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From the Convener

It has been inspiring to see the iSChannel make its third edition, and go from strength to strength. As the Editor of the Journal of Information Technology, I know only too well what goes into setting up and running a journal - the staff and students have done a great job so far and I am sure that each new wave of students will contribute and develop the Journal further. I also have great respect for the Journal's objectives. In particular, providing the opportunity to develop the discipline of writing for a journal is hugely valuable. Meeting deadlines, writing well, developing coherent ideas and marshalling evidence are very valuable skills for students and their future careers whether in academic or working life. Also being involved in the creation and delivery of the journal provides very good learning experiences. This is a very creative and highly useful venture which I have supported enthusiastically from the start. So far everyone involved has derived immense benefit from the iSChannel. And it helps to underpin the longstanding reputation of the Information Systems and Innovation Group for its focus on student support and development. I look forward very much to the next edition!

Professor Leslie Willcocks
Head of the Information Systems and Innovation Group

From the Faculty Editor

So the iSChannel has made it to its third edition. This is a great achievement and a clear message that the journal has become an established part of ISIG's activity. The quality of the journal is increasing and the editorial process is becoming more embedded and streamlined. Those whose names appear in this journal as editor, author or reviewer should be very proud.

As a snapshot of the concerns of ISIG students, the papers make interesting reading. I was particularly struck by Pavlo Tanasyuk's whose concerns over second-life are philosophical, drawing on Dreyfus's phenomenological ideas to question the mind-body duality of the Virtual World. Abhishek Dhingra is similarly concerned with the virtual world of facebook, but grounds his analysis in non-virtual world issues of security and privacy. Other authors' focus on the perennial issues of our field shows that long held concerns continue to be important – IT in healthcare (Yan), Outsourcing (Guilbaud), eGovernment (Monaghan and Savvides) among others. Most importantly however is that each article demonstrates the deeply investigative nature of our approach, drawing on a range of theoretical ideas to make sense of our messy, complex social world. It is this that provides the strength to the iSChannel and ensures the quality of its contribution.

But we cannot be complacent and must continue to improve. Each year the editorial team receive a large number of submissions from which it must select a small number for publication. This is not an easy task. Making the job of the editorial board easier will demand changes in the way articles are written and reviews are undertaken. It is my plan to involve faculty and students in a wide-ranging discussion of how we can improve the iSChannel publication process for next year. I would like to see more targeted articles written specifically for the iSChannel, rather than receiving large numbers of course-essays submitted on-spec. New approaches to writing such as joint-authoring, review articles and interviews will be considered alongside the traditional research article. By improving the writing, review and editorial process my aim is not just to improve the quality of the journal (which is already extremely high) but also to improve the educational benefit of writing and reviewing for the iSChannel whatever the outcome.

All this does not diminish the fantastic work of all those involved in this edition of the iSChannel. Working to a tight deadline the editorial team have managed the review process fantastically. They have selected an excellent mix of articles, the authors of which must be praised.

Dr Will Venters
Faculty Editor

Welcome to the Third Edition of the iSChannel!

iSChannel 2008 prides itself with the tradition set two years ago, when this publication was conceived and since then has become the platform for publishing interesting and innovative works from the students of Information Systems and Innovation Group at the Department of Management, London School of Economics & Political Science. Although the earlier two editions of the iSChannel have set an excellent benchmark for quality and diversity of the material published, we have made a serious attempt to uphold this standard and are hopeful that this year's volume will present, yet again, an assortment of issues and insights in the world of information systems.

Indeed, considerable effort was put in compiling this journal. The editorial board has had a fair share of pressures and deadlines alongside academic pressure and exam season running parallel with the compilation process of this publication. The reviewers cannot be commended enough on their time, effort and commitment. It is certainly never easy to read papers and to identify required changes. Without their dedication and commitment to this, it would have been impossible to have a timely edition in place. We are utterly grateful to the faculty editor for always being there to help and guide us. Although coming up with the final version of this issue was challenging in its own way, we are extremely glad to finally present it to you.

The articles printed herein are not all strictly academic pieces and this was not our aim either. Although we try to stick to some basic standards, the diversity of issues and the quality of information hold greater importance than the rigorous academic writing criteria. We are hopeful that these articles will give you an insight to the sociological, economic, political and human aspects of the field of information systems. This way, we aim to stay in line with the overall salient feature of the LSE Information Systems and Innovation Group which focuses much on the socio-technical approach of information systems.

We hope that you will enjoy the thoughts, ideas and opinions of our talented writers!

The Editorial Board

Social implications of Virtual Worlds:

Duality of mind and body

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A virtual environment, with its all-pervasive notion of disembodiment and other cultural repercussions associated with modernity, is argued to be a great liberator of the mind and a place to 'ultimately open up possibilities for creating new and autonomous identities' (Poster, 1997).Referring to the philosophy of the mind, the author presents the mind-body problem in the form in which it exists today. The author argues that only limited disembodiment takes place in Cyberspace, as we create a symbolic representation that embodies ourselves in a new virtual form of being. Therefore, the virtual environment is far from a Cartesian dualism in its purest form. The author believes that disembodiment in Cyberspace does not provide us with a truly spiritual life of the mind, but just serves as escape from reality, which might have long-term social implications yet to be learned.

Every single day millions of users interact online, explicitly representing their thoughts and intentions, providing content and ultimately contributing to the experience. Second life, a multiplayer online role-playing game, was launched in 2003, but a long time before that Arthur Schopenhauer, in his work "*The Wisdom of Life"*, referred to 'second life' as the life of the mind, eloquently capturing the essence of its existence:

" Second life is not only a protection against the boredom, it also wards off the pernicious effects of boredom; it keeps us from bad company from the many dangers and misfortunes, loses and extravagances which the man who places his happiness entirely in the objective world is sure to encounter. Varying with the amount of superfluity, there will be countless developments in this second life, the life of the mind." (Schopenhauer, 2007)

The life of the mind is not a new phenomenon—it is a part of us as human beings. We were granted such a spacious tool to develop and hone ourselves in the world of objective reality—reality defined by the majority. However, with help of modern technology we can construct our own reality, where we can vividly represent our fantasies to other people in a very explicit and common way, which was never possible before. Gillett (1986), in discussion of 'Disembodied Persons', provides us with two important questions. The first one is epistemic: under what conditions would we consider that a person was present in the absence of normal bodily cues? And the second is more metaphysical: could such circumstances arise?

Bering (2006), referring to the work of Bloom (2006), mentions that some scientists have already started examining the question of whether humans by default are "common sense Cartesian dualists". Kuhlmeier et *al.* (2004) speculate that "infants do not readily view humans as material objects". If it is true, then it is probably our life in the physical world that predefines our ability or inability to cope with disembodiment in the virtual world. The idea of disembodiment and creation of a virtual person without a physical shell is conceptually alluring. Dreyfus (2001) addresses this question by saying that our mortality will not let us escape the boundaries of our body through participation in virtual reality. But what about our perceptions? What if Kuhlmeier was right and psychological immortality is a cognitive default of our mind? If this is true and we are born "disembodied in our mind", where we do not have a direct link between our consciousness and the real world (the physical environment), then our prior experience in the real world may be the only genuine reasons why we try to create a virtual identity "avatar" and require it for effective communication. There probably will be future babies to be born who will enroll in a virtual world before the real world and who will be able to be "a thinking think" (Almog, 2005), and will need no extra reference to the physical body in order to communicate efficiently. However, there are still many questions and very few answers.

Dreyfus (2001) states that on-line relationships are less stable as the participants are not embedded in the same day-to-day environment, and will not easily understand the context of information. The author would like to argue that this is not the case, as in a real world human relationships are also only periodically directly-observable and characterized by offline social events (Dunbar, 2004). Sometimes, people exist in our minds and we can tacitly assume their actions(Bering, 2006) without sharing the same space and time.

"I forced myself to stop thinking of her as someone still somewhere, if only in memory, still obscurely alive, breathing, doing, moving, but as a shovelful of ashes; as a broken link, a biological dead end, an eternal withdrawal from reality." (Fowles, 1978)

What really distinguishes cyberspace is our initial perception of temporality and our default recognition of every new online encounter as a 'dead' agent (for explanation of the concept please see (Bering, 2006)). While we realize our own existence, we subconsciously perceive everyone in Cyberspace as a figment of our own fantasy – a product of our mind.

The virtual world is often seen as a great liberator, providing us with an opportunity for liberation through disembodiment and identity construction. One can create a new virtual-self that is not limited by previous conscious experiences—in a virtual environment a professor can become a rock star (Nardi *et al.*, 2004). Our identity can possibly be flexible

(Dreyfus, 2001) and we can pretend to be someone else, while still being ourselves. However, can 'one' really be 'many'? Aristotle states—the property of being many and the property of being one are contradictory. Thomas Nagel (2004) in his work "What is like to be a bat?", describes the problem of sensory experiences and argues that to know is not enough in order to be alike, e.g. even with scientific knowledge about a bat's sonar system we would still not know what it is like to be a bat.

The mind-body dualism and ideas of personal liberation stretch as far back as the time of Plato. Ideas of liberation and personal freedom are some of the most powerful concepts that have inspired humanity over the centuries; furthermore, these ideas have been a fruitful inspiration for imagining new types of utopian societies. Today, with technology in place, we can actually see these fantasies taking shape in virtual worlds. Virtual identity construction can hardly change what a man 'is itself' or what 'the man has'. Nevertheless, it can help to change how 'man stands in the estimation of others' (Aristotle, 2000), as identity is one of the most important elements in virtual worlds. Hence, disembodiment can liberate us from our own existence that is predefined by our own life. However, if we construct our identity to please our own fantasies, are we, in the words of Schopenhauer (2007), producing not a virtual-self but a virtual-slave of what other people think, instead of what we are 'in and for ourselves'?

When we talk about liberating ourselves by enrolling in a virtual world and escaping the boundaries of the human body, we have to ask ourselves—what in fact are we liberating; can we really have a disembodied experience in a cyber world? Kant (1999) provided us with his transcendental concept: 'the mind and body become one in order to pursue a unified goal, and if either is missing, the result is the non-existence of the experience' (Btihaj, 2004). Even earlier, Descartes conceived body not solely as subdivision of 'who we are' but as inseparable part of the world, as substance that has to be controlled (Seidler, 1998). Schopenhauer (1995) goes even further, arguing that the mind by itself, if not controlled by the *will,* can produce fantasies that are sometimes vulgar and of fleeting importance, just to feed our satisfaction for being (Hegel, 1979). So does participation in a virtual world liberate us, or enslave us in the interplay of our own fantasies?

The author believes that while we can play with our physical representation online, virtual reality is not a tool to help one escape from the mediocrity of one's own existence. We can never hide our true self behind our virtual identity and imagine that we are someone else, as there is a strong isomorphism between constructing and representing; hence, our constructed identity will always mimic our true self. Virtual space makes us even more transparent to others, as our behaviour is less limited by social norms and rules imposed on us in real life. Participation in a virtual world can be seen as just an escape from reality, a tickling of the will, and insubstantial reflection of self into self (Schopenhauer, 2007). However, reflection and thinking are commonly treated as a similar/constituting actions, as René Descartes (1991) stated – 'cogito ergo sum' - I reflect (think) therefore I am. Hence, by thinking we reflect what is in our minds, but what distinguishes virtual environment is that it makes what is in our minds more explicit than ever. A virtual world can be seen as a mirror that reflects and magnifies all the good and bad in a person—'if a sinner looks in into the mirror of the virtual reality you don't expect an Apostle to look back' (adapted from St. Augustine (2002)).

Today, more and more people are spending most of their life on-line, but do they really live their lives, or just dream online? Possibly, it is just a new form of sleep, or even "death" of a conscious citizen, a burial of a living man where his mind is absent from the physical world while participating in this illiterate leisure—'otium sine litteris mors est et vivi hominis sepulture' (*leisure without literature is death, or rather the burial of a living man*) (Seneca, 1974).

In a virtual environment people are able to represent their fantasies explicitly for others to observe and furthermore, allow others to interact with their fantasies. How can we distinguish between the imaginary—something that just "is" - and what is genuine—"real"? Do we really construct a virtual kingdom of the spirit and liberate ourselves, or perhaps we are just enslaving ourselves in a virtual kingdom of deception? This dilemma reflects the obvious problem: "that through our conscious experience of introspection we are unable to conclude the existence of any third-personal fact, as to conceive that would require something far beyond the purely subjective contents of the mind" (Williams, 1990). However, in neither a virtual nor in a physical world does such mechanism exist.

Hence, are people taking it too far by putting/playing their fantasies 'out there'? Yet, we do not fully realize the long-term consequences of dealing with the *virtual* in the same way that we deal with the *real*. Sometimes this seems like insanity on a global scale, but who is in charge of the asylum?

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About the author

Pavlo Tanasyuk holds a BSc and an MSc in Business Economics from the Kyiv National University. Currently he is a graduate student at the London School of Economics and Political Science. Before coming to London, Pavlo lunched a successful start-up company, as well as consulted externally. He served as a Chief Reviewer and Editor for the iSChannel Journal in 2006/07 and is a member of IFIP WG 9.5 - Applications and Social Implications of Virtual Worlds.

When Healthcare Industry Faces IT Innovation

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This literature review provides an insight into trends within academic research in the field of IT adoption in the healthcare sector. There are two main debates regarding IT adoption in healthcare sectors whether to adopt or not to adopt. Each of them has its own justifications regarding its applicability. This paper reviews recent research regarding IT in healthcare and classifies the research along three different dimensions – "Organizational Vs Individual", "Benefits Vs Barriers" and "Pre– Vs Post-adoption". This review of the existing literature provides a comprehensive understanding from both an academic and empirical perspective of the current situation, and identifies gaps towards which future research can be directed.

1. Introduction

The healthcare industry is arguably the world's largest information intensive industry. Although the need for information in healthcare is universally accepted, surveys show that the progress in integrating IT innovation into healthcare has been slow in comparison to other fast-moving industries like the finance industry (Ford, Menachemi et al. 2006; Ash and Bates, 2005). Adoption seems to be a significant problem with respect to embedding IT innovation in the healthcare industry. Here, the term adoption is defined as "the acquisition of an IT application" (Davidson and Heslinga, 2007), which indicates the transfer from the traditional information-sharing methods to the emerging technology-based information network.

Relevant literature covers a wide range of IT applications, such as Electronic Health Records (EHRs), Electronic Medical Records (EMRs), Computer Physician Order Entry (CPOE) and the use of handheld computers like the PDA. Regardless of the type of the healthcare-related application, there is a growing body of relevant literature to measure the current adoption as well as to guide future prospects for IT innovation. The studies use different frameworks, models and theories to study both adopters and non-adopters. There are debates regarding the validity of applicable models based on data analysis using different theories.

2. Approaches to classify the literature

The goal of this review is to analyze this area of research against three comparable macro angles which correspond to scope, economic perspective and phase. In terms of scope, this paper discusses the organizational level versus the individual level of IT acceptance, comparing IT adoption by organizations such as hospitals and primary practices to technology acceptance by individuals such as physicians and patients. Along the economic dimension, a benefit-barrier perspective demonstrates how authors' emphasis on either benefits or barriers will result in different conclusions regarding adoption measurement. With respect to phases, focusing on different time stages in adoption (e.g. pre-adoption versus post-adoption) can lead authors to different conclusions. The following will more fully describe these three dimensions. However, they are not completely separable, and may overlap.

2.1 Organizational Versus Individual

A discrepancy in the approach taken in research on adopters and non-adopters has sometimes resulted in studies reaching quite opposite conclusions. A substantial amount of research focuses on healthcare technology acceptance at the individual level (Davis 1989; Chau and Hu 2001; Wilson and Lankton, 2004), while other research pays attention to organizational and environmental determinants, e.g. in looking at adoption in hospitals, conceptualized as the organizational level (Kazley and Ozcan, 2007; Hu, et al. 2002).

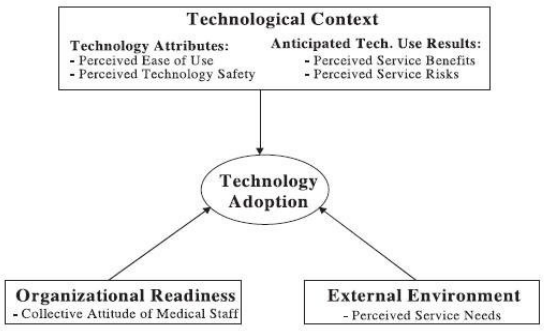

Figure 1-1(Hu, et al., 2002)

At the organizational level, Hu, et al. (2002) suggest a framework (Figure 1-1) that incorporates those factors pertaining to the technological context, organizational readiness and external environment which influence an organization's telemedicine technology adoption. Similarly, Kazley and Ozcan (2007) propose a model (Figure 1-2) using a Resource Dependence Theoretical Perspective, where organizational and environmental factors are examined to determine the national EMR adoption in acute-care hospitals.

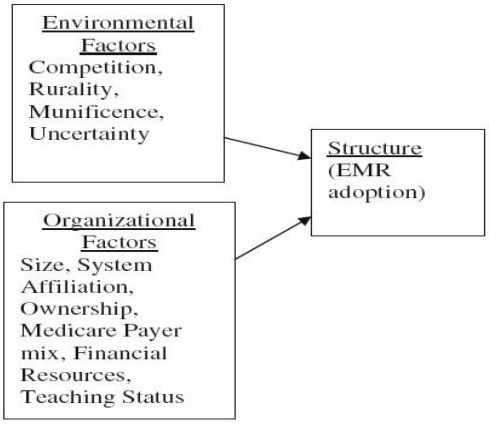

Figure 1-2 (Kazley and Ozcan, 2007)

Hu, et al. (2002) developed a framework to classify adopters and non-adopters. In their opinion, those organizations that have committed funding to a telemedicine technology or have already implemented the technology and are actually using it are regarded as adopters, while organizations that have not yet made a commitment to the use of technology are considered as non-adopters. According to them, the three most important factors that have a significant effect on IT adoption are perceived service risks, perceived ease of use and collective attitude of medical staff. Understandably, organizations are more likely to make the decision to use new technology when they exercise predominant control over their internal conditions. Within this context, Kazley and Ozcan (2007) emphasize that a large scale, affiliated system and urban location are three significant predictors for hospital use of EMRs. These factors supporting adoption are derived from environmental and organizational theories.

In additional, several empirical studies indicate that the adoption of IT in healthcare to some extent depends on the level of IT sophistication in organizational performance (Pare and Sicotte, 2001). Pare and Sicotte (2001) introduce their framework to of IT sophistication along three dimensions of sophistication: functional sophistication, technological sophistication and integration sophistication. According to their analysis of data, integration sophistication tends to rank at the lowest level. This means that the communication between clinical and administrative applications needs more attention. Acknowledging the status quo of IT sophistication within the organization, hospitals could situate their position among the healthcare industry in terms of IT adoption and use of information technologies. In return, IT adoption might be promoted by analyzing IT sophistication level (Pare and Sicotte, 2007).

In contrast, numerous studies shed light on user acceptance of technology, which puts emphasis on acceptance at an individual level. A leading model to measure user acceptance conceptualized by Davis (1989) is the Technology Acceptance Model (TAM). This demonstrates two theoretical determinants, perceived usefulness (PU) and perceived ease of use (PEOU) which contribute to behavioural intention (BI). Based on TAM, different researchers frame their own integrated models to examine the user acceptance particularly in the healthcare industry. Wilson and Lankton (2004) cite the model (Figure 2-1), incorporating TAM as well as the motivational model defined by Venkatesh, et al. (2002) to measure patients' acceptance of provider-delivered e-health. The motivational model suggests intrinsic motivation (IM) and extrinsic motivation (EM) as two prominent factors (Davis, et al. 1992), and Venkatesh, et al. (2002) propose their integrated model using IM, PEOU and unitary PU-EU to predict BI. Chau and Hu (2001) advance their integrated model (Figure 2-2) using the Theory of Planned Behavior (TPB), which contains three original constructs in parallel: attitude, subjective norms and perceived behavioural control (Ajzen, 1991). In relation to the study on healthcare, Chau and Hu (2002) assume that compatibility is an essential factor for BI, and thereby 'a decomposed TPB model' is conceptualized. Keeping Chau and Hu's (2001) views about compatibility in mind as a convincing background to integrated models, Wu, et al. (2007) propose their structural equation model (Figure 2-3) incorporating TAM and Innovation Diffusion Theory (IDT) (Roger, 2005). To be more specific about the study in healthcare, they assert two other constructs that supplement the structure, namely, self-efficacy and technical support and training. Healthcare providers use their own various models to measure user acceptance, which complicates matters.

Patients are more likely to accept e-health when they are satisfied with the current medical care situation, are willing to seek more information about healthcare and have easy access to the internet (Wilson and Lankton, 2004). On the other hand, professionals, including physicians and clinicians, tend to be pragmatic with their technology acceptance decisions. PU appears to be the most significant factor in data analysis. That is, professionals are likely to accept new technology like telemedicine if it is perceived as a tool to improve their workflow (Chau and Hu, 2002). Chau and Hu (2001) also articulate why PEOU is insignificant to BI in the model by identifying the high general competence, mental capacity and quick-learning skills of physicians, which may make them subtly different from other groups in the studies.

