INSTITUTIONAL AND COGNITIVE FEATURES OF THE ACADEMIC FIELD OF INFORMATION SYSTEMS IN EUROPE

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Abstract

This paper outlines the academic field of Information Systems in terms of its main thematic areas and theories, and discusses the institutional and cognitive features of this field in Europe. It shows that the field is concerned with a large range of questions regarding the development, use and implications of information and communication technologies in organisations, and does not fit neatly within the conventional divisions of academic disciplines. The study of IS remains institutionally weak, particularly in Europe. Despite its diversity of topics, methods and theories, cognitively it lacks confidence, it is reluctant to make cause and effect statements, and avoids making predictions. However, throughout its history the IS field has filled the gap between the invention of new technologies and the macro-level generalisations regarding the impact of such inventions with a wealth of detailed knowledge. Whether its position within academia will become more prominent with time or it will decline depends not only on the validity and significance of the knowledge it produces, but also on the capacity of academia itself to foster the inquiry of new phenomena that transcend its established institutional divisions and enquiry conventions.

Introduction

The academic field of Information Systems (IS) has its origins in applied computer science studies of the 1960s which aimed at systematising the design of data processing applications in organisations. Since those early days the field has been broadened in scope to study the efforts organisations make to respond to the challenge of continuous and profound innovation in information and communication technologies. In many countries IS studies are now more frequently hosted in business schools and faculties of social science, such as economics, than in faculties of computer science or engineering.

The IS field gradually emerged as an internationally identified academic field since the early 1970s. In 1972 the American Computer Society (ACM) published a curriculum for a two-year Masters degree on computing in a business context. This was followed by similar curriculum suggestions by the International Federation of Information Processing (IFIP), intended to create knowledge on the design of computer based information systems. Other important landmarks in the creation of the field have been the publication of publication of its major research journals – *MIS Quarterly* in 1977, and *Information Systems Research* in 1987 – the launching of the International Conference of Information Systems (ICIS) in 1980, and the establishment of the Association for Information Systems (AIS) in 1995.

The most dominant group in these journals and conferences has been IS researchers from the North American business schools. Europe, although not as homogeneous as North America, has made distinct contributions which amount to schools of thought - such as the Scandinavian socio-technical approach, or German software engineering - with

particular research agendas and methodological approaches. The launching of the European Conference of Information Systems (ECIS) in 1993 has made European IS research much more visible within the international IS community.

However the IS field has never attained a prominent position within academia, despite the timeliness of the issues it addresses. The object of IS studies does not fit easily within the categories of conventional scientific disciplines. Although IS is concerned with a new technology, it addresses questions of organisational action and social change. Drawing from both engineering and social science disciplines its value and rigour are often questioned by both. This problem is particularly acute in Europe, where the study of IS has not been subsumed in business schools as widely as in North America, and is accommodated in a variety of university faculties. While such spread has enriched European IS studies intellectually, it has left the field institutionally weak.

There has always been concern within the IS field itself about its 'scientific' merit, and its future. Some have called for a more strict definition of the object of study, and more rigorous efforts for its theoretical foundations. However, it is generally felt that the variety of research topics and approaches, the interdisciplinary sources of theory used, and the methodological pluralism found in the field are a necessity to cope with the complex nature of the phenomena studied. Rather than being limitations to be overcome, diversity and pluralism can be seen as the strength of an intellectual inquiry addressing the multifaceted processes involved in the appropriation of IT in contemporary organisations.

This paper sketches the profile of the evolving IS field in terms of research themes and theoretical underpinnings. Drawing from a recent survey, it presents some fundamental institutional and cognitive features of the field in Europe, and discusses the strengths and limitations of the European IS field within the international academic context.

The object of IS studies

The focus of attention in information systems studies is a human **organisation**, which may be a private enterprise or a public institution, a multinational corporation, or a small company. Nevertheless, the study of the use of IT in organisations inevitably raises questions about how people as **individuals** interpret information, use technologies, and take part in working out innovation. Also, as organisational boundaries often become blurred and the development of communication networks and IT applications play an instrumental role in new forms of organisational interactions, information systems studies are broadening, becoming increasingly more concerned with the **wider context** within which an organisation is embedded. Technological, economic, social, legal and political aspects of the national context affect the capability of an organisation to exploit the potential of new information and communication technologies. Furthermore, the global context of influential institutions and multinational corporations, trends of economic liberalisation, increasing flows of ideas, information, and cultural products exert pressures and present opportunities as well as threats to organisations developing information systems, wherever they may be located. Thus more recently the organisational focus of the field is changing to include topics such as philosophical foundations of information and communication, inter-organisational uses of IT, the nature, use and impact of the Internet, and policy aspects regarding the 'information society'.

