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Information View of Organization

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ABSTRACT

This article proposes an information view of organization that brings the information systems field closer to organization theory. Although voluminous bodies of literature have been developed within each of these disciplines and links between them do exist, their mutual informing is still insufficient. The proposed view of organization is intended to help convey results of information systems research to organizational scholars, while broadening theoretical horizons of the former. This article discusses the premises, conceptual framework, examples, and preliminary evidence of the information view of organization.

INTRODUCTION

The purpose of this article is to offer to the reader an information view of organization (IVO) that has been recently introduced (Travica, 2003) and advanced both theoretically and empirically since then. The start point of IVO is to reinforce the relationship and increase exchanges between the field of information systems and organization theory.

IVO places information and IT into the nexus of organization. I use “information” in a broad sense to mean knowledge, wisdom, meaning (or organized/meaningful data), and data; when “information and knowledge” is used, “information” refers to “meaning.” IVO builds on the premise that organizations (in business and other sectors) are a natural habitat for information systems (IS), even though not an exclusive one. Organization theory has made organizations the subject of its study from various angles defined by the constitutive social and behavioral sciences (sociology, psychology, economics, etc.), “organizational views” or schools of thought (e.g., structural, cultural, political, and process), specific theories (institutional theory, resource dependence theory, transaction cost theory, etc.), and ontologies (e.g., functionalist, and interpretive approaches). Juxtaposed to organization theory is the IS field, which is complex in its own right.

The constitutive streams of research include management information systems/information systems, computer information systems/computer business information systems, library and information science, information resources management, information study, decision sciences, telecommunications (also called business or data communications), systems analysis and design/software engineering, and operations research. The premise behind IVO is that all these streams of research in IS can find purpose and direction in organization theory, which, in turn, can benefit from IS disciplines’ shedding light on the increasingly important technological and information aspects. Still, the cross-pollination between the systems and organization theory is insufficient (cf. Orlikowski & Barley, 2001), even though a channel between them has existed for quite some time. IVO builds on this channel, with the intention to increase its capacity.

ORGANIZATION THEORY AND THE IS FIELD: LOW BANDWIDTH CHANNEL

The channel between the IS field and organization theory can be traced several decades back. Both have inherited certain principles and frameworks from general and special systems theory, although this heritage is more dominant in the IS field. General systems theory provided foundations for thinking about information, IT and IS. Its special extensions advanced the understanding, for example, of systems’ self-regulation (Wiener, 1948), and telecommunications systems (Shannon and Weaver, 1949). These foundations are still visible in IS theory today. The systems thinking lineage can be traced to organization theory as well. The father of general systems theory, Ludwig von Bertalanffy (1968), included organization theory in his selection of relevant disciplines. The impact of systems theory on organizational theory was recognized early on (e.g., Scott, 1963), and March (1965) included an

extensive chapter on elements of a systems view of organizations in his representative selection of organization theory. In later developments, systems theory yielded outcomes relevant both for the organization and IS fields (e.g., Galbraith, 1973; Lawrence & Lorsch, 1967; Scott, 1981; Thompson, 1967).

Another connection between organization theory and IS theory is manifested in exchanges between them. For example, Haberstroth (1965) asserted that “informational systems” constituted “one of the more important properties of the organization” (p. 1192). In a recent review of organizational literature by Clegg and associates (1996), IS-related issues spread over the chapters on “group information technology,” decision making, cognitions in organizations, communication, organizational learning, and technology. The subject index contains seven references to information, six to IT, thirty-two to knowledge, and various references to group support systems. The continuing contributions of organizational psychologist Karl Weick to the understanding of organizational information and IT, including his more recent concept of technology as “equivocal” (Weick, 1990), additionally exemplify the exchanges between the two fields. Belonging to the same order of magnitude is the classical work of Jay Galbraith (1973), who used information principles to explain organizational design.

IS scholars have also worked on the channel connecting their field with organization theory. Some have been concentrated on specific organizational dimensions in relation to the usage and other measures of IT/IS. Examples include decision making and DSS, computer mediated communication and IT for electronic communication (Hiltz & Turoff, 1978; Rice, 1984; Sproul & Kiesler, 1991; Wigand, 1985), group work and GSS (e.g., Ciborra, 1996; Gallagher et al., 1990; Nunamaker et al., 1996/7), and enterprise systems (e.g., Hanseth et al., 2001). IS researchers have also used specific “organizational views” (e.g., the structural and cultural), tested particular organizational theories (e.g., transactions costs, resource dependence, and institutional theory), and adopted the structuration ontology even as it was just making initial inroads into organization theory (cf. Jones; 1999; Hatch, 1997). Yet another connection between organization theory and the IS field is embodied in interdisciplinary research that bridges them. A good historical example is Herbert Simon’s work, which was evolving around organizations and IS. Today’s followers of this path have special publishing outlets available, such as the journal: *Organization Science*.

Although extant, the channel connecting the two academic camps has been of a narrow bandwidth. Due to various reasons, an intra-disciplinary focus is the rule rather than an exception. The IS camp bears its share of responsibility for this situation because some of its parts are disconnected from organization theory. A part of IS research deals merely with describing capabilities of trendy IT and with possible implications for organizations. Also, studies that merely correlate some aspects of IT/IS are abundant with behavioral and organizational aspects with no clear guidance of a particular organizational framework or theory. Purely technical research influenced by applied computer science is even farther away from organization theory. Similarly, information-focused study (e.g., research on information seeking) is often focused on the individual who is either isolated or just loosely connected with some environment. These are some indications of a lack of the organization theory perspective in the IS field.

The organization theory has also been taking insufficient input from the IS field. Given the pervasiveness of modern electronic IT in contemporary organizations - a major topic of interest in the IS field - IT still takes a smaller proportion in organization theory. In addition, the topic of e-commerce, which excites so many IS researchers and takes much space in IS publications, is little known among organizational scholars. A search of well-known publishing outlets (e.g., *Organization Studies*, and *Administrative Science Quarterly*) returned just a few references to e-commerce in recent years. Moreover, IT poses as just one of technologies (a “high technology”) in organization theory. The line of studying organizational technology that connects Joan Woodward, James Thompson, Jay Galbraith, Charles Perrow, and Karl Weick (see Hatch, 1997) may just partially be relevant to contemporary digital IT. For example, it could be argued that different kinds of IT could fit into any of the typologies of technology these researchers developed. If so, the typologies do not account for modern IT types. At the same time, today’s IT is more complex than other technologies of the past and it still maintains yet to be explained characteristics. Interestingly, this proposition comes from an organizational scholar, Karl Weick (1990). Modern ERP systems or N-tier distributed systems used for supporting processes of e-commerce provide a good illustration. All these examples are indications that IT is under-represented in organization theory.

