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Structuration to research in information systems

Jesús Alberto Andrade

Universidad del Zulia. Facultad Experimental de Ciencias
jandrade01@yahoo.com

Abstract

Information and communications technologies cannot be studied in isolation from their social contexts. Structuration is a theory that has been in the information systems field; it might be a promising avenue to better understand how technologies interact within organizations. Because technology and information systems cannot usefully be studied in isolation from their social contexts, this paper analyzes how Giddens' *Structuration Theory* is used to offer a theoretical understanding between technology and information systems, and organizational structure and social practices. The idea being that social systems and information systems and technologies are structures that adapt well to strengthen the role of human beings as actors within the organizations.

Key words: structuration, information systems, information systems research.

Estructuración para investigar en sistemas de información

Resumen

Las tecnologías de la información y de las comunicaciones no pueden ser estudiadas solo pensando en la utilidad que puedan reportar, independientemente del contexto social. La Estructuración es una teoría

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que ha sido poco usada en el campo de los sistemas de información; sin embargo, ella puede ser un promisorio camino para entender mejor cómo las tecnologías interactúan en las organizaciones. Debido a que las tecnologías y sistemas de información no pueden ser estudiados separadamente del contexto social, este trabajo analiza cómo la Teoría de la Estructuración formulada por Giddens es usada para ofrecer un entendimiento teórico entre tecnología y sistemas de información con las estructuras organizacionales y las prácticas sociales. Esta idea equivale a decir que los sistemas sociales y los sistemas y tecnologías de información son estructuras que se ajustan bien para fortalecer el rol del ser humano como actores en las organizaciones.

Palabras claves: estructuración, sistemas de información, investigación de los sistemas de información.

INTRODUCTION

Social and organizational issues are important in developing successful information systems (IS). Information systems is an area of research positioned between management studies and applied computing; it is influenced by tremendous variability disciplines. Some of them such as sociology, economics, psychology, politics, industrial relations, human resources, and even philosophy are a constant source of influence to shape the conceptualization of specific elements of contemporary IS research.

There are many bodies of knowledge that could be linked to IS: information theory, hermeneutics, phenomenology and the sociology of knowledge, and philosophy of science, where science is regarded as being only one form of knowledge. There is an amazing hybrid field in the social study of information and communication technology (ICT) where scholars can develop different stances to understand the way people use technology and how technology is appropriate for them.

Research on organization structure has dealt with concepts, definitions and dimensions of structure. Effectiveness is attributed to the internal consistency among the patterns of relevant contextual, structural, and strategic factors. Specifically, organizational, technological, and user areas are considered and modeled to generate a set of testable propositions that can subsequently be investigated in various organizational settings.

While the overwhelming focus of the literature on information to date has been on the process of technology implementation, relatively little attention has focused on the epistemological aspects of the information systems on organizations; however, theories and concepts of information are vibrant in philosophy (Floridi, 2002), communications (Braman, 1989), information science (Borgmann, 1999; Cornelius, 2002), social study (Avgerou, Ciborra, and Land, 2004) and human context (Kling, Rosenbaum and Sawyer, 2005).

Most of the time, systems are created as a new way to solve problems, and that means it builds new structures. A new structure is chosen because it is assumed that it will make the organization more successful and effective than the old one; so management sees new organization structure as the solution to many problems. In the middle of the 20th century some of the optimistic predictions of the impact of technology on business efficiency and productivity were confusing. There were many examples of the introduction of technology being associated with implementation problems often linked to resistance by the work force and a failure to achieve the expected benefits. In its 50-60 year history, socio technical theory and socio technical practice has accumulated a very large literature. In these cases, technology has been used isolated of epistemological aspects.

Socio technical ideas began to be used in the IT/IS field in the 1960s, and many approaches have been used in IS field, such as Habermas´s Theory representing the critical social theory, and recently, *Structuration Theory* of Gidddens.