With the risk of oversimplifying, we can distinguish four main thematic areas of information systems research: applications of information technology to support the

functioning of an organisation; the process of systems development; information systems management; and the value of information systems.

a) Applications of information technology to support the functioning of an organisation.

Soon after the invention of computers and their first use for military and scientific purposes, data processing applications for "commercial organisations" emerged as a distinct field of computing. Over the years application areas have included Database technology, Decision Support Systems (DSS), Expert Systems, Electronic Data Interchange (EDI), multimedia systems, computer supported co-operative work systems (CSCW). This stream of studies has explored the technical capabilities of successive generations of computers and telecommunication media, from the mainframe and the analogue telephone lines, to the powerful micros, the compact disk, and the Internet. It resulted in a wealth of applications in organisations, and a vibrant software market.

To a large extent, this has been the work of technical experts with the enthusiasm for building and refining intricate artefacts. Moreover, a great deal of research has been devoted to understanding the domains of applications and to developing models that provide the basic logic for combining sophisticated technical components in order to form a useful application. For example, the development of systems to support managers in their tasks drew extensively from decision theory, psychology, organisational theory and operational research in order to form an adequate understanding of how managers work. Such research differentiated between different management roles and management contexts, and contributed valuable findings about the way technologies are used. Studies on DSS and Executive Information Systems focus more on the nature of management decision making and the job of executives, and less on technical features of applications.

b) The process of systems development.

A great deal of effort has been made to work out methodical practices for developing reliable and effective systems in cost-efficient ways. This effort began with introducing systems analysis lessons in computing curricula in the 1960s, and the first theoretical foundations of systems analysis such as by Langefors in Sweden. In the 1970s the life cycle model was established as the professional way to organise the development of a computer based information system. Several techniques and methods were suggested to systematise the practice of systems development. By the mid-1980s research on systems methodologies had addressed fundamental questions about the nature of information systems, and the process of systems development. Such research continues and is now related with research on organisational change.

Early engineering conceptions of the process of systems development were enriched with recognition of the ‘soft’ social and human aspects of information systems. Such enrichment did not happen smoothly. Reconciling the existing engineering practices for building robust technical systems (the ‘hard’ systems approach) with the slowly emerging perceptions that information systems are as much social systems as they are machines, proved particularly difficult.

Textbooks and research publications on systems development methods of the early 1980s manifest the tension between the engineering of a robust technical system and the management of a social intervention. Viewed from the perspective of the classical life cycle of a software application, systems development is an engineering task that can benefit from formal engineering principles for specifying requirements of the system to

be developed, selecting an optimal technology that satisfies the specified requirements according to technical and economic criteria, implementing the selected technology and producing a quality system for use. What matters is the delivery of useful, reliable, and cost-effective systems to users.

Viewed from a socio-technical perspective, the development process is an intervention in an organisation to change the technical means and the information available to people's work. The use made of technical means is not determined by technical properties alone, but depends on how people perceive the use of the new techniques and tools, the interpretation of intentions of those who decided to bring the technical change in the first place, the personal interests and power relations, and the cultural norms that exist in the organisation. Such a perspective of the systems development process emphasises the importance of understanding the social dynamics that accompany the building or adopting of technical systems and the organisational and social change related with the systems development project. What matters in this approach is the improvement of the capacity of people to perform their work tasks in the context of their organisation.

The tension between the engineering and the social perspectives has been eased with the distinction between two different disciplines: software engineering and information systems. The former dedicated to the development of robust software applications in cost-effective ways, the latter being more concerned with getting value from information and telecommunication technologies in organisations. Moreover, the availability of flexible generic application software in the market, the possibility of linking powerful microcomputers in networks to form complex infrastructures for information processing and communication, and the development of a vibrant market of information systems services, shifted attention to new issues, such as the merits and risks of end-user computing, organisational change, or the benefits and the pitfalls of outsourcing. In other words emphasis has been shifted from systems construction to systems implementation and management issues.

c) Information systems management.

The issues explored in this stream of studies partly reflect the evolution of information technologies, and partly the learning process organisations have undergone regarding the management of IT and their information resources. In the days of the mainframe a centralised department (usually called EDP, from Electronic Data Processing) was the 'natural' way to organise the required expertise for the design and operations of computer applications, and to control investment and services of the computer based information systems. The diffusion of ever more powerful microcomputers and software packages led to 'end-user computing' and raised questions regarding the relative merits and problems of centralised and decentralised management of the 'information systems function'. Moreover, the development of a market of software and information systems services provided increased possibilities for sub-contracting information systems development or operations to specialist companies. Such 'outsourcing' raised new questions of controllability and contract-based relationships between the purchaser and the provider of information systems services.

