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# iCHANNEL

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## From the Head of Group

Welcome to the fourth edition of iCHANNEL. It has been inspiring to watch students and staff working together to produce such a professional, quality publication. Each year iCHANNEL has gone from strength to strength. As Editor in Chief of the Journal Of Information Technology I do know precisely what effort and talent needs to go into this type of endeavour, and on both counts the inputs have been remarkable, while the high quality of the output is there for all to see.

I 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, marshalling evidence, and being to take and act on constructive advice are very valuable skills for students and their future careers whether in academic or working life. Then there are the opportunities offered by the Journal to develop experience at providing constructive, objective advice by taking up a role as a reviewer of submitted papers. The administrative roles of editing, proof-reading and seeing each publication through to its final form and dissemination are also key to iCHANNEL. The whole enterprise provides experience in working on a joint endeavour in an interdependent way.

This, then, is a very creative, and highly useful venture which I have supported enthusiastically from the start. Everything that has happened over the first three issues has only confirmed the faith we have had in our student population in producing something both professional, and remarkable. So far everyone involved has derived immense benefit from the iCHANNEL. And it continues to underpin ISIG's long-standing reputation for its focus on student support and development. I really do look forward to the content of the 2009-2010 issue, especially in the light of the positioning of Information Systems within a department of Management and in the context of our group's increased focus on Innovation studies.

Professor Leslie Willcocks  
Head of the Information Systems and Innovation Group  
Department of Management

## From the Faculty Editor

While the role of the student editors is to manage the articles and production of the journal, my role as faculty editor is to oversee the journal and its long-term direction.

Reaching a fourth edition of the iCHANNEL is quite an achievement for any journal. It is now an important part of ISIG (see Leslie's editorial above) and has become part of the department's routine. We cannot however sit on our laurels and if the journal is going to develop then next year's editorial team need to think carefully about the strategic direction the journal should take. While it is for them to decide, I have used this editorial to make a few suggestions. Firstly the journal could develop new areas within it for other forms of output. This year has seen an interest by the Alumni society (LISA) to write articles for the iCHANNEL and it would be interesting to develop this link further. Another area where the journal might expand would be within the Department of Management. While the journal is an Information Systems publication there are other students within the Department who could provide a new set of ideas to the journal.

Another option would be to develop the publication cycle of the journal. At present we aim to publish in July, knowing full well that this often slips into a mad panic in August as we rush to complete the journal at the same time as the authors are trying to complete their dissertations. Instead we could try alternative arrangements - perhaps aiming to publish in December with articles being submitted for the following year's publication. This would allow students who had completed their masters to develop their dissertation into an article for the Channel - allowing original research to be published.

Another option is to expand the authorship beyond even the LSE - making the iCHANNEL an International student journal and inviting authors and reviewers from across the globe to publish. This should not be taken lightly (I can imagine that we could quickly become swamped by submissions) but might be a way to develop the journal into a stronger future.

A student conference may be an opportunity to develop these discussions and see people present and develop their work further. This might run alongside the Open Research Forum and SSIT conferences.

Finally the problem facing any publication is cost. At present the journal is underwritten by a small budget from the Information Systems and Innovation Group, however more money would enable these and other new ideas to develop. Raising money is not easy but a dedicated team of students could easily make it happen. Sponsorship and advertising are one option in this way.

Whatever direction the future editors decide to take it is clear that we have a good quality journal here which is growing and of which everyone who has been involved this year should be proud.

Dr Will Venters  
Faculty Editor

### Welcome to the Fourth Edition of iSCHANNEL!

iSCHANNEL serves a number of purposes each year. While an excellent tool for teaching students the rigors of managing an academic journal, another purpose is to provide an overview of the types of research and work that students in ISIG focus on during their time here. This is an area that we have tried to focus on this year. In past years, iSCHANNEL's publishing deadlines effectively mandated that the majority of submissions came from the fall project, dominantly literature reviews. This year, through a combination of factors, we have broadened our scope to include some of the spring projects. Spring projects are generally guided by student's interests and their particular course selections, allowing for a great deal of variety due to different combinations of student and professor preferences. They can also include original research, something Will touched upon in his editorial. As such, including them provides a greater perspective of the myriad different perspectives LSE and ISIG impart upon its students.

In his editorial, Will talked about the future role of the journal. I strongly encourage the concept of allowing prior year dissertations—perhaps a limited selection. While this would be extremely challenging due to the academic cycle and the departure of ISIG students during and after summer term, providing a venue for student research publication would be a very rewarding endeavour for all parties involved—if it is indeed an achievable goal.

In this volume we have a selection of original student pieces. Not only do we have papers inspired by four different courses from the Analysis, Design, and Management of Information Systems (ADMIS) group, we have a paper from a student in the Information Systems and Organizations (Research) (ISOR) group, broadening the scope even more. Unfortunately, by focusing on breadth instead of depth, we cannot explore any single subject in great detail. Instead, this journal admirably serves its goal of showcasing the work of ISIG as a whole.

The first paper, **The Überlingen Mid-Air Collision: A Tragedy—Revisited**, is notable most importantly for its approach to a non-traditional information system—that of two airplanes involved in a tragic crash due to mismatches in information and conflicting systems, despite all controls in place to prevent the crash. Through his analysis and application of theory, Branstner shows how broad of a scope the group takes when it refers to an 'Information System.' In addition, he links that to a recently published theory from Lars Mathiassen and Carsten Sorensen, one that we are introduced to during the course of our studies in the department, applying theory to real-life situations.

Moving on, **Reconsidering the Digital Divide** is one of the clearest papers that I have read this year. In the course of reviewing literature on the oft-mentioned digital divide, Benhabrim simultaneously identifies a gap in the literature that analyzes the digital divide, and calls for more exploration of the socio-economic systems in developing countries as they relate to ICT, and area he has found to be sorely lacking.

Next, Zhan presents a concise overview of perspectives on the development of artificial systems. In **Challenging the Intelligence of Systems**, he presents four different perspectives on systems and emergent processes, using them to show how they massively increase the complexity of any attempt to create an artificial intelligence. While merely an introduction to applying these theories, the framework he presents shows how many challenges there are in any system designed to approximate, even roughly, human activity.

When asking **Is the world agile?**, Knosalla identifies a series of questions pertaining to the general category of development methodologies categorized as 'agile.' Taking us through the arguments for and against agile methods, Knosalla identifies a trend towards polarization. While a good overview of the world of agile methodologies in academic circles, the most contributory aspect of the paper is its conclusion, that there is likely a need for a more balanced view in practitioners—they need the ability to pick and choose what fits from old and new circles as best fits the situation at hand.

From the ISOR group, Oymen Gur presents an academic exploration of Foucaultian methodology as applied to social networking sites. In **An Alternative Approach to Research in ICT**, Gur demonstrates the application of genealogical techniques to very recent innovations in technology. This is particularly significant as it is arguably more common to hear Foucault invoked when referring to power dynamics instead of his teachings of genealogy.

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Next up, Gabe Chomic presents a historical account of emergent change literature over time, detailing the academic development of the theories of situated and emergent change. Taking a longitudinal approach, **Change Over Time** traces similarities and dissimilarities in the literature, concluding that change theories are at risk of becoming too complex and difficult to apply. This, too, raises the question of where emergent change approaches are going, and what situations they can be applied to and still be useful.

In another piece from a Lent term course, Knosalla provides an overview of the conflicts created between banking law and privacy concerns in **Tax Havens, Evasion, and Banking Secrecy**. Instead of focusing on exploring a particular theory, she examines recent developments in the international financial environment and how they relate to taxation, finding a situation where there is a lot of debate and political discourse, with less opportunity for reasoned action and a strong risk of losing financial privacy.

Finally, the last piece, **Bits & Bytes of Happiness**, is a short opinion piece designed to provoke thought about happiness in internet users. While intentionally short, the studies it references point to a trend for happiness in internet users until a sharp dichotomy, and provoke thought about happiness in today's culture.

Running the iSCHANNEL editorial team this year has been a quite a challenge, but also quite rewarding. Future editorial teams should definitely consider the suggestions made by Leslie and Will, and expand this journal's scope if possible. However, even if just maintaining the status quo, the next teams need to focus on motivation. There is a lot that needs to be done to keep the journal running, but even more to ensure quality submissions and a balanced viewpoint. For next year's editorial team, wherever you bring the journal, jump into it!

Gabe Chomic  
Lead Editor, iSCHANNEL 2009

# The Überlingen Mid-Air Collision: A Tragedy—Revisited

**David F. Branstner**

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When Danish air traffic controller Peter Nielsen was murdered in 2004 by a Russian who lost his family at the Überlingen mid-air collision, this was only the last point of a big tragedy. 71 people lost their lives when a Boeing B-757 cargo aircraft and a Tupolev TU-154 commercial airliner collided in July 2002 over Germany, close to the Swiss border. Although several factors led to the disaster, it was also the inconsistent behaviour of the two pilots which contributed to the collision. One followed the instructions of the Traffic Alert and Collision Avoidance System (TCAS). The other followed the orders of the air controller. In this paper I argue that the redundancy systems which are constructed in order to increase safety in High Reliability Organisations (HRO) can conversely produce uncertainty. They can create situations in which decisions need to be made based on insufficient information. By reflecting on trust, culture and power I analyse why under these circumstances the commercial airliner might have been eventually steered according to the orders of the controller. Finally I apply aspects of Mathiasen and Sørensen's (2008) framework of Information Services to offer a theoretical explanation as to why the ultimate situation was impossible to resolve.

## Introduction

Mid-air collisions are an enduringly relevant subject with regard to air transportation safety. In spite of improvements in air traffic management, they still seem to occur from time to time (Weber, 1982). If they do happen their consequences are fatal and almost inevitably connected with deaths. Sometimes passengers escape with a fright like in 2001 when a Boeing 747-400 and a DC-10 missed each other tightly over the Pacific Ocean, south of Yaizu, Japan (Staff, 2004). Sometimes passengers die as in the case of the Überlingen mid-air collision.

From the perspective of an Information Systems researcher mid-air collisions are particularly interesting as in most cases they indicate failure of interaction between man and machine. They represent a failure of systems which are decisively created with the purpose to offer an extremely reliable service. Furthermore they are special in the sense that they allow to re-construct the scenario in high detail. This is due to technical artefacts such as Flight Data Recorders (FDR) and Cockpit Voice Recorders (CVR) which document the sequence of events and can be analysed afterwards. Finally, mid-air collisions normally take place within an intercultural context. This can be critical if norms and standards of behaviour vary between different actors (Pidgeon, 1997).

The Überlingen mid-air collision is not only a tragedy which led to the death of 71 people and the murder of the air controller by a Russian who had lost his family in the disaster. It is also an example of failure where two systems generate conflicting information and finally cause a disaster – two systems which had been built to complement one another for the means of safety. Moreover, this accident stirs up a debate about whether humans trust more in humans or in machines, whether coherent culture and norms could have avoided the disaster and whether authoritative power-structures in the cockpit contributed to the fatal accident.

## The Überlingen Mid-Air Collision

In the night of July 1, 2002, two airplanes collided at 34,890 feet over the German-Swiss border close to the town Über-

lingen – a Boeing 757, operated by DHL, flying from Bergamo to Brussels and a Tupolev 154, operated by Bashkirian Airlines, en route from Moscow to Barcelona. The aircraft which finally were on a 90° collision course both had Traffic Alert and Collision Avoidance Systems (TCAS) installed. During the final minutes before collision they were both under the supervision of the Zürich Area Control Centre (ACC) (BFU, 2004).

During that night the Zürich ACC performed maintenance measures on the radar and telephone system. As a result the radar system was operating only on fall-back mode and the main telephone system was shut down. Furthermore the Short Term Conflict Alert (STCA) which would normally warn the controller of any impending collision was not available either (Flottau, 2002). The fall-back telephone system had a software failure which nobody had noticed.

According to the routine at Zürich's ACC only one of the two controllers on duty, Peter Nielsen, worked at the time of the accident. Because he had to control two frequencies, Peter Nielsen needed to monitor two separate screens at the same time. On the one screen he observed the en route traffic and on the other screen all flights approaching the airport of Friedrichshafen (FHA). When he tried to reach the tower of Friedrichshafen airport in order to get the landing clearance for an Airbus 320 registered to Thai Airways he could not get through due to the telephone system malfunction. Several times he tried to hand over the Thai Airways flight and meanwhile kept the second screen unattended. Two minutes before the collision the STCA did not alert him as it normally would have done. Neither could another controller from Karlsruhe, whose STCA had gone off, warn Peter Nielsen as a result of the telephone failure (BFU, 2004; Nunes, 2004).

50 seconds before the collision TCAS warned the crew of the Tupolev about convergent traffic: "Traffic, Traffic". 40 seconds before collision Peter Nielsen became aware of the convergent course of both airplanes and instructed the Tupolev crew to descend: "B-T-C 2937, descend flight level 3-5-0, expedite, I have crossing traffic." 36 seconds before collision the Pilot Flying (PF) of the Tupolev initiated the descent. At



the same time TCAS generated a Resolution Advisory (RA) for the Tupolew to “climb, climb”. In spite of the TCAS order the Tupolew continued its descent. At 21:35:32 Central European Summer Time (CEST) the passenger aircraft collided with the DHL airfreight machine which had followed the TCAS orders and thus mirrored the manoeuvres of the Tupolew (BFU, 2002).

### How could it come so far?

As the overview of the Überlingen accident has demonstrated, many different factors contributed to the mid-air collision. These factors have been described in detail as well in the official report of the German Federal Bureau of Aircraft Accidents Investigation (BFU, 2004) as well as by Nunes and Laursen’s (2004). Although a list of factors never can be regarded as complete, we can assume that the circumstances which led to the collision are relatively clear. But as clear as these frame conditions are, as much room there is for interpretations and analyses.

For researchers such a variety of factors offers diverse starting points for analysis and for the application of theories. At first sight it seems to be appealing to approach the Überlingen collision with a classical disaster theory. The overall system to prohibit aircraft collisions is complexly interactive and tightly coupled. It offers the ideal environment in which “small errors can interact in unexpected ways”. And for sure “the tight coupling will mean a cascade of increasingly large failures”. The character of such a system virtually calls for Perrow’s Normal Accident Theory (NAT) (Perrow, 1994).

On the other hand, the happenings at the Zürich ACC ask for further analysis from a managerial and organisational standpoint as they indicate insufficiencies in air traffic capacity management. And there are indeed parties that accuse the Zürich ACC for the accident. Paul Duffy, a Russian Aviation consultant, for example stated that “the system responsible for the accident was the poor Skyguide management and quality control” (Cineflix, 2004).

From a system development point of view the problematic maintenance of the air traffic control systems could be of interest, raising the question how maintenance work should be carried out for High Reliability Systems (HRS). How to maintain systems which have to function with the same reliability during maintenance work because they are extremely critical for the safety of the organisation?

The situation of the controller might offer starting points for further research from a cognitive science angle. On the one hand the workload and stress which the controller suddenly faced and on the other hand the monotony and boredom during long quiet nights at the control centre psychologically provide an extraordinary setting (Baase, 2003; Hoc, 2000; Kirwan, 2001). Also related to this area is the interaction between the controller and his instruments which refers to the research area of Human Machine Interaction (HMI).

If we have a look at the research that has been conducted so far related to this specific case, one research paper seems to be noticeable in particular. Based on the Überlingen case Weyer (2006) analyses the distribution of control between humans and machines in collision avoidance systems. However, Weyer does not give an explanation of the disaster. He rather uses this case to support his argumentation that TCAS can be regarded “as a first step in a regime change”. He predicts a lower dependency of pilots on controllers and an in-

creasingly higher dependency of pilots on technical artefacts (Weyer, 2006).

In this respect this essay can be seen as the presumably first attempt to use theoretical concepts to explain the Überlingen case. Although no paper can be regarded as purely non-interpretative, it can be argued that the official report (BFU, 2004) and Nunes and Laursen’s (2004) article have a strong descriptive and factual character. Therefore this essay is neither set out to explicitly describe existent papers nor to close gaps of their interpretations. It rather builds on the facts that they deliver.

In awareness of the different possible ways to approach the case, this essay focuses on one particular situation within the sequence of events – the crucial situation in which the pilot-crew of the Tupolew finally had to act. In this regard three questions appear to be central: Why could it happen that two different orders were available to the pilot-crew? Why was the airplane finally steered according the controller’s order? And, from an Information Services angle, in what way had the decision basis changed so that it could not be resolved anymore?

### When redundancy systems lack independence

Flying is regarded as a very secure way of transportation. In 2007 the Jet Airline Crash Data Evaluation Centre (JACDEC) registered 52 accidents worldwide in which 752 people died. This is a rather low number considering that in the same period 4.65 billion people went by plane according to the Airports Council International (ACI) (Focus Online, 2008). In consequence, air transportation organisations can be described as High Reliability Organisations (HROs).

Paradoxically, air transportation is at the same time a highly risky field as human lives are at stake. Therefore it is an enduring issue to design secure and highly reliable systems (LaPorte, 1991; Parasuraman, 2004). This expedite is also challenging because one important learning technique is not available in this field. As Todd LaPorte said at the Close Calls Conference at the London School of Economics, in these organisations “your next error is your last try” (LaPorte, 2009). Whereas in other areas “trial and error” is a suitable way for improvement, in air transportation it is not. The asset – human lives – is just too valuable as to wait until an error occurs (Weick, 1987). As a consequence, organisations put a lot of effort into identifying errors before they occur. But obviously it is impossible to anticipate all potential errors. Too complex are the social and technical systems and too unforeseeable are potential combinations of events. Hence, alternative ways must be explored to increase system reliability.

One approach to achieve high reliability is to embed redundancy. Etymologically, redundancy exists whenever something exists in abundance. With regard to technical or organisational systems, the notion of redundancy has been introduced by Harry Nyquist. As mentioned by Landau (1969), he described any non-crucial part of a message as redundant. However, later it has been recognised that redundancy also provides characteristics which can be regarded as extremely useful to achieve continuous operational effectiveness (Jarman, 2001). Consequently, safety critical organisations now use redundancy in order to increase the reliability of their systems. If the main system fails, a redundancy system takes over and replaces the primary one (Rochlin, 2005). In air transportation redundancy is not only realised for techni-

cal systems but also for humans. If we take the pilots as an example: Not only the captain is able to fly the aeroplane but also the co-pilot (Grabowski, 2000; Helmreich, 1997).

