Challenges in Conducting Empirical Work Using Structuration Theory: Learning from IT Research

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Abstract

Giddens's structuration theory is increasingly used as an alternative approach to studying numerous organizational phenomena. However, the applicability of Giddens's concepts is not without difficulties because of two main challenges. First, structuration theory is complex, involving concepts and general propositions that operate at a high level of abstraction. Second, structuration theory is not easily coupled to any specific research method or methodological approach, and it is difficult to apply empirically. Arguing that structuration theory is a valuable framework for a rich understanding of management, organization and related subjects of inquiry, this paper aims to improve the application of structuration theory in empirical work by drawing on the experience in information technology (IT) research. It identifies patterns of use of Giddens's theory in publications in the domain of IT, and then describes how IT researchers have attempted to address its major empirical challenges. The paper presents a repertoire of research strategies that might guide students of organization in dealing with three elements that are central to structuration theory: duality of structure, time/space and actors' knowledgeability.

Keywords: structuration theory, research methodology, research methods issues, information technology research, organization studies research

As information technology (IT) pervades numerous aspects of human life (e.g. work, social, family) at multiple levels — individuals, teams, organizations, markets, countries, and society — an increasing number of researchers have looked for alternative ways to study IT interactions (Klein 1999; Lee et al. 1997; Walsham 1995). Among current developments in IT research are the articulation by several researchers of the main assumptions of Giddens's structuration theory (ST) (Barrett and Walsham 1999; Majchrzak et al. 2000; Orlikowski 2000; Sahay 1998) and the publication of literature reviews on the use of ST in IT research (Jones 1997; Jones and Karsten 2003; Pozzebon and Pinsonneault 2000; Rose 2000; Walsham and Han 1991). ST has been seen as a promising theory to resolve the longstanding debate concerning the relationship between structure and agency, a challenge not confined to IT or even to organization theory. In fact, such a debate is among the most ubiquitous and difficult issues in the whole of social theory (Cohen 1989; Giddens and Pierson 1998).

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ST is one of several alternatives that go beyond dualistic ways of thinking, proposing a form of social analysis that avoids the historical division between determinist and voluntarist views, which helps to bridge micro and macro levels of analysis. Other well-known alternatives are Bourdieu's (1977) interplay between objectivism and subjectivism; Bernstein's (1983) move beyond objectivism and relativism; Bhaskar's (1989) account of positivism and postmodernism; and Fay's (1996) discussion of science versus hermeneutics. Some examples of the extension of such a debate into organizational studies are: Willmott's (1993) break from paradigm mentality; Weaver and Gioia's (1994) incommensurability-versus-structurationist inquiry; and Reed's (1997) discussion of duality and dualism. A detailed discussion of each of these theoretical choices is beyond the scope of the present paper. However, it should be noted that most of these accounts are not 'competitors' but 'alternatives', and the choice between them is often a matter of 'ontological affinity' (Pozzebon 2004).

Aware that Giddens is not the only theorist to have proposed an alternative to dichotomous systems of logic, this paper does not intend to place ST as 'the best' alternative, but simply to propose it as one powerful alternative not yet fully explored by students of organizations. We hold the view that much of the potential of ST in helping to increase the understanding of 'organizations, organizing, and the organized' remains to be developed. Organization studies has been the arena of rich theoretical discussions about the use of Giddens's social theory to study organizational phenomena (Bachmann 2001; Barley and Tolbert 1997; De Cock et al. 1995; Hardy 2001; Holmer-Nadesan 1997; McPhee and Poole 2002; Pentland 1992; Ranson et al. 1980; Reed 1997; Sarason 1995; Slappendel 1996; Staber and Sydow 2002; Weaver and Gioia 1994). Also, several articles have illustrated the structurationist framework using case studies already published (Alexander 1998; Bouchikhi 1993; Sydow and Windeler 1998; Weisinger and Salipante 2000). We found only two studies that actually used a structurationist framework (Brocklehurst 2001; Riley 1983), suggesting that while organization theorists have engaged in discussions of Giddens's theoretical notions (agency/structure, time/space, power, identity, subjectivity and others), their application in empirical studies is still at an early stage.

As previously mentioned, a cautious look at other disciplines within the overall management field reveals a different picture. For instance, a number of IT scholars have already applied concepts drawn from Giddens's social theory in their *empirical inquiries*, revealing a 'cumulative tradition' in empirically applying ST over the last decade. Our intent in this paper is to draw upon that experience in IT in order to contribute to the application of structuration theory in organization studies (OS). This effort joins a recent call for intensifying the collaboration between OS and IT, seen as two distinct but overlapping disciplines: 'much can be gained from greater interaction between them' (Orlikowski and Barley 2001: 145). Central to IT research is the understanding of how organizational phenomena affect the development and use of technologies and how technologies help to shape organizations. The stream of IT research outlined in this paper — the structurationist view

of technology — can be seen as focused on this central issue, and OS could benefit by following the lead of IT research in taking into account the material properties of technology.

However theoretically promising, the applicability of Giddens's concepts is not without difficulties. Since its publication, Giddens's ST has been discussed and certain issues regarding its application have been raised (Held and Thompson 1989). Conceptually, ST is complex, articulating concepts from psychoanalysis, phenomenology, ethnomethodology and action theory, among others (Turner 1991). Based on general propositions and concepts that operate at a high level of abstraction, ST gives rise to diverse and sometimes contradictory interpretations (Jones 1997; Jones and Karsten 2003; Pozzebon and Pinsonneault 2000). Moreover, 'structuration theory is not intended as a method of research or even as a methodological approach', and its application in empirical research is widely recognized as very difficult (Giddens 1989: 296). In order to be relevant, a theory must be applied empirically, and ST is not easily coupled with any specific method. By addressing the research question *How can the application of ST in empirical research be improved?* this paper seeks to advance the empirical use of ST in several areas of organization and management studies. Although we try to learn from the experience in IT, the findings are likely to be applied beyond the investigation of IT and organizational change.

