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

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Abstract

Given the pervasiveness of information technology (IT) in human life at multiple levels – from individuals, to teams, organizations, markets, countries, and society – an increasing number of researchers have looked for alternative ways to study technology and organization interactions. One of the main perspectives that have been articulated by several researchers in IT is Giddens’ structuration theory. However, the applicability of Giddens’ concepts is not without difficulties. Two main points help explain the challenge of using a structurationist framework. 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 essay aims to discuss and improve the applicability of structuration theory to empirical work using IT research experience. It identifies and analyzes patterns of use of Giddens’ theory in IT publications, and then describes how IT researchers using a structurationist framework 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: time, context and duality of structure. The systematization of a repertoire of methodological strategies to apply Giddens’ ideas is likely to increase the use of structuration theory, encouraging the improvement of existing, and the development of new, methodological strategies that ameliorate its empirical application.

Résumé

En raison de la place de plus en plus répandue qu’occupent les technologies de l’information (TI) dans les multiples sphères de la vie humaine - des individus, aux équipes, aux organismes, aux marchés, aux pays, et à la société - un nombre croissant de chercheurs ont tenté de trouver de nouvelles façons pour étudier les interactions de la technologie et de l’organisation. Une des principales perspectives qui ont été articulées par plusieurs chercheurs des TI est celle de la théorie de la structuration de Giddens. Cependant, l'applicabilité des concepts de Giddens n'est pas sans difficultés. Deux points importants expliquent le défi relatif à l’utilisation d’un cadre structurationniste. D'abord, la théorie de la structuration est complexe, impliquant des concepts et des propositions générales qui fonctionnent à un degré élevé d'abstraction. Ensuite, la théorie de la structuration est difficilement combinée à une méthode spécifique de recherches, et il est laborieux d’employer cette approche méthodologique empiriquement. En soutenant que la théorie de structuration est un cadre valable pour une compréhension riche de la gestion, de l’organisation et des sujets liés à l'enquête, l’objectif de cet essai est de discuter la pertinence et d’améliorer l’applicabilité de la théorie de structuration au travail empirique, en se fondant sur les travaux de recherche en TI. Cet essai identifie et analyse des modèles d'utilisation de la théorie de Giddens dans les publications du domaine des TI et décrit comment les chercheurs des TI, en employant un cadre structurationniste, ont tenté d'adresser ses principaux défis empiriques. L’article présente un répertoire des stratégies de recherches qui pourraient aider des chercheurs en théorie de l’organisation à faire face aux trois éléments au cœur de la théorie de la structuration : le temps, le contexte et la dualité de la structure. La systématisation d'un répertoire des stratégies méthodologiques pour appliquer les idées de Giddens est susceptible d'augmenter l'utilisation de la théorie de structuration, encourageant l'amélioration des méthodes existantes, ainsi que le développement de nouvelles stratégies.

Mot-clés

structuration theory, research methodology, research methods issues, information technology, organization studies
1. Introduction

Given the pervasiveness of information technology (IT) in human life at multiple levels – from individuals, to teams, organizations, markets, countries, and society – an increasing number of researchers have looked for alternative ways to study IT and organization interactions (Klein 1999; Lee, Leibenstein, and DeGross 1997; Walsham 1995). Among current developments in the IT field are the articulation by several researchers of the main assumptions of Giddens’ structuration theory (Barret and Walsham 1999; Majchrzak et al. 2000; Orlikowski 2000; Sahay 1998) and the publication of literature reviews of the use of structuration theory in IT research (Jones 1997; Jones and Karsten 2003; Pozzebon and Pinsonneault 2000; Rose 2000; Walsham and Han, 1991). Structuration has been seen as a promising theory to overcome 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 all social theory (Cohen 1989; Giddens and Pierson 1998).

Structuration theory is one among 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, and that 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 post-modernism; and Fay’s (1996) discussion of science versus hermeneutics. Some examples of the extensions 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. Whittington (1988), Zan (1995) and Avenier (1997) are examples of similar contentions translated to the strategic management field. While it is outside the scope of this paper to discuss each of these theoretical choices, we argue that most of these existing accounts that go beyond dualistic ways of thinking are not really competitors but “alternatives”, and that the choice among these alternatives is often a matter of “ontological affinity”.

Aware that Giddens is not the only theorist to have proposed an alternative to dichotomous systems of logics, this paper does not intend to place structuration theory as “the best” alternative, but simply to propose it as one powerful alternative not yet fully explored by students of technology and organizations. We hold the view that much of the potential of structuration theory in helping to increase the understanding of “organizations, organizing, and the organized” remains to be developed. Organization theory has been the arena of rich theoretical discussions about the use of Giddens’ social theory to study organizational phenomena (Bachmann 2001; Barley and Tolbert 1997; DeCock 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). Several articles have illustrated the structurationist ideas with case studies (Alexander 1998; Bouchikhi 1993; Sydow and Windeler 1998; Weisinger and Salipante 2000), but only two studies have empirically applied a structurationist framework (Brocklehurst 2001; Riley 1983). This suggests that while organization theorists have engaged in discussing Giddens’ theoretical notions (agency/structure, time/space, power, identity, subjectivity and others), their application in empirical studies is still in an early stage.

As previously mentioned, a cautious look at other disciplines within the overall field of management, especially the IT area, reveals a different picture. A number of IT scholars have already applied concepts drawn from Giddens’ social theory in their empirical inquiries,
revealing a “cumulative tradition” in empirically applying structuration theory over the last ten years. Our intent in this essay is to draw upon that experience in IT in order to contribute to the application of structuration theory in organization studies (OS). This effort echoes 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, p: 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 essay – the structurationist view of technology – can be seen as focused on this central issue, and OS could benefit by following the lead of information research in taking into account the material properties of technology.

However theoretically promising, the applicability of Giddens’ concepts is not without difficulties. Since their publication, Giddens’ ideas about social theories have been discussed and certain issues regarding their application have been raised. Conceptually, structuration theory is complex and is based on general propositions and concepts that operate at a high level of abstraction, thereby giving rise to diverse and sometimes contradictory interpretations (Jones 1997; Jones and Karsten 2003; Pozzebon and Pinsonneault 2000). Further, “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, p: 989).

By addressing the research question How can the applicability of structuration theory in empirical research be improved?, this essay seeks to advance the empirical use of structuration theory in several areas of organization and management studies. Although we try to learn from IT experience, the findings are likely to be applied beyond the investigation of IT and organizational change.

The essay is structured as follows. Section 2 discusses some of the key elements of structuration theory and their implications for empirical research, especially in IT. Section 3 quickly highlights the role Giddens’ ideas have been playing in IT research. Section 4 presents the method used to identify the papers that are relevant for analysis: we selected and screened empirical research that makes use of structuration theory in the investigation of IT-organization interactions, from 1990 to 2002. Section 5 focuses on the methodological strategies adopted by IT researchers to overcome the empirical barriers structuration theory presents. Section 6 presents the essay’s main contribution: a repertoire of research strategies that helps expand and improve the empirical application of structuration theory in IT and organization studies. Our central argument is that the strategies we have systematized from previous research help deal with three elements that are central to structuration theory: time, context and duality of structure. We also validate the repertoire vis-à-vis Giddens’ recent reflections regarding the empirical application of his theory. The systematization of this repertoire of methodological strategies is likely to increase the use of structuration theory and to encourage the improvement of existing and the development of new methodological strategies that ameliorate the empirical application of Giddens’ ideas.
2. Giddens’ ideas: the boon and bane of empirical research?

