three phases of the adoption process —pre-adoption, adoption, and post-adoption— and combines IS literature with innovation literature to show their convergence on these three phases. The pre-adoption phase refers to the initiation phase, in which a “need” is recognized or an “attitude” can be detected towards IT innovation. The adoption phase involves the decision to accept IT innovation and to undertake the allocation of resources. The post-adoption phase consists of implementing IT innovation, implying “acceptance” by the users.

In addition, this model examines the activities undertaken during the acquisition of IT from an organizational perspective. User acceptance of IT innovation and its actual use are examined at an individual level. Thus, in Hameed's model, the adoption of IT innovation is studied holistically; it is seen as an organizational process, starting with the awareness of an IT innovation and ending with the acquisition of this IT innovation. The process of user acceptance of the technology is then analyzed in terms of user acceptance characteristics.

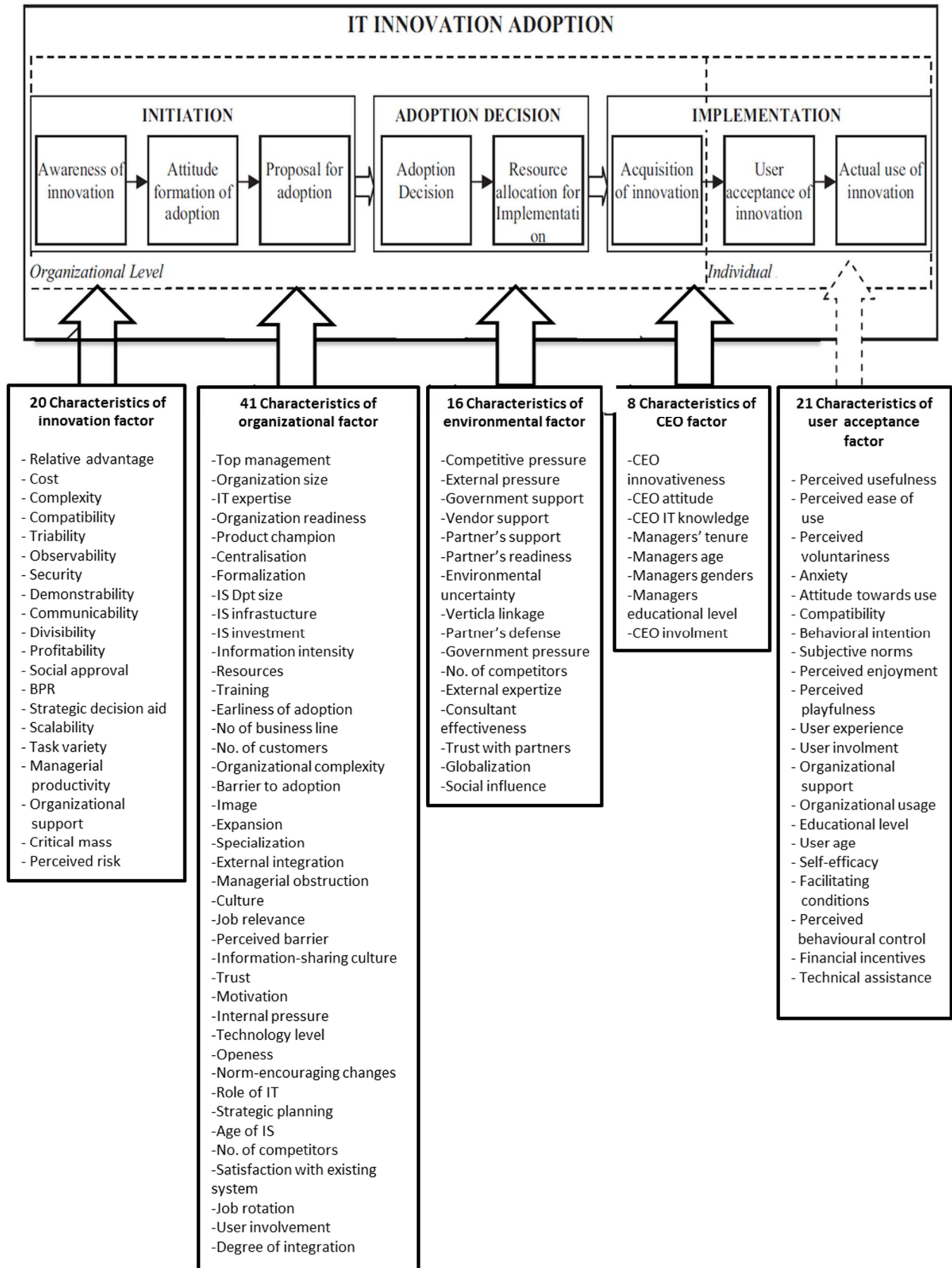
A combination of innovation theory and the TOE framework with CEO characteristics are used to model pre-adoption, adoption, and post-adoption until the acquisition of the innovation. TRA, TAM, and TPB are used to analyze user acceptance of IT innovation.

Based on these theoretical approaches, the model offers several characteristics that impact the three phases of the adoption process of IT innovation. The integrative model covers many IT innovations. Indeed, the characteristics stem from 151 previous research articles dealing with

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<sup>1</sup>Here, the term ‘Hameed's model’ refers to the integrative model developed by Hameed et al. (2012).

different adoptions of IT innovation, including “collaboration technologies, Enterprise Resource Planning (ERP), Electronic Data Interchange (EDI), Open System, Database Machine, Medical innovation, E-commerce IT, Database management, Geographic Information Systems, etc.” (Hameed et al. 2012, pp. 375-390). These characteristics can be organized into five factors: (i) innovation; (ii) organization; (iii) environmental; (iv) individual (CEO); and (v) user acceptance.



**Figure 1.** Hameed's model of IT innovation adoption with detailed characteristics (Hameed et al., 2012)



### 3.2. New characteristics of the adoption of IT innovation since Hameed's model

After examining the Science Direct and Scopus databases, as well as Google Scholar, ResearchGate, and peer-reviewed journals, we could find no research investigating Hameed's model.

However, between 2012 and 2018, 41 studies were published on the adoption of IT innovation. Seven of them identified new characteristics that were not mentioned in Hameed's model, the details of which are presented in Table 1 below.