IVO hold that organization theory and the IS field could increase mutual informing for mutual benefit since conceptual and some institutional conditions are in place.

INFORMING ORGANIZATION THEORY BY THE IS FIELD

I would argue that this under representation is a consequence of fundamental limitations of the approach to IT taken in mainstream organization theory. Secondly, I believe that the MIS field could influence how IT is positioned in organization theory if it addresses IT in a more meaningful manner. The following discussion on these two points addresses some of the recently raised concerns about an identity crisis in the IS field (e.g., Baskerville & Myers, 1992; Benbasat and Zmud, 2003; Kock et al., 2002) as well as the possibilities of enhancing the field’s identity by cooperating with organization theory (Orlikowski & Barley, 2001).

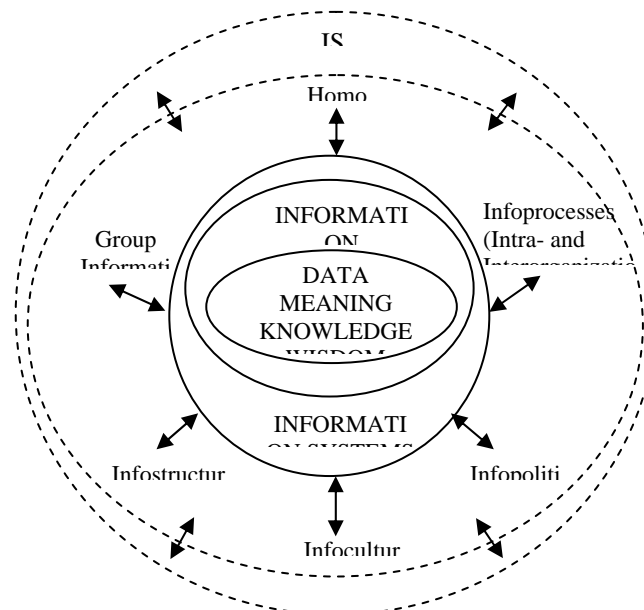
Coupling IT with Information

In organization theory, IT is not distinguishable from other technologies. Any technology, including IT, is viewed as a bundle of physical things, knowledge, procedures, and other artifacts that transform organizational inputs into outputs—a transformational function. So for example, technology of a car manufacturer consists of the factory *machinery*, *computers* driving it, warehousing, transportation and other *equipment*, computers in the back office, computer and telecommunications *networks*, engineering *knowledge*, knowledge of production processes, accounting, marketing, and other areas, *procedures* of planning, logistics, manufacturing, and *management techniques*—everything that fits into the convenient box called “organization.” This idiosyncrasy may be appropriate for theorizing on higher levels of abstraction, such as typifying organizations and studying the relationship between organization and environment. However, the picture is too big and lacks analytical power. IT, the phenomenon central to the IS field, is a needle in the haystack, and specificities of its design, uses, and relationships with information and with the social context remain far from sight. Differences between various kinds of IT and their organizational consequences also go undetected.

This situation can be improved if organizational scholars concentrate on differentiating between different technologies and between technological physical artifacts, knowledge (of a professional domain, of technology use) and organizational context (procedures, management systems). The IS field can provide a significant contribution in this respect and so assist in increasing the bandwidth of the inter-field channel. But in order to accomplish this, the IS field may need to (a) integrate its two disparate streams of research, and (b) take a comprehensive approach to IT. What follows is the discussion on both propositions.

Information in its various modalities should be the phenomenon that is as central to the IS field as IT. In IVO, this assumption is presented by making IT and forms of information the central aspects of the framework, as depicted in Figure 1. However, information issues are underrepresented in the large part of the field traditionally called management information systems (just “information systems” is used more recently, which may be confusing in this discussion that uses this term to refer to all the research streams making the IS field). In contrast, information is central to the part of the IS field that is called information science.

Figure 1: Conceptual Framework of Information View of Organization.



With some exceptions, MIS research has overlooked information issues. Typically, some sort of IT (indeed, this often is some IS) is studied in relation to behavioral phenomena and broader organizational aspects (structure, strategy, processes, etc.). Information is not explicitly addressed, and yet it does represent that critical link between IT and organizational context. IT and IS that IT participates in, are there to support information in the first instance, and thus this information supports a task or process. Therefore, IT/IS supports organization only through mediation of information. Information is in the system (data) as well as in the system user's mind (meaning, knowledge, wisdom). The cited research omits this first level of analysis and jumps right to the second level. Leaving out information as the important chain link impoverishes and distorts the picture. For example, one may not fully and accurately understand the effects of animation features on a Web site if one neglects that animation influences creation of particular meaning and perhaps knowledge in the user's mind. Assessing knowledge of a product that the system facilitates may be particularly important as it could include a surrogate psychomotor experience, which might be antecedent to the purchasing intention.

Another detriment to leaving information out of the scope is a lack of disciplinary identity. Unselective galvanizing of IS research around whatever is the organizational topic of the day (trust, social presence, core competence or some other strategy or new organizational design) makes it look much like the disciplines of organizational behavior, organizational strategy, or some other area of organization theory. The identity of the IS field is also vulnerable to random shaping by influences from the IT industry. More often than not, new software and hardware are regarded as a magic bullet that can directly produce organizational effects. Accustomed IT acceptance models are put to use without asking what is the role of information that the new IT engenders in creating the behavioral intention to use this IT/IS. Likewise, technical capabilities engender hypothesizing about higher level organizational effects without looking at the first-level effects concerning information. The end-result is that, again, the specific contribution that IS research is supposed to bring is not clear; what differentiates this from IT consulting?

