I S D

An International Research Programme

2010-2012

The Research Agenda

Key Research Issues
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Foreword

This volume presents the rationale and key questions proposed by the Scientific Committee as building blocks for the research agenda of the ISD international research programme. They represent the collective effort of the twenty members of the Scientific Committee to construct an articulated research programme covering emerging practices and their related societal and organisational issues.

However, this document should be seen only as a starting point for a collective dialogue and collaborative effort among scholars and other stakeholders involved in, or concerned by, the deep shift in our societal and organisational structures and behaviours in relation to IT/IS. We welcome any comments, contributions, references or informative experiences for consideration and sharing within the ISD Community and more generally within the general public.

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Summary

Overview

Introduction

ISD is a public interest programme that aims to evaluate the societal and managerial challenges in the long-term usage of IS (1970-2020) by mobilising the best expertise available at the international level. Its purpose is to analyse the momentum of usage by studying its different dimensions: strategic, social, ethical, regulatory, technological and organisational—both from a historical point of view and from a prospective one.

ISD considers that the issue of use of information systems now goes beyond the framework of managerial action: it embraces the whole domain of society. From this central perspective, the programme's objectives are of different types:

- An *overall objective*: to understand the many facets involved in the dynamic use of information systems over a long period;
- A *specific objective*: to provide and co-produce with the stakeholders (the target communities of the programme—large companies, members of the IT ecosystem, students, government, academics, the media) the analytical grids that will enable us to understand the strategic issues arising from the changes under way; this will be achieved by fully mobilising the collective intelligence of these communities.

In light of these objectives, we propose five analytical perspectives as the core building blocks of the programme. The future of enterprises—and the design of their future IS—will be determined by the interaction between developments in socio-ethical, strategic, technological, regulatory and organisational trends.

It is by considering these five perspectives, interactively and systemically, that we can grasp the reality of the driving forces affecting future companies and their information systems.

- **Social and ethical trends,** because it is by analysing these trends within societies and their evolution—including in terms of innovation and IT—that future norms of conduct will be brought to the fore;
- **Strategic trends,** because today's business models inevitably face major disruptive change, in which networks, communities and spot markets will play a decisive role;
- **Technological trends,** because the ubiquity of informational artefacts will become commonplace;
- **Regulatory trends,** because new standards—including regulation—will emerge to regulate the transitions that are taking place (we must therefore be prepared for and, of course, influence such tendencies);
- **Organisational trends,** because companies and societies will undergo massive transformations in their structures, processes and standards.

The ISD research programme is therefore focused on obtaining a better understanding of the relationship between, on the one hand, progress in the development and implementation of information technology (IT) and information systems (IS) and on the other, their numerous impacts on organisations, industries, and society in general. This relentless progress is building a future where IT/IS will play an increasingly important role in:

- Business models;

- Organisational design;

- Support for innovation;

- Human resource strategy;

- Governmental regulation;

- Social & economic development.

A critical enabler of these profound changes will be the existence of a ubiquitous broadband network infrastructure (wireless and wired), not just in mature economies but also in developing nations. The impact of the evolving IT superstructure on societies, and the ethical practices they embrace, will also have to be considered as a factor in IT/IS leadership.

The very concepts of time, space, and information complexity will have to be revised to help explain and predict the trajectories of these changes. This will ultimately affect the management of IT capabilities by identifying emerging practices embodied in performance rules and developing standards.

The ISD research agenda is very ambitious. The results of this research should provide new explanatory theoretical frameworks to formulate innovative approaches to IT/IS management and also, to help IT/IS leaders to manage increasingly risky IT/IS acquisition and management portfolios.

Summary of key issues & expected deliverables

The programme is divided into 13 work packages, to be articulated along the five dimensions underlined earlier. They key issues and expected deliverables for each WP can be summarized as follows.

	Key issues	Deliverables
WP 1 : **Business Models**	• What are the emerging business models and their fundamental driving factors? • What types of meaningful experiences, in specific socio-economic contexts, can be identified and brought to the fore? • What types of configurations can be profiled? • To what extent should the digitization of activities and social links lead to new rules of governance? • What types of renewability (via and in relation to IT/IS) can be observed in business models? • What lies ahead for basic business activities by 2020: developing products & services, procuring, producing, selling, exchanging… and creating value in general? • To what extent will IT/IS constitute a critical driver for these changes? • How will new forms of socio-economising (communities, networks, etc.) critically influence future business model configurations?	• Models and assessments of emerging business models • Evaluation of emerging practices • Forward-looking views and scenarios

	Key issues	Deliverables
WP 2 : **Social and Ethical Values**	• What are the social expectations for ethical rules and what are their main driving factors? • What are the expectations for green IT and what does it mean in practice? • To what extent does the spread of mobility lead to the emergence of new rules of behaviour? • To what extent does the digitisation of social links & business interactions lead to the emergence of new norms of behaviour and values? • What status should the "digital identity" have? • What will the impact be on privacy? • Are there differences in approaches across countries and regions (Asia, Europe, and North & Latin America, Australia, Africa)? • What will the impact be on corporate business models? • How will identities be structured and managed in the digital world, and what opportunities will this create for business?	• Assessment of emerging social values in response to the use of digital objects and systems • Profile of regional specificities • Assessment of the implications for enterprises
WP 3 : **outdoor & open innovation**	• To what extent do open innovation models lead to specific types of organisational innovation? • What is the relative importance of users in innovation processes? • How significant will new organisational forms (communities) be in IS innovation? • To what extent will IT/IS systems play a critical role?	• Evaluation of IS usage in the context of open innovation (including from the social perspective)
WP 4 : **Ubiquitous Networks**	• What are the key characteristics of ubiquitous networks? • What is their level of effective deployment? • What are their regional and cultural specificities? • What is the level of user involvement? • What are the implications for large enterprises?	• Assessment of the relevance and the feasibility of ubiquitous networks

	Key issues	Deliverables
WP 5 : **Space and Knowledge Flows**	• What will the impact of IT be on the location of jobs for high and low-skilled employees in different economic branches of IT? • What should the relationship be between knowledge and power in IT? • To what extent will the relationship between power and knowledge be influenced by new information technologies? • What role will proximity and distance play in the generation, diffusion and application of knowledge? • Under what conditions are proximity and face-to-face contacts indispensable and under what conditions can they be replaced by digital information systems? • Why do different categories of knowledge "travel" at different speeds? • What contextual factors improve or impede creativity? • What role will social and material environments play in the generation and diffusion of the different categories of knowledge?	• Assessment of the level of fixity/mobility of IT/IS knowledge (capacity of creating and maintaining a competitive supply, including in Europe)
WP 6 : **HR, Work Organisation and Collective Intelligence**	• How do we deal with the issues of intra- and inter-organisational coordination? • How should IS projects be assessed? • What types of organisational design correlate with generational issues (Generation C, Y, X…)? How much importance should be given to demographic aspects? • What are the interactions between private spaces & work spaces? • What new resource complementarities will emerge? • What are the processes for knowledge creation, knowledge sharing and learning at enterprise level—especially for the use of collaborative technologies? • What specific ad-hoc organisational functionalities are developing (in HR, etc)? • What types of competence building through education & training? • How will we work, learn, and navigate our career paths in 2020?	• Possible types of organisational configuration • Evaluation of IS projects and learning in this context • Analysis of IS competences and resource complementarities • Assessment of generational issues • Working, learning, and professional navigation by 2020

	Key issues	Deliverables
WP 7 : **IT and Technological Convergence**	• How do a firm's characteristics determine the rate of acceptance and deployment of these technologies? • How do user characteristics determine the level of effective use of these systems? • How do social network characteristics determine levels of trust and sustained investment in these systems? • What is the impact of these emerging technologies on a firm's strategy, processes and performance? • What is the ROI of these emerging technologies? • What are the best practices in terms of the adoption, use and maintenance of these technologies?	• Assessment of technological options relative to the specific characteristics of firms and users
WP 8 : **The Micro-Economics of IT/IS**	• How do investments in information technology affect organisational design decisions? • What are the baseline returns on investment in information technology for the various industry segments? • What are the average volatilities of ROI from IT for different organisations? • How do reports on the ROI of IT in corporations influence the decisions of investors (including financial analysts, fund managers, private investors) and stakeholders (including government and NGO leaders) with regard to the companies concerned? • How have investments in information technology affected the performance of not-for-profits (e.g., government agencies, NGOs)?	• Modelling the use (impacts) of IT/IS in the context of emerging organisational configurations

	Key issues	Deliverables
WP 9 : **Emerging Practices**	• What typology of emerging practices can be defined (in relation to IT applications, user characteristics, etc)? • What emerging practices in specific technological applications or domains (communities & social networks, enterprise search applications, IT-supported cooperative work, KM, etc) can be brought to the fore? • To what extent are emerging practices radically new practices influenced by new IT, or merely recombinations and adaptations of existing practices? • How should we categorise industrial cases of the adoption and integration of emerging practices in the design of innovative IT applications? What are the implications for the management of innovation and new services? • What are the consequences of emerging practices for IS management: horizon-scanning (low-level signals), distributed learning and sharing of best practices, implementation and incentives, controls and limitations?	• Evaluation of emerging practices

	Key issues	Deliverables
WP 10 : **Regulation**	• What are the implications for privacy? • How universal is the "silence of the chips"? • What will the impacts be on NBIC technologies? • What are the regional specificities?	• Assessment of the regulation dimension

	Key issues	Deliverables
WP 11 : **Performance Rules and Standards**	• What are the driving forces for IS performance in digital spaces? • What architectures are possible for socio-economic and organisational performance? • What are the corresponding standards and metrics?	• Assessment of performance drivers and standards

	Key issues	Deliverables
WP 12 : **Managing IS Functions in 2020**	• What type of design will we find for digital territories (companies, communities, markets) by 2020? • What will be their driving forces? • What type of governance will apply? • How will IS systems and artefacts be used in this context? • What role—if any—will there be for the CIO?	• Design of digital spaces for 2020 and associated CIO profiles

| **WP 13 :**

Blank Call for Projects | • Projects presented here should be very innovative and explore research frontiers in relationship to one (or more) of the programme's three main dimensions: Strategic, Organisational, Social & Ethical | • Any topic related to the 3 main dimensions of the ISD programme |

WP 1: Business Models

Description of the work package

• Questionings

Disruptive new business models are changing the competitive landscape, among other ways by shifting the innovation process towards end-users—democratising innovation (Von Hippel, 2006). But in spite of their importance, business models are rarely addressed in a systematic way. To exploit their full potential and to gain a good understanding of the applicable success factors, a multidisciplinary approach ranging from technology, to business, law and governance might be considered as of relevance.