Such characteristics will be taken into account in the discussion section of this article, as they can potentially provide a different perspective on our results and analysis. They could also provide potential avenues for future research.

**Table 1:** New characteristics resulting from research on the adoption of IT innovation since 2012

Ref.	Factor	Characteristic	Definition
Cegielski et al. (2012)	Innovation	Task uncertainty	Organizations seek to reduce task uncertainty through the application of information within their decision-making processes.
Wu and Chiu (2015)	Innovation	Task structure	Task complexity is a critical component of external stimulus and has an important impact on a multi-stage diffusion structure, initiation, adoption, implementation, and diffusion.
	Organizational	IT innovation type	There are three types of IT innovation for supporting application domains, namely IT unit; intra-organization; inter-organization.
	User acceptance	User attribute	Gender can affect different diffusion levels of IT innovation
Atkin et al. (2015)	Innovation	Opinion leadership	The adopted two-step flow suggests that information and influence flow from the media to opinion leaders, before being directed towards the less-interested members of the population.
		Contagion	Contagion refers to how individuals monitor others and imitate their behavior to adopt (or not) innovations. This process depends on peer relationships and represents the interpersonal influence on the diffusion process.
	User acceptance	Fluidity	An interoperable multifunctional and multitasking capability stemming from the converged synergy of compatible digital communication, information, and media technologies.
Agarwal et Brem (2015)	Organizational	Convergence of operational and information	The tendency for OT and IT to evolve toward performing similar tasks. While the underlying technologies of OT, such as platform, software, security and communications, are becoming more like IT systems, IT is supporting OT in building standards, enterprise

		technologies	architecture, support and security models, software configuration practices, and information and process integration.
Chu and Chen. (2016)		Social bonds	Social bonds refer to social sanctions against deviant behaviors within a social group. Social bonds are operationally defined as the degree to which users perceive the bonds in their group.
Trang and Zanders (2016)	Organizational	Technology readiness	This consists of both technology infrastructure and IT human resources. Technology infrastructure comprises all technologies that enable and facilitate Internet-related businesses. In comparison, IT human resources consist of IT professionals who are responsible for e-business application development.
		Technology integration	Technology integration is defined as the degree of interconnectivity between an organization's back-office ISs and databases, and those externally integrated with the suppliers' systems and databases.
Boritz et al. (2018)	CEO	Top executives' competencies	Top executives' competencies are defined as a combination of knowledge and skill derived from education and professional experience, as well as other personal attributes that enable an individual to perform effectively in an educational, professional or employment role. In this study, the authors focused on IT and financial competencies.

## 4. Research context and data collection

This study aims to identify which are the characteristics of the adoption of IT innovation involved in the adoption of ESN, and what new insights does the adoption of ESN reveal. Therefore, the adoption of ESN is explored through the lens of Hameed's model.

### 4.1 Research context

We collected data from 28 organizations: nine large firms, 13 SMEs, and six public sector administrations (Table 2).

It was relatively straightforward to find large firms that used ESN. Six of the nine large firms interviewed had implemented ESN and were in the post-adoption phase, and ESN users were either in the confirmation or routinization phase. One large firm faced the problem of rejection of ESN by users, and another was in the adoption phase.

It was harder to find SMEs that were using ESN: eight of the 13 SMEs identified declared that they had no interest in ESN, while five had decided to use it (one in the pre-adoption phase, two in the adoption phase, and two in the post-adoption phase).

Lastly, public sector administrations did not seem to be interested in using ESN, though two of them were aware of the tool and its functionalities.

**Table 2:** ESN adoption phase by type of enterprise

Type of enterprise	No ESN	Pre-adoption	Adoption	Post-adoption	Total
Large firms	2		1	6	9
SMEs	8	1	2	2	13
Public sector administration	4	2			6
<b>Total</b>	<b>14</b>	<b>3</b>	<b>3</b>	<b>8</b>	<b>28</b>

#### 4.2 Data collection and analysis

To reach the research objectives, an exploratory qualitative research approach was used. In this study, we attempt to test and validate the characteristics that impact the adoption process of IT innovation featured in Hameed's model, and to identify further characteristics that have not previously been reported.

We conducted 34 semi-structured interviews between October 2013 and January 2014 with 35 managers from 28 organizations in various sectors (see Appendix 1). Interviews were face-to-face (20 interviews out of 34, or 59%) or conducted by telephone/Skype (14 interviews out of 34, or 41%).

The objective was to meet with individuals who were interested in the subject (for example, managers who use ESN, or managers in organizations that have implemented ESN but do not use it themselves), or who were debating about whether to adopt it. Our respondents were either employed in business intelligence or IT/IS services, or were operational managers, as shown in Appendix 1.

All interviews were fully recorded, transcribed, and double-coded using a coding grid (see Appendix 2) constructed on the basis of Hameed's model. The unit of analysis chosen for the coding was the interview itself.

The validity of the coding rate of consistency was calculated. It was defined as the proportion of encodings that coincided for two codes (Rust and Cooil, 1994). The results showed a

consistent average rate of 72.8%, which is higher than the minimum rate of 70% recommended for this type of exploratory study (Nunnally and Barnstein, 1994).

## **5. Results**

Our exploratory study allowed us to identify 18 characteristics spontaneously mentioned during the interviews, including one that was not identified in Hameed's model (see the overview table in Appendix 3).

Ten of these characteristics had already been identified in Hameed's model, but not in the corresponding adoption phases. Our results show that the ten characteristics emerge in the pre-adoption phase, two of the ten emerge in the adoption phase and five in the post-adoption phase.

### **5.1 Security issues as a characteristic of both innovation and organizational factors**

Our results gave rise to a new characteristic that was not identified in Hameed's model.

In their study, Hameed et al. (2012) identify security as a characteristic of the innovation factor. According to Luo et al. (2010), security refers to “the subjective probability with which users believe their sensitive information (business or private) will not be viewed, stored, and manipulated during work sessions by unauthorized parties in a manner consistent with their confident expectations” (p. 165). In other words, security is understood in a technical and IS sense. Our results confirm these concerns, with managers expressing their fear of confidential information leaks or the instance of spying; processes that could compromise their professional projects or even their personal information. Such a mentality is explained in the following two interviewees:

“In R&D [research and development], it won't be shared on corporate social networks, as this subject is more critical than turnover or prices” (Interview n°5);

“I believe that one of the reasons, in my opinion, behind the abstention from putting in place a corporate social network is the fear of information leaks” (Interview n°1).