This principle of redundancy is used for air collision avoidance. In the Überlingen case the Zürich ACC represents the primary system. In this capacity the controller Peter Nielsen had the responsibility to ensure that all aircraft moved in separated airspace. As fall-back systems there were the STCA, controllers of other ACCs and finally TCAS. STCA was unavailable due to maintenance work. The controller from Karlsruhe who had noted the impending collision could not contact Nielsen due to a telephone software failure. TCAS was fully operational. But by functioning it caused also the disaster. If TCAS had not generated the RA, the collision would not have happened.

This suggests that redundancy systems can only achieve reliability when they are designed in a specific way (Grabowski, 2000). If independence between the single redundancy systems is not given, they can even contribute to accidents (Landau, 1969). If failure of one redundancy system can negatively impact on the functionality of another redundancy system, then the reliability of the overall system is not increased, contrary to intention. Equally, this independence is not given if two systems generate conflicting information and thus increase uncertainty. Then “redundancy may increase complexity [...]: redundant information gathering may lead to ambiguity and conflicting perceptions” (Rijpma, 1997). And exactly this occurred at the moment when the controller and TCAS acted in parallel. The pilot-crew of the Tupolew did not know which instruction to follow – the TCAS’ RA to descend or the controller’s order to climb. The Tupolew descended and thus mirrored the movement of the conflicting aircraft which followed the TCAS instructions. As a result both airplanes collided.

Those explanations might shed some light on the question why different information was available to the crew of the Tupolew. But how can we understand why the pilot-crew did not follow the TCAS command?

### **No trust in a computerised system?**

Trust can be seen as a potential explanation why the pilot-crew of the Tupolew followed the instructions of the controller. Trust is a complex concept which is strongly connected to sociology and psychology. It basically expresses the expectation of a trusting party to receive something positive from another party. These parties do not necessarily have to be human. Often machines are regarded as trust-worthy owing to their reliability and security. Most people for example have a certain trust in the reliability of airplanes (Jøsang, 1996).

Another characteristic of trust is that it is usually associated with an external threat. If we look at the airplane-example once more: Trust would not be necessary without the potential danger of the passengers’ deaths.

Trust can also help to understand the behaviour of individuals and organisations in situations where rational theories fail to provide an answer. Trust might be the last way out in situations of high uncertainty, when decision makers have to take risks because they are only provided with incomplete information. Trust can be seen as the last resort when the outcome lies no longer in your own hands but in independent actions of another party (Cahill, 2003). And, as Helmreich (2000) states, “trust is a critical element in safety culture”.

One might ask why the Topolew-crew or at least the Pilot In Command (PIC) had no trust in the TCAS. Overreliance of humans on technical artefacts has been well recognised (Baase, 2003). In 1987 for example the military ship USS Vincennes shot down an Iran Air passenger aircraft. The report later suggested “task-fixation” as one contributing factor which led to “scenario fulfilment” (Peltu, 1996).

One could argue that the pilot crew was fixated on fulfilling the controller’s orders and thus ignored TCAS. However, from my standpoint this does not present a strong argument. Task fixation might be sufficient to explain a single incident of a crew directing the plane according to the controller’s orders. But in a comparable scenario on January 31, 2001 two airliners of Japan Airlines had a near miss. TCAS and controller produced contradicting advisories and again the crew followed the human advisory (Tomita, 2005). This begs the question of additional causative factors rather than just task fixation.

Another explanation why TCAS has been ignored in both cases could be distrust in this system. Distrust can be caused by a high proportion of false alarms, especially when systems are immature (Parasuraman, 2004). And there are indeed indicators to suggest that early versions of TCAS were literally unusable. Baase (2003) for example cites an article from the Wall Street Journal mentioning that “the system directed pilots to fly toward each other rather than away, potentially causing a collision instead of avoiding one”. One could argue that pilots consequently have lost their trust in this particular system.

From my standpoint additional arguments ought to be considered. Otherwise it is not explicable that pilots nowadays seem to have a rather positive attitude towards TCAS. Bruce Nordwall (2002) for example states that “pilots generally have a high regard for TCAS, and its European counterpart ACAS (Air Collision Avoidance System). From the cockpit they are perceived as a safety net.”

I argue that humans are prone to follow humans, not computers, when they are in a critical situation and have to choose between the two. This is also the result of two studies conducted by Waern (1996). Both studies come to the conclusion that the “general trust in computers was, however, much less than their trust in human beings.” And even if we question the results of these somewhat artificial experiments, we can follow on from Waern’s thought that the human communication style is more effective than the computational. There is no doubt that the voice of controller Peter Nielsen sounded much more dramatic than the computerised voice. As Rashid Mustafin, Deputy Chief Pilot of Bashkirian Airlines, states: “The TCAS commands are spoken in such a dispassionate voice. ‘Descend. Increase descent.’ Such a matter of fact type of voice. And then there is the voice of the air traffic controller’s urgent command. So which ever voice sounded more urgent was the one the crew obeyed” (Cineflix, 2004).

This still leaves a question unanswered. If the English pilot-crew of the other airplane, the Boeing 757, did have direct contact to the controller, would they have also preferred the controller’s order to the TCAS? We will never be able to answer this question. However, it provides the starting point for another possible explanation. Maybe it was not only a question of trust, but also a question of culture with regard to the use of TCAS.

## Culture and norms

Culture can be described as the phenomenon that individuals of the same background show similar patterns of communication, thinking and way of life. Comparable to trust, culture is not consciously perceived and needs to evolve over a period of time. Nevertheless it can have a strong impact on the behaviour and actions of people as it shapes the inner sense of “right and wrong” (Jing, 2001).

Culture also plays an important role within HROs since these organisations are often based on the same implicit assumptions and norms (Grabowski, 2000; Schein, 1996). Although a unification of norms, especially the unwritten ones, is usually difficult to achieve, these organisations develop a common understanding which in turn ensures consistent action across the organisation (Grabowski, 2000; LaPorte, 1991). This applies not only to air transportation but also to other high reliability industries. At BP for example it is an official rule to hold the handrail when taking the stairs. According to John Meakin, Chief Information Security Officer (CISO) of BP, this rule is to embed an awareness of security in the culture of BP (Meakin, 2009).

Moreover, cultural understanding and unified procedures are two ways to replace central storage of information within a distributed system. Ideally, culture would then unify behaviour beyond different locations as if by magic (Weick, 1987). Referring to the air collision avoidance system in the Überlingen case, the ACC can be regarded as a central system and the pilot’s interaction with the TCAS as a distributed one. When two contradictory advisories were available to the Tupolew-crew, consequently the functionality of the system was dependant on either culture or standardised operational procedures. Both, culture and procedures could have equally led to a coherent understanding which of the two orders should be prioritised.

In the highly regulated airline industry these rules and cultural norms would usually provide an effective platform to establish consistent procedures. However, at the time of the Überlingen accident different norms seemed to have existed with regard to the TCAS usage. Neither the same tacit understanding nor a consistent world-wide rule was available to the pilots. In the United States it is generally accepted that in such situations TCAS orders ought to be prioritised (Nordwall, 2002). In contrast to that Russian operating procedures leave the decision to the pilot whether to follow TCAS or ATC. As most Russian aircraft in 2002 were not equipped with TCAS one even can assume that the standard procedure was to follow ATC commands (Flottau, 2002). This view is shared by Marinus Heijl, deputy director of the Air Navigation Bureau ICAO: “Perhaps the ICAO procedures and standards, but in particular the operating procedures for airborne collision avoidance were somewhat ambiguous, were open for interpretations” (Cineflix, 2004). This argument is also supported by the fact that guidance material now, after the Überlingen accident, emphasises that pilots should follow the TCAS instructions (Brooker, 2005; Staff, 2004). Unfortunately, neither culture nor procedure are of any help in an unprecedented case of emergency (Weick, 1987).

## Or a question of power and authority?

In the literature we can find the notion of the “culture free cockpit”. This expression probably intends to emphasise that irrespective of their diverse cultural background crew members communicate smoothly. However, research studies have

shown that differences between attitudes of crew members exist depending on their “national, organisational, and professional cultures” (Helmreich, 2000). For example the degree of openness co-pilots display towards their captains varies considerably. Whereas in western countries concerns in relation to the safety of the flight are voiced without restraint, pilots from Eastern countries seem to be dominated by the respect for their more senior colleagues. This can result in hesitation or worse, withholding of their opinion (Helmreich, 1997; Sherman, 1997).

This leads to a discussion about the distribution of power within the cockpit. Power in general has been discussed through the centuries, for example by philosophers such as Machiavelli or Foucault. The social psychologists French and Raven (French, 1959) see power as relationships between people that can influence the goal achievement of groups. This aspect of power appears to be relevant for the Überlingen mid-air collision.

So far we have made no distinction between the Pilot In Command (PIC), the Pilot Flying (PF) and the co-pilot. But the crew constellation in the Überlingen case might be important, especially when we consider that it differed from the routine. During that night an instructor had joined the crew which resulted in a change of the usual hierarchy in the cockpit. The instructor was the PIC and Pilot Non-Flying (PNF), meaning that he gave the orders but delegated the execution to the PF. The third pilot, the co-pilot, had only a passive advisory role.

Analysing the last conversation in the cockpit, the question arises as to why the co-pilot’s doubts were not considered. He was the only one who uttered his concern about the contradictory orders of TCAS. However, his doubts did not influence the outcome. His words “It says climb!” were answered by the Pilot In Command (PIC) with “he [the controller] asks us to descend.” The co-pilot repeatedly asked: “Descend?” After the TCAS instruction to “increase climb”, the co-pilot again remarked: “Climb did it say!” (BFU, 2004).

Did the instructor ignore the co-pilot’s opinion because he was the lowest ranked officer in the cockpit? Was the co-pilot’s expertise not considered as valuable? Or did he not have the personal authority to make himself heard? Did he have a different training background related to TCAS which made him more sensitive for the TCAS RA? It is not possible to answer these questions in this essay. However, they represent an interesting starting point for further analysis.

## Why could the situation not be resolved? – An Information Services perspective

So far two questions have been analysed: How could it happen that contradictory information was available to the Tupolew-crew? And secondly, how can we understand that the aircraft was finally steered according to the controller’s orders and not to the TCAS RA? Thus, up to this point the essay has presented factors that could serve to explain how such a critical situation could occur. Now we will turn the attention to another question. An information services perspective will be taken to analyse as to why the situation could not be resolved.

During the last 15 years an increasing number of authors have applied a services perspective instead of a traditional systems perspective. One advantage of this approach is that it helps to increase understanding of “how configurations of people and



IT artefacts interact to support work, communication, and decision-making” (Mathiassen, 2008). Although the information services perspective is often used with regard to web-services – especially Web 2.0 and Cloud Computing – it has also been applied to other areas. Brittain and MacDougall (1995) for example write about the usage of information services in the National Health Service (NHS).

Mathiassen and Sørensen (2008) mention four points that are considered characteristic for information services: (1) They are used every day; (2) they support very specific tasks; (3) they are normally portfolios of different “processing capabilities” and (4) they are different from business or software services. Although the acknowledgement of point (4) appears to be difficult with regard to air collision avoidance, the first three points are easily applicable. (1) Air traffic needs to be coordinated every day. (2) Ensuring the separation of aircraft in airspace is a very specific task and (3) various computational and human elements interact in order to fulfil it.

Mathiassen and Sørensen (2008) categorise information services along the dimensions of equivocality and uncertainty (see figure 1). Simplified, situations can be described as highly equivocal when several controversial interpretations are possible. Situations of high uncertainty are classified as those where the available information is not sufficient to

		Uncertainty	
		Low	High
Equivocality	High	<u>Adaptive service</u> Use of information Relationship service	<u>Collaborative service</u> Production of information Relationship service
	Low	<u>Computational service</u> Use of information Encounter service	<u>Networking service</u> Production of information Encounter service
		<i>Need to do something</i>	<i>Need to know something</i>

complete a task (Daft, 1986; Daft, 1981).

Figure 1: Diversity of organisational information services (Mathiassen, 2008)

With regard to the Überlingen case, TCAS can be regarded as an element of the information services portfolio to avoid air collisions. If we attempt to allocate it in Mathiassen and Sørensen’s (2008) framework, it falls in the category of computational encounter services. “An encounter is a straightforward, standardised service that spans a short period of time and has a predefined context (Mathiassen, 2008).” These are procedures which have been designed for a specific purpose through a “process of input, computation, and subsequent output”. TCAS only intervenes when the separation between aircraft is no longer guaranteed. In this case TCAS uses information of the Secondary Surveillance Radar (SSR) to produce standardised RAs. The RAs are based on computerised input (low uncertainty) and leave no room for interpretation (low equivocality). As long as the pilots follow the RAs, the separation of the airplanes is re-established. Within seconds the critical situation is resolved and TCAS switches back into passive mode (Williams, 2004).

Similarly, the instructions of controller Peter Nielsen for the Tupolew-crew can be interpreted as a service. Mapped to the above framework, his advise can be described as an adaptive service. The controller uses the information available to him

in order to advise the crew. As human interaction takes place, both parties – controller and crew – are in a position to give each other feedback. They can react to the high equivocality by discussing the situation and adapting their actions. The controller for example could have adjusted his advise to descend if the crew had told him that TCAS had produced a contradictory RA. But, and this is a key point, the controller can only act on the available information. As a result, even if the crew had informed him about the contradictory orders, he could not have resolved the situation, because he had no information about the action of the DHL-crew.

Hoc (2000) mentions “incidents or breakdowns” as factors which can impact on procedures. If we follow this thought, we can interpret the moment when the contradictory orders became available as a breakdown. If we refer to Mathiassen and Sørensen’s framework, at this point the uncertainty shifted from low to high. The information available to the controller and the Tupolew-crew was no longer sufficient. Immediately conflicting ideas on how to interpret the situation and confusion arose. The co-pilot for example had serious doubts about the instructor’s decision.

As previously analysed, there were no standard procedures in place to regulate such situations. The crew had no reliable information on which to base their decisions. But sensible decision-making is only possible if different options are known and if the outcome of these options can be at least vaguely estimated (Weick, 1987).

Facing the contradictory orders, it was inadequate to simply use information. Instead it had become indispensable to produce information. This would have required the collaboration between the different actors, creating an exchange of information in order to realise consistent action (Mathiassen, 2008). In other words, a shift from information usage to information production was necessary to resolve the situation, a shift from computational / adaptive service to collaborative

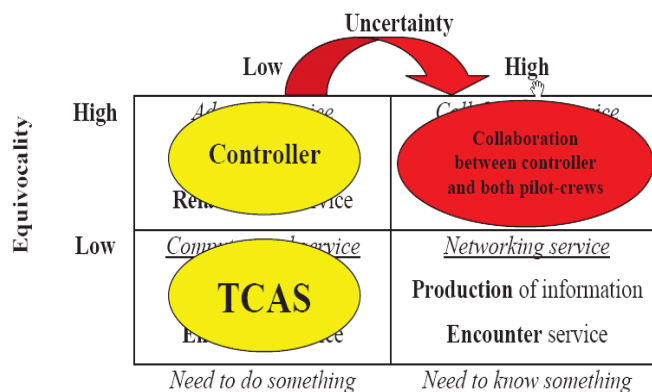


Figure 2: Misfit of information services portfolio in the mid-air collision

service. It can not be stressed enough that external rules had further restricted the collaboration and thus the resolution of the crucial final situation. Firstly, pilots are not able to directly contact pilots on other airplanes. Therefore, the pilot-crew of the Tupolew could not get in touch with the DHL aircraft. And secondly, controllers are unable to make contact with aircraft that are currently not within the area of their own ACC. As a result the controller in Karlsruhe who had recognised the impending collision could not reach the airplanes directly. He could only call the Zürich ACC which was unavailable due to problems of the telephone system. There is no doubt that

these rules have a justification under normal circumstances. In this case, however, they made it even more difficult to resolve the situation as they constrained the collaboration.

With reference to the information services framework, in restricting the collaboration these rules additionally hindered the shift from an encounter to a collaboration service. They hindered the generation, share and usage of information in response to emergent requirements (Mathiassen, 2008). They hindered the adaption of mechanisms in real-time which is necessary to resolve such situations (Hoc, 2000). If some additional time had been available, the situation could have been stabilised and information could have been generated to "precede decision making" (Weick, 1987). This again would have allowed to make a rational decision.

One might argue that this consideration is not applicable because additional time could not be created. However, there are indeed ways to increase time in air traffic management. In unmanageable situations controllers for example can "spin" the aircraft in place (fly in circles) to buy time to sort out the mess" (LaPorte, 1991).

If more time had been available and communication had been realised, the Überlingen mid-air collision may have been avoided. To use Mathiassen and Sørensen's terminology (2008), additional time had enabled the adaption to the misfit of the information services portfolio.

### Conclusion

This paper has analysed the Überlingen mid-air collision from two perspectives. In the first part explanations have been provided to understand how the final situation could occur. Therefore, concentrating on the pilot-crew of the Tupolew two questions have been discussed in depth: How could it happen that two contradictory advisories were available to the Tupolew-crew? And why had the Tupolew finally been directed according to the controller's orders? In the second part an information services perspective has been applied to analyse why the final situation could not be resolved.

With regard to the first part it has been suggested that the Tupolew-crew faced uncertainty as a result of redundancy systems which lacked independence. As under these circumstances a rational decision was impossible to make, social and psychological aspects may have gained in importance. This paper suggests that in situations of uncertainty pilot-crews tend to trust in humans rather than in technical systems. Being in direct contact with air controller Peter Nielsen the Pilot in Command followed the controller's orders and not those of the technical Traffic Alert and Collision Avoidance System (TCAS). Furthermore the different cultural background of the pilot-crews has been identified as a possible reason for the incoherent interpretation of the orders. Whereas Western pilots generally accept that in such situations TCAS orders ought to be prioritised, Russian operating procedures leave the decision to the pilot whether to follow TCAS or the Area Control Center. Finally the authoritative structures in the cockpit have been highlighted as an influencing factor of the outcome. The disaster could have been prevented if more attention had been given to the co-pilot's doubts, it is argued.

Based on these interpretations this paper argues in the second part that the uncertainty embedded in the final situation of the Überlingen mid-air collision required an information exchange between the pilot-crews and the controller. Facing the contradictory orders, it was inadequate to simply use infor-

mation. Only if more information had been produced a joint and consistent decision would have been possible. In situations of high uncertainty organisations need to flexibly adapt their information services portfolio by shifting between computational / adaptive and collaborative / networking services, it is argued. In these cases "the organisation needs to adopt approaches that will help actors produce the information they need for task execution" (Mathiassen, 2008).