What should the future modes of organisation be? How will the vertical organisation—the large enterprise—interface with emerging forms of activity—small businesses, communities, solo working, clusters and intermediate forms? How will transaction and knowledge flows intermesh? What patterns are emerging to suggest how IT/IS can play a key role in shaping future business models (including in terms of operational organisation: procurement, supply chain, CRM, e-collaboration,)? These are primary issues that are critical for the future of IS, and that this first work package aims to address, in order to design key change scenarios in business models for large enterprises that operate in a global environment.

• Objectives

WP1 is focused on identifying and assessing new business models and highlighting their main driving forces. In concrete terms, and among other possible modalities of conduct, this WP might aim at establishing a Business Model Observatory of emerging business models with a specific focus on IS. Such an Observatory would make scientific contributions in the form of research and development of new tools to observe, design, analyse, and understand new business models and their contingency factors. It would benefit the project through multidisciplinary collaboration and regular workshops among engineers, business researchers, lawyers and policy makers to address relevant market issues and understand potential future scenarios.

Finally, this Observatory would benefit companies through new tools and methods to develop and manage business models. It would also give them a better understanding of the business landscape and opportunities.

• The state-of-the-art of current research in the work package

Business models issues are closely related to value creation and its modalities in the knowledge economy. Value creation has been widely debated in economics and business literature over the last ten years. Due to the emergence of the Internet, several—sometimes naïve—views have been put forward, especially those emphasising the role of transparency and resource mobility. In many respects, the new economy is considered as endowed with characteristics similar to those proposed by classical economists for characterising market structures, notably those related to atomicity and free entry and exit of firms in the market. The main issue to be considered here is to what extent the new economy allows for specific characteristics, which need (or include) a deep change in business modelling from the industrial point of view (the value-added chain). Are there alternative (complementary) ways of designing business models in the new economy? Is co-production of value now an alternative form to linear production? This distinction has been introduced by Ramirez (1999) as a follow-up on his value constellation model. In this paper, Ramirez differentiates between production value in value-added chains, which is basically an industrial perspective, and value co-production, a model more adapted to the intangible economy. Verna Allee's value network analysis also provides some interesting concrete insights on business modelling.

From the industrial point of view, value creation is sequential, unidirectional and transitive, realised in transactions and measured in monetary terms. Economic actors are analysed in a linear sequence, with one dominant role. It is best described in value-added chains. From the co-production view, "value creation is synchronic, interactive, best described in 'value constellations' (Ramirez, 1999:61)." Consumers are considered as a factor of production and contribution to value creation. Economic actors are analysed as holding different roles simultaneously. The basic unit of analysis is the interaction.

Behind Ramirez's analysis lies the underlying assumption that we are facing a deep shift in business paradigms: value is created by co-production, and not sequentially in linear terms. In this paradigm, interstices should be considered as more relevant than sequences. From the business perspective, value creation might be related here to the relationship dimension of activities and their intangible dimension (Baxter, Matear, (2004). Does this mean that Porter's value-added chain (Porter, 1985) is no longer relevant? According to Stabell and Fjeldstad (1998), three types of value-creation model should be retained: chains, shops and networks. As we have just underlined, in value added chains value is created in sequential processes, by transforming inputs into products and by resorting to two types of activity: primary activities and support activities. In the Value Shop model the basic logic of value creation lies in mobilising resources towards problem-solving. Value is created for customers by solving their problems. In the Value Network model, value is created by linking up independent customers, directly or indirectly. This distinction signals the importance of considering the value-added chain in a more extensive way, in particular by considering business combinations and hybrid market structures that might be induced by the new economy, notably from a B2B perspective.

● Business configurations, market structures

From a business perspective, different configurations of value-creation can be considered, taking into account the co-production perspective suggested earlier, depending on the dominant type of interaction and economic coordination. Several authors have analysed e-business modelling in specific detail. Their work, as reviewed by Osterwalder (2004), contains several definitions: Timmers (1998) defines a business model as an architecture for product, service and information flow; Mahadevan (2000) refers to three components: value, revenues and logistics; Rappa (2004) refers to several categories of e-business model. Different configurations are proposed in the literature (Hayes, Finnegan, 2005): the aggregation model, the agora (as the traditional space for exchange between buyers and suppliers), virtual communities, knowledge networks, collaboration platforms and value-service providers. According to these authors, value chain integration is just one of the possible models for value creation and not necessarily the oldest one. According to Berthon et al. (2002), four modes of coordination should be considered: matching, aggregation, integration and creativity.

More recently, Osterwalder & Pigneur (2009), proposed a framework for business model generation. At a more macroeconomic level, there is great interest in the analysis of knowledge markets and networks as new hubs for value creation and organisation. This is the theme of an ongoing project under the auspices of the OECD and the CAE (Conseil d'Analyse Economique) in France.

● Research gaps: relevant research issues for the ISD programme and its target communities (business, society, and other stakeholders)

There is a need to understand business models from a multidisciplinary perspective, as well as by considering the role of information systems in designing new forms of organisation. One possible option lies in identifying and assessing new practices. Another option might consist in creating a "collective design" community, based on a multidisciplinary approach. A third, complementary, option might be to implement future design workshop. A final option might include designing and implementing a repository of currently emerging and fully implemented business models.

● Areas of interdependence with other work packages

■ WP3: Outside & Open Innovation
■ WP6: HR, work organization and collective intelligence

• Emerging key research issues for the work package

Several analytical issues can be raised here. There is a need to:

- Document new business modelling trends, by identifying and analysing emerging practices as low-level signals that influence the design of future business models;

- Document the notion of cloud computing in relation to the broader issues of business and organisational design, and the "last mile issue" (Markus, 2008);

- Design possible business models for the future, taking into account different regional, cultural and organisational contexts;

- Document the degree of importance of the user role in business model design;

- Understand the role of IS in breaking down business-line frontiers and cross-fertilising organisations;

- Provide insights into what might be defined as the building blocks for successful business models over the next 10 years.

WP 2: Social and Ethical Values

Description of the work package

The ubiquity of "information artefacts"—at least in complex economies, is now largely recognised in the literature, as well as in practice. At the same time, social ties are being increasingly deconstructed, as they become more centred on individuals and more deeply embedded in digital territories. There is also an emergence of horizontal forms and spot markets as a mode of social and economic coordination (outsourcing, networking). This is reflected in the emergence of new societal values and norms of behaviour with regards to the subject-object-subject triad. One possible scenario might consist of the emergence of a strong subject-object relationship, with subject-to-subject social mediation taking place more and more through informational artefacts. This theme is essential for companies to design new ways of governing inter-individual relationships, and therefore for CIOs in particular, organisations cannot develop information systems in serious dissonance with the ongoing changes in practices and societal norms.

This work package aims to provide the contingent approaches needed to identify and interpret emerging standards/ norms of behaviour and societal values in relation to the use of digital objects.

● The state-of-the-art of current research in the work package

At the research level, several scholars have warned of the risk of jeopardising rights and liberties, due particularly to the ubiquitous use of Internet tags and surveillance. NBIC (Nano-Bio-Informatics and Cognitive sciences) convergence is also a highly complementary issue debated within and around institutions in Europe, the US, and other major countries.

The erosion of personal freedom, due to the emergence of the Internet of Things (IoT) as a powerful digital space, is one of the most commonly stressed phenomena. The European Commission, in its communication of June 18 2009 (Com 2009 278 final), aimed at reducing the obstacles to the uptake of the Internet of Things, insisted on the importance of considering two major issues: privacy, and the protection of personal data—two of the EU's fundamental rights. Appropriate measures are expected along these lines. European Commission Recommendation 29 provides guidelines on how to operate RFID in compliance with privacy and data protection principles, and a further communication is expected in 2010. Additionally, the Commission will initiate a debate on the technical and legal dimensions of the "right to the silence of the chips".

The issues posed here relate to regulation and ethics. Regulation might be covered by a text on self-regulation or co-regulation (see WP10). The issue can also be addressed from the general

perspective of behavioural ethics. Such a perspective concerns different facets of societal norms, including with regard to issues such as IPRs.

Ethics is a more sophisticated issue than regulation. It tells us what is good and what is bad in a specific context. It has, of course, an element of contingency: geographically and also temporally: what is good today will not necessary be good tomorrow, or to put differently, some new forms of "goodness" might emerge in the near future. Hence the importance of addressing social and ethical values in relationship to the ubiquity of digital artefacts and systems, and also of considering two important dimensions: time and space. The ethical issue has been posed from a managerial perspective, for instance in the case of non-respect of private space. In a recent study, Jai-Yeol Son and Sung S. Kim (2008) raised important implications for managers whose customers might believe their privacy rights to be threatened. In such cases, customers might start not only to refuse to provide their personal information to online companies, but might also embark on private actions such as word-of-mouth campaigns.

Naturally, there is no universal response to these issues, and geographical and cultural differences may act as contingency factors in the type of norms and behaviours adopted. Such differentiations have been put forward in different cultural contexts. They have notably been underlined in comparative analyses between Japan and China (Davison et al. 2009) and also within China (Matinsons, Ma, 2009).