For some interviewees, the sharing of information using ESN can be dangerous, especially if critical information goes to a competitor:

“This is dangerous because you cannot then obtain a patent if it is disclosed. Moreover, if a competitor receives the slightest leak, they become a competitor that will overpower you” (Interview n°8).

However, results show that security can also be understood from a human point of view, with managers explaining how they were concerned not only with the technical aspects of information security, but with the human aspects too. Sharing information via ESN could be dangerous: when managers disseminate and share personal information within the organization, they may see it as an internal loss of information control and its associated power. Furthermore, some believed that they could lose control of their business:

“We do not know, even us, in the private sector, where information goes and when we can retrieve it” (Interview n°4).

In other words, managers were afraid of losing their power over information, particularly that to which only they had access. Consequently, since security involves human concerns in addition to those of a more technical nature, it can also be classified as an organizational factor.

## 5.2. Innovation factor

Regarding the innovation factor, the results show five characteristics that had already been identified in Hameed’s model. Of these five, however, “compatibility” and “security” were identified as being related to the pre-adoption phase, which was not the case in Hameed’s model. “Business process re-engineering” was identified in both the pre-adoption and adoption phases, which was also not the case in Hameed’s model.

**Table 3:** Characteristics identified in the pre-adoption, adoption, and post-adoption phases for the “innovation” factor

Factor	Code*	Characteristics	Pre-adoption	Adoption	Post-adoption
Innovation	I01	Relative advantage	6	1	4
	I04	Compatibility	1	-	2
	I07	Security	5	-	1
	I08	Demonstrability	-	1	-
	I13	Business process re-engineering	1	1	3

\*Codes related to Hameed’s coding grid (cf. appendix 2)  
 Characteristics mentioned during the interviews (in number of interviews)

Defined as “the degree to which adopting/using the IT innovation is perceived as being better than using the practice it supersedes” (Karahanna et al., 1999), “relative advantage” is the major innovation characteristic influencing the adoption of IT innovation in organizations. In past research, this characteristic has generally been identified in the adoption phase. In our research, however, we identify this in both the pre- and post-adoption phases. Expectations in the pre-adoption phase relate to a reduction in information overload, information cross-cutting, promotion of common values, improvements in feedback, and the development of contacts:

“Having a common platform could be hyper-efficient in terms of exchanges... in terms of progress on certain issues” (Interview n°15).

In the post-adoption phase, the benefits of ESN are the creation of common values and a means of maintaining social links, as well as the opportunity to connect collaborators in a cost-effective manner, become more reactive, and improve information access control:

“Yes, this is a more reactive channel! It’s a tool among others but much more dynamic, much more in real time. That’s the point! Thanks to this tool, you are aware of information before other channels, especially when it’s a problem!” (Interview n°27)

In Hameed’s model, “(result) demonstrability” was identified only three times. This is defined as “the degree to which the results of adopting/using IT innovation are observable and communicable to others” (Karahanna et al., 1999). In our research, this characteristic was mentioned only once, and had the same meaning.

“Compatibility” was identified by Rogers (1995) as one of the four major characteristics of innovation that influence the adoption of IT innovation in organizations. Compatibility is defined as “the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters” (Luo et al., 2010). It has been identified in a number of studies in the adoption and post-adoption phases. Our results suggest that compatibility could also be a characteristic that influences the pre-adoption phase. We observed how managers are potentially more reticent to accept ESN if they perceive a lack of interoperability between existing IT tools and the new processes. Thus, in the pre-adoption phase, the perceived interoperability of a new IT tool with existing ISs can be a barrier to IT innovation adoption, as explained by the following interviewee:

“Our collaborators already work with email; we all send a lot of emails and we do not want one more tool. We do not want two tools that coexist! It’s difficult to simultaneously manage email and ESN. Why? Because we will not know which tool to use! If I send a message with ESN to one of my collaborators, that means he has to use it too! If he does not use it, I will not be able to contact him. So, either we stop email and we all go on a social network, or we keep email, but [doing] both [is] difficult.” (Interview n°27)

Using Hameed’s model, the characteristic of “business process re-engineering” was identified only once, in a study of the implementation of ERP (Bradford and Florin, 2003). For Hameed et al. (2012), this characteristic is not significant. However, business process re-engineering was identified in five of our interviews. When managers are in the pre-adoption phase, this characteristic becomes visible in that a streamlining process is needed before the implementation of ESN. During the pre-adoption process, managers need to determine whether or not re-engineering is possible, desirable, and/or necessary:

“ESN might be an outcome of restructuring work that is conducted upstream. And this could later lead to putting in place ESN. But I believe that restructuring should be done first.” (Interview n°25).

### 5.3 Organizational factor

In terms of the organizational factor, results show five characteristics that had already been identified in Hameed’s model, and one characteristic (security) that had not previously been identified (as explained in Section 4.1). Of these five characteristics, “image” and “information-sharing culture” were identified in the pre-adoption phase, which was not the case in Hameed’s model.

**Table 4:** Characteristics identified in the pre-adoption, adoption, and post-adoption phases for the “organizational” factor

Factor	Code	Characteristics	Pre-adoption	Adoption	Post-adoption
Organizational	O04	Organizational readiness	2	-	-
	O19	Image	2	-	-
	O23	Managerial obstruction	-	-	2
	O27	Information-sharing culture	1	-	-
	Oxx	Security	8	1	7

\*Codes related to Hameed’s coding grid (cf. appendix 2)

Characteristics mentioned during the interviews (in number of interviews)

“Organizational readiness” has three components: financial resources, technological readiness, and customer readiness (Lee and Cheung, 2004). Previous research has typically identified this characteristic in the adoption phase, whereas in the current research, we found it only in the pre-adoption phase. Technological readiness gives rise to issues such as how to create, maintain, and develop ESN, and how to maintain network profiles. Financial resources and customer readiness are not mentioned, but our research identified a new component of organizational readiness called “organizational maturity.” It seems that, for certain organizations, implementation of ESN is more challenging since the CEO and team managers of such organizations are not ready to use it. It can therefore be very difficult to convince them to use this kind of technology:

“It’s difficult to explain new uses to people who do not want to use ESN or who do not want to open an account on social networks. It’s very difficult, and I think it’s a pity. I understand their reluctance, but we have to be able to move forward with those people who are less fearful; those who are equally aware of the dangers, but who do not worry as much.” (Interview n°4)

For a very new IT system, it seems that in the post-adoption phase, organizational maturity can be a barrier to ESN use.