In a number of articles in the late 1970s and early 1980s, culminating with the publication in 1984 of *The Constitution of Society*, British sociologist Anthony Giddens developed the theory of structuration, which addressed fundamental problems in the social sciences in an unconventional way 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. Numerous books and papers promptly emerged with the purpose of discussing, scrutinizing, supporting or criticizing the tenets of Giddens’ ideas. It is not our purpose, in this essay, to provide a full overview of Giddens’ 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 controversial, elements of structuration theory, discussing how they have been interpreted and what their implications are for empirical research.

The relationship between agency and structure is among the most pervading 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 reckon 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 only exists in and through the activities of human agents (Giddens 1989, p: 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. 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, p: 2).

Actually, the concept of *duality of structure* is at the core of structuration theory. Social structures are both constituted by human agency and, at the same time, the very medium of this constitution (Giddens 1976, 1984). A similar argument can be made for the study of technological artefacts: 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) – Orlikowski expanded the earlier work on structuration theory and presented a practice lens through which to examine how people enact structures of technology use. Users’ interaction with technology is thus recursive: “in their recurrent practices, users shape the technology structure that shapes their use” (Orlikowski 2000, p.407). Technology structures are not external or independent of human agency, but exist in the form of a set of rules of behavior and the ability to deploy resources (Walsham 2002) that emerge from people’s interactions with the technology at hand – *technologies-in-practice* (Orlikowski 2000). We talk about “*duality of technology*” with caution because, as recalled by Jones (1997) and Walsham (1993, p.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 talking about technology, understanding it as “enacted structures of technology in use” (Orlikowski 2000).

In addition to the agency-structure duality, the notions of time and space are central to structuration theory and are key to understanding more concretely 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). However, they are often neglected in social and organizational studies. Although the analysis of time-space is inseparable from the study of organizational change, until quite recently the literature on organizational change was largely acontextual, ahistorical and aprocessual. 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 rather 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. Taking all this into account, we retain time to represent this preoccupation with time-space as a key element, and we add another element, context, arguing that the idea of “contextualities” is also central to Giddens’ theory: “I have an eclectic approach to method, which again rests upon the premise that research inquiries are contextually oriented” (Giddens 1989, p. 296).

In summary, three elements of structuration theory were discussed above: duality of structure, time and context. Although structuration theory is very complex and articulates concepts from psychoanalysis, phenomenology, ethnomethodology, and action theory, among others (Turner 1991), these three fundamental elements are key to the theory and relevant to the purposes of the present essay. Other concepts are also central to structuration theory, such as the notion that social actors are knowledgeable and reflexive (Giddens 1984). Nonetheless, the notion of knowledgeable actors cannot be dissociated from the formulation of duality of structure. 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 knowledgeable reproduced by actors. Consequently, when incorporating the duality of structure as an analytical tool in any empirical investigation, the researcher cannot neglect other aspects of structuration theory, such as the notion of actors’ knowledgeableability: they are intrinsically interrelated. In Giddens’ words, knowledge about the conditions of system reproduction is reflexively used to influence, shape or modify that system reproduction (Giddens and Pierson 1998).

Because structuration theory is not easily coupled with any methodological approach, several authors have challenged its relevance to empirical research. Gregson’s compilation of critiques and Giddens’ reply provide a comprehensive view and convey the “tone” of such discussions (Held and Thompson 1989). IT researchers have spent considerable time over the last 13 years struggling with the empirical difficulties of applying structurational theory. Our literature review shows that this effort, recognized in IT research, has already produced many contributions and can be used to advance research in other fields. In addition to being central to structuration’s
theoretical foundations, the three elements – time, context, and duality of structure - have been suggested as challenges to the applicability of Giddens’ ideas on empirical research (Giddens 1989) and, as such, they are likely to constitute barriers to successfully applying the theory in IT and any other empirical research. Identifying how researchers have dealt with these three elements and providing a framework that helps address them constitute a valuable contribution. The repertoire of methodological strategies we will present provides useful information for researchers who intend to articulate structurationist premises in their empirical research.

3. The contribution of structuration theory to IT empirical research

Giddens’ structuration theory addresses the complex link between action and structure, 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, p. 34). From Giddens’ perspective, social structures are seen as rules and resources that exist as memory traces in people’s minds, and are manifested in social action and interaction. However, Giddens gave little attention to technology in his formulation of structuration theory, which is seen as a general theory of social organization rather than a theory addressing specific fields like IT (Jones, 1997). Given the pervasiveness of technology in organizations’ everyday operations, and especially the role of information technology (IT) in the process of enactment and reality construction in contemporary organizations, some attempts have been made to extend Giddens’ ideas by including an explicit IT dimension in the 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, such as IT development, implementation and use, IT and organizational communication, IT-based organizational change, and IT and globalization, among others. Some recent examples are studies on electronic trading and work transformation in the London insurance market (Barret and Walsham 1999), the development of GIT in India (Sahay and Walsham 1997; Walsham and Sahay 1999; Sahay and Robey 1996), IT strategy and implementation in the UK (Walsham 1993; Walsham and Waema 1994), the dynamics of groupware application (Ngwenyama 1998), the nature and locus of change associated with case tools (Orlikowski 1993), genre repertoires and organizational communication (Orlikowski and Yates 1994; Yates, Orlikowski and Okamura 1995), communication and collaboration with IT (Olesen and Myers 1998), globalization of software implementation in Britain and India (Nicholson and Sahay 2001), 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 structuration theory 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 can we try to deal with their intended and unintended consequences. According to Jones, we already have “good evidence that the perspective that structuration offers is a fruitful one for the analysis of IT and this does not [need] to be ‘proved’ again” (1997, p.128). Similar benefits could be proven by other areas of organizational inquiry.
4. Methods

In IT, many researchers have used Giddens’ ideas in their work (Barret and Walsham 1999; Orlikowski 1992 1993 1996; Orlikowski and Robey 1991; Orlikowski and Yates 1994; Walsham and Sahay 1999). In order to better evaluate this use, a comprehensive review of the literature over the last twelve years of IT publications (1990-2002) was conducted. To ensure that the most relevant sources were covered, we took a number of steps in the identification of IT studies that used structuration theory.

While the major contributions are likely to appear in leading journals (Webster and Watson 2002), academics from different regions of the world perceive the relevance of specific journals differently. A ranking of journals recently published in Communications of the ACM takes into account these differences. The authors present journal rankings by region (North America, Europe and Australasia), and by one global measure that takes into account all three rankings (Mylonopoulos and Theoharakis 2001). We used their global ranking, selecting the 30 highest-ranked journals but extending our list to ensure that at least the top 20 journals in each region (North America, Europe and Australasia) were included in our sample. Following this, we used ABI-Inform database to verify what journals are accessible and in what form, i.e. full texts vs. abstracts only vs. both. Journals that were not available on ABI-Inform were accessed in print from libraries. The final sample covered 30 of the highest ranked IS journals (the list of journals is available upon request).