But the issue of ethics can be posed in a more general, epistemological terms: What has ethics got to do with information systems research? How should it be approached? And what are the guidelines for dealing with components? An epistemology agenda has been developed by several papers in IS research: Tavani (2002), Stahl (2008), Mingers and Walshman (2008) as well as by several papers in Ethics and Information Technology Journal, as well as the special issue of Journal of the Association for Information Systems (November 2009).

● **Research gaps: relevant research issues for the ISD programme and its target communities (business, society, and other stakeholders)**

From the ISD programme perspective, the question of social and ethical values is worth addressing because of the shift in the main locus of change and innovation from inside the enterprise towards society at large. Therefore, research into the social dimension of IS usage is of critical importance, including for managerial purposes, especially by looking at emerging practices and rules, which might reveal emerging ethical values potentially of high impact for decision-making.

This issue of emerging practices, as ingredients for designing future norms and values, is not sufficiently described in the literature. It should be one of the components of the ISD research agenda.

● Areas of interdependence with other work packages

■ WP1: Business Models

■ WP10: Regulation

● Emerging key research issues for the work package

As a starting point, the research should address the following questions:

- What are the social expectations for ethical rules and what are their main driving factors?

- What are the expectations for green IT and what does it mean in practice?

- To what extent does the spread of mobility lead to the emergence of new rules of behaviour?

- To what extent does the digitisation of social links & business interactions lead to the emergence of new norms of behaviour and values?

- What status should the "digital identity" have?

- What will the impact be on privacy?

- Are there differences in approaches across countries and regions (Asia, Europe, and North & Latin America, Australia, Africa)?

- How will identities be structured and managed in the digital world, and what opportunities will this create for business?

WP 3: Outdoor & Open Innovation

Description of the work package

The outlined deconstruction of social links, combined with the potential of information technology (particularly the Internet), creates the conditions for the emergence of innovations outside the vertical organisation. The formation of communities and networks that are not, and cannot be, controlled by companies is certainly a key feature of the new "cognitive capitalism".

"Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [This paradigm] assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology" (Chesbrough, 2003).

Open-source specialist François Letellier advocates that open-source (or free software) is a natural way of innovation in the software industry and that it is an exemplary and very effective form of open innovation—as open-source projects/communities act as innovation intermediaries.

The new paradigm of open innovation challenges the old paradigm of closed innovation. Open innovation is based on an innovative ecosystem, which refers to self-organisation and communication. The dynamics of the innovative ecosystem are dependent on cultural elements, such as social capital, flexibility, attitudes towards entrepreneurship and risk taking, e.g. innovative culture.

The main features of the ecosystem are:

- Adaptation to the changes in the environment;
- Self-organisation;
- Autonomy and dependency between actors;
- Increasing importance of societal innovation.

Silicon Valley is one of the most successful innovative environments in the world. Its success is primarily based not on technological but on organisational innovations. The operational models in Silicon Valley are open networks and distributed experimentation (Saxenian 2006). The innovative ecosystem is a network of local companies, research institutions and experts that continuously produces new ideas and tests their business potential.

The paradigm of open innovation was created by Henry Chesbrough (2003). He calls the traditional innovation paradigm—in which a company can control all the phases of innovation—"closed". Open innovation processes are based on external networks and cannot be controlled by any company alone. Open innovation reduces R&D costs, quickens access to the market and shares risks between several actors. To be able to benefit from open innovation the company must renew its business model and management processes (Chesbrough, 2006).

The forerunners in open innovation have been several big companies, e.g. IBM, Nokia, Procter & Gamble and Qualcomm. Another kind of open innovation is represented, for instance, by Linux—created by experts working together on a voluntary basis.

How can innovations develop in these new organisational forms outside the enterprise? How can companies take advantage of these innovations? What mechanisms can they deploy in the mid-term? What is the role of IS in this context? These are among the questions for which this WP should provide the analytical background needed to understand the dynamics of the new capitalism, and the specific role of digital artefacts.

● The state-of-the-art of current research in the work package

The leading researchers in the field of open innovation are Henry Chesbrough (Center for Open Innovation at UC Berkeley), Eric von Hippel and AnnaLee Saxenian. In 1997, Eric Raymond wrote about the open-source software movement.

● Research gaps: relevant research issues for the ISD programme and its target communities (business, society, and other stakeholders)

- Analysing and evaluating innovation in information goods;
- Developing lessons from the open-source world;
- Leadership/management of open innovation;
- Success factors of open innovation;
- Evaluation of societal innovations based on digital objects and information systems.

● Areas of interdependence with other work packages

■ WP1: Business Models

■ WP2: Ubiquitous Networks and Business Ecosystems

■ WP5: Time, Space, and Complexity of Information & Knowledge Flows

■ WP9: Emerging Practices

● Emerging key research issues for the work package

- To what extent do open innovation models determine specific types of organisational models?

- In what ways are end-users involved in these innovation processes?

- To what extent and in what way will new organisational forms (communities) be involved in IS-based innovation?

- To what extent will information systems play a critical role in outside / open innovation?

WP 4: Ubiquitous Networks and Business Ecosystems

Description of the work package

In recent years, some Eastern Asian countries such as Japan and South Korea have developed national strategy plans aimed at implementing the concept of ubiquitous networks. For example, Japan started "u-Japan" in September 2006, following on from "e-Japan" which was launched in 2001. http://www.soumu.go.jp/menu_seisaku/ict/u-japan_en/new_outline03.html

The fundamental concept of "ubiquitous" is that it will "connect everyone and everything." Since commerce of products and services is now shifting from provider-oriented to user-oriented, ubiquitous networks will also transform society from being homogeneous to heterogeneous and are expected to generate more creative business approaches and services, as well as a new social systems and values.

This package aims to assess the state of development of this concept and its potential replication in other contexts.

● The state-of-the-art of current research in the work package

Taking as our guide sections of ICMB 2010, the main conference related to the issues of WP4, the current topics of debate are:

- Mobile value services & business models, strategies, policies & economics of mobile business (mBusiness);
- Mobile entertainment, mobile government, contextual & pervasive systems, social networking & societal implications of mBusiness, mobile marketing & advertising, mobile user behavior, innovation networks in mBusiness, enterprise applications/mobility.

From a business viewpoint, a comparison of mobile solutions in business seems interesting. For example, the following proposition appears to be valid: mobile enterprise solutions in Japan are mainly implemented for smartphones as mobile devices to enable employees to be move around inside the premises. In Europe, mainly high-capacity mobile devices with mobile communication are used for workforce mobility outside the premises.

In Japan, there are many mobile solutions using IP Centrex in business. It should be possible to transfer these applications to other countries, including Europe.

Another aspect of ubiquitous networks is B2C applications. Some research has been conducted into comparisons of B2C usage of cellular phones from a cultural viewpoint, along the lines of Hofstede's work.

- **Research gaps: relevant research issues for the ISD programme and its target communities (business, society, other stakeholders)**

There is a need for a deeper understanding of the dynamics behind the experience and practice gained over the last five years in eastern countries—Japan and South Korea—especially in the use of mobile technology for ubiquity purposes. These experiences need to be assessed both from a business and societal point of view, especially on the question of usage: expected uses, established or emerging uses, and their related barriers.

- **Areas of interdependence with other work packages**

- WP 9.

- **Emerging key research issues for the work package**

Situation-dependent service is one of the key research issues in ubiquitous networks. Situation calculus, developed by John McCarthy in AI, provides a good theoretical basis for it.

From the usage point of view, several points can be addressed:

- What are the key characteristics of ubiquitous networks?
- What is their level of effective deployment?
- What are their regional specificities?
- What is the level, and nature, of user involvement?
- What are the implications for large enterprises?

WP 5: Time, Space, and Complexity of Information & Knowledge Flows

Description of the work package

The issues of globalisation, outsourcing and off-shoring have been on the agenda of CEOs and CIOs for several years now. However, cross-cultural knowledge management and knowledge-sharing within organisations and networks, as well as learning from competitors and business partners, leave a lot to be desired. The exchange of various types of knowledge between individuals, between organisations or between different areas and milieus is a highly complex process. The impact of new communication technologies is not unambiguous. What is technologically possible is not necessarily socially acceptable. Many forecasts about the impact of digital information systems have proved to be completely wrong. This work package aims to improve our understanding of what it is that impedes the flow of different categories of knowledge.

This work package has three agendas:

- The issue of knowledge diffusion in space and time;

- The role of spatial (cultural, social) contexts for the generation, diffusion and application of various categories of knowledge;

- The question of whether, in which situations and under which circumstances face-to-face contacts can be replaced by digital information systems.

The state-of-the-art of current research in the work package

There is a clear partition in the scientific community. Some authors do not distinguish between knowledge and information. They assume that scientific results, new technologies or creative processes can be generated everywhere, that "objective" scientific truths are quickly accepted universally, that knowledge can be easily and rapidly disseminated throughout the world by digital information systems, and that everybody is able to gain access to the knowledge he or she needs.

Other authors maintain that only information can be disseminated by digital information systems, but not knowledge. They demand to distinguish between orientation contacts, planning contacts, and routine contacts as well as between internal and external contacts. According to this view, the importance of face-to-face contacts and the possibility of substituting them by indirect contacts (e.g. digital information systems) depend on the type and grade of knowledge that has to be transferred from A to B, on the relations between A and B (cooperative or competitive?), on the degree of uncertainty a person or social system is exposed to in its external environment, and on many other issues.

They argue that knowledge is situated in space and time; that the generation and diffusion of knowledge is affected by numerous spatial, cultural and social factors; that knowledge is built through acts of social interaction; that various types of knowledge spread at different speeds; that knowledge is not only in the heads of individuals but also represented in rules, routines, and architectures of organizations; that knowledge is reified in scientific instruments, machines, and research infrastructure; and that the various carriers of knowledge are never equally distributed in space.