“Image” is defined as the “degree to which use of an innovation is perceived to enhance one’s image or status in one’s social system” (Luo et al., 2010). For Rogers (1995) and Moore and Benbasat (1991), image plays a role in both the adoption and post-adoption phases. Our results show that image can also play a role in the pre-adoption phase, since organizations are particularly concerned about controlling their external image:

“If we go for social networks, what is the image we want to reflect? A communication policy is a plus.” (Interview n°26)

“What an enterprise seeks is mastering [something] first. Especially on the web, it is all about mastering its image; the way the outside world sees it.” (Interview n°12).

Thus, image concerns can be both a barrier and a driver in terms of the communication policies embedded within the pre-adoption phase of ESN.



“Managerial obstruction” was operationalized using three components: the difficulty of making organizational changes, integrating an IT system into an overall strategy and business process, and acquiring expertise for the new IT system (Zhu et al., 2006). Although managerial obstruction is regarded as a significant barrier, we found this characteristic only in the post-adoption phase:

“Managers are sensing a loss of power and a loss of control. They systematically ask their collaborators to be in the information loop, despite having 50 unread emails a day” (Interview n°14).

The main fear here is a loss of control over certain information and thus a loss of power. In ESN, information has a much more transversal structure, and information is disseminated very quickly to everyone. For managers, these functionalities may represent a threat since collaborators can bypass their authority to obtain information.

In terms of an “information-sharing culture,” Veiga et al. (2001) find that an individual’s cultural beliefs are connected to how useful and easy to use the IT innovation is, as perceived by the individual in question. This characteristic therefore influences the adoption phase of IT innovation. Our results show that culture can also influence the pre-adoption phase:

“I believe that the absence of a real social network of information is also somehow due to the culture of the enterprise. We have [...] a culture of... let’s call it of information protection... there is somehow a culture of information protection and silos. This is still present, even though we have put monitoring systems in place and the top management itself has evolved, however there is still a strong information silos.” (Interview n°1).

The information-sharing culture can have a negative impact on the willingness of those affected to adopt ESN for two reasons. Firstly, ESN has a negative image at the professional level, since it is related to the use of social media such as Facebook, which has the reputation of being an entertainment tool as opposed to something more productive. Secondly, the use of ESN implies a culture of information sharing that can be challenging for some organizations, particularly those with differing organizational and national cultures.

Additionally, and paradoxically, some community managers currently choose to use ESN in response to individual, rather than collective, needs, acting as individual customers without concern for the more collective aspects, as explained in the following interview:

“There are people who consider information as power; therefore, they do not want to give information out. This is why I would say that information sharing exists, even if it has always existed—this is true. Regardless, it is not very developed and, most importantly, it is not managed by good practices.” (Interview n°3b)

Thus, the information-sharing culture can be a barrier to the adoption of a collective tool such as ESN.

## 5.4 Environmental factor

In Hameed’s model, the environmental factor relates solely to the external environmental characteristics.

**Table 5:** Characteristics identified in the pre-adoption, adoption, and post-adoption phases for the environmental factor

<b>Factor</b>	<b>Code</b>	<b>Characteristics</b>	<b>Pre-adoption</b>	<b>Adoption</b>	<b>Post-adoption</b>
Environmental	E02	External support	-	-	-
	E05	Partners support	-	-	1

\*Codes related to Hameed’s coding grid (cf. appendix 2)  
 Characteristics mentioned during the interviews (in number of interviews)

External support, “defined as direct or indirect forces exerted by peers, competitors, social referents, others firms, the government” (Al-Qirim, 2007) was not mentioned in our research as an important element of ESN, despite it being identified in many other studies. This potentially means that there is no external force, since ESN is not considered a strategic IT tool.

“Support from partners,” as an external force, is an important characteristic in the adoption phase (Premkumar and Roberts, 1999), and, in terms of collaboration, should also be considered in the post-adoption phase. Our results show that some managers do not envisage themselves collaborating with other organizations; they are reluctant because they don’t want to expose their work to others:

“I don’t want to collaborate with the outside via social networks because I don’t want to disclose what I am working on.” (Interview n°3b).

### 5.5 User acceptance factor

For the user acceptance factor, results show six characteristics that had already been identified in Hameed’s model. Of these six characteristics, “perceived usefulness” and “attitude towards use” were identified in the pre-adoption phase, “perceived playfulness” and “user involvement” were identified in the pre- and post-adoption phases, and “user age” was identified in all three phases. None of the aforementioned findings could be found in Hameed’s model.

**Table 6:** Characteristics identified in the pre-adoption, adoption, and post-adoption phases for the user acceptance factor

Factor	Code	Characteristics	Pre-adoption	Adoption	Post-adoption
User acceptance	A01	Perceived usefulness	9	2	11
	A02	Perceived ease of use	-	6	4
	A05	Attitude towards use	7	6	9
	A10	Perceived playfulness	2	1	3
	A13	User involvement	1	6	1
	A17	User age	4	1	4

\*Codes related to Hameed’s coding grid (cf. appendix 2)  
 Characteristics mentioned during the interviews (in number of interviews)

The TAM hypothesizes that the adoption of IT innovation has two characteristics that influence user adoption: “perceived usefulness” and “perceived ease of use.” Our research highlights the importance of the former in the pre-adoption phase: its influence is negative when managers raise the question of actual usefulness and added value, i.e., when they question whether this kind of tool is merely an empty buzzword. Its influence is positive when managers view ESN adoption as a way to construct and maintain a collective intelligence mechanism that supports information sharing:

“It is simply because the subject seems interesting to me and I believe that there is a pertinent field to develop, which enables us to go beyond in terms of sharing. Using this allows us to benefit from a certain form of collective intelligence and economies of scale. This allows everyone to contribute, and to gain more than his contribution in a symmetrical way.” (Interview n°18)

To a lesser extent, the influence of “perceived usefulness” is positive when managers are interested in adopting ESN to limit the use of paper-based information without reducing the amount of information shared per se. Lastly, when managers perceive ESN as a collaborative tool able to promote collaboration and idea sharing, ESN could help increase benefits derived from collaborative networks and mutual exchanges.