Also, growing management appreciation of the potential benefits and risks associated with information technology investment, shaped the research agenda of the information systems management theme in a way that reflects more complex business concerns. Information systems management is concerned with issues such as the formation of

strategy regarding information systems, aligning information systems development with business objectives, using IT to achieve desirable organisational change, using IT to manage multinational corporations in the emerging global economy.

Research in information systems management is pursued primarily in business schools, and has been cross-fertilised with other business studies areas such as strategic management, and more specific management themes, such as total quality management, or business process re engineering. Indeed many influential publications on information systems management on business strategy were written by experts on business strategy.

d) The value of information systems.

Although information technology and telecommunication networks are now unquestionably considered to be fundamental infrastructure for the running of all contemporary organisations, increasingly more questions are raised about the value that organisations get from investment in these technologies, and the resulting impact of new technologies on wealth creation, working life, and social life more generally. A great deal of research has been devoted to the evaluation of information systems, in terms of criteria (what effects should be assessed), methods (how to assess potential or perceived effects), and the very nature of the evaluation process.

The economic value of early applications, substituting computer data processing for manual data processing appeared rather straightforward to assess. They had more or less clear efficiency objectives, and were not intended to cause significant organisational changes. Cost-benefit analysis techniques were considered to be the most valid way to assess the merits of investing in data processing applications in comparison to competing need of investment an organisation was facing.

However, it was soon realised that assessing costs and benefits was much more complex than what investment appraisal techniques can account for. To begin with, in addition to the quantifiable costs of equipment and personnel, there are risks associated with computer projects, such as the occasional (and sometimes more persistent) jeopardising of customer services, which are more difficult to forecast and quantify. Not all benefits are easily or legitimately quantifiable in monetary terms, as for example savings from reducing human error at work (let alone accounting for the possibility of faulty system performance due to human error in systems design or operation), or increase in productivity due to better quality information that a new system may provide for management purposes.

Moreover, it became clear that there are aspects other than economic efficiency that matter in computerisation, such as centralisation effects and the dominant role of the technical experts of the EDP department, or the morale of the employees who have to cope with new information procedures. Indeed, the question whether computerisation is beneficial in an organisation proved to be highly political: beneficial to whom? would some categories of employees loose in power of position[1]? would some employees

[1] As early as 1958 Leavitt and Whishler predicted that computers would weaken middle managers, lower their status and reduce their numbers while they would add to the power, innovativeness, creativity and extent of control of the higher managerial echelons. Thirty years later research by Applegate, Cash and Mills found that Leavitt and Whishler's prediction of downsizing the structure of organisations by reducing middle management was correct. However centralisation of control has not been found to be an imperative, mainly because technical developments allowed for technology-driven control systems that can support the flexibility and responsiveness of decentralised organisations.

loose their job? would the whole organisation run the risk of becoming too vulnerable to a powerful group of technical experts, such as systems analysts or even operators[2]?

Today organisations are well aware that the development of new technology information systems have multiple and far reaching economic, organisational and social effects. It continues to be necessary to evaluate the economic impact of an information systems project, both for learning and accountability purposes. Techniques for that purpose have been refined to account for several categories of risks, and tangible and intangible benefits. Moreover, a number of qualitative assessment techniques have been suggested to assess the non-quantifiable impact associated with IT projects.

Another stream of studies has addressed the evaluation of the strategic gains or losses organisations expect or fear in relation to IT investment, and several techniques have been suggested to that end. However, capacity to establish cause and effect relationships for 'strategic' impact remains limited - as for example in the case of trying to assess the role of IT in organisational change. When strategic issues are at stake, decisions tend to be highly judgmental and political.

The costs, risks and benefits and their distribution to different groups become even more difficult to understand and assess when we need to account for inter-organisational systems, shared by more than a single organisation. Interesting research has been done to show the organisational dependency implications of Electronic Data Interchange (EDI). Significantly less is done so far to understand the much looser and anarchic case of Internet, despite its phenomenally fast spread and the wild expectations associated with it.

Much less attention has been paid to the assessment of effects beyond the organisational boundaries of the organisation or the organisations ‘owning’ information systems. The diverse social groups outside the organisation which are affected by its new information systems, such as customers, service users, tele-workers or contract-based service providers have not been considered systematically in IS research. The emergence of ‘information society’ initiatives raise relevant issues, but such knowledge is only very slowly accommodated in information systems studies.

Theoretical foundations of information systems

The study of the themes outlined above has involved a variety of conceptual approaches, from the very technical, to the philosophical. The IS literature has put forward a plethora of theories, such as various modelling theories, for technologies, organisational practice, or decision making; social intervention theories; organisation development theories for managing the IS function and the use of IT; or economic theories for guiding IT investment decisions.