Place matters. Creative or inventive persons are very sensitive and responsive to the attitudes and behaviours prevailing within an organisation or at their place of work. In the psychology and geography of knowledge, it is generally accepted that creative individuals are embedded in particular environments capable of either fostering or hindering their creativity and that cognitive processes are guided not only by personal capabilities or intrinsic motivations but also by interactions with, and influences from, the environment. A spatial context not only influences the generation of knowledge, it also strongly affects the justification, legitimisation, diffusion, acceptance, interpretation, and application of new knowledge. Locally produced knowledge, as the competence of locally situated actors, becomes widely disseminated knowledge only if it is shared with others, recognised by epistemic authorities of the relevant domain, and proved useful.

In a competitive society, the _time dimension_ is also very important. Success in a competitive society does not depend on knowledge or information per se but on having knowledge before another competitor (agent) does, or on receiving information earlier than others. History of science and economic history are replete with examples illustrating the extremely long time it took for highly creative ideas, new research results, and theoretical concepts to be perceived and accepted by the epistemological centres of the relevant disciplines. The slogan "invented in Europe, but realised in USA or Japan 10 years later" shows that the value of many scientific results was not recognised by the relevant organisations in spite of the fact that the publications were available on the Internet. And the financial crisis of 2009 demonstrated that the knowledge needed for the right decisions was available within the organisations in question but did not "travel" or flow to the top decision makers.

Also the question of whether, and in what circumstances, face-to-face contacts between high level decision makers can be replaced by digital information systems has not yet been sufficiently answered. In trustful or long-standing relationships, much more information can be exchanged by digital information systems than in a risky environment.

Research in this work package is characterized by the fact that many disciplines study the same topics work in a more or less isolated fashion, ignoring the findings of other disciplines. In so doing they prove that communication processes or "knowledge flows" do not function in the way that is often assumed.

An overview of the state-of-the-art from the viewpoint of the geography of knowledge can be found in the papers presented to the "Knowledge and Space" symposia at Heidelberg University. For more details see: http://www.knowledgeandspace.uni-hd.de

● Research gaps: relevant research issues for the ISD programme and its target communities (business, society, other stakeholders)

Research gaps

Historically, new communication technologies—from the creation of the first scripts to the invention of paper, the construction of the first printing machine, the innovation of the telephone, and the introduction of digital information systems—have facilitated and accelerated access to freely offered and easily understandable information. They have also changed the spatial division of labour, the structure and complexity of organizations, the asymmetry and spatial range of power relations, and the ways in which social systems and networks are coordinated and governed in space.

But none of these inventions ever abolished spatial disparities pertaining to the production, diffusion, and use of knowledge. Centres of power and knowledge have shifted, but spatial disparities of knowledge have never disappeared. On the contrary, most of these communication techniques enlarged the disparities between the centres and peripheries of national or global urban systems with regard to the distribution of workplaces for highly and marginally skilled persons.

The recurring erroneous predictions about the impact of telecommunication on the spatial mobility of codified knowledge, and most deficits in research about knowledge spillovers, and knowledge sharing in clusters, organizations and networks can be traced back to an oversimplification of the communication process of knowledge, a missing distinction between knowledge and information, and insufficient categorizations of various types and grades of knowledge. In order to improve the available theoretical concepts it should be more clearly specified which categories of knowledge are transferred, between whom, to what purpose, and under what conditions (cooperation or competition).

The categories of implicit and explicit, or tacit and codified, knowledge are not sufficient; they must be supplemented by categories focusing on the grades and carriers of knowledge. High-grade knowledge requiring years of study, research and experience to be understood by the recipients has to be distinguished from low-grade knowledge that can easily be understood by almost anybody and can swiftly be acquired. Knowledge embodied in people has to be distinguished from knowledge presented in publications or integrated in machines. Knowledge sharing within organizations or between co-operating units has to be distinguished from acquisition of knowledge in a risky and competitive external environment. Codified routine knowledge storable in databases has to be distinguished from intuition, foresight and competence based on years of experience and learning. Knowledge exchange between agents with equal expertise and professional skills (e.g. communication between the owner and user of a patent) has to be discerned from communication between agents of unequal cognitive skills and experience.

Many authors have underestimated the barriers to the diffusion of knowledge, especially when its tacit dimension is considered:

- They overlook the spatial consequences of the vertical division of labour, which become manifest in a spatial bifurcation of skills between centres and peripheries;

- They do not distinguish between knowledge and information and between different categories of knowledge; the distinction between codified and tacit knowledge or between individual and collective knowledge is not sufficient;

- They overlook the importance of the spatial context and spatial interactions in the generation, justification, diffusion, and application of new knowledge;

- They base their empirical evidence about the changing functions of cities on the resident population instead of on the places of work, as recommended and demonstrated elsewhere;

- They disregard the findings of organisation theory and underestimate the close affiliation between power and various categories of knowledge. They fail to acknowledge that a spatial system's asymmetry of power relations between centre and periphery continually prompts the migration of talent and thus produces, or reproduces, spatial disparities of knowledge;

- They apply a naïve model of linear communication between the sender and receiver of information. When analysing the process of communicating knowledge from A to B, they overemphasise the producer and codifier of knowledge and neglect the cognitive processes taking place in the receiver of information. They overlook the importance that prior knowledge has for the ability, willingness, or reluctance of potential receivers to accept and integrate certain kinds of information into their knowledge base;

- They focus on codified knowledge as a tradable commodity and fail to notice that the acquisition and application of knowledge is primarily a cognitive process;

- They undervalue the importance of the time dimension in a competitive society. Success in a competitive situation does not depend on knowledge or information per se but on having knowledge before another competitor (agent) does, or on receiving information earlier than others.

Most communication models explaining the diffusion of knowledge are much too simplistic. What Meusburger calls the "the knowledge-transfer paradox" refers to the fact that some scholars act on the assumption that codified knowledge is very mobile in space. Yet, some kinds of knowledge diffuse very slowly in space and arrive only at relatively few places. Among these forms are implicit knowledge, nonverbal knowledge (e.g., the competence to play piano), non-propositional knowledge (a type of knowledge that cannot be articulated in a that-proposition, such as knowing how to understand a bodily movement), and embedded or encultured knowledge arising from socialisation and acculturation in specific cultural settings or shaped by stable relationships in organizational routines and interpersonal relationships. Some contents of knowledge (e.g. gene technology, and the interpretation of certain "historical facts") are opposed by political elites and therefore do not circulate in certain areas.

In other words, the generation and diffusion of knowledge is affected by many influencing factors, and any delay or impediment in the diffusion, acceptance, and application of knowledge produces new spatial disparities of knowledge, at least temporarily.

● Relevant research issues for ISD

The communication process of various categories of knowledge is a central issue for all ISD research projects. Most work packages have to address the following questions, which are within the scope of WP5:

- Which categories of knowledge are easily communicated via digital communication systems, and which categories depend, and in what circumstances, on face-to-face contact?

- Why does it take years, or even decades, for some kinds of publicly available knowledge (e.g. scientific results) to be communicated between two scientific disciplines, or between science and economics?

- What are the main barriers or impediments that prevent the communication process working between two agents or organisations?

- What are the limits of knowledge management?

- What is the impact of the spatial context on the generation and diffusion of knowledge?

Since the 1980s, it has been acknowledged that the creative scientist or engineer does not work in a social, cultural, and economic vacuum. It is accepted that creative individuals are inspired or impeded by societal and organizational structures and that they depend on evaluators, audiences, and research infrastructure. It is recognized that such people may meet with incomprehension, competition, hostility, and social conflict in their environment. The environments that support or impede creativity vary in the spatial dimension.

● Target communities

- Multinational companies doing business in different cultural areas;

- Any organisation with a high degree of spatial division of labour;

- Public administration;

- Companies in the field of ICT.

● Areas of interdependence with other work packages

There are interdependencies with almost all of the other work packages. The closest areas of interdependence will be with the following work packages:

■ **WP6: Work Organization and Collective Intelligence**: Organisational structures have a spatial dimension. Social systems are at the same time spatial systems. Centres—defined as

places where the highest authority of a social system is located—have to be distinguished from peripheries, which are to a large degree directed by and dependent on centres.

The structure (or design) of organisations depends on the degree of uncertainty in the environment.

■ **WP7: IT and Technological Convergence:** New IT technologies can alter division of work, the location of high-level decision-making, and the structures of organizations. However, what is technologically possible is not necessarily socially acceptable.

■ **WP8: The Microeconomics of IT/IS:** Changes in organisational design are not only caused by new IT technologies, but also by social and contextual factors.

■ **WP9: Emerging Practices:** Modes of coordination and the question of whether centralising or decentralising high-level decision-making brings better results partly depend on spatial contexts, the degree of uncertainty of the environment, and the availability of skills.

● **Emerging key research issues for the work package**

- The impact of telecommunications on the location of work-places (jobs) for high- and low-skilled employees of various economic branches;

- The relations between knowledge and power: why do they tend towards spatial concentration? How is the power/knowledge relationship influenced by new information technologies?

- The role of proximity and distance for the generation, diffusion and application of knowledge. Under what conditions are proximity and face-to-face contacts indispensable, and under what conditions can they be replaced by digital information systems, including for IT?

- Mobility of knowledge. Why do different categories of knowledge "travel" at different speeds? Currently used communication models are far too simplistic to be able to explain the communication and non-communication of knowledge;

- Milieus of creativity. What contextual factors improve or impede creativity?

- Knowledge and action in a spatial context. The role of social and material environments for the generation and diffusion of various categories of knowledge.

WP 6: Human Resources, Work Organization and Collective Intelligence

Description of the work package

Information technologies are transforming our daily work practices. They automate part of them, and paperwork is often reduced, and coordination improved both for traditional organisational forms and for newer ones such as call and contact centres. They also inform, providing information assessments as well as more detailed contextual, raw and calculated information for individual decision-making and collective deliberation and intelligence. They therefore contribute to speeding up organisational processes and the associated cost-reduction and productivity. They also contribute to new possibilities for solving complex problems, or at least finding solutions that are socially and democratically acceptable.