As time in the Überlingen case was too short to install collaboration, this paper further emphasises time as an important factor to increase safety in air transportation. This may generate further improvement for example in capacity management of control centres – to gain time for controllers – or to extend the critical TCAS-time-span – to have more time to react.

Hazardous operations are often time critical and have a number of characteristics in common. In so far the findings of this essay might be well transferable to other High Reliability Systems (HRS) and help to increase safety in general (LaPorte, 1996).

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# Reconsidering the Digital Divide: A Look at Technology Innovation in Developing Countries

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In the academic realm, the term digital divide which typically relates to the gap between those who have and do not have access to information and communication technologies (ICTs), has been an attractive subject on the scholarly and political agenda. The problem however is that the topic is highly fragmented in academic literature, and many of the research findings are inconsistent and contradictory. In addition, too much of the research effort has gone into the ‘niceties’ of measuring the divide and too little has been devoted to establishing a consistent analytical framework. In information systems and development terms, there have been few attempts to critically pinpoint the socio-economic impact of ICT innovation in developing nations and its relation with bridging the digital divide. The goal of this literature review accordingly, is to demonstrate how theoretical perspectives regarding ICT innovation can strengthen digital divide research within the broader socio-economic context of developing nations. The paper simultaneously calls for more extensive empirical studies backed by theory and valid operational frameworks.

**Keywords:** digital divide; access to ICT; digital divide measurement; innovation; social exclusion; diffusion of innovation theory; IS theory; ICT and development

## 1. Introduction

There has been a lot of interest generated on the digital divide judging by the vast amount of scholarly work that has been produced since the mid 1990s. The topic has been (and still is) a central of national and international debates as they propose to tackle the growing issue of inequality in the society. The main problem however arises in the lack of definition and conceptual explanation of the term the digital divide, thus resulting in more confusion than clarification.

The ambitious purpose of this paper is to review and analyse the relevant literature on some key aspects of the digital divide. In the next section, I begin with a discussion on some of the scholars’ different approaches and contributions in interpreting the digital divide, seeing how the focus of research has evolved over time. In highlighting the obvious variations of the different definitions, I then examine the different conceptual frameworks and models used in measuring the digital divide, in order to pinpoint whether they in fact attempt to identify the real issue. In the following section, I focus on one research theme, specifically the role of ICT innovation in developing nations and its impact on growth and poverty. Finally, I conclude with a recap on the different perspectives focusing on the aspect of diffusion of technology in developing countries, with some suggestion for future research and policymaking.

## 2. Understanding the Digital Divide

*“The ‘digital divide’ is one of the most discussed social phenomenon of our era. It is also one of the most unclear and confusing” (Warschauer, 2003)*

The term ‘digital divide’ first appeared officially in the United States and according to Gunkel (2003), was a result of a US Internet access study by the National Telecommunication and Information Administration (NTIA) that revealed sharp disparities among users according to race, gender and income (Vehofar et al., 2006). More and more of the term began to surface in various political speeches, policy analysis and conferences triggering an immense amount of investiga-

tion in the scholarly literature.

Numerous schools of thought have emerged on the interpretation of the digital divide as researchers try to find answers to many critical questions such as: What inequality does the digital divide refer to? Who gains and loses from bridging the digital divide? What future course will the digital divide take?

However, the current state of debate is such that answers to these questions are divided up into 4 different categories. The first group sees the divide as a ‘non-issue’ (Compaine, 2001). The second group sees the divide as a ‘real issue’ and particularly an economic one tied to the problems of development (Antonelli, 2003). The third group sees the issue as a more political and social one (Hacker and Mason, 2003; Colby 2001). Finally, the fourth group reject any ideas that sees the digital divide as a strategic, political or development one (Alden, 2003). That last group also recognizes that all efforts put to bridging the digital divide seem to benefit the rich sections of society more then they do the poor (Yu, 2006).

Despite all these efforts, Digital divide research is short of theoretical analysis and conceptual framework (Vehofar et al., 2006). In the next section, I will present how the many interpretations of the digital divide evolved over the years.

## 3. Conceptualizing the Digital Divide

Earlier study of the digital divide was built primarily upon the principle of “haves and have-nots” of access to ICTs (Bertot, 2003), and to “the attached importance of the physical availability of computers and connectivity rather than to issues of content, language, education, literacy, or community and social resources” (Warschauer, 2003).

This view was misleading because it attempted to rationalize the postulated relationship that exists between IT and the social context. Both Van Dijk (2003) and Gunkel (2003) refute this idea and warn that this view resonates some form of technological determinism. The idea that ‘physical access’ to computers and networks would solve particular problems in



zboth the economy and society not only suggests a technological bias, but also a normative one.

Looking at it from a political standpoint, Bertot (2003) argues that this view of the divide, as being a gap of technology “haves” and have-nots”, becomes extremely problematic as it enables politicians to cut funding to various technological initiatives intended to bridging the digital divide gap in certain communities.

Nevertheless, research has evolved and the focus has shifted from a simplistic view based on ‘dichotomous measures’ to a more complex view, deeply rooted within the social and economic structures. Researchers like Warschauer (in Vehofar et al., 2006) express their view of a “simple binary divide” as inaccurate since it fails to value the social resources of diverse groups.

In dealing with the expression of ‘access’, many researchers have suggested to reframe from the ‘techno-rational’ ways of thinking and to a more social, psychological and cultural view of perception. For example, Van Dijk and Hacker (2003) encompass a more ‘multifaceted’ meaning behind the term ‘access’ to ICT by stretching beyond “*simply having a computer and a network connection*” but by pointing out the disparity of access along the elements of ‘motivational access, material access, skills and usage’. Fig.1 shows how Van Dijk uses a recursive and cumulative model in his research to extend the concept of ‘access’ and accordingly, uses this model as a framework to interpret the digital divide. In another study, Hargittai (2002) similarly identifies the importance of skills and experience to the divide as the main problem once the Internet becomes universally accessible.

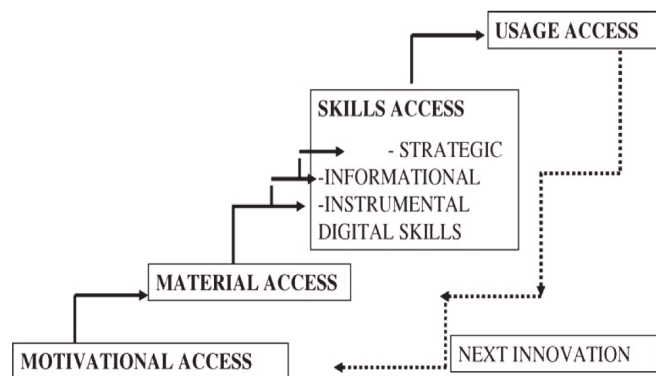


Figure 1: A cumulative and recursive model of successive kinds of access to digital technologies. Source: Van Dijk (2005), p.22

### 3.1 Measuring the Digital Divide

Moreover, there are a number of empirical studies which survey the scale of existing digital divides between countries and between societal sections within a country. In one study, Norris (2001) surveys 179 countries across the world to observe the degree of access and use of the Internet, and produces her own interpretation of the divide that is classified into 3 categories: the global divide, the social divide and the democratic divide. The research Norris (2001) conducts is more normative than descriptive seeing as she tries to uncover the digital divide by providing researchers better prescriptions to more policy initiative.

Other scholars have conducted their research in a more accurate and quantitative manner. Researchers like Corrocher and Ordanini (2002) examine case studies in various countries by using indicators from the NTIA (US) reports and OECD sta-

tistics. Another such study is that of Chinn and Fairlie (2004). They attempt to explain the digital divide by conducting a cross-country analysis to precisely estimate the role played by various variables such as income, infrastructure indicators, telecommunication pricing measures and regulatory quality.

There are more efforts of similar cross-country studies performed on the digital divide, and they all produce a vast amount of correlation. Most of them agree that disparities do in fact exist in the use and access of ICTs between countries and between sections of society within a country. However, many of the investigations disagree on the size and magnitude of such divides. The fact that these studies often adopt different definitions and indicators of the divide makes the comparison between different research findings even more difficult. Vehofar et al. (2006) for example, identifies three different approaches to digital divide measurements: multivariate modeling, compound indices and time-distance methodology. They argue that the inclusion of ‘theory-driven’ variables and proper modeling are the key elements for successful empirical research (Vehofar et al., 2006).

Simply put, there are many different interpretations and studies of the digital divide that can be found in shelves of articles and books. However, many of these studies have remained of a descriptive and normative nature. Few have attempted to critically pinpoint the main issue that influences one’s view of the importance of the digital divide, and in explaining the significant consequences of these gaps, especially against theoretical background based on Information Systems (IS) and Development literature. In this next section, I will discuss how various scholars view the decisive role ICT plays in the digital divide, with particular focus on the aspects of the diffusion of ICTs in developing nations and the changes innovation brings in the wider socio-economic context.

## 4. Diffusion of ICTs in Developing Countries

What puzzles the minds of many researchers is the question of whether there are tangible benefits to using ICT that address the social, cultural and political dynamics in developing countries. There are numerous studies in the IS literature that identifies the many opportunities ICT provides in improving a country’s productivity and efficiency and more generally, raising well-being of its members. In Castells’ view, information has become an independent source of productivity and power (Castells, 2000). He argues that we are now living in a ‘new economy’ where competitiveness and productivity are measured by the capacity to generate knowledge and process information rapidly (Castells in Mason and Hacker, 2003). Similarly, Van Dijk (1999) argues that ICT innovation strengthens the societal influence and power of those with the most resources. Furthermore, there is substantial evidence in the IS literature that shows how individuals and organizations in the developed countries are enjoying the benefits of these interactive communication technologies.

### 4.1 Social Exclusion

This makes the digital divide a real issue. According to Van Dijk (2005), the divide adds to the relative disparity in society that is already imbalanced in terms of ‘old’ types of resources and materials. Therefore, this results in a negative outcome such that those in the developing (and even within communities in developed nations) to be excluded from the emerging forms of technologies and innovation.

Many scholars have talked about the threat of ‘social exclu-

sion', and many produced an abundance of work and theories. Tranter and Willis (2002) warns that new 'status divisions' between those included and those excluded from access to ICTs may emerge when certain members of society benefits from ICTs to improve their life situations, while other members of society do not. Mason and Hacker (2003) apply the Structuration theory to recognize the 'social exclusion' issue of the digital divide. Similar concerns are echoed by Castells (2000) in his argument about "network society". Both share a common understanding of the importance of ICTs as an instrument of influential networking, organizing and making institutional changes (Mason and Hacker, 2003).

#### 4.2 Applying Diffusion of Innovation Theory

This leads to the next question: What are the impacts of ICT innovation on the digital divide? In an attempt to provide a useful guide in understanding the implications of ICT innovation on the digital divide, Mason and Hacker (2003) draws elements from the Diffusion of Innovation Theory namely the 'S-curve' and the 'trickle-down principle', in order to emphasize the importance of critical mass in the adoption of new media and technologies. In response to Compaine (2001), who was one of the scholars who stated that the digital divide will eventually disappear because of the nature of the market place, Mason and Hacker (2003) argue that ICTs, follows S-curves where early adopters who have the most personal resources first adopt the technology and the others follow suit over numerous years.

Yet, many scholars criticize the use of the innovation theory in the notion of the digital divide. Van Dijk (2005) considers the theory undesirable because it bears somewhat of a deterministic flavor. In his view, adopting the innovations theory in the digital divide ignores the dynamic nature of both the society and the economy. The 'trickle-down' principle for example, states that the Internet and personal computers will soon be available to all because these technologies are getting cheaper and easier to access. However, this principle ignores the fact that society is also a dynamic entity that is constantly changing by the very way they are structured.

Norris (2001) on the other hand, attempts to take up the idea of Diffusion of Innovation theory and elaborate it further using both the normalization, and stratification models. The normalization model suggests that the divide gap will narrow in the last stages of diffusion as technologies become cheaper and easily accessible. Whereas the stratification model indicates that the gap will continue because people who have first adopted the new technologies will not stop obtaining new ones. Thus Norris' model leads to two different projections of the digital divide as shown in Figure 2 below.

#### 5. Impact of ICTs on the Digital Divide

The primary concern in today's debates when analyzing the diffusion of ICT in developed and developing countries is not so much on the socio-technical economic differences between the countries, and how factors such as income and infrastructure play a role in ICT penetration. The concern for most researchers is of the rapid change that has been occurring in the Digital Divide (James, 2007).

Recent data from the International Telecommunication Union (ITU) shows that Internet subscribers and mobile phone users have increased considerably over the past 10 years in developing countries (ITU, 2006). However, one's view of how important this change is on the digital divide gap tends to be

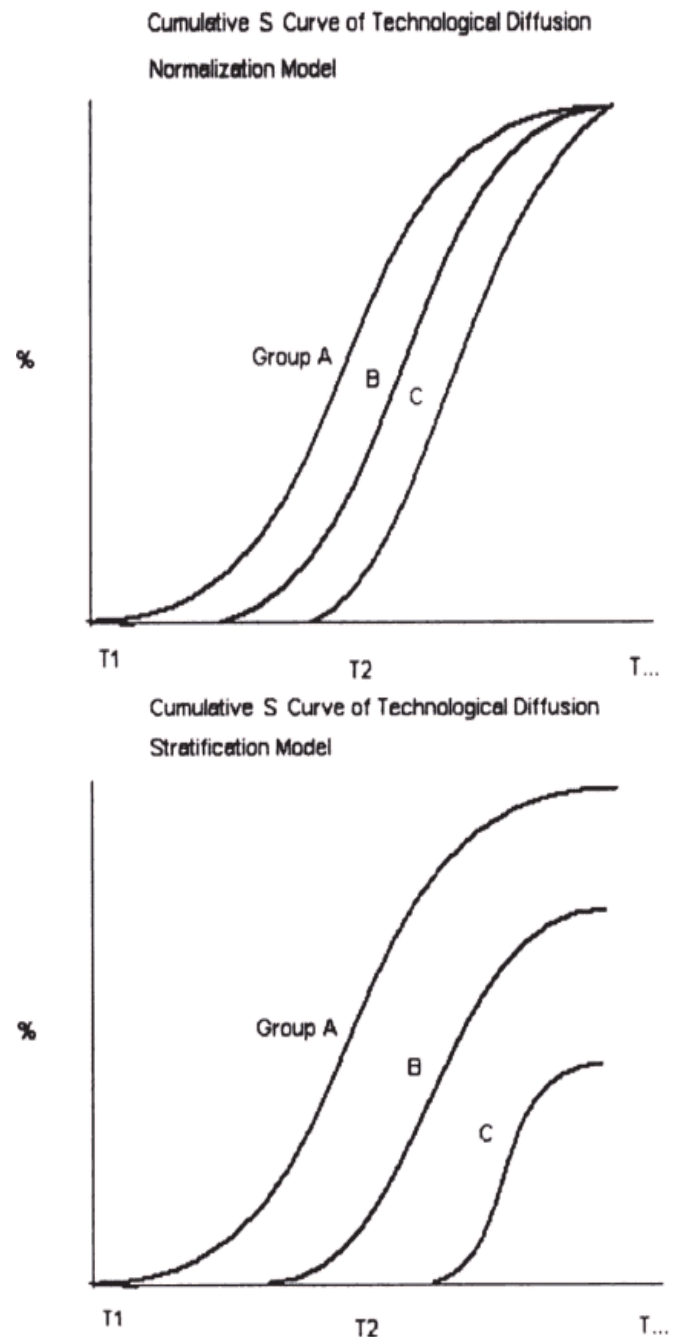


Figure 2: The Cumulative S Curve of Technological Diffusion

heavily influenced on whether the concept is measured in relative or absolute terms (James, 2007). This implies that data can be pictured in an optimistic way, if measurements are based on the rate of growth of technology in developing countries; or in a more pessimistic way if measurements are based on the growing division of ICT stocks between developed and developing nations. According to Fink and Kenny (2002), the digital divide of ICTs is no more different than the other earlier divides of technologies such as the telephone, television and radios. In their view, the focus must be on the rapidity of which the gap is closing, and not on the size of the gap itself. Mason and Hacker (2003) argue that IT requires user capabilities that are hardly comparable to radio or TV, and only a minority of people in developing countries possesses these capabilities.

James (2007) on the other hand, believes that the global digital divide is just another reflection of the "technological dualism" principle, which was first introduced by Singer (1970). The "technological dualism" principle recognizes the fact that

technological gaps between countries existed since the industrial age, because innovation had always been concentrated in countries that would closely resemble the socio-economic characteristics of developed countries (or urban sectors within a country with high income and education). James (2007) then goes on to use this principle to acknowledge that the pattern of diffusion of ICT would closely resemble what the idea of 'technological dualism' would tend to predict and that this outcome would then favor the rich countries.

## 6. Conclusion

Attempts to measure the impacts of diffusion of ICT in developing countries have been limited. Some argue that ICT contributions to economic growth have mostly been focused in developed countries. There is remarkably little reliable evidence in literature today that displays the full potential of ICTs in developing countries from a social and economic perspective, as most research has been focused on developed countries. Several multinational firms and institutions have occasionally shown interest in investing in ICT-related projects for the poorest groups in developing countries. This is encouraging from a policy perspective according to James (2006), as innovation represents in his view, the most promising change in bridging the digital divide. From this point of view, the challenges of bridging the digital divide thus lies in finding alternative ICTs and institutions that better meet the need of the people in developing countries.

There are of course several key aspects of the debate that could not be discussed here due to the voluminous nature of the topic. However, some of the key research designs and methods have been examined in this review that is not exhaustive, nor definitive, but merely brings out the major points relevant to the IS literature. It is evident that there is a clear lack of conceptual elaboration and definition in current digital divide research and filling that gap is the most urgent of task (Van Dijk, 2005). In particular, the substantial question of why, how and with what benefits and consequences of individuals using ICTs in developing countries will have to be addressed more profoundly in future research.

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# Challenging the Intelligence of Systems: A Literature Review on How IT Deals with Reasoning and Action

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Whether a system can exhibit intelligence behavior like human beings has always been one of the hottest topics in the field of information system. The failure and unexpected difficulties of artificial intelligence (AI) have prompted more and more scholars to focus on the study of AI and intelligent systems. This paper will specifically focus on the debate of artificial reasoning and action, one of the most important parts of AI, and present a literature review on different perspectives and issues of how IT deals with reasoning and action. In this way, the paper can help us to have a clear understanding to the interesting phenomenon and important theories in this enduring topic related to IS construction. The paper also provides a discussion of AI's future development and what the debate can suggest for contemporary IS studies.