The paper is structured as follows. The next section discusses some of the key elements of ST and their implications for empirical research. We then present the method used to identify the papers that are relevant for analysis: we selected and screened empirical research from 1990 to 2002 that made use of ST in the investigation of IT–organization interactions. In the following two sections, we focus on the methodological strategies adopted by IT researchers to overcome the empirical barriers presented by ST. We then present one of the paper's main contributions: a *repertoire of research strategies* that helps clarify, improve and expand the empirical application of ST in IT and organization studies. Finally, we draw out the implications and conclusions.

Giddens's Ideas: The Boon and Bane of Empirical Research?

In a number of articles in the late 1970s and early 1980s, culminating in the publication of *The Constitution of Society* in 1984, British sociologist Anthony Giddens developed the theory of structuration, which addressed fundamental problems in the social sciences in a way that was unconventional at the time. Moreover, he provided an account of the constitution of social life that departed from and challenged established theoretical positions and traditions (Cohen 1989). Structuration theory drew significant attention, and numerous books and papers promptly emerged discussing, scrutinizing, supporting or criticizing Giddens's ideas. It is not our purpose in this paper to provide a complete overview of Giddens's structuration theory, as a number of comprehensive and authoritative texts on the topic already exist

(e.g. Cohen 1989; Giddens 1976, 1984, 1989, 1990; Giddens and Pierson 1998; Held and Thompson 1989). Instead, we highlight here some of the most important, and sometimes most controversial, elements of structuration theory, discussing how they have been interpreted and what are their implications for empirical research.

The relationship between agency and structure is among the most pervasive and difficult issues in social theory. How are actions of individual agents related to the structural features of society? How are actions structured in everyday contexts? How are the structured features of actions reproduced? To examine the dualism between structure and agency, Giddens departed from the conceptualization of structure as some given or external form. Structure is what gives form and shape to social life, but it is not itself the form and shape. Structure exists only in and through the activities of human agents (Giddens 1989: 256). Similarly, he departed from the idea of agency as something just 'contained' within the individual. Agency does not refer to people's intentions in doing things but rather to the flow or pattern of people's actions. Giddens deeply reformulated the notions of structure and agency, emphasizing that 'action, which has strongly routinized aspects, is both conditioned by existing cultural structures and also creates and recreates those structures through the enactment process' (Walsham 1993: 34). He suggested that while structural properties of societies and social systems are real, they have no physical existence. Instead, they depend upon regularities of social reproduction (Giddens and Pierson 1998). As a consequence, the basic domain of study in the social sciences consists of social practices ordered across space and time (Giddens 1984: 2).

Structuration theory is a general theory of the social sciences; in its original formulation, ST pays little attention to technology (Jones 1997). However, given the pervasiveness of technology in organizations' everyday operations, and especially the role of information technology in the process of enactment and reality construction in contemporary organizations, some attempts have been made to extend Giddens's ideas by including an explicit IT dimension in social analysis (Walsham 1993, 2002). As a result of such attempts, structurationist analyses have helped to increase our understanding of important IT-based contemporary phenomena. Some recent examples are studies on electronic trading and work transformation in the London insurance market (Barrett and Walsham 1999); globalization issues and IT deployment in India and Britain (Nicholson and Sahay 2001; Walsham and Sahay 1999); the dynamics of groupware application (Ngwenyama 1998); communication and collaboration using IT (Olesen and Myers 1999); global virtual team dynamics and effectiveness (Maznevski and Chudoba 2000); and cross-cultural software production and use (Walsham 2002). An examination of these studies suggests that, more than simply acknowledging that IT structural properties might 'enable or constrain human action', the value of ST to the IT field is to provide IT researchers with a theoretical approach that helps them understand how users' interactions with IT evolve, what the implications of these interactions are and how we can try to deal with their intended and unintended consequences.

Giddens has suggested that theories like structuration should be utilized in a selective way in empirical work and should be seen more as 'sensitizing devices than as providing detailed guidelines for research procedure' (Giddens 1989: 294). By 'sensitizing devices', Giddens refers to some of the basic elements of ST, such as the notion of duality of structure. As a result, in order to advance the use of ST, one needs to achieve ways of soundly applying such sensitizing devices in empirical work. Recalling that there is no available 'manual' to guide the empirical application of ST, we started by analysing how IT scholars have succeeded in empirically articulating several of Giddens's key concepts. For instance, the notion of *duality of structure* is articulated by most studies (e.g. Barley 1990), *time/space distantiation* is particularly covered by Ngwenyama (1998), and *actors' knowledgeability* is articulated by Orlikowski (1991, 1992). Others have addressed concepts developed in Giddens's later work (1990, 1996), such as *modernity* (Nicholson and Sahay 2001) and *self-identity* (Barrett and Walsham 1999). Paying particular attention to Giddens's first phase, 1976–1989, and especially to the few pieces of work where Giddens discusses 'structuration theory and empirical research' (Giddens 1984: 281–348; Giddens 1989: 293–301), we have selected three central elements of ST as fundamental devices to help guide the empirical application of ST.