There is an interest in looking at these recurring themes in the information systems discipline in different ways, as well as in investigating these themes at the level of departments, divisions, firms and extended enterprises, but also at the societal level as collective intelligence tools such as wikis, search engines and forums facilitate collective deliberation on complex problems. There is also an interest in specifically looking at the organisation of the IS function and its evolution in small and larger firms (Bounfour, 2009).

But the new emerging organisations are networked enterprises and communities, with a variety of hybrid forms, balancing different stakeholders. Here, value creation starts with collective intelligence, inside and outside the enterprise. The critical role will then be the cultivation of this collective intelligence. Organisational capital and organisational design will become increasingly critical.

In this context, the relationship to work, and the ways of organising work, particularly in the context of widespread outside innovation, are key themes of reflection and action for the leaders of the future. The demographic constraint (an aging population) has already prompted several countries—notably Japan—to develop a "ubiquitous network" approach. Information and communication technologies can be used in this context as a lever for articulating intra-and inter-organisational competences.

This WP will also deal with issues relating to capacities for—and styles of—learning, new incentive systems at work, and the modes of articulation of core competencies in new spaces of work organisation (the enterprise, the community, the network, the spot market), as well as with the specific role of organisational IS in this context. Generational as well as intergenerational issues (C, Y, X) are also very critical questions to be addressed.

• The state-of-the-art of current research in the work package

Several streams and sub-themes of research have developed under the label of "coordination". The literature on outsourcing and off-shoring continues to develop apace, but IS-based coordination seems to be heading in a direction where they will no longer be seen as a radical departure from in-sourcing and on-shoring, but rather as complementary approaches, to be investigated from different viewpoints, ranging from IT-specific human resource policy to more general project management issues.

In relation to the coordination theme, research on integration is needed at various levels:

- At the organisation integration level within the firm. Little is known about the impact enterprise systems (notably ERP, SCM and PLM) have on the quality of information and on behaviour and performance. Some have shown greater cross-functional awareness, but not in large firms. What are the conditions for large firms, as well as SMEs, to benefit from these systems? At which levels are improvements or deficiencies, if any, to be observed? To what extent do these effects depend on the modules actually implemented and on their scope (El Amrani et al, 2006)? Many of these questions unfortunately still remain unanswered;

- At the inter-organisational level, it is unclear whether integrated systems should be the norm. It is important to investigate firms' practices and technologies, such as extranets, electronic catalogues and collaborative tools that may contribute to the building of the extended enterprise and new hybrid forms.

Collectively, new forums and decision systems have to be investigated. Collective intelligence is obviously needed to deal with issues such as climate change, traffic jams and security. It is also a landmark of real leadership for dealing with internal organizational problems. With Internet and communication technologies people and computers can be connected so that—collectively—they act more intelligently than any individuals, groups, or computers have ever done before. But *the conditions for effective work and organisational design have yet to be investigated*. Some of these problems cannot be investigated at the firm level only. For example, while operational research models help to improve sub-optimal supply chains and goods delivery, the quality of the data used in logistical processes remains poor, leading to overly frequent delivery rounds.

The impact of IS on HR, work organisations and collective intelligence has been a subject matter of research for several years now. Traditionally, the research has focused on the impact of IT on organisational structures and processes, including issues such as decision-making, communication & control, workflow, productivity, and the emergence of new structural forms such as horizontal organisation and network organisation. This has in turn spurred research, on the one hand, into concepts and practices such as BPR, ERP & SCM as IT-enabled intra- and inter-organisational work flow systems, and, on the other, into business intelligence and CRM as IT-based approaches for securing competitive advantage and enhancing organisational effectiveness. The critical importance of organisation culture as a key variable in describing or predicting behaviours has also been widely researched.

Over the course of time, the scope of research has begun to encompass the processes of knowledge acquisition, sharing and utilisation in large global organisations through knowledge management systems, and this has in turn moved into research areas concerning capacities and styles of learning, and incentives for knowledge-sharing. The issues of effective project management, team leadership and managing organisation-wide IT-led changes (e.g. ERP implementation) have also been studied.

Finally, IS function governance needs to be investigated more thoroughly. It has traditionally been described as oscillating between federation and centralization. IT portfolios and systems are subject to IS governance and control; but they also evolve, drift (Hanseth et al., 2001) or emerge. Two aspects in particular require further investigation. Firstly, we need a better theoretical understanding of the dynamics of emergence, i.e. an in-depth theorisation of emergence and control. For Besson and Rowe (2001) emergence is fundamentally related to the way designers, in general, communicate with users prior to implementation; different modes of communication, and of dealing with conflict, pave the ways for different forms of emergence. Emergence is also related to technological and structural paradigms (Rowe, 1994). But overall, the information systems discipline seems to lack a general theory of emergence that would offer a better understanding of what and how IT can be controlled. Secondly, we need a better description and theoretical analysis of current practices. There may in fact be a significant gap between intended portfolios and the portfolios that are actually in use. At the operational level, managers and employees introduce new systems to supplement or replace the officially mandated applications. Typically, web-based applications such as Google docs, Twitter and wikis or databases such as Excel or Access are more often used, as an increasingly savvy workforce uses IT at home and outside the workplace. An investigation of these practices—covering function IT, network IT and enterprise IT—should also help understand why and how emergence occurs.

● Research gaps: relevant research issues for the ISD programme and its target communities

The current research endeavours identified above can also be seen as research issues relevant to the ISD Programme. The objective of research under ISD should be to strive for comprehensiveness, international comparison, and the transfer of learning from one context to another. This approach will ensure that the global perspective of ISD is given proper consideration. Further, research should strive to address the stated and unstated needs of the target communities. Studies with common research frameworks can be conducted in selected identified countries to obtain insights into cultural and social dimensions, such as consumer affluence. For example, studies related to mobile usage and its impact in Japan and Europe could be extended to cover other countries such as India, which provide the additional dimensions of large size and the co-existence of highly prosperous and highly deprived population groups.

Among the topics to be considered for the research agenda are:

- Coordinating outsourced and offshore resources with internal resources in IS projects and in operating IT infrastructure (targeted on CIOs);

- Structure, governance and work practices in the IS function (CIOs);
- The impact of integrating resources and systems on cross-functional awareness, work behaviour and performance (business);
- New organisational forms and designs (business and society);
- Collective intelligence (business, society, and other stakeholders);
- Generational and intergenerational issues (Y, C, X…) and the digital divide.

Areas of interdependence with other work packages

There is obviously a great deal of overlap between WP6 and many other packages. For example:

■ WP1: Business Models, which explicitly addresses the issues of the future organisational modes related to future business models;

■ WP2: Social & Ethical Values, which also focuses on the issues surrounding the emergence of horizontal forms and spot markets;

■ WP3: Outside & Open Innovation, which refers to the emergence of innovations outside the vertical organisation;

■ WP4: Ubiquitous Networks, which are also a response to the issues of WP6;

■ WP5: Time, Space, and Complexity of Information & Knowledge Flows. One can see a high degree of overlap of WP6 with this package;

■ WP8: The Micro-Economics of IT/IS, which will also examine the economic impact of emerging changes in organisational design;

■ WP9: Emerging Practices, which concerns itself with the ways of organising centralised and decentralised IS.

Emerging key research issues for the work package

- Research into outsourcing / off-shoring and global sourcing / global delivery models, making them more inclusive and multi-dimensional;
- Organisational design and the generation issue (Generation C, Y, X…);
- International knowledge flows & the geography of knowledge (WP 5);
- Impact of IT on business organisations: current & foresight perspective;
- Continued research into the processes of knowledge creation, knowledge sharing and learning at enterprise level, and the use of collaborative technologies;
- Research on innovation ecosystems in selected countries (e.g. India and China);
- Competence-building through education & training.

WP 7: IT and Technological Convergence

Description of the work package

The purpose of this work package is to identify and evaluate the emerging information and communication technologies that will shape the modes of corporate organisation between now and 2020. For instance, real-time collaboration technologies such as video-conferencing are revolutionizing the way corporations communicate and collaborate today. This in turn leads to considerable savings in terms of time and money (which would otherwise be spent in travel). The most prominent revolution in information technology today is the emergence of cloud computing and the advent of Software as a Service (SaaS) as the preferred model of technology investment. With Web 2.0 gaining worldwide recognition as the way forward, we are seeing more and more traditional software services move to the cloud (internet). CRM applications, for instance, are increasingly deployed not within the firewalls of an organization, but hosted by a third-party organization like SalesForce and accessed over the Internet as and when required. This is similar to the way individuals access Yahoo Mail or Gmail from anywhere, as and when they need it. This removes the overhead in terms of the huge upfront investment required to procure the software and the hardware to deploy it on. Meanwhile, innovations like GoogleWave are making real-time collaboration a reality. There are several such vendors offering products and services that are revolutionizing the way we go about doing our everyday business and are even significantly impacting the way organizations operate. This package will also identify specific hardware technologies (e.g. servers, datacenters), networking technologies, Internet technologies, database technologies and mobile technologies. This evaluation exercise will be conducted on a rigorous basis by mobilizing the most prominent scientists and experts.

• The state-of-the-art of current research in the work package, and the institutions involved

The state-of-the-art of current research in the WP

Cutting-edge research has bee conducted mainly in the area of databases and networking technologies. The Advanced Database Research Group (ADRG) at the Eller College of Management, studies "interoperability among heterogeneous database systems", which leads to seamless electronic data interchange (EDI) between diverse databases produced by different vendors. This reduces the need for collaborators to have uniform database systems and provides a great degree of flexibility. IBM Research has been pioneering research on efficient data-access methods for RDBMS (Relational Database Management Systems) and accessing semi-structured and unstructured data. The research group at Stanford University has been developing a new database system called TRIO, which not only manages data but also manages the accuracy and lineage of the data.