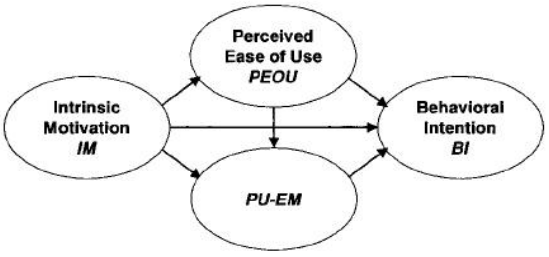

Figure 2-1(Wilson and Lankton, 2004)

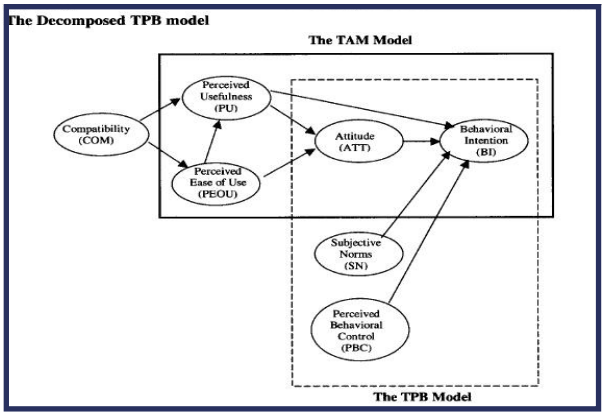

Figure 2-2(Chau and Hu, 2001)

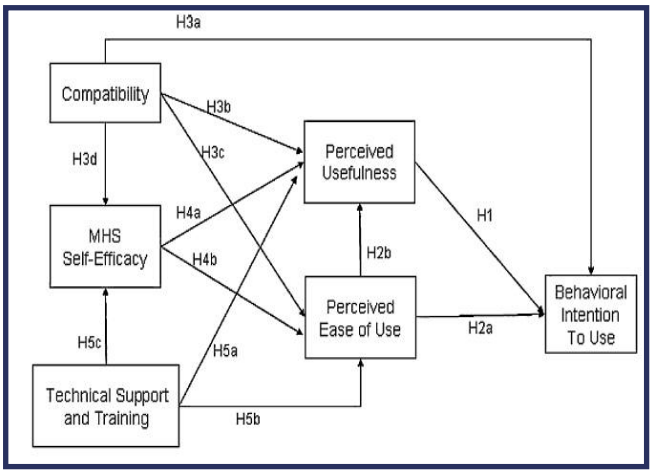

Figure 2-3(Wu, et al., 2007)

Research at the organizational level and the individual level needs a significant amount of correlation to fill in the gap between the two different approaches. Once the organization such as a hospital decides to adopt a new technology, it is important for the users inside the organization to adopt it as well. It is this gap that will result in failures where the organization is willing to accept the technology without measuring and understanding the perception of users. Most research focuses either on the individual level or organizational level adoption of IT in healthcare. However, McAlearney, et al. (2005) considers this gap between organizations and individuals such as physicians. They advise that if physicians are willing to make better use of handheld computers (IT technology), it is important to upgrade the usability and usefulness of the device as well as to promote its use and support it with substantial training and servicing support facilities.

2.2 Benefit Versus Barrier

The question whether to adopt a new technology in the healthcare industry may not have a clear answer. Numerous research efforts assess the benefits and barriers in terms of functionality, financial return, organizational properties and social concerns.

It is widely accepted that introducing information technology techniques such as Electronic Medical Records (EMRs) or Computerized Physician Order Entry (CPOE) could reduce rates of medication errors, and also improve healthcare quality by moving the paper-based industry into e-health (Ford, et al. 2006; Hillestad, et al. 2005; Lu, et al. 2005; Cutler, et al. 2005; Anderson and Balas 2006). Historically, the traditional paper-based record-keeping is popular because of its simplicity and low cost. Nevertheless, computerization and the emerging information technology have significant benefits for healthcare sectors in various aspects such as ease of access to remote data, utility of large volume of data and computerized ordering (Bates, et al. 2003). Hillestad, et al. (2005) also state that EMRs might transform healthcare, enumerating benefits such as efficiency savings, safety benefits and productivity, Therefore, Bates, et al.(2003) argue that a high standard healthcare service qualification could only be met with the introduction of EMRs.

There is a widespread belief that the use of handheld computers could benefit the healthcare industry in areas of documentation, medical reference, and information access to patient data. This supports the continued adoption of IT (Lu, Xiao et al. 2005). Cutler, Feldman et al. (2005) also speculate that the diffusion of information about the benefit of CPOE within teaching hospitals contributes to the large ownership of CPOE there. This notion of benefits thus is paramount to an even wider spread of CPOE in other healthcare organizations.

Meanwhile, numerous researchers talk about barriers and reveal deep concerns about both the technology and its adoption (Anderson and Balas 2006; Davidson and Heslinga 2007; Anderson, 2007; Cutler, et al. 2005). Anderson (2007) asserts that most physicians believe that lack of financial support for IT applications would be the most significant barrier to adoption. Since implementing IT facilities involves a high initial cost and a level of uncertainty in payoffs, there is a risk in the initial IT decision. In this respect hospitals will make the investment only if the implementation leads to a success so that they can recover most of their investment (Ash and Bates, 2005). Inadequate vendors and competing providers for IT applications are viewed as another barrier. The uncertainty of recovery of the initial investment and concerns about whether providers and vendors will remain in business to support their products increase the uncertainty about selecting a suitable vendor (Davidson and Heslinga, 2007). Bates, et al. (2003) argue that parties who pay for the IT application need not obtain maximum financial gain. The interests of those who invest in EMRs, third-party payers and purchasers of healthcare should be aligned, and they should receive proportional return on their investment. Otherwise, it can hamper the successful adoption of IT.

Davidson (2007) articulates his views based on an action research (AR) project to investigate the barriers in adopting Electronic Health Records (EHRs) in small physician practices. He concludes that it is mainly features of the organization that determine differences in adoption within the healthcare industry in United States. The gap between small and larger practices influences the adoption among physicians, due to more resources being available in larger practices for up-front investment and on-going support. Moreover, it is not only the size of the practices but also their organizational knowledge management that promotes the use of IT. Two major theoretical studies relevant to this analysis are Orlikowski, et al. (1995) regarding technology use mediation (TUM) and Duguid (2005) regarding communities of practice (CoP).

Other barriers to adoption of information technologies are based on social aspects. The complexity of EMRs and clinical IT applications impedes the wide use of information technology among physicians. That is, there is a gap between the expressed belief in the value of EMRs and the actual intention to use it (Ash and Bates 2005; Anderson, 2007). As suggested by Lu, Xiao et al. (2005) and Ash and Bates (2005) physicians are reluctant to use new technologies such as PDA or EMR if they do not fit their current workflow seamlessly. Anderson (2007) states that although on one hand IT promotes patient safety, on the other hand there are concerns about privacy, hindering the implementation of IT. In addition, identifying a unique patient when implementing IT can give rise to privacy issues, and thus legal barriers (Ash and

Bates, 2005).

Here we speculate that there are several arguments both in favour as well as against adoption of IT in terms of benefits and barriers. It is however important that the benefits and barriers are examined from multiple perspectives. Most of the literature articulates benefits from more technical viewpoints such as effectiveness and efficiency, whereas others identify barriers mostly from social perspectives such as privacy and legality. The key factor that influences the IT adoption is whether IT has profound benefits that overweigh barriers to overcome (Anderson and Balas, 2006).

2.3 Pre-Adoption Versus Post– Adoption

Pre-adoption refers to the period starting with the initial decision to adopt information technology to the time of initial implementation, whereas Post-adoption refers to the period starting when the new technology goes into use even if merely in the early stage.

The initial theory of pre-adoption and post-adoption beliefs was put forward by Karahanna, Straub et al. (1999) at a time when few empirical studies had looked into this time or phase issue. Karahanna, et al. propose a framework which combines innovation diffusion theory and attitude theories to examine differences between pre-adoption and post-adoption beliefs. Social norms alone dominate pre-adoption mainly because of the absence of concrete knowledge about the technology prior to adoption. In the post-adoption period, concrete knowledge and experience generate perceptions of usefulness and image. However, it is undoubtedly the case that studies on pre– and post-adoptions are limited, suggesting the need for further research.

Studies made at different times relative to adoption may reach inconsistent conclusions on the same question about adoption. When EMRs in small physician practices and telemedicine in Hongkong are studied at early stages of implementation, quite limited adoption is measured, according to Davidson (2007) and Chau and Hu (2005). As to individual level adoption, physicians' resistance to use of EMRs is primarily due to lack of the availability of time. Data entry application may take time to learn, but time is the most precious things to physicians. Physicians who are in the advanced post-adoption stage (that is, familiar with the technology) prefer to use EMRs whereas novices do not, since for experienced users it will take little time out of the regular time made available for patients (Bates, et al. 2003).

Hu, et al. (2002) develop the notion of a continuum of organizational technology adoption, conceptualized as seven logical and distinct phases. These range from the definition as "Already adopted telemedicine technology and used it for clinical purposes" to "Thought about potential adoption but decided not to pursue at present time", including almost all possible variables. By means of the described continuum, it is clear that an organization that has already allocated resources to new technology is more likely to adopt IT than one that informally realizes the potential benefits of telemedicine and has made the decision to adopt but has not yet allocated any resources.

When Anderson and Balas (2006) made their study on computerization of primary care in the United States, the survey they designed contains patterns of questions to locate physicians' stage for each IT application. Whether he or she "had implemented", "planned to implement within one year", "had no plans to implement but was interested in learning more", or "had no interest" were taken into consideration as a prominent factor with respect to time scale to adoption. As a result, physicians in different stages will have different response to the same question on the web-based survey.

3. Discussion and Conclusion

The three issues discussed in this paper provide a comparison of the different approaches used in studies of IT adoption in the healthcare industry. It is evident that practitioners must understand the potential benefits of information technology in the long term perspective and thus hospitals and primary practices would like to take steps forward to invest and embrace emerging technologies. Barriers need to be identified and addressed at the earliest opportunity, since it is only where IT has profound benefits which outweigh barriers that institutions will adopt the new technologies (Anderson and Balas, 2006). Moreover, the likelihood of adopting future and emerging technology among the organizations will increase as organizations advance along the phases on the continuum described by Hu, et al. (2002).

IT innovation in healthcare as a research topic is quite new because of the relative short history of technology adoption in healthcare in comparison with other industries. Consequently, it has latent research opportunities not only from an "IT enabler/constraint" perspective, but also from other perspectives which theorize the technological and organizational issues regarding IT innovation, such as actor-network theory (ANT). ANT represents an attempt to analyze the complex socio-technical world in which we live as comprising hybrids of human and non-human elements, at the same time contesting the boundaries between the technical and the social, human capabilities and machine functions. An increasing number of IS researchers are making explicit use of the theory in their work, including in IS research regarding the healthcare industry (Walsham 1997). Bloomfield, Coombs et al. (1992) articulate how ANT approach does not privilege either the social side or technology by discussing an interesting case study of the development of a particular set of resource management information systems in the UK National Health Service. They argue that social structures and technology are interwoven within the actors who persuade others to align with their interests. Monteiro and Hanseth (1995) use ANT to study the innovation diffusion of IT in general practice in Norway and conclude that ANT is a powerful tool to understand how organizational behaviour is influenced by technical aspects and adoption of IT in healthcare. They also hold the opinion that structurational analysis along with ANT would give a better perspective of the overall scenario. This further fortifies the need of more than a technological perspective while analyzing the prospects of IT adoption in healthcare, and hence these additional perspectives should be borne in mind when academics conduct future research in this area.

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Exploring IT Outsourcing Relationships and Innovation Potentiality:

A Quest for a Research Framework

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Innovation has gained enormous attention in the IT outsourcing activities but remains poorly documented in the relevant literature. This article presents a brief overview of both innovation and IT outsourcing literatures and provides the theoretical foundations for the research framework. In this context, the sharing of knowledge is considered as an indicator of the innovation potentiality. Furthermore, the different types of knowledge are discussed and contrasted for their relative applicability to studying innovation within an IT outsourcing arrangement. The paper finally concludes with the identification of a research framework that captures the innovation potentiality.

Introduction

A recent study from Feeny et.al (2006) points out the lack of innovation within IT outsourcing arrangements. The end users seem to commonly experience "a period of 'mid-contract sag' in which the vendor has lost energy and enthusiasm" (Ibid:545). This study stresses a failure to create and leverage knowledge between client and supplier, despite the promises of applying the current 'Best Practices'. Since knowledge is an input to innovation (Quintas 2002), the sharing of knowledge is an inseparable link from the innovation process. Accordingly, Feeny et.al describe a business case where the relationships between client and supplier are particularly suited to leverage knowledge sharing and innovation. However, very few studies in IT outsourcing have considered the relationships between client and supplier; even then these studies did not consider the consequences of these relationship on the innovation process. To address this situation therefore, this paper aims to explore a suitable framework for examining how IT Outsourcing relationships can be leveraged to pursue a shared innovation objective between client and supplier.

To achieve its objective, this paper is structured into six sections, including this introduction. The background to IT outsourcing is presented in the next section while a highlight of existing IT Outsourcing relationship approaches is presented in the third section. Knowledge sharing as an input to innovation, and the existing approaches for capturing the innovation potentiality are presented in the fourth and fifth sections respectively. Finally, the paper concludes with the innovation potentiality in IT outsourcing research framework.

Background

Over the past decade, IT outsourcing has evolved beyond a mere simple idea of achieving cost savings through contracting the services of a cheaper labour, to a new and complex strategic combination to achieve IT resource optimization. Basically, the IT outsourcing rationale was presented as: "(…) a cost-effective way of controlling the costs of the information system function" (Dalcher 2005:10), through which providers "benefit from economies of scale related to mastering a professional service and investing in supporting infrastructure that enables them to offer a first class level of expertise and reputation in that domain" (Ibid:10). Nowadays, IT outsourcing embraces some complex arrangements such as alliances or partnerships where both the client and the supplier share risk and reward (Hirschheim and Dibbern 2006). These new forms of organization in IT outsourcing require that client and vendor be mutually dependent as well as careful management of the resulting relationships between them. "If as we indeed believe, the relationship dimension is critical to IT outsourcing success,… then this presents profound management challenges for the ways in which IT Outsourcing is more typically conducted" (Kern and Willcocks 2001). However, so far this area has not received enough attention as compared to the other IT outsourcing domains. Among the few scholars who have drawn on IT outsourcing relationships, some have focused on the management (McFarlan and Nolan 1995; Klepper 1995a), the behaviour (Klepper 1995), and a synthesis of its main characteristics (Kern and Willcocks 2000a).

Existing IT Outsourcing Relationships Approaches

McFarlan and Nolan (1995) view the outsourcing agreement as a strategic alliance and they propose a framework to manage it as such. They describe a strategic alliance as: "(…) allow a firm to leverage a key part of the value chain by bringing in a strong partner that complements its skills" (Ibid:11). Consequently, a strategic alliance is a relationship in which the supplier complements a client's weakness. However, the characteristics of this relationship are not based on a classic contractual obligation but on a more complex cooperation. Therefore, McFarlan and Nolan suggest many criteria for structuring an IT outsourcing alliance that not only underline the contract but also the monitoring in line with the company's culture.

Klepper (1995a:249) explores the "mechanisms for the development of long term relationships between clients and vendors in IT outsourcing, or what are sometimes called partnering relationships". Therefore Klepper describes another type of relationship, he developed the notion of partnership where McFarlan and Nolan use the term of strategic alliance. Each of these notions is frequently used in the IT outsourcing literature without providing a clear distinction between them. It seems that strategic alliance and partnership are both describing the same kind of relationship where the main components would be a high degree of interdependence and a long-term orientation. However, the partnership literature put more emphasis on the sharing of risk and reward, and trust. According to Klepper, a partnership "can only evolve through a progres-

sion of exchanges with steadily increasing trust in and commitment to an on-going relationship by both client and vendor"(Ibid:251). Subsequently, a strategic alliance appears to be the previous stage of a partnership where trust is gradually more present between actors.

Among the mechanisms leading to develop a partnership, Klepper points out that in a partnership each actor expects the other to behave in a certain way. The development of trust between client and vendor is linked to the fulfillment of these expectations. On the other hand, Klepper stresses that the only way to accelerate this process of "expectations development" is to provide incentives for the suppliers who meet these expectations. Therefore, the construction of a partnership is viewed as an investment over time: "The spiraling relationship between expectations and trust is a critical element in partnership development and is a necessary foundation for investment by both parties in assets and capabilities that are specific to the relationship. One can easily conceive of a sequence of contracts between client and vendor over time with steadily increasing expectations, trust and increasing investment in relationship-specific assets" (Ibid:252).

Kern and Willcocks (2000a) designed a conceptual framework which highlights the main characteristics of an IT outsourcing relationship. This model is articulated around five elements: context, contract, structure, interactions and behaviour. The context concerns the particular purposes and expectations (i.e. economical, political, and technical) which will be encapsulated in the contract. The structure is the third element of this model; it describes the management structure and the multi-level escalation procedures. The interactions (formal and informal) are considered by Kern and Willcocks as facilitating the terms stipulated in the contract through an ongoing communication, which will help achieve the expectations and reducing uncertainty between client and supplier. On the one hand, the informal communication includes an ongoing daily talk (i.e. coffee machine) with more familiarity and casualty. On the other hand, the formal communication is characterized by "hard facts" such as official meetings about legal, technical or economical issues (Hakansson and Snehota 1995). Frequent communication is an antecedent of trust and provides improvements to formal and informal communication (Dwyer, Schurr et al. 1987). Subsequently, cultural adaptations are described to be an output of the communication, for instance it can evolve to a common language between both companies. A common culture is also reducing the level of anxiety in employees (Lacity and Hirschheim 1993) but can only be developed after "phasing-in period and a process of adaptation" (Kern and Willcocks 2000a:330). The interactions including formal and informal communication are considered by Kern and Willcocks as an investment requiring time, knowledge and resources from both client and vendor. Therefore, it signals a strong commitment from the parties, since the economic cost can be considerable if the relationship ends (Cassel 1996).

The behavioural dimensions are characterized by Kern and Willcocks (2000a:331) as "commitment and trust, satisfaction and expectations, co-operation and conflict, and power and dependency". Commitment appears to be critical in the relationships, it is considered as a clear indication of willingness to successfully achieve the expectations. Commitment is also viewed as interdependent with trust: "Trust grows with commitment, and it starts with taking the risk to trust the other party. As experience with the partner develops, trust will evolve" (Ibid:331). Here again trust appears to be an essential criteria for a successful relationship. Ultimately, all the existing approaches described above are a good starting point for defining the relationships between client and vendor in an IT outsourcing arrangement.

Knowledge Sharing: An Input to Innovation

We can distinguish two notions relative to "newness", invention which involves something new and innovation which implies something new and practically applied (Lyrette 2002). Invention is usually used for radical discoveries, such as the laser or the transistor. Innovation does not have to come from a radical invention but can be for instance a different way to put things together which creates something new. In 1947, Schumpeter agued that innovation as a routine would have a major influence on the future nature of capitalism. This issue is mainly important to advanced societies, where it is increasingly difficult to remain competitive in the production of goods against countries with a lower cost of labour. In this context, innovation is critical for constantly maintaining and improving a competitive advantage.

In the recent years, a theory elaborating on the relation between innovation and knowledge has emerged. "Knowledge is an input to innovation, inseparable from the innovation process, and is also an output of that process. Innovation is concerned with the new or the novel, the break with the past, with change. (…) When we are innovating, we are also creating knowledge" (Quintas 2002:141). Furthermore there is a growing interest in how organizations manage their intangible assets, such as knowledge. However we can distinguish three type of knowledge: tacit, explicit and implicit. One way to differentiate them is to introduce "the knowledge representativeness" which considers the degree of expression in verbal, codified and written form (Lee 2001). Tacit knowledge cannot be expressed in verbal and written form while explicit knowledge exists in codified or written form. Finally, implicit knowledge can be expressed in verbal, codified or written form, but not yet expressed (Ibid). Furthermore, Polanyi (1966) consider that tacit knowledge can only be learned by apprenticeship and experience. Nonaka and Takeuchi (1995) regard tacit knowledge as hard to formalize, context-specific and personal. However, even in the case of explicit knowledge there is a tacit aspect relative to the process of appreciating or extracting meaning from the information. Thus, the boundaries between tacit and explicit knowledge are undeniably ambiguous. Ultimately, the concept of knowledge is complex and the definitions given in this paper are no more than a hint at the main epistemological concerns that are relevant.