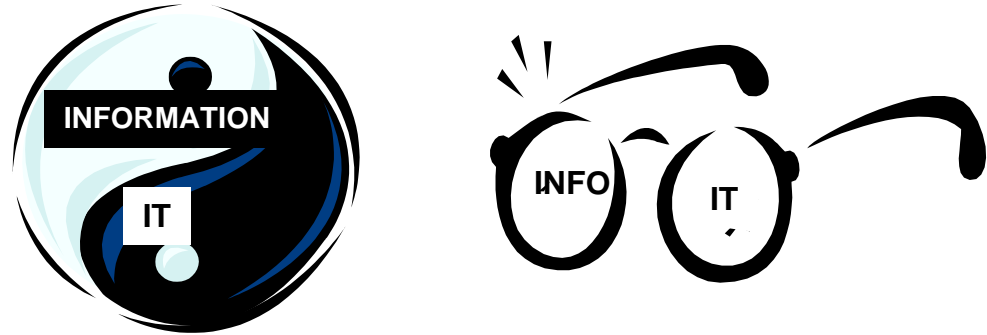
In contrast to the exclusive IT focus in MIS/IS research, information attracts nearly all attention of research that is called information science or more recently, the study of information. While contributing to understanding properties of information and information-related behaviors (e.g., seeking, and use), this research disregards the axiom that technology can make a difference in information. An identifiable anchoring in paper technology as opposed to electronic is a striking example. Data stored on paper can elicit different meaning and knowledge than electronic data. Mass media epitomize this principle: the same event described via text is likely to be interpreted when presented on video footage. In addition, the video story is likely to be perceived even differently than an Internet-based combination of various data formats and contents that portray the same event. In effect, different technologies capture the same event through different data inputs and, consequently, elicit different meaning and knowledge in the user's mind. This could be the reason why older types of IT keep coexisting alongside new ones, as the need for different, always richer information characterizes the contemporary *homoinformaticus* (more on this concept below).

Although apparent and institutionally entrenched, the fragmentation on the information and IT focus is reconcilable. Leads and exceptions that advocate a balanced approach exist. For example, the concept of IS brings together IT and data, which is one modus of information. Placed in an organization, an IS is supposed to satisfy information needs that are part of the system's requirements. Implicitly, the data maintained by the system are in function of meaning and knowledge that reside on the system user's side. The subject of systems analysis and design (SA&D) has been studied across the schools in the IS field. By following the logic of SA&D, one is compelled to dive into organizational information needs, the data content, flows, and specifics of IT. Therefore, a bridge between information and IT is tangible in this rationale. But, interestingly, it has not made a stronger impact in the IS field. Furthermore, balanced approaches can be found in interpretivist research.

For example, Markus's (1983) classic study on a financial management system revealed new information phenomena that followed implementing a system (e.g., direction of information flows, data content, and new ways of informing on divisions' performance). Another study by the same author showed how an email system engendered information that carried much of scheduling, reporting, and collaboration processes, and preoccupied managers' attention at the expense of social interaction (Markus, 1994). Also, Orlikowski (1992) indicated how design of CASE software led to certain information outcomes in the system development tasks supported by the software, including constraints on the developers' flows of thought. Yet another good example, with no pretense of exhausting the list, is the set of case studies edited by late Claudio Ciborra (1996). Furthermore, the tradition of

GDSS research has made aspects its mainstay. One way of doing this was by studying quantity and quality of information as the outcomes of GDSS. On the side of students of information, research on information retrieval systems has balanced the technology and information perspectives (Belkin, Oddy & Brooks, 1982; Wilson, 1999).

Figure 2: Metaphors of the IVO Approach.



Also relevant is the work of Dillon (1994; Dillon & Vaughan, 1997) on electronic information that accounts for properties of technology and contains important implications for design and use of IS. These are just some examples of a balanced approach that can help the IS field to obtain a more definitive, recognizable and useful focus, which could be attractive to organization theory. The assumption of the balanced approach is metaphorically presented in Figure 2. As the principles of yin and yang are distinct but inseparable entities, one needs to look through both the information and IT lenses in order to understand organizations from the IS perspective suitable to IVO.

Painting the Black Box of IT

Another change that could shape contributions of the IS field refers to developing a more comprehensive approach to IT. In their argument for bridging the gap between organization theory and the IS field, Orlikowski and Barley (2001)—the IS and organizational scholar, respectively—suggest that the former can benefit from the insight into technology issues the latter could provide. However, it is interesting that the authors do not locate this insight in what is considered to be the academic IS field. Instead, they point to the IT trade press. Indeed, the academic approach to IT is rather scanty. IT is often conceptualized as some type of information system and operationalized in terms of some surrogate measure (e.g., the frequency of usage, or the amount of investment in it; see Orlikowski & Iacono, 2001). The authors also assert that some of the popular areas of IS research operate with a black box concept of IT. I would like to point to the subject of IT acceptance (adoption) that exemplifies this point, although it may not be apparent due to the popularity of the subject.

The typical technology acceptance model (TAM) relates users' perceptions of usefulness and of ease of use of some IT/IS (causes) and the intention to use IT/IS (the effect). Although this research has been partly conducive to predicting users' intentions, its approach to IT is too abstract. Overlooking the features of IT/IS functionality, user interface, data in the system and meaning/knowledge elicited on the user's side, TAM research does not help us understand what specifically the user values, what system properties need attention for they could discourage use, or what particular tasks the system could be adopted for. Take for example email systems. The single function of informing the sender that a message is delivered (e.g., the PROFS[™] email system supports it) may be critical for a secretary to adopt email for the task of scheduling meetings. The secretary may not be aware of this feature or may know that it is unavailable. In either case, a TAM survey would indicate a rejection of the system. But this finding cannot explain much about the user's behavior or be very useful for management since the specific reasons remain opaque. Also, we would not know that other current features were satisfactory, when in fact they were. By prompting users to provide blanket statements on systems' usefulness (and ease of use) one suffers a significant loss of information. Also, validity and reliability of measurement is potentially jeopardized because the users are assumed to be capable of quantifying and averaging across different system aspects on the fly.