The variety of theoretical constructs deployed in information systems research has given ground to criticism for amateurism and lack of a cumulative knowledge trend. However, a closer investigation of IS research suggests that studies in this field are founded on ideas which can be traced into a few widely influential reference theories. It is by understanding these fundamental theoretical allegiances of the IS research that we can understand the nature of the IS field.

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[2] An example of such a case was the strike of the operators in the computer centre of the Department of Health and Social Security in Britain in 1979, over a dispute on night shifts. The strike paralysed the payment of pensions for months. The Department had to work out temporary alternative means for issuing pension payments and to employ additional staff in its hundreds of local offices.

By reference theory here we mean an intellectual construct that provides general principles of making sense of the world. Reference theories cut across conventional boundaries of academic disciplines; they address universal questions about the nature of society and social change, and imply general principles for perceiving social phenomena and for organising intellectual inquiry. Moreover they have methodological implications, determining 'valid' ways of conducting research. Their principal concepts are relevant to the investigation of a diverse range of topics.

The most influential reference theories in the information systems have been systems theory, organisational rationalism, socio-technical theory, structuration, and critical theory.

Systems theory

Systems theory started taking shape in the late 1920s as a result of increasing doubts about the ability of classical science to deal with complex phenomena. The basic principles of classical science are to break down problems into as many separate simple parts as possible and to try to discover one-way causality between the elementary unit or variables of these parts. This approach has worked with impressive results in fields such as physics, but was less successful in fields studying complex entities, such as biology, psychology the social sciences, which have to cope with many variables, and need to understand their order and organisation.

Such concerns led to the development of the 'General Systems Theory', a logico-mathematical field which attempted to formulate principles of 'systems' applicable to all sciences. A wealth of models, mathematical techniques and concepts were developed, many of which are applicable across conventional disciplines, addressing issues of interrelations within a 'whole'. These models, techniques, and concepts are general abstractions in the sense that they do not consider the nature of elements and forces in a 'system'. General Systems Theory amounts to a conceptual approach for the study of complex phenomena, rather than a specific 'theory'.

General Systems Theory has had practical and philosophical implications. At the practical realm, it has provided a powerful basis for modern technology. In particular, computer and telecommunication technologies embody systems concepts, models, and techniques, and have themselves contributed to the efforts of advancing the interdisciplinary general theory of systems. It has also provided a new conceptual vocabulary for social science entities, such as organisations. Philosophically, General Systems Theory suggested an epistemology different from that of the logical positivism or empiricism of classical science, which aims at establishing linear causality between observed parts of the world. It put forward the view of knowledge as an interaction between knower and known, and thus dependent on factors of a biological, cultural and linguistic nature.

However the vision of the founders of General Systems Theory that, with time, common concepts, models, and techniques will provide a cohesive interdisciplinary science, fundamentally different from classical sciences, proved unrealistic. Today the concept of system is widely used in most fields, but often only in its broad meaning of 'interdependent set of elements', and systems ideas have lost their initial epistemological bite.

In information systems, elements of systems theory have formed part of the conceptual fundamentals in all of the field's thematic streams. Terms such as system, sub-system,

control, boundary, and environment constitute the field's pervasive vocabulary. Systems modelling techniques have been widely influential in designing IT applications as well as in organising the design process. Also, systems concepts and models have had an impact on IS in as much as they are used to conceptualise organisations and society. Seminal early publications such as those by Churchman, Emery, and Ackoff, established an elaborate conceptualisation of organisations as purposeful systems. Despite some criticisms that viewing an organisation as a purposeful system is oversimplifying its social dynamics, the systems perception has proved a useful abstraction, which continued to be refined and to provide theoretical thinking tools.

Overall, however, the use of systems ideas has not led to a comprehensive theory for the field of information systems. Rather, it has sustained distinct and often conflicting approaches, which reflect the more general differences of orientation, such as between engineering and social intervention, that exist in the field.

Organisational rationalism

With the term organisational rationalism we refer to the stream of thought concerned with the identification of the principles of deploying the resources of organisations in order to survive and excel in the capitalist market economy. Unlike systems theory, organisational rationalism cannot be attributed to a particular person or school of thought. It represents a much more pervasive attitude towards the study and the practice of contemporary organisations, and can be deduced from the shared ideological and epistemological fundamentals of the prevailing 'orthodoxy' of theories and practical rules on how to run organisations. Although more often identified through the work of its critics rather than the declared intellectual positions of its followers, organisational rationalism can be recognised as a distinct conceptual and epistemological platform for the study of human organisations in contemporary society.