In the area of networking technologies, the Network Systems Laboratory at IIT Madras, has been pioneering work on computer networks and multimedia and trying to understand the techniques for reducing the latency of retrieval in online presentations. In the area of Internet technologies, academic research is more focused on retrieval of information through search engines. For example, at the InfoLab of Dr. Hector Garcia-Molina (Stanford), the WebBase project has been focusing on crawling, storing, indexing and querying large collections of web pages and examining how the data archive can be made available/accessed by various stakeholders. Meanwhile, corporate research in the same area has focused on monetizing the use of Internet technology. For example, intelligent advertisement delivery, which targets particular user profiles, is gaining in importance. Professor Ghose at the Stern School of Business has been studying the effect of user-generated content in online information exchanges on the Internet and the monetization of such content. With the introduction of technologies like Google's Chrome operating system, hardware could be a thing of the past. All one would need is a browser to access all the required applications. This could mean storage spaces on hardware devices no longer matter, as everything will be stored in the cloud and accessible from everywhere.

In their 2006 editorial in the leading information systems journal ISR (Information Systems Research), two academics, Dr. Rai and Dr. Sambamurthy, called for greater attention to the study of services. They outlined the broad areas into which further research in information systems can expand, and the opportunities that exist for scholars. This is very apposite for our WP7. Particularly, with more and more software taking the services route, the time is right to study this domain from a service science perspective. While there has been a strong line of research on services in the marketing literature, in information systems it is still somewhat embryonic. This underlines the importance of driving more research in this area, and the relevance of this WP7. Current research as it relates to web-based services focuses mostly on trust (the readiness of people to rely on a third-party vendor to store their confidential data), buyer intention, complexity of networks etc. Studying from a shareholder perspective, or from the customer's perspective, would elicit more interesting research findings.

Research is also still early in the early stages on Web 2.0 and Enterprise 2.0 technologies, especially with regard to how they impact the bottom-up sharing of information/knowledge, and how they gather and leverage collective preferences/opinions and combat information overload. Furthermore, given the massive demand for (re)training workers into knowledge professionals in the new knowledge-based economy, and taking into consideration the rapid advance of mobile technologies and broadband/WiFi/WiMax coverage, mobile technologies in learning are clearly going to be an important area over the next 10 years, with rapid expansion and adoption. Again, research in this area tends to be insufficient, with nearly all of the work to date focussing on research prototypes operating on proprietary and non-scaleable platforms.

● **Current research institutions, research issues & sponsors**

Research Institution	Research Issues	Sponsors
Advanced Database Research Group (ADRG)—Eller College of Management at the University of Arizona	Interoperability among heterogeneous database systems (principal investigator: Dr. Sudha Ram)	IBM, Intel, Raytheon, US ARMY, NIST, National Science Foundation (NSF), NASA.
RFID Research Center at the Sam Walton College of Business	Item level tracking using RFID technology	WalMart, Motorola, Tyson Foods, etc.
Center for Research on Information Technology and Organization (CRITO) at UC, Irvine	Social networks, IT & public policy	N/A
Center for Information Technology & the Networked Economy (CITNE) at ISB, Hyderabad	New computing technologies, Web 2.0 success strategies, grid and distributed computing, impact of IT	N/A
Network Systems Laboratory at IIT Madras	Multimedia networks, mobile wireless networks	Tata Consultancy Services
Laboratoire du Dr. Sethuraman Panchanathan, School of Computing and Informatics	Multimedia computing, face/gait analysis	N/A
Stern School of Business, New York University	User-generated content	NSF

In Web 2.0 and Enterprise 2.0, several key research laboratories in Europe (e.g. DFKI, KNOW-Centre, Cardiff University, etc.) are conducting research into ad-hoc areas. In Asia, the Japan Advanced Institute of Science and Technology (JAIST) and Hong Kong's Knowledge Management Research Centre (KMRC) at the Hong Kong Polytechnic University are actively researching the topics of Web 2.0 and knowledge systems. Samsung SDS has already deployed an in-house knowledge platform combining, among other things, taxonomy frameworks and folksonomy tags contributed by employees. Other critical issues to be explored in research include:

- How can we best leverage Web 2.0 tools for effective bottom-up knowledge sharing?

- How can we merge enterprise knowledge with personal knowledge?

- What are the obstacles to introducing Enterprise 2.0 tools into an organisation and how can they be overcome?

- How can we measure the success and benefits of Web/Enterprise 2.0 tools?

- What is the role of scenario-based learning in organisations, and how should we deploy such tools?

- How can we provide a personalised learning environment for knowledge workers?

- Do we still need a corporate IT department in the future? If so, what will its role be?

Financial services, transportation, logistics and healthcare industries are expected to be very receptive to the above research agenda, especially for the Web2.0 approach, the reason being that organisations in these industries have knowledge-intensive activities and complex business processes involving multi-party stakeholders, IT-centric operations, and a large number of mobile workers.

That apart, corporations like Zoho, Google and Microsoft have also been focusing a lot on research into Web 2.0, specifically in the field of cloud computing. Amazon's S3 Web Service is yet another pioneer in this area, indicating that Amazon is also involved in this domain; recommendation agents are a main area of interest for Amazon Corporation.

Research Gaps: relevant research issues for the ISD programme and its target communities (business, society, other stakeholders)

Privacy issues

This is the single biggest issue in today's networked world. With all systems literally connected to the web, the chances of intrusion into confidential information are very high. And with location-aware technologies, that can even transmit where one is located geographically, privacy is at a bare minimum. This could have far-reaching consequences in particular for corporations that store their customers' data. More research is required to understand how this privacy issue can be addressed.

Compatibility of different technologies

With numerous choices today, it is possible for companies to pick and choose their own IT components. That being the case, how does the compatibility factor impact the way companies interact (with clients, service providers, customers)?

Adoption of new technologies

Although a lot of work has been done in the area of technology acceptance, we still need to further our understanding of the acceptance of revolutionary technologies such as Web 2.0, which, as well as being useful and easy to use, also bring a degree of uncertainty. For example, what if the network is attacked by a virus, what if the Internet is not available, what if the data centre is attacked and all the confidential customer financial data is lost?

The impact of these technologies on the company's bottom line

All of these technologies are supposed to revolutionise the market while cutting costs. But do they in actual fact really do so? Also while they cut costs, do they adversely affect the customer's opinion, thereby impacting the company's stock price?

Repair of trust

It is very likely that there will be a service outage from time to time (even the most popular services like Gmail from Google and Bing from Microsoft have had outages in the past that have impacted people worldwide). In such scenarios, how do the companies bounce back to carry out trust repair?

The impact of social networks on sustained and effective usage of these systems

• Area of interdependence with other work packages

Talking, as it does, about a revolution, this WP has significant links to other WPs, namely WP1 (Business Models), WP4 (Business Ecosystems and Ubiquitous Networks) and WP9 (Emerging Practices).

• Emerging key issues for the work package

- How do firm characteristics determine the rate of acceptance and deployment of these technologies?

- How do user characteristics determine the level of effective use of these systems?

- How do social network characteristics determine levels of trust and sustained investment in these systems?

- What is the impact of these emerging technologies on a firm's strategy, processes and performance?

- What is the ROI of these emerging technologies?

- What are the best practices in terms of the adoption, use and maintenance of these technologies?

WP 8: The Microeconomics of IT/IS

Description of the work package

The focus of this area is on understanding the economic impact of information systems on organisational performance, organisational design, and societal trends.

The state-of-the-art of current research in the work package

The literature on the impact of information systems on organisational performance presents contradictory arguments. Furthermore, it is not sufficiently future-oriented (prospective), e.g. founded on future organisational design. ISD will seek out projects that provide ways of measuring the value-added of information systems for organisations, taking into account possible evolution scenarios (networks, communities, and other organizational forms). Projects in this area should also attempt to forecast the impact of information systems on organisational design and the resulting changes in economic performance. Because information systems affect the economic performance of organisations, they necessarily have an impact on overall societal trends such as employment, outsourcing, company stock prices, and public sector efficiency. These larger-scale issues emanate from organisational design and internal performance. Thus, it is essential that more aggregated projections of firms' performance be derived from internal organisational performance trajectories. ISD seeks to initiate a new trend in research, dedicated to understanding the relationship between the economic impact of information systems both locally—within organisations—and globally, taking account of new forms of social organization.

Research gaps: relevant research issues for the ISD programme and its target communities (business, society, other stakeholders)

There are numerous gaps in the current research into the economic impact of information systems on organisational design and performance, as well as at the societal level. For example, there has been an ongoing debate about the "productivity paradox" and the inability to objectively quantify the economic impact of information technology on overall corporate performance as well as societal-level changes in productivity. There has also been much debate about how information systems impact organizational design and the consequences for estimating the economic value they add to the organization.

Areas of interdependence with other work packages

In terms of the microeconomic impact of IT/IS, WP8 overlaps with WP1 and WP11. Clearly, the use of information systems can provide a number of options for creating and modifying business models (WP1). For example, most of the large retailers have been employing a "clicks and mortar" approach, allowing customers to access their products and services on line as well

as by the usual visits to their physical locations. Also, there are examples of "game-changing" strategies that include information technology as the enabler of new business models. For example, companies have come to social e-networks to access the underlying collaborative cohorts in order to rate—as well as advertise—their goods and services.

Performance rules would be difficult to assess and enforce without the monitoring capabilities of enabling information systems (WP11). These performance rules include more than the performance of the information technology as such; they also incorporate the general performance of various areas and core processes within organisations.

● Emerging key research issues for the work package

One critical issue that research in this work package should include is how to unambiguously tie information systems to the economic performance of the organisation. This issue is also critical for non-profit, public-sector organisations where the economic impact of information systems must be determined in other areas than simply "cost-cutting". Public-sector organisations must also provide a way of evaluating the economic benefits of using information systems within these organizations, as well as externally, for society at large.