Past studies pointed out the introduction of alliances to gain new capabilities through knowledge sharing (Hamel 1991) and collaboration between actors. Here we define knowledge sharing as "activities of transferring or disseminating knowledge form one person, group of organization to another" (Lee 2001:324). Hence, the innovation process is not a fuzzy grouping of territories of specialists but rather an integrated human resources network. It implies a series of iterative steps where all the actors are interplaying together. This process and the linkages among the human network represent the essence of collaboration. Furthermore, codified information are not very rich in human interpretation, knowledge is embodied in the user's subjective context, based on experience. The

main concept used to describe this phenomenon is the "wisdom" which belongs to the tacit knowledge. Therefore, creating the environment that allows people to share knowledge and to interact together is critical for the creation of new knowledge (Lyrette 2002). However, the "wisdom" fits in tacit knowledge and is embedded in people, thus its evaluation remains complex. "Gain in human performance and competitiveness remain difficult to measure, which makes it difficult to value leveraging of intellectual capital and know-how that can be found in linkages and networks" (Lyrette 2002:91).

Existing approaches for capturing the innovation potentiality

Since our objective is to link IT outsourcing with the innovation process, there is a need for a method to capture or somehow measure innovation. There are mainly two approaches to achieving this; the first one and the most straightforward is to measure the output to innovation, such as new products, services, or from a financial perspective the return on investment (ROI). While the other, the assessment of innovation in terms of knowledge sharing (Tidd, Bessant et al. 2001; Quintas 2002). In other words, the study of the innovation process can have two perspectives, new outputs or knowledge sharing; the latter can also be regarded as the capturing of innovation potentiality.

Paul Quintas (2002) considered the innovation process from the perspective of knowledge sharing, networks and alliances. The main rationale is that "knowledge cannot be regarded as a commodity that is easy to transfer between collaborating partners. Knowledge acquisition depends on the development of capability, although this may occur within the network community of practice without being internalized by the firm concerned" (Ibid:160). Therefore, the central question is how do we access knowledge from partners? Pavit (1998) concedes that cross-boundary linkages between organizations are weakly understood and cannot be considered only as a flow of codified information since tacit knowledge is ambiguous and unavoidable.

Subsequently, in order to be shared, knowledge requires common knowledge (Grant 1996) or redundant knowledge (Nonaka and Takeuchi 1995). The common or redundant knowledge is comprised of different types, such as a common natural languages, common usage of mathematics and computer code, shared meaning through tacit exchanges (Grant 1996). Actually, a company needs to develop a common knowledge with its partners according to its model of network. Many types of network are described by Quintas, the Coleman network (1990) is characterized by few nodes and dense ties (such as Toyota) whereas the Burt networks (1992) have many nodes with few redundant ties. The redundant and overlapping knowledge is a key determinant for bridging organizations / peoples within a network. Thus, there is a requirement for joint activity, for working together and for learning from the other the common particularities, which will make the bridge between organizations. In this context, the common or redundant knowledge can be used to measure the innovation potentiality of a network. However, the nature of such knowledge is mainly tacit (i.e. shared meaning) and because it is not available to researchers, it remains a major methodological challenge (Quintas 2002). A long-term ethnographic study with a behaviourist approach can be suitable to research on the indicators of tacit knowledge that betray its existence.

Another perspective to research on innovation and knowledge sharing is provided by Jae-Nam Lee (2001). Lee examines the consequences of knowledge sharing upon the success of an arrangement whereas this paper is more about the link between client / supplier relationships and knowledge sharing. Nevertheless, Lee's research method seems interesting for drawing on the exchange of codified information between client and vendor in IT outsourcing. In Lee's research, the explicit knowledge represents the sharing of business proposals, manuals, success / failure stories and journals. The implicit knowledge represents the sharing of know-how, know-where, know-whom and education / training. However, this distinction remains ambiguous concerning the tacit knowledge. For instance, the know-how overlaps codified information which can be written down and tacit knowledge which can only be experienced. This overlapping with tacit knowledge is a vast debate but it is essential to know that some knowledge can only be learned and not shared.

Conclusion

This document encompasses a quest for discovering an appropriate research framework that captures the innovation potentiality. As a result, the innovation process can be studied from the knowledge sharing perspective (Quintas 2002). Since tacit knowledge is hard to be formalized and be embedded in the "wisdom", the explicit and implicit knowledge are found to be appropriate for a case study research (Yin 2003), although that tacit knowledge can be studied with an ethnographic perspective (Hammersley 1983). The relationships between client and supplier in IT outsourcing can be considered as strategic alliances or partnerships under particular characteristics. Among those features, we find context, contract, structure, interaction and behaviour (Kern and Willcocks 2000a). Subsequently, researching these characteristics which enable the sharing of knowledge is pertinent for an empirical investigation. The five elements of the Kern and Willcocks' (2000a) model are relevant to research the sharing of knowledge (implicit, explicit and tacit) in each element (context, contract, structure, interaction and behaviour) of an IT outsourcing relationship (Figure 1). Nevertheless, there are two different lines of attack in order to achieve the study, which also means different units of analysis. This implies that we either have to study the knowledge sharing from the organizational side (context, contract and structure) or from the individual perspective (interaction and behaviour). Ultimately, this paper described a cross-boundaries research framework that enables the examination of whether or not the relationships between client and supplier in IT outsourcing have an influence on the innovation process. Innovation has gained interest within IT outsourcing activities (Feeny, Willcocks et al. 2006), therefore some further investigations in this area would be relevant for the research field and for the future IT outsourcing arrangements.

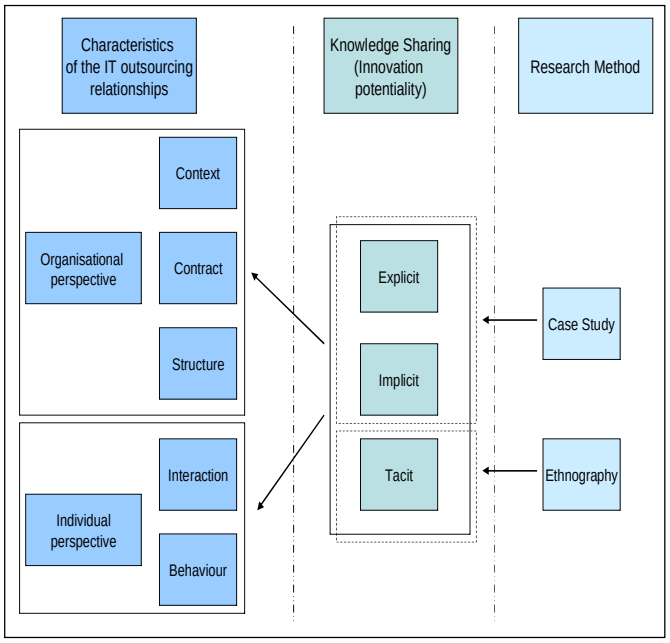

Figure 1: Innovation potentiality in IT outsourcing Research framework

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The Limitations of eGovernment Evaluation: A Critical Review

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In the academic realm, the widely accepted definition of Electronic Government (eGovernment) is the delivery of government services through electronic means, namely the internet. As a result, most of the literature which deals with eGovernment evaluation consists of assessing local government agency websites which offer services to a specific community. More recently, researchers have begun to question the limitations of this definition. Most people visit government websites to obtain information on services which they require once every few years, such as driving licenses, passports, or birth certificates. This clearly outlines the limitations of the eGovernment concept. Given the different social contexts of the world, it is possible that many people do not see these services as a high priority and therefore the widely accepted definition of eGovernment might not be universally applicable. The purpose of this literature review is to demonstrate how eGovernment evaluation studies are limited by a lack of clearly defined objectives, and how this has led for calls to broaden the concept of eGovernment to the use of information and communication technologies (ICTs) to transform government by rendering it more effective and participatory.

Introduction

EGovernment is still a nascent field, and most of the research literature concerned with its evaluation has been written in the last seven years. The evaluation studies do not follow a particular chronological trend. Instead, there is a tendency to measure "what is measurable" based on the background, knowledge, and preferences of the researchers who carry out the studies (Jansen, 2005). Most researchers evaluate eGovernment by describing the technical aspects of a website and the services which are offered online. Others advocate the evaluation of eGovernment programs on economic grounds through analysing technology investments and the savings associated with putting a government service online. Another way to evaluate government websites is the citizen-centric approach, in which researchers interview users and ask them to report the experiences they have had with obtaining services on a government website. Other frameworks put forth in the literature employ a combination of the economic, technical, and citizen-centric approaches to analyse eGovernment programs.

The vast majority of research literature on eGovernment evaluation studies is based on the definition of eGovernment as services offered online, usually those which would be sought in a geographically localised context. The contrasting school of thought follows a more generalist view, which is more in line with the definition of eGovernment put forth by the Organisation for Economic Co-operation and Development (OECD, 2003) as "the use of information and communication technologies, and particularly the Internet, as a tool to achieve better government". Proponents of this school of thought believe that the aim of eGovernment should be to improve the well-being of citizens and render public services more accessible. These programs should be assessed based on how they lead to greater transparency and trust in government institutions.

Supply-Side Evaluation

The term coined by Janssen et al.(2004) to refer to the evaluation of eGovernment programs through the assessment of the services offered on websites is *supply-side evaluation*. Here, the focus is on website usability and offering suggestions on how to modify websites to make it easier for citizens to find desired information (Wang et al., 2005). Evaluation is carried out through the use of standard website diagnostic tools which check for broken links, colour schemes, and how long it takes for the pages to download (Choudrie et al., 2004). Others focus on the attributes of the technology such as accessibility (Abanumy et al., 2005), the extent of services offered, the number of website visitors (Kaylor et al., 2001), and the presence of a security or privacy policy (Middleton, 2007). The majority of this research is descriptive as it is concerned with little beyond the website itself.

Pina et al. (2007) state that governments are using websites as billboards, and that there are very few mechanisms in place that encourage participatory citizen action. Yildiz (2007) argues against evaluating eGovernment programs from a technological perspective, stating that the rapidly developing pace of ICTs hinders researchers from determining the effectiveness of these initiatives. More resources should be devoted to evaluating the issues that eGovernment programs are meant to address (Yildiz, 2007). The internet provides the technical operability to offer services in more effective ways, but institutional and organisational support is essential in making these programs work (Montagna, 2005). When eGovernment consists of putting up a website, citizen participation is still minimal and government effectiveness does not change (West, 2004). Measuring progress by assessing government websites may provide fast, cheap, and clear results, but it does not offer insight into which issues these programs are meant to address (Kunstelj & Vintar, 2004).

Economic Evaluation

Wang et al. (2005) believe that it is necessary to evaluate eGovernment programs based on the resources saved by citizens who use the online service in lieu of travelling to obtain it. Picci (2006) proposes a purely quantitative methodology to analyse the cost-benefit analysis of eGovernment programs, specifically programs used by businesses to facilitate their dealings with municipal service providers. Mathematical variables are employed to represent elements such as technology investment, usage, and regional output. The variables are

used in complex equations which determine how the use of ICTs affect economic output in the Italian region of Tuscany (Picci, 2006). In these studies, the way in which the results are presented may vary slightly, but the main purpose is to investigate what was done, how much was spent, and what was actually achieved (Brown, 2007).

Grimsley and Meehan (2007) criticise the evaluation of eGovernment programs based on economic terms. While it is important to justify ICT investments, it does not support the social and political goals that an eGovernment program might have (Grimsley & Meehan, 2007). Irani et al. (2005) are also critical of the evaluation of eGovernment programs from an economic perspective. Evaluating ICT investments based on financial benefits is appropriate for the private sector, where investments can be assessed against sales or other financial measures [e.g. cost savings]. However, the concept of economic value has less significance in the public sector, where the intended benefits might be intangible, and therefore more difficult to measure (Irani et al., 2005). Government is not subject to market forces and does not need to compete with other agencies to offer services to customers, therefore, evaluating it from a financial perspective will not help the researcher gain insight into the issues the initiative was meant to address (Montagna, 2005).

Demand-Side Evaluation: The Citizen-Centric Approach

A shift in focus to the user experience led to the development of the citizen-centric approach. In these studies, researchers employ qualitative methods such as interviews, focus groups, and questionnaires to assess people's experiences in dealing with government websites. Janssen et al. (2004) refer to this as *demand-side evaluation*. Numeric values are assigned to certain qualities in order to score the programs based on levels of satisfaction, trust, and efficiency. In some cases, the results are compared with similar initiatives in other locations to determine who is "ahead in the game". Some researchers develop their own frameworks while others build on existing ones, usually those developed to assess private sector websites. In the latter case, the researcher's contribution consists of a new element which adapts it to an eGovernment context.

Horan and Abhichandani (2006) propose an eGovernment satisfaction model (EGOVSAT) to measure user satisfaction in using the websites of the public transport systems of two major US cities. The model is based on asking users to rate factors such as reliability, efficiency, and flexibility. The results are then combined with an "emotional dimension" in order to measure the extent to which the users are satisfied with the services (Horan & Abhichandani, 2006). Carter and Belanger (2005) propose a model for assessing eGovernment adoption based on the technology acceptance model (TAM) (Davis, 1989) and diffusion of innovation model (Rogers, 1995). The added element is the inclusion of "government trustworthiness" as one of the variables to be assessed (Carter & Belanger, 2005).

Other studies aim to assess several areas of an eGovernment program. Data is collected by reviewing websites, appraising ICT investments, and interviewing users. As in most other evaluative studies, numeric values are assigned to each response and the program is given a score and compared to other initiatives. Pina et al. (2007) have conducted a study in which they rated eGovernment programs in terms of the amount of money being spent on a program, whether there is an interactive element on the website, and the sophistication of the technology employed. Wang and Liao (2007) propose a model based on the DeLone and McLean (2003) ten-year update of the model of information systems success. Variables such as system quality, user satisfaction, and individual and organisational impact are assessed. De Jong and Lentz (2006) propose an expert scenario evaluation framework, in which experts familiar with the technology are asked to perform specific operations on government websites and rate their experiences. It is concluded that expert evaluation could help correct basic structural problems, but the real indicator of success will depend on whether the citizens adopt the technology (de Jong & Lentz, 2006).

Redefining eGovernment

People who require frequent transactions with the government, such as those who receive social benefits, are not likely to use the internet to obtain them. Seen in this light, the widely accepted definition of eGovernment is not such a breakthrough concept, and efforts should be focused on making information more accessible to those who need it (Bannister, 2007). This represents a shift in focus from eGovernment as an array of services offered online to a way of making government more participatory, improving economic conditions, and increasing democracy. Current evaluation studies place too much emphasis on the visible front-end applications of eGovernment programs, namely websites. This implies that there are many aspects of eGovernment that cannot be seen, and therefore they are treated as if they do not exist (Bannister, 2007).

The Current State of eGovernment Evaluation Research

Researchers have a tendency to define eGovernment success based on a few variables, and in subsequent studies they set out to measure these variables (Janssen et al., 2004). The limited definition of eGovernment does not consider the more complex issues involved with transforming government, nor does it fully acknowledge the role of ICTs in this process (Jansen, 2005). Most evaluation occurs by assessing what is visible, while almost no attention is given to the back-office. Jansen (2005) compares this to the dot-com era, when companies would employ websites without changing their organisational infrastructure. Political and social issues have a major impact on institutional life, therefore, the context in which the ICTs are implemented play an important role on the evaluation methods (Irani et al., 2005). Studies which focus on the outcomes and outputs of the eGovernment tend to be descriptive and promotional, whereas it is necessary to understand the political process behind eGovernment before it can be properly evaluated.

Researchers are increasingly critical regarding the assumption that evaluative eGovernment studies which do not go beyond assessing the attributes and impacts of website have universal applicability. Peters et al. (2004) argue that these evaluations are too simplistic, and that results gathered from a particular study might not produce consistent results when applied to other social and cultural contexts. Jansen (2005) makes a similar argument in stating that, in not allowing for specific national contexts and priorities, evaluation using standardised frameworks is inherently flawed, and that research should focus on relating these programs to national goals. The term eGovernment should vary depending on cultural factors and national priorities (Yildiz, 2007) and studies must consider

the cultural and political context in which the program is enacted (Jansen, 2005).

Esteves and Joseph (2007) claim that the assessment of eGovernment programs is an area that remains largely unexplored and that most of the current research focuses on describing the features of local government websites. Irani et al. (2005) attribute shortcomings to the fact that human and organisational factors are often not considered when carrying out evaluative studies. The success of an eGovernment program relies on well-informed, knowledgeable, and critical citizens, and it is very difficult to use a standardised measure to gauge such attributes (Jansen, 2005). There is a belief that soft measures such as improved decision making, societal impact, and employee performance are often ignored when evaluating the success of eGovernment programs (Gupta & Jana, 2003). The evaluation process is often too simplified, and researchers often do not take into account the various political, social, and institutional aspects (Yildiz, 2007). Montagna (2005) states that researchers work with what is available to them when rating and comparing eGovernment initiatives, but concedes that these studies should not qualify as universal analyses, as organisational structures, beliefs, and values vary greatly among cultures.

Heeks and Bailur (2007) take a harsher line by arguing that the current research in eGovernment evaluation suffers from a "naive optimism", in that it ignores negative aspects and fails to consider other studies which point out the costs of IT failure in the public sector. They attribute this to the fact that a lot of eGovernment evaluation literature is written in an optimistic tone by IT vendors seeking to sell their services to the public sector. As a result, it tends to be positivist in that it treats key factors as real and measurable (Heeks & Bailur, 2007). In their literature review, they lament that theories and frameworks are often not applied in on eGovernment evaluation studies. They also claim that it seems most researchers do not leave their offices to carry out the studies. They conclude that many shortcomings within evaluative research results from the fact that eGovernment is not properly recognised as an academic discipline (Heeks & Bailur, 2007).

The Social Perspective

Those who argue that eGovernment programs should be evaluated from a social perspective believe that more emphasis should be placed on developing research models which help us understand eGovernment implementations based on national priorities (Jansen, 2005). Value in eGovernment should include the ability to deliver social services effectively and the development of new ways for citizens to play a more active role in governing themselves (Esteves & Joseph, 2007). They recommend a socio-technical framework called the eGovernment assessment model (EAM) which states that the relationship between the social and technological factors must be considered when evaluating eGovernment programs (Esteves & Joseph, 2007). Irani et al. (2005) introduce social and organisational parameters into their framework for evaluating eGovernment, and apply it to a study in which the satisfaction of UK public housing seekers is assessed. Grimsley and Meehan (2007) devise a framework based on Moore's (1995) concept of public value, meaning how citizens view government efforts to provide services which reduce homelessness, enable universal access to healthcare, and increase trust. Grimsley and Meehan (2007) seek to analyse the role of ICTs in achieving these objectives. Gupta and Jana (2003) rate the eGovernment program of a municipality in India based on economic factors combined with employee and user perception of programs carried out by the New Delhi Municipality.

As the definition of eGovernment transforms from "online public services" to "the use of ICTs to improve government", the frameworks for future evaluation studies will consist of more holistic, socio-technical approaches (Grimsley & Meehan, 2007; Esteves & Joseph, 2007) in which the emphasis is on the citizens, employees, and national and social contexts (Gupta & Jana, 2003). Yildiz (2007) supports eGovernment as an academic field within public administration studies, and calls for analysis of the political processes behind eGovernment programs in order to improve decision-making in future initiatives. Heeks and Bailur (2007) believe that the "poor state" of eGovernment evaluation can be improved through the use of broader research methods to gain a better perspective of the complexities involved when technology is enlisted to benefit public administration.

Conclusion

Most eGovernment evaluation studies to date have occurred in very limited contexts. Usually, a small cross-section of a city's inhabitants is asked to rate the experience of obtaining a service through a local government website. The e-government service is of interest only to the people interviewed in the study. Whether or not it is used by the majority of whom it is available to is usually never considered. Nevertheless, such studies are included under the universal heading of eGovernment, but what really takes place is a simple transaction between the city and its inhabitant. Can a website where citizens are able to obtain information about a public transport system be considered eGovernment? Future research literature will likely distinguish between eGovernment as online public services and eGovernment as the use of ICTs to improve the citizen-government relationship. The former definition of eGovernment has been given a distinct priority since the beginning, and but its limited scope has led researchers to question it. This has left the field in a confused state, attracting a broad range of researchers from several academic disciplines such as information systems, computer science, public administration, and political science. Perhaps this is indicative that eGovernment is not a field in itself, but a broad range of sub disciplines that are dependent on a broader context.

This literature review provides an overview of the current trends of eGovernment evaluation and how these studies are limited by accepted definition of eGovernment. Given the complexity of the world, it is clear that the dominant and privileged view of eGovernment as a service to technically able citizens in developed countries limits its applicability. These efforts are nonetheless useful in providing a basis for furthering the development of the eGovernment concept. The emerging research literature indicates an effort to expand the definition of eGovernment so that it can be applied to different and broader contexts, by universalising it in a way that is applicable to different political circumstances. The way in which eGovernment programs evolve will determine future evaluation efforts, and future evaluation studies are likely to take a more comprehensive view in assessing the success of these initiatives.