The origins of organisational rationalism can be traced in the work of Max Weber, who at the turn of last century studied structures of authority in organisations and established the notion of 'bureaucracy' as a mechanism of efficient administration. He defined the 'ideal type of bureaucracy' as the organisation functioning according to a formal rationality on impersonal legal and technical rules. Bureaucracy, of course, has had numerous critics and it has revealed many un-anticipated dysfunctions, to the extent that the word is now often used as synonymous to inefficiency. Nevertheless, it has been established as a universal model of efficient organisation, and provided the basis for organisational analysis. Organisational theory was later developed as the branch of sociology committed to improving organisational efficiency. It is a rather mixed bag of general approaches to social phenomena in organisations and specialised research fields, such as decision making theory, management theory, administration science, industrial and organisational psychology.

Organisational rationalism became the dominant approach of inquiry within the field of organisation theory, aiming at deriving the general logic of organisational functioning, applicable to all organisations through the use of 'scientific' method. The first 'successes' of this approach, such as Taylor's scientific management, Fayol's principle of management, Simon's administrative science, gave rise to ubiquitous practices and developed the fundamental knowledge of the professional 'manager'. A great deal of attention has been given to the structure of organisations and decision making authority. Systems concepts were widely used, on the assumption that an organisation is a complex purposeful entity whose goal is commonly pursued by its participants. However

the use of systems concepts was not accompanied by the epistemological orientation of the systems theorists mentioned above to overcome the limitations of positivism. Organisational rationalism derives general 'truth' statements through empirical research establishing cause and effect relationship between 'factors', such as technology, and organisational characteristics, such as the structure of management.

Today organisational rationalism continues to be the dominant approach in management research, providing much of the intellectual legitimacy for the mainly normative field of business studies, and has been particularly influential in information systems research. It has provided models of organisational communication and decision making both for the development of applications, such as decision support systems, and the structuring of methodical systems development practice. Moreover, it constitutes the most favoured research approach in the academic and publishing establishment regarding issues of IS management and the value of IT. The typical research publication in these sub-fields concern some empirical testing of hypotheses regarding cause and effect relationships between aspects of technology or conditions of its use and organisational characteristics, and is intended to inform professional managers on effective actions.

Organisational rationalism has provided the confidence of 'rigorous' social science research to the young field of information systems, and led to the development of theoretical propositions regarding IT and organisational structure and functioning in order to inform professional management . But its dominance as the right type of IS research has restricted enormously both the research questions regarding the use of the powerful cluster of information and communication technologies in organisations, and the intellectual inquiry pursued by IS researchers. Increasing criticism of the limitations of organisational rationalism has been accompanied by adopting alternative research approaches from the social sciences, including structuration theory, and critical theory, which are examined in the following sections.

Critical theory

Critical theory has its roots at the work of a group of German writers connected to the Institute of Social Research at the University of Frankfurt before the Second World War, known as the 'Frankfurt School'. Best known among them are Max Horkheimer, Theodor Adorno, and Herbert Markuse[3]. Their analysis was concerned with the changing nature of capitalism and the forms of domination emerging from this change.

Horkheimer, Adorno and Markuse did not produce a unified critical theory. However, their work crystallised in particular ways of viewing society, social action, and social science as such, which established the fundamentals of a distinct theoretical thinking and has been adopted by many researchers in all fields of social science. Critical theory pays attention to the construction of social experience and is based on the belief that social sciences have an emancipatory role to play, and can eventually lead to a more egalitarian and democratic social order. Thus, critical theorists in any domain of social science attempt a form of social or cultural criticism, based on some fundamental assumptions. Their basic principle is that thought cannot be objective and neutral, and practice cannot be impartial; they are mediated by power relations which are historically constituted in society. Contemporary societies tend to reproduce various distinct, although interconnected, forms of oppression, such as on the basis of class, gender, or

[3] The rise of Nazism forced Horkheimer, Adorno and Markuse to leave Germany. They located in California, where they wrote most of their work. Horkheimer and Adorno returned to Germany after the war and re-established the Institute of Social Research.

race. Social science research should consciously endeavour to assist subordinates to challenge their social status.

Critical social theory has been applied to criticise the 'instrumental rationality' underlying information systems research and practice. The notion of instrumental rationality refers to the application of reason for exploring means and assessing their consequences, without questioning whether the purposes that these means are marshalled to serve are reasonable. The fundamental criticism made is that the use of computer technology without questioning the utilitarian ethos of contemporary industrial society is limiting the exercise of human choice and ultimately endangering human existence. Authors such as Winograd and Flores, Klein and Hirschheim, use Horkheimer's concept of instrumental reasoning and draw from Habermas' theory on language and to discuss critically the assumptions behind the use of computers to support decision making in organisations.

Critical theory has also been used to classify and criticise systems development approaches. Lyytinen's classification used Habermas' interest theory and communicative action theory and showed that most information systems development approaches support an interest in technical control. Furthermore, critical social theory has been suggested as a useful basis to develop alternative approaches to overcome the narrowness of vision of currently used methods.