Critical social theory is very relevant and appropriate to the context of IS research. An explicit link between information systems and Habermas´s Theory was developed by Mingers (1981) and Klein and Lyytinen (1985). They discuss IS as rational discourse. Mingers (1992) applies Habermas´s Theory of knowledge constitutes interests as the basis for reflection on the history and future of operational research. This is one of the first cases where Habermas´s Theory of communicative rationality can be applied in IS research.

Habermas argues that crises stemming from the process of production are displaced into the political sphere, placing severe strains on the state (*organization*) apparatus. In Habermas view, modes of communi-

cation and socially organized work are used to understand the formation of human species in society.

By contrast, in Giddens Theory, the problem of the relation between the individual and society, or between action and social structure lies at the heart of social theory and the philosophy of social science. *Structuration Theory* of Giddens have been used in the IS literature by several scholars of organizational and information systems fields.

In this paper we will work with the *Structuration Theory* of Giddens, because it reflects that technology can stabilize in circumstances where relevant social groups see their problems as having been solved by the technology in question.

RESEARCH IN INFORMATION SYSTEMS

Understanding the role of technology in the information systems (IS) implementation success formula offers a significant promise for explaining a major component of the research process in IS.

Many IS researchers who use the word theory repeatedly in their work fail to give any explicit definition of their own view of theory. A number of papers that discuss different research paradigms (for example, Klein and Myers 1999; Mingers 2001) offer little in the way of definitions or discussion of the nature of theory or types of knowledge that can be expected to result from different research approaches. A wider view on theory and knowledge types is found in only a handful of papers in IS (Cushing, 1990; Gregor, 2002a-2002b).

The terms information, systems and information systems have fallen into such careless use that they seemingly no longer denote anything different from one another (Lee, 2004). Bostrom and Heinen (1977, 18) say that an information systems is that which results from the intervention of an information technology into an already existing social system. That means, social context is an important issue for developing IS. As much as an information system is that which results from an intervention of a social system into an already existing information technology.

Information is a central construct in Information Systems research. The use of information is a construct in the information systems research in three ways: as *object*, as *embedded* or *naively*. From an object view, in-

formation is a discrete entity (something that can be passed from sender to receiver with no loss of value; or something that can be stored to be recovered later; or something that can exist on its own. As embedded, information is that which is in someone´s head (tacit knowledge), or embedded into the design of organizational structures. And, information as naïve, the meaning of information is never made explicit to depicting information.

Systems Theory is a well-developed body of knowledge and offers ideas that can advance current information systems research and practice. A view of information systems focuses on information requirements, which describe the information that an organization requires from information technology to achieve its goals. *Information, information systems* and *information technology* round the idea that people use them to develop better organizations. The peculiar powers of organizations are the basis of modernity on all dimensions.

Because, in most of these studies the term "systems" or "information systems" appears to be interchangeable with *information technology,* we must be clear what term and what context we are using. Nevertheless, most research and studies are not information systems research at all; they are organizational research at the most.

Term "system" could be associated with every system as biological, economic, social, physical, and others. Thereby, to introduce a primary idea about system, we must enable the idea of forming subsystems, systemic relations, and processes between them, which interact among all the systems. If these interactions are capable of cooperation, then, the interaction's exchange is a necessary condition, to define a system. From that, the system's definition follows: *a system is a set of interactions exchanging information capable of integrating them into common units (systems, subsystems).*

Information systems would be the emergent result of the mutually and iteratively transformational interactions among the social systems and the technical systems. Thus, the study of IS as the integration of information and communication technology (ICT) and social elements (people) constructs could be understood as part of design, behavior and properties of a knowledge systems and how it interacts with a social system and a technical system.

Even when people become aware of an issue or an entitlement, it is apparent that information alone is not enough to trigger action or even, in many cases, to provide an answer to questions in research areas.