Concerning the “perceived ease of use,” results show that there is a demand for ergonomic tools that are easy to use and end-user centric. In the post-adoption phase, while some users of ESN encounter difficulties such as complexity of use and a lack of usability, users generally appreciate both the usability of ESN and the increased productivity:

“What’s interesting is that I targeted all this ‘processing time’ in the organization, and I know that we waste a lot of time looking up information. I hope that, via all these tools and the knowledge base, we will see substantial gains in terms of productivity.”  
(Interview n°20)

“Attitude towards use” is a personal factor representing an attitude towards IT innovation adoption (or its continued use), which reflects the individual’s positive or negative evaluations of their interactions with ESN (Karahanna et al., 1999). Our results show that this attitude exerts influence within the pre-adoption phase, during which managers raise negative points. Some managers explained that ESN adoption was not an organizational priority for them or their direction:

“CEOs or directors are not involved in digital networking; they have other priorities.”  
(Interview n°3c)

As such, they did not consider this tool useful. Other managers admitted that they were passive or expressed an unwillingness to use ESN:

“It is simply not possible. We cannot do this as we will identify people. It somehow holds records of information. Some people will be more visible, and others will not appreciate this—people do not appreciate these aspects. It is better to remain anonymous, as highlighting the position of a person, his identity... this bothers people in general. Some people use an alias instead.” (Interview n°17)

Managers also indicated that they lacked the curiosity or open-mindedness necessary to embrace the usefulness of ESN:

“One should just come to accept it. We should have the willingness... I believe we will do it, but some people will find it very hard to do, because we want to be at the heart of the matter. But it is true that we feel a lack of willingness.” (Interview n°20)

Some managers felt that they lacked the time to consider ESN implementation for their activities, and others stated they had either more important priorities or difficulties in motivating people:

“The biggest challenge we face is motivating people to use these types of networks. And this will be a major problem. What matters to them is being informed and not necessarily being driving forces... people receive information, they read it or not, but in general they do not want to be drivers to the extent that they will comment, share... I get the impression that people do not want to be drivers.” (Interview n°3c)

Citing Moon and Kim (2001), we define “perceived playfulness” as “the extent to which the individual perceives that his or her attention is focused on the interaction with the information technology; is curious during the interaction; and finds the interaction intrinsically enjoyable or interesting.” Our results show that perceived playfulness is an individual characteristic that influences the pre-adoption phase. Before adopting ESN, managers and potential users often wonder whether such a tool is fun or not to use, and try to determine the possibility of using it in a playful manner. Our research also shows that perceived playfulness is a characteristic that influences the post-adoption phase. Once ESN is implemented, transforming or adapting it into an exciting tool can improve its adoption and use:

“Playful... It is hard to apply that to the existing tool we have. But we decided to take the time to make it enjoyable. We ended up creating something fun. So fun, in fact, that other communities’ members, almost everyone, asked us how we did it!” (Interview n°3e)

Simultaneously, some managers asserted the need to maintain an informal type of interaction with their collaborators. A “fun tool” is not sufficient for their purposes; human contact and “watercooler” moments are the elements that provide essential face-to-face interaction.

Hameed et al. (2012) found that “user involvement” was not significant. In our results, some managers raised the issue of immediacy, i.e., whether the tool would increase the capacity of co-workers to share more information and obtain more feedback. As a collaborative tool, ESN

has the potential to improve inter-organizational interaction. In practice, we observed that interactions were limited because people were not present enough or sufficiently involved in the ESN process. Thus, the use of ESN does not guarantee rapid feedback, despite improving the immediacy of information sharing.

Although it was attributed little significance in Hameed's model, "user age" was clearly important in the current research for the ESN pre-adoption phase. Managers raised a generational problem in which older co-workers (aged 35–40) had more difficulties in understanding the usefulness of ESN. For instance, older colleagues may find it difficult to understand how ESN integrates with the IT tools they typically use; some may also be afraid to use the ESN tool, believing that it could harm their career, as explained by this manager:

"This is perhaps the reason that there is this new generation, which gradually prompts the use of such tools. And since they take advantage of these tools better than we have managed to, and as techniques improve, the transplant will perhaps be successful in five or six years. We will not be able to work without these tools. Who would have imagined, 15 years ago, that we would be working today without a pen, a pencil, or an eraser? Yet, this is the case today! [...] I do not know what the generation of tomorrow may yield. They will perhaps get used to working without seeing people, without making eye contact with them. However, I find it hard to imagine myself in such a place. I belong to the old school. I am not like these youngsters who rely a lot on computers. I keep everything in my head." (Interview n°3a)

User age also raises the question of who should be involved in the future of ESN. Due to generational issues, managers should consider whether ESN would be best used by all organizational members or in different ways by different user groups, and whether implementing ESN across all business units in the same manner would be the best approach.

## **6. Discussion and conclusions**

The aim of this study was to examine the characteristics of the adoption of IT innovation involved in the adoption of ESN. This has been accomplished by considering ESN adoption through the factors and characteristics identified in Hameed's model, and more generally,

through a holistic approach of the adoption of IT innovation. It sheds light on the specificities of the adoption of ESN.

### **6.1 Interest of a holistic approach**

First, our study underlines the advantages of a holistic approach when studying the adoption of IT innovation. Taking into account the limitations of existing studies in this area, we identify characteristics that are involved throughout the adoption process, that is, in the phases of pre-adoption, adoption, and post-adoption at both the individual and organizational levels. Following this integrated approach, we find empirical evidence supporting the integrated model of Hameed et al. (2012), which had, until now, remained untested.

Examining both the individual and organizational levels allowed us to demonstrate that the security criterion is not only an innovation concern but it can also be an organizational one. With ESN, managers are concerned not only with the technical aspects of information security, but the human aspects too. From a theoretical perspective, we have essentially revisited Hameed's model by identifying this new, previously unidentified concern about the adoption of IT innovation.