**Keywords:** artificial reasoning; plan and strategy; situated action; tacit knowledge; improvisation

## 1. INTRODUCTION

More than half century ago, Alan Turing, one of the computer pioneers, claimed that a high-speed digital computer, programmed with rules and facts, might exhibit intelligent behavior (Dreyfus, 1993). Thus was born the field later called artificial intelligence (AI). According to Marvin Minsky, artificial intelligence can be defined as: "the science of making machines do things that would require intelligence if done by men." Along with the fast development of information technology, many scientists and experts have tried time and again to enable systems or machines to have the same intelligence as human beings. However, the development of AI was not as easy as predicted. The field ran into unexpected difficulties.

In a holistic view of AI's history, it is interesting to find AI's development falls into a strange cycle of boom and bust, of "AI winters" and summers. The first boom of modern AI was accompanied by the birth of programmable digital computers. Actually, the field of AI was founded during this time at the Dartmouth Conference in the summer of 1956 (Copeland, 1993). During these golden years, many successful programs such as natural language were created. These resulted in the extremely optimistic attitude towards AI at the time. Minsky even announced in 1967 that within a generation the problem of creating "artificial intelligence" would be substantially solved (Dreyfus, 1993).

However, some serious problems later emerged. The most important critique was that most AI applications could not deal with commonsense knowledge and reasoning which require a truly vast amount of information. Thus followed the first "winter of AI". Many scholars had already pointed out that the failure was not only a superficial phenomenon but a fundamental issue. Dreyfus (1979) argued that human reasoning actually involved very little "symbol processing" but a great deal of embodied, instinctive, unconscious "know how". But the leaders of AI doggedly believed the problem was caused by the limited computer power at the time and refused to accept the critiques.

After the capability of computer had developed as fast as the famous "Moore's law" predicted, the field of AI entered another eight years' boom period in 1980 with the symbol of the rise of expert systems. Expert systems are described as a program, using logical rules that are derived from the knowledge of experts, to solve problems about a specific domain of

knowledge. By restricting themselves to a small domain of specific knowledge, expert systems avoided the commonsense knowledge problem. Yet, the problem can not be avoided permanently. Even the AI researchers themselves later realized that the enthusiasm for expert systems had spiraled out of control. Their fears were warranted. In the late 80s, another "winter of AI" came.

To conclude the brief history of AI, there is no doubt that AI succeeded in many sub areas after more than half a century's attempt. However, there is still a long way to go before fulfilling the dream of human level intelligence. The two cycles of boom and decline reveal that the debate was on the fundamental aspect of AI: to use the methods based on the perspective of rules, plans and strategies; or to use the methods based on the perspective of commonsense knowledge, situated action and learning in order to solve the problem of artificial reasoning and action. The current methods do have serious limits. They can not realize many key factors which human beings have when dealing with reasoning and action (Harry and Martin, 1998). This actually prevents the development of the whole realm of AI from making substantial progress.

Thus, it is necessary to have a clear review and understanding of different perspectives on the topic of how IT deals with reasoning and action. In order to achieve this, the paper will contain an explanation of the current perspective based on rules, plans and strategies and of the opposite perspectives based on situated action and learning. Specifically, the opposite perspectives will be presented through three aspects: the aspect of tacit knowledge, the aspect of situated action and the aspect of improvisation. They are all related to some key theories of IS and convincingly challenge the intelligence of systems. Finally, in the third section, the paper will compare different perspectives and elaborate on future development and in what way the current study will be helpful to contemporary IS studies.

## 2. PERSPECTIVES OF THE DEBATE

Compared with most people's enthusiasm regarding the development of technology, there are always some sober voices pointing out the limit of modern technology. In the field of artificial reasoning and action, its development has always been accompanied by drastic debate since its birth.

In fact, many scholars in the field of IS are affected by the



philosophical theory of Martin Heidegger, one of the most important philosophers in the twentieth century. In Heidegger's early article called "the question concerning technology", he had critically discussed the essence and limitations of modern technology. Enlightened by Heidegger's work, many IS scholars established their unique theories with a critical view of the current approaches of artificial reasoning based on plans and rules. As Hubert Dreyfus who was considered as a leading interpreter of the work of Martin Heidegger, he built his critique of AI which concerns what he considered to be the four primary assumptions of AI research. He also used some phenomenological theories to challenge traditional AI. Dreyfus' work further influenced many other scholars. These different voices resulted in the current debate.

**2.1 Perspective of Plans and Strategies**

Suchman (1987) defines the perspective of plans and rules as a prerequisite view to prescribe appropriate actions at every level of detail due to typical situations. This perspective has its origin in the structure of modern digital computers. As Weizenbaum (1984) advocates, though the modern computer has significant differences from the Turing machines that operate on an alphabet including only "0" and "1", it is necessary to recognize that a modern computer is fundamentally a symbol manipulator and a symbol system.

In this way, the perspective of plans and strategies greatly relies on the symbol system hypothesis. Copeland (1993) further shows the proposed recipe for making the symbol system adaptable in order to explain this basic hypothesis. The symbol system hypothesis would be justifiable and warranted if the recipe is correct.

Copeland (1993) concludes this recipe in five steps. First, use a suitable and recursive code to represent the objects, actions, relationships and everything important in the circumstances. Then, enrich the representation of the world; make it much more specific inside the symbol system. This "knowledge base" will include vast information in interconnected structures of symbols. Thirdly, since the system is always in interaction with the environment, it needs suitable input devices to represent the flux of outside stimuli in the right form. In the fourth step, the system's fundamental operations need to be designed according to its structures of input devices and "knowledge base". Finally, the output requires careful design in order to translate the symbols into appropriate behavioral responses.

Now, it is quite clear that the symbol system hypothesis not only shapes the way modern computers operate but also the way AI researchers deal with reasoning and action. Due to the described recipe, the knowledge, reaction and operations need to be previously codified. This kind of information is exactly what we call plans, rules or strategies. Since a digital computer is the most powerful tool human beings have to achieve ideal artificial intelligence, the current perspective and methods based on plans do to some extent make sense. Actually, the AI researchers have to compromise with the tools they developed, to accept the limit and weakness the computer has.

The intelligence based on these mechanics and perspective may be enough to deal with the Turing Test which Suchman (2007) describes as the test to judge whether a machine is intelligent enough to respond to questions in such a way that the person asking the questions could not distinguish between the machine and another human being. However, this kind of

intelligence is certainly not qualified to face the much more complicated reasoning problems in the real world. This is why many different opposite voices arise.

**2.2 Perspective of Tacit Knowledge**

The commonsense-knowledge problem was firstly raised to question the validity of mechanics based on plans. The failure to solve this problem, as mentioned above, resulted in the first "AI winter". In order to explain the problem, Dreyfus (1993) suggests that a huge data structure comprised of facts and rules is required to represent the commonsense knowledge which is far more difficult to formulate than expected.

From another view, the commonsense-knowledge problem is "not really a problem about how to represent knowledge; rather, the everyday commonsense background understanding that allows us to experience what is currently relevant as we deal with things and people is a kind of know-how" (Dreyfus, 1993). The problem precisely was that the know-how, as a combination of all the interests, feelings, motivations and bodily capacities that go to make a human being could not be represented and conveyed to the computer by the data structures made up of facts and rules. The inarticulate symbolic way of input is almost impossible to finish this task.

Moreover, the commonsense-knowledge, appearing at a higher hierarchy than information and data, contains a number of skills for dealing with people or other things in the environment rather than facts about them (Dreyfus, 1993). Human beings need these skills to accomplish intelligent behaviors, so does the system. However, even if we accept the argument that the rules can play a role in the acquisition of these skills, it is not reasonable to say these rules still play a role in the skills' later application. That is to say it remains doubtful whether the skills can be fully applied through the methods based on plans and rules.

The discussion of commonsense-knowledge to some extent leads to the appearance of the new research realm of knowledge management. In the theory of knowledge management, a new concept called tacit knowledge appears in order to standardize the formal concept of commonsense-knowledge. Due to Nonaka (2000; 2001), tacit knowledge, compared with explicit knowledge, is rooted in a specific context. It remains unconscious but becomes explicit and comprehensible when aroused by certain factors. It contains skill, know-how, expertise and competence.

	<b>KNOW</b>	<b>DON'T KNOW</b>
<b>KNOW</b>	Knowledge that you know you have <b>EXPLICIT KNOWLEDGE</b>	Knowledge that you know you don't have <b>KNOWN GAPS</b>
<b>DON'T KNOW</b>	Knowledge that you don't know you have <b>TACIT KNOWLEDGE</b>	Knowledge that you don't know that you don't have <b>UNKNOWN GAPS</b>

Fig.1 : Knowledge Stock (Liam Fahey, Babson College)

Both the definition of tacit knowledge and the “Knowledge Stock” showed in Fig 1 reveal why the methods based on plans fail to deal with tacit knowledge. As Weizenbaum (1984) predicts, it is the fact that humans do know something they can not express by any kind of language. There is some knowledge that computers would never acquire. If tacit knowledge is something even human beings ourselves do not know we actually have, how can we expect the systems to know it? How can AI researchers find some rules and plans to define and describe it?

### 2.3 Perspective of Situated Action

The concept of “situatedness” can be described in a general way: the concept of situatedness, having many different terms such as “Situated Action”, “Situated Learning” and “Situated Activity”, means that the agent’s behavior and cognitive processes first and foremost are the outcome of a close coupling between agent and environment. In this way, the perspective of situated action strongly emphasizes the importance of continuous interaction between agent and outside circumstances (Suchman, 2007).

Though the methods based on plans keep a keen eye on presenting different situations the systems will face by establishing many specific strategies, the environmental contexts are still ill-defined. Suchman (2007) emphasizes that no matter how detailed they are, the plans cannot represent the practices and circumstances in all of their concrete detail; especially human beings do not know ahead of time, or at least not with enough specificity, what the future situation will be. In Suchman’s words: “even in the case of more deliberative, less highly skilled activities we generally do not anticipate alternative courses of action or their consequences until some course of action is already underway”. This reflects the “wicked problem” in system design.

Suchman (1987) not only questions the feasibility of presenting situations through plans but also the practical objectivity of situations. Suchman says that if the environment of human’s actions is made up of a succession of situations they move into, it is problematic to guarantee the objectivity of the previous descriptions of the situations. Moreover, how can we judge the practical objectivity of the descriptions of the situations ahead?

Though a little bit exaggerated, the profound metaphor given by Gladwin (1964) may be a good conclusion of the perspective of situated action: “This total process goes forward without reference to any explicit principles and without any planning, unless the intention to proceed to a particular island can be considered a plan”.

### 2.4 Perspective of Improvisation

Improvisation is defined as an intriguing process: “Improvisation is a kind of situated performance where thinking and action emerge simultaneously and on the spur of the moment. It is purposeful human behavior which seems to be ruled at the same time by intuition, competence, design and chance” (Ciborra 1999). Though it is intentional, it happens extemporaneously and almost unexpectedly.

Improvisation plays an important role in human being’s reasoning and action. It can be demonstrated through many interesting case studies. Weick (1993) tells the vivid story of the Mann Gulch fire disaster and how the unexplained improvisation, resulting from the panic and forces, saved the firefighter’s life. It is also necessary to mention that the

charm of jazz also has a strong relationship with the executives’ improvisational performance (Ciborra 2002). It is such a joy to see the jazz musicians indulge themselves in the music they create extemporaneously according to their instantaneous feeling and inspiration.

Improvisation also takes an important part in the daily life of the main economic institutions (Ciborra 1996; Weick 1993). It is emphasized that some characters of improvisation such as immediacy, situatedness and local knowledge can be seen as the key elements of quickly adapting to the change of the market. It also helps the hierarchies to make decisions.

Ciborra (1996) further argues that improvisation is a much more grounded and useful process than plan-driven decision making which directly challenges the perspective based on plans. However, it is really difficult to copy the process of improvisation by the current mechanics of artificial reasoning. Ciborra (2002) argues the current mechanics can be reconstructed in order to meet the demanding of improvised decision making by adding symbolic representations of the ongoing problem. However, since improvisation is analyzed as quick design and simultaneous implementation of plans of action, its “magic” cannot be fully presented by the current methods. Ciborra (1996) jokes with AI researchers that their way of solving the problem of improvisation may be even worse than the departure point. In other words, the significant character of improvisation contradicts the rational and planned process of decision making and makes it almost impossible for systems modeling.

## 3. DISCUSSION-PERSPECTIVES & CONCLUSIONS

In summary, there are tight links between the three perspectives of tacit knowledge, situated action and improvisation, though they each have their own particular emphasis. These three critical perspectives, focus on situated action and learning, form the opposite view against the current perspective based on plans, rules and strategies.

There are some important hints and clues from the study of this debate. First, no matter how powerful IT would be, it is still the tool developed by human beings. In order to achieve ideal artificial intelligence, AI researchers must first have a clear understanding of the way how human beings ourselves present intelligent behaviors just as reasoning and action. Then, it is warranted to discuss the topic of how to fulfill AI. The fast development of IT sometimes puzzles us by making people too ambitious. Human beings would never use the technology to fight against the original mechanism we are born with.

Second, this topic actually reflects another deeper debate of whether computers are the best tool to realize AI or whether human beings think and do things in the same way computers do. In the future, a more advanced tool may be designed which reasons and acts in a way more similar to that of human being.

Last but not the least, the debate makes some important suggestions for contemporary IS studies. The problem researchers face in building intelligent systems reflects the “Wicked Problems” in IS construction. The uncompleted plans represent constraints based upon ill-defined environmental contexts. The problem of tacit knowledge shows how unreasonable it is to depend on human cognitive abilities to produce effective solutions since humans cannot even perceive the tacit knowledge they have. The way humans deal with rea-

soning and action is a sustaining unstructurable process sharing many key characters with “emergent knowledge processes”. Moreover, the perspective of situated action also indicates the demand for accommodating complex, distributed and evolving knowledge-bases in order to support dynamically changing processes.

In my mind, the field of artificial reasoning and action is like a laboratory to test different IS development methods and methodologies in the most extreme conditions. Human beings ourselves are the most complicated systems in the world. Since the purpose of these methods is to imitate and realize human level intelligence, they will face and be verified by the most rigorous conditions. This kind of extreme test will magnify the limits current methods have. This is exactly where the value of this topic lies and why the discussion matters.

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## Is the world agile?

# A review of the IT knowledge base and debate on agile methodologies in the field of information systems development

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This paper starts with presenting the context of the development of agile methodologies and a general justification for the existence of methodologies. The following section will give an overview of the different types of literature available in IS research as well as identify the gaps that can be mainly stated in the lack of empirical studies and the academic rigour they were conducted with. The next part will present the major arguments of proponents and opponents of agile methodologies. Then a third perspective will be introduced that takes a more balanced view on competing methodologies. It proclaims more openness to a flexible use of methodologies which can be more generally related to a paradigm shift and new implications for the work of developers.

**Keywords:** agile methodologies, XP, literature review, traditional methodologies

### Introduction

The question of how information systems are constructed, has been one of the major research objects in the IS field during the last decades (Avgerou, 2000). Actually, we can state that there has always been a kind of quest for the “best methodology” in systems development, in a way relating to the desire for having a rational, systematic way of designing a system (Parnas & Clements, 1986). As to why methodologies are needed at all, the answer can be found in the different functions they serve; in short, they represent work practices, making it easier to introduce new people to the process, defining responsibilities, convincing sponsors or providing a curriculum for training (Cockburn, 2007).

According to Avison & Fitzgerald (2003), the methodologies with the systems development lifecycle prevailing that have evolved in the early methodology era (70s/80s), have showed serious limitations. Agile software development methodologies have evolved as an answer to the so-called “heavyweight” methodologies, such as the lifecycle model which emphasizes a rationalized, engineering-based approach (Dybå & Dingsøy, 2008) with the assumptions that problems can be fully specified and that there is an optimal and predictable solution to every problem. With regard to changing requirements and smaller systems this approach has turned out to be too inflexible (Nerur et al., 2005).

As to the assumptions about organizations, agile methodologies see them as fluid and adaptive as well as the environment in which it operates, therefore much emphasis is put on skilled employees who are capable of accommodating change during the development process (Avison & Fitzgerald, 2006). Rajlich (in Dybå & Dingsøy, 2008) encounters a paradigm shift in software engineering: In short it can be put as a shift from methodologies offering all things one could do to agile methods offering generative rules that have to be followed as a minimum (Highsmith & Cockburn, 2001). Agile methodologies have generated a lot of interest not only in the practitioner’s world (Dybå & Dingsøy, 2008) but also in academia, where it is taken on by academic journals as well as by conferences (Abrahamsson et al., 2002). In the following parts, the current knowledge base on agile methodologies with a focus on Extreme Programming will be assessed as

well as the major arguments and current state of the debate in the IS community will be presented.

### The IS knowledge base

As it comes to the literature available on agile methodologies, one stream is highly descriptive and prescriptive as to textbooks explaining what extreme programming is and what actions need to be taken to use it, for example (Cockburn, 2007; Gordon & Gordon, 2004). Recently, a vast amount of new agile methodologies has emerged. Many researchers and practitioners are not aware of approaches available and their suitability for particular development projects (Abrahamsson et al., 2003).

Although lots of literature and debates have evolved on agile methodologies, academic research is still scarce, as most of the publications are written by practitioners and consultants (Abrahamsson et al., 2002). There are some reviews available on agile methodologies. The one by Abrahamsson et al. (2002) provides a comparative analysis of methods giving “anecdotal evidence” that agile methods are “effective and suitable for many situations and environments” (Dybå & Dingsøy, 2008). But nevertheless, there are only few empirical studies supporting these claims. Another piece of work by Cohen et al. (2004, in Dybå & Dingsøy, 2008) focuses on the history of agile development but also on the important factors for the selection of a method as to the number of people working on a project, the application domain, its criticality and innovativeness. The interesting point of this review is that the authors are convinced that agile methodologies are going to be consolidated and will rather have a “symbiotic relationship” with traditional methods and not necessarily “rule them out”. Erickson et al. (2005, in Dybå & Dingsøy, 2008) give an overview of the state of research on XP, the more well-established stream of research on agile methodologies. Dybå & Dingsøy (2008) in their review of empirical studies of agile software development argue that there has been no systematized review of research, so that practitioners and researchers are mostly relying on practitioner books to get an overview. As their review method is concerned, they have set up a transparent set of inclusion and exclusion criteria, i.e. using journal articles from electronic databases and conference proceedings as well as indicators for quality as to



rigour, credibility and relevance leading them to identify 36 out of 1996 studies as empirical ones. The studies included in their review showed that most of them were done on XP (25; 76%). Furthermore, 24 studies (73%) dealt with developer teams who were beginners in using agile methods. One of their major critiques is that the methods used in the studies were not described adequately.