First, Giddens suggests that an important issue to examine concerns complex action/structure relations. Actually, the concept of duality of structure is at the core of structuration theory and emerges as an important device for both the planning of an investigation and the interpretation of its results. What ST suggests as an operational principle of research is, not a categorization of rules and resources involved in a given social conduct, but rather an emphasis on the constitution and reconstitution of social practices. Analytically, this should be a mixed process of observation and decoding (Giddens 1989). Structure is embedded in practice, or in a series of practices, in which it is recursively implicated (Giddens 1976, 1984). A similar argument has been made for the study of technological artifacts: the real nature of the technology and its consequences emerge from the actions of human beings (Giddens and Pierson 1998). IT is drawn on, to provide meaning, to exercise power and to legitimize actions, and is, consequently, deeply involved in the 'duality of structure' (Walsham 2002). After framing the concept of technology as a duality — duality of technology — Orlikowski (1992) expanded the earlier work on ST and presented a practice lens through which to examine how people enact structures of technology use. We refer to 'duality of technology' with caution because, as pointed out by Jones (1997) and Walsham (1993: 66), it may be misleading to treat technology 'as a structural property without emphasizing the contrast between such physical structures and Giddens' social structures which are memory traces in the human mind'. Therefore, we retain the 'structurationist meaning' of structure when discussing technology, understanding it as 'enacted structures of technology in use' (Orlikowski 2000). Users' interaction with technology is thus recursive: 'in their recurrent practices, users shape the technology structure that shapes their use' (Orlikowski 2000: 407). Technology structures

are not external or independent of human agency, but exist in the form of a set of rules of behaviour and the ability to deploy resources (Walsham 2002) that emerge from people's interactions with the technology at hand — *technologies-in-practice* (Orlikowski 2000).

In addition to the agency-structure duality, the notions of time and space are central to ST and are also presented as key features in understanding the properties of social systems, how people conceptualize time and space and how they manage to organize themselves across time and space (Giddens and Pierson 1998). Giddens (1989) stresses the importance of the study of the contextualities of institutionalized patterns of interactions across time and space, which are viewed as inherent in the investigation of social reproduction. Giddens argues that all social research necessarily has cultural, ethnographic or anthropological dimensions that are, nevertheless, often neglected in social studies. Such a claim can easily be applied to organization studies: although the analysis of time/space is inseparable from the study of organizational change, until quite recently the literature on organizational change gave only limited attention to context, history and process. Considerable advances have been made in these areas, but the field of organizational studies is still far from being mature in understanding the dynamics and effects of time, process, discontinuity and context (Pettigrew et al. 2001). Some attempts to overcome this absence of time in organization studies are represented by recent special issues of leading journals such as *Time and Reflexivity in Organization Studies* (2002) and *Special Topic Forum on Time and Organization Research* (2001). Regarding IT studies, the focus on the relationship between IT and time/space has been also limited. Worthy of note is the work of Sahay (1997, 1998), who provided a comprehensive literature review of the relationship between technology, time/space and social structure, developing and proposing a framework that allows the integration of time/space analysis into IT research. For recent examples of studies of time and IT, see the *Information Society Special issue on Time and IT* (2002).

A third concept suggested as central to ST is the notion that social actors are *knowledgeable* and *reflexive*. According to Giddens, no study of the structural properties of social systems can successfully be carried out, or its results interpreted, without reference to the knowledgeability of the relevant actors (Giddens 1984). Patterns of actions and interactions of knowledgeable and reflexive actors become standardized and, over time, eventually become institutionalized, thereby forming the structural properties of organizations (Orlikowski 1992). These structural properties simultaneously enable and constrain human action, yet are knowledgeably reproduced by actors. Consequently, when incorporating *actors' knowledgeability* as an analytical tool, the researcher is assuming that 'structure has no existence independent of the knowledge that agents have about what they do in their day-to-day activity' (Giddens 1984). Because knowledgeability is incorporated into the practical activities that make up the bulk of daily life activity, it is seen as constitutive of the social world and its study must be incorporated into research work. The challenge is *how* to include it.

These three elements of ST — duality of structure, time/space and actors' knowledgeability — were treated by Giddens as devices for empirical concerns and can be seen as part of an *overall orientation* of social research. In fact, to account for time/space is not a challenge exclusive to structurationist analysis: researchers on organizational change have been struggling to overcome traditional shortcomings in dealing with a historical or developmental perspective and in developing sensitivity to variation of location. What does seem to be a novelty introduced by structurationist analysis is the need to deal explicitly with the notions of duality of structure and actors' knowledgeability. Taking as a starting point Giddens's suggestions for how social research might proceed when consciously informed by a structurationist outlook, we took the further step to verify how some researchers have planned their methodological design, i.e. how they have collected and analysed their data. This attempt is described in the rest of this paper.

Method

In order to assess how IT researchers have empirically applied ST, a comprehensive review of the literature over the last 13 years of IT publications (1990–2002) was conducted (Appendix 1 lists the journals reviewed). Table 1 describes the method followed to identify, select and analyse the articles that used ST in empirical studies. We tried to ensure that our review was comprehensive and our sample of studies representative of the use of Giddens in the IT field. The method's step 1 resulted in a set of 32 articles, categorized into two broad groups.

The first group, called *adaptive structuration perspective,* clearly represents a stream of research that applies the structuration-inspired framework proposed by DeSanctis and Poole (1994). The second, called *structurationist perspective on technology,* encompasses several IT researchers who are notably influenced by the work of Orlikowski and Walsham. Despite a number of possible similarities and differences in terms of underlying ontological and epistemological assumptions of these two groups of papers, in this paper we focus on examining the *methodological strategies* employed by these two groups in applying structuration theory. As suggested by Pettigrew et al. (2001), we shift our approach from being comprehensive to being selective: we have screened the sample of 32 studies, using two additional criteria that allowed us to focus our attention on specific methodological issues.