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Perspectives on IT Innovation in Organisations

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IT innovation is often considered a main actor for organizational transformation and can be an important asset for gaining competitive advantage (Ciborra, 2002a; Orlikowski, 1996). Yet, there is little agreement on how IT innovation happens. It is however critical to understand how IT innovation takes place in an organization so as to better facilitate its development. We identify and discuss several perspectives of how IT innovation happens and argue that they are not necessarily exclusive, simply casting a certain light upon a problem depending on the concerns of the practitioner.

1. Introduction

IT innovation has become increasingly important in organizations and has led many researchers to study its impact and its benefits (Ciborra, 2002c; Orlikowski, 1996; Orlikowski, 2000). However, there are many perspectives of how such innovation happens.

In this essay, we focus solely on understanding how IT innovation takes place in an organization, how it is developed or develops and what the different perspectives on the subject are. The difference between these perspectives is grounded on the difference in the underlying concerns from the various fields of study of the practitioners.

Technology innovation is often sold and advertised as being the result of the application of best practice engineering methods. This perspective often rests on the assumption that the use of rational techniques will result in a reliable and useful product (Stenning, 1986). However, this represents only one view that tends to see or idealise IT development as a clean and logical work. Other views cast a different light on how technology innovation takes place. These take a broader picture of the development of technology innovation and argue that innovation is not planned, but rather improvised (Ciborra, 2002c) or that it emerges through the use of technology (Lin and Cornford, 2000).

First, we identify and discuss four ways that drive the development of IT innovation: through rational process, through improvisation, through use and finally, the manner in which institutions can shape IT innovation. We then discuss some limitations of this literature review and then conclude.

2. IT Innovation in Organization: Differing Perspectives

In this section we will expose the differing viewpoints, starting with the engineering perspective, to then discuss the various sociological and socio-technical perspectives before finally considering the impact that institutions have on IT innovation.

2.1. Technology Innovation through Rational Process

An important view on innovation has its origins in the engineering world. This is significant, as engineers are the ones responsible for the creation of technological IT systems, and hence their view of technological innovation has implications into how systems are created. This, in turn, will have repercussions upon their concerns when engineering IT systems development.

Engineers tend to view IT innovation as being brought about by the construction of a software system by a rational semi-formal or formal structured process (Stenning, 1986). This is despite the impossibility for humans to ever follow a completely rational process (Parnas and Clements, 1986). Even if it is impossible to do so, Parnas argues that it is important to imitate rational processes. Rational processes are based upon the premise that the application of a certain methodology in the construction of a software system will increase the reliability of the software system and the productivity of the engineers involved (Stenning, 1986).

There are many different methodologies but all usually involve more or less the same tasks: requirements gathering and specification, some form of analysis and design, implementation and maintenance (Arlow and Neustadt, 2002; Boehm, 1988). The names assigned to these tasks vary from methodology to methodology. Boehm (1988), for example, refers to analysis as design and design as "detailed design". The methodologies are, however, semantically the same. More than just proposing a set of tasks, software systems development methods give guidance as to how the tasks should be carried out. Two such methods which stand at opposites are the waterfall-like models and iterative and incremental models. The former being a pure top-down approach where the various tasks are seen as steps while the latter is often seen as more flexible (Avison and Fitzgerald, 2003) by allowing the iteration between the tasks and building a system incrementally after each iteration.

The requirements task is the most interesting one for our purposes since it is this activity that will define technological innovation as viewed by engineers as it determines the purpose of the software. The requirements task tends to be viewed as the most difficult activity in building software, but also one of capital importance (Brooks, 1987). Carrying out requirements tasks involves many sub-activities which put together form the field of study of Requirements Engineering (RE).

There are many definitions of RE. In his paper, Nuseibeh (2000) provides a definition from Zave (1983) which describes RE as being "a branch of software engineering concerned with the real-world goals for, functions of, and constraints on software systems […] and the relationship of these factors". This idea is shared by Jackson who captures this notion of having the software, the *machine*, and the context

and environment, the *world*, as two different intersected entities (Jackson, 1995; Jackson and Zave, 1995). The world describes the problem (i.e. the requirements and goals) and the machine represents the actual program (i.e. the solution to be built in its own machine context). The most interesting idea is that requirements are solely contained in the world, and not in the machine. Hence, the purpose of the machine is only found in the world.

Out of the five main tasks, four are solution-oriented in that they are concerned only with the construction of the software. Only the requirements activity focuses on the problem domain, acting as a bridge between problem and solution. Technological innovation is thus considered a process grounded in the RE activity where the purpose of the system is identified. Yet the engineering view is always turned into bringing rationality and reasoning abilities in order to understand and create IT innovation. These five tasks highlight the main concerns that the engineers have to deal with: they must create an IT product that is both functionally useful and responds to required constraints in terms of quality of the product. Their concern is thus focused on the functions and on the quality constraints that the product *should* deliver.

Many alternative views, however, oppose this positivist perspective. We study one such a view in the next section.

2.2. Technology Innovation through tinkering and improvisation

One of the alternative views on technology innovation opposes the idea that innovation is carried out only through a rational process (Ciborra, 2002c). This in a way joins Parnas' idea that rational design processes are an ideal that will never be reached giving several reasons for this among which is the fact that IT is developed by humans (Parnas and Clements, 1986). This view is somewhat shared by Brooks who argues that there is no 'silver bullet' in software engineering which will improve the creation of IT (Brooks, 1987). Therefore, it would seem that rationale processes are unlikely to be an absolute method to the success of IT development. Ciborra, as opposed to Parnas however, argues *against* the need to imitate them. According to Brooks (1987), what distinguish successful IT products are not so much the methods used, but rather the skills of the designers. Ciborra takes this idea quite drastically forsaking the use of rational processes altogether, whereas Brooks simply argues that their sole use is no guarantee of success.

Furthermore, Ciborra argues that the world is complex and that it cannot be captured in a static picture (Ciborra, 2002b; Ciborra and Hanseth, 1998). This constitutes another criticism of the rational processes. What the world constitutes for Ciborra is not completely transparent. He often gives examples from a managerial and economic point of view, relating such concepts as management agendas and top-down managerial approaches to the way IT systems are developed. These would seem, a priori, as separate concerns entirely. However, we argue in this paper that they really are the same. In the engineering view, requirements belong to the *world* and the *machine* acts upon the *world* by way of specifications that it must render true (Jackson and Zave, 1995). As previously described, all the other activities of the software lifecycle are based upon the requirements and their subsequent satisfaction. The world that Ciborra refers to really equates to the world used in Zave's definition (1983) from which goals are drawn and which an IT system implementation would need to satisfy. World goals here would be, for example, aligning a business and IT strategy or focusing on the need for flexible infrastructure (Ciborra, 2002b; Ciborra and Hanseth, 1998). Of course, these are high level goals, but they nonetheless provide the rationale for the lower level requirement specifications that can be used and transformed into a working IT system. According to Ciborra then, a static picture of the world is impossible to define since the world is dynamic and cannot be captured into what engineers view as requirement specifications, which are static specifications by nature.

Instead of rational processes and planned structured methods, some authors argue that the ideas of tinkering and improvisation in IT systems are better able to cope with the dynamic picture that the world offers (Ciborra, 2002c; Elbanna, 2006). Tinkering takes place when an IT system comes to support a function that had not been planned during its creation. Also, they argue that the success of many IT products have actually originated from tinkering and improvisation and not from structured methodologies and rational thinking as management likes to advertise once the IT product has become a success (Ciborra, 2002c; Elbanna, 2006).

This idea of tinkering is not exempt of criticism. Ciborra, does not mention any structured methodology in particular, seemingly encompassing all the methods as being articulated from the management hierarchy in a very much planned top-down approach which, once articulated, encompasses the strategic agenda to be carried forward to the next stages of development, ending in a useful IT product. This, however, would represent one type of system development methodology, namely the waterfall model (Royce, 1970). Other methods are much more incremental and iterative in nature, allowing a learning process of what is doable by the system and in understanding what the desired real world goals and requirements are (Arlow and Neustadt, 2002; Boehm, 1988).

There also is an important difference in concerns. Ciborra (2002c) constructs his argumentation from an economic and managerial perspective, referring to IT artefacts as possible conduits towards sustainable competitive advantage if methodologies other than structured ones are used. The main concern here is the economic advantage coming from the innovation of an IT artifact. The engineers on the other hand must consider a plethora of widely different concerns stemming from the main goals for creating the IT system. They also must consider all the technical details of the IT artifact, whether it will be usable and whether it will satisfy the main goal. For this reason there is a lot of research in the line of what Stenning (1986) proposed: ways to validate that each step taken brings closer the creation of an IT artifact that is both reliable and in line with what is needed (Lamsweerde, 2000).

Ciborra gives various examples of successful IT products which came about through tinkering (Ciborra, 2002a). All of these examples have two things in common: firstly, they came to support a certain function that was not expected during the creation of the IT artifact; secondly, the idea to build the function came through the use of the IT product. Hence, the ability to hack and tinker seems to require an actual working IT product. Thus, Ciborra's idea of tinkering does not necessarily invalidate the use of structured methods as an

approach to create IT systems from scratch. Furthermore, it is much more likely that one will find new ideas while using a built IT system than to imagine it before it is constructed. This is interesting since it indicates that the real use of an IT innovation is revealed when in context, when it has to fuse with the working practices of the users. This perhaps is the main reason why improvisation can be seen to work well: the organizational settings are easily apparent when the new innovative function is developed. Hence, tinkering is the development of IT innovation in context, satisfying certain identified social or organizational need. As a result, tinkering is an interesting framework to support and explain the finding of new ideas that will be truly innovative but often seems to require an existing system.

2.3. Technology Innovation through usage

Another view from the socio-technical perspective on technology innovation in organization is that technology innovation does not simply happen, but rather changes through use (Ciborra, 2002d; Lin and Cornford, 2000). These authors use different terms to explain this phenomenon: Ciborra uses the word "*drifting*" while Lin and Cornford use the phrase "*emergent phenomena*". These terms are equivalent in that they refer to a difference in the usage of a technology from what was planned to its actual use in organizations. This means that technology is, at least partly, designed in its usage.

According to Lin and Cornford (2000), not only does technology influence organizational settings, but the inverse is also true: organizational settings influence how technology innovation takes place. The meaning of technology innovation thus really takes form in the workplace when the planned innovation is put against the expectations and working practices of the humans in the organizational setting which will define the technology innovation (Lin and Cornford, 2000).

This has several implications. Firstly, the emergence phenomena would imply that organizations can have an indirect and unplanned impact upon IT innovation. This is opposed to the direct and planned impact which can be brought about by rational processes as viewed by the engineering perspective. Thus, it might be interesting to investigate how rational design processes can accommodate this view (Lin and Cornford, 2000).

Secondly and following from the first point, there is a double relationship between the technology and the organization in terms of change. This is in stark contrast with the engineering view which perceives change as technologically driven (Orlikowski, 1996).

Thirdly, since organizational settings have an impact on the design of the IT innovation through its use, then the institutions must also have an impact upon the development of IT innovation.

2.4 Technological Innovation and Institutions

Yet another possible factor that can determine how technological innovations are developed in organizations is *institutions* (Orlikowski and Barley, 2001). Institutions are "norms, rules, beliefs and taken-for-granted assumptions" (Orlikowski and Barley, 2001) cited from Barley (Barley and Tolbert, 1997). These institutions have an impact upon the organizational settings in which these factors are created. These in turn will have an impact upon how technology is developed and used inside an organization. A good example of how institutions can affect technological innovation comes from Orlikowski and Barley (2001) where they evoke questions of intellectual property, individual privacy, organizational control, national sovereignty and corporate boundaries and their impact upon e-commerce.

It is also interesting to note that different countries will have different institutional beliefs which will affect how IT products are developed (Thanasankit, 2002). Culture and institutions thus inevitably affect the way IT creation is brought about. It would therefore seem that the creation of IT does not entirely stem from conscious effort, whether planned and rational or through bricolage, but that unconscious elements such as culture and institutions also affect the way IT innovation is developed.

3. Conclusion

Different perspectives on the development of IT innovation were reviewed. The engineering perspective prescribes the use of as rational processes as possible, and albeit acknowledging that rational processes are idealizations, one should strive to follow them as closely as possible (Parnas and Clements, 1986).

Critiques of these rational methodologies argue that technology innovation is unplanned and that strict processes cannot capture a dynamic world (Ciborra, 2002c). However, improvisation is often carried out of an already working IT artifact, and thus does not necessarily invalidate the engineer's point of view when creating systems from scratch.

Another view argues that technology innovation is constantly created via its use (Lin and Cornford, 2000). Thus, the development of technology is not a one-off creation, but rather an ongoing learning process.

Institutions also have an impact upon the development of IT innovation, affecting the way development has to cope with cultural differences and how emergence phenomena take place (Orlikowski, 1996; Thanasankit, 2002).

These different perspectives stem mainly from the different concerns practitioners hold. The engineers focus on solving technological complexity and uncertainty in order to provide quality IT products that are useful. Their scope is narrow (Orlikowski and Barley, 2001), but so can be the sociologists' view when it comes to understanding technology (Orlikowski and Iacono, 2001). This essay does not point out which perspective is best, as none really is; they are simply different lenses to see the world in a certain interested way. Sociologists argue that engineers see the world abstractedly, but the same argument can be said about the sociologists who see technology abstractedly. Rather, the different practitioners should foment understanding and find ways to accommodate the different perspectives.

The political and institutional impact on IT innovation could benefit from a further discussion, especially in what concerns requirements and how these are dealt with.

Two important questions stem from the idea of emergence phenomena. First, how can a rational process accommodate

this? Second, what is the relationship between emergence phenomena and the requirements engineering phase which defines what the IT product should do. An IT product with poorly conducted requirements engineering might be more likely to develop emergence phenomena than a well conducted one.

Another important question which emerges from this work concerns the link between these perspectives and organizational change. In her paper, Orlikowski (1996) argues for a perspective which considers organizational transformation as being emergent. This perspective implies that there can be a mutual influence between technology and the organization, arguably leading to an evolution or accommodation of both rather than radical change. It would thus seem interesting to investigate how technology innovation can influence organizational change, and to what degree.

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Sustainable competitive advantage through the use of IT

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Many companies, in their quest to sustain a competitive edge, opt for technology as a natural strategic choice that will align with their business to help them maintain a leading position in the marketplace. The strategic use of information technology (IT) has applied a variety of methods and frameworks to enhance a firm's business performance through cost-effectiveness, firm capability leverage, business-IT alignment, and value chain integration, with the Resource-Based View of IT as an organizational resource being the most widely recognized practice. This article aims to review the position of IT as a possible means for organizations to achieve long term market advantage and the importance of strategic IT management in this process. Further discussion focuses on the apparent IT productivity paradox, and whether IT is indeed a source of sustained competitive advantage.

1 Introduction

The current debate as to whether IT can be used as a strategic tool to enable sustained competitive advantage is discussed principally in the strategic management literature, applying several different theoretical perspectives that build on predominantly economic and administrative rationalities. Using these viewpoints, the strategic management and use of IT will be critically reviewed, and the issue surrounding the benefits of IT investment will be highlighted.

2 Theoretical perspectives

A useful conceptual framework, drawing on economic and administrative rational concepts, is proposed by Feeny and Ives (1997) as a normative approach to assessing the sustainability of IT-enabled competitive advantage in organizations (Figure 1).

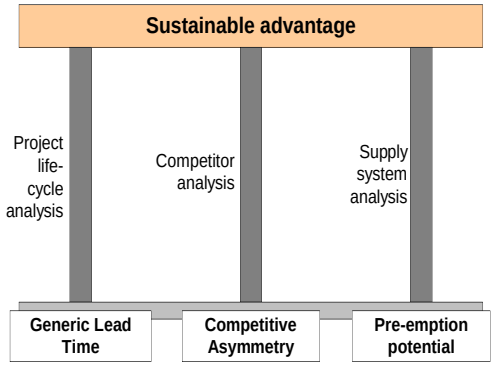

Figure 1. Three pillars of sustainable advantage

(Feeny and Ives, 1997)

Through personal experience, and founded on this normative model, the authors identify several firms successfully achieving sustainable IT-based competitive advantage, such as the well-known case of Merrill Lynch with their customer Cash Management Account IT system. By extending the time it would take a competitor to imitate the firm, possess the heterogeneous IT exploited firm-level capabilities, and using IT to build up switching costs limiting the customer's desire to switch to competitors, Merrill Lynch gained a sustainable market advantage over its competitors (Feeny and Ives, 1997). This proposed theoretical model however, deems sustainability as necessary only until the required investments have paid off, thus questioning whether competitive advantage has serious long-term potential.

2.1 Economic perspective

Sustaining competitive advantage has long been associated with the financial benefits of strategic IT investment. Drawing attention to the difficulty of the market to assess the economic benefit of IT investments, it is argued that this benefit is only recognizable when it becomes known to the market and IT-enabled competitive advantage is no more long-term than competitive advantage achieved by other, non IT means (Davis *et al*., 2003). Statistically assessed and not taking into account important social and political factors that may influence a market's ability to value competitive advantage, these arguments pose a very limited positivist view on how cost savings and business profitability can lead companies to sustainable market advantage.

In terms of cost reduction, an analytical framework has been developed enabling a company to gain competitive advantage by using IT to transform its value chain by reducing costs, enhancing differentiation, and changing the firm's competitive scope (Porter and Millar, 1985). Focusing mainly around the business attractiveness and the information intensity of products, this transformation however does not consider, from a structurational viewpoint, how employees' levels of IT knowledge can shape the way IT is used to decrease expenses.

From the perspective of transaction costs, IT has the capacity to reduce complexity and decrease the cost of information searching and negotiating, and enforcing the exchange of goods or services, if the rate of adopting the technology is lower than the cost of the adoption affected externalities (Cordella, 2006). Conversely, IT can also increase transaction costs when extra overheads are needed to accommodate complex environments (Cordella, 2006). Nonetheless, these analytical arguments do not clearly elucidate how IT can enable the sustainability of competitive advantage through lowering transaction costs.

Evident in several studies (Porter and Millar, 1985; Davis *et al*., 2003; Cordella, 2006), the economic rational view of IT-enabled sustainable competitive advantage does not identify how this is achievable by juxtaposing a firm's human assets and capabilities with the economic benefits IT produces. Although, one theoretical argument does apply the Resource-Based theory in stating that exploitation of a company's strategic resources can explain the cost advantage of using inno-

vative IT to manage vertically and horizontally interacting activities (Clemons and Row, 1991). In alignment with Feeny and Ives' (1997) third pillar of sustainability (Figure 1), Clemons and Row (1991) defend the, albeit decreasing, occurrence of switching costs as a source of sustainability. Nevertheless, their study does not describe how IT is used to transform these firm resources to core organizational competencies through which cost reduction can be achieved for long-term market advantage.

A need is hence identified to analyse the socio-technical perspective of using innovative IT as a cost decreasing tool for sustaining competitiveness in an organizational context of human interaction, IT culture, and technological understanding.

2.2 Resource perspective

As the diffusion of IT innovation makes it easier for customers to choose between suppliers, Mata *et al*. (1995) argue against switching costs as a promising option for sustainability, proposing the alternative notion of managerial IT skills as essential enablers of sustainable market advantage. This view stems from a theoretical analysis of the administratively rational Resource-Based View of the Firm (RBVF) which regards organizational resources as socially complex, difficult to imitate, and heterogeneously distributed across the firm and its competitors, in order to sustain business value (Mata *et al*., 1995). These findings, derived from a non-exhaustive list of IT attributes, suggest that a more detailed analysis be carried out to understand the nature of managerial skills and how these are integrated and applied in an organization.

Viewing IT as an organizational capability, these managerial IT skills and other assets such as technology infrastructure, and IT-enabled intangible resources, can combine effectively to produce IT capabilities that will enhance a firm's financial performance (Bharadwaj, 2000), in accordance with Feeny and Ives' (1997) second pillar (Figure 1). However, the use of pre-determined rankings of IT leaders in this empirical study provides a subjective view of this statement, and there is an apparent gap between the IT capabilities argued for and their role in the strategic alignment of IT and business plans to enhance organizational performance.

While the applicability of the classic RBVF theory is limited to stable environments, two studies (Jarvenpaa and Leidner, 1998; Pavlou and El Sawy, 2006) provide an extension to this theory by introducing the notion of dynamic capabilities in two different unstable environmental contexts. In addition, Jarvenpaa and Leidner (1998) broaden the resource theory one step further, drawing upon aspects of institutionalist theory to state that resources will only be used successfully by a firm if their competency is attained through traditional and widely accepted actions and cultures of the organization. Establishing the importance of shaping the environment to achieve sustainable advantage in less developed countries, when basic foundations such as information culture and infrastructure are missing (Jarvenpaa and Leidner, 1998), this case study acknowledges the need to consider the socio-political issues present in the environment when leveraging IT to create sustainable advantage.