A large part of the literature on agile methodologies consists of case studies describing practitioners' experiences (cf. Drobka et al., 2004; Smith & Pichler, 2005; Andersen, 1998). In the article by Williams & Kessler (2000), they refer to their "Pair Programming Questionnaire" showing that programmers were more confident in their solutions than if they were programming alone and that 96% showed a higher job satisfaction. Still, it remains unknown on what data and questions the results are based. In the case of Motorola (Drobka et al., 2004), the authors who had no experience with XP, report an increase in morale and engineer productivity as well as very good test coverage. One of the interesting aspects of this practitioners' experience is that in order to meet organizational requirements, there has been an attempt to identify a productivity formula to demonstrate tangible benefits to the senior management – in other cases the economic perspective on the development process is missing. Measuring economic benefits might remain an unresolved issue as the adoption of agile methodologies is often a result of former failure of traditional methods (e.g. Andersen, 1998) and therefore, comparison of traditional versus agile results is not likely to be feasible. Abrahamsson et al. (2002) also claim that already little is known about the return on investment into process technologies and even less is known about how much an organization will benefit from using agile methods. Although the initial experience reports are predominantly positive, "hard numbers" are very difficult to obtain.

Taking a more general view at the methods used for studying systems development methodologies, the part of evaluation represents a huge challenge in the IS field as an exhaustive, systematic and scientific study is not feasible (Wynekoop & Russo, 1997). The authors identify a "positivist box" of research methods and although a research paradigm shift in IS has established the legitimacy of interpretative methods, there is a strong bias to discuss successful practices as practitioners seem to be unwilling to share failures (ibid). Returning to the case of Motorola (Drobka et al., 2004), the authors provide some reflection on areas of difficulties as to scheduling for pair-programming or the difficulty of interfacing with teams using traditional processes. As far as the knowledge base is concerned, this aspect of different methodologies used for development projects within one organization and the effects it has on the organization's social context is rarely addressed.

Turning towards the debate on agile methodologies, it will become very evident that also partly due to the historically strong link between systems development and methods leading to problems in distinguishing method from systems development (Truex et al., 2000); the technical-rational view of engineering on information systems with strong lifecycle thinking is still very prevalent. Truex et al. (2000) more generally identify the mainstream "privileged text" in systems development methodologies as undertaking a technical-rational view. So let us now have a look on the arguments in the IS community.

## The debate

Considering the fact that there is no agreement on what the concept of "agile" actually means (Abrahamsson et al., 2002), it is very interesting to have a look at the arguments that have evolved around it. In the debate we can identify three positions. There are the opposing camps of "traditionalists" and "agilists" and there are those who take a more balanced view on the use of methodologies in general (Nerur et al., 2005). The major problems or points of critique can be traced back to the tendency of organizations trying to create optimized and repeatable processes creating the biggest barrier for adopting agile methods as these organizations are implicitly looking for stability (ibid). Nerur et al. (2005) have undertaken an organizational and managerial perspective that is not found explicitly in other pieces of work. One important factor is the organizational culture, as job roles are redefined with the adoption of agile methods. For example, the project manager role shifts from a planner and controller to a facilitator who directs and coordinates. One requirement for agile methods is to have "premium people" who are competent and above-average (Boehm, 2002). This raises questions of how to attract them and how the "below-average" developers in the organization react. As there is a high reliance on teamwork, questions about performance measurement are raised, too (Nerur et al., 2005). Another point of critique is the absence of documentation, but as Fowler & Highsmith (2001) stated in the Agile Manifesto, agile methodologies embrace documentation but not to "senseless" extents as it does not represent the primary goal of the development effort. Turk et al. (2002) are thinking about situations where agile methodologies may generally not be applicable as to developing safety-critical software or large and complex software. They also address the difficulties of use in distributed development environments or subcontracting in outsourcing projects, as they are characterized by precise conditions as to deliverables.

Agile methodologies have four core values that define where the priorities are lying: individuals and interactions, working software, customer collaboration and responding to change (Fowler & Highsmith, 2001).

These are not meant to completely ignore other important aspects as opponents are attaching blame to agilists. Rakitin (in Boehm, 2002) has a "hacker interpretation" for this and claims that the values serve as an excuse for hackers to throw code together without paying attention to engineering discipline; Wiegers (in Avison & Fitzgerald, 2006) calls it "a licence to hack". This is probably one of most severe critiques.

The practices coming with agile methodologies are not new as some of the opponents are pointing out explicitly but the recognition of people as primary drivers is (Abrahamsson et al., 2002). Going through the literature by the community of agilists, it becomes evident that they are very self-reflective and less dogmatic than the traditionalists. They are very much aware of the limitations of agile methodologies, as Scott Ambler, one of the originators of agile modeling, expresses (in Boehm, 2002):

"I would be leery of applying agile modeling to life-critical systems."

Beck (in Abrahamsson et al., 2002) also suggests not to try and "swallow it all at once" and Highsmith & Cockburn (2001) present twelve practices as generative rules stating that they are rather giving the "minimum" of what needs to

be put into action rather than a vast amount of anything that could be done. It is interesting that the “traditionalists” presume a more prescriptive use of agile methodologies than is initially intended by its inventors.

One point that is relevant for the debate and the establishment of credibility to agile methodologies can be put under the heading of an “image problem”: the 17 signers of the Agile Manifesto refer to themselves as “anarchists” (Fowler & Highsmith, 2001) and XP, the most successful methodology so far, is facing reluctance of managers to adopt “extreme” things (Boehm, 2002). Looking at the core of each side, the differences in argumentation can be assigned to differing views and assumptions about the organization and the problems it faces.

Last but not least, there is the third position, arguing that agile and traditional methods will become more symbiotic in the sense that people who work on a certain project are capable to select which parts of which methodology are most appropriate without regarding any of them as “the best” per se (Dybå & Dingsøyr, 2008). Having a look at the use of methodologies in practice, it becomes clear that there is much modification and omission as well as a kind of “mix and match” of seemingly contradicting methods or just a general limited use in practice (Fitzgerald, 1997; Truex et al., 2000; Introna & Whitley, 1997). Boehm (2002) also belongs to those arguing for a mix, claiming that hybrid approaches are feasible as agile and plan-driven methods form part of the spectrum from which developers can draw.

Some regard agile methodologies as a step towards “anti-methodology” (Avison & Fitzgerald, 2006). This statement leads us to the work of Introna & Whitley (1997) in which they are exploring the limits of method. They do not reject methodology in general but are postulating adjustments to the use of methodology. They argue to give up our thinking that there is one single methodology that will serve our needs, as well as to be aware of the importance of background understanding for the use, i.e. we have to be able to see methodologies in context - this is what they proclaim the new, “involved developer” should be able to do. They are also making us aware of the fact that methodology can be a “means to itself” in many cases, as to having a psychological effect when attaining a new client, for example. In addition, they provide the insight that one major, unquestioned belief prevalent for the use of method in information systems development is that methodology is a necessary and sufficient requirement for successful systems development, but they also point at the often-made, faulty assumption that methodologies are value-free. The Truex et al. (2000) paper raises also interesting questions as to whether we are able at all to think outside the “box” of methods, as we are prone to adopting a domineering concept. This also becomes evident in Abrahamsson et al. (2003) as their research was also aiming at finding out whether and where agile methodologies cover phases of the lifecycle model – so even with a new methodology evolving, the thinking about “thinking about systems development” in terms of a lifecycle makes its way through. They want to raise awareness that being too obsessed with method can result in us ignoring activities that do not fit within a methodical frame (Truex et al., 2000). As pointed out in Parnas & Clements (1986), one of the “marginalized texts” according to Truex et al. (2000), even if during the development phase there has been or is going to be no strict adherence to methods, there is still a “good” reason for pretending to have some

in place, as guidance is seen as a major requirement for designers.

One thing that we can state is that a common base of understanding within the IS community is the necessity for planning – this still leaves room for interpretation as to the required extent and serves as major source for discussion between traditionalists and agilists. We can also notice that pure “a-methodical” systems development in the literal sense as Truex et al.’s work (2000) suggests at first glance is not imaginable in an organizational context.

To put the state of debate into a nutshell, this part has first presented the points of the two contrasting views of agilists and traditionalists on agile methods. Rather than treating methodologies as mutually exclusive, this paper has tried to show a shift of focus in research by introducing a third perspective with a flexible view on methodologies that is not asking the either-or-question but more the question of why not using both.

### Limitations and further research

This paper did not give too many details on which agile methodologies are available and what practices are related to them. First, it has been assumed that the reader is already familiar with the concept and second, the focus chosen made it necessary to narrow down the level of detail in order to be able to present the types of literature available on the topic as well as arguments of the discussion on the use of methodologies in a broader sense. Taking a look at the literature available, a general lack of “academic rigour” can be recorded as well as a lack of a standardized or coordinated way of researching XP, as this is the agile methodology that has been most written about. Also a more interdisciplinary work would be desirable as Smith & Pichler (2005) note a gap between information systems and project management literature.

### Conclusion

We have seen that information systems development research has strongly been coupled with the methods used for the construction of systems (Truex et al., 2000). Changes in the organizational contexts have led to changes in approaches to methodologies. We have also encountered a paradigm shift: Some literature promotes to be more open to a flexible use of methodologies. This has future implications for the work of developers. They will have to be much more involved with their work – apart from their technical abilities, they need to be familiar with a set of tools and methodologies available, as well as to judge which ones are the most appropriate ones for a particular development project. This gives way to a more pragmatic view, as also suggested by Hevner et al. in their design theory, where evaluation is based on whether the application works and whether the result is an improvement.

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# An Alternative Approach for Research in ICT: Foucaultian Methodology

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Various theoretical perspectives and methodologies are present for studying information and communication technologies (ICT). However, most of these approaches overlook the social and especially the historical aspects of the phenomena. The lack of these trigger overly deterministic and thereby mostly inaccurate findings regarding social change, which is also the case for the research in social network sites (SNSs). By proposing an alternative approach, based on Michel Foucault's philosophy, we aim to close the gaps both in SNSs and ICT literature in terms of methodology. Our goal in this article is not to outline a full research process but to introduce ICT researchers to Foucault's genealogy by using social network sites as an example.

**Keywords:** Information and Communication Technologies, Methodology, Theoretical Perspective, Michel Foucault, Genealogy, Archaeology, Discourse, Power, Social Change, Technological Determinism, Social Network Sites, Social Media, Internet,

## 1. Literature Review

### 1.1. Extant Literature

Social Network Sites (SNSs) have been the dominant Internet phenomena in the last couple of years because of their use as a second level network, based on not IP addresses but social ties. Most Internet users rely on them for accomplishing various tasks because SNSs include many different aspects of social media (Gilbert et al., 2008). Because of the massive interest from the society, researchers from various disciplines responded quite early to this phenomenon and many articles have been published (Livingstone, 2008). In SNSs research, majority of the methodologies are quantitative, where survey results, structured interviews, structured observation or public data are analyzed by various statistical methods, social network analysis or content analysis. There are also interpretive studies that employ qualitative methodologies such as case study or virtual ethnography.

However, Orgad points out that the boundaries of offline and online is not as clear as it used to be and studying SNSs only as online social formations is not enough (2007). Beer also advises a broader and holistic perspective where we see SNSs as manifestations and extensions of the entire social system (2008). In addition, most of the existing approaches overlook the social and especially the historical aspects of the phenomena. Therefore, majority of the research on SNSs is optimistic, carrying 'rhetoric of democratization' (Beer, 2008) or in other rare cases highly pessimistic, but in any case carry a huge deal of technological determinism, which is about believing that technology establishes the behaviours of the subjects.

### 1.2. Causes of Technological Determinism

There are three causes for this deterministic lens. First cause derives from substance ontology, which is the tendency for some researchers to treat the technology at hand as if it is asocial and therefore a stable tool, a finalized object (Introna, 2007). These result in deterministic snapshot studies because these researchers don't feel a need for a historical study. On the contrary, not only technology but all meanings, concepts and materialisations are on the continuous change through social interactions. In order to explain the phenomena studying present-day social relations are not enough as Kallinikos argues (2004). If we don't look at things from a historical perspective,

we fail to understand the contingent nature of our research subjects.

Second cause, finalism influences researchers to see a rational continuity in the history of the mankind. It makes researchers take the current facts as a 'march forward', which looks like the result of a 'finalized necessity of development'. Under the affects of finalism, researchers treat the present-day findings as the results of the necessary change that has been introduced by technology without referring to any comparison to past structures. Third and final reason for technological determinism is presentism in the historical studies. It is interpreting past in terms of present-day values and concepts. People, who are under presentism, see major changes in the society, believing that our time is completely different than the past. Presentism cause researchers neglect the changes in meanings and definitions over time. However, what the term SNS refers to is constantly evolving and the common understanding that we have today is not the one that we had before.

## 2. An Alternative Approach

### 2.1. Research Question

We find the current literature on SNSs and ICT 'inadequate' and 'incomplete' in terms of methodology because of the above oversights and would like to take the challenge on a different level. Rather than looking for the social changes that SNSs might have caused, we should analyse whether SNSs themselves are the representatives of social change. We must ask a broader yet more illuminating research question: *How different are social network sites from the past social systems?* By studying SNSs with a historical perspective, we may be able to show whether they are representatives of a novel social system, which could instigate social change, either positive or negative.

In order to answer this question we propose the below:

1. Seeing and treating SNSs as if they are asocial and stable manifestations that we can trace both into the past and future would create various oversights and inaccuracies in research. Therefore, substance ontology and the resulting tool conceptualization have to be avoided and a much more holistic approach, based on analysing the discourse that defines the understanding of SNSs, has to be adopted.

2. Understanding change as a multi-level concept is important in realizing what kind of data and findings can claim substantive change in the nature of society. We shouldn't confuse a symbolic change or a time-and-space distancing with a fundamental change in the nature of the society. Symbolic change is the change only in the signifier, where the underlying reality remains constant throughout the observed period. Time-and-space distancing happens when technology brings efficiency and therefore compresses time and space (Poster, 1990: 8). Here, life is simply accelerated and shrunk rather than being structurally changed. However, we are after how much the current technological social system really differs from the past social systems according to the social relations, concepts and especially power relations, which define us.
3. Consequently, an empirical historical study, combined with social theory and philosophy, is what we need to show the actual changes in the society but most historical research is affected by presentism and finalism. Thus, in our alternative approach, the past and the present social systems have to be abstracted to power relations, which are conceptualized and captured above the social context yet still traceable back to it. Only then, it would be possible to compare different social systems in different timelines and discover whether there is a profound change in the society.

## 2.2. Theoretical Perspective

In order to comply with the above propositions, we choose to apply Foucault's theoretical perspective and methodology. Foucault's name is sometimes pronounced under critical research, yet he never had prescribed solutions or grand theories for emancipation. On the contrary, he used historical analyses to help us to reflect upon the current conditions of the research subject (Brooke, 2002). Foucault focused on the contingencies in the history of the subject and the human sciences, and opened up different ways to see things. He wasn't after the truth or a-temporal structures (Willcocks, 2003: 247). He was showing that truth was contingent throughout the history. That's why, leaving a priori concepts about human nature and moving onto historical discourses was crucial for him. In a Foucaultian research, we have to use the term *concept* rather than *theory* because Foucault was against strict theorizing. Foucaultian perspective has two fundamental concepts: *discourse* and *power/knowledge relations*.

Discourses construct the objects that they talk about by statements (Dreyfus and Rabinow, 1982: 61).

[Discourse] whose meaning Foucault expands from 'a regulated order of talk' to cover also chains of statements, institutionalized statement processes and the historically and culturally determined rules that regulate the form and content of the order of the talk. (Willcocks, 2003: 250)

There are non-discursive real world entities like the body or the nature but nothing is really outside the discursive domain as discourses define their contemporary understandings (Dreyfus and Rabinow, 1982: 67). Discourses have neither 'inside' nor 'outside' (Kendall and Wickham, 1999). 'No inside' implies that there are no deep internal meanings in things as they are merely the products of discourses. 'No outside', suggests that while tracking a discourse we cannot go

beyond the discursive surface of our study to another discursive domain or go deep through the non-discursive reality, because there is no meaning hidden in those places as well.

Unlike Kant, early Heidegger and other philosophers, who looked for existential preconditions, for Foucault discourse is all there is. Discourse is not a context where we can trace and analyze objects, subjects or even concepts, because they are in constant change without being finalized. Therefore, discourse is the foremost entity to be studied. However, discourse cannot be explored by an essential system of formation rules as structuralists believe and yet discourse is not as autonomous as early Foucault used to believe as well. Even if it was autonomous then we could have no analytical foundation that can conceptualize it relevant to our social context. Therefore, after a long period of self-imposed silence, Foucault came up with his concept of power to study the discourse and no longer claimed a position of phenomenological detachment (Dreyfus and Rabinow, 1982: 61, 77-78, 100, 103, 122).

Foucault believed that 'A normalizing society is the historical outcome of a technology of power centred on life' (1998: 144). Unlike the general belief that where power is not present, there can be true knowledge, for Foucault, there is no power in the absence of knowledge and vice versa. Thus, they are usually written together and imply one another. Foucaultian power is not a negative force but actually a productive one and should be seen as the invisible force that keeps the discourse going on, thereby the society (Dreyfus and Rabinow, 1982: 185-186).

Power relations are defined by various modes of action that act upon others' actions but not on their body (Foucault, 1982: 220). Foucaultian power can only be exercised over free subjects, because each individual must feel that they have "a field of possibilities in which several ways of behaving, several reactions and diverse components may be realized" (Foucault, 1982: 221). If power limits the body rather than constraining actions, then it doesn't stay in the background, but renders itself visible; this is not the Foucaultian power, which should be nonsubjective, not present in the will of an individual or a group.