Fine-tuning of IT acceptance research would assume focusing on specific features of a system and particular tasks. Information aspects, including the systems data and information that is elicited on the user's side would additionally increase the predictive power and validity. This approach, of course, is juxtaposed to the black box approach to IT/IS that TAM has espoused. Instances of the extreme "blackness" are bluntly inappropriate uses of TAM for investigating consumer behavior (e.g., the intention of using Web stores; what technologies' adoption is really investigated?) or the technologies whose use is mandated (e.g., security systems that are enforced by management; hence, no research is needed to predict a usefulness of such IT for accomplishing professional objectives relating to reward and promotion). It is interesting that TAM was originally built on ideas from the area of social cognition, which developed in a contra-position to the black-boxed approach of behaviorist psychology. Ironically, TAM research fell back into the black box trap, with the stipulation that the box is now labeled "IT" instead of "human psyche."

IVO holds that a more comprehensive approach to IT outlined above would enable the IS field to make a more meaningful contribution to organization theory. That way, the IS field could increase its chances of becoming a "reference discipline" for organization theory (see Baskerville & Myers, 2001).

INFORMING THE IS FIELD BY ORGANIZATION THEORY

Organization theory can also contribute to broadening the channel that connects it with the IS field. In addition to using specific theories and frameworks from organization theory, IVO proposes that this influence can be funneled by a particular anchoring of IS in views of organization. This anchoring shifts the structural, cultural and other views so that information and IT aspects are brought to the fore. Thus, organizational structure becomes infostructure, organizational culture is infoculture and so on, as it will be discussed below. These shifted views, then, become the lenses for investigating the traditional IS issues (design, adoption, use, and evaluation). In addition to these shifted views, the IVO framework includes the individual and group topics, both anchored and centered around information and IT issues. The IVO framework is presented in Table 1 and Figure 1.

IVO has similarities with information ecology frameworks (Davenport and Prusak, 1997; Fedorowicz et al., 2004) in advocating both organization/management theory and a holistic approach. The main differences between IVO and information ecology are (a) that IVO includes IT in its framework, and (b) that central concepts from organization/management theory are given a decisive anchoring in the IS perspective, as mentioned above.

Individuals and Groups

Individuals make a logical beginning of IVO because an organization, no matter how we conceive it, is still a collection of individuals. Indeed, early research that operated on the juncture between IS and organization theory was focused on the individual perspective (March & Simon, 1958).

Table 1: Scope of Information View of Organizations.

IVO Topic	Focus / Definition
Homoinformaticus	Individual cognition, individuals as creators and users of information; Individuals as users and creators of IS
Groupomatics (Group Informatics)	Group cognition, decision making, work and supporting IS
Infostructure	Stable patterns of relationships between information segments and the arrangement of IT that complement social structure.
Infoprocesses	Interrelated information activities that altogether deliver an outcome to a customer.
Infoculture	Beliefs, behaviors and artifacts that are related to information and IT.

Infopolitics	Power, agendas and fight/flight behaviors related to information and IT.
IS Management Issues	Design, Adoption, Use, and Evaluation of IS. <u>Note:</u> These are standard IS issues that should be intersected with the IVO issues above.

From the IVO perspective, individuals are information creators, processors, disseminators, and users. I term this omnipotent individual with *homoinformaticus*, in order to emphasize its distinctiveness from *homo economicus*, *animalis politicus*, *homo ludens*, etc. Different branches of psychology applied to the organizational context can inform this part of IVO. The premise of the classic Karl Jung (1922) is today as relevant as always: “The subjective factor is as much a fact as the radius of the earth.” Based on Jungian psychological types, the Myers-Briggs type indicator was developed to predict dominant characteristics that have to do with modes of judging (either based more on feelings or on thinking) and of perception (based more on sense data or on the inner world of an individual). This instrument can be applied in understanding individual users, and then, providing information and IT that fits their type or that compensates for shortcomings of their type. Useful extensions and modifications of Jungian psychology can be found in Kolb’s (1984) typology of learning styles. For example, the Assimilating learning style prefers readings, analytical models, and time to think things through, and it is important for effectiveness in information and science careers. In contrast, the Diverging style prefers working in groups and listening with an open mind and it performs better in situations that call for generation of ideas, such as brainstorming.

Cognitive psychology can also help in understanding perception, memory, and thinking. (Note that this psychology is separate from organization theory’s discipline; thus, IVO borrows from cognitive disciplines as well.) For example, the perception process involves both external stimuli and internal mental activity, or the bottom-up and top-down processes (Eysenck and Keane, 1995, pp. 80-81). An individual gathers sense data, organizes it, and, with the help of previous knowledge (mental imagery, schemas and mental models), attributes a meaning to it. Perception is, thus, a process of the active creation of meaning. This premise is in a stark contrast with conceiving information as “facts” that are readily available for consumption. Also, the premise brings closer to reality the usual simplistic black box models of learning how to use a new piece of IT. Richer modeling of individuals as creators of information can additionally draw on corresponding approaches in organization theory, such as sense-making (Weick, 1995) and symbolic perspective on organization (Czarniawska-Joerges, 1992). As the users of IT, individuals have been studied extensively in the IS field since early IT adoption studies to modern research on structuration processes, usability (Nielsen, 1993), and information architecture (Rosenfeld & Morville, 1998). However, individual organization members are also creators of IT. Beyond the limited practices of user development of IS, an inspiration can be sought in the methodology of participatory design developed in Scandinavian countries (see Iivari & Lyytinen, 1999).

Groups have long been a standard organizing unit in certain industries (mining, project-driven organizations, public accounting) and have spread to other industries since the 1980s (Galbraith, 1973; Travica, 1999). In IVO, the group level of analysis is referred to as *group informatics* or *groupomatics*. IS research has provided significant contributions to understanding groups using particular GDSS products as well as systems for various operational purposes (see Ciborra, 1996; Nunamaker et al., 1996/7; Turoff et al., 1993). IVO is particularly interested in the fact that the group context raises the creative role of individuals discussed above to a new height: creativity surfaces even in the adoption of off-the-shelf products, as a group can significantly shape the system’s purposes and outcomes. Groups can also shape the relationship between IT and people by compensating for the narrow bandwidth of communication technology, as this is exemplified in the revision of media richness theory. It is interesting that the group as a whole is that which acts. Indeed, our time has revamped the relevance of socio-psychological propositions put forward by classics of group psychology. For example, Kurt Lewin (1948) proposed that a group could be attributed with the same cognitive characteristics that describe an individual. That groups can have transactive memory, collective mind, and shared perception has just started to be acknowledged in the IS field (Shepherd et al., 1995; Shaila and Saunders, 1995). IVO draws on these premises and evidence and calls for continuing learning from social psychology applied to organizations.