A large segment of information systems research consists of behavioral studies of how people and organizations do (or do not) use, adopt or diffuse information technology. This stance does not account for the iteratively transformational interactions between the social systems and the technological system. Therefore, an information system is not the information technology alone, but the system that emerges from the mutually transformational interactions between the information technology and the organizations.

According to Allen (2002) research in information studies can be divided into three categories:(1) research into information interactions, using methods drawn from the social sciences, (2) research into cultural history, using methods from the humanities, and (3) information technology research and development, using methods from science and engineering.

If we consider the first view, one could research the social aspects in developing Information systems using social sciences in particular if one pretends to know how technology is embedded in the process of constructing social interactions.

Information systems are developed for people who interact with them to search for, evaluate, and employ information. The interactions of users with information systems, and the factors that influence those interactions, are important focuses of information studies research. Researchers ask a variety of questions about information interactions, and they base these questions in a variety of perspectives drawn from the social sciences.

Researchers in the field of information studies investigate information systems and services to understand how people use them and to discover better designs for those systems and services. Most researchers in IS field start from the idea that an information system is simply an instance of socio technical systems, but a research perspective looking beyond the calculative behavior of decision makers in the organizations would find information itself is a rich phenomenon that deserves its own separate focus no less than either information technology or organizations.

Recent debates about technology and organizations have emphasized the extent to which technologies, are 'socially constructed' and sought to develop frameworks which acknowledge both the material and social nature of these technologies (Orlikowski and Barley, 2001: 149; Orlikowski and Iacono, 2001).

Orlikowski and Iacono (2001) argued for attention to the information technology artifact as the core subject matter of the IS discipline. At least, two conflicting set of values sometimes underlie much socio-technical thinking (Land, 2000). The first is a belief in the importance of humanistic principles, where the main task of the designer is to enhance the quality of working life and the job satisfaction of the employee. In turn, the achievement of these objectives will enhance productivity and yield added value and benefit to the organization. The second set reflects managerial values socio-technical principles are merely instruments for achieving primarily economic objectives.

THE CONTRIBUTION OF GIDDENS TO DEVELOP OF INFORMATION SYSTEMS

In the past, several approaches were used to investigate the social systems issues. Research that assumes the subjectivity of social systems focuses on subjective human experiences, interpretation of them, and elements of human behavior modifying the world. The contrasting view of objectivism focuses on the properties of institutional elements shaping social systems, providing explanations for their influences on human actions and relationships.

This seemingly dichotomous view of social systems is seen by Giddens as problematic. Giddens (1979), who asserts that the grounds of mutual exclusiveness between subjectivism and objectivism is flawed, developed the *Theory* of *Structuration* to accommodate the two traditions. *Structuration Theory* views the subjectivity and objectivity of social realities as equally important. According to *Structuration Theory*, cultural context is generated and regenerated through the interplay of action and structure. It recognizes that 'man actively shapes the world he lives in at the same time as it shapes him' (Giddens, 1986).

Structuration is not a positivist theory; thus, unlike other theories as economics or engineering, it does not provide causal models (where one could prove a hypothesis) to support or refute, nor does it provide a

recipe for research. In fact, Giddens´view *the uncovering of generalizations is not the be-all and end-all of social theory.*

In the *structuralist* tradition the emphasis has been on structure (often understood primarily as constraint), whereas in the phenomenological and hermeneutic traditions the human agent is the primary focus, but more recently, an emerging and promising approach is to use *Structuration Theory* (ST), that it is acknowledged as a powerful approach to understand the society. Therefore, at the same time that Giddens rejects a positivist stance, he also rejects a *purely* interpretive issue, because he notes in his theory more broadly that "concentration upon epistemological issues draws attention away from the more *ontological* concerns of social theory". So, structuration is a theoretical stance for looking at human phenomena, a way of understanding, that can help us, people, address some of the tensions or conflicts between men/women and the institutions or between technological determination and social construction of technology.