For each on-line journal, we used search engines to find articles whose text or abstract contained the keywords “information technology” or “information systems” and “structuration theory” or “Giddens”. A manual search was carried out for journals not available electronically. For these journals, we checked to see if Giddens was included in the bibliographical references. Further, for all identified articles (electronic and manual), we read each paper in order to determine whether structuration theory was central to the paper and adopted as theoretical foundation or was only used marginally. Similarly, articles in which the terms “information technology” or “information systems” appeared but were not the main subject of the research were disregarded.

Finally, 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 (Jones 1997; Rose 2000), in order to be sure that no relevant article was missed. In addition, in an effort to be exhaustive, we went back and reviewed the citations identified in the articles previously selected. Books, book chapters and conference proceedings were not included, although we acknowledge that they could be valuable sources. We actually used some books and proceedings to enrich our review, but we did not use them in our sample of articles because of practical considerations involving the feasibility of full coverage. Nonetheless, we consider that the literature review carried out is comprehensive and the result drawn from it is representative of the use of Giddens in the IT field.

The final sample is comprised of 32 articles (Table 1), organized in 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, which we called structurationist perspective on technology, groups several IT researchers who are notably influenced by the work of Orlikowski and Walsham. A detailed analysis of similarities and differences, in terms of underlying ontological and epistemological assumptions of these two groups of papers, was presented elsewhere. Our focus in this examination, as described in the next section, is the methodological dimension.
Table 1 – Two broad groups of studies using structuration theory in IT research

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<th>Selected Studies</th>
<th>Adaptive Structuration Perspective</th>
<th>Structurationist Perspective on Technology</th>
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<td>Chin, Gopal and Salisbury (1997); DeSanctis and Poole (1994); Fulk (1993); Majchrzak et al. (2000); Maznevski and Chudoba (2000); Miranda and Bostrom (1993-1994); Miranda and Bostrom (1999).</td>
<td>Barley (1990a); Barret and Walsham (1999); Heracleous and Barret (2001); Kakola (1995); Kakola and Koota (1999); Karsten (1995); Lyytinen and Ngwenyama (1992); Montalegre (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).</td>
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Note: In addition to the studies above, which were taken into account for the purpose of our research, we found another group of articles that follow exactly the same pattern of AST but that have not made any direct reference to Giddens’ theory. For this later reason, they were not included in our sample. The articles are: Anson, Bostrom and Wynrie (1995); Chidambaram (1996); Gopal, Bostrom and Chin (1992-1993); Griffith (1999); Nagasundaram and Bostrom (1994-1995); Poole, Holmes and DeSanctis (1991); Salisbury at al. (2002); Sambamurthy and Poole (1992); Wheeler and Valacich (1996); Watson, Ho and Raman (1994). Walsham and Sahay (1999), Lea, O’Shea and Fung (1995) and Rose (2002) were initially selected because they make a clear reference to Giddens. However, the main theoretical approach of the two first is actor-network theory, and of the third is SSM’s theoretical formulations, they were not included in our sample.

Refining the selection of studies with a methodological assessment

After identifying two broad groups of empirical studies using structuration theory as a lens through which to understand IT and organizations, we examined the methodological strategies used in applying structuration theory. As described above, in the initial selection of studies, we tried to make sure that our sample was comprehensive enough to be representative of the application of structuration theory in the field of IT. Now, we focus our attention on a smaller subset to highlight methodological issues associated with the application of structuration theory. As suggested by Pettigrew et al., (2001), we felt that it was appropriate to shift our approach from a comprehensive mode to one that was selective and focused. We screened the sample of 32 studies using two criteria.

First, only studies using a process approach were included in the methodological analysis. Most studies grouped as adaptive structuration studies (AST) (Table 1) were based on nomothetic assumptions, using survey and experimental methods. Generally speaking, the AST studies aim to predict outcomes or consequences of the interaction between technology and organizations by testing hypotheses derived from research models (Miranda and Bostrom 1999). They try to make sense of the interaction between IT and human actions in terms of relationships between dependent and independent variables and statistical analyses. Consequently, AST studies rely on variance approaches, with few exceptions. For instance, Majchrzak et al.’s (2000) study is close to AST propositions but differs from other empirical studies using AST in that it uses an interpretative approach, relies on intensive case studies, and assumes more purposively that IT effects emerge from contextual interactions between individuals and malleable technologies.
On the other hand, process approaches analyze the sequence of events that describe how things change over time (Van de Ven 1992). Among the two approaches (variance and process), process approaches more easily permit the direct observation of the process in action and correspond to Giddens’ view of process, encompassing different levels of analysis and the dynamic interrelationship between context and action. Along with other scholars (Jones 1997; Rose 2000), we suggest that process approaches are more appropriate when structuration is adopted as the theoretical approach. Variance approaches do not seem fully compatible with prevailing interpretations of the central tenets of structuration theory. Therefore, articles using a variance approach were excluded from the methodological analysis that follows.

Second, only the studies that had described in detail their research methodology for the empirical study were included. For example, studies such as Lyytinen and Ngwenyama (1992) and Sahay (1998) empirically apply structuration theory, but they 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 the following 20 studies: Barley (1990a); Barret and Walsham (1999); Heracleous and Barret (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).

Langley’s Strategies for Theorizing from Process Data

Recently, Langley described and compared a number of alternative generic strategies for theorizing from process data, and evaluated their accuracy, simplicity and generality (Langley 1999). 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, structuration theory fits into this category (Markus and Robey 1988; Orlikowski and Robey 1991). Second, among the strategies Langley recognized, she offered temporal bracketing strategy as a direct reference to Giddens’ structuration theory, viewing it as a classic example of a research strategy involving mutual shaping. At the heart of structuration theory is the idea that the actions of individuals are constrained by structures, but that these actions may also serve to reconstitute those structures over time (Langley 1999). Because mutual influences are difficult to capture simultaneously, it is easier to analyze the two processes sequentially by temporally "bracketing" one of them. Several authors warn of the danger of bracketing analysis in overlooking that, finally, a sequential analysis of continuous processes inevitably distorts the picture, hiding that the phenomena we study are not artefacts of this bracketing (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 (Langley 1999; Barley and Tolbert 1997).
Seven strategies for analyzing process data were identified and described in terms of their capacity to generate a theory that is accurate, parsimonious, general and useful. Figure 1 summarizes the seven research strategies for theorizing from process data, categorized into three groups (grounding, organizing and replicating), which are explained in detail in Langley (1999). Grounding strategies are either inductive (grounded theory) or deductive (alternate templates), and involve the systematic comparison of data to gradually 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, quantification and synthetic – are ways of breaking down the data for replication of theoretical propositions. Langley (1999) suggests that strategies are rarely used alone but are usually combined. Each strategy tends to provide different and complementary understandings of processes. For instance, 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), which is the reason their combination is suitable.

Langley’s repertoire of strategies was adopted as a powerful analytical tool to analyze the methodological choices made by IT researchers in order to overcome the empirical challenges imposed by the adoption of structuration theory. Among other methodological aspects, we seek to verify to what extent “bracketing” strategies were applied by IT researchers and, if they were not, what different strategies were effectively applied. The 20 structurationist articles were carefully analyzed (see Appendix 1), based on the studies’ main purposes or research questions, their articulation of structuration theory, the methodological approaches they used, strategies of data collection and analysis used (based on Langley’s framework).