Shifting Organizational Views

The informing effect of organization theory on IS research can be even more pronounced by focusing on

the views of organization that are shifted toward IT and information. Information (in the broader sense) and IT (including its pre-electronic kinds) have been embedded in organizational structure, culture, politics, and other aspects. For example, the structural dimension of hierarchy, which Weber (1946) defined as the levels of graded authority, can also be understood in terms of the levels or vertical distribution of information and IT. I call this *infostructure* (see Figure 1). A precursor to my concept is Bressand and Distler's (1995) conceptualizing of infostructure in terms of formal rules that govern the exchange between the actors present on the social network. Therefore, the logic applied is clear: Take an organizational view, and enrich it with IS-related content.

Relationships between hierarchy, IT, and information have been addressed from various perspectives; for example, studies on structure-IT relationships (e.g., Pfeffer & Leblebici, 1977), information processing approach to organization (Galbraith, 1973; Stinchcombe, 1990), institutional/structuration theory (Barley, 1986, 1990), and actor network theory (Hanseth et al., 2004; Latour, 2005). These studies teach that IT is associated with structure as a cause or an effect or condition. Acknowledging the merit of the structural view, IVO advances the argument of IT-hierarchy study by proposing that structuring of information and IT is a necessary condition—if not the antecedent—to the social structure of organizations. For example, Ciborra & Patriotta (1996) studied an application of the Notes groupware that supported the product innovation process at Unilever. Teams competing for funding kept their project documentation online. When the teams discovered that managers could access this information before its official release, they objected and a conflict with management ensued. The solution was to stratify information into the above and below-the-line segments. The former was public to teams, the latter private. This new information order modified social hierarchy because managers—as opposed to teammates—had no authority over the private information. From the perspective of IVO, this is a dimension of information structure—*infostructure*. Other infostructural dimensions include infocentralization (the extent to which information and access to IT are concentrated), and infofragmentation (the extent of grouping information and IT on the department, job, task, and process basis).

The part of organizational culture that revolves around information and IT is the domain of *infoculture*. In an infoculture, cultural assumptions, values, and rituals have a clear focus. For example, these can be focused on the Internet in organizations that owe their existence to this global computer network. This indeed is the case at Amazon.com and at MediPlan, an international Internet pharmacy based in Canada: each company nurtures stories that praise the Internet as the creative force responsible for the advent of the company. Davenport and Prusak (1997) have defined information culture as "a pattern of behaviors and attitudes that express an organization's orientation toward information" (p. 84). I expand this conception to incorporate IT. One should note that some organizational scholars have begun paying attention to the impact of modern IT on organizational cultures. For example, Deal and Kennedy (1999) believe that computers have created "cultures of isolation" as they destroyed old social rituals by making these machine-timed (p. 148). Evidence on infoculture can be detected by reading certain literature through infoculture lenses. For example, Orlikowski (1996) studied a help desk in a software company that used a new database and communication system in everyday work. This use resulted in the creation of new values and work rituals applying to the tasks of documenting problem-solving efforts. Specifically, the values that praised quality documenting of problem solving processes were created. Another novelty that belongs to the domain of infoculture was a dramatic story about the frustration with poor documentation that reinforced this value— however the documenter and user were the same person, and so the user became angry with himself (ibid.). Furthermore, there emerged a new value that vested the authorship of a solution with a seal of quality. Rituals of publicly praising good documenters followed the suit. In this case, we can see that new IT was responsible for new information practices, which delivered a new information entity (problem-solving report), which, in turn, became a new cultural phenomenon.

Infopolitics is the next dimension in IVO and it refers to issues of power, agendas, and fights/flights that concern organizational information and IT. Sitting at the nexus of contemporary organizations, information, and IT constitute high political stakes. In the organizational literature, it has long been maintained that control over professional knowledge can be a source of power (Crozier, 1964; Pfeffer, 1981), while Barley (1986, 1990) related power changes to knowledge of manipulating new computer-based medical technology. Similarly, Zuboff (1984) identified a possibility of power gains on the side of professionals who adopted new digital IT (she called this *informatization of organization*), while warning that IT can also lead toward solidifying old political positions (*automation of organization*). Boisot (1987, 1998) differentiated between clan, fief, bureaucracy, and market organizations by using criteria of information codification, diffusion, and abstraction. For example, the clan organization is based on information that is low on codification (formalization, organization) and high on diffusion

(dissemination, sharing), while the bureaucracy draws on information with directly opposite characteristics. Therefore, specific information characteristics funnel power to a clan or to bureaucrats. In a case study of a festival venue in Canada, I found that a monopoly of knowledge on organizing and management represented the main lever of power in a clan-like organization (Travica, 2005; more discussion in a separate section below). Provided the space limitations, it suffices here to mention that power, the central phenomenon in social science, deserves special attention in furthering the framework on infopolitics. The impetus comes from advances in broadening the concept of power beyond the notion of domination/dependence to include the aspect of autonomy (Giddens, 1979, 1984) and from questioning the character of social to include objects (Latour, 2005).

IVO ventures in the domain of organizational processes as well. Again, the specific approach that IVO takes leads to altering the conventional concept of organizational process: *infoprocess* (short for “information process”) refers to interrelated information activities that deliver an outcome to a customer. This definition builds on the concept of business process (Hammer and Champy, 1993). Although these authors placed the definition of process in a change perspective—business process reengineering (BPR)—it can be argued that the concept of process (and, therefore, infoprocess) are to be taken as neutral, analytical devices, divorced from any ideological connotations. Processes have been studied in various disciplines and the process view is a cornerstone in the IS field (although differences between concepts of process and of system are not always crystal clear). IVO takes interest in various specific approaches to the process view of organization in order to draw consequences for understanding infoprocesses. Malone and Crowston (1994) pointed out that many organizational processes indeed revolve around information, and embarked on adjusting theory of coordination organization, which originated in organization theory (Thompson, 1967) to the IS field. Other relevant literature includes study of BPR and ERP systems. Study of BPR is interesting because it addresses the relationship between processes and new organizational forms. For example, Hammer (1996) has proposed the concept of a process-centered organization that introduces a new job specialization, power distribution, and knowledge requirements.