Assessing the strategic use of IT at a process level, Pavlou and El Sawy (2006) argue that the ability to combine technical, managerial, and customer skills, and dynamic capabilities in turbulent environments, when developing new products, indirectly impacts a firm's competitive advantage by enhancing its core business resources. This subjective survey-based study found that the greater the environmental instability the stronger the impact of effective use of this IT leveraging competency on competitive advantage. Nonetheless, the way these dynamic and functional capabilities are gained and strategically situated in a firm, from a structurational perspective, requires further research, as their use and understanding may differ depending on the organizational context.

2.3 Competitive positioning

Competitive positioning, simply put by Porter, entails "doing things differently from competitors, in a way that delivers a unique type of value to customers" (Porter, 2001, p70). This can be achieved by using IT to integrate a firm's distinctive value chain activities, as illustrated by the successful US pharmacy chain Walgreens for example, which offers customers a choice of service and delivery channels through its website (Porter, 2001). Drawing upon dot-coms and established businesses, this argument however leaves out small to medium sized enterprises, and family businesses. By focusing primarily on competitors' ability to imitate a product or service as becoming decreasingly arduous, this study thus portrays a less convincing argument for the difficulty encountered in sustaining higher levels of operational effectiveness. Here, the author focuses solely on the Internet as an Information Technology that can enable strategic positioning through long-term return on investment, offering products in special niche areas, and making interdependent choices throughout the value chain. Drawing upon his five competitive forces, Porter (2001) argues that these are the underlying determinants of business profitability, highlighting that industry structure, far from being static, is shaped by the choices enacted by competitors, as implied by structuration theory.

A conceptual framework extending the value chain, enables firms to strategically position themselves with regard to the scope of the product, market, business value system, and product creation, considering both vertical and horizontal integration, in order to create business value by developing products, resolving customer problems, and creating customer exchange relationships (Stabell and Fjeldstad, 1998). This analysis however does not mention the impact strategic firm positioning has on the sustainability of competitive advantage, and what value the exploitation of organizational assets has in this value configuration, as it mainly focuses on representing the latter.

Orientated around single industry service firms in the US as social organizations whose production and delivery process uncertainty is highly dependent on the interaction of customers, a recent normative study emphasizes that organizations strategically positioning themselves by combining an increased amount of highly educated and experienced employees with highly customized services and low customer interaction can gain performance benefits (Skaggs and Youndt, 2004). Limited to questionnaires, the authors' highly interpretive study results were empirically measured without considering the structure of a company's decision-making process or the varying customer knowledge level of certain services, assuming it to be homogeneous for all customers. Moreover, Skaggs and Youndt's (2004) claims exclude the assessment of technology as a sustainability enabling resource.

2.4 Competitive alignment

From a strategic planning viewpoint, aligning a firm's Information Systems plan to its business plan and vice-versa supports the use of IT-based resources to thus improve business performance and create competitive advantage, although non-IS executives are unsuccessful in associating firm resource use with business plan-IS alignment (Kearns and Lederer, 2000). These subjective claims are based on a field study conducted with both IS and non-IS senior executives and indicate an analytical gap between the nature of a firm's organizational IS-based capabilities and its ability to successfully apply them in the strategic alignment of technology with business in a socio-political environment.

Viewing alignment from a social dimension, although excluding the effects of political actors, Reich and Benbasat's (2000) normative study underpins strategic IT-business alignment as understanding current business and IT objectives (short-term) and creating IT vision (long-term), identifying shared domain knowledge between IT and business units as the factor enabling both types of strategic alignment, elucidating the vital role of senior managers in the process. These rather interpretive results were empirically tested through interviews and document collection in 10 business units in the unstable environment of the life insurance industry. This identifies a gap in cross-industry analysis of firms in stable and fluctuating environments considering IT as both of strategic and less strategic value.

The importance of business and IT planning integration and effective communication are identified as important social factors of strategic alignment (Reich and Benbasat, 2000; Huang and Hu, 2007), as well as strong relationships between IT and business managers and an institutionalized alignment culture (Huang and Hu, 2007), the latter enforcing long-term alignment.

Building on Reich and Benbasat's (2000) key alignment factors, a practical framework is proposed to develop future alignment perspectives, having the possibility to redistribute the organization's unique business and technology competencies (Avison *et al*., 2004). This is achieved by classifying an organization's projects by business, information, and technology strategy domains, in order to detect patterns of project similarities across these domains (Avison *et al*., 2004). Assessing the strength of this practical framework, however, the authors' analysis is not globally convincing as their model was applied to one financial services organization, limiting its scope of validity.

Following the difficulty in achieving sustained IT-business alignment through social factors (Reich and Benbasat, 2000), Huang and Hu (2007) suggest this could be achieved through identifying appropriate measures for business performance by applying the balanced scorecard approach in a top-down manner, driven by the CEO. Applying its principles to a case study of a manufacturing firm, the study presents an interpretive qualitative assessment through interviews, and does not identify how the scorecard implementation applies to politically sensitive environments where, seen from a social shaping perspective, these will affect its use in IT-business alignment.

2.5 Summary of views

The economic perspective of using IT to lower costs for business advantage has shifted focus to the Resource-Based View as the dominant approach to strategically using IT in sustaining market advantage (Mata *et al*., 1995; Jarvenpaa and Leidner, 1998; Bharadwaj, 2000; Pavlou and El Sawy, 2006), although some argue only in conjunction with strategic alignment (Kearns and Lederer, 2000).

IT infrastructure is highlighted as an important organizational resource, necessary to a firm but which alone cannot achieve sustainable competitive advantage (Mata *et al*., 1995; Bharadwaj, 2000). Instead, the strategic management of IT in a business context is identified as the most important organizational capability to achieve sustainability (Mata *et al*., 1995; Jarvenpaa and Leidner, 1998; Bharadwaj, 2000). This involves managers' ability to strategically deploy business and IT resources across the organization (Mata *et al*., 1995; Bharadwaj, 2000) while considering the social and political nature of their business environments (Jarvenpaa and Leidner, 1998).

There is an inherent difficulty identified by the reviewed literature of adequately measuring the benefits of IT investment. The use of popular accounting measures such as return on assets and return on sales have been used by many (Bharadwaj, 2000; Davis *et al*., 2003; Skaggs and Youndt, 2004; Pavlou and El Sawy, 2006) although these are limited as they use conservative cost saving principles and do not account for other important measures of competitive advantage such as intangible assets and the value gained by shareholders (Davis *et al*., 2003).

3 Productivity Paradox

A long-lasting contradiction amongst the literature has been whether an increased investment in IT leads to increased productivity; the so-called "IT productivity paradox" (Willcocks and Lester, 1997; Brynjolfsson and Hitt, 1998; Bharadwaj, 2000; Carr, 2003; Huang and Hu, 2007).

Describing technology as a business supporting infrastructure, rather than as a strategic core business asset, Carr (2003) places little strategic value on IT when arguing that IT's competitive advantage is diminishing as it becomes an easily replicable commodity. In reference to Porter's (2001) strategic value of high barriers to entry for competitive advantage, it is argued that cheaper IT functionalities have removed these barriers making IT widely affordable (Carr, 2003). Although urging companies to spend less on IT, being a market follower rather than a first mover, and focusing on the ever increasing security risks posed to firms worldwide, rather than on opportunities (Carr, 2003), this study portrays a very narrow vision of technology as simply a commodity.

From an evaluation perspective, much of the IT discontent illustrated in the IT productivity paradox lies in the fact that there is a lack of appropriate evaluation of IT performance (Willcocks and Lester, 1997; Brynjolfsson and Hitt, 1998).

Brynjolfsson and Hitt (1998) provide a descriptive account of the need to understand the source of productivity and ways it can successfully be measured. IT value differs across businesses and focus must be drawn on leveraging the value of IT to successfully manage organizational change (Brynjolfsson and Hitt, 1998) rather than focusing on the productivity value of IT alone.

Taking a functional approach when examining the productiv-

ity paradox from an intra-organizational perspective, Willcocks and Lester (1997) propose a holistic life-cycle approach to evaluating IT performance, and test its applicability and validity through a case study. This approach aims at improving the quality of evaluation in the long run (Willcocks and Lester, 1997) but would require a more substantial cross-industry assessment of validity.

Realizing the global nature of the productivity paradox, Dewan and Kraemer (1998) analyze the return on IT investments in 17 of the world's most developed countries in terms of labour productivity. They highlight that the decline in labour productivity in these countries is not due to the increased investment in IT, as the latter produces a positive increase in the output per worker, but might be due to other macroeconomic factors, not mentioned in the study. This analysis does provide an important extension to the current, mainly US-based firm-level analysis of this IT investment issue, but does not take into account the socio-political factors of these countries which might have a significant effect on productivity growth rates.

4 Conclusion

The debate as to whether IT can enable sustainable competitive advantage rests at present with the importance of the way IT is managed and strategically utilized in an organization (Huang and Hu, 2007), and how well suitable measures are used to evaluate its performance (Willcocks and Lester, 1997). For completeness, it is imperative to include all actors participating in value-enhancing activities when empirically measuring the benefits of IT investment, and not only executives as the reviewed literature illustrates.

Quite a substantial limitation emerges from the majority of literature focusing solely on developed countries as a source of explaining IT-enabled sustained competitive advantage. It is suggested that much more research is required around the assessment of IT-enabled firm benefits in a global context.

This review, however, does not cover an exhaustive set of theoretical viewpoints, and it does not critique the mainly rational literature reviewed in its evident deterministic acceptance of IT as a positive influence on society, nor does it question the inherent subjectivity of the authors.

As the environmental consequences of IT innovation rest on the shoulders of current and future generations, a prospective research question should focus not on whether IT *can* achieve sustainable competitive advantage but rather *how* can firms leverage IT in an environmentally responsible manner to sustain a leading position in the marketplace?

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Identity in Virtual Communities of Practice

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The "knowledge society" has become a predominant metaphor in the current day and age. Recent development of contemporary information and communication technologies (ICT) has enabled the emergence of new sorts of communities and communicative practices such as Virtual Communities of Practice (CoP). The digitization of identity may be viewed as a bottleneck in the civic engagement with Virtual CoPs, because identity is a critical cornerstone in such environment. This literature review explores a multi-dimensional view of Virtual CoP, acknowledging cumulative traditions in this research area. The review investigates researchers' questions, approaches, and insights within information systems and other related fields, in order to identify promising new directions for study focusing on the role of identity within VCoP.In other words, this paper explores the importance and role of identity within communities of practice theory, which can be applied in the context of the networked organization. Reviewing how new forms of Virtual CoP enable a new paradigm of collaboration.

1. Introduction

The term 'community of practice' (CoP) was first used and conceptualized by Wenger and Lave (1991). In his later work Wenger (1999) applies this concept in different context including organizational environment.

The definition of the term 'community of practice' was described by Wenger himself as *"groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly."*

(Wenger, 2002)

It can be further characterized as:

" Individuals with common expertise participating in an informal relationship to resolve a shared problem or situation that impact upon their shared futures ".

(Bowles, 2002)

The current field of research is voluminous and some authors use other terms: "community of knowing" (Boland and Tenkasi, 1995), "learning community" (Senge, 1990), or community of purpose (Warren, 1996), but in general they present a similar concept.

Different studies on communities of practice use various theoretical frameworks: the theory of practice that was firstly introduced by Bourdieu (1972) was later amplified and applied to CoP by Lave and Wenger, (1991). The theory of social structure (Murdock, 1949; Giddens, 1984) is applied to CoP by Wenger (1998) and Lin (2001). There are also studies focusing on situated experience (Wenger, 1998) and studies that are based on identity theory (Wenger, 1999; Lesser and Storck, 2001).

Lately the concept of CoP has been viewed as a facilitator of social capital development, which is an important element of individual behaviour in the knowledge economy; it is often associated with the issues of knowledge management (Lesser and Prusak, 1999; 2000). Some authors represented it as a facilitator of innovative processes (Brown and Duguid, 1991; Judge and Cable, 1997), as the mediator for sharing of tacit knowledge in the organizational environment and as an 'enzyme' for creation of intellectual capital (Nahapiet and Ghoshal, 1998). In addition to organizational learning, some researches argue that CoP can enhance performance of the organization in general (Lesser and Storck, 2001) and its competitive advantage (Liedtka, 1999).

2. Emergence of Virtual CoP's

The emergence of new ICT technologies and the Internet provoked the creation of various virtual communities where communication is performed for the most part, or even solely by means of ICT; where new forms of communications are performed and the new functions are developed (Orlikowski, 2000). Therefore, these changes are resulting in an increase of strategic importance of knowledge accumulation and dissemination within the organizational context (Wenger, 1999; Ciborra and Andreu, 2001). This brings possibility for new forms of communication, including indirect, non face-to-face and primarily text-based written communication, which potentially can take place across national and temporal borders. It has resulted in emergence of various types of electronic communities (Teigland, 2000) where individuals can share their organizational knowledge; some of these can be referred to as Virtual Communities of Practice (VCoP) (Wasko and Faraj, 2000; Wenger *et al.,* 2002). Yet some authors (Hildreth *et al.,* 2000) describe communities of practice in a geographically-distributed sense albeit eliminating the notion of virtuality.

For many authors the question "Can CoP be virtual?" has become, in a sense, a peculiar 'philosophers' stone'. Wellman and Gulia (1999), in their study on Usenet groups, were among the first to conclude that VCoP could exist. At present there are still scholar polemics and the term 'Virtual Communities of Practice' is not widely accepted; some authors refer to it as 'On-line CoP' (Cothrel and Williams, 1999), Computer-mediated CoP (Etzioni, 1999), Electronic CoP (Wasko and Faraj, 2000) and Distributed CoP (Wenger *et al.,* 2002). On the other hand, all of them describe a similar concept.

This division and variety of used terms are due to the debate which exists in the field. Much of the debate over *Virtual* CoP existence hinges on the polemics over the precise definition of the term, as various researchers emphasise or deny the existence of certain attributed properties. The dispute is formed around the first usage of the term CoP by Lave and Wenger (1991), where this concept was based upon situated learning in a co-located setting in which face-to-face contact

among participants is a crucial element in constructing a CoP. Therefore, it requires the distribution of tacit knowledge, which by itself requires participants to share the same physical space (Nonaka and Takeuchi, 1995, Teigland, 2000). Hence, the theory has some inherent limitations that may prevent it from being fully applied to modern organizational settings with its emerging and networked nature. However, credibility of the last sentence depends on the type of knowledge to be shared and this also determines to greater extent whether it is possible for CoP to work in a virtual mode (Hildreth *et al.,* 2000) – if the community has to be co-located because they share the same resources or documents then virtualization is possible, but if the nature of learning is situated due to essential face-to-face interactions then virtualization cannot be easily performed due to the disembodiment in virtual environments (Dreyfus, 2001). Nevertheless, with the rapid development of modern technologies the foregoing statement is arguable.

Castells (2000) and Concar et *al.,* (1999) discussed multi-user dungeons, where they referred to participants as a CoP, although their usage of the term CoP is very similar to Wenger's (1991) meaning, as the multi-user dungeon is not only the environment and medium by which participants communicate, but also a motive for the subsistence of the CoP. In his early work Wenger presents CoP as an "...intrinsic condition for the existence of knowledge" (Leve and Wenger, 1991) where the learning process, which takes place in the CoP, is not just a narrow, situated learning, but also a constituent part of practice with three important aspects: legitimation, peripherality and participation. With respect to VCoP, the aspects of peripherality and participation are the key elements, as they refer to the questions of location and identity. As we move towards the VCoP, the role of location is eliminating, while the role of identity is starting to play an even more pronounced role.

Various authors argue that identity is one of the most important elements in virtual communities, as knowing identity of people you interact with is an essential element in evaluating quality of interaction.

3. Role of Identity in Virtual CoP

Social identity theory is also very important in order to understand the nature of processes enabling the transaction of the virtual community into the VCoP, as it describes the categorization of in-group and out of group perception, which are founded on differences and similarities of "they" and "we". When the individual "they" becomes the individual "we", people's identities become depersonalized and combined into one identity of a certain group. Wenger (2002) argues that it is hardly possible to differentiate between an individual and a group identity, as individual knowledge that forms and shapes social groups brings the emotional complexion to the group membership (Hogg and Terry, 2000). It is also supported by Tajfel (1970) who conducted experiments using the "minimal group paradigm" and showed that the random assignment of people into the group may gradually initiate a social identification. In contrast to Hogg and Terry (2000), Clifford (1995) suggests that electronic communication doesn't require emotional investment and usually does not lead to close friendships. However empirical evidence (e.g. Miller and Slatter, 2000; McKenna *et al.,* 2002) suggest quite the contrary— people do establish long-lasting relationships, business partnerships and even marriage online.

Membership in CoPs helps personal identity to evolve and form a work-based identity (Hara, 2000; Mu and Varadharajan, 2000). Therefore, once an identity is developed it usually doesn't stay intact but shifts slightly over a time. Literature on networks suggests that interacting members of VCoP modify personal identities as well as identities of communities and organization(s), sometimes developing a 'multiple citizenship' with various personal identities for the each group identity. This raises questions about identity salience. Multiple citizenship, as argued by Dyer and Nobeoka (2000), can present a serious problem for VCoP's persistence as it provokes the creation of a 'free riders' category—"members who enjoy the benefits of the collective good without contributing to its establishment" (Dyer and Nobeoka, 2000). This phenomenon was also described by Millen et *al.,* (2005), Wasko and Faraj (2005), but they referred to free riders as 'lurkers'. This was also discussed by Wenger (1999) where he focused on identity, describing the importance of trajectories and the problems of multi membership in various communities, and presenting them as main dilemmas for individual members. However, in contrast to above-mentioned authors he does not present it as a problem for CoPs as a whole.

Development of identity or an adequate representation of a real identity is important as it helps to develop trust and, as a result, reduces complexity. Various studies show that in off-line CoPs trust can be developed during through regular meetings, while in on-line environments trust can mostly be accumulated by representing own and shared collective identities. Additionally, this helps community members to feel that they know the people they are communicating with, which may help to create desired artefacts and to share knowledge with members more effectively. In a virtual CoP the artifact used for embodiment limits and imposes predefined functionality that shapes the ways in which members of community can participate and exist as code developed by programmers. Some authors even argue that technical objects may themselves predefine users' behaviour (Woolgar, 1991), which is even more noticeable in virtual environments where predefined system architecture shapes users' identity (Taylor, 2003). Wenger (1998) describes a similar concept defining it as the "boundary objects" that are common for individuals and the community in general, but perceived in a different manner. These artefacts may be norms, tools, or procedures that are used by the CoP to execute its tasks.

Social presence and its value (Short *et al.,* 1976) is also related to the issues of identity, as it helps to increase realism of the situation and develop the feeling that one is interacting with a human being. It is true that in virtual communities individuals may hide their own identities. However,, some authors argue that there are some positive outcomes from initial disembodiment and the need for creation/reconstruction of identity online, as it may facilitate as a leveler of race, class differences and even gender discrimination, which can be strong barriers to effective participation in offline society (Verba *et al.,* 1995). Therefore, VCoP members may come from various cultural backgrounds or even live a long way from each other (Etzioni and Etzioni, 1999). This statement is also supported by Tranvik (2000) who describes user participation in virtual communities as less restricted and hence more encouraging more involvement and interaction with complete strangers than in daily life. How-

ever, people in virtual environments, while open to communication with nearly anyone, still need a large number of potential 'friends' or potential community members, as the more individualized people are the more difficult it is to achieve identification.

Turner (1988) distinguishes between two social types of status identification. The first one is initially inherited, e.g. race, sex, age, and the second one is achieved status, e.g. education, position, etc. He argues that in a modern society, achieved status is starting to play the most important role. However, the virtual environment is more open to fantasies where participants can exploit situations of disembodiment and transform oneself from an insignificant employee to a knight of one's profession (Steinkuehler, 2004); where professor can become a rock star (Nardi *et al.,* 2004). In virtual communities people can escape from the predefined and constructed, boundaries of the real world and further develop and extend their identities. Furthermore, it can be argued that people in virtual communities are not fooled by these constructed identities, as long as people declaring their knowledge can disseminate it, while other people can observe their behaviour and judge whether these individuals are really who they claim to be. This is supported by Berman and Bruckman (2001) where they have studied the communication patterns of different categories of people and were able to identify social and geographical origins of the person by studying linguistic patterns. Kollock (1998) presents several reasons for participating in VCoP, egoistic—anticipated reciprocity, sense of efficacy, enhanced reputation, and altruistic—satisfying the needs of others.

This raises the question of competence; as knowing the leaders and 'knowledge holders' helps VCoPs to proliferate. However, in VCoPs identifying the leaders and evaluating competence may be not as easy, as some people can role-play with their virtual identity. Quality of interaction is a critical element of both CoP and especially of VCoP due to the lack of behavioral transparency, as there is very little or, sometimes, nothing to validate the relevance and trustworthiness of the disseminated knowledge. That is one of the reasons why in virtual communities people behave differently with strangers compared to people they know and trust (Nabeth, 2005). Thus, virtual identities constructed by participants of VCoP are quite complex; *representation* and *perception* of the identity have immediate consequences on the quality and value of interaction within VCoP.