Our analysis indicates that a number of characteristics are shared by these IT studies. IT scholars have articulated several of Giddens’ key concepts. For instance, the notion of duality of structure (also referred to as duality of technology) is articulated by most studies; time-space distantiation is particularly covered by Ngwenyama (1998); signification, domination and legitimation are modalities applied by Karsten (1995) and Olesen and Myers (1999); the notion of ontological security is central to Nicholson and Sahay’s (2001) study and actors’ knowledgeability is carefully articulated by Orlikowski (1992). Others have addressed concepts developed in Giddens’ later work (1990, 1994, 1996), such as modernity (Nicholson and Sahay 2001) and self-identity (Barret and Walsham 1999).

The epistemological assumptions are predominantly interpretive and the methodological approaches, ideographic. They rely on ethnography (Barley 1990a; Orlikowski 1992), case studies (Heracleous and Barret 2001; Karsten 1995; Orlikowski 1996; Walsham 1995), grounded theory field study (Maznevski and Chudoba 2000; Orlikowski 1993), and action research (Olesen and Myers 1999). A detailed assessment of the methodological strategies is presented below.

5. Learning from IT research

Identifying how the methodological barriers to applying structuration theory have been addressed in the past can help in further applying the theory in the future. Figure 2 summarizes the six strategies used by IT researchers when applying structuration theory.
“There is always a room for developing new strategies for understanding processes that mix and match those I have presented here or that take a new tack entirely. Sensemaking is the objective. Let us make sense whatever way we can” (Langley 1999, p: 708). Four strategies emerge directly from Langley’s repertoire: grounded, narrative, visual mapping and temporal-bracketing. However, because there are always subtle idiosyncrasies inherent in different samples of studies, we have extended Langley’s strategies by including one additional strategy and by refining another.

In this vein, the new strategy we have included is called comparative: a between-cases logic that takes into account a systematic comparison among cases or units of analysis often used as a replicating strategy. Comparative strategy has some resemblance to Langley’s synthetic strategy, but the underlying logic is different. Langley’s (1999) synthetic strategy takes a process as the unit of analysis and attempts to construct global measures or constructs from the detailed event data used to describe it. Such measures or constructs are then used to compare different processes and to identify regularities that will support a predictive theory. Our comparative strategy, on the other hand, attempts to abstract themes, concepts or events that allow the comparison of several cases, and to draw conclusions about their similarities and differences. In addition, instead of developing causal models to predict outcomes as synthetic strategies intend, the comparative analysis focuses on developing frameworks, typologies and taxonomies to express the commonalities and differences between processes in different contexts.

We have also refined temporal-bracketing (Barley and Tolbert 1997), recognizing two sub-modalities. Indeed, these two methodological patterns can be seen as “inherent” in the application of structuration theory. The first is a sort of fine-grained bracketing. We identified ten studies that had used this modality of bracketing: Barley (1990a), Majchrzak et al. (2000), Ngwenyama (1998), Orlikowski (1991 1992 1993 1996), Orlikowski and Yates (1994), Orlikowski et al. (1995), and Yates and Orlikowski (1992). The second is a broad-ranging bracketing strategy, which was used by seven studies: Barret and Walsham (1999), Heracleous and Barret (2001), Karsten (1995), Montealegre (1997), Nicholson and Sahay (2001), Sahay and Robey (1996), and Walsham and Han (1993). Only three studies in our sample did not apply any kind of bracketing strategy: Maznevski and Chudoba (2000), Olesen and Myers (1999), and Yates et al. (1995).

Both modalities – fine-grained bracketing and broad-ranging bracketing – are based on the decomposition of phases or events that evolve over time. The main difference between them is that fine-grained bracketing purposively breaks down events into the effects of action on structures on one hand, and the effects of institutional constraints on action on the other, into a
continuum of time that is scrutinized in detail below (Figures 3 and 4 below). In order to break down the events and to analyze them in detail, the period of data collection very often spans the entire period analyzed, i.e., data is collected during the entire period of investigation. For instance, Barley (1990b) conducted an intensive and sustained observation over six to seven hours per day for ten months in order to analyze the introduction of a new technology during the period; Ngwenyama (1998) collected data for 12 months to analyze the same 12 months, applying an intensive analysis of the context, temporal order and underlying logic of events; and Orlikowski (1991) conducted a contextualized and interpretive case study characterized by on-site observation for eight months, the same period covered by her analysis. Consequently, the temporal bracketing strategy in its fine-grained form requires a sort of data density, i.e., the researcher needs to be able to be close to the empirical data and collect it intensively over time.

**Figure 3 – The first form of bracketing strategy: a fine-grained temporal bracketing**

![Diagram showing a fine-grained temporal bracketing strategy](image)

Note: The period of analysis and the period of data collection are identical.

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-range bracketing is applied in these cases. Most of the studies classified in this pattern are designed to investigate periods of three to ten years. In this case, the period in which the data is collected is much shorter than the period analyzed and a fine-grained bracketing is neither possible nor desirable. As discussed above, the researcher needs to achieve a certain density in the data in order to be able to break the data down into successive adjacent periods and carefully examine how specific actions lead to contextual changes which will again affect action, and so on. On the other hand, the route towards investigating more historical and extended periods leads to a kind of sequential analysis, where the bracketing, a broad-range one, is still present but is somehow rough.
Figure 4 – The second form of bracketing strategy: a broad-ranging temporal bracketing

<table>
<thead>
<tr>
<th>Period of data</th>
<th>Institutional Realm</th>
<th>Realm of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>Even</td>
<td>Even</td>
</tr>
<tr>
<td>Year 2</td>
<td>Even</td>
<td>Even</td>
</tr>
<tr>
<td>Year 3</td>
<td>Even</td>
<td>Even</td>
</tr>
</tbody>
</table>

Note: The period of analysis is bigger than the period of data collection (historical analysis).

Barret and Walsham (1999) illustrate well 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 (1990a) or Orlikowski (1991). 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.

In brief, the 20 examined studies have adopted an inductive logic (data-driven) as grounding strategy. To different degrees, all studies apply narrative strategies as a way of organizing their data. Several studies combine narrative with visual mapping and describe the relationship between technological and social elements interacting over time by representing the sequences of events graphically (Orlikowski 1996; Orlikowski and Yates 1994). Finally two modalities of temporal bracketing (within-cases logic) and comparative (between-cases logic) are used either alone or in combination as replicating strategies. Orlikowski (1996) uses a temporal bracketing strategy alone; Barley (1990a) is an example of combining temporal bracketing and comparative strategies, relying on synchronic, diachronic and parallel research design.

6. Discussion and Implications for Organization Theory

The application of structuration theory to any organizational study brings about theoretical and methodological challenges. From the IT experience, we offer the following outline.