Infoprocesses exist at different levels, ranging from fundamental infoprocesses that work at the data manipulation level, to macro-organizational and inter-organizational infoprocesses. These highest level infoprocesses give rise to another novel organizational design—the virtual organization. It can be argued that electronic interorganizational infoprocesses that rest on EDI, e-market systems, automatic ordering systems, and ERP systems, engender virtualizing of organizations. These infoprocesses support subcontracting, sourcing and outsourcing operations, and they also engender B2B e-commerce. In a study of a VO based on subcontracting in the electronics industry, I found that infoprocesses between the company and its software vendors that rested on email, the transfer of program files, and direct downloading of binary code to programmable machinery were crucial for successfully virtualizing the company (Travica, 2005a). In another study on a hotel providing Internet service to guests, I discovered a connectivity infoprocess was dysfunctional and it caused much trouble to guests, the hotel, and the external Internet cable service provider (Travica, 2004). Information was fragmented between different work positions both in the hotel and at the ISP (a dimension of *infostructure*), hardware support was deficient, automatic code download was not fully controllable, and it was unclear who was the owner of the connectivity infoprocess. In effect, dysfunctional interorganizational infoprocesses caused a malfunctioning virtual organization (*ibid.*).

All the dimensions discussed above are depicted in Figure 1. The inner circles show the central phenomena of IVO-driven IS research—information in its various modalities and IT. These relate to IVO dimensions. The outer circle represents the standard IS management issues (refer to Table 1). These are anchored in IVO dimensions, which (as discussed above) are inspired by organization theory.

Conceptual Framework and Research Models

The conceptual framework I outlined above is supposed to help better understand the relationships between IT and information on one side, and the organization on the other. The IVO framework (Figure 1) simply sketches the relationships between the dimensions. Precise defining of the relationships (cause-effect flows, positive/negative direction) is not yet done. Even precise determination of the relationships is left open. The research purpose of the framework, in addition to the mentioned broadening of ontology, is to serve as the springboard for specific research models. These may contain just some of the dimensions proposed, or all of them.

Organization theory provides the background to sketching relationships in the present form of the IVO

framework. Some students of organization theory share the assumption that a combination of organizational structure, processes, culture, politics, and other key aspects engender different organizational designs or forms (e.g., Clegg & Hardy, 1996; Galbraith & Lawler, 1993). The concept of organizational design/form explains organization in a more holistic way than the concept of organizational structure. Since IVO dimensions complement organizational dimensions, the logic of organizational design applies to the IVO framework. For example, if a bureaucracy is characterized with a particular organization structure, culture, politics, processes, and other key aspects that are in congruence, it follows that there should exist complementary IVO aspects of infostructure, infoculture, infopolitics, infoprocesses, and so on.

Notwithstanding the outlined rationale, defining precisely the relationships between IVO dimensions remains a matter of empirical inquiry. The IVO framework is, thus, open and can be molded into different research models, which may include certain dimensions and exclude others. This was demonstrated in Travica's (2005) study, which focused exclusively on relationships between infoculture and infopolitics (see below). A researcher can accomplish the goals of IVO in any sort of modeling, even with a single dimension, as the framework inspires a focus on information and IT and specific organizational tasks/processes.

It should be apparent by now that IVO is a guide for research action, rather than a closed registry of research prescriptions. In other words, when IS is designed, adopted, used and evaluated, one should take the stance of appropriate IVO aspects to get a full understanding of needs, capabilities, limitations and effects of these management aspects. What appropriate aspects indeed are depends on information and organizational needs. If the integration of data and process efficiency are the goals, then IVO aspects of infostructure and infoprocess are apparent candidates for evaluation conducting an evaluation task. If one faces the same needs from the system design or adoption perspective, the inquiry may also benefit from the inclusion of infocultural dimensions. In other cases, the topic of infopolitics may impose itself, as the case by the end of this article illustrates. It is also important to keep in mind that analysis starts on the information and organization end, and then moves to technology. For example, data integration needs can be served by various types of IT and systems, including ERP systems (Sarker & Lee, 2001) and internal Web services (Venkatraman, 2004). But rather than starting with what a particular IT/IS can/could do, the researcher should move from organizational needs expressed in terms IVO of a chosen IVO topic toward matching these with technological aspects. The openness of the IVO inquiry has another facet. With the exception of infostructure, other topics have less clearly defined dimensions. The typical example is infoculture. What specific dimensions will be enrolled in research is the matter of a specific piece of research. Although there are more efficient solutions for the study of cultural issues than interpretivist methods (Hofstede, 1991; Nath & Murthy, 2004), the efficiency of research on intricate IS-related issues may not always be at par with its effectiveness.

BROADENING ONTOLOGICAL AND EPISTEMOLOGICAL HORIZONS

Organization is a different entity for an interpretive theorist, or a postmodern thinker or a follower of some modernist approach (Clegg et al., 1996; Hatch, 1997). How do these differences reflect on understanding information and IT? What relationships do exist between information/IT and differently conceived organizations? What roles do information and IT have in respect to these different conceptions? These are just some of the questions that could inform IS research. IVO advocates pluralism in ontologies and epistemologies. Rather than being an intellectual fad, I believe that a pluralist approach is needed in order to make sense of the complexity challenging contemporary organizations. We live in a time of change or "chaos" and "unreason," and we have to submit to this challenge (Clegg, 1990; Clegg & Hardy, 1996; Davidow & Malone, 1992; Handy, 1989; Hatch, 1997; Heckscher & Donnellon, 1994; Morton, 1991; Peters, 1992; Thietart & Forgues, 1995). Uncertainty and ambiguity reign. Owing to the electronically networked character of today's global economy, the social forces we create evade our comprehension and control (Castells, 1996). Overheated spending sends core economies to long recessions, dragging smaller economies into crises. Accounting controls colossally fail in major corporations in spite of all the accounting knowledge, internal and external services, and financial management systems. Either way, the list could continue. In this situation, it appears to be misleading to keep thinking about organizations exclusively in terms of a machine made of tangible parts, whose relationships are readily susceptible to scientific insight and management control.