Although, the empirical application of *Sructuration Theory* remains scarce, the *structurational* model of technology is the most convincing attempt to account for technology in terms derived from Giddens´ theory. Orlikowski (1992) and Orlikowski and Robey (1991) are among the first to use *Structuration Theory* for studying the interaction between IT and organizations. They proposed the structural model of technology in which the dual nature of information technology is at the heart of the structuration process. In this model, organizations are not only shaped by IT but they are also strongly influenced by social and political processes and by the actions of members of the organization.

Structuration is a general theory of social organization and has a primarily ontological focus. But, this theory was developed by Anthony Giddens as a sociological theory to analyze how society is *constituted*. In founding the tradition of *Structuration Theory* during the 1970s, and developing it in the 1980s, he provided an original and systematic means to combine the central sociological concepts of structure and agency.

Social practices lie at the root of the constitution of both individual and society. Human agents are knowledgeable and have the capacity to exercise their powers to accomplish a social practice in their daily interactions. These social practices are repeated and turned into a routine and people draw on structural properties (rules and procedures) which are in-

stitutionalized properties of society to construct visible patterns (social practices) that make up society. Therefore, structure is both the medium and outcome of a process of structuration that it is seen in the production and reproduction of practices across time and space.

As these practices become *routinised* they become established as the espoused process, changing the values and knowledge of the organization. It is therefore necessary to understand the changing theory-in-use by studying the process changes as they occur. Thus, each member of the organization (or society) has the power to conform or challenge a suggested change.

The Giddens' treatment of power in institutional relationship is particular interesting. Unlike many critical theorists Giddens does not see power as inherently conflict or asymmetric. In Giddens' (1986) words, "Power is not necessarily linked with conflict in the sense of either division of interest or actives struggle and power is not inherently oppressive (p. 257). He conceptualizes power as the "transformative capacity" of all individual to act either to reinforce or to undercut existing structure.

The concept of organization has a place in Giddens' (1990, 1991) theory more general theory of modernity. Organizations, embody the principle of institutional reflexivity to isolate space–time, that is, to separate traditional connections of times and places and to reintegrate them in a reflexively designed way (Giddens, 1991). Giddens centers his attention on three main elements that explain the dynamic and global character of the modern age: the separation of space and time (through mobility and the uniform scaling of time), the disembodying of institutions (through the replacement of traditional routine), and institutional reflexivity, the regular use of knowledge about social life as a resource for guiding and even constituting the social order.

Structuration Theory synthesizes a rich array of philosophical and sociological approaches to create a theory of social life that places socially situated practices at its core in order to avoid an exaggeration of either the subjectivism of an overly agency-based approach or the objectivism of an overly structure-based approach. Giddens´work analyze the changing character of modernity to address changes at the societal level, characterized as "postmodern" society.

Structuration Theory recasts structure and agency as a mutually dependent duality. *Structuration Theory* has been used in the study of IS for some time. It offers a model which relates institutional properties, human agents and technology: technology is both constituted by human agency, and helps constitute institutional practice.

Changes in information technologies cannot be viewed as isolated events; rather, one must be mindful of the interdependent, reciprocally structuring relationships that exist between the information technology, people and the organization. The interrelated dynamics embedded in the application/creation of the technology that is in use by the organization through the combined processes of human interaction, technology and organizational social structures.

Therefore, the study of technologies typically involves two broad traditions of assumptions: social reality as subjective or objective (Orlikowski y Robey, 1991). This opposition in theory is reflected in the assumption of social systems (of which information technologies are part) as the result of 'meaningful human behaviour', representing social realities as subjective; while the other focuses on the organizational aspects of social systems, independent of and constraining human actions, representing social realities as being objective (Bhaskar, Orlikowski and Robey, 1991).

At the centre of Giddens's synthetic reconceptualization of the structure-agency couplet is the notion of "the duality of structure". Through this notion he conveys the idea that structures are both the medium and the outcome of social practices.