First, it is difficult to capture the duality of structure, which in the IT field is often redefined as “duality of technology”, representing the recursive relationship between organizational actors and technologies in use. When first conceptualized by Orlikowski in 1992, the notion of duality of technology allowed some misunderstandings, opening the possibility of reading technology essentially as a material artefact. As discussed by Jones (1997, p. 127), “from Giddens’ standpoint institutional properties are traces in the mind which are inseparable from the human agency with which they are mutually constituted, and material phenomena are resources only when drawn upon in processes of structuration”. Revisiting the structurational model of technology in a recent paper, Orlikowski (2000) clarified the analytical distinction between technology as artefact (e.g., hardware, software, techniques) and technologies-in-practice (enacted structures of technology in use). For example, not all properties provided by a given technology as artefact are put to use by given users. Therefore, such properties “do not exist” for them; they do not play a part in the structuration process which mediates their action. Despite this and other efforts to refine conceptual attempts to incorporate IT or IS within the theoretical

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framework of structuration theory (Walsham, 2002), the analytical challenge of penetrating the “duality of structure” remains as one of the most important elements of any structurationist agenda.

Second, studies on IT and organizations, like any other social study, necessarily have a cultural, ethnographic or anthropological dimension. Understanding the “contextualities” of interactions, which are inherent in the investigation of the social reproduction of structures, requires an in-depth study of the context in which IT-organization interactions occur and evolve. Third, because of its non-deterministic nature, the mutual influence of technology and actions evolves over time as “appropriation-in-use” occurs. Researchers need to study that process over time to understand its intricate nature.

In brief, time, context and duality of structure are seen as three key elements in the application of structuration theory. In fact, time and context are not challenges exclusive to structurationist analysis. Research on organizational change has also been struggling to overcome traditional shortcomings and to become more contextual, historical and processual (Pettigrew et al. 2001). What seems to be a novelty introduced by structurationist analysis is the need to deal with the notion of duality of structure (or duality of technology) explicitly.

In this review, we purposively explore the kind of strategies IT researchers have been applying in order to overcome the methodological barriers imposed by the adoption of a structurationist framework. We try to take initial steps towards answering the question of what a structurationist program of research would look like in terms of its methodological possibilities. Langley (1999) has suggested temporal bracketing as a key strategy to empirically apply a structurationist framework, because it is essential to understand how the actions of individuals are constrained or enabled by their contexts and how these same individuals reproduce or change their context over time. Similarly, a sequential model of institutionalization that proposes charting flows of action and scripts that fit with bracketing strategies was proposed by Barley and Tolbert (1997) to empirically link structuration theory and institutional theory.

Our review and analysis not only reinforces Langley’s and Barley, and Tolbert’s contentions, but also helps to “fine-tune” the role of bracketing strategy. Bracketing is a rich data analysis approach because it allows different modalities to emerge depending on the purpose of the research, the period of time to be covered and the degree of density in the data, the researcher is able to collect. In the future, different forms of bracketing and bracketing-based patterns may be further developed. Fine-grained bracketing and broad-ranging bracketing strategies seem to be powerful analytical tools available to structurationist researchers and are even more powerful when combined with other strategies, such as visual mapping and comparative strategies.
Figure 5 – A repertoire of strategies for the application of structuration theory in empirical IT research

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Main characteristics</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grounded</td>
<td>Key issue addressed: context</td>
<td>Barret and Walsham (1999); Orlikowski (1993)</td>
</tr>
<tr>
<td></td>
<td>Data needs: detail on many similar incidences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensemaking: meanings, patterns</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Narrative</td>
<td>Orlikowski (1993); Sahay and Walsham (1997)</td>
</tr>
<tr>
<td></td>
<td>Key issue addressed: context and time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data needs: One or a few rich cases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensemaking: stories, meanings, mechanisms</td>
<td></td>
</tr>
<tr>
<td>Visual Mapping</td>
<td>Key issue addressed: time and duality of structure</td>
<td>Orlikowski (1996); Orlíkowskí et al. (1995)</td>
</tr>
<tr>
<td></td>
<td>Data needs: several events in moderate level of detail</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensemaking: patterns</td>
<td></td>
</tr>
<tr>
<td>Temporal Bracketing</td>
<td>Key issue addressed: duality of structure and time</td>
<td>Barley (1990a); Orlíkowskí (1996)</td>
</tr>
<tr>
<td></td>
<td>Data needs: several events in moderate level of detail</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensemaking: patterns, mechanisms</td>
<td></td>
</tr>
<tr>
<td>Broad-ranging</td>
<td>Key issue addressed: duality of structure and time</td>
<td>Barret and Walsham (1999); Sahay and Robey (1996)</td>
</tr>
<tr>
<td></td>
<td>Data needs: several events spanned over a period</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensemaking: patterns, mechanisms</td>
<td></td>
</tr>
<tr>
<td>Comparative</td>
<td>Key issue addressed: context</td>
<td>Barley (1990a); Sahay and Robey (1996)</td>
</tr>
<tr>
<td></td>
<td>Data needs: two or more cases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensemaking: patterns, mechanisms</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5 shows how we can combine the strategies identified above in order to help overcome empirical barriers, such as those imposed by a structurationist framework. We present the six strategies and indicate how each allows the capture of three concepts central to structuration theory: time, context and duality of structure. We call this a repertoire of methodological strategies for applying structuration theory. Following Langley’s guidelines, the repertoire suggests specific or special data needs in terms of depth (detailed or not) and breadth (number of cases, events, incidents), and also indicates how each strategy tends to favor different types of process understanding or sensemaking. According to Langley (1999, p. 695) “some strategies seem best adapted to the detection of patterns in processes whereas others penetrate their driving...
mechanisms. Some are more oriented toward the meaning of the process for the people involved, whereas some are more concerned with prediction.”

The repertoire illustrates strategies which could be used alone but, when purposely combined, produce powerful implications. With the exception of the two modalities of temporal-bracketing, which represent mutually exclusive ways to manage the analysis, all other strategies might be used together. The repertoire of strategies keeps the researcher’s attention on the benefit of combining strategies that, together, cover all three elements (time, context and duality of structure). For instance, two widely referenced works applying structuration theory to investigate the role of technology in organizational change – Barley (1986) and Orlikowski (1993) – mobilize at least four different strategies (grounded, narrative, fine-grained bracketing and comparative), covering time, content and duality of structure. This partially explains the strength of their analysis. Another good example is the work of Walsham and Barret, who rely on combination of only two strategies (narrative and broad-ranging bracketing), which are, nevertheless, enough to cover context, time and duality of structure, and help explain their ability to analyse IT-based change from historical or societal perspectives (Barret and Walsham, 1999; Heracleous and Barret, 2001; Walsham and Han, 1993).

To conclude this review, in the next sub-section we explain how each strategy deals with context, time and duality of structure, keeping the study of IT and organizations as the focal point, but extending its potential to OS. Following that, we “validate” the repertoire in the light of Giddens’ recent reflections regarding the empirical application of his theory.

Dealing with Context

Three strategies were identified as especially appropriate for dealing with context: (1) grounded, (2) narrative, and (3) comparative. The (1) grounded strategy deals with systematic comparisons of small units of data and the gradual construction of systems of categories that describe the phenomena being observed. When grounded strategy is seen as a methodology, it is similar to the classic “grounded theory” (Glaser and Strauss 1967; Strauss and Corbin 1990). In our sample of studies, Orlikowski (1993), and Maznevski and Chudoba (2000) are examples of this form. Alternatively, grounded theory is sometimes applied not as a broad methodology, but as a specific data analysis technique. Barret and Walsham (1999) and Nicholson and Sahay (2001) are examples of this.