The questioning of ontology triggers the question of organizational metaphors. IVO advocates such metaphors that connote organizations with intelligence. Morgan (1986) argues that organizations resemble the human brain in principles of holography, cooperation, and basic structure simplicity. In a holography, every part mirrors capabilities of the whole, and therefore there exists self-sufficiency and self-organization. Brain neurons cooperate to create larger wholes with complex capabilities (perception, memory, thinking, etc). Indeed, information and IT resemble the nervous system of an organization, making it an intelligent entity. I believe that intelligence of an organization also has to do with wisdom. This is one of special forms of information in the IVO framework, and I propose that we conceive it as the result of a capability of making a right judgment. Similarly popular terms include "thinking out of box," "always getting back on your feet," "doing the right thing," "intuition," and "improvisation." Wisdom is the least studied and unique sort of information. Wisdom may not necessitate knowledge—a continuously successful improviser appears to be wise although he may not know more than his colleagues (Ciborra, 2002; Weick & Westley, 1996). The opposite also holds: a seasoned professional can make the right judgments swiftly without much thinking—intuitively—probably because he has become familiar with many problems and their variations. Knowledge can be acquired via a self-learning process and can be taught, while the possibilities of learning and teaching wisdom are questionable, to say the least. A knowledgeable bureaucrat knows operating procedures and their relationships well, while a wise bureaucrat knows how to deal with problems that do not fit procedures, so that a worthy solution can be discovered. Therefore, flexible and novel thinking, and seasoned knowledge facilitated wise judging, which can apparently have beneficial effects in organizations. How can the growth of wisdom be nurtured? Can IT help? Consider two Japanese prescripts: "Wisdom is squeezed out of someone who is standing on the edge of the cliff and is struggling to survive" (Kobayashi, 1985; cited in Nonaka and Takeuchi (1995: 80)). Wisdom is achieved by "giving free play to all the creative and benevolent impulses inherently lying in our hearts" (Zen master Dr. Suzuki; cited in Barrett, 1956: 13, 3).

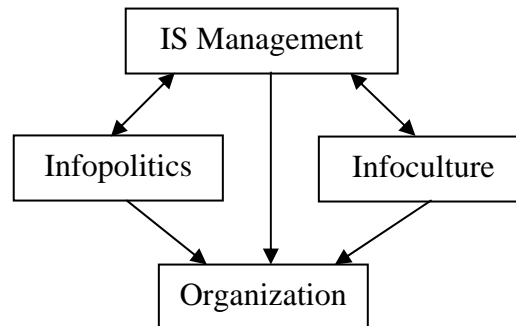
In conjunction with the ontological opening on the organizational side, a similar opening on the side of information and IT is in order. The philosophical question about the roles of information and IT in organizations requires continuous attention. I believe that the teleology of information and IT varies with different ontologies of organization. Traditionally considered the means of uncertainty reduction and control (Shannon & Weaver, 1949; Stinchcombe, 1990), information and IT can legitimately perform different roles, including those diametrically opposite—uncertainty creation and control dissipation. For example, as one learns of a security breach in a company's computer network, the next question becomes, what systems are affected? That question answered, triggers the question, what data are affected? This being determined leads to questioning the extent of the data damage, possible propagation of errors, and so on. One explanation for this seemingly contradictory work of new information is in the time dimension: while information resolves uncertainty with regard to the past, it creates uncertainty toward the future. Constructive outcomes with regard to past uncertainties deconstruct the road ahead. This is why it may be inspiring to replace the traditional uncertainty reduction principle with the assumption that there is a circle of uncertainty in which uncertainty resolution/creation with help of information and IT is a continuous process.

IVO endorses yet another challenge to the perfectly predictable Cartesian world and its complementary positivistic inquiry—the factor of ambiguity (the unclear, ambivalence). In their discussion on knowledge management, Nonaka and Takeuchi (1995) suggest that organizations need to generate "creative chaos" in order to be innovative. Management may try to invoke a sense of crisis in order to move organizational members into action. Instead of solving defined problems, attention is focused on identifying problems in organizational procedures and values. Open-ended, ambivalent statements are purposefully uttered to make employees puzzled and to trigger the creative reexamination (pp. 78-80). Therefore, we see that information (managers' statements) creates ambiguity. Weick (1990) shifts attention to how ambiguity relates to modern IT. He terms IT with "equivoque," because it is not always clear what is happening in it and why it delivers certain outcomes (either desirable or erroneous). The IT user does not always know how technology functions internally, and so he often creates mental models that deviate from the physical reality. This happens because of the complexity of modern technology and limitations in human cognition. The corollary is: not only does IT fail to help reduce ambiguity, but it continuously generates it. In sum, both information/IT and organization of today call for new philosophical approaches that decisively part with Cartesian certainty and clarity.

EVIDENCE OF INFOPOLITICS AND INFOCULTURE

The conceptual framework I described above is supposed to be used for developing research models that would advance its validation through empirical research. I used a part of the framework to study a festival organization in Canada that had characteristics of a small business and a volunteer organization code-named the Folklandia Pavilion (Travica, 2005). This was a longitudinal interpretivist study, which used the research model depicted in Figure 3.

Figure 3: Research Model Used in Travica's (2005) Case Study.



The model in Figure 3 inter-relates the IVO concepts of infoculture and infopolitics, relates these to IS management, and relates all of these to organizational performance. In accordance with the IVO framework, IS management refers to the issues of using, evaluating, designing, and adopting IT and information practices. Findings corroborated both IVO concepts and found that these evolved through two distinct stages, each having a different bearing on organizational performance. The specific aspects of infopolitics and infoculture discovered are grouped in Table 2. Note that the citations refer to the literature that has delivered similar concepts or evidence, even though the authors, understandably, did not have these IVO concepts in mind; items with no citation are contributions of the study.