Structuration theory

The theory of structuration, elaborated mainly by the sociologist Anthony Giddens in a series of publications, has provided a powerful epistemological and ontological perspective for the social sciences. Giddens' theory reconciled a fundamental division between two traditions of thought in the social sciences: one which emphasises the pre-eminence of the social whole over its constituent actors, the human subjects, and the other which makes the study of subjective experience the foundation of the social or human sciences. The most dominant schools of thought in sociology, functionalism and structuralism, despite their difference of approach, tend to study 'structures' of social phenomena, such as patterns of social relations, and they pursue a naturalistic, objectivist perspective. In contrast, the hermeneutic school of thought studies social phenomena by focusing on action and meaning in human conduct. Whereas functionalism and structuralism see human action constrained by the structures of societal totalities, hermeneutics do not pay much attention to constraint of human action.

According to structuration theory people are skilled agents who produce, sustain and transform social life. Social structure - the organised sets of rules and resources of social systems – is produced by actors and at the same time provides the resources and restrains the outcome of their interaction. In this sense 'action' and 'structure' are in a recursive relationship, each iteratively shaping the other, and this is the meaning conveyed by the name 'structuration'.

The theory of structuration is a rich perception of social phenomena, which elaborates on the nature and the significance of many fundamental concepts such as communication, power, time and space. Its epistemological and practical implications are relevant to the whole spectrum of social sciences. It has influenced the study of the relationship between social change and technology, and more specifically the study of the organisational implications of information technology.

IS research has always been cautious to avoid a technology deterministic attitude. But the role of IT innovation in organisational and societal changes has been unclear, characterized vaguely as 'enabler' of change. The 'socio-technical' tradition of IS research and practice has

maintained the complementarity between technology and the social context. Structuration theory reinforces this position with a powerful general conceptual foundation and provides links between IS research and the more general studies regarding the relationship between technology and society.

In short, structuration theory provided IS research with powerful concepts to express the association of technology and organizations, of machines and society, and formed an intellectual basis to address one of the most troublesome issue of the field, namely the reconciling of the technical and the social, the 'hard' and the 'soft'.

Institutional and cognitive characteristics of the IS field in Europe

The evolution of scientific fields is an intertwined process of intellectual and institutional development. Institutional development is a battle on two fronts: the organisational hierarchies of universities and other authorities or markets which control resources for higher education and research, and the mechanisms which determine the reputation of academic outcomes, such as academic journals, and conferences.

By far the most powerful institutional setting for the IS field is the North American business school. The AIS was created primarily as a response to marginalisation threats faced by IS academics in US business schools, and the great majority of its members as well as its officers are North American. Both in ICIS and in the journals most widely considered to represent the field, most of the editors and contributors are from North American business schools. This has had a strong influence on the research agenda and the curriculum of this area, as they are internationally known. Most information systems management research deals with issues concerning corporations competing in a free market environment. The main international journals and conferences of the field suggest that the mission of IS research is to produce knowledge useful for the Chief Executives about the business value of IT. Far less attention, for example, has been given to issues concerning the take up of new information and communication technologies in public sector institutions. Preoccupation with business-type concerns reflects the predominant neo-liberal ideology during the development of this field. Thus, even the limited research that examines public sector institutions tends to deal with the same questions studied in business firms, and to use the concepts established in business firm studies. Issues such as accountability, security, accessibility to services, quality of social services, and sovereignty, which are relevant to state functions have hardly been addressed by information systems management research and they hardly feature in relevant teaching programmes.

Nevertheless, in Europe the IS field is more diverse than the prevalent North American IS studies, both in terms of institutional setting and research areas and approaches. As mentioned in the introduction, unlike North America, where most IS is located in business schools, in Europe IS academics are hosted in engineering departments as well as in various departments of the social sciences. They have made significant contributions in conceptualising and systematising the process of information systems development. Moreover, European IS researchers have been seen as challengers of the objective empirical research approaches, and advocates of interpretative method.

Some countries or European regions are known as fostering particular streams of research. Research in the Scandinavian countries pioneered the theoretical foundations of information systems development and contributed to the emergence of socio-technical and humanitarian approaches to the development and use of technology. Within a distinct culture of industrial democracy in those countries during the 1970s and 1980s,

the introduction of IT in the work place raised issues about its impact on work conditions and the rights of people to control the means of their work. In Britain, such ideas were linked with prior work regarding technology and the organisation of work, and authors such as Mumford, Checkland and Land and Hirschheim elaborated the first socio-technical theories of the field. Significant efforts have been made in conceptualising and analysing 'information' in the context of organisations, thus broadening the scope of systems development beyond purely technology related issues. More recently, European researchers linked IS studies with the strong tradition of European social theory, thus contributing promising interpretative dimensions to IS theory.