Orlikowski considers technology-in practice as the structure that is enacted by users of a technology as they use the technology in recurrent ways. It is only when this technology is used in recurrent social practices that it can be said to structure users' actions' (Orlikowski, 2000: 408). Consequently, recurrent is the idea behind of Giddens´social theory.

Therefore, agency is considered as an important factor to understand how the information systems have some transformational capacity, and this capacity could reflect power, because human agency, in Giddens formulation, is the 'capacity to make a difference'.

Giddens defines structure as 'rules and resources recursively implicated in social reproduction; institutionalized features of social systems have structural properties in the sense that relationships are stabi-

lized across time and space'. Structure can be 'conceptualized abstractly as two aspects' (Rose and Hackney, 2003). Structure refers, in social analysis to 'the structuring properties allowing the 'binding' of time space in social systems, the properties which make it possible for discernibly similar social practices to exist across varying spans of time and space.

As Giddens claims: *to say that structure is a 'virtual order' of transformative relations means that social systems as reproduced social practices, do not have 'structures' but rather exhibit 'structural properties' and that structure exists, as time-space presence, only in its instantiations in such practices and as memory traces orienting the conduct of knowledgeable human agents'* (Giddens, 1986).

Structuration is therefore the process whereby the duality of structure evolves and is reproduced over time space. Agents in their actions constantly produce, reproduce and develop the social structures, which, both constrain and enable them.

To be success over the time, this process requires certain degree of stability. Because people make their activities in a stability base, all social interactions are situated in time and space that it can be reconstituted within different areas. That kind of activities is considered a routine that constitute "habits". Social practice which endures over time is, effectively, routine-people repeating recognizably similar encounters.

If social practice becomes reasonably stable over time and space, then routines-practices in which actors habitually engage-develop (Rose and Hackney, 2003). The regular or routine features of encounters, in time as well as space, represent institutionalized features of social systems' (Giddens, 1986).

Orlikowski conceives of technology-in practice as the structure that is enacted by users of a technology as they use the technology in recurrent ways. It is only when this technology is used in recurrent social practices that it can be said to structure users' actions' (Orlikowski, 2000:408). Consequently, recurrent is the idea behind of Giddens' social theory.

DISCUSSION AND CONCLUSIONS

Social theory would appear to be a minor interest in the information systems field as a whole. Although Giddens is one of the most

widely cited social theorists in information systems research, he still remains relatively little known among IS researchers.

However, the increasing number of studies using the *Structuration Theory* in the IS field might be a promising avenue to better understand how technologies interact with organizations. Any organizational systems will maximize performance only if the interdependency of these subsystems is explicitly recognized. Through analysis, we can provide evidence that IS research is structured by the interrelations among three particular constructs: information, technology, and people. These three constructs are at the center of IS research.

Information systems and technologies may well have an objective reality independent of their social construction, but it is only through their enactment in practice that their effect can be understood, hence the importance of focusing on 'technology in practice' as a way of understanding the relevance of technology to people and organizations.

Structuration (central in Giddens´ Theory) represents an attempt to develop a middle way between two sociological traditions: the *tradition of naturalistic* sociology, referred to as positivism focused by functionalism, that sees social phenomena as manifesting enduring social laws, where objective, external social structures act on passive human agents. And, on the other hand, there is the interpretative tradition of phenomenology that regards social structures, seeing society as primarily an effect of human agency.

Organizations might adapt any of those structures to accommodate the processes or the appropriation of technology to the daily processes they do it. Information and communications technologies cannot usefully be studied in isolation from their social contexts.

Theory concerning information systems, which is avowedly structurational, should remain faithful to the main Giddens' thinking. The *Structurational Theory* of information systems offers an account of IT heavily embedded in social practice. Human agents re enact that practice, using the technologies at their disposal as resources, according to the structures (rules, conditions, contexts) available to them.

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