Using the integrated model, we identify that many of these characteristics present strong challenges in the adoption of IT innovation, since they cut across multiple phases of the adoption process. Results show that the usual post-adoption characteristics (perceived usefulness, attitude towards use) can also be involved in the pre-adoption phase, which had not previously been demonstrated. Results also extend previous research by showing empirically that many characteristics are common to the entire adoption process of IT innovation, and suggest that it may be applicable to other similar IT innovations.

### **6.2 Pre-adoption: a key phase**

Of the three phases of IT innovation adoption, challenges were primarily concentrated in the pre-adoption phase. Results show that this phase is rife with challenges, indicating that a great deal of effort is required prior to executing an innovative ESN adoption project. Indeed, the post-adoption phase gives rise to a wide range of views: for some, the main interest lies in the development of a collective intelligence to share both relevant information and common values; others are more skeptical, fearing that such a tool is a short-lived trend, and that (yet)

another new tool would be better suited to solving their operational difficulties. Here, ESN suffers from the poor image of public social networks and the numerous problems related to a loss of control of information (especially when such information is confidential). At the same time, the attitude towards ESN is rather hostile; there seems to be little willingness on the part of managers or even employees to engage in the use of ESN. All of these reasons may explain the low adoption of ESN in organizations. Mainly implemented in large companies, ESN typically forms part of a communication and branding strategy, and is perceived as having little value in operational work.

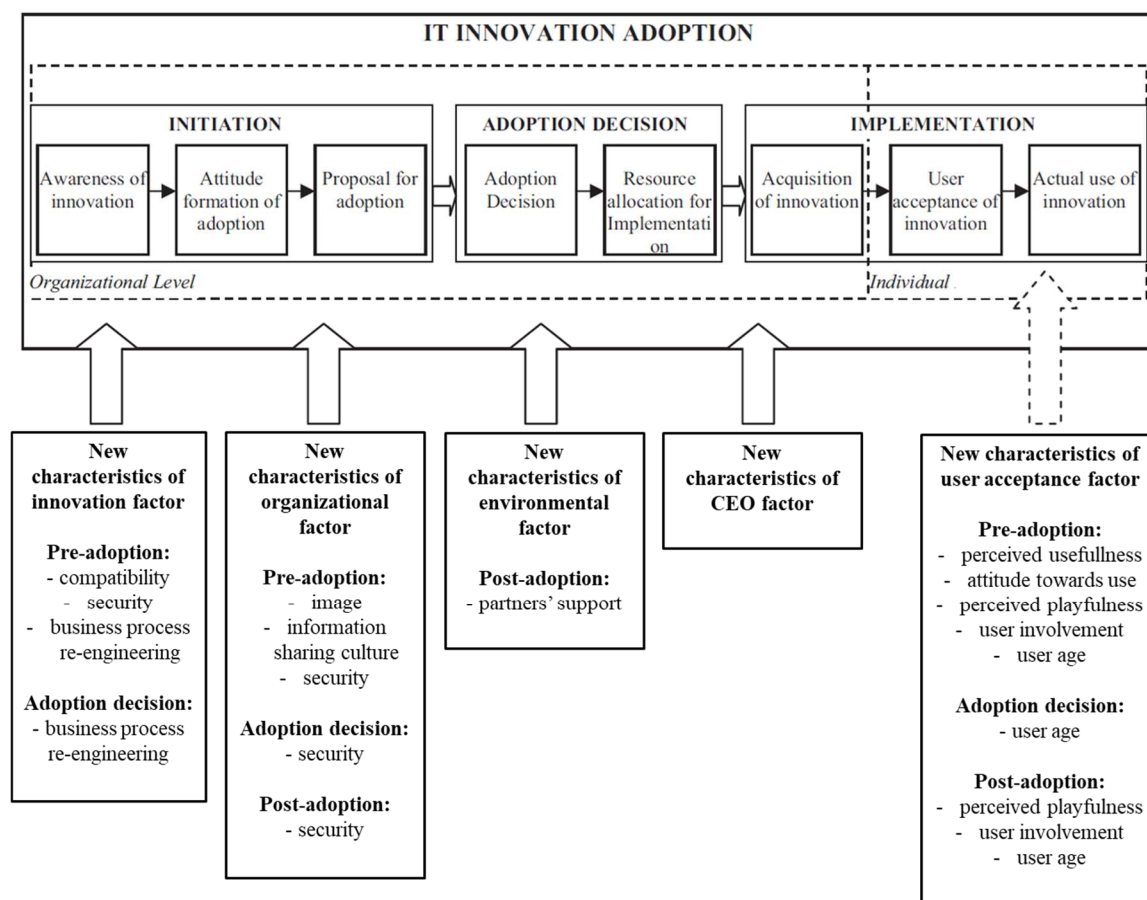
This result may be linked to the specificities of ESN, and leads us to the second aim of this study: to find novel approaches to adopting ESN. ESN is an IT innovation for organizational life; it is not rooted in one's social life. Since these tools are commonly used in one's private life, they may give rise to more pre-adoption challenges in organizations than tools that are specifically designed for a working environment. In this case, the transfer of social IT practices to the professional realm appears to be difficult, and perhaps off target. This may explain the importance of the characteristics of perceived playfulness and user age—both aspects that correspond to social networking—during the pre-adoption phase. The adoption phase may ease in difficulty as users become accustomed to the functions of ESN, and its implementation becomes thus less challenging. Nevertheless, the post-adoption phase appears to be problematic; users may not embrace the potential of ESN at work and may retain their private social network habits. User acceptance stands out among the post-adoption challenges, since users typically do not understand the usefulness of workplace ESN.

It can be concluded that the degree of novelty of an IT innovation may influence its adoption, especially for people who know little about the uses of technology and its potential. In the case of ESN, our study coincides with its emergence in organizational life, and this may affect our results and explain the concentration of pre-adoption challenges, with substantial initial fears regarding the interoperability of ESN being expressed at length. In addition, ESN is a bundled IT package (Kügler et al., 2015), and this raises questions of compatibility with other forms of IT. Finally, the degree of novelty of an IT innovation could account for these recent challenges, such as compatibility and issues with business process re-engineering, during the pre-adoption phase. This result is consistent with Agarwal and Brem (2015) who found that IT adoption supposes business transformation. The logical beginning of this transformation is strategic transition followed by the alignment of business process.