First, only studies using a *process approach* were included in the methodological analysis. Along with other scholars (Jones 1997; Rose 2000), we suggest that process approaches are more appropriate when structuration is adopted as the theoretical approach. Process approaches analyse the sequence of events that describe how things change over time (Van de Ven 1992), more easily permitting the direct observation of the process in action and corresponding to Giddens's view of process. Giddens stresses the importance of investigating, through a historical and processual perspective, the recursive relationship between everyday practices and their institutionalization (Giddens

Table 1. Research Method

Step 1: Identify the studies that used ST	1. We first looked for 30 leading journals, taking into account 3 journal rankings per region, as proposed by Mylonopoulos and Theoharakis (2001). We ensured that at least the top 20 journals in each region (North America, Europe and Australasia) were included in our sample. 2. We then used ABI-Inform database to find additional articles whose text or abstract contained the keywords 'information technology' or 'information systems' and 'structuration theory' or 'Giddens'. 3. We completed the literature review by comparing our final sample of articles with the articles referred to in previous literature reviews on the use of structuration theory in the IT field (e.g. Jones 1997; Rose 2000), in order to be sure that no relevant article was missed. Books, book chapters and conference proceedings were not included.	
	Both researchers read the articles in an effort to group them into categories based on their ontology, epistemology, and methodology. Through discussions, two groups emerged.	
Result of step 1: Initial group of 32 studies	**Adaptive Structuration Perspective** Chin et al. (1997); DeSanctis and Poole (1994); Fulk (1993); Majchrzak et al. (2000); Maznevski and Chudoba (2000); Miranda and Bostrom (1993–1994; 1999).	**Structurationist Perspective on Technology** Barley (1990); Barrett and Walsham (1999); Heracleous and Barrett (2001); Kakola (1995); Kakola and Koota (1999); Karsten (1995); Lyytinen and Ngwenyama (1992); Montealegre (1997); Ngwenyama (1998); Nicholson and Sahay (2001); Olesen and Myers (1999); Orlikowski (1991; 1992; 1993; 1996; 2000); Orlikowski and Yates (1994); Orlikowski et al. (1995); Sahay (1998) Sahay and Robey (1996); Stein and Vandenbosch (1996); Walsham (2002); Walsham and Han (1993); Yates and Orlikowski (1992); Yates et al. (1995) .
Note on the initial selection of studies	The following articles follow the same pattern of AST but do not make any direct reference to Giddens's theory. For that reason, they were not included in our sample. The articles are: Anson et al. (1995); Chidambaram (1996); Gopal et al. (1992–1993); Griffith (1999); Nagasundaram and Bostrom (1994–1995); Poole et al. (1991); Salisbury at al. (2002); Sambamurthy and Poole (1992); Watson et al. (1994); Wheeler and Valacich (1996).	Walsham and Sahay (1999), Lea et al. (1995) and Rose (2002) were initially selected because they make a clear reference to Giddens. However, because the main theoretical approach of the two first articles is actor-network theory, and that of the third is soft systems methodology's theoretical formulations, they were not included in our sample.
Step 2: Methodological criteria	Only studies with the following characteristics were included in the methodological analysis: 1. Using a process approach; and 2. Describing in detail their methodology.	
Result of step 2: Final sample of 20 studies	Barley (1990); Barrett and Walsham (1999); Heracleous and Barrett (2001); Karsten (1995); Majchrzak et al. (2000); Maznevski and Chudoba (2000); Montealegre (1997); Ngwenyama (1998); Nicholson and Sahay (2001); Olesen and Myers (1999); Orlikowski (1991; 1992; 1993; 1996); Orlikowski and Yates (1994); Orlikowski et al. (1995); Sahay and Robey (1996); Walsham and Han (1993); Yates and Orlikowski (1992); Yates et al. (1995).	

1984). This explains why all articles using a variance approach were excluded from the methodological analysis that follows. Variance approaches do not seem fully compatible with prevailing interpretations of the central tenets of structuration theory. Most studies grouped as adaptive structuration studies (AST) (Table 1) are based on nomothetic assumptions, use survey and

experimental methods and try to make sense of the interaction between IT and human actions in terms of relationships between dependent and independent variables, using statistical analyses (Miranda and Bostrom 1999). While DeSanctis and Poole's (1994) original elaboration of AST draws from Giddens's ST, its subsequent application in empirical studies has departed from the fundamental premises of Giddens's theory. In fact, Jones (1997) argued that the application of AST in experimental studies to test causal models bears very little resemblance to Giddens's ideas. Although almost all AST studies were excluded from our analysis because they relied on variance approaches, exceptions exist. One of them is Majchrzak et al.'s (2000) study, which is close to AST propositions but differs from other empirical studies using AST in that it uses an interpretive approach, relies on intensive case studies and assumes more purposively that IT effects emerge from contextual interactions between individuals and malleable technologies.

Second, we included only studies that contain a detailed description of their research methodology. For example, studies such as Lyytinen and Ngwenyama (1992) and Sahay (1998) empirically apply structuration theory, but do not provide sufficient information on their method to be included in this methodological assessment. As a result, the methodological analysis that follows is based on 20 studies, as outlined in Table 1.

Langley's Strategies for Theorizing from Process Data

Recently, Langley (1999) described and compared a number of generic strategies for theorizing from process data, and evaluated their accuracy, simplicity and generality. We use Langley's framework to explore a number of methodological issues raised by a 'structurationist agenda' for two main reasons. First, Langley's focus is on process theories and, as discussed above, ST fits into this category (Markus and Robey 1988; Orlikowski and Robey 1991). Second, among the strategies that Langley recognized, she offered temporal bracketing strategy as a direct reference to Giddens's ST, viewing it as a classic example of a research strategy involving mutual shaping. At the heart of ST is the idea that social structures are both constituted by human agency and, at the same time, the very medium of this constitution (Giddens 1976, 1984). Because mutual influences are difficult to capture simultaneously, it is easier to analyse them by temporally 'bracketing' them (Langley 1999). Several authors warn that bracketing analysis risks distorting Giddens's meaning of 'duality of structure' and overlooking that structuration occurs in every instant of action (Jones 1997). Others, nonetheless, affirm that breaking down data into successive periods permits the examination of how actions in one period lead to changes in the context that will affect action in subsequent periods (Barley and Tolbert 1997; Langley 1999), facilitating the study of the everyday forms stretched across time–space, 'the basic part of the analysis' (Giddens 1989: 298).