Grounded strategy is a kind of inductive theorizing, which is interactive – continuously switching between concepts and data (theory and empiricism) – and comparative – constantly comparing emerging categories. Consequently, a grounded strategy might be most appropriate when researchers are able to collect detailed data from a large number of comparable events or processes, which can occur in a single case or across several cases. The opportunity for collecting rich and detailed data for similar incidences provides conditions for the identification, using systematic comparisons, of emerging categories.

IT researchers who have applied a structurationist framework have used grounded strategies in different ways. Orlikowski (1993) provides a good description of how to use a grounded approach mainly to organize the data analysis. She uses a form of iterative analysis where the data are read and categorized into concepts suggested by the data itself. Aiming to identify possible categories and their properties and dimensions, she examines and organizes data into recurring themes which, in turn, are candidates for a set of categories. These categories are linked to a number of associated concepts, in an attempt to make connections between sub-categories and to construct a more comprehensive scheme. It is a data-driven pattern, where
explanations, concepts and theories are inductively grounded in a recursive process of collecting and analyzing data.

The fact that rich and detailed data can be collected through grounded strategies allows for a good appraisal of the context. At the beginning of the process, this strategy tends to stay very close to the original data, providing empirical details expressed in interview transcripts and field notes. The gradual construction of a system of categories ends in a description of the phenomena being observed in a different way. The process of context sensemaking assumes a new perspective, where less attention is given to details and more to a small number of core categories or patterns (Langley 1999).

The second strategy, (2) narrative, suggested to deal with context is, according to Langley’s scheme, an “organizing” strategy and, indeed, is seen as quite important when time and context play an important role. Langley (1999) stresses the potential of narrative strategy for researchers intending to discover meanings of processes. 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 analyze the sequences of different phases and make links between them; and (c) as the main product of the research (Eisenhardt 1989; Guba and Lincoln 1984; Langley 1999). For example, Robey and Sahay (1996) rely essentially on narratives to organize and explain their results while Orlikowski (1993) uses narrative as a complementary way of explaining her findings.

Narratives can be seen as particularly appropriate to deal with context because they involve the construction of detailed stories from empirical data. Narrative strategy dominates not only the work of “contextualist” researchers (Pettigrew 1990) but also traditional ethnographers (Van Maanen 1988), and cultural researchers (Bartunek 1984). To some degree, all studies investigating organizational processes should use descriptive narratives at some point in the work. Because of its focus on contextual details, narrative strategy works best for one or a few cases. The variety and richness of the incidents described, and of the linkages between them, should convey a high degree of authenticity, the sense of “being there”. It is a sensemaking strategy that avoids the necessity of clear definitions when boundaries are not clear, and that accommodates variable temporal embeddedness and eclectic data. In summary, narrative is highly useful for communicating the richness of the context to readers, and, when combined with other strategies, can move further and provide explicit theoretical interpretations (Langley 1999).

Finally, (3) comparative strategies are particularly useful in dealing with context by identifying similarities and differences among processes and cases. It is particularly useful when studying multiple sites or embedded cases, allowing comparison among different contexts and their influences on the process outcomes. Barley’s (1990a) and Robey and Sahay’s (1996) studies are excellent examples of how the incorporation of comparative strategies in the research design can produce rich results, giving evidence that the same IT might produce different outcomes in different sites, breaking down the technological imperative that has dominated IT research for years.

**Dealing with time**

Three strategies were identified as especially appropriate to deal with time: (1) narrative, (2) visual mapping, and (3) bracketing in its two forms. (1) Narrative has already been described above, and is used independently or jointly with visual mapping, depending on research needs and purposes. Several studies, like Orlikowski (1996) and Orlikowski and Yates (1994), combine narrative with visual mapping to describe the relationship between technological and social elements interacting over time and to represent the sequences of events graphically. Like
narrative, (2) visual mapping is often an intermediary step between the raw data and abstract conceptualization. In order to help elaborate more general theories or more generalizable patterns, such a strategy needs several cases with a moderate level of detail (Langley 1999). Because of its focus on representation and analysis of sequences of process and events, visual mapping provides a sound route to understanding how events shape processes across several cases or a few cases with several embedded events. For example, visual mapping strategies could be used to help understand the adoption of a new technology in a few organizations or units. Sequences of interactions following the introduction of the new technology can be graphically tracked and compared. Orlikowski (1996) is an exemplary illustration of the use of visual mapping. In brief, combined with temporal bracketing strategies, visual mapping is a powerful strategy for manipulating time, which is basic to the application of structuration theory. The third strategy identified, (3) temporal-bracketing, is discussed below.

Dealing with duality of structure

Two strategies were identified as particularly appropriate to deal with the duality of structure: (1) visual mapping, and (2) temporal bracketing (both fine-grained and broad-ranging modalities). Because of its representation of sequences of events, simultaneity of processes, and mutual influences between actors and technologies, (1) visual mapping could be used to help assure that both sides of this dyadic interaction are given adequate attention. Combined with temporal bracketing strategies, visual mapping is also a good tool for exploring the structuring processes involved in several cases or in several events embedded in one case.

(2) Temporal bracketing strategy has been suggested as key in the use of structuration theory. It allows the breaking down of a process into the effects of actions on structures on the one hand, and the effects of structures on actions on the other - in its fine-grained form - and also helps focus on sequences of events - in its broad-range form. These two types of bracketing allow the analysis of mutual shaping between structures and actions, and encompass the effect of time. Also, because one can use events, phases, or processes as the unit of analysis, internal replication is feasible when wanted.

As far as choosing between the two types of bracketing, in effect, these two methodological patterns represent two different ways of analyzing 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 (broad-ranging bracketing). The choice depends primarily on the researcher’s purposes and on the type of interaction between the researchers and the empirical material. For instance, Barret and Walsham’s (1999) purpose was broad-reaching: to understand the social and organizational transformation associated with the introduction of electronic trading across the London Insurance Market over a period of nine years. They collected data during four separate phases over three years. Therefore, their methodological strategy, a broad-ranging bracketing, seems not only appropriate but suitable. Their conclusions point toward the need for a historical account in order to make sense of the structuring, at the societal and individual levels of new cultural values, associated with the introduction of new technologies.

On the other hand, if we take one of the case studies carried out by Orlikowski, that of 1996 for example, we observe that her purpose is rather more specific: to show how subtle shifts in action by organizational actors transformed, over a two-year period, aspects of their work practices, organizing structures, and coordination mechanisms, and the implications of such shifts for the organization. The researcher acknowledges that, ideally, a study of such changes would involve
the sorts of extensive and intensive participant observation enabled by techniques of organizational ethnography. However, this is not always possible, and she tries to prove that the data she collected in two phases (spanning two years) are adequate to distinguish five different situated changes. Once again, the choice of a fine-grained bracketing, in the availability of relatively dense data, seems appropriate. Therefore, her findings 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.