The studied organization drew an evolutionary trajectory. In the first stage, it resembled a clan organization (Handy, 1993; Ouchi, 1979, 1980) in which a group of seasoned volunteers (“the insiders”) entirely controlled knowledge and information (information centralization/knowledge monopoly) as the basis of power over the majority of the Pavilion members (“the outsiders”). The insiders' agenda was to preserve the status quo in the distribution of information and in use (or better disuse) of IT. Political maneuvering of the insiders was in accordance to these goals, and they blocked action that would threaten to transform the Pavilion into something other than their “homey, affordable dining place” (vested organizational vision). The mainstream infopolitics also exhibited aversive attitudes toward documenting knowledge and methodical records keeping, a preference for human memory over a technology-supported one, valuing paper trails over computers, favoring informal oral communication over a mediated and formalized one, and excluding IS from the beliefs system. In the domain of infoculture, the insiders followed an assumption of the status quo, and exercised rituals and work practices aiming at keeping knowledge within their circle.

The clannish infopolitics and infoculture were challenged when some outsiders managed to enter certain leadership positions in the Pavilion (ibid.). The challenge included a struggle for a more systematic information management, a push for the use of computers, and planting a vested vision of competitive economic enterprise. Drawing on these limited changes, the Pavilion entered the second stage characterized by a radical transformation—the teams' era. The insiders almost left the scene, and so their knowledge monopoly was terminated. A significant segment of the power basis of the new regime was knowledge of using newly deployed modern IT and thereby supported information management. In transforming the infopolitics, the outsiders pushed for the overall modernization of information and knowledge management, open communication channels, and bringing to fruition the vision of a competitive economic enterprise. These swift changes were possible because of the specific character

of the organization—it had no permanent staff, and its design and operations depended crucially on the leadership. For these reasons, a new infoculture was possible to be planted as well, building on the changes mentioned above. The driving infocultural assumption was aiming at a transformation based on professional knowledge and continuous learning. The teams carrying various functions in the Pavilion became agents of intelligence suitable to the new era, incubators of new ideas brought from the Pavilion's environment, and developers and testers of new methods of work. The vested vision of the pavilion as an economic profit-making enterprise was backed by the assumption that IT and information were instruments of accomplishing performance goals.

Table 2: Infopolitics and Infoculture Aspects Discovered.

Infopolitics Aspect	Infoculture Aspect
The speed, direction, content and pattern of information flows as instruments of power (Danziger et al., 1982; Markus, 1983)	The choice of communication channel, information sharing practices, and preference for facts or rumors (Davenport & Prusak, 1997)
Centralization/decentralization of information and IT (Hanseth et al. 2001; Markus, 1983; Orlikowski & Yates, 1994; Travica, 1999; Zuboff, 1984)	Shared expectations and background knowledge (Bressand & Distler, 1995)
Codification and diffusion of information as basis for power differentiation (Boisot, 1987, 1998)	Assumptions regarding instrumentality of IT and information in accomplishing performance goals (Orlikowski & Gash, 1994)
Knowledge monopoly vs. sharing (similar to dimension of information centralization/ decentralization) as power basis	The assumption concerning preservation of knowledge, and values and stories of preserving knowledge via documenting it (Orlikowski, 1996)
Regularity in information and knowledge management as political agenda and practice	The proportion of paperwork vs. digital processing, and match between technological infrastructure and process efficiency needs (Sarker & Lee, 2000)
Closed loop vs. open loop communication as political agenda and flight/fight behavior	The orientation toward change of information and IT
Computer denial vs. embracing as political agenda and flight/fight behavior	Beliefs about the character of intelligence
Vested organizational vision as political agenda	Beliefs concerning worth of computers, paper, and IS

Note: Adapted from Travica's (2005); items with no reference have been discovered in the study.

Digital IT and IS posed prominently both in the value system and in work practices (ibid.). Through practice and ritualistic reinforcement of values attached to it, email was promoted as a key technology in the new infoculture, forming the technological foundation of organizational memory. From the management perspective, email was deployed in informing, coordinating, negotiating, planning, scheduling, and decision making activities. All these changes in infoculture and infopolitics were also tokens of a different management. Therefore, these two domains ended up being interrelated.

While in the clan era the Pavilion was lagging behind similar enterprises in financial performance, the teams' era brought increases in all financial parameters (ibid.). This can be partially attributed to the new infoculture and infopolitics working in this direction. For example, better information accrued for the management and stakeholders; better cost accounting supported a tighter financial discipline; more efficient communication supported better planning and control; richer and faster organizational memory utilizing email helped save time and money increased effectiveness; and so on.

In retrospect, the Folklandia Pavilion exemplified some of IVO's ontological assumptions regarding organizations. The pavilion's evolutionary path, internal struggles and dramatic changes portray it as a continuously uncertain and ambiguous entity. In the first development phase, information was manipulated to create ambiguity,

which benefited the power holders. In the second phase, information and IT acted as forces of reducing uncertainty and ambiguity.

CONCLUSION

This article has introduced IVO (Information View of Organization) as a way of broadening the channel between the fields of IS and organization theory, which can both benefit. Although links between these camps have existed for decades, their mutual informing is still insufficient: organization theory lacks a deeper analytical insight into information and IT issues of contemporary organizations, while IS theory is not building enough on organizational disciplines that could give it an academically more relevant and legitimate direction. IVO is aiming at improving this situation. In particular, the IS field can be more informed by organization theory by anchoring dimensions of interest in “organizational views”—the framework IVO provides gives guidance to this end. The IS field may make more influence on organization theory if it integrates its fractured streams of research that focus either on IT or on information, and if it addresses IT in a more comprehensive way.

The article also discussed the scope of IVO, which encompasses the individual, group, macro-organizational and inter-organizational level of analysis. A conceptualization of each has been provided and relevant literature discussed. In addition, IVO includes the aspects of infostructure, infoculture, infoprocesses, and infopolitics. Each aspect has been defined, the background literature indicated, and examples provided. All these are important academic topics that are intended to raise IVO to the level of other “organizational views” within organization theory and serve as an integrated framework for IS research. With regard to practical management, IVO is occupied with the management of information, IT, IS, and the IVO aspects listed above.

IVO advocates a pluralist approach to the ontology and epistemology of organization, information and IT. In a reversal of traditional principles, organizations are seen as continuously complex, uncertain and ambiguous entities, and information and IT are seen as forces that both reduce and create uncertainty and ambiguity. After the pilot testing of such concepts as infopolitics and infoculture, the IVO framework awaits further validation through more elaborate studies in different kinds of organizations. Besides helping mutual informing of IS theory and organization theory, IVO might help the former in the current search for self-identity.

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