Langley (1999) identified and described seven strategies for analysing process data in terms of their capacity to generate a theory that is accurate,

Figure 1.
Langley's (1999)
Seven Strategies for
Theorizing from
Process Data
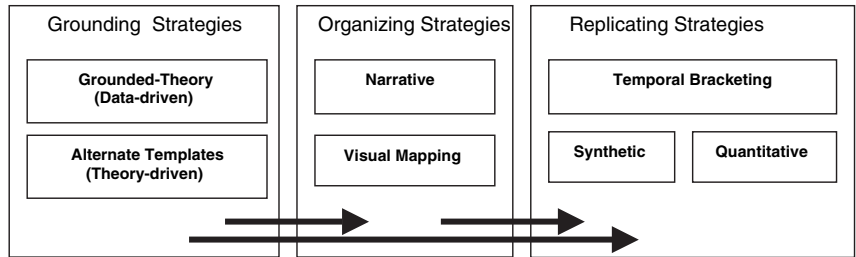
parsimonious, general and useful. These strategies are presented in Figure 1 and summarized here (see Langley 1999 for a detailed description of the different strategies). *Grounding strategies* are either inductive (grounded theory) or deductive (alternate templates), and involve the systematic comparison of data gradually to construct an explanation of an observed phenomenon. *Organizing strategies* — narrative and visual mapping — represent two different ways of describing and structuring process data in a systematic form. *Replicating strategies* — temporal bracketing, quantitative and synthetic — are ways of breaking down the data for replication of theoretical propositions. In the next section, we use Langley's repertoire of strategies as an analytical tool to identify the methodological choices made by IT researchers, in order to overcome the empirical challenges imposed by the adoption of structuration theory.

Learning from IT Research

The 20 structurationist articles were carefully analysed in terms of their main purposes or research questions; their articulation of structuration theory; their methodological approaches; and their strategies of data collection and analysis. The epistemological assumptions of these 20 articles are predominantly interpretive, and their methodological approaches ideographic. Most often, they rely on ethnography (e.g. Barley 1990), case studies (e.g. Heracleous and Barrett 2001), grounded theory field study (e.g. Maznevski and Chudoba 2000) and action research (e.g. Olesen and Myers 1999). Full information and detailed summary of the analysis of these 20 articles is available upon request.

Four of Langley's seven strategies were identified among the 20 studies: *grounded, narrative, visual mapping and temporal bracketing*. Figure 2 illustrates these strategies and, for each of them, indicates: (1) exemplars from our sample that well illustrate each approach; (2) the type of 'anchor point' that helps in structuring the material and determines which elements will receive more attention; (3) relative data needs of each strategy in terms of depth (process detail) and breadth (number of cases); (4) what type of process understanding (sensemaking) each strategy tends to favour.

IT researchers have adopted a grounded, data-driven logic as a basis for theorizing within a structurationist framework. *Grounded strategy* is used in
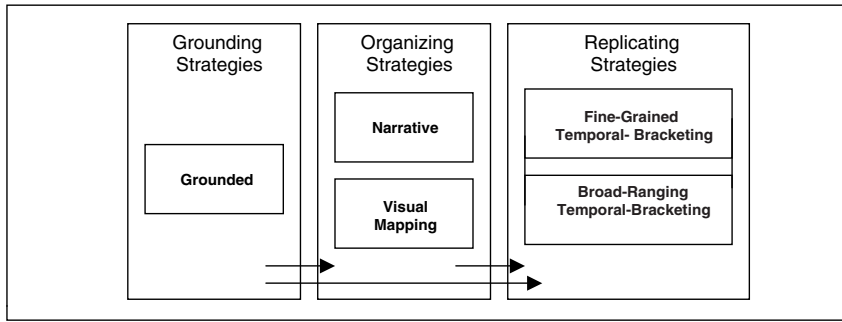
| | Data collection and analysis guidelines (Langley, 1999) | | |
Strategy	Exemplar of the use of each strategy	Key Anchor Points	Specific Data Needs	Form of Sensemaking
Grounded		Orlikowski (1993)	Incidents (unit of text), categories	Detail on many similar incidents. Could be different processes or individual-level analysis of one case.	Meanings, patterns
Narrative		Yates and Orlikowski (1992)	Time	One or a few rich cases. Could be helped by comparison.	Stories, meanings, mechanisms
Visual Mapping		Orlikowski (1996)	Events, orderings	Several cases in moderate level of detail to begin generating patterns.	Patterns
Temporal Bracketing	Fine-Grained	Barley (1990)	Phases, events	One or more detailed cases. Requires data density: the period of data collection equals the analysed period.	Mechanisms
	Broad-Ranging	Barrett and Walsham (1999)	Phases, events	One or more detailed cases. Requires historical data for a longer period.	Mechanisms

Figure 2. Methodological Strategies Applied in IT Structurationist Studies

this text to refer to any kind of inductive theorizing. It is appropriate when researchers are able to collect detailed data from a large number of comparable events or processes (Langley 1999). It is basically interactive — continuously switching between concepts and data (theory and empiricism) — and comparative — the opportunity for collecting rich data for similar incidences providing conditions for systematic comparisons and the identification of emerging categories, if sought. Orlikowski (1993) provides a good description of how to use such a data-driven strategy, where explanations, concepts and theories are inductively grounded in a recursive process of collecting and analysing empirical material.

To different degrees, all 20 studies have applied *narrative* strategies as a way of organizing, analysing and making sense of their empirical material.

Narrative strategy dominates the work of not only 'contextualist' researchers (Pettigrew 1990) but traditional ethnographers (Van Maanen 1988) and cultural researchers (Bartunek 1984). Narratives are being used in several ways: (a) as a preliminary step to prepare the chronology of all phases; (b) as an autonomous analytical tool to analyse the sequences of different phases and establish links between them; and (c) as the main product of the research (Langley 1999). Yates and Orlikowski's (1992) study of genres of organizational communication is an example of the potential of deep exploration of narrative strategies.