Hence, virtual identities can inherit several aspects—an explicit identity that can be real or imaginary, a digital identity declared by a user's profile, as well as an implicit social identity that is developed via a process of on-line communication and is stored in the form of text postings that are explicitly represented in the virtual environment. In contrast to the real world, communication and relationships in VCoPs are stored in log files, blogs, etc., and, to some extent, can be exploited in order to form an on-line reputation, which is one of the crucial parts of social identity (Kumar *et al.,* 2004). Social identity within VCoPs can be described as 'you are what your community is' and vice versa.

Privacy is starting to play more important roles in VCoPs due to the explicit nature of the environment. There is an interesting study by Saunders (2002) on the invasion of privacy where he differentiates the following three main privacy issues: privacy to people not in contact lists, privacy of availability, such as online and offline status, and privacy of shared content, which also relates to distribution of conversations, usually stored in textual form, to third parties. Concerns about virtual identities are often associated with anonymity. When a user enters a virtual community, he/she starts to use a pseudonym, which can be one's real name or imaginary, but in both cases there is nearly the same level of anonymity with respect to the virtual world, as there is no reputation and power attached to the pseudonym (Berman and Bruckman, 2001) and no previous behavioural information that can be extracted. Beenen et *al.,* (2004) exploited questions of anonymity by using theories of social psychology to investigate motivation strategies of people participating in VCoPs in order to find methods to increase levels of participation or manipulation with their behaviours.

4. Conclusion

The field of VCoP research represents an interesting and fascinating area for practical application of many social theories. These theories are raising many questions in relation to these new virtual environments. Representation of explicit and implicit social identity in the real world is now transformed by the new opportunities afforded by virtual environments. Hence, there are many new categories to be defined and dimensions to be explored, bringing the possibility for development of new services to maximize benefits for end users – community participants. However, with the current state of technology, VCoP cannot be as effective as a conventional CoP due to the lack of interpersonal contact (Wellman and Gulia, 1999).

The theory of communities of practice developed in the early nineties by Wenger (1991) is no longer sufficient as there is a need to evaluate communities of a new kind, which quite differs from the original concept of CoP. Virtual CoPs share many differences and similarities with traditional CoPs, but the theory of CoP, which has not been straightforward even in the past, needs to be re-evaluated and adjusted for the modern organizational context; where working teams are interacting across space and time. Furthermore, there is no reliable theory that explains how knowledge in VCoP is created and how to effectively utilize such knowledge in the networked organization. Participation in CoPs may disrupt psychological and social processes that are underlying the principles of identity enactment, identification, and most importantly—verification of an individual in the workplace, which bring up questions to be answered by future researchers on virtual identities.

At the current stage, communities of practice theory and identity theory, as discussed in literature review, have some considerable limitations and are no longer sufficient to explain all the new changes within networked organizational settings. However, they have some valuable strengths that can be seen as starting points for further VCoP and the identity research.

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Has the "e-" given Government the citizen trust it longed for?

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E-government is a relatively new term in Information Systems but has still raised serious debate on whether it has lived up to expectations in obtaining the citizen trust it promised. Being generally accepted that, in order to achieve trust, transparency and interactivity are absolute necessities, how these can effectively be achieved and accepted by both bureaucrats and citizens has become the starting point of much research. This literature review shall endeavour to assess the work done by academics on analyzing the issue of trust through transparency and interactivity and describe the scene of the current debate on the subject.

1 Introduction

Ever since governments realized the highly positive effects e-Commerce had on businesses around the world, they have been trying to achieve analogous results through the implementation of e-Government (Pina et al, 2007). As the literature states, this is a product of the realization that citizen trust was declining; as observed through various sources, such as opinion polls and increasingly low election turnout (Gil-Garcia, 2005). The demand for a more electronically-driven government also comes from the new internet-driven global order with Danzinger et al (2007) stating that 80% of the public questioned found the Internet as a vital aspect of their lives. All of the reasons mentioned, in conjunction with the fact that bureaucratic institutions have become much more complex and overloaded, resulted in the adoption of e-Government (Cordella, 2007; Gil-Garcia, 2005; Heeks, 2005).

This essay shall endeavour to assess the literature analyzing the issue of trust through transparency and interactivity and whether e-Government has accomplished its difficult task of improving the internal relations of Public Administration (PA); an issue relatively complicated to measure (Cordella, 2007; Ramaswamy and Selian, 2007) especially due to the relatively small amount of theoretical research on it. Being a fairly new topic in Information Systems (IS), the various authors mostly base upon case studies conducted over the previous decade, with some claiming that e-Governance is still improving and that current failures might not necessarily be total and final (Heeks, 2005; Mossberger and Tolbert, 2006; Pina et al, 2007; West, 2004); with Cordella (2007) also arguing that what needs to be done is a change of strategy by keeping current bureaucratic structures as the basis of the electronic implementation. Various frameworks and models have been developed by scholars in order for e-Government to reach its potential; which has been characterized as being "far from straightforward nevertheless achievable" probably due to the fact that the aimed e-democracy is usually "simpler to describe than it is to realize" (Chadwick, 2003).

This literature review will be based on some core issues that need to be considered for the successful adoption of e-Government, including the relationship between technology and bureaucracy; the complexity of government bodies; the importance and interdependence of transparency and interactivity with citizens; the barriers arising due to the ad hoc politics between bureaucrats, the digital divide and security issues.

In the discussion, the various methodologies used by authors to study Information Communication Technologies (ICTs) in government are assessed and specifically how they collect data to reach their conclusions. This is followed by suggestions on what improvements should be made in research for more insightful results to be gained. The essay will conclude with a recap on what has been reviewed and an outline of impressions on the literature.

2 E-Government, its adoption and trust

2.1 E-Government

As far as defining what e-Government actually is there seems to be a general consensus within literature that, through the usage of ICTs combined with organizational change, the relations of PA and stakeholders (whether internal or external) are supported, service delivery is enhanced and the actual decision-making process is directly affected by citizens with the ultimate aim being to attain trust through transparency and interactivity (Bekkers and Homburg, 2007; Bolgherini, 2007; Chadwick, 2003; Cordella, 2007; Heeks, 2005; West, 2004;). Of course, each author emphasizes different aspects of it – economic, socio-technical, technical or political; West (2004) proclaims that it enables bureaucrats to work closer together; Mossberger et al (2003) (cited in Mossberger and Tolbert 2006:354) indicate that it provides opportunities for political participation over the Internet; Conklin (2007) asserts that its primary aim is to enable "full access to governmental activities" and online transaction-making, thus focusing on shrinking time and distance. However, significant debate on e-Government elaborates on the actual route to designing and implementing it, with authors admittedly based on the perspective they prefer.

2.2 Trust, transparency and interactivity

As previously mentioned, trust is the focal aspiration of e-Government. With governments eagerly seeking to attract citizen concern towards politics, the digital era came to rescue governmental institutions. But, as should have been expected from the beginning, things are more complex than just digitalizing institutions; hence, we find some varying focuses on where trust can arise from, on all of which this essay attempts to provide equal weight since an efficient combination of all can result in an effective implementation of e-Governance.

Trust can be considered "to emerge from the interaction of citizens with the network of government agencies as well as its effectiveness in fostering effective markets and fair social relationships" (Avgerou et al, 2005). Even though the term e-Government has been used by nearly all Governments worldwide (Ruth and Doh, 2007) for around a decade, West (2004) is not surprised that trust has not yet been increased; he attributes this to the incremental nature of change inflicted on PA structures and to the fact that technology has to compete with all those years of scandals and failures prior to its use. One of the most discussed topics that are expected to promote trust is security assurance, which gives substantial arguments to the adversaries of ICT. Based on this, Paskaleva-Shapira (2006) believes that the development of a "clear and comprehensive" legal framework is essential for the successful deployment of e-Government.

Norris (2001) (cited in Mossberger and Tolbert 2006:357) finds Information Technology (IT) as an effective ingredient for increasing trust due the mere fact that it has the capacity to provide enhanced participation portals which, in turn, enable citizens to come closer to government. In other words, transparency and interactivity promote trust by showing that institutions not only have nothing to hide but seek citizen feedback. To give this statement some more substance, it is important to note that the information provided through these portals need to be "timely" in order to provide a real-time transparency for citizen monitoring of governmental activities and total interactivity (Wong and Welch, 2004). This argument, characterized as e-Government "in its most radical guise" by Chadwick (2003), is countered by Heintze and Bretschneider (2000) (cited in Wong and Welch 2004:276) who argue that IT "often simply improves [the PA's] technical efficiency without leading to significant organizational changes"; an argument reinforced by Wong and Welch (2004) whose research shows a monitoring behaviour through controlled access to the information provided. Justice et al (2006) also add that transparency requires "accurate and sufficient" information suitable for a valid basis of government accountability, whilst interactivity necessitates channels of communication directly to elected and administrative officials; something that corresponds to the concern indicated by Welch and Hinnand (2003) that citizen's knowledge of what bureaucrats are doing is observed to be limited and that there is great need for interactivity to build a sense of mutual trust between them. These necessities are not always followed though, as Heeks (2005) finds that most of the cases he studied included a consciously reduced flexibility in design in order to retain staff autonomy – and even conceal corruption.

The above notions on the use of technology are being uncluttered and sorted by some of the literature decreeing that, in order for e-Government projects to be successful, they need a firm grasp of bureaucratic reality. Heeks (2005) states that IS designers have to be exposed to the realities of the user context and provide systems that are "reality-supporting" – we could add to this that due to the ever changing "realities" of globalization the proper flexibility will need to be incorporated in the finalized system to support it. Going even further and proposing an e-bureaucratic form, Cordella (2007) locates ICT failures in the increased complexity of today's public offices. He states that in order to tackle PA problems, they need to be directly dealt with through using ICTs as instruments that foster and "sustain existing bureaucratic organization forms". Organisational remodeling should only be imposed where serious issues of ICT incapacity to handle these forms arise. This proposal is supported by the fact that the very idea of bureaucracy was incepted in order to act as a "fundamental guarantor of equal and impartial action by PA" and that overriding bureaucracy with e-Commerce-like, economically-driven managerial practices can result in the very unsatisfying observations stated by Heeks earlier (Cordella 2007).

From the above we can identify that it might not be ICTs that are to blame for the current failures of e-Government but the approach taken for its implementation. While pursuing a balance between social factors and technology, we need to remember that the politics involved in government inscribe a hidden element of the social context – bureaucratic institutions. Trust being – or at least should be since it was the very reason of fostering IT in government – the main objective, ICTs are indeed the approach to achieve it. As Avgerou et al (2005) assert, ICTs provide a "trustworthy means of formal communication or a trustworthy context for public services provision" when the crucial importance of the social factor is recognized. Further supporting the trust conveyed is the fact that as technology penetrates in citizens' lives and they become accustomed to it they tend to increasingly expect it to be utilized by government bodies to approach them (Mossberger and Tolbert, 2006; West, 2004). Hence, the reciprocal relationship between technology and citizens is emphasized.

2.3 Barriers to the adoption of e-Government

The social barriers to the successful implementation of e-Government can be generally classified into two categories: citizen background and surrounding politics. Each category involves sensitive matters that need to be paid special attention in order for partial or total failure to be avoided.

Several studies have taken place (Belanger and Carter, 2006; Cordella, 2007; Danzinger et al, 2007; Snellen, 2002) aimed at finding the cause of the so called 'digital divide' – the "unequal access to and familiarity with computers and the Internet" (Justice et al, 2006) – that is increasingly becoming a calamity of electronic governance, crippling many of its communication channels. Some authors state that the argument that e-Government will increase participation is biased, since the "wealthier and better educated" will benefit more (Justice et al, 2006). Assuming results that would conclude to such findings, Danzinger et al (2007) conducted a telephone survey covering as much disparity of the US population as possible. Even though their initial expectations stated that income, age, education and years living in the community would play a critical role of online political participation, they concluded that none of these were of any importance – thus noting that this was an "indeed significant finding". A contradictory study undertaken by Welch and Hinnant (2003), based on data obtained by a previous study, concluded that educational levels and income are positive determinants of Internet use and that older people and African Americans are less likely to use web facilities, resulting to the finding that there is indeed a significant proportion of the population that will not benefit from e-Government; West (2004) agrees based on a study by Hart/Teeter. Bélanger and Carter (2006) provide the same results, adding Latinos to racial factors. Mossberger et al (2003) (cited in Mossberger and Tolbet 2006:361) found that African Americans show as much interest in looking up gov-

ernment information online as Caucasians, but are distinguished due to access disparities. The Jansen et al (2007) findings seem to contradict the rest of authors but when combined with the study by Mossberger et al (2006) it leaves some interesting questions on how high interest in online participation and access interrelate; shouldn't less access mean lower interest? Could it be that the internet-café boom aids and increases access, similarly to its effects in developing countries – i.e. in India (Ahmed, 2004).

The second – highly imperative – social issue is the political scene surrounding e-Government, which can in turn be broken down into citizen and civil servant acceptance. As far as citizens are concerned, surveys have shown that supporters of the political party in power tend to trust the government more – and thus give positive feedback when surveyed – demonstrating the impact of partisan control (Mossberger and Tolbert 2006; West, 2004), but also that mistrust arises due to the constant fear of possible surveillance inflicted by the government (Chadwick, 2003). Civil servant acceptance is much more delicate; transparency gives the feeling of insecurity due to the exercise of scrutiny, which can jeopardize their power basis (Coklin, 2007); citizen participation may alter or even revoke decisions bureaucrats made for their benefit (Krimmer and Mahrer, 2005). To avoid the menace of e-Government, politicians and civil servants tend to strain the highly debateable issues of security and privacy, social exclusion, digital divide and the fact that they are qualified professionals in the field and hence in a better position to know what is good for citizens than they do (Krimmer and Mahrer, 2005). Vesting from the current status quo, the actors threatened will not sacrifice their advantage even for the public good (Coklin, 2007). As Cordella (2007) states, we know how politics works – with power games. To add to this, comes the "battle of the back offices" that highlights the resistance in cooperation of government bodies, again due to the "ambiguous distribution of tasks" (Bekkers and Homburg, 2007). Finally, the usual case in IS of user dissatisfaction towards changing organizational order comes into the picture with resistance to learn a new way of tasking with no direct benefits (Chadwick, 2003). From the above findings that PA is deeply mediated by institutional arrangements, group conflict and individualistic beliefs and behaviour may be one more reason to bring ICTs in to monitor the situation (West, 2004).

3 Discussion

3.1 Methodology

This section assesses the various methodologies used by authors to study Information Communication Technologies (ICTs) in government and how they collect data to reach their conclusions. Probably due to the quite recent establishment of e-Government projects, the literature seems to be rather inconsistent in terms of the perspective to be followed in order to measure their success and failure; this is explicitly indicated by Cordella (2007) and also Ramaswamy and Selian (2007). In the literature selected for this review, practical research was found to be undertaken both through case studies of running projects (Bekkers V. & Homburg V., 2007; Heeks R., 2005; Justice et al, 2006; Krimmer, R and Mahrer, 2005; Pina et al, 2007; Snellen I., 2002), surveys in the form of either interviews or questionnaires (Belanger and Carter L., 2006; Gil– Garcia, 2005; Jensen et al., 2007; Mossberger and Tolbert, 2006; Welch E.W. and Hinnant C.C., 2003) or a mixture of both, with considerable theoretical research built upon findings from such sources (Bolgherini, 2007; Chadwich, A., 2003; Conklin, 2007; Cordella., 2007; Doh and Ruth, 2007; Paskaleva-Shapira K., 2006; Ramaswang and Selian, 2007; Snellen, 2002;). Recognising the fact that a great amount of effort has been put into practical research, it is what currently requires the proper attention and reforms in order to provide more representative results and findings with further depth to the theoretical research based on it. This might mean repeating the same research to ensure its validity, receiving longitudinal data and insuring that a representative sample was chosen; Belanger, F., and Carter, L. (2006) were found to base their paper on questionnaires answered by US citizens at a Russian boys' choir performance, which could imply a sample not necessarily representing the general public.

Another observation is that even though authors seem to have a similar understanding of what transparency and interactivity are, they follow considerably different routes to examining how and if they are achieved. A notable example of highly contradictory findings is between Pina et al. (2007) who carried out a case study to measure governmental websites and Krimmer and Mahrer (2005) who undertook interviews of politicians and bureaucrats – for both, one of the assessed cases was that of Austria, with Pina et al. (2007) concluding that it had the highest score of all countries, with the exception of the UK, whilst Krimmer and Mahrer (2005) reported extremely high resistance to e-Governance by bureaucrats.

3.2 Further thoughts

For research to conclude to less diverse findings on trust towards e-government, more research should first be put into establishing more accurate measurements of trust suppliers – transparency and interaction – and how these directly relate to citizen-bureaucrats relations on trust. Additionally, due to the degree of socio-technical, legal, organizational, political and even power distribution issues in government, the fact that it may be required to combine even further the knowledge of IS, political science and law scholars emerges from examining the literature, in order to achieve more promising and sustainable results. Nonetheless, it is also concluded that, as with all new themes, e-Government needs some time to mature for the proper results to come to the surface. Now that we have been acquainted with the term for a more or less a decade, more reality based solutions are obtained, such as the fact that we should not be moving away from bureaucracy for sustainable results (Cordella, 2007) and that more reality-oriented solutions should be provided (Heeks, 2005).

4 Conclusion

E-Government was called up at a time when citizen trust in government was at an alarming decrease. ICTs were seen as ideal to aid the situation due to the revolution they had brought to businesses and commerce. But just like technology was rushed into organizations in the seventies and it took some time to realize the importance of taking under consideration the social factor as much as the technical, something similar happened here too; social factors extend much deeper into the bureaucratic system, which in turn relies on law-based policies. Having now reached a point where we can see the various problems that surface from using e-commerce-like techniques in implementing technology projects in government institutions and authors relying on varying measurement techniques for success and failure factors, it has become an

absolute necessity to review the way literature has been dealing with the subject of e-governance.

Literature on e-government is not at a point, yet, that can be assessed according to how it has evolved over time since the actual term has only been around for around a decade. Through reviewing it though, we are provided with the positive notion that authors have grasped its importance and are searching for the golden solution of its implementation. The "silver bullet" (Brooks, 1986) might take some time to be found, but there seem to be very interesting proposals from the academic field that, associated with the literature on the socio-technical nature of ICTs, can provide highly promising solutions.

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Advent of ISO/IEC 27001 Certification and its Role In Initial Inter-organizational Trust

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In the competitive global village we live in, organizations have realized that information security has become a critical business function. Companies are no longer able to fully protect their own information technology (IT) environments, since they have little control over the IT systems with which they link. Building upon over ten years of development, the information security industry has agreed upon and published the international standard ISO/IEC 27001 for Information Security Management Systems. This study provides a review of this international standard and, utilizing a trust model as a theoretical lens, goes on to examine the role of this standard in facilitating initial interorganisational trust. Conclusions are then drawn, including a recommendation that further rigorous examination is required in the form of empirical studies.

1. Introduction

> *" The only truly secure system is one that is powered off, cast in a block of concrete and sealed in a lead-lined room with armed guards – and even then I have my doubts "*
>
> **Eugene H. Spafford**[1]

Nowadays organizations increasingly rely on information technology (IT), which makes IT security a very important field for guaranteeing business continuity (Von Solms & Von Solms, 2005). The majority of companies interlink their IT systems as a result of connecting to electronic data interchange (Reekers & Smithson, 1996) and the Internet. This interconnection holds an information security risk for an organization (Solms, 1999). Companies attempt to protect their own IT environment, but unfortunately they have little control over the IT systems with which they link. In the case that those external IT environments are not secure, it may create a threat to their own IT systems (Straub & Welke, 1998). Accordingly, certification of one's IT security approach assures collaborating companies a certain level of reliability and trust (Fenz, Goluch, Ekelhart, & Weippl, 2007; Wilson, 1997).

According to the Department of Trade and Industry (DTI), the annual cost of information security breaches in the UK was estimated for 2006 to be £10 billion pounds (Information Security Breaches Survey, 2006). Moreover, 2004 survey findings by DTI revealed that 74% of the overall respondents suffered a security incident during the previous year (as opposed to 44% in 2002, and 24% in 2000). Such incidents (Schneier, 1998; Willison & Backhouse, 1998) can result in financial loss, damage to the organization's reputation, disruption in business continuity, and legal liabilities. The head of security and privacy services at Deloitte UK recently stated that the protection of organizations' data has never been under such intense scrutiny, that now this is expected to be a board level issue, and that ignorance is no longer an excuse. [2]

With these facts in mind, organizations would do well to ensure that they are appropriately protected. One of the fundamental approaches to achieving this is to follow international standards. According to "Information Security Breaches 2006" by PriceWaterhouseCoopers, corporations certify their Information Security Management System (ISMS) according to international standards in order to increase their equity. ISO/IEC 27001, which is the first in the ISO/IEC standards family, is one such certification standard.