Nevertheless, barriers to these adoption projects remain present. On an individual level, users are convinced by ESN, but they lack organizational support. Managers seem to focus more on the social benefits of ESN, such as “social connectedness” (Kügler et al., 2015), than on the informational benefits for work-related tasks.

The following figure represents our main findings, which extend and complement Hameed’s model. We identify new characteristics for innovation, organizational, environmental, and user acceptance factors. We do not identify any new characteristics for the CEO factor. We identify 18 characteristics that are in line with the model, but are not present in the corresponding phases of the adoption of IT innovation. With regard to the pre-adoption phase, we identify 12 new characteristics: compatibility, security, business process, re-engineering, image, information, sharing culture, partners’ support, perceived usefulness, attitude towards use, perceived playfulness, and user age. With regard to the adoption decision phase, we identify three characteristics: business process re-engineering, security, and user age. In terms of the post-adoption phase, we identify four characteristics: security, perceived playfulness, user involvement, and user age.



**Figure 2.** New characteristics added to Hameed's model

### **6.3 Implications for practice**

Our results raise specific managerial concerns, particularly in terms of how critical the pre-adoption phase is. We also find that the primary barriers are not financial; rather, they arise at organizational and individual levels. Future buyers and users therefore need to be reassured and engaged prior to the adoption phase, as opposed to being so solely during implementation. Firstly, IT vendors and consultants should adapt and strengthen their communication to convince managers of the usefulness of ESN, since managers seem less than inclined to implement such a tool. Our findings indicate that a lack of managerial support in IT implementation results in a higher likelihood of failure. It is therefore important that consultants be able to reassure managers and play a true advisory role, and that their discussions focus on the strategic advantages of ESN. Since these tools are relatively new, it would be useful to reassure managers by describing successful ESN experiences through case studies.

Secondly, IT vendors, consultants, and managers should intensify their message about IT innovation by communicating frequently on the topics of security, usefulness, advantages, and user profiles, in order to inform potential users and encourage adoption. The aim is to convince potential users of the added value of ESN, especially when compared to the tools already in use.

### **6.4 Limitations and further research**

This research is subject to certain limitations associated with data collection. Our semi-structured interviews were limited to 35 managers. Although our collected data were rich, due to the use of personal interviews, there is a need to pursue the issue of ENS adoption further.

A quantitative approach would be appropriate to help validate our emergent characteristics and to test Hameed's model in more depth. A combination of qualitative and quantitative methods would support the exploration of the breadth and depth of ENS adoption. From a

methodological point of view, a multi-method research design with a qualitative dimension would be able to examine the characteristics influencing ENS adoption in more detail. A quantitative approach could validate emergent characteristics and reveal new behavior patterns. Given our results, a specific study of the post-adoption phase may reveal new insights; it would also be interesting to focus on the threats and barriers arising during the post-adoption phase in order to understand why ESN is not more widespread in organizations. Finally, an IT-Enabled Business Transformation approach could help better understand the adoption of ESN in a more global approach and the trajectories of convergence between the strategy, business processes, the organizational structure and market aspects.

## Appendices

### Appendix n°1: Details of interviews

Companies			Interviewees'		Interviews	
n°	Business sector(1)	Type of enterprise (2)	nb	Positions	Length	Mode
1	Educational Services	P	1	Communication manager	0h50	Face to face
2	Educational Services	P	2	Archivist	1h08	Face to face
3a	Information	L	1	Research manager	1h39	Face to face
3b	Information		1	Information architect manager	0h54	Face to face
3c	Information		1	Business intelligence manager	1h03	Phone
3d	Information		1	Project director	0h47	Phone
3e	Information		1	Project analyst	0h19	Face to face
3f	Information		1	Head of business intelligence	0h34	Phone
4	Manufacturing	L	1	Business intelligence manager	1h28	Face to face
5	Manufacturing	L	1	Business intelligence manager	0h47	Face to face
6	Manufacturing	L	1	Digital transformation director	0h49	Phone
7	Manufacturing	L	1	Head of business intelligence	0h34	Face to face
8	Manufacturing	SME	1	Head of business intelligence	0h58	Face to face
9	Manufacturing	L	1	Head of business intelligence	0h34	Phone
10	Manufacturing	SME	1	Market manager	0h32	Face to face
11	Professional, Scientific, and Technical Services	SME	1	Head of business intelligence	0h35	Skype
12	Professional, Scientific, and Technical Services	SME	1	Director – Consulting manager	0h34	Face to face
13	Construction	SME	1	Performance director	0h24	Phone
14	Professional, Scientific, and Technical Services	SME	1	Business intelligence manager	0h26	Face to face
15	Professional, Scientific, and Technical Services	SME	1	Head of consulting and productivity products	0h43	Face to face
16	Professional, Scientific, and Technical Services	SME	1	Innovation manager	1h15	Face to face

17	Professional, Scientific, and Technical Services	SME	1	Head of business intelligence and communication	1h40	Face to face
18	Professional, Scientific, and Technical Services	SME	1	Founding partner	0h45	Skype
19	Professional, Scientific, and Technical Services	SME	1	Technical director	1h24	Face to face
20	Professional, Scientific, and Technical Services	SME	1	Founder and CEO	0h40	Phone
21	Professional, Scientific, and Technical Services	SME	1	Digital strategy manager	00h45	Phone
22	Public Administration	P	1	Communication Director	0h20	Phone
23	Public Administration	P	1	Cataloguing manager	0h42	Face to face
24	Public Administration	P	1	Communication director	0h42	Phone
25	Public Administration	P	1	Local development officer	1h11	Face to face
26	Public Administration	P	1	Business intelligence and social media manager	0h38	Face to face
27	Transportation	L	1	Digital project manager	0h35	Phone
28a	Utilities	L	1	Project manager	0h52	Face to face
28b	Utilities	L	1	Digital Expert	0h35	Phone

(1) NAICS (*North American Industry Classification System*, [www.naics.com](http://www.naics.com))

(2) Type of enterprise: Large firm(L) – Small and Medium sized firm (SME) – Public Sector Administration(P)