Some studies apply *visual mapping* strategies, which are often seen as an intermediate step between the raw empirical material and abstract conceptualization. In order to help elaborate more general theories or more generalizable patterns, such a strategy requires a number of cases with a moderate level of detail and provides a sound route to understanding how events shape processes across numerous cases or a few cases with several embedded events (Langley 1999). Orlikowski (1996) is an exemplary illustration of the use of visual mapping to track graphically and compare sequences of interactions following the introduction of the new technology.

Finally, our analysis not only outlines the importance of *temporal bracketing* — it has been used by a number of researchers — but has also allowed us, as Figure 2 indicates, to refine this strategy, recognizing two sub-modalities. Indeed, these nuanced versions of temporal bracketing can be seen as appropriate to the application of ST. The first is a sort of *fine-grained bracketing*. The second is a *broad-ranging bracketing* strategy. Both modalities are based on the breakdown of phases or events that evolve over time, but each modality accomplishes that differently.

Fine-grained bracketing purposively breaks down events into the effects of action on structures on the one hand, and the effects of institutional constraints on action on the other, over a thin continuum of time (Figure 3). In order to break down the events and analyse them in detail, the period of data collection very often spans the entire period analysed; i.e. data is collected during the entire period of investigation. The researcher needs to achieve a certain density in the data so as to be able to break down the data into successive adjacent periods and carefully examine how specific actions

Figure 3. The First Form of Bracketing Strategy: Fine-Grained Temporal Bracketing
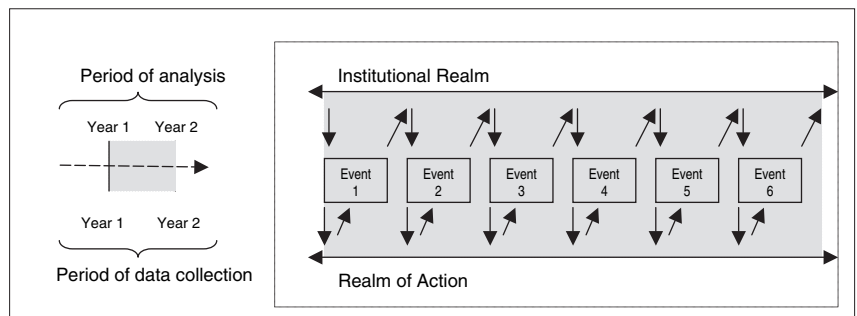
Note: The period of analysis and the period of data collection are identical.

Figure 4.
The Second Form of
Bracketing Strategy:
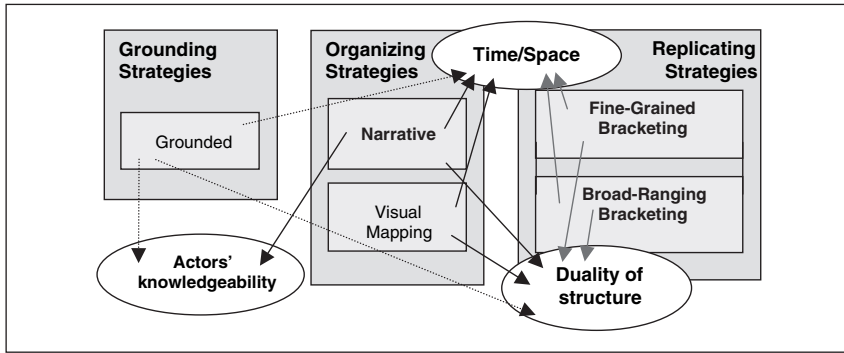Broad-Ranging
Temporal
Bracketing
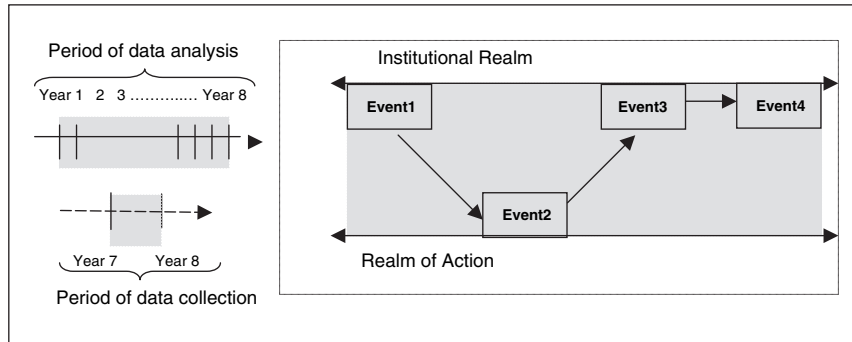
Note: The period of analysis is longer than the period of data collection (historical analysis).

lead to contextual changes which will, again, affect action, and so on. For instance, Barley (1990) conducted an intensive and sustained observation six to seven hours per day for 10 months in order to analyse the introduction of a new technology during the period. His study helps us to understand that temporal bracketing strategy in its fine-grained form requires a kind of *data density*; i.e. the researcher needs to be able to be close to the empirical data and collect it intensively over time.

The second type of bracketing is based on the analysis of sequences of events over time without breaking down each event in the same degree of detail as the scheme described above. A kind of *broad-ranging bracketing* is applied in these cases (Figure 4). Most of the studies classified in this pattern are designed studies that cover periods of 3 to 10 years. Indeed, the route towards investigating more historical and extended periods leads to a kind of sequential analysis, where the bracketing is present but is somehow rough. In this case, the period in which the data are collected is much shorter than the period analysed, and a fine-grained bracketing is neither possible nor desirable. Barrett and Walsham (1999) well illustrate this second form of bracketing: a broad-ranging and sequencing one. Aiming at developing a conceptual scheme to understand broad social transformations associated with the introduction of electronic trading across an entire market, they conducted an iterative analysis of data spanning three years in order to cover a period of nine years. Of course, the period of bracketing analysis applied is not as fine-grained as that applied by Barley (1990). However, a broad-ranging bracketing allows them to understand how situated technological changes in modern institutions relate to shifts in self-identity and, consequently, to broader cultural changes, producing a historical account.