The next section presents a review of the literature regarding the ISO/IEC 27001 certification. This is followed by a brief explanation of the trust model proposed by McKnight (1998). The trust model is then used as a theoretical lens in order to examine the role of the standard in the production of initial inter-organizational trust.

2. Literature Review

2.1 Defining ISO/IEC 27001 Certification

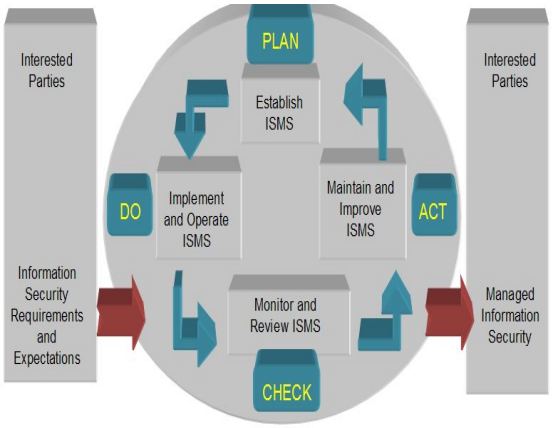
The term "certification" describes a process whereby a product or a process is tested and evaluated to determine whether or not it complies with a specific standard (Eloff & Solms, 2000). A "standard" includes unified regulations and simplified necessary timely conditions that provide a way of measuring objects, procedures, duties, concepts of power and so on, based on fair, just and convenient opinions (Fung, Farn, & Lin, 2003). These unified regulations and conditions need an "authority" to see that all parties adhere to these regulations (Solms, 1999). For that reason, written guarantees of compliance are issued by certification authorities (CAs) verifying that products, procedures, and services of a company comply with the procedures or activities specified in the regulations (Fung, Farn, & Lin, 2003).

Furthermore, a substantial goal of a demanding standard is to become an international, authoritative and generic standard (Siponen, 2005). Thus one of the value measures of a standard is to become incorporated by the International Organisation for Standardization (ISO), an association based in Switzerland which establishes international certification standards in several fields.[3] In October 2005, ISO and the International Electrotechnical Commission (IEC)[4], after establishing a joint technical committee, ISO/IEC JTC 1, and building upon over ten years of development (Backhouse, Hsu, & Silva, 2006), formed the specialized system for worldwide standardization. As a result organizations can now be certified under the new ISO/IEC 27001 international standard (ISO/IEC 27001:2005). Some organizations will be certified for the first time, with others converting from existing BS7799 certifications (Mann & Richardson, 2006).

ISO/IEC 27001:2005 is an evolution on British Standard BS7799, which addresses the definition of requirements for information security management systems (Mann & Allison, 2006). According to ISO/IEC 27001:2005:

> *"This International Standard has been prepared to provide a model for establishing, implementing, operating, monitoring, reviewing, maintaining and improving an Information Security Management System (ISMS)".*

The "Plan-Do-Check-Act" (PDCA) model is adopted in this international standard in order to structure all ISMS processes. The next figure outlines the PDCA model and demonstrates how an ISMS utilizes the information security requirements and expectations of the stakeholders as input to produce accurate, functioning, and effective information security results (ISO/IEC 27001:2005).



PDCA model applied to ISMS processes (adopted from ISO/IEC 27001:2005)

The ISO/IEC 27001 process approach first highlights the significance of understanding an organization's information security requirements and the need for information security policies and objectives (Plan). Second, it points out how implementing and operating controls are important in managing information security risks, specifically within the context of the corresponding business risks (Do). Third, it emphasizes the need to monitor and review the performance and effectiveness of a company's ISMS (Check). Finally, it highlights the importance of continuous improvement based on objective measurement (Act) (ISO/IEC 27001:2005).

According to BS 7799 (the predecessor of the international information security standard) as well as ISO/IEC 27001, the three elements of information security – confidentiality, integrity and availability – are completely upheld by the standard. In essence, the first element requires that only authorized users can access the information. The second one requires that information is kept accurate through proper safeguarding and the third one requires that information and associated assets are accessible to the appropriate people when needed (BS 7799:1995; ISO/IEC 27001:2005;). Moreover, Thomas Peltier, a certified information systems security professional (CISSP) and president of a security consulting company, indicates that confidentiality, integrity and availability need to be the pillars of an effective information security management within an organization (Peltier, 2003).

The following table outlines the controls of the new ISO/IEC 27001 as published by ISO on October of 2005.

Controls of ISO/IEC 27001
1. Security policy
2. Organization of information security
3. Asset management
4. Human resources security
5. Physical and environmental security
6. Communications and operations management
7. Access control
8. Information systems acquisition, development and maintenance
9. Information security incident management *
10. Business continuity management
11. Compliance

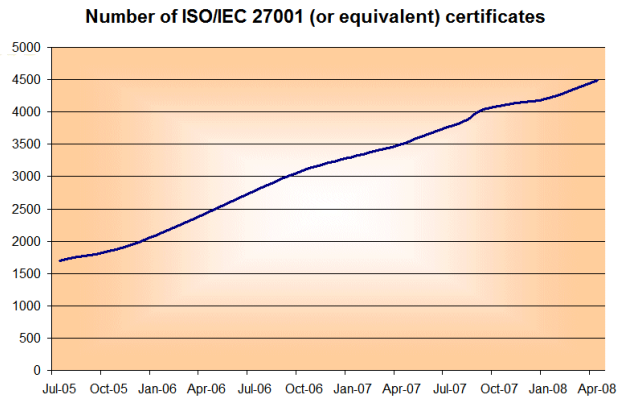
This control was added after the adoption of BS 7799 Part 2 by ISO in 2005.

Ted Humphreys, who was a convenor of the group for the development of the ISO standard stated[5]:

> *" The publication of ISO/IEC 27001:2005 is a big event in the world of information security and the standard has been eagerly awaited. It is a standard that all security-conscious organizations should look to implement."*

2.2 Widespread adoption of ISO/IEC 27001

Many certification bodies become accredited by national standards bodies, such as the British Standards Institution and the National Institute of Science and Technology, in order to be able to issue certificates by reviewing compliance with the international standard ISO/IEC 27001. More than 4,400 organizations all over the world have already been certified with ISO/IEC 27001 or equivalent certifications[6]. The following graph[7] shows the total number of ISO/IEC 27001 certifications over the last two and a half years.



What is remarkable is that although companies are not required to be certified by the standard, an increasingly demand by organizations of different types is noticeable by observing the data above. The reason is that the adoption of ISO/IEC 27001 within organizations results in a number of benefits above and beyond simple compliance, which all together lead to ensuring business continuity (Freeman, 2007).

2.3 ISO/IEC 27001 Ensures Business Continuity

Numerous authors support that the advent and subsequent adoption of ISO/IEC 27001 definitely ensures business continuity (Fenz, Goluch, Ekelhart, & Weippl, 2007; Freeman, 2007; Mann & Richardson, 2006). According to JTC1/SC27[8], the ISO/IEC 27001 standard has several different features that ensure business continuity including:

- ensuring that security risks are cost effectively managed;
- ensuring compliance with laws and regulations;
- ensuring that the specific security objectives of an organization are met;
- determination of the status of information security management activities by the management of organizations;
- determination of the degree of compliance with the policies, directives and standards adopted by an organization by the internal and external auditors;
- provision of relevant information about information security policies, directives, standards and procedures to trading partners and other organizations with whom they interact for operational or commercial reasons; and
- provision of relevant information about information security to customers.

The next section focuses on the benefit which is engendered by the last two types of use. That benefit is the production of the initial interorganisational trust which is conducive to business continuity.

3. ISO/IEC 27001 and Initial Interorganisational Trust

3.1 Defining Initial Interorganisational Trust

According to Pavlou (2002), interorganisational trust can be defined as "the subjective belief with which organizational members collectively assess that a population of organizations will perform potential transactions according to their confident expectations, irrespective of their ability to fully monitor them".

Initial trust refers to trust in an unfamiliar trustee, a relationship in which the actors do not yet have credible, meaningful information about, or affective bonds with, each other (Wingreen & Baglione, 2005).

As stated earlier, organizations have little control over the IT systems with which they link due to the increased connectivity created by EDI and the Internet (Solms, 1999). Thus, trust becomes an infrastructure requirement, like a firm's operating system or its network (Wilson, 1997), in a world where trust is difficult to establish due to the impersonal environment (Pavlou, 2002).

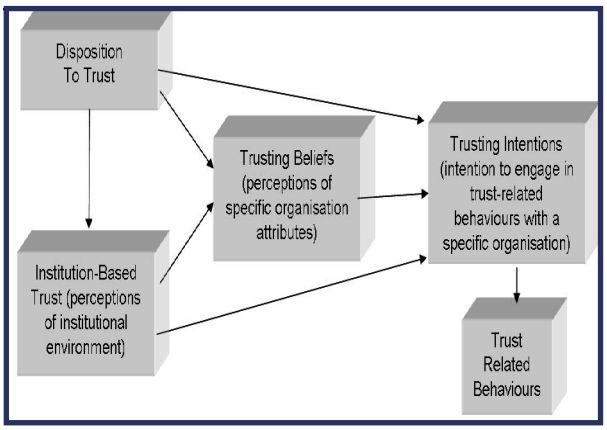
According to ISO/IEC 27001 (first edition), the standard is "designed to ensure the selection of adequate and proportionate security controls that protect information assets and give confidence to interested parties". Therefore one of the main aims of ISO/IEC 27001 is the production of confidence and subsequently of trust among the organizations.

However, according to Pavlou (2002), in order to achieve the production of interorganisational trust, institutional trust is first needed due to the fact that the latter acts as proxy for the former. It is stated that institutional trust is the most essential approach by which trust is produced in an impersonal economic environment. Institutional trust can be described as "the belief that a party has about the security of a situation because of guarantees, safety nets and other structures" (Shapiro, 1987). Two types of institutional trust mechanisms are third party certification and escrows (Zucker, 1986 cited within Pavlou, 2002). ISO/IEC certification is an example of the first type. Thus, the adoption of this standard within organizations may contribute to a large extent in the production of interorganisational trust and especially of initial trust among organizations (before parties have meaningful information about each other).

3.2 Initial Trust Model

It was decided to use the McKnight trust model as a theoretical lens because it includes institution-based trust as well as the more common trust types—trusting intentions, trusting beliefs, and disposition to trust. This model was also chosen because the aim is to examine the influence of ISO/IEC 27001 to interorganisational trust before the organizations have meaningful information about each other. Thus this "Model of Initial Formation of Trust" was considered to be the most appropriate for the purposes of this study.

The constructs of the McKnight trust model are being integrated within the broad framework of the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975; McKnight, Choudhury, & Kacmar 2002). TRA posits that beliefs lead to attitudes, which lead to behavioural intentions, which lead to the behaviour itself. Applying TRA to the trust model, it is then posited that trusting beliefs (perceptions of specific organization attributes) lead to trusting intentions (intention to engage in trust-related behaviours with a specific organization), which in turn result in trust-related behaviours. The figure below shows the model of initial trust formation integrated within the framework of the TRA.



Model of Initial Trust Formation integrated within the framework of the TRA (McKnight, Choudhury, & Kacmar, 2002)

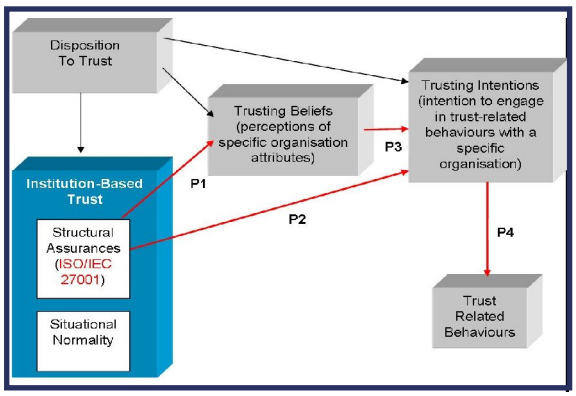
Furthermore, institution-based trust and disposition to trust are posited as antecedents to trusting beliefs and intentions. Institution-based trust is the sociological dimension of trust (McKnight, Choudhury, & Kacmar, 2002). It refers to an organization's perceptions of the institutional environment – in

this case, the international standard. Perceptions of the structural characteristics of the international standard, such as security and international recognition, can influence trusting beliefs and trusting intentions toward a specific organization. Disposition to trust means a general propensity to trust others, which can also influence an organization's beliefs and intentions towards a potential collaborating organization. However our attention in this study will be on the first antecedent, the institution-based trust, and not on disposition to trust.

In the following section, the constructs of the proposed model are analysed and discussed, in order to examine the influence of the international standard ISO/IEC 27001 to the initial interorganisational trust.

3.3 Analysis and Discussion

The following is a depiction of the trust model as it modified by the author in order to show the significance of ISO/IEC 27001 as an element of institution-based trust.



ISO/IEC 27001 as a part of structural assurances to examine its influence in the proposed model

3.3.1 Trust-Related Behaviours

It is posited that interorganisational trust is gained only after each party has both engaged in trust-related behaviours and assessed the "trustworthiness" of the collaborating organization by observing the consequences of those behaviours. In this case, we use the above trust model to examine only the first aspect, the engagement in trust-related behaviours. This is because the aim is to examine how and to what extent the internationally established standard ISO/IEC 27001 influences an organization's engagement in trust-related behaviours with a potential collaborating company. We examine only the standard's influence on the initial interorganisational trust and not on the ongoing trust relationship.

Trust-related behaviours are actions that demonstrate dependence on a collaborating organization, that make the trusting organization vulnerable to the collaborating one, or increase its risk. For instance, such behaviours in inter-organizational coordination are sharing confidential information or entering into a transaction.

3.3.2Institution-Based Trust

Institution-based trust (Bjorck, 2004) is the belief that necessary structural conditions are present to enhance the probability of achieving a successful outcome in an endeavour like the interconnection of organizations. McKnight (1998) describes two dimensions of institutional trust – structural assurances and situational normality. Structural assurances are "beliefs that favourable outcomes are likely because of contextual structures, such as contracts, regulations, and guarantees". Situational normality refers to "beliefs that success is anticipated because the situation is normal". In this case, we take the International standard ISO/IEC 27001 as an element of structural assurances in order to examine its influence in the proposed model.

Establishing ISO/IEC 27001 within organizations, structural assurance belief is likely to affect trusting beliefs for several reasons. First, believing that a situation is bounded by principles enables an organization to believe that the participants in the situation are trustworthy. This international standard provides a robust information security management framework for implementing the principles of OECD Guidelines (2002)[9], governing the security of information systems and networks. These OECD principles, which are reflected by the PDCA model, govern risk assessment, security design and implementation, security management, reassessment, response, awareness, and responsibility (ISO/IEC 27001:2005).

Moreover with this standard, structural assurance belief will stay consistent with all the produced trusting beliefs. That is due to the fact that this standard advocates checking on a routine basis that the existing controls are working effectively. As the UK Audit Commission reports for 1994, 1998, and 2001 showed, many firms fail to check whether their controls are operating as intended (Willison & Backhouse, 1998). As a result, those safeguards which are failing to perform leave an information system vulnerable. The ISO 27001, however, upholds compliance reviews at managerial and technical levels[10]. Apart from the compliance reviews, which are a part of the Check phase, the standard also advises organizations to address new and emerging risks to their systems. The standard emphasizes that organizations can identify their security requirements by using risk assessment techniques. By doing that, companies can identify their risks and implement the requisite controls, which is a part of the Act phase. This characteristic of the standard is extremely important for the production of trusting beliefs because as Willison & Backhouse (1998) stated, just as organizations change in terms of business practices and resources, so do the security functions, and with change come new risks.

Thus, the following proposition is suggested:

> *Proposition 1: In the initial attempt of an interorganisational coordination, the adoption of the international standard as a part of the institution-based trust will tend to produce high levels of trusting beliefs.*

The fact that ISO/IEC 27001 is the only internationally recognized standard for an information security management system and that now all the trading partners conform to the same standard enables organizations to feel assured about their expectations of the other party's future behaviour. The perception that the two world's largest developers of international standards, ISO and IEC, collaborated for the development of a mutually accepted standard will probably lead to the direct effect on trusting intentions. As a consequent, the following proposition is made:

> *Proposition 2: In the initial attempt of an interorganisational coordination, the per-*

ception that the ISO/IEC 27001 is the only internationally recognized standard for information security management systems will tend to directly lead to trusting intentions.

3.3.3Trusting Beliefs: Perceptions of Specific Organisation Attributes

Trusting beliefs refers to the confident truster perception that the trustee, a specific potential collaborating organization, has attributes that are beneficial to the truster. As mentioned at the beginning, ISO/IEC 27001 reinforces the three attributes of information security – confidentiality, integrity, and availability. Thus the international standard provides fundamental attributes that can be beneficial to the truster. Furthermore, the management of risk, which is provided by the standard, is a process that includes the prevention, detection, and response to incidents, ongoing maintenance, review, and audit. All of these aspects, which are encompassed in the Plan, Do, Check and Act phases, are conducive to the three aforementioned attributes. As a result, if an organization believes that the other party has confidentiality, integrity, and availability as the pillars of its information security, then it is likely to form a trusting intention toward that party. Therefore, the third proposition that is suggested is the following:

Proposition 3: In the initial attempt of an interorganisational coordination, trusting intention will be a function of confidentiality, integrity, and availability which are totally upheld by the international standard ISO/IEC 27001.

3.3.4Trusting Intentions: Intention to Engage in Trust-Related Behaviours

Trusting intentions refers to the truster being securely willing to depend, or intends to depend, on the trustee (McKnight, 1998). The standard's developers stated that "implementation of ISO/IEC 27001 will reassure customers and suppliers that information security is taken seriously within the organizations they deal with because they have in place state-of-the-art processes to deal with information security threats and issues"[11]. Considering this and the previous discussions, we can suggest that in the initial attempt of an interorganisational coordination, trusting intentions originated either from the trusting beliefs (confidentiality, integrity, and availability) or directly from the institution-based trust (due to the standard's international recognition) will produce a high probability of engagement in trust-related behaviours. Therefore we finally have the beginning of the production of initial interorganisational trust. Therefore, the last proposition is the following:

Proposition 4: In the initial attempt of an interorganisational coordination, trusting intentions originated from the adoption of ISO/IEC 27001 as a part of institution-based trust, will produce a high probability of engagement in trust-related behaviours and as a result lead to initial interorganisational trust.

Considering the propositions above, we see that the international standard positively influences the production of initial interorganisational trust to a high level. However, it may not apply in the same way to the maintenance of interorganisational trust. For ongoing trust between organizations, the adoption of this international standard may not influence in a major way the sustainability of interorganisational trust (although the positive influence is obvious) and many other factors are more important, such as escrows, testing, and back and forth operations. Like any relationship, trust is built over time, starting with shared understandings (standards in this case) but actually built and grown with mutually acceptable practices in the long run.

4. Conclusion

This study presented the international standard ISO/IEC 27001 followed by an investigation of its role in initial interorganisational trust. It is clearly seen that the adoption of this standard within organizations positively influences the production of intercompany trust. Although the sustainability of trust among firms certified by this international standard has not been examined in this study, the use of the initial trust model by McKnight (1998) as a theoretical lens clearly shows that the establishment of this standard produces a high probability of the production of initial interorganisational trust.

However, future empirical validation is definitely needed to validate the propositions revealed by this study and show that international standard ISO/IEC 27001, as a part of institutional trust, could engender initial interorganisational trust. Moreover, it would be interesting to empirically assess the relative effect of the standard to the ongoing interorganisational trust by examining how and to what extent this international standard affects the consequences of trust-related behaviours and the subsequent sustainability of intercompany relationships.

In general, given the impersonal nature of the electronic environment and the extensive use of IT, organizations now recognize that information is their greatest asset and that information security is a critical business function. The ISO/IEC 27001 standard has emerged as the recognized mechanism to improve the security of information exchange, and more importantly, to make judgements about others. Organisations are now being asked about ISO/IEC 27001, particularly by national and local government entities and financial sector customers. This is being driven by adoption of the standard as part of their legal and regulatory compliance. Others are seeing a competitive advantage in leading their sector and using certification in information security management to develop customer confidence and win new business (Mann & Richardson, 2006). With more public concern over security issues, there is now a requirement to build effective mechanisms in order for the organizations to demonstrate that they can be trusted.

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Footnotes

[1]Professor of Computer Science, Purdue University

[2]Comment by Mike Maddison, UK head of security and privacy services at Deloitte, on 19 March of 2008 (http://www.deloitte.com/dtt/press_releases).

[3]ISO is the world's largest developer of International Standards. It was established in 1947 in Geneva, Switzerland. Although ISO's principal activity is the development of technical standards, ISO standards also have important economic and social repercussions (http://www.iso.org/iso/about.htm).

[4]The IEC was founded in 1906 and is the world's leading organization that prepares and publishes international standards for all electrical, electronic and related technologies (http://www.iec.ch).

[5]http://www.ansi.org.

[6]http://www.iso27001certificates.com (visited May 5, 2008).