The German IS field, 'Wirtschaftsinformatik' (WI), has a much more prevalent technology orientation. Although it is located in business schools, its objective is to provide technologies enabling business excellence. The development of integrated software applications, such as SAP, is considered a good indication of the strengths of the German WI approach.

Across country differences of language, academic norms and career structures make it particularly difficult to form an overall picture of the cognitive characteristics and the institutional position of the IS field in Europe. With a recent survey we attempted to understand the main features of IS in this region. Preliminary consultation with knowledgeable academics in 11 European countries suggested that the IS field does not have the status of an academic discipline in its own right. IS expertise is scattered in a variety of faculties, such as computer science, business administration, accounting and finance, economics. A variety of terms are used to denote the IS field, or as overlapping with the IS area, including 'information technology', 'applied telematics', ' 'informatics', 'business information systems', 'business systems', 'management information systems'.

A subsequent questionnaire survey of academics listed in the European IS faculty directory created a data set of 373 cases, with a response rate of 37%. The size of data collected from different countries varies considerably, as shown in table 1. Such variations are not surprising, reflecting similar patterns of countries participation in ECIS, and ICIS. While the collected data are not sufficient to form detailed country profiles, we can look at three clusters the countries in regions with socio-cultural similarities: the German speaking countries, Austria, Germany, and Switzerland (80 cases); the English speaking isles, Britain and Ireland (99 cases); the four Scandinavian countries, Denmark, Finland, Norway and Sweden (84 cases).

Table 1. Country distribution of survey data

	Responses received		**Responses received**
Austria	24	**Netherlands**	33
Belgium	4	**Norway**	10
Denmark	33	**Poland**	8
Finland	23	**Portugal**	6
France	10	**Slovenia**	12
Germany	48	**Spain**	8
Greece	4	**Sweden**	18
Ireland	4	**Switzerland**	8

Italy	11	**UK**	95

Position within university structures

Most IS academics work in small concentrations of IS specialists. 32.6% work in units with fewer than 5 IS full-time staff, 62.6% in units with less than 10 IS full time staff. Only 29% are in units called 'Information Systems'. The remainder 71% of European academics are scattered in units with over 30 different names. 14.8% are units which 'combine' IS with another discipline. Some names are the expected 'synonyms' of IS, such as Information Management, and Business Informatics. In some countries, notably in the Scandinavian and Central East European regions, substantial numbers of respondents work in units called 'Informatics', a term with an unclear overlapping with the field of Information Systems in its prevailing 'international' content.

Teaching subjects and research topics

Table 2 shows the teaching of the various subjects, grouped in the following categories: technologies, systems development process, applications, IS management aspects, and ethics, impact and policy. *Technologies* includes computer and programming concepts, software and hardware architectures, databases, networks and distributed processing, internet, telecommunications, and neural networks. *Systems development* includes software engineering, information systems development methods, and HCI. *Applications* includes decision support systems and executive information systems, IKBS and expert systems, computer graphics, simulation, and accounting systems. *IS Management* includes management of information systems, systems quality and management, logistics of IS/IT, and IS security. *Impact, ethics and policy* includes IS professionalism and ethics, socio-economic impact of IT, and IT policy.

Table 9. Teaching of IS subjects (% of academics who teach the topic)

	Technologies	**Applications**	**Systems Dev.**	**IS Management**	**Impact, ethics and policy**
English speaking	51.5	40.4	58.6	66.7	41.4
German speaking	82.5	48.8	65	62.5	22.5
Scandinavian	56.2	29.8	63.1	41.7	29.8
Europe	**60.6**	**41**	**61.9**	**57.4**	**30.3**

Regarding research, we asked respondents to indicate whether they researched in the past five years, they research now, or they intend to research in the future each of a long list of topics included in the questionnaire; they could specify their research field if not listed. Table 3 classifies in broad areas of research the topics that were suggested on the questionnaire and those that were added by respondents as follows: *Technologies* includes databases, software development, web/internet technology, and intranet; *applications* includes computer and network applications, decision support systems, and executive information systems, IKBS, geographic information systems; *systems development* includes IS development methods, the nature of the IS development process, cultural differences among IS professionals; *IS management* includes management of information systems, alignment of IS with business strategy, and IS security; *organisational change* includes BPR, IS and organisational change,

organisational implications of IT; *impact of IT and ethic*s includes impact on individuals, societal effects of IT, economic effects of IT, ethical aspects, globalisation effects of IT. Table 3 shows percentages of those who have been doing research in each area either in the past or currently, or who are planning to do such research in the future.