When applied to OS, this means that researchers begin by observing the initial organizational context, and then study the introduction of a new technology, or any other structural element that could trigger change, and how it affects the pattern of interaction among organizational members over time. Keeping the example of the introduction of a new technology, the moment the technology is implemented might be the point of departure for the structuring process. We acknowledge that no structuration process starts or stops at a particular time; it is happening continuously. However, for analytical and practical reasons, we need to establish artificially mark points to start and complete our analysis. Data about the process is analyzed and compared across successive periods, which are the units of analysis for replicating the emerging theory. This allows a deep understanding of the role of technology in the transformation of structural properties. The identification of recurring themes allows the transformation of a fluid mass of data into a series of more discrete but connected blocks. Within each phase, data is used to describe the processes and to examine how the context affects them. Discontinuities lead to replication of the analysis in a new phase, and so on (Langley 1999).

Validating the repertoire vis-à-vis Giddens’ directions

Structuration theory is not easily coupled with any specific method of research or methodological approach, but this does not mean that structuration theory is irrelevant to empirical research (Giddens 1989). In order to illustrate its relevance, Giddens enumerates people from a diversity of fields who, over the years, have made use of concepts drawn from structuration theory in their pursuit of empirical inquiries. In this view, 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, p: 294). However, in order to advance research in any field of inquiry, one needs to achieve ways to soundly and empirically apply such devices. To do so, Giddens suggests some avenues along which empirical research might apply structuration theory. Our repertoire of strategies fits well with his recommendations.

First, Giddens suggests that an important issue to examine is the complex action/structure relations. The duality of structure emerges as an important device for both the planning of the investigation and the interpretation of its results. As an operational principle of research, what structuration theory suggests 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. Structure is embedded in practice or in series of practices, in which it is recursively implicated (Giddens 1989). Both temporal bracketing strategies (fine-grained and broad-ranging) are intended as analytical tools for the study of the action/structure relationship. When combined with visual mapping, the ability to recognize patterns of interaction increases. When used with grounded and narrative strategies, the capability of “bracketing” over time and in different contexts is improved. Referring to the concept of ‘society’, Giddens indicates that “it is one mode of ‘bracketing’ time and space among others, that bracketing process itself being the primary object of study in social
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Marlei Pozzebon and Alain Pinsonneault

science” (Giddens 1989, p: 300). We suggest extending such a notion from society to lower levels of analysis, such as organizational or group levels.

Second, Giddens stresses the importance of investigating through a historical and processual perspective the recursive relationship between everyday practices and their institutionalization. This stresses the importance of the study of the *contextualities* of institutionalized patterns of interactions across time and space, which is viewed as inherent in the investigation of social reproduction and involves the time-space dimension and the co-presence of actors (Giddens 1989). Giddens argues that all social research necessarily has a cultural, ethnographic or anthropological dimension. As discussed, all the strategies proposed here are appropriate, to different degrees, when combined with the study of time and context.

Conclusion

The basic insight inspired by structurationism, that structural properties of technologies in use might enable and constrain human action, has been fleshed out by IT researchers. Efforts have been made to try to understand *how* technologies are drawn upon to provide meaning, to exercise power and to legitimize certain outcomes to the detriment of others, and *how* people reproduce or enact organizational practices using certain technological properties or not using others. In order to apply the theory without misrepresenting basic structurationist premises, several challenges must be overcome. Giddens’ social theory is neither simple to interpret nor easy to apply empirically. In this essay, we reviewed these challenges from the perspective of IT research, trying to answer the question *How can the applicability of structuration theory to empirical research be improved?*

Our review of empirical studies helped to identify two broad groups of IT studies using structuration theory: adaptive structuration theory and structurationist perspective on technology. We analyzed how researchers from these two groups have addressed certain empirical challenges. The main product of this analysis is a repertoire of methodological strategies that might improve the empirical application of structuration theory by dealing with three fundamental elements: *time, context and duality of structure*. In particular, we suggest *temporal bracketing* and its combination with other strategies such as visual mapping, comparative, grounded and narrative strategies. We propose two types of temporal-bracketing, *fine-grained* and *broad-ranging*, which are suitable for different research purposes, periods of time to be covered and degree of data density the researcher wants to collect. We also suggest that *narrative strategies*, which help to deal with time and context, are especially appropriate to a structurationist framework in practice. Finally, we show that powerful structurationist analyses (some of those already published) have tried to *combine more than one strategy* in a manner that *covers all three elements* discussed.

Briefly, the present essay aims to contribute to research in two principal ways. By reviewing how structuration theory has been applied in practice, our analysis clearly identifies three fundamental elements of structuration theory that have been emphasized by Giddens’ concern with the applicability of his ideas to empirical research (Giddens 1989), but can also be identified as frequent barriers to be overcome in other qualitative research. Because IT researchers have been building a “tradition” in applying structuration theory, we identify how they have dealt with time, context and duality of structure, and we draw an applicable framework from their experience. Our description of how researchers have addressed the challenges posed by structuration theory and our compilation of their lessons may stimulate other researchers to apply the theory in the future. The repertoire of research strategies presented in this essay can also help expand the use of structuration theory in studying other aspects of organizational change by...
providing an initial methodological guideline to new researchers that have not yet ventured along structurationist roads.

The second contribution of this research echoes a recent call for intensifying the collaboration between two distinct but overlapping disciplines: organizations studies (OS) and information technology (IT). According to Orlikowski and Barley (2001), much can be gained from greater interaction between them. Central to IT research is the understanding of how organizational phenomena affect the development and use of technologies and how technologies shape organizations. The stream of IT research outlined in this essay – the structurationist view of technology – has already produced concrete contributions to the advancement of knowledge about organizations and technologies mutual influences. From their experience, OS researchers may benefit in two ways. First, they can gain greater familiarity with the subject “technology” from other perspectives and intensify their research efforts in understanding technology-based organizational change or permanence. Second, they can be encouraged to go beyond the existing, and fertile, theoretical discussion in OS literature about Giddens’ notions of agency/structure, time/space, power, identity, subjectivity, etc., and to start to empirically explore these concepts, thereby increasing their understanding of contemporary organizational phenomena, technology-based or not.

Future research could contribute in two main ways. First, conceptually, research could help in further developing the repertoire of strategies by identifying additional approaches and by refining the applicability of those already identified in the present essay. Second, from a practical point of view, researchers from several disciplines, especially OS, could empirically apply the strategies identified here, helping to refine them in practice, to find other relevant combinations of strategies, or to suggest new ones.
References
Chidambaram, L. 1996. ‘Relational development in computer-supported groups,’ *MIS Quarterly* 20/2: 143-165.


Orlikowski, W.J., and S.R. Barley. 2001. ‘Technology and institutions: what can research on information technology and research on organizations learn from each other?’ *MIS Quarterly* 25/2: 245-265.