Benchmarking the economic impact of information systems could be useful in determining sector baseline performance expectations, and in identifying best practices. This kind of work would provide some episodic models and performance expectations for organisations contemplating the acquisition and implementation of new information technology.

Organisational designers would benefit from understanding the economic impact of information system usage in different organizational configurations. This kind of research work would provide guidance, and possibly normative models, to achieve given organizational designs using information technology with their subsequent economic impacts.

The issue of complementarities (Milgrom and Roberts, 1990) can be refined from this perspective, in relation to the broader issue of organisational capital.

● Research questions:

- How do investments in information technology affect organisational design decisions?
- What are the baseline returns on investment in information technology for the various industry segments?
- What are the average volatilities of ROI from IT for different organisations?
- How do reports on the ROI of IT in corporations influence the decisions of investors (including financial analysts, fund managers, private investors) and stakeholders (including government and NGO leaders) with regard to the companies concerned?
- How have investments in information technology affected the performance of not-for-profits (e.g., government agencies, NGOs)?

WP 9: Emerging Practices

Description of the work package

The evolution of information and communication technologies corresponds to a succession of shared and specific tendencies, to gradual and radical evolutions and to local and general learning processes. This diversity suggests that ITC implementation should not be reduced to mere technology. Technological applications are produced and structured through dynamic social processes that take into consideration existing organisational and user practices. Specific attention should, therefore, be paid to early adopters and emerging practices since they signal noteworthy innovations and may contribute to further technological improvements. This is the case for information system management within a specific organisation, but also for open network applications (e-commerce, Web2.0, open innovation, etc). This WP aims to characterise and identify the trends now emerging regarding user practices and organisational implementation in the industrial context. Examples might include: involvement in social networks, community of practices, information search, user-generated content applications, outsourcing and ASP, the sharing of computing resources, the development of mobility, and the control and disclosure of information.

The state-of-the-art of current research in the work package

The dynamic of information and computing services relies on innovation. This does not only refer to the introduction of new technical supports to improve processes, infrastructures or terminals: it also concerns the development of new business designs, cognitive industrial systems and efficient applications for users. From this viewpoint, the existing theories in management of innovation argue that developers need to work simultaneously with users, project managers, CIOs and strategic business lines.

Existing IS research also demonstrates the need to recognise, on the one hand, the non-deterministic, processual, multi-layered dimensions of the technology (infrastructure, software, networks, business model, uses, etc.), and on the other, the constant interactions and feedback loops between technological and organisational evolution. The efficient management of such interactions (tracking of emerging practices, experimentation with new applications, close relations between developers and users) offers opportunities for rapid evolution and innovation.

The current research can be outlined as follows:

- Analysis of IT projects: emerging models of open innovation;
- Development of Web 2.0 organizations: the growing role of communities and social networks in industrial contexts;

- The new role of information and knowledge management (for instance the case of Enterprise Search Solutions);

- Emerging attitudes, new consumer roles and the development of creative business models on the Internet.

● Research gaps: relevant research issues for the ISD programme and its target communities (business, society, other stakeholders)

Beyond the general framework depicted above, the following research issues may also be identified as relevant:

- New relations between private and public practices: convergence, cross-learning process, workstation maintenance and ownership;

- Industrial appropriation of Internet uses and B2C practices (namely games, social networks, UGC, etc.);

- The ability to develop permanent industrial observation posts on emerging practices, to improve the management and implementation of new IT applications, to share and accelerate the dissemination of existing and emerging best practices.

● Areas of interdependence with other work packages

Axé sur les pratiques des utilisateurs, ce lot est étroitement lié à la plupart des autres lots. Plus particulièrement, le Lot 1 (Modèle d'affaires), le Lot 2, (Valeurs), le Lot 3 (Innovation ouverte), le Lot 4 (Omniprésence), le Lot 5 (Information et connaissance), le Lot 6 (Organisation du travail et intelligence collective) et le Lot 12 (Gestion des fonctions et territoires numériques en 2020).

● Emerging key research issues for the work package

- Longitudinal in-depth analysis of emerging practices in specific technological applications or domains (communities & social networks, enterprise search applications, IT-supported cooperative work, KM, etc).

- Analysis of the level of novelty of emerging practices: are they radically new practices influenced by new IT, or merely recombinations and adaptations of existing practices?

- How should we categorise industrial cases of the adoption and integration of emerging practices in the design of innovative IT applications? What are the implications for the management of innovation and new services?

- What are the consequences of emerging practices for IS management: horizon-scanning (low-level signals), distributed learning and sharing of best practices, implementation and incentives, controls and limitations?

WP 10: Regulation

Description of the work package

The ubiquity of information and related networks will raise significant ethical and regulatory issues for societies of the twenty-first century. This WP will consider this issue from a dynamic point of view, taking into account the latest developments. It will also offer an adapted approach for company management, while also considering the possible diversity of ethical rules from one nation to another.

The state-of-the-art of current research in the work package

The main policy/regulatory issue is **privacy**. Privacy is a fundamental human right that underpins human dignity and values such as freedom of association and freedom of speech. It is recognised around the world in diverse regions and cultures and it is protected in many international and regional treaties. At a minimum, relevant treaties include rights of inviolability of the home and secrecy of communications. Recently, some treaties also include specific rights to access to, and control of, one's personal information ("personal data" in the EU Data Protection Directive).

There are four major models for privacy protection:

- *Regulation*. This generally refers to a law that governs the collection, use and dissemination of personal information (or data) by both the public and private sectors, with a legal authority ensuring compliance. This model exists in the EU (Data Protection Directive) while a variation of it, which can be described as a "co-regulatory model", has been adopted in Canada and Australia. Under this approach, industry develops rules for the protection of privacy that are enforced by the industry and overseen by a privacy agency. (For the EU see for example http://www.ejcl.org/91/art91-3.PDF and
 http://www.eesc.europa.eu/smo/publications/2018_Cahier_EN_SMO_def.pdf).

- *Sectoral Laws*. Some countries, such as the U.S., have avoided enacting general data protection rules in favour of specific sectoral laws (e.g. financial privacy, video rental records privacy). Sectoral laws may be used to complement comprehensive legislation by providing more detailed protections for certain categories of information (e.g. telecommunications, police files, consumer credit records). But they also may show limitations since new legislation needs to be introduced with each new technology, and there is no legal authority.

- *Self-regulation*. Sometimes, companies establish "codes of conduct" or "codes of practice" and engage in self-policing. However, such a model may suffer from a lack of adequacy and enforcement. This is why consumer organisations and civil society groups in Europe generally consider that while a "recommendation" or "code of conduct" may provide more flexible and

rapid solutions in comparison to traditional law-making, such "soft law" measures would only be acceptable if fully respecting the minimum regulatory criteria of the Lund declaration of April 2001 (i.e. efficacy, democratic legitimacy, consumer confidence, together with coherence and consistency in the context of the single market).

- *Privacy Enhancing Technologies* (PETs). With the recent development of commercially available technology-based systems, privacy protection has moved into the domain of control by individual users. The European Commission organised an international workshop in Brussels on 12 November 2009 to discuss the economic benefits of PETs.
See: (http://ec.europa.eu/justice_home/news/events/workshop_pets_2009/programme_en.pdf)

Information technology developments since the 1960s and 1970s have played a major role in the evolution of privacy rights. The genesis of modern legislation in this area can be traced back to the first data protection law in the world enacted in the German Land of Hesse (1970). This was followed by national laws in Sweden (1973), the U.S. (1974) and France (1978). Two crucial international instruments evolved from these laws: the Council of Europe's 1981 Convention for the Protection of Individuals with regard to the Automatic Processing of Personal Data, and the OECD Guidelines Governing the Protection of Privacy and Transborder Data Flows of Personal Data.

● **Research gaps: relevant research issues for the ISD programme and its target communities (business, society, other stakeholders)**

A comprehensive study should be carried out to investigate differences in productivity performance across countries over the past 20 years and the role that particular national or regional regulations may have played in these differences. For example, some experts believe that the alleged "tight regulations" in the EU have slowed down growth in ICT-using sectors (e.g., RFID in logistics and transport, healthcare, distribution and commerce). However, it could also be argued that under certain conditions regulations may create a competitive advantage for companies insofar as they create or support consumer trust in the products and services offered. In other words, it is not established today that regulations hurt firms that have the potential to excel in domestic and global markets. This topic should be further explored and debated.

● **Areas of interdependence with other work packages**

■ WP2 Social and Ethical Values (ethics);

■ WP3 Outside & Open Innovation (governance);

■ WP5 Time, Space and Complexity of Information and Knowledge Flows (regional regulation & global trends/forces);

■ WP7 IT and Technological Convergence (implications of convergence on regulation).

● **Emerging key research issues for the work package**

- What are the implications for privacy?

- How universal is the "silence of the chips"?

- What will the impacts be on NBIC technologies?

- What are the regional specificities?

- PETs;

- Internet of Things governance.

WP 11: Performance Rules and Standards

📝 *Description of the work package*

This WP aims at addressing several questions: What type of monitoring will apply to IT/IS territories by 2020? What type of scorecards will be designed? What might the modes of articulation be with senior management, business lines and the wider network of business?

● The state-of-the-art of current research in the work package

The literature has not thus far addressed the issue of foresighting IS territory performance. A recent overview of the IS research agenda indicates that inter-organisational issues, as well as societal issues, are now under consideration by researchers (Sidorova et al. 2008). At the practical level, CIOs and their ecosystem are aware of the deep shift in value creation and innovation from inside the enterprise to the society at large (WP2 Outside and Open Innovation). The observation of emerging practices attests to the predominance of users—potentially "lead users"—in the process of implementing digital artefacts. The literature on innovation and strategy underlines the importance of open innovation, the emergence of communities, and of spot markets as complementary spaces for value creation. IS, in this context, might become the hub for leveraging firms' and networks' resources.