Strategies for Empirically Applying Structuration Theory

Figure 5 suggests how the four strategies can be combined to help overcome the empirical barriers or challenges imposed by a structurationist framework. We call this a repertoire of methodological strategies for applying ST.

Figure 5. A Repertoire of Strategies for Applying Structuration Theory in Empirical IT Research

	Strategies to be particularly mobilized				
Sensitizing Device	Grounded	Narrative	Visual Mapping	Temporal Bracketing (Fine-Grained OR Broad-Ranging)	Study that illustrates the combination of these strategies
Duality of Structure	Necessary	Strongly recommended	Suitable	Strongly recommended	Barley (1990)
Time/Space	Necessary	Strongly recommended	Suitable	Strongly recommended	Orlikowski (1996); Barrett and Walsham (1999)
Actors' knowledgeability	Strongly recommended	Strongly recommended			Orlikowski (1991)

It is worth noting that the strategies are rarely used alone but are usually combined. Indeed, in their purposive combination rests one of the main lessons learned regarding the overcoming of barriers to empirical application of ST, because each strategy tends to provide different and complementary understandings of processes. According to Langley (1999), some strategies seem best adapted to the detection of patterns in processes (e.g. visual mapping) whereas others seem more appropriate to examine driving mechanisms (e.g. temporal bracketing) and others are better for analysing the meaning of the process for the people involved (e.g. narrative). Figure 5 shows the specific *combinations* of strategies that are more appropriate in dealing with each sensitizing device. We illustrate the use of the different strategies with a few examples.

First, we suggest the combination of narrative and temporal bracketing as central for dealing with the duality of structure and the interplay between micro–macro. Because of their focus on contextual details, the variety and richness of the incidents described, and the linkages between them, narrative strategies can facilitate the detailed observation of events over time. Complementarily, bracketing strategies, especially in their fine-grained form, increase the ability to follow sequences of subtle changes (or reproductions)

of structural properties. Temporal bracketing helps to recognize *when* and *how* changes are triggered; narrative strategies help to explain *why*. Visual mapping is seen as suitable: it helps graphically to represent events that shape processes across numerous cases or a few cases with several embedded events. Grounded strategies, in turn, are important sources of rich and dense data for all strategies. Barley (1990) offers an excellent illustration of dealing with the duality of structure. His work on the introduction of CT scanning in a radiology department is widely referenced. From our perspective, what partially explains the strength of his analysis is his methodology: to investigate carefully the role of technology in organizational change, he relies on synchronic, diachronic and parallel research design, and mobilizes three different strategies: grounded, narrative and fine-grained temporal bracketing.

The way of dealing with time/space as a sensitizing device is similar to that previously described: narrative and temporal bracketing are strongly recommended, and grounded offers the foundations, whereas visual mapping provides an important (but not crucial) visual support. Combining the four strategies, Orlikowski (1996) offers a good illustration of dealing with time/space. Her purpose was to show how subtle shifts in action by organizational actors over a two-year period transformed aspects of their work practices, organizing structures and coordination mechanisms, and to show the implications of such shifts for the organization. Once again, narrative strategies helped to express a high degree of authenticity (the sense of 'being there') and emerged as central to examining patterns of interaction across time and space. Because of its focus on representation and analysis of sequences of process and events, visual mapping provided a sound route to understanding how events shaped processes over time. Regarding temporal bracketing, Orlikowski opted for fine-grained bracketing because she was able to collect relatively *dense* empirical material from document analysis, interviews and on-site observation. Her methodological strategies provide a way of seeing the structuring of process where subtle improvisations of everyday activity — when repeated, shared, amplified and sustained — can end up producing perceptible organizational changes over time. It is worth noting that not all IT researchers have relied on the fine-grained form to explore time/space. As previously described, Barrett and Walsham (1999) have applied the broad-range form, which revealed itself to be more appropriate when the researchers' purpose was to construct a historical account.

Finally, regarding actors' knowledgeability, we suggest that a combination of grounded and narrative, with its potential for discovering meanings of processes, is fundamental for understanding the role of people's reflexivity regarding their day-to-day interactions. The use of a grounded strategy is seen as more than necessary: it is crucial, providing rich empirical details gathered from interview transcripts or field notes. Above all, actors' knowledgeability is always incorporated in the daily activities that constitute social phenomena. However, such ability to identify contextually the bounds of agents' knowledgeability is strengthened when grounded is combined with narrative, involving the construction of detailed stories from the grounded empirical material. The only illustration we found of actors' knowledgeability as a

sensitizing device was the work of Orlikowski (1991), an interpretive field study characterized by on-site observation for eight months and, basically, applying techniques of organizational ethnography. With the purpose of exploring how the introduction of information technology in production work changes the nature and role of organizational control mechanisms, the author drew on Giddens's ST, especially the concepts of forms of control and human agency. In her careful description of organizational change and permanency, the role of human agents in *reflexively enacting* the forms of control to which they are subjected emerged as central. In order to 'discover' this emergent character of actors' knowledgeability, Orlikowski combined grounded and narrative strategies in a rich way.

Implications and Conclusions

Since its publication, Giddens's theory has been criticized as being difficult to apply in empirical research (Giddens 1989). Its general propositions and concepts, although potentially valuable and insightful, operate at a high level of abstraction, so that ST has been often seen as a meta-theory and a way of thinking rather than as an empirically testable explanation of social behaviour (Jones 1997). This paper contributes to advancing the application of ST by providing concrete directions for employing ST in empirical research in several ways.

First, it helps to delineate three fundamental sensitizing devices that need to be taken into account when carrying out research in a structurationist sense: duality of structure, time/space and actors' knowledgeability. The purposive recognition of these three sensitizing devices might help researchers in investigating the constitution and reconstitution of social practices and delving into the subtle interplay between 'the intractability of social institutions and the options they offer for agents who have knowledge, but bounded discursive awareness, of how those institutions work' (Giddens 1989: 298).