[7]http://www.iso27001security.com/html/27001.html (visited May 5, 2008).

[8]The ISO/IEC committee responsible for the ISO/IEC 27001 standard (http://www.din.de/ni/sc27/).

[9]OECD (Organisation for Economic Co-operation and Development) Guidelines for the Security of Information Systems and Networks – Towards a Culture of Security. Paris: OECD, July 2002. www.oecd.org.

[10]This supported by the last (11th) control area, Compliance, which is divided into the following controls: first, "compliance with legal requirements"; second, "compliance with security policies and standards and technical compliance"; and third, "information systems audit considerations".

[11]http://www.ansi.org.

About the author

Nikolas Prezas, graduated from the National Technical University of Athens, with a five-year BSc & MSc degree in Applied Mathematics and Physical Sciences. He carried out a six-month project on ERP Systems, before coming to the London School of Economics to pursue the Analysis, Design and Management of Information Systems masters programme. His specialisation is on Information Risk & Security and his dissertation research focuses on the implementation and adoption of ISO/IEC 27001 within the context of Cyprus.

OPINION

Where you did sleep last night?

…Thank you, I already know!

Abhishek Dhingra
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Information Systems and Innovation Group
Department of Management
London School of Economics

I Know where you were last night. I know the salad was delicious, the look on your face says it all. I wonder why you have to diet; you look absolutely captivating to me whenever you don that black dress. He never deserved to be with you. Just look at the meager £1 tip he could spare for the waitress. I know I swore out loud each time he touched you. And why did you kiss him back? Sheer profanity! I know I bled when I broke the window pane on my fist. I know. I know it all. I'm your Facebook stalker!

Potential victims: over 60 million

Criminal opportunities: over 1.7 billion

A picture is worth a thousand words, or should I say, a thousand wounds! Each one of those 1.7 billion uploaded photographs is capable of shattering trust, annihilating relationships and wrecking lives. Each one of those 60 million active users, mere victims! I know. I know it all. I'm the one, who shall substantiate in the next 2800 words that Facebook albums are neither private nor secure.

I can see you, beh-bie!

Facebook.com is a minefield for its users. One faux pas and an entire private life could blow up and disperse into the vast and resounding expanse of the Internet. Since its inception in 2004, numerous questions have been raised about the security of data and the privacy of users. Due credit should be given to Mark Zukerberg and his team for covering up for 'technical glitches' and reassuring the users of security after applying quick plasters to the 'technical marvel'- a large poster-board where anyone with the slightest knowledge of PHP can paint and patch up their own applications. Due credit should be given to the users for believing each word he ever said, and for their loyalty to what has the potential of being the 22nd largest nation by population, displacing the UK in the list.

Let me get down to decimating the certitude and establishing the facts. This is not an attempt to ravage the medium itself, but a cry for cognizance and the exercise of discretion. I am not a vandal; I am an antagonist of blind faith. I urge you, the reader, to look beyond the credence and invite you to try the following as I state them. A word of caution, though. Facebook is not a mere medium anymore; it is an adoration that has grown to a worldwide size that can outnumber the Protestants in North America over the next 5 years. What follows here may be termed as blasphemy, though I prefer to call it apocalypse.

Security on Facebook albums is a mere dance of obscurity. It works on the premise that if you cannot type it, you cannot see it. Being the sceptic that I am, I argue that the premise is flawed. Anything that is on Facebook is public for anyone to see and use, if they can guess the URL right. A very obvious question arises from the last statement.

How can one guess the right URL?

The answer to that question is as trivial as the English alphabet is to a first grader in Britain. Let me try and answer that with another question.

How would you 'guess' the URL of the website of the Ministry of Health in India?

If you said, "Google it", rest assured that you 'guessed' the answer right. Google the following and you are in for the first shock.

Allinurl: "facebook.com" "album.php"

A mere click on the "*repeat the search with the omitted results included"* link at the bottom of the search results and Google lists out all the URLs that have the keywords *"facebook.com"* and *"album.php"*. Replace the keyword *"album.php"* with *"photo.php"* in the search query and Google, as an obedient dog, fetches the URLs to user photographs on Facebook. These are not public albums, thus **not all** clicks on these links would lead us to a photograph. Not yet, but by the end of this section, I hope to be able to join the dots and spot both the Timon and the Pumba of the issue.

I hate to get technical, but hey, who in their right mind lets go of an opportunity to prove their ingeniousness? If you still secretly wonder what makes an electric toaster smart enough to pop the toast up when it is done, maybe you should skip to the next section.

Facebook assigns a unique URL to each album and photograph. This URL is visible to only the owner of the album/photograph and exists so that the album/photograph may be shared if the owner intends to. *However, if the owner does not intend to share the albums/photographs, is this URL secure?* The answer is **no**. The URL is merely **obscure**. Using this URL the album/photograph can be globally accessed by anyone. Access is instantly granted independent of the privacy settings on the owner's profile. The most ominous part about these URLs is that the viewer does not even need to be a Facebook user to be able to access these. The implications are unmistakable. There is no record of all who can witness your private life in all its *stark nakedness*. This global access URL is the *only* stylus one needs to join the dots and make a picture worth looking at.

Let us take a closer look at the URL itself. The following is a sample global access URL. Click on it to say a quick personal hello to the overlord of Facebook himself– Mark Zuckerberg, with his girlfriend, Pricilla Chan, at a photo shoot for *BusinessWeek*. If I were you, I would mouth a quick swear instead, but that is just me! Where did I find the URL? I found it exactly where I found the URL to the Ministry of Health in India.

http://harvard.facebook.com/photo.php?pid=30054437&id=4&l=ae012

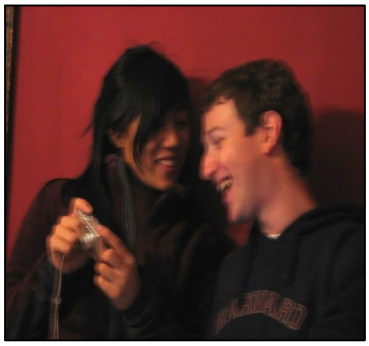

Exhibit 1: Mark Zuckerberg and Pricilla Chan

Each of these URLs is made up of parameters that follow the question mark symbol (?) and are separated by the ampersand symbol (&). A global access URL would consist of three such parameters. *What are these parameters?* Facebook identifies these parameters as the following.

1. Id – A unique 128-bit number that represents a user's Facebook profile. This unique number is readily made available to anyone who runs a Facebook search for a particular user, through the link to their profile on search results listing page. Easier still, running a Google search for a particular name, and a bit of luck, would fetch the URL of the public listing of that user's profile. This URL contains the unique id. If you happened to act smart and set your privacy settings to block Google from indexing your profile, rest assured some *'cool dude'* on that friends list of yours wouldn't have been that smart. If Google can index them, you can be reached.

2. aid/pid – Another unique 128-bit number representing an album or photograph in the Facebook database. Remember the *"allinurl"* query results from Google? That is where you nail this number down.

3. l – This is the key to all locks– the global access parameter. I wonder why Facebook recognizes it as 'l' and not *'access'* or *'key'* itself. Maybe, it is just a part of *'Facebook's security through obscurity'* plan. A 5-digit hexadecimal number. Hold on to that thought for a minute. This would have magnified ramifications as we progress.

Having observed the above mentioned trends and with some knowledge and experience of information security on the Internet, it was unmistakable that Facebook albums could be broken into. I decided to be astute about the issue and ask the experts before sounding the panic alarm. My research led me to interview **Priyank Thakur** and **Narendranath Tangudu**, who have spent years of their career working as **Security Specialists** at the IBM Software Labs. Their words testified that there was an actual fire behind the smoke.

In the information security domain, we are always threatened by one basic premise.

" If it was generated by an automated code using a particular logic, it can always be generated again by another automated code if the governing logic can be reverse engineered ".

The idea behind securing an application is either to ensure manual intervention (as in the case of a *captcha*) or to make reverse engineering on an automated result incredibly time consuming and uneconomical. Our friend here – the global access parameter 'l', subscribes to neither of the two. Even for an amateur, detecting the logic behind the generation of a 5-digit number is neither infeasible nor impractical.

Priyank said, *"Reverse engineering to fabricate the logic of the global access parameter is a three step process.*

1. *Perform a few sample registrations.*
2. *Get a set of Album IDs and URLs.*
3. *Crack the logic using logic sniffing based on a few parameters like timestamps and utilizing methods in the line of neural networks."*

He went on to say that even a dump of URLs containing the parameters pooled from a proxy server or a public Internet access café can provide the sample data set for sniffing the logic. The only challenge he identified in the process was the lack of information on the inputs to the automated parameter generation code, which he said, could be guessed to some extent. A preliminary analysis later, the probable inputs to the parameter generator were guessed to be the owner ID, the album/photograph ID, and time stamp/date of the creation of the album or a combination of these. Using neural network based transformation/data predictors on the web one can sniff this logic for fabrication with fair accuracy.

What if the logic for generation of this parameter is actually obscure? Let us talk about the possibility of a brute force attack. Since it is only a 5-digit hexadecimal number, the possible values it can have are exactly **983,039**. Priyank examines the issue and testifies that the possibility of a brute force attack is considerably high given the small range. He says, *"A simple Web-Reaper can be customized to pick up the values of global access parameter from a file to download the entire data from the URLs generated. This would not take much effort, time or finances and the only challenge could be an intrusion detection system at the website."*

The Larger Picture

If you happened to get through the entire technical parlance of the issue, it is now time to arrange all the larger pieces of the puzzle. With a recently updated value tag of $15 billion and a trust base of over 60 million, is Facebook selling nothing but an illusion of privacy? Priyank argues, *"Facebook's approach for albums cannot be deemed as unsecure. There is a possibility of breach of privacy in case an amateur hacker chooses to hack some particular albums, but in case of intrusion, only mass download of pictures will not be taken as a breach considering the bulk of data"*. **Sorry Priyank, I beg to differ**. In December 2005, Jones and Soltren took up the task of a mass download of user profiles from Facebook and published a paper on the dismaying state of affairs. The following are extracts from their paper. The findings clearly exhibit that Facebook is nothing but a mass massacre of users.

*" It served as a proof of concept, to demonstrate that it is possible for an individual to automatically gather large amounts of data from Facebook. The collection of data was not entirely trivial, but we were able to produce the scripts necessary to do so within **48 hours**. The final application we used to download profiles was a short (**five line**!) BASH shell script. We ran this script four times: once for Harvard, MIT, the University of Oklahoma (OU), and New York University (NYU). "*

Success Rates In Downloading Profiles

School	Number Profiles	Number Downloaded	Percentage
MIT	10063	8021	79.71%
Harvard	25759	17704	66.16%
Oklahoma U.	28201	24695	70.54%
NYU	32250	24695	77.41%
Total	97273	70311	72.28%

Exhibit 2: Success Rates of Mass Data Download[2]

Narendranath has a more entrepreneurial take on the issue. He suggests, *"It is only the photographs of the users that can be accessed using the logic discussed. They are used only on a view basis, not on an edit basis. The information is not sensitive in nature, at least not to Facebook. Social networking has a governing principle– anything put on there is not private and is accessible to all. Facebook is a business too. It is governed by the same principle"*. How reassuring! Priyank explains that these flaws could have three-fold ramifications for Facebook– legal, loss of business and loss of credibility. My question is more sinister. ***What are the users hell-bent on compromising?***

Heads and Tales

" We could all donate a dollar each and raise millions to hire an assassin to kill the US president and replace him with a monkey."

In March 2005, this cry of a University of Oklahoma freshman was met with US Secret Service's intent of framing him.

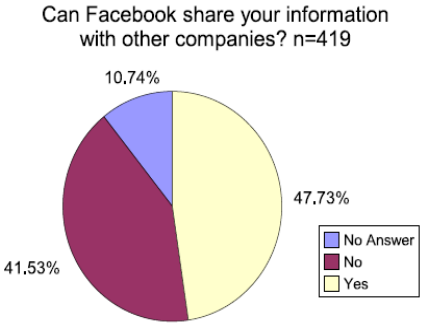

Exhibit 3: For ignorant users: Facebook legally shares information

I don't know if American Facebookers considered him to be a threat or a saviour, but I do know that Facebook has been increasingly used as source of evidence for disciplinary action and law enforcement. Despite Facebook's Terms of Use, their spokespeople clearly state that all information published on the site should be presumed available to the general public, school administrators included. Legal experts agree that Facebook can be legally used in criminal or other investigations.

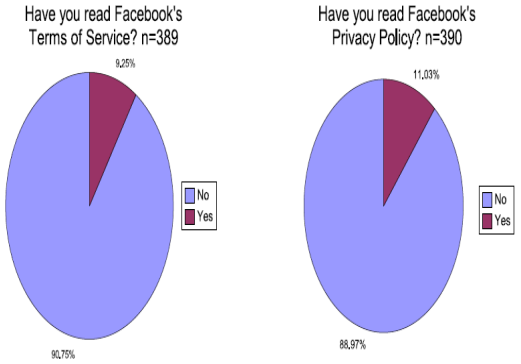

Exhibit 4: Users never read the fine print

In February 2006, a Miami Facebooker was arrested for creating panic by having the police sketch of a rapist accused as his profile picture. April 2006 saw a University of Dayton student being fined for $10,000 as damages caused by "Lowesfest", the Facebook invitation that was sent by him. He never attended the festival himself. In October 2006, a Southern Illinois university student faced expulsion for Facebooking his sexual escapades with his girlfriend, who *"never thought Facebook could cause real-life problems"*. In February 2007, Alvino was traced using Facebook and charged for a hit-and-run. In the light of the Virginia Tech shootings, a SUNY student was sent to psychiatric remand since he had vaguely threatening photographs on Facebook.

Even though cyberstalking has been recognized as a growing menace and states are finding it increasingly hard to keep the laws in shape to deal with it, most incidents often go unreported. Statistics reveal that women on social networking websites are thrice as susceptible to stalking as they are to rape, with each incident lasting 1.8 years on an average. With Facebook, you're the next potential Monica Seles.

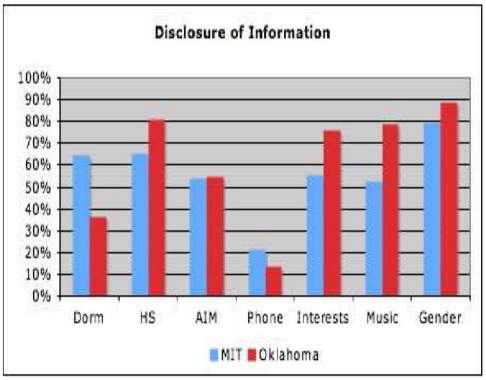

Exhibit 5: Overexposed??

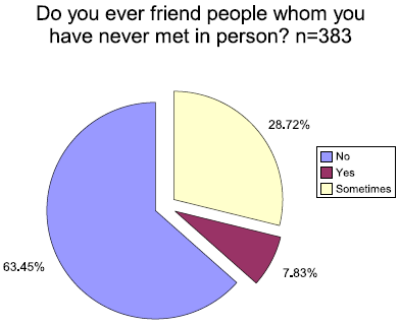

Exhibit 6: Overfriendly or Actively Social??

Julie was chosen by her cyberstalker when she bought a DVD from his shop in LA. Digging her up on the Internet, he broke into her house and installed a webcam to stream every second of her bedroom to his live website, www.fortheloveofjulie.com. It is ironic that due to firewalls

and Internet security, he could never be traced, though the website was taken down. Manish Kathuria became the first criminal of cyberstalking in India, after he had been stalking Ritu Kohli for months.

Another emergent theme from social networking is social pornography. In December 2004, an MMS video of a 15-year old school girl in Delhi performing fellatio on her boyfriend became a rage in India, and online social networking communities helped it spread further, publicly shaming her for life. Similar cases led to a market of *'real porn'* as opposed to *'directed porn'* and people started sharing videos and links to social porn using social networks. Morphing of images on the web for pornography has been a widely known phenomenon. In a separate incident, a 16-year old Delhi boy was taken into custody for morphing and uploading images of his school teachers and peers onto a pornographic website. Incidents of this nature are countless and Facebook is the most advanced tool to label the girl next door as *'America's Next Porn Star'*.

You can check out anytime you like, but you can never leave

This is when I stop talking *'Geek and Latin'* and narrating stories that most readers would still audaciously label as *'one-off incidents'*. Let us talk numbers. Running the risk of sounding like the blabber of a grumpy old man with gray wilderness growing off his scalp, I'll reiterate that *'the problem with this generation is that they'll talk-the-talk but won't walk-the-walk'*.

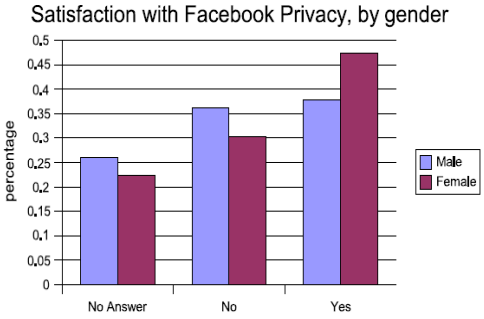

Exhibit 7: Satisfaction with Facebook Pri-

From the survey results produced by Jones and Soltren, it became clearly evident that a total of 33.17% people surveyed were sure that they were not satisfied by Facebook's attempts to protect a user's privacy. This figure translated to 41.34% of the survey sample being concerned over their privacy on Facebook.

I decided to take this one step further by surveying a carefully selected sample of 50 male and 50 female college students, who were Facebook regulars. On asking them if they would stop using Facebook albums if it could be proven that all Facebook photographs are globally accessible to absolutely anyone, 84% women said yes, while 52% men said no. The question still stands. How many of these will actually walk-the-walk?

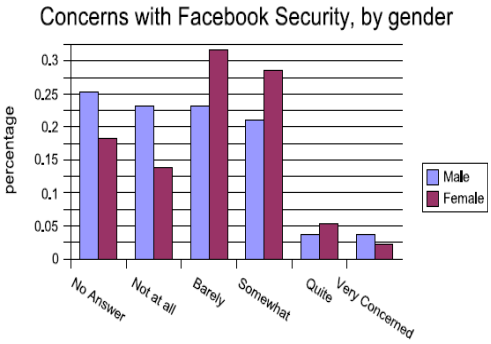

Exhibit 8: Concerns with Facebook Security

"*Why would this stop me from 'facebooking'? Not for a minute have I entertained the thought that FB is even remotely secure… I'm just confident that my face will not fit a porn star's body!"* - a Masters student at the LSE

The final nail in the coffin. Facebook is stickier than you can imagine. While the website offers users the option to deactivate an account, the servers keep copies of the information in those accounts indefinitely. Nipon Das had to go head-to-head with Facebook's customer service for two months and threaten them with legal action for most of his profile to be erased. Even after that, a reporter was able to find his empty Facebook profile and successfully sent him an e-mail message. Steven Mansou decided to write a blog entry– a detailed account of his frustration- *"2504 Steps to closing your Facebook account"*.

The question is right here and standing tall in our face. Have we been *'facebooked'* beyond reason? **I can see I am going blind!** Can you see what I see?

Acknowledgements

I am thankful to **Priyank Thakur** and **Narendranath D. Tangudu**, IT Specialists for Enterprise Application Security at the IBM India Software Labs, for finding the time to be interviewed for the purpose of this article. It was very kind of them to share their knowledge and expertise while analyzing the issue with me. I am also thankful to my dear friend **Merlia Shaukath** for her assistance while carrying out the survey and writing the article.

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About the author

In 2005, Abhishek Dhingra graduated amongst the top 2% of his class in India, with distinction grades and a Bachelor of Technology degree in Computer Science and Engineering. Before being accepted for the MSc ADMIS class of 2008 at the London School of Economics, he worked in the role of a Technical Associate at Tech Mahindra Ltd. And a Security Expert/Consultant at IBM Global Services. His education at the LSE has been generously funded by the school. He is now researching the work-lives of IT workers for his dissertation.

Group photos of ADMIS and ISOR MSc students for 2007/8

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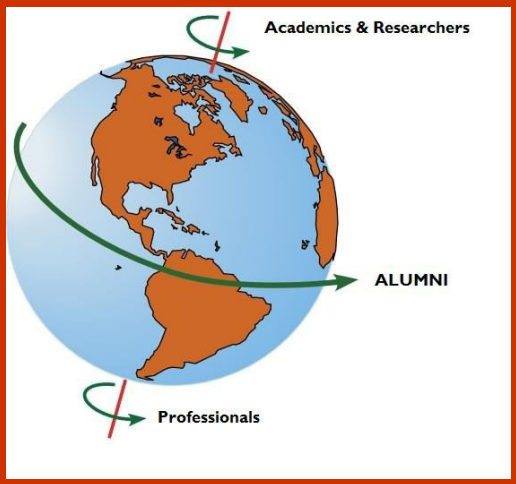

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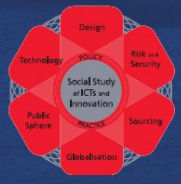

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