Still, this doesn't mean that the Foucaultian power is unintentional (Foucault, 1998: 94-95). All power relations are meaningful with specific objectives, but these objectives do not originate from certain individuals. At the local level, the tactics of power – normal observable power, not the Foucaultian one – is explicit and rational, but all these local tactics affect each other and form the system of power relations on the background. The local tactics don't consciously relate themselves to this system, as they are unaware of it. However, the resulting strategies, *technologies of power*, are anonymous and hidden yet still deliberately coordinate the local tactics.

## 2.3. Methodology

Foucaultian methodology has two separate phases, archaeology and genealogy, but usually the entire research process is called only as genealogy. Archaeology is studying general history rather than total history (Kendall and Wickham, 1999: 24-25). Total history sums up the progress of a certain phenomenon in a rational order, however, in general history, the statements are not organized. Our judgement is suspended because we refuse to evaluate the statements outside of their historical context. We just document the discursive statements for a certain phenomenon by focussing on the contin-

gent nature of history.

After the archaeological phase, where we come up with ‘meaningless’ results, genealogy starts. As a genealogist, we change our mood and we switch to, as Foucault said, ‘lighthearted positivism’ (Dreyfus and Rabinow, 1982: 105). We start diagnosing our ‘meaningful’ text, and ‘concentrate on the relations of power, knowledge and body in modern society’ (Dreyfus and Rabinow, 1982: 104-117). Basically, we analyze the discursive statements with power/knowledge relations in mind to discover the technologies of power in the discourse and the resulting social system. In short, Foucault’s genealogy avoids the pitfalls of other methodologies by analyzing subjects and objects without resort to theory or deep meaning (Dreyfus and Rabinow, 1982: 183).

Hook states that a Foucaultian discourse analysis ‘cannot remain simply within the text, but needs to move in and out of the text’ (2007: 134). It is a double analysis where you concentrate both on actual practices and discursive statements, which objectivise them. This is actually what Foucault calls constructing the grid of analysis, *dispositif* (Dreyfus and Rabinow, 1982: 121). *Dispositif* is combining both the episteme and the discourse in your analysis. This results in analysing both the discursive and the non-discursive, which includes finalized activities and manifestations (Jaeger, 2001: 57). The discursive and the non-discursive mutually shape each other. The *dispositif* for the entire society is a huge social network, which defines all understanding, therefore there is no way to capture it wholly for any given research topic. We have to limit our studies in the selection of discursive and non-discursive data and focus only on the ones that relate directly to our phenomenon.

#### 2.4. Conceptual Framework

Foucault defines three types of relationships: non-discursive, discursive and power relations. These three intersecting types are in a constant mode of stimulation and negotiation in various interstices. There is no single balanced version of these that is prevalent throughout the society but sometimes, these three areas form a distinct block of ‘capacity-communication-power’ (Foucault, 1982: 218). Various institutions can be seen as a *block* as well, where these types of relationships are materialized. These blocks might be good places to start the analyses. However, analysing power relations cannot be limited to the study of institutions. We also have to analyse the relevant discourses. Accordingly, we have to conceptualize SNSs in two parts, nondiscursive and discursive.

Our first part of the conceptualization, the non-discursive, consists of various practices and materializations. If we stick to Foucault’s methodology, for the non-discursive part, it would be best to conceptualize SNSs as “carefully defined institutions” (Foucault, 1982: 222), where the users gather to socialize, while being governed by the SNSs’ internal policies. To emphasise and analyse materialization, SNSs’ software can be seen as architectural objects, where the technologies of power are embedded in. The members’ online actions and social interactions within these institutions are the non-discursive practices that we are after. Like the architecture, these actions embody certain technologies of power that are at play.

Second part of the conceptualization consists of various discourses that have shaped the today’s SNSs by carrying the same technologies of power within the discursive statements.

Obviously, there are numerous discourse planes that join to the discussion but we have to limit ourselves to the most direct ones regarding our aim. The discourses that we concentrate on are the ones about defining SNSs and their proposed social effects, especially on individual liberation. Here, the most effective medium is the mass media especially newspapers, where there are constantly articles and news about SNSs. Even the results of the academic articles and the summary of the books are conveyed through daily news. Owners of the SNSs are also influential in the discourse by their mission and vision statements, personal blogs etc. Finally, users of SNSs discuss at the forums and discussion boards within SNSs about their rights and expectations from the company and the software.

We can gather the above discursive and non-discursive data to construct SNSs with power/knowledge relations in mind. Still, we need additional sources for our genealogy, so that we can compare SNSs with the other historical social systems. Foucault already studied various discourses and institutions, and in his books, we can find the general technologies of power that belongs to certain timelines in our history. We may use these descriptions in our studies for comparative purposes. This approach is also consistent with what Foucault advises at the end of *Discipline and Punish*: ‘At this point I end a book that must serve as a historical background to various studies of the power of normalization and the formation of knowledge in modern society’ (1991).

### 3. Discussion

The major limitation of a Foucaultian theoretical perspective is only being able to produce redescrptions. There is neither exploration nor explanation involved in the Foucaultian studies and thereby no action plan as well. In addition, because of the sceptic nature of Foucaultian philosophy, there is no way to prove that these descriptions are better than the existing ones (Prado, 2000: 38). Besides, as some researchers claim, we can go back in time forever to trace the construction of knowledge and facts. Nevertheless, it is not about truth finding or a question of where to stop. As long as we reach to an alternative viewpoint that disrupts the current perception of the phenomenon, then we are one step closer to a wiser action plan.

Foucault chooses to stay out of the interpretive context by focussing only on the power relations. With his methodology, it is not possible to do a more in-depth study that would also analyse the interpretive context. Yet, a study that might trace a phenomenon both on the power relations level and also on the interpretive context might be very rewarding. Even though, we don’t need this for the SNSs example, in most ICT studies, this might give more empirical strength and result in more specific findings regarding the phenomenon. Shoshana Zuboff’s (1988) book, *In the Age of the Smart Machine*, is a good example where she successfully employs Foucault’s theoretical perspective and power concept by providing detailed historical analyses about the role of IT in the long-term discourse of the work environment (Willcocks, 2006: 278, Willcocks, 2003: 268-269, 1988). However she also, by employing phenomenology, explores various technologies of power on the material level.

### 4. Conclusion

As Willcocks reminds us, in Foucaultian methodology, we don’t focus on materialized technologies but on social and behavioural technologies that generate the contemporary un-



derstanding of these materializations (2006). These social technologies are tied to the *power relations* within the discursive and non-discursive. If we can identify these relations, then we can come up with alternative descriptions of ICT based on power strategies. This abstraction can help us to put ICT into a historical perspective, where we can avoid substance ontology, presentism and finalism. This way, we won't fall into the trap of technological determinism while comparing ICT with past social structures and will have more accurate findings regarding social change.

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# Change Over Time: Research Approaches to ICT-Enabled Emergent Change

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Organizational change related to information and communication technologies (ICT) has been a well-discussed topic over the last few decades. Both positivist approaches, such as technological or organizational determinism, and socio-economic and socio-technical approaches have been prevalent as research approaches in ICT change literature. Within the interpretative realm embodied in the social approaches, the concept of emergent change – that is, change as emerging or enacted over time – has been paramount. This paper provides an overview of the development of emergent change approaches and theories, with the body of the review focusing on the primary lines of approach developed and used in the last decade. It goes on to review research studies performed in the current environment, and assesses how they correspond to the approaches and questions raised therein. It concludes with a critical view on the application of emergent change theory in modern practice.

## 1. Introduction

Within IS and organizational change literature, a great amount of research has been performed as to how organizations change, either as a result of direct stimulus or over time. Numerous researchers have approached this subject in different fashions, as summarized by Orlikowski (1996). In recent literature, the concept of emergent, situated change has arisen as researchers look at organizational change as it relates to technology over time (Orlikowski, 1996; Suchman, 1987, 2007). Other approaches advance the structurational view as a lens with which to consider technology and organizational change (Orlikowski & Robey, 1991; Orlikowski, 2000). This has been approached in a number of different ways, as summarized by Orlikowski & Scott's analysis of three decades of literature reviews, and has led to a call for a new, sociomaterial approach. Finally, Ciborra (2006) has criticized the overall approach to 'situated' change as being divergent from the original concepts of phenomenology, and among others there has been a push for a more critical approach. It is the intent of this paper to bring this all together into a comprehensive summary of the current state of this field.

The next section provides a brief description of methods and approaches. Following that is a chronological overview of the development of emergent/enacted change theory, starting in the late 1980s. The final analytical section critically reviews organizational studies performed in the current environment. This paper then concludes with a summary of the ongoing trends in the modern application of these approaches.

## 2. Approaches and Methods

The preponderance of emergent change literature is strongly rooted in the administrative realm. Further, studies in emergent change often adopt a process-based, interpretivist approach (Orlikowski & Scott, 2008). As such, in an effort to distinguish between the different studies, conventions of classification from Orlikowski and Iacano's 2001 classification of the IT artefact, and from Avgerou's 2000 critique of IS science, will be used where applicable. Other sources of critique include Crotty's 1998 work on social research foundations, and multiple analyses by Claudio Ciborra (1996, 2002, 2006). In particular, theoretical perspective, ICT theory, technological embodiment, approach, and rationality have been considered in this review.

## 3. A Lifetime of Theories

In this section we look chronologically at the development of emergent change and related approaches, choosing as a starting point a timeframe around the seminal work of Lucy Suchman in 1987. It progresses into the early formative years of ICT organizational theory, the decade of 1990, and closes with recent developments in emergent change approaches. Despite the temporally convenient delimiters, it will become clear that the division between the three bodies is distinct in approach and theme in addition to numeric prefix.

### 3.1 The Early Years

Prior to the late 1980s, positivist approaches and variance theories dominated the ICT literature on organizational change (Barley, 1986; Markus & Robey, 1988; Orlikowski, 1996). These approaches emphasized the concept of determinism in their analysis of technology and organizational change. Barley (1986) accurately pointed out that many of these approaches had failed to create repeatable findings, and accepted the contradictory results as repeatable. Structure was then introduced as an emergent property that could be applied to technology. This approach showed marked similarity to later perspectives, such as the ensemble view. However, the final application of structuration in Barley's work moved away from those original concepts, focusing on structure-in-place as an institutional and slowly dynamic entity. An interesting point in this early application of theory is its socio-historical, contextual awareness – at one point it provides an injunction against reviewing organizations with different cultural environments and histories.

Two other key concepts in this period influenced much of later theoretical developments. The concept of situated change was introduced (Suchman, 1987), and an in-depth analysis of causal structure in IT organizational theory was developed (Markus & Robey, 1988). Suchman's work ascribed reactive, linguistic, and opaque properties to artifacts, and linked these properties to a framework for situated action. This practice framework, perhaps intentionally, did not explicitly prescribe emotions to the actors involved, giving it a more dialogic and contextual view.

In contrast, Markus & Robey (1988) performed a review of causal structures, highlighting the preponderance of imperative, variance-based studies and presenting the utility of emergent, process approaches. Their conclusions supported the further development of emergent approaches, especially

in the use of mixed-level analysis. The dominant perspective of technology used was that of the web ensemble, although within that framework they did not completely identify the role of the actor. This was pioneering work, and was a strong influence in the development of the interpretive viewpoint.

Between the three studies are roots of many of the modern approaches to ICT organizational change. As conceptual frameworks, they all have slight omissions compared to the current comprehensive view, which may have contributed to the meandering path research approaches have taken since that time, such as the late-90s minimization of emotion and history (Ciborra, 2006). However, these core approaches were vital to the development of many of the approaches to come.

### 3.2 Research Structuration

The 1990s comprised a period of significant advancement for interpretivist organizational change theory in ICT, even though positivist views still dominated many journals (Orlikowski, 2001). In particular, the structurationalist view developed by Anthony Giddens was expanded extensively. This era saw a series of trends develop in the approach of theory, and a number of lenses were developed as alternative analysis approaches. For example, one paper's introduction references no less than 26 other papers detailing other theories (Orlikowski, 2000). For reasons of space this review only covers a selection of the current dominant theories relating to the approach of situated or structured emergent change.

In early 1990, the concepts from Markus & Robey (1988) were pulled into structuration theory (Orlikowski & Robey, 1991). This view set forth a structured ensemble view that actors shape the world at the same time as it shapes them, and utilized a dialogic view, similar to Suchman's practice based work in 1987, to help understand this concept. A contextualist approach, it does not incorporate macro-organizational factors, such as government or industry forces, directly on technology, instead focusing on a definition of human action in institutional contexts of use. It also asserts that due to mutual dependence, technology cannot determine social practices, only mediate them. The framework lends itself to both quantitative institutional reviews and qualitative reviews of human action, but it is interesting to note that few studies in the scope of this review had strong qualitative elements. Nonetheless, this approach lent itself as a catalyst for further research and refinement (Orlikowski, 2000).

After a period of critique, the structuration approach was refined into an 'in-practice' view (Orlikowski, 2000). This posited that the structurationalist view represents a static embodiment of structure in technology, and that study should focus on 'enactment,' or structures that emerge through recurrent interaction with technology. This approach prescribes a lens for aligning technology properties with social-organizational characteristics. By focusing more closely on enacted technology properties, such as only focusing on specific, current, technologies-in-practice (Orlikowski, 2000), it can potentially further abstract the researcher from macro-economic, engineering, or individual socio-historic concerns than the prior approaches. Additionally, due to its situated and active nature, this paper argues that application of the lens is subjectively more difficult in practice.

Two other major developments are included during this timeframe. The first was the formalization of micro-level emergent change as 'situated' – making sense of the world over

time, depending on situational variables and daily improvisations or 'slips' (Orlikowski, 1996). Ciborra (1996a) refers to this process as 'drifting.' The studies that support situated change primarily relate to groupware (Orlikowski, 1996; Failla, 1996; Ciborra & Patriotta, 1996; Ciborra 1996b; Bikson, 1996) and are primarily social interpretivist, administrative, focused on active ethnographic techniques, and treat technology as an embedded ensemble. It is interesting to note that the cases of successful situated change were predominantly on a smaller scale than the macro-level attempts, even when organizations tried to match technology to working processes. This would suggest that on a larger scale the difficulty of applying a situated approach becomes progressively greater. This is supported by the concept of groupware being 'fragile' (Ciborra, 1996a); that groupware is easy to subvert if situational and cultural factors do not support its use.

The second development was the connection of emergent literature to socio-technical design theory at the end of the decade. So far, most analyses have been directly concerned with emergent change. In an analytical review, Lin & Cornford (2000) contrasted nine principles of socio-technical design (adapted from Cherns, 1976), with approaches to systems-in-use. What is interesting is the use of the perspective of ensemble in the developmental sense, with a socio-technical engineering background, which is unusual for the literature reviewed here. Advocating the radical view of 'use-design-analysis' as a new development model, they directly associate the principles of compatibility and incompleteness with emergent design, but find that others are more problematic and need to be reconsidered. While space is insufficient for full discussion, a quick contrast between emergent requirements as outlined above and in the concept of the 'platform' (Ciborra, 2002c), indicates that perhaps some of the other principles – support congruence, information flow, sociotechnical criterion, and boundary location – could be used as an evaluative tool for aligning one's organizational characteristics to support an emergent platform.

### 3.3 Critiques and Developments

Above we have looked at the development of structured, situated and emergent theory. Their application over time resulted in a drift towards consensus and a loss of focus on power, historicity, and emotions (Ciborra, 2006). This was revealed by asking a simple question – are research approaches losing the original historical and emotional grounding originally embodied in phenomenological research? Does it have a place? Through review of the original work of Lucy Suchman in 1987, contrasted with one of Heidegger's early works, it is shown that the sense of history and emotion, of being, is absent. Through analysis of the papers reviewed in this study, a similar conclusion can be drawn – emotional approaches are not strongly present in modern emergent literature. Instead, while the approaches covered here make reference to historical (Orlikowski, 1991), emotive, or power-based (Orlikowski, 1996) capabilities, such applications are limited in practice.

As the above shows, the tenor of the 2000s was more reflective. This generated another critical view, phenomenological improvisation, by throwing out the methodologies of systems development and implementation (Ciborra, 2002b), and instead bolstering incremental learning through the adoption of strategic tinkering (Ciborra, 2002a). This would support the development of a platform of emerging adoption and techno-



logical hospitality to espouse constant capability for improvisation and emergent change (Ciborra, 2002c). As with other approaches introduced by Ciborra (Millet, 2008), while the core tenets are clear, such as dynamism in framing and management approaches, it is not a prescription for implementation. Nor, in its trivialization of ERP-style monoliths, does it readily answer how to compete with these efficient monoliths within crowded markets when flexibility, not efficiency, is the priority. However, this perspectives' study of Olivetti (Ciborra, 2002c), has a characteristic seldom seen in the emergent literature reviewed here – concepts that may be relevant to nurturing emergence over time.

Recently, the approaches of Actor-Network Theory (ANT) have been applied to organizational change theory, under term 'sociomateriality' (Orlikowski & Scott, 2008). ANT's broad definition of 'actor' allows it to provide a wide-lensed approach to organizational issues, in particular change over time. Unfortunately, its application to IT-enabled emergent change could be said to have been hindered by its complexity and scope. It is argued that prior approaches were hindered by specific periods of relevance, obscured views, and distinct entities, and instead should be viewed as a relational mangle. Luna-Reyes, et al (2005), show this to be true for earlier approaches, as their practice study, incorporating structuration, institutional, social construction, and tech-in-practice concepts, highlights only specific spots in time and features numerous organizational, technological, and institutional structures. Indeed, their study takes the approach of dualizing structure and dualizing technology independently at the same time, highlighting the need for the new conceptual fusion to address increasing interpenetration.

The sociomaterial approach brings together a number of concepts developed in prior literature into one overarching theory, including Suchman's revised work (2007) detailing embodied knowledge, and enacted dialectic concepts such as performativity (Orlikowski & Scott, 2008). As this is a very new approach, it generates more questions than can be answered at this time. An overarching theme found throughout this review is the increasing complexity of applying the various complementary models, methods and lenses to properly approach a research study. Orlikowski and Scott raise this issue, acknowledging that approaches need to be tailored to the sociomaterial approach. As for its applicability, for situations like emerging internet-based systems the relevance is clear, as given with the example of Google (Orlikowski & Scott, 2008), and with other contemporary web-based collaboration tools and networking. On the other hand, while it references acknowledgment of political approaches, overt attention is not paid to the emotive-historical 'whole person' concept, prior criticized by Ciborra (2006).