● Research gaps: relevant research issues for the ISD programme and its target communities (business, society, other stakeholders)

What is the state of the art in performance standards? As indicated in WP8, the literature is still mainly focused on the impact of IT investment, and on assessing IT function maturity in terms of what is put into practice as standards (ITIL, COBIT, CMMI among others). A substantial share of the literature has been devoted to the analysis of IT assets as complementary to other assets. But the design of this research, and the indicators and metrics used, are mainly based on the organisational unit, e.g. the vertical enterprise.

We need to go further by putting forward:

- The driving forces for mid-term performance;
- The architecture for possible standards and scorecards.

- **Areas of interdependence with other work packages**

■ WP1: Business Models;

■ WP8: The Microeconomics of IT/IS

■ WP12: Managing IS Functions & Territories in 2020

- **Emerging key research issues for the work package**

  - What will the driving forces of IS performance be in 2020?

  - What architectures are possible for socio-economic performance?

  - What are the corresponding standards and metrics?

WP 12: Managing IS Functions (and Territories) by 2020

Description of the work package

The information society is no longer a society where the optimisation of the use of scarce resources is important, but making choices in the abundance of possibilities generated by new technologies. Information (use) is the survival kit for organisations in search of innovation. This inevitably entails a fundamental reflection on the value system adhered to and hence on the very identity of the organization. The information society is becoming a values society.

This phenomenon also gives rise to a blurring of the frontier between organizations, companies as well as governmental agencies, and society: sustainability is everyone's responsibility. Virtualisation and the advent of networks of temporary organizations such as communities are a logical consequence. These permanently changing organizations all participate in large digital territories with new governance rules. In this "management of digital territories", control, market and care compete for supremacy as leading governance principle.

We all agree we live in an information society, but information professionals distinctively stay away from vital discussions on the future of this evolving, yet vulnerable society. The CIO of 2020, as well as the forward-looking CIO of 2010, is playing a vital role in this transition. Information and no longer ICT is his primary focus. Information systems anticipating the future and no longer those explaining the past, the opportunities of the information society and no longer the technological relics are in his center of attention. He is playing a vital role in society, at the center of the "informational hub" of organizations and society; he is no longer an inward-looking supporting functionary.

The analysis will determine the analytical elements necessary to characterise the profile of the CIO function by 2020 as well as of its relevance. It will outline the necessary steps to be taken in order to arrive at a CIO function that is responsible in society as well as in its own organization.

● The state-of-the-art of current research in the work package

The current research on information management and the potential role of the CIO is very much concentrated on the concept of business-ICT alignment. Not withdrawing the results attained, one should conclude that the artificial separation between IT and business (in a sense equivalent with "all the rest of the organisation") didn't do any good to a better integration of IT in contemporary organizations. Further, information is still very much linked to its technological appearance, whereas the information society is stressing the independent "life" of information as one of its primary features: information and no longer ICT should be at the focus of relevant research. Finally, no serious research has been done on the societal role of the CIO as depicted above.

This conclusion doesn't mean that no valuable pre-research for this programme has been done. Precious lines of thoughts can be derived, e.g., from recent programmes integrating perspectives on the role of ICT in their investigations. Examples are: the MIT programme of the enterprise of the XX1st Century, the Nordic project, the EPO Scenario for the Future, Futuris as well as France Numérique 2020, Being Human – Human-Computer Interaction in the year 2020 (ed. by Richard Harper from Microsoft Research), the IST Forum and more recently the FinES Future Internet Enterprise Systems Research Roadmap at the European Level. They all developed interesting arguments and scenarios for the future of ICT impact but to a less extent the impact of information as an independent societal agent.

● **Research gaps: relevant research issues for the ISD programme and its target communities (business, society, other stakeholders)**

There is a need to understand the emerging dynamics in digital (knowledge) territories, in order for executives and decision makers to design appropriate tools for managing organisations. Relevant research issues regarding the role of the CIO in 2020 include the following:

- There is a need to understand the emerging dynamics in digital (knowledge) territories, in order for executives and decision makers to design the adapted tools for managing organisations
- Governance has to be redefined as separated from ICT governance and from a uniquely hierarchical, control-oriented vision.
- Which mechanisms can be defined and worked out in order for the CIO to become the Chief Inspiration Officer of his organisation?
- The role of the CIO in society has received no attention, despite the fact that major societal issues were all linked to information related issues.
- The educational programmes for CIO's have to be (re)defined with a view to the issues mentioned above. These programmes should educate for "information leadership".

● **Areas of interdependence with other work packages**

All of the previous WPs**.**

● **Emerging key research issues for the work package**

- What type of design will we find for digital/knowledge territories (companies, communities, markets, etc.) in 2020?
- What will be their driving forces?
- What type of governance will apply?
- How will IS systems and artefacts be used in this context?
- What role—if any—will there be for the CIO?

WP 13: Blank Call for Projects

This call is open primarily to projects at the frontier of research in one (or more) of the three main dimensions of the programme: strategic, organizational, and societal.

References

▪ Afuah, A., Tucci, C. (2003), *Internet Business Models and Strategies*. Boston: McGraw Hill.

▪ Baden-Fuller, C. et al. (2010), *Long Range Planning*, special issues on business models.

▪ Baxter, R., Matear, S. (2004), "Measuring intangible value in business-to-business buyer-seller relationships: An intellectual capital perspective", *Industrial Marketing Management*, 33, 491-500.

▪ Berthon, P., Ewing. M., Pitt, L., Naudé, L. (2003), "Understanding B2B and the Web: the acceleration of coordination and motivation", *Industrial Marketing Management*, 32, 553-561.

▪ Besson, P., Rowe, F. (2001), ERP project dynamics and enacted dialogue: perceived understanding, perceived leeway, and the nature of task-related conflicts, Database for Advances in Information Systems, 32(4), 47-66.

▪ Bounfour A. (2009), Organisational capital, Modelling, Measuring, Contextualising. Routledge, London & NY.

▪ Bounfour A, Epinette G. (2006), Valeur et performance des SI, Une nouvelle approche du capital immatériel de l'entreprise. Dunod. Paris.

▪ Chesbrough, H. (2006) *Open Business Models: How to Thrive in the New Innovation Landscape*. Boston: Harvard Business School Press.

▪ El Amrani, B., Geffroy-Marronat, B., Rowe F. (2006), "The Effects of ERP Implementation Strategy on Cross-Functionality", *Information System Journal*, 16(1), 79-104.

▪ Hanseth, O., Ciborra, C., Braa, K. (2001), *Database for Advances in Information Systems*, 32(4), 34-46.

▪ Hayes, J., Finnegan, P. (2005), "Assessing the potential of e-business models: Towards a framework for assisting decision-makers", *European Journal of Operational Research,* 160, 365-379.

▪ Itami, H, Nishino, K, (2009), "Killing Two Birds with One Stone: Profit for Now and Learning for the Future", Long Range Planning.

▪ Johnson, M., Christensen, C., Kagermann, H. (2008) Reinventing Your Business Model. *Harvard Business Review*, 86 (12) December, p. 50-59.

▪ Karahanna, E., Preston D., Rowe, F. (2006), "Development of Shared Understanding Between the Chief Information Officer and Top Management Team in U.S. and French Organizations: A Cross-Cultural Comparison", *IEEE Transactions on Engineering Management,* 53(2), 191-206

▪ Lecocq, X., Demil, B., Warnier, V. (2006) Le business model, un outil d'analyse stratégique. *L'Expansion Management Review*, 123, December, pp. 96-109.

▪ Mahadevan, B., (2000). "Business models for Internet based e-commerce: An anatomy. *California Management Review*, 42(4), 55-69.

▪ Markus, L. (2008), Going the last mile for business integration, CIO Symposium, ICIS 2008, Paris, December 16.

▪ Normann, R. Ramirez, R., (1998), *Designing Interactive Strategies, From Value Chain to Value Constellation*. New York, John Wiley & Sons.

▪ Osterwalder, A. (2004), *The Business Model Ontology. A Proposition in a Design Science Approach*. PhD. Université de Lausanne. Ecole des Hautes Etudes Commerciales. Switzerland.

▪ Osterwalder, A., Pigneur, Y. (2009), *Business Model Generation.* A self-published book. Lausanne. ISBN: 978-2-8399-0580-0

▪ Osterwalder, A., Pigneur, Y., Tucci, C., Clarifying business models: Origins, present and future of the concept. *Communications of AIS*, 16(1), 751–775.

▪ Porter. M.E. (1985), Competitive *Advantage: Creating and Sustaining Superior Performance*. New York Free Press.

▪ Ramirez. R (1999), "Value coproduction: Intellectual origins and implications for practice and research", *Strategic Management Journal*, (20) 49-65.

▪ Rappa. M. (2004), Business models on the web. Available at:
 http://www.digitalenterprise.org/.

▪ Rowe, F. (1994), "Data network productivity and competitive behavior", *Technological Forecasting and Social Change*, 46 (1), 29-44.

▪ Stabell, C.B., Fjeldstad, Ø.D. (1998), "Configuring Value for Competitive Advantage: On Chains, Shops, and Networks", *Strategic Management Journal*, 19 (5), 413-437.

▪ Timmers, P. (1998), Electronic Commerce: Strategies and Models for Business-to-Business Trading. Wiley.

▪ Von Hippel, E. (2006), Democratizing Innovation. MIT Press, Cambridge, Mass./London, England.

▪ Weill, P., Vitale, M. (2001), *Place to Space: Migrating to E-business Models*. Boston: Harvard Business School Press.

▪ Zott, C., Amit, R. (2008), "The fit between product market strategy and business model: Implications for firm performance", *Strategic Management Journal*, 29 (1), p. 1-26.