Table 3. Topics of research (%)

	Techno-logies	Applica-tions	Systems development	IS mana-gement	Organisa-tional change	Impact and ethics
English speaking	29.3	43.4	43.4	62.6	68.7	38.4
German speaking	63.7	60	47.5	66.3	66.3	31.3
Scandinavian	33.3	29.8	63.1	52.4	64.3	31
Europe	**39.9**	**45.6**	**50.4**	**60.1**	**66**	**35.1**

Research method

Our survey confirms the view that IS research in Europe is methodologically pluralistic. Table 5 shows the frequencies of use of the most typical research methods used in the IS field. Generally in Europe qualitative methods, namely case study, action research, and secondary qualitative data analysis are more prevalent than the empirical methods of surveys, secondary quantitative data analysis, and experiments, which through the main publication outlets of the field are thought to be the 'norm'. Moreover, a great deal of research is done by methods that are not given attention at the methodological debates of the field. 35% of researchers in German speaking countries often do technology development and testing, and 11% do so 'always'; 16% often do theory proof, 41% 'often', and 15% 'always' do model building.

Table 5. Research method (% of academics applying frequently or always the indicated method)

	English sp.	German sp.	Scandinavian	Europe
Laboratory experiment	8	17	10	**14**
Simulation	11	13	10	**14**
Technology development	17	48	19	**26**
Questionnaire survey	25	19	26	**27**
Secondary data: quantitative	23	15	19	**23**
Secondary	38	16	33	**27**

data: qualitative				
Theorem proof	3	19	5	**9**
Model building	28	56	31	**40**
Case study	58	32	57	**52**
Action research	23	21	30	**23**
Ethnography	11	-	1	**3**

The survey confirms the large thematic diversity of the IS field in Europe. Aggregately within Europe teaching is spread uniformly across the technologies and management spectrum, with less emphasis on aspects of impact, ethics and policy. Research effort, however, tends to be made more on management and organisational themes, than on technology themes, and less on the impact and theoretical foundations of information systems. There are, however, consistent differences between the country clusters. For example IS academics in the German cluster are engaged in technology innovation more substantially than the English and the Scandinavian clusters. Also, they make significantly more use of technology testing methods, theorem proving and model building than the English speaking cluster, whose research effort is more oriented towards the study of human, social and organisational issues, and tend to use more interpretative methods.

Conclusions

IS research concerns the efforts made in human organisations to exploit the phenomenal potential raised by the invention of information and communication technologies, and the consequences of such efforts. The prevalence of the business school setting for the IS research in North America has undoubtedly biased the research agenda. It has absorbed the research resources of the most advanced economic region and channelled them in a narrow set of objectives. Moreover by controlling the main international mechanisms of intellectual reputation in the field it has left the research efforts and outcomes of other institutional settings and other regions of the world relatively unknown.

Our study of the academic field of IS in Europe suggests diversity of research topics and methods employed in the research inquiry. Such diversity manifests the multiple facets of issues involved in the development and use of new information and communication technologies.

Over its history the field of IS, with significant contributions from European schools of thought, has developed knowledge that formed professional roles for systems development and management. It has built detailed understanding of the nature of the process of using information and communication technologies, filling the gap between the engineering studies which elaborate the capacity of new technologies, and macro sciences, such as economics and sociology which tend to suggest general trends on the basis of the technological capacity. Thus IS is in a position to explain the socio-economic changes associated with IT, and to provide relevant guidance for action.

Yet, IS has significant limitations. In most European countries it is awkwardly positioned within academia, either as part of engineering, or in social science faculties. Within the conventional division of intellectual inquiry in disciplines, each with their own legitimate areas of study and rules for trustworthy knowledge, IS is often an outcast, seen as

lacking in rigour and consistency of inquiry. At best, it is sometimes acknowledged as interdisciplinary. This, however, determines the field in relation to other existing disciplines, an amateur borrower of theories and methods whose validity has proven in other field, and restricts its efforts to develop the integrity needed for the phenomena it studies.

Although in the self-criticisms of the field the main concern is the development of academic rigour, usually implying the need for more strict formal research conventions, perhaps a more important criticism is that IS research has often failed to predict significant developments regarding IT innovation and organisational change. Too cautious to substantiate its knowledge empirically it has not been keen to develop a predictive capacity. For example it did not predict the advent and significance of the microcomputer, or the internet. Only after the spread of the mighty micro its organisational implications were reflected in IS models, such as end-user computing. More recently, IS research and teaching have been slow to respond to – let alone to proactively address - the development of a market driven software industry. Our models and good practice regarding the development of information systems is rapidly becoming obsolete as software entrepreneurs distribute everywhere powerful generic applications, which they create with little respect to life cycle based methodologies. Concern for empirical rigour has restricted our predictive vision.

It is not surprising that a field of inquiry studying the nature and implications of the profound changes occurring in organisations as they exploit the new technologies exposes the limitations of the established academic system. The weaknesses of the IS field are, at least partly, the manifestation of the limitations of today's academia to address itself to such a revolutionary phenomenon.