Second, this paper provides a repertoire of actionable strategies for gathering, analysing and making sense of data from an ST perspective. Two strategies emerge as central in the use of structuration theory: narrative and temporal bracketing in its two modalities, fine-grained and broad-ranging. These two modalities represent two different ways of analysing the structuring of processes: to be closer to the ongoing events, collecting empirical material with high density that supports the structurationist analysis of a shorter period (fine-grained bracketing); or to be further from the ongoing events but with a longer period of analysis, often allowing a historical account (broad-ranging bracketing). The choice depends primarily on researchers' purposes and the degree of density in the data they are able to collect. Visual mapping is seen as complementary, particularly useful when dealing with duality of structure and time/space. Grounded strategies are an essential source of rich and dense data and constitute a fundamental tool for conducting ST-based research. It should be applied jointly with all other strategies.

Third, by analysing how IT researchers have applied ST in empirical studies, we provide specific combinations of data strategies that can be used to take into account the three sensitizing devices in empirical work. In particular, the combination of narrative and temporal bracketing is strongly recommended for dealing with duality of structure and the time/space sensitizing devices, whereas actors' knowledgeability is best captured by a combination of narrative and grounded strategies.

This paper joins a recent call for intensifying the collaboration between two distinct but overlapping disciplines: organization studies (OS) and information technology (IT). According to Orlikowski and Barley (2001), much can be gained from greater interaction between them. OS researchers may benefit from IT experience in two ways: by gaining greater familiarity with the subject 'technology' and by intensifying their research efforts in understanding technology-based organizational change or permanence, particularly from the structurationist perspective.

The fourth implication of this paper is for the debate on the value of structuration theory, particularly for organizational research. We hold the view that much of the potential of ST in helping to increase the understanding of organizational life and change remains to be developed. In their turn, IT researchers have spent considerable time over the last 13 years applying ST in empirical work and trying to find ways to address the difficulties of applying a structurationist framework. According to Jones (1997), there is evidence that the perspective that structuration offers is a fruitful framework for analysing IT and organizations. Indeed, the basic insight that structural properties of technologies might enable and constrain human action has been fleshed out by IT researchers using ST. The use of ST has helped IT researchers to understand better how technologies provide meaning, are used to exercise power and legitimize certain outcomes to the detriment of others, and how people produce or reproduce or enact organizational practices by using certain technological properties and not others. Similar benefits of 'opening black boxes' could be the subject of experimentation by other areas of organizational inquiry.

Despite the fact that ST is an important research perspective that has been used for a number of years, our knowledge on the topic and on how best to apply it remains limited. Our paper constitutes a step towards increasing the empirical relevance of ST. Future research could extend our work in several ways. First, conceptually, research could help in further developing the repertoire of strategies by identifying additional approaches and specifying their application. Future research can also extend our identification of sensitizing elements of ST and focus on Giddens's later work, where concepts such as modernity and self-identity occupy an important place. More work is also needed on the concept of actors' knowledgeability, which has often been neglected in previous research.

Appendix 1. Journals' Ranking and Their Availability to Our Review

	Journals	Period searched	Type of availability to our review[a]
1	MIS Quarterly	1990–2002	Search in full texts available (ABI-Inform)
2	Communications of the ACM	1990–2002	Search in full texts available (ABI-Inform)
3	Information Systems Research	1993–2001	Search in abstracts available (ABI-Inform)
4	Journal of MIS	1992–2001	Search in full texts available (ABI-Inform)
5	Management Science	1990–2001	Search in abstracts available (ABI-Inform). Full texts from 1996
6	IEEE Transactions	1990–2001	Full texts available at local library
7	Harvard Business Review	1990–2001	Search in abstracts available (ABI-Inform)
8	Decision Sciences	1990–2001	Search in abstracts available (ABI-Inform). Full texts from 1996
9	Decision Support Systems	1990–2002	Search in abstracts available (ABI-Inform)
10	Information and Management	1990–2002	Full texts available at local library
11	European Journal of IS	1993–2001	Search in abstracts available (ABI-Inform)
12	Sloan Management Review	1992–2001	Search in full texts available (ABI-Inform)
13	ACM Transactions	1990–2002	Search in full texts available (ACM Digital)
14	Data Base	1990–1995	Full texts available at local library
15	Organization Science	1993–2001	Search in abstracts available (ABI-Inform)
16	Information Systems Journal	1997–2002	Search in table of contents electronically available
17	Academy of Management Journal	1990–2002	Search in abstracts available (ABI-Inform). Full texts from 1992
18	Communications of the AIS	1999–2002	Search in full texts available (Site AIS)
19	IEEE Computer	1990–2002	Electronically available to IEEE computer society members
20	Journal of Strategic IS	1991–2002	Electronically available to Elsevier members
21	Administrative Science Quarterly	1990–2002	Search in abstracts available (ABI-Inform). Full texts from 1992
22	Academy of Management Review	1990–2002	Search in abstracts available (ABI-Inform). Full texts from 1992
23	International Journal of E-commerce	1996–2002	Search by keywords electronically available
24	ACM Computing Surveys	1990–2002	Search in abstracts available (ABI-Inform). Full texts from 1995
25	Accounting, Management & IT	1992–2002	Full texts available at local library
26	ACM SIG Publications	1990–2002	Search in full texts available (ACM Digital)
27	IT and People	1990, 92, 94, 96	Full texts available at local library
28	IBM Systems Journal	1990–2002	Search in abstracts available (ABI-Inform). Full texts from 1996
29	OMEGA	1990–2002	Search in abstracts available (ABI-Inform)
30	Journal of the AIS	1999–2002	Search in full texts available (Site AIS)

[a] Where only abstracts were available, we obtained the full papers directly from the authors or in journals. The limited periods for some journals reflect their availability at Proquest or at local libraries.

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