#### 4. Studies and Practice

Bringing the conclusion of the review of emergent organizational change development over the last three decades to a close, we now turn the remainder of this review to a brief overview of studies performed in this area in recent years, using for the example studies of a less-than-malleable technology, ERP systems. Following that, we conclude with a review of our ongoing questions and conclusions from the development of organizational change.

One of the theories studied in recent years has been the improvisational view (Ciborra, 2002). Elbanna (2006) applies this theory to a non-malleable ERP deployment, using an

ANT-based hermeneutic approach. Elbanna concludes that Ciborra's improvisational theory can be applied to ERP technologies and similar inflexible systems, in addition to the groupware analysis his prior work was based on (Elbanna, 2006). The analysis focuses on guiding the implementation of the ERP system, therefore serving as an analysis of pre-implementation (rather than post) managerial and organizational agility. While it aptly shows the applicability of improvisation in an alternate context, it does not extend the full concept of the improvisational platform to static, emplaced systems, nor does it prescribe how to address such emplaced systems in other environments.

In a different study of ERP systems, a tech-in-practice, social constructivist approach is taken (Dery, et al, 2006). The analysis follows Orlikowski's practice approach closely. This is notable as it provides a contrast against the earlier analysis by Luna-Reyes, et al, which diverged significantly from the framework, using a blend of multiple approaches. Dery concludes that management of social context is vital in the successful implementation and post-implementation of ERP systems, especially in situations where alternate options are available. While this demonstrates the applicability of the approach, a further conclusion was that the technology-in-practice approach paid insufficient attention to organizational factors.

A drastically different approach is the use of the mangle-of-practice framework also used in sociomateriality to tie structuration and ANT together (Chae, Poole, 2005), with further focus on social institutional theory. The reason given for this approach was a critique that even refined structuration approaches were not fine-grained enough to account for human, material, and disciplinary agencies and modalities. A unique benefit this approach was that it allowed for the inclusion of power in the analysis.

Over this admittedly brief review of emergent ERP studies, it can be shown that there is a limited consensus on which theories fit organizational scenarios. Further, even within the more common approaches, such as structuration or tech-in-practice, researchers posit that certain aspects are not adequately covered, leading to refinements and modifications. This leads to an inevitable question – how to define the appropriate level of complexity without generating an unmanageable glut of information?

#### 5. Conclusion

The development of interpretivist organizational change theory has been reviewed chronologically. Each era reviewed is characterized by a different theme. The first steps towards emergent causal structuring were taken in the late 1980s. Following that was a decade of theoretical development, with multitudes of interpretivist approaches developed, each with strengths and weaknesses. This decade was characterized by a focus in both professionally-focused literature and the developments of interpretivism (Avgerou, 2003). In turn, the closing years of the current decade are showing a more mature selection of critical new approaches and refinements, however, they run the risk of returning us to an overabundance of complexity.

Some limitations must be acknowledged in this analysis. First is the matter of space. With greater room, analysis would be extended into other emergent theories and older studies. Time is the other factor, as sociomateriality is new, and analysis and critiques have not developed yet, limiting

analysis.

The realm of theory that has been reviewed, even in part, is immense. A researcher in this space has a huge range to choose from, each with its own merits. These options can be a hindrance. One of the strongest points in this review is the rising complexity of the theory base. For example, the structured practice lens is applied inconsistently (Luna-Reyes, 2006; Dery, 2006), and disregarded or criticized for being too broad (Chae, 2005). This concept of complexity applies even more to sociomateriality. Will its large breadth reduce the ability to apply it and acquire meaningful results? This is further complicated by the largely unanswered call for a return to emotive-historic roots (Ciborra, 2006).

Another recurrent question for further study is how to apply the benefits of interpretivist research. While improvisational and socio-technical applications of emergence show evidence of guiding principles, other areas of emergence are exploratory and less applicable to organizational application, as shown in the contextually grounded ERP studies. This may account for strong positivist trends in professional literature.

A final question that comes to mind is the situatedness of situated change. What factors, such as technological malleability or organizational approaches, have been missed by the lenses used? Is 'successful' situated change a result of only open-ended, or unambitious, projects, where features are deployed for exploratory purposes? Or are these factors unrelated? This area does not appear to be substantially covered by the literature reviewed for this study.

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# Tax Havens, Evasion and Banking Secrecy: A Review of the State of Financial Privacy vs. Financial Transparency

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This paper explores recent developments regarding financial privacy with a special focus on taxation. After introducing the concept of privacy and linking it to financial information, we will move on to the principles of taxation, compliance and evasion. The next part identifies the major interest groups focusing on the role of the Organisation for Economic Cooperation and Development. In the next part, the case of Switzerland will be presented. One aim is to show that with the current financial crisis, governments are in the unique position to push forward their calls for information disclosure as well as the loosening of banking secrecy and that it is very unlikely to find strong supporters of financial privacy. I will also argue that in the discussions about tax evasion a lot of “black and white painting” is conducted especially by high-tax jurisdictions, but that there is a strong notion of hypocrisy.

## Introduction

“In this world nothing can be said to be certain, except death and taxes.” - (Benjamin Franklin, 1789)

With regard to the current financial crisis and excess government spending, this quote might hold true for the future more than ever in the sense that today’s spending will represent tomorrow’s tax (BBC One, Panorama; *The Economist*, Apr. 4, 2009). As far as taxes are concerned, states are in the most need of international cooperation but are also least able to achieve it. Since the 1990s with the rapid development of ICTs and changes in the global economy, corporations and individuals have been able to undermine governments’ ability to tax (Sharman, 2006). With the collapse of the financial system, the calls for regulation and transparency have become very strong. The current situation does not only offer a unique opportunity to regulate the financial system in a new way but also to exercise more control over tax, i.e. cracking down on “tax havens” and ensuring that corporations and individuals meet their tax liabilities. Putting pressure on tax havens ranks high on the agenda of mostly European governments and the US, e.g. Obama supporting the “Stop Tax Haven Abuse Bill” (Stewart, *The Observer*, Feb. 22, 2009). Prior to the G20 summit, Gordon Brown already appealed for tough regulation for tax havens and banking that will cover every country. He wants “the whole world to take action” and “changes (...) to apply to all jurisdictions around the world” (Watt, *The Guardian*, Feb. 19, 2009).

As the estimates of the amount of money held offshore ranges from \$1.7 to \$11.5 trillion, there is a strong incentive for governments to find ways to “secure” this tax foregone (Owens & Saint-Amans, 2009; *The Economist*, Apr. 4, 2009).

All this has led to increased pressures for information disclosure on countries like Liechtenstein or Switzerland. In the case of UBS, the handing over of the names of about 300 customers to the US government has been approved in February this year. It was the first time that Swiss regulators have allowed a bank to bypass the banking secrecy laws that had been introduced in 1934 (Gallu & Logutenkova, Bloomberg, Mar. 13, 2009; *The Economist*, Feb. 21, p. 8).

## Privacy and financial information

First, let us now take a broader view on the phenomenon of privacy and find out how it is related to taxation. It has been

argued that surveillance has to be considered a central feature of the modern society and that it is somehow the flipside of the coin of democracy. An essential element in this respect is the creation and collation of files or dossiers on individuals – also with regard to the collection of taxes. The following quote shows how the disclosure of personal - also financial - information simultaneously is a means of social control as well as a guarantee for the rights of social participation in a society:

“To exercise the right to vote, one’s name must appear on the electoral roll; to claim welfare benefits, personal details must be documented.”

As it is such a crucial element for participation, why is there a need to worry? The issue arises with administrative surveillance that has once been limited by the borders of nation-states, spilling over old territorial boundaries, most obviously in the form of international intelligence networks. This becomes a highly political question of power and of how individuals experience the surveillance since capacities with regard to the size of files, the degree of centralization, the speed of information flow and the number of contacts between administrative systems and subject populations have grown systematically (Lyon, 1994).

Taking a look at the socio-cultural level of privacy, it is frequently determined by the individual’s power and social status. Westin (2003) argues in the first place that the rich can withdraw from society when they wish to, whereas the lower classes cannot – this is also one of the main arguments used to preach against tax avoiders. The reasoning is that the rich are not in need to receive subsidizing support from the government by revealing sensitive information to authorities. But Westin also concludes that with increased “virtually universal” record-keeping and credentials review, even the wealthy and powerful become enmeshed in all-pervasive data-collection processes.

Another aspect of privacy is that it has to be considered as an elastic concept. One view is that it “protects behavior which is either morally neutral or valued by society” (Warren & Laslett, 1977 in: Margulis, 2003). Others take a more neutral stance, as they believe that privacy can also support illegitimate activities – here it is often claimed that banking secrecy represents an obstacle to law enforcement and the prevention of money laundering (Rahn & De Rugy, 2003).



Government plays a role as a threat to and a defender of privacy. It conducts extensive collection of personal information and with regard to information privacy laws is also legitimating the use of personal information by the government for a purpose other than that for which it was collected. This is in most of the cases justified in the name of efficiency as well as for reducing waste and fraud (Margulis, 2003). Rahn & De Rugy (2003) take a more critical stance as governments are “infamous for abusing information” and argue for selective and limited sharing of financial information. According to them, financial privacy concerns the ability to keep confidential one’s income, expenditures, investments and wealth. Without financial privacy, many other fundamental freedoms, such as the right to property and freedom of speech are endangered.

Before having a closer look at the role of financial privacy today on the macro-level of different interest groups including the OECD, individual governments of high-tax jurisdictions and those jurisdictions that are accused of having “harmful tax practices”, let us make a detour to the principle of taxation and compliance, tax avoidance, planning and evasion, as well as the motivations for evasion, and the morality issues linked to it.

### Taxes, compliance and evasion

An important question to ask at this point is: Why do we pay taxes? Governments have the power to set and to enforce some of the “rules of the game” by which economic relationships are supposed to abide. With regard to tax evasion, they are rule makers and victims at the same time. The basic assumptions are that there are private and collective goods and that the individual as part of the community has an obligation to reciprocity i.e. to contribute to the finance of collective goods. Governments need money to finance public expenditure and transfers. The law attempts to specify the portion of the individual’s resources to which the state is entitled. The alternative to taxation would be borrowing and selling the goods and services it provides (Cowell, 1990).

Tax compliance is defined by James & Alley (1999, in: Braithwaite, 2003) as

“the willingness of individuals and other taxable entities to act (...) within the spirit as well as the letter of tax law and administration, without the application of enforcement activity.”

The management of tax systems is very complex; often tax law cannot catch up, so that new legislation also comes with loopholes. People, who resist vocally and challenge the tax authority decisions with being openly critical of the institution, are not necessarily less tax-compliant than others, but they can provide valuable feedback for tax administrations.

It is also worth to keep in mind that the regulated are not powerless – they can cooperate or withdraw. Bogardus (in: Braithwaite, 2003) identifies a “social distance” that can emerge as well as five motivational postures towards tax compliance: commitment, capitulation, resistance, disengagement and game playing. All this already hints at the fact that the scope of the problem of tax evasion is not limited to one dimension. Cowell (1990) identifies three dimensions:

1. legalistic (inside/outside law),
2. moralistic (good/bad) and
3. agnostic (evasion and avoidance merely as two arbitrary

segments of a continuum “stretching from innocent tax planning to outrageous fraud”).



These perspectives are difficult to apply on a consistent basis. There is a very thin line between tax planning, avoidance and evasion. In fact, laws differ from each country so that, e.g. in Liechtenstein tax evasion is punished with the payment of a higher tax, without resulting in a criminal conviction which would be only the case when tax fraud, e.g. if falsifying documents had been committed (BBC One, Panorama). This explains also why one of the major attractions of putting money in tax havens is privacy, because tax evasion cannot be a crime where there are no direct taxes to evade. In that case authorities in such jurisdictions are (technically) not under any legal obligation to cooperate with investigations by foreign tax authorities (Sharman, 2006).

The phenomenon of private knowledge of individuals and the lack of omniscience pose major challenges to the authorities – one way of preventing tax evasion is to make it difficult for people to avoid telling the truth, e.g. deducting income tax on a pay-as-you-earn basis (Cowell, 1990).

Why do people evade taxes? Economics of crime seem insufficient for explaining the motivations for breaking the law. Some important factors are the individual’s perception of the fairness of the tax rate, social consent, attitude towards risk, and the structure of production and market transactions as well as the structure of their social relationships (Cowell, 1990; Braithwaite, 2003).

Ho & Wong (2008) have been drawing from the field of ethics. The factors playing a role for unethical behaviour were defined as the expected gain from behaving unethically or the expected loss when getting caught, the individual’s perception of the likelihood of getting caught, the individual’s attitude to risk and the individual’s ethical reasoning levels. Evasion can also be seen as a simple form of gambling. Here, the rich ones tend to stake more and evasion rises with the tax rate. Studies have also shown that a greater level of education is linked to a higher level of non-compliance (Cowell, 1990; Ho & Wong, 2008).

The consequences of large scale tax evasion and avoidance are the “wrecking” of governments’ macro-economic plans as well as the undermining of their capacity by eroding the tax base and shifting the tax burden to less mobile factors as to small businesses or low income individuals. In this respect, it is also important to note tax base externalities, i.e. the tax rate set by one jurisdiction affects the tax revenues of the other jurisdiction. This is an important factor when we come to the OECD and its stance towards tax competition which can frustrate the attempt of elected governments to achieve desired levels of tax and public spending (Johnson & Holub, 2003; Sharman, 2006). The equity criterion as to how the burden should be distributed is often used with the appeal to fairness to argue against mobile, better educated and higher salaried workers who are claimed to be best placed to escape from increased taxes, but also to argue against “irresponsible” behaviour of corporations, both “operating beyond the normal rules of society” (Murphy, 2008; OECD Working Paper, 2000).

After having set the scene, let us now take a look at the global regulation of taxation with the major groups of interest.

### Who is who?

Taking a look at the global regulation of taxes, we can state that the OECD represents the major actor. There is no International Tax Organization (yet), but there has been a proposal by the UN for an organization that “could take a leading role in restraining the tax competition designed to attract multinationals” and would be operating a global system of taxing emigrants (Rahn & de Ruyg, 2003). What constitutes a tax haven or offshore financial center (OFC)? First, we have to note the extreme flexibility of the term. By some measures the City of London can be classified as one of the largest OFCs, others would state America as the world’s biggest tax haven (Mitchell, 2001; Sharman, 2006). It is worthwhile to keep in mind that there tends to be a misconception about tax havens – they are neither restricted to small island states, as advanced countries also offer economic incentives to attract non-residents, nor are they a homogenous group as the services they provide vary considerably. The Financial Stability Forum (FSF), a group consisting of major national financial authorities such as finance ministries, central bankers, and international financial bodies, released the classification of 42 jurisdictions as OFCs in Group I to III in May 2000.

An OFC is defined by the FSF through the fulfilment of one or more of the following criteria (Johnson & Holub, 2003):

Zero or low taxation, including the absence of withholding taxes

- Little regulatory or financial supervision
- The availability of flexible corporate structures
- No requirement for a physical presence
- Secrecy
- Little or no sharing of information or cooperation with other jurisdictions

As the OECD also releases lists of tax havens that are referred to in most newspaper articles and discussions, the next part is dedicated to present the organization’s work.

### The OECD and its standards

Offshore tax evasion is not seen as a new problem, but according to the OECD has become more complex and serious with the scope for illicit use of the international financial system in a globalised world. In 1996, the OECD governments recognized the need for a coordinated approach and initiated a project on “harmful tax practices”. The criteria for those were (OECD Working Papers, 2000):

1. Lack of effective exchange of information
2. Lack of transparency
3. Ring-fencing or attraction of investment without substantial activities

The initiative itself is carried out through the Forum on Harmful Tax Practices, a subsidiary body of the Committee on Fiscal Affairs (CFA). The first major output was the report “Harmful tax competition: An emerging global issue” from 1998 that “initiated a period of intense dialogue” aiming at eliminating harmful tax practices (Owens & Saint-Amans, 2009).

As the success or failure of a tax haven is more dependent on its reputation than on any other factor and they are very much

concerned about projecting an image of secure, stable and well-run investment destinations, the next step would be to target the tax havens’ reputation as coercion (Sharman, 2006).

Therefore, in 1999 a more confrontational style was adopted, so that instead of white listing and capacity building the new tactics were “naming and shaming”. It ultimately resulted in a report issued in 2000 that identified a number of jurisdictions which the OECD categorized as tax havens. Between 2000 and 2002, the OECD worked with those jurisdictions to secure their commitment to implement its standards of transparency and exchange of information - in total, 35 jurisdictions made formal commitments, three still remained under the classification of uncooperative tax havens, namely Andorra, Monaco and Liechtenstein (Owens & Saint-Amans, 2009).

Another active organisation is the Global Forum on Transparency and Exchange of Information consisting of OECD and non-OECD countries that have made commitments to the OECD standards. It has worked on developing the international standards for transparency and effective exchange of information in tax matters. The major achievement of this collaboration was the development of the 2002 Model Agreement on Exchange of Information on Tax Matters that has been used as the basis for the negotiation of more than 70 Tax Information Exchange Agreements (TIEAs).

The standards require:

- Exchange of information on request where it is “foreseeably relevant” to the administration and enforcement of the domestic laws of the treaty partner.
- No restrictions on exchange caused by bank secrecy or domestic tax interest requirements.
- Availability of reliable information and powers to obtain it.
- Respect for the taxpayer’s rights.
- Strict confidentiality of information exchanged.

Since 2000, 49 TIEAs have been signed, out of them 27 in 2008, with 20 signatures since November 2008. By now, the Global Forum standard is claimed to have become the internationally agreed standard for the exchange of information and transparency in tax matters. It has also been incorporated by the UN Committee in its own model tax convention in October 2008. Another area that is of special interest for the work of the OECD Committee on Fiscal Affairs is the investigation of the extent and improvement of access to bank information for tax purposes. Here the “Improving access to bank information for tax purposes” report was published in 2000 setting out an ideal standard of access to bank information; it states that:

“All member countries should permit access to bank information, directly or indirectly, for all tax purposes so that tax authorities can fully discharge their revenue raising responsibilities and engage in effective exchange of information with their treaty partners.”

Under this agenda, the 2003 Progress Report also set out a common definition of tax fraud which was endorsed by all OECD member countries except for Luxembourg and Switzerland (Owens & Saint-Amans, 2009). With this links were drawn between banking secrecy, money laundering and tax evasion (Sharman, 2006).