## Appendix n°2: The coding grid

Factors in the innovation adoption	Code	Characteristics
<b>Innovation</b>	<b>I01</b>	<b>Relative advantage</b>
Innovation	I02	Cost
Innovation	I03	Complexity
<b>Innovation</b>	<b>I04</b>	<b>Compatibility</b>
Innovation	I05	Trialability
Innovation	I06	Observability
<b>Innovation</b>	<b>I07</b>	<b>Security</b>
<b>Innovation</b>	<b>I08</b>	<b>Demonstrability</b>
Innovation	I09	Communicability
Innovation	I10	Divisibility
Innovation	I11	Profitability
Innovation	I12	Social approval
<b>Innovation</b>	<b>I13</b>	<b>Business process re-engineering</b>
Innovation	I14	Strategic decision aid
Innovation	I15	Scalability
Innovation	I16	Task Variety
Innovation	I17	Managerial productivity
Innovation	I18	Organizational support
Innovation	I19	Critical mass
Innovation	I20	Perceived risk
Organizational	O01	Top management support
Organizational	O02	Organizational size
Organizational	O03	IT expertise
<b>Organizational</b>	<b>O04</b>	<b>Organization readiness</b>
Organizational	O05	Product champion
Organizational	O06	Centralization
Organizational	O07	Formalization
Organizational	O08	IS dept size
Organizational	O09	IS infrastructure
Organizational	O10	IS investment
Organizational	O11	Information intensity
Organizational	O12	Resources
Organizational	O13	Training
Organizational	O14	Earliness of adoption
Organizational	O15	No. of business lines
Organizational	O16	No. of customers
Organizational	O17	Organizational complexity
Organizational	O18	Barrier to adoption
<b>Organizational</b>	<b>O19</b>	<b>Image</b>

Organizational	O20	Expansion
Organizational	O21	Specialization
Organizational	O22	External integration
<b>Organizational</b>	<b>O23</b>	<b>Managerial obstruction</b>
Organizational	O24	Culture
Organizational	O25	Job relevance
Organizational	O26	Perceived barrier
<b>Organizational</b>	<b>O27</b>	<b>Information sharing culture</b>
Organizational	O28	Trust
Organizational	O29	Motivation
Organizational	O30	Internal pressure
Organizational	O31	Technology level
Organizational	O32	Openness
Organizational	O33	Norm encouraging change
Organizational	O34	Role of IT
Organizational	O35	Strategic planning
Organizational	O36	Age of IS
Organizational	O37	No. of competitors
Organizational	O38	Satisfaction with existing system
Organizational	O39	Job rotation
Organizational	O40	User involvement
Organizational	O41	Degree of integration
<b>Organizational</b>	<b>Oxx</b>	<b>Security</b>
Environmental	E01	Competitive pressure
<b>Environmental</b>	<b>E02</b>	<b>External pressure</b>
Environmental	E03	Government support
Environmental	E04	Vendour support
<b>Environmental</b>	<b>E05</b>	<b>Partners support</b>
Environmental	E06	Partners readiness
Environmental	E07	Environmental uncertainty
Environmental	E08	Vertical linkage
Environmental	E09	Partners defence
Environmental	E10	Government pressure
Environmental	E11	No. of competitors
Environmental	E12	External expertise
Environmental	E13	Consultant effectiveness
Environmental	E14	Trust with partners
Environmental	E15	Globalization
Environmental	E16	Social influence
CEO	C01	CEO innovativeness
CEO	C02	CEA attitude
CEO	C03	CEO IT knowledge
CEO	C04	Managers tenure

CEO	C05	Managers age
CEO	C06	Managers gender
CEO	C07	Managers educational level
CEO	C08	CEO involvement
<b>User acceptance</b>	<b>A01</b>	<b>Perceived usefulness</b>
<b>User acceptance</b>	<b>A02</b>	<b>Perceived ease of use</b>
User acceptance	A03	Perceived voluntariness
User acceptance	A04	Anxiety
<b>User acceptance</b>	<b>A05</b>	<b>Attitude towards use</b>
User acceptance	A06	Compatibility
User acceptance	A07	Behavioural intention
<b>User acceptance</b>	<b>A08</b>	<b>Subjective norms</b>
User acceptance	A09	Perceived enjoyment
<b>User acceptance</b>	<b>A10</b>	<b>Perceived playfulness</b>
User acceptance	A11	User experience
User acceptance	A12	User training
<b>User acceptance</b>	<b>A13</b>	<b>User involvement</b>
User acceptance	A14	Organizational support
User acceptance	A15	Organizational usage
User acceptance	A16	Educational level
<b>User acceptance</b>	<b>A17</b>	<b>User age</b>
User acceptance	A18	Self-efficacy
User acceptance	A19	Facilitating conditions
User acceptance	A20	Perceived behavioural control
User acceptance	A21	Financial incentives
User acceptance	A22	Technical assistance

*In red color : characteristic identified in our interviews*

*In blue color: new characteristics (not identified in Hameed's model)*

### Appendix 3: Characteristics mentioned during the interviews

Factors	Code**	Characteristics	Pre-adoption		Adoption		Post-adoption	
			Characteristics identified in Hameed conceptual model	Characteristics mentioned during the interviews *	Characteristics identified in Hameed conceptual model	Characteristics mentioned during the interviews*	Characteristics identified in Hameed conceptual model	Characteristics mentioned during the interviews *
Innovation	I01	Relative advantage	X	6	X	1	X	4
	I04	Compatibility	-	1	X	-	X	2
	I07	Security	-	5	X	-	X	1
	I08	Demonstrability	-	-	X	1	X	-
	I13	Business Process Re-engineering	-	1	-	1	X	3
Organizational	O04	Organization readiness	X	2	X	-	-	-
	O19	Image	-	2	X	-	X	-
	O23	Managerial obstruction	X	-	X	-	X	2
	O27	Information sharing culture	-	1	X	-	-	-
	Oxx	Security	New – never identified before	8	-	1	-	7
Environmental	E02	External pressure	-	-	X	1	X	1
	E05	Partners' support	X	-	X	-	-	1
User acceptance	A01	Perceived usefulness	-	9	X	2	X	11
	A02	Perceived ease of use	-	-	X	-	X	4
	A05	Attitude towards use	-	7	X	-	X	9
	A10	Perceived playfulness	-	2	X	1	-	3
	A13	User involvement	-	1	-	-	-	1
	A17	User age	-	4	-	1	-	4

\*in number of interviews

\*\* according to Hameed et al. (2012) code



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