## High tax jurisdictions

The most active participants of the “high-tax jurisdictions” are the US and the EU. The US has its Financial Action Task Force (FATF), an inter-governmental body primarily concerned with developing and promoting international policies to fight against money laundering and terrorist financing ([www.fatf-gafi.org](http://www.fatf-gafi.org)). The EU has a slightly different focus. It is concerned about tax competition, the integrity of its single market, as well as the corrosive effect of tax competition on the welfare state (Sharman, 2006).

The following G20 statement from a meeting of finance ministers and central bank governors in November 2004 sheds light on the position adopted on Transparency and Exchange of Information for Tax Purposes:

“We regard this as vital to enhance fairness and equity in our societies and to promote economic development.

Financial systems must respect commercial confidentiality, but confidentiality should not be allowed to foster illicit activity. Lack of access to information in the tax field has significant adverse effects. It allows some to escape tax that is legally due and is unfair to citizens that comply with the tax laws.” (Owens & Saint-Amans, 2009)

Again, with this statement we can encounter the appeal to morality and fairness.

## The “tax havens”

In this section, I would like to review the arguments which support the use of tax havens. One argument is that many of the same tax-related inducements that tax havens are often accused of, are also offered by OECD economies on a “ring-fenced” basis, i.e. they are only available to foreign investors (Sharman, 2006). Another example is the state of Delaware as the leading provider of anonymous companies (FT, Mar. 5, 2008). During a meeting of the Commonwealth small state law ministers in 1998, there has been protest against “blurring the distinction between tax evasion and avoidance”. They also pointed at the facilitation of “fishing expeditions” that would seek the disclosure of information where there was no evidence of criminality (Sharman, 2006). The primary reason that tax havens have financial privacy laws is that they protect their economic competitiveness. For many small island states offshore finance represents a viable solution to their development problems; it has also been recommended by the World Bank, for example. In order to attract mobile capital, small jurisdictions had to offer a tax rate at or near zero. For Bermuda and the Cayman Islands this has resulted in first world standards of living (Sharman, 2006). As World Bank data shows, jurisdictions with low taxes on capital income and a strong commitment to financial privacy are also the world’s richest (Rahn & de Rugy, 2003). Furthermore, there is no evidence that tax havens attract an unusually high share of the world’s “dirty money” (Mitchell, 2001).

## The case of Switzerland

It is said that 27 % of the world’s wealth managed outside the country of residence is managed in Switzerland. It is also considered to be the global leader in cross-border asset management. Today, it is under pressures due to turbulences in the financial markets and criminal misuse of financial institutions. It is mostly renowned for its banking secrecy (Frei, 2004; Gallu & Logutenkova, March 13, 2009, Bloomberg). In

Switzerland, banking secrecy laws have been of great importance with regard to their historical development. The introduction of criminal sanctions for the violation of secrecy about bank customers by the Swiss federal parliament in 1934 and its influence on Swiss thinking can be traced back to two events: In 1931, Nazi Germany intensified foreign exchange controls and Adolf Hitler passed a law under which Germans with foreign capital were punished to death. The Gestapo also started to espionage on Swiss bank accounts where many Jews had placed their assets and some Germans were put to death for holding Swiss accounts. With the second event in 1932, a list of two thousand French citizens who had deposited their holdings was discovered and had been made public by the police. The list included senators, a former minister, bishops and generals. The French government jumped at this and announced that it would pressure Switzerland in order to gain legal authority over the accounts of French citizens held in Switzerland (Rahn & de Rugy, 2003; Sharman, 2006).

As Frei (2004) points out, banking secrecy is often misunderstood as it does not protect terrorists and other criminals. The purpose of financial privacy is not to safeguard the interests of the banks but to protect the private sphere of their clients. The secrecy legislation was amended in 1998 to stop banks from shielding identities of those suspected of money laundering or tax fraud. Shortly before the G20 summit, in the case of UBS, information of 300 customers was handed over to the US government. With this, the Swiss Banking Association was expecting to put an end to the international criticisms of Switzerland and its legal system, but also to put an end to threats to be put on the OECD black list. Switzerland’s Finance Minister Rudolf Merz announced the renegotiation of agreements with other countries and cooperation on cases of tax evasion and fraud. He also pointed out that his nation does not want to land on the OECD list. He confirmed the softening of absolute banking secrecy but regards it as necessary, as a place on “the list” would hurt the whole economy, not only the banking sector (Gallu & Logutenkova, Bloomberg, Mar. 13, 2009). This did not prevent that Switzerland is on the list again, although it recently agreed to loosen its strict banking secrecy and to comply with the OECD standards for information exchange in order to fight tax evasion (Reuters, Apr. 3, 2009).

## It’s all rhetoric...

One conclusion we can draw at this point of analysis is that all discussions regarding financial privacy in relation to taxation are clouded by very emotional terminology and a plethora of pejorative terms (Cowell, 1990). Going through newspaper articles, a clear distinction between the “good” and the “bad” is drawn, although we have seen that this distinction is not easily applicable as high-tax jurisdictions use the same incentives as tax havens, so that we can state hypocrisy and double-standards with regard to the accusations they make. In most of the cases, there is the narrative of the “betrayal of the elites”, the “greedy managers”, the “unpatriotic companies” that chose reincorporation in tax havens to increase their profits, and the “theft from the fellow citizens” (Kulish, NYT, Febr. 18, 2008; Spiegel Online, Febr. 16, 2008; Johnson & Holub, 2003; FT, Mar. 5, 2008), all confirming the increased gap between the ordinary people, the rich, and the government (BBC One, Panorama). The scandals around tax evasion and the current economic climate are not particularly helpful for making the case for financial privacy, either.



If we take a look at how the call for the transparency of financial information has evolved, we can identify three stages or lines of argument for more disclosure: In the 1970s and 80s, one of the primary concerns was claimed to be the detection of drug money laundering. Then, there is the more general goal of detecting and fighting crime finance, followed by new demands of information disclosure after 9/11 in the name of fighting terrorism (Sharman, 2006; Westin, 2003). We have seen that over the last decades more and more disclosure has been put forward. A question that needs to be asked is where the line will be drawn. More disclosure of information might result in law enforcement getting diverted as it no longer concentrates on individuals and the “good” law-abiding citizens’ freedoms will be permanently undermined with the full disclosure of their financial activities. The alternative ways to broad and systematic information sharing do not seem to be very popular these days (Rahn & de Rugy, 2003), but more disclosure of information does not imply a better use of it.

The sovereignty of individual countries, the principle of non-intervention and the search for dialogue representing the foundational norm of the modern international system, are replaced by the coordinated “bullying” of tax havens by high-tax jurisdictions. As morality is often referred to while arguing against tax havens, the question also needs to be asked the other way round: Is it fair to sanction small non-OECD member countries that are dependent on their financial services (Sharman, 2006)? Another aspect is the proportionality of measures. Governments have been abusing information in many ways in the past and it remains questionable whether information sharing can really stop capital flight once and for all as it is argued that there will always be tax loopholes (Rahn & de Rugy, 2003). Increased information sharing might as well result in information overload.

Privacy has always been a negotiated state in society (Margulis, 2003) and we are seemingly entering a new stage of negotiation concerning financial information. The OECD blacklist has turned out to be a very effective and powerful tool for putting pressure on countries that do not “play by the rules of the game”, as nobody wants to be on it. As Germany’s chancellor Angela Merkel recently put it:

“The more clearly we say that those who don’t cooperate will be put on a list, the more they will try to cooperate.” (Bloomberg, March 12, 2009)

Given the reactions to the new OECD list that has been released in conjunction with the G20 summit, the determination for collective action against tax havens and the disappointment, e.g. from Switzerland, the tendency goes towards more cooperation and disclosure from tax havens.

This paper tried to present the different aspects of financial privacy linked to taxation in a balanced way, but one factor that has not been touched explicitly so far is the role of curiosity and jealousy as possible explanations for the lack of strong support for financial privacy. Last year, the Italian Finance Ministry published the official income statements of all tax payers online. The website had to be shut down due to privacy concerns as it was overrun by curious Italians who wanted to see what their neighbours or favourite actors earned. Beppo Grillo, a comedian and activist, called it “pure folly”, as it would be too dangerous to pay taxes when criminals are supplied with income information and the address. Although this is common practice in Scandinavian countries, in Italy’s case, the claim was that these measures would not

help the country or tax payers, but rather add to its problems allowing individuals to see what a co-worker or neighbor earns (Scherer & Salzano, Bloomberg, Apr. 30, 2008). This example represents the realization of living in a class society and that having more openness does not necessarily result in a better society.

## Conclusion

One thing that should be evident by now is that the argument for financial privacy is not an easy one to make as a lot of things are mixed together in discussions. This paper has tried to present some of the many facets of financial privacy and to avoid going too deep into the discussion of morality. As an outlook, we will see banking secrecy become a relic of the past and the number of tax havens will diminish significantly. Evaders will also be pushed to the margins of the system, so that paying taxes might become more attractive than risking fraud in jurisdictions with lax rules. Tax evasion by itself might become obsolete, as the current developments push towards the extremes of complying with the law of the home country or to leave the country and move to a tax haven (Economist, Apr. 4th, 2009). It remains to be seen whether a new path will be taken to create a cooperative culture and change in attitude, as this would be a way to build a “natural sense” of compliance.

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## Bits and Bytes of Happiness!

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This article draws its inspiration from the Virtual Happiness Project and then attempts to build on the linkage between happiness and technology usage (mostly, the internet). While the study is still underway, researchers on the project have come out with certain data-backed analysis as mentioned in the article. The term ‘Happiness’, in the context of the article is used to indicate a general sense of well-being and harmony with oneself (and the outer world, to some extent) rather than economic/tangible gains. The world is definitely not what it was a few years ago and every new technology invented claims to (or even has) altered the definition/s of happiness individually (and to that effect, socially as well). Although a far-fetched topic, I have tried to capture the role of technology (perceived vs. actual) in a human being’s pursuit of happiness. The preference to end the article on a non-conclusive note is primarily attached to the fact that the 25 years I have spent haven’t been enough to explore all the dimensions of happiness; probably even a lifetime won’t suffice.

Are you one of those who wire your way to happiness? Well, many do! Recent studies from the Virtual Happiness Project (VHP) show that internet users are in fact happier than non-internet users. While researchers do mention that online social interaction and internet usage promote your happiness, they also caution you to keep your blackberry or the i-phone out of your bedroom. The study (Virtual Happiness project) carried out in 25 European countries (n=18000) explores the technological side of human emotions in the digital jungle and provides certain intriguing ways internet could make the modern human being happy.

As minute-on-minute communication and technological display of social lives become the new mantra for happiness, increasingly large number of individuals have plugged in technology to edifice their personal and social verve. The VHP reports that happier people know when to switch on and switch off! Don’t let the gadgets control you (or your emotions) – technology is a good servant but a bad master.

Another significant pointer from the report is towards the expanding ‘knowledge experience’, internet provides. Infor-

mation technology platforms are bringing the world closer than ever before; internet experience is driving serotonin levels and the inflated need to ‘know-it-all’ is promoting information frenzy societies. Critical here is to know when to limit your information search – if the information sought isn’t on the first 3 Google web search pages, you clearly don’t know what you are looking for! Don’t let the mad world of data bamboozle you – over-reliance on information is in many cases a cause for increased anxiety and stress.

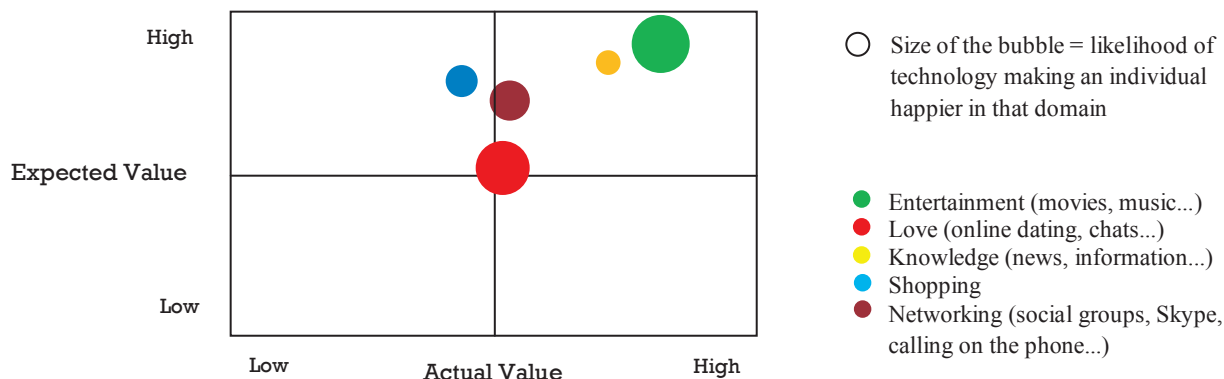
Beyond the VHP, research on online social interaction has already shown that happiness is contagious and a smiley can reciprocate a smiley giving instantaneous shots of happy emotions! Log onto the internet and your seemingly boring, depressive life has a new twist to the tale – you are now in a zone of endless possibilities, a world where you can associate yourself with success, power and fame, a potent LSD that unplugs the miseries, realities, failures and gives you a sense of high – a kaleidoscopic sense of happiness. With a single click, you are a member of a high profile networking website or even better gambling online and making a few thousand dollars. Internet supports animal instincts of instant emotional

Happiness is experienced by almost all people on a 2x2 matrix – Expected Value vs. Actual Value where, Expected Value = [Odds of gain] x [Value of gain] (Prof Gilbert on Bernoulli’s principle) and Actual value is relative and context-specific.

Simple, though it looks, the quantification of value differs for every single individual because of:

- Errors (judgement, estimation, probabilities & an “experience rectification” factor)
- Comparisons (point of reference, joy of anticipation vs. disappointment of failure)
- Psychological complexities & situational factors
- Plain stupidity
- Intuition, gut- instinct

A small data sampling across a group of direct acquaintances suggests (not to be used for generalization):





gratification, greed and aggression and that is why it has such a larger-than-life place in our lives. Take the 'I' (self) element out of it and the internet is just another brick in the wall.

At a recent social gathering, when one of my colleagues asked me 'what's your facebook name?' and on replying that 'I don't have one', I got the stare of my life. Call it peer pressure or a hip-hop trend; if you aren't a member of the happening websites, you are just surviving, not living. Definitions of happiness are changing – it's no longer an evening walk with your beloved partner or an encouraging pat on your child's back – it's virtual canoodling, it's hanging out with the latest gadgets in town, it's an over-indulgence in anything technological. Recent studies show teens spend at least 31 hours online per week on legitimate surfing (exclusive of adult content hours) – that's 9 hours short of a healthy working week in Britain. Internet usage (in hours) and happiness are directly proportional till a threshold value (unique for every user) beyond which it exponentially increases unhappiness and depression.

So where does one exactly fit the internet hysteria? The third layer of needs in the Maslow's hierarchy is where most people fit the technology paradigm. Ignorance is bliss and so there's no point debating if I would have been much happier grazing my cows in the pastures of some remote land in India or designing million dollar babies for i-banks on Wall Street. Technology gives me the opportunity to compete/network/think/source/communicate – all at the same level as the world does. Information makes me intelligent but not worldly wise; technology makes me materialistically comfortable but not spiritually refined. Happiness is relative and has a strong linkage to one's cultural roots, ambitions, philosophy and a myriad other aspects. Whatever, wherever, however one is; the reins of one's happiness are only within his/her control and so is internet usage!

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## Group Photo—ADMIS 2009





# Profile of the Information Systems and Innovation Group

Within LSE's Department of Management, we form the leading European university-based Group focusing on Information Systems and Innovation, and are recognised widely as amongst the top ten such groups in the world. We have 16 full-time academics and also benefit from the contributions of our Centennial and Visiting Professors, all of whom are scholars of international repute and leaders in the field, from Visiting Fellows who are experts in their respective fields, and from project researchers. There are also over 45 PhD students undertaking research in any one year.

The Group is international in its reputation, its activity, its staff and its students. Members are active in the International Federation of Information Processing (IFIP), the Association for Information Systems (AIS), the UK Academy for Information Systems (UKAIS), the British Computer Society (BCS), and other national and international organisations including United Nations and European Union bodies. Academic staff are Editors-in-Chief of four major journals (JIT, ITP, JSIS, JISS) and variously serve as Senior and Associate Editors on most high quality refereed journals in the IS field (e.g. MISQ, MISQE, ISR, EJIS, ISJ plus over 20 others).

The Group's teaching has been rated as excellent by the UK's Quality Assurance Agency and its research is recognised as internationally excellent by the Higher Education Funding Council for England.

The Group has received from funding bodies and industry more than £2 million in research income in the last four years. Staff have made over 60 keynote addresses at major academic and practitioner conferences in the last five years, and have been very active in advisory and representational roles on panels and committees for governments, major corporations and institutions. Members have made major policy interventions in recent years, notably in the UK governments National Identity Card scheme 2005-07. Awards and recognition are extensive and include Frank Land's Leo award of the AIS for Lifetime Exceptional Achievement, Ciborra's AIS Distinguished Member award, and Willcocks's Price Waterhouse Coopers/Corbett Associates World Outsourcing Achievement award for academic contribution to this field.

The Group runs several high profile seminar programmes. These include the annual *Social Study of ICTs* seminar run over two days in March. This attracts over 200 international participants and has a related two day research workshop. We also host throughout the year a trans-disciplinary seminar series entitled *ICTS in The Contemporary World*.

We offer three degree programmes – a one-year MSc in the analysis design and management of information systems (ADMIS) focusing on theory and practice, a one-year MSc in information systems and organisation (research) (ISOR) preparing students for research design and execution, and a PhD in information systems.

The Group's research, teaching and dissemination strategies are closely interlinked and its distinctive focus on the social study of Information Communication Technologies (ICTs) and Innovation underlies a concern for policy and practice issues in six major fields (see figure).

All research is subsumed into these centres with research-based teaching aligned with their themes. Thus the MSc in Analysis Design and Management of IS (ADMIS) draws on all items, while future MScs for example in Risk and Security

and in Global Sourcing are more restricted, and the present MSc in IS and Organisation (Research) draws upon research methods, social theories and philosophy inherent in the Social Study of ICTs and Innovation component. There is also strong overlap between these centres: for example, research on public sector ICTs might relate to research on globalisation and developing countries, or information risk and security. We also perform research-based teaching for



other existing and planned LSE degrees in Management, Government and Media and Communication departments.



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