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

Marlei Pozzebon and Alain Pinsonneault


### Appendix 1: Detailed analysis of empirical studies applying structuration theory in IT research

<table>
<thead>
<tr>
<th>Study</th>
<th>Main Objective or Research Questions</th>
<th>Articulation of ST premises</th>
<th>Methodological Approach</th>
<th>Data collection</th>
<th>Data analysis</th>
<th>Strategies Identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley (1990a)</td>
<td>Did the social organization of special procedures, ultrasound, and CT scanning differ from the social order surrounding radiology's traditional technologies, radiography and fluoroscopy? If so, why did such differences exist? Were the differences peculiar to specific hospitals or were they to be found in any radiology department that had adopted the technologies?</td>
<td>Duality of technology and micro-macro interplay (also described in detail elsewhere (Barley 1986, 1990b))</td>
<td>Ethnography</td>
<td>Interviews: Sustained observation: 6 to 7 hours per day Sociometric questionnaires Data collection: 10 months Period covered: 10 months</td>
<td>Research design: synchronic, diachronic and parallel; iterative and comparative; use scripts as analytical tool.</td>
<td>Grounded Narrative Fine-Grained Bracketing Comparative</td>
</tr>
<tr>
<td>Karsten (1995)</td>
<td>To discern the interplay between the organizational form (and function) and alternative IT solutions and to trace the logic leading to the commitment to a new platform for the applications.</td>
<td>Duality of action; signification, domination and legitimation; the contextualist analysis of change.</td>
<td>Single case study</td>
<td>Document analysis: Interviews: 17 Data collection: Around 6 months Period covered: 6 years</td>
<td>Content analysis (Silverman 1993); vertical and horizontal process analysis (Dawson 1994); interpretational analysis (Patton 1990).</td>
<td>Grounded Narrative Broad-Ranging Bracketing (smooth)</td>
</tr>
<tr>
<td>Majchrzak et al. (2000)</td>
<td>How an inter-organizational virtual team, tasked with creating an innovative product over a 10 month period, adapted the use of a collaborative technology and successfully achieved its challenge? Four research questions on page 573.</td>
<td>Structuring process over time and in context</td>
<td>Descriptive case study</td>
<td>Document analysis: Interviews: Around 56 On-site observation Data collection: 35 weeks Period covered: 35 weeks</td>
<td>Identification of structures and reasons for technology appropriation</td>
<td>Grounded Narrative Visual Mapping Fine-Grained Bracketing</td>
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<th>Data analysis</th>
<th>Strategies Recognized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maznevski and Chudoba (2000)</td>
<td>To build a grounded theory of global virtual team processes and performance over time.</td>
<td>The interplay between the structure of relationships and the dynamics and processes of relationships.</td>
<td>Grounded theory field study</td>
<td>Documentary analysis</td>
<td>Interviews: Around 36 On-site observation Data collection: 21 months Period covered: 21 months</td>
<td>Template coding; axial coding and analysis of emergent higher level relationships</td>
</tr>
<tr>
<td>Montealegre (1997)</td>
<td>How structural rules and resources within the environmental, organizational and IT contexts influence and are influenced by the process of IT implementation?</td>
<td>Duality agency/structure and the link micro-macro level of analysis.</td>
<td>Single case study</td>
<td>Document analysis</td>
<td>Interviews: Around 82 Data collection: Not clear, at least 4 months Period covered: 6 years</td>
<td>Iterative coding and analysis (Glaser and Strauss 1967) Grounded Narrative Broad-Ranging Bracketing</td>
</tr>
<tr>
<td>Nicholson and Sahay (2001)</td>
<td>How the top management in a British firm used Indian outsourcing to bring about change in their own organization? How the structured IT development methodology was used as a mechanism to create, change and support managerial power structures?</td>
<td>Globalization and modernity. The three modalities and ontological security</td>
<td>Interpretive case study</td>
<td>Interviews: 42 On-site observation Data collection: 2 years Period covered: 4 years</td>
<td>Iterative coding and analysis (Walsham and Sahay (1999) and Barret and Walsham (1999)). Grounded Narrative Broad-Ranging Bracketing</td>
<td></td>
</tr>
<tr>
<td>Olesen and Myers (1999)</td>
<td>To understand the way in which groupware may or may not improve patterns of communication and collaboration in organizations.</td>
<td>Signification, domination, legitimation; duality of structure,;</td>
<td>Action research method</td>
<td>Documentary analysis</td>
<td>Interviews: 42 Participant observation Data collection: 4 months Period covered: 3 years</td>
<td>Diagnosing, action planning, action taking, evaluation, specifying learning. Grounded Narrative No bracketing recognized</td>
</tr>
<tr>
<td>Orlikowski (1991)</td>
<td>How does the introduction of IT in production work change the nature and role of organizational control mechanisms, and what are the implications – intended and unintended – for organizational forms and worker agency?</td>
<td>Allocative and authoritative resources, intended and unintended consequences of human action.</td>
<td>Contextualized and interpretive case study</td>
<td>Document analysis</td>
<td>Interviews: 94 On-site observation Data collection: 8 months Period covered: 8 months</td>
<td>Data analysis was not described here. It is described on Orlikowski (1992) Grounded Narrative Fine-Grained Bracketing</td>
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<tr>
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<tbody>
<tr>
<td>Orlikowski (1992)</td>
<td>To illustrate the potential of a structurational model of technology (in contrast to models that relate elements linearly, the structurational model assumes that elements interact recursively).</td>
<td>Actor’s knowledgeability, duality of structure, interpretive flexibility.</td>
<td>Field research study. Ethnographic techniques</td>
<td>Document analysis Interviews: 8 months On-site observation</td>
<td>Structurational analysis.</td>
<td>Grounded Narrative Fine-Grained Bracketing</td>
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<tr>
<td>Orlikowski (1993)</td>
<td>What are the critical elements that shape the organizational changes associated with the adoption and use of CASE tools?</td>
<td>Human action and institutional context interaction over time.</td>
<td>Grounded Theory</td>
<td>Document analysis Interviews: 119 On-site observation</td>
<td>Inductive, contextual and processual. Iterative, from open-ended to more structured. Comparative</td>
<td>Grounded Narrative Visual Mapping (a sort of) Fine-Grained Bracketing Comparative</td>
</tr>
<tr>
<td>Orlikowski and Yates (1994)</td>
<td>Genres are organizing structures that shape and are shaped by individuals' communicative actions. How this process occurs?</td>
<td>Structuring process, through which social structures are produced, reproduced and changed.</td>
<td>Empirical study examining communication exchange (basically, electronic mail)</td>
<td>Transcripts of 2000 electronic mail Interviews: Around 18</td>
<td>Qualitative (coding scheme) and quantitative analysis</td>
<td>Grounded Narrative Visual Mapping Fine-Grained Bracketing</td>
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<tr>
<td>Orlikowski et al. (1995)</td>
<td>To understand how the use of IT in changing organizational forms can be facilitated by the explicit and ongoing adaptation of those technologies to changing context of use.</td>
<td>Structurational Model of Technology</td>
<td>Exploratory study</td>
<td>Interviews Extensive textual data (computerized records)</td>
<td>Qualitative data analysis methods</td>
<td>Grounded Narrative Visual Mapping Fine-Grained Bracketing</td>
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<tr>
<td>Sahay and Robey (1996)</td>
<td>To describe the socially constructed frames of meaning pertaining to GIT, trying to draw specific conclusions about the links between the process and context of implementation.</td>
<td>The framework uses a reciprocal link between context and process that is drawn from ST.</td>
<td>Comparative research design</td>
<td>Document analysis Interviews: 60</td>
<td>Process of theoretical induction through data reduction (coding scheme)</td>
<td>Grounded Narrative Broad-Ranging Bracketing (smooth) Comparative</td>
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<tbody>
<tr>
<td>Walsham and Han (1993)</td>
<td>To increase the understanding of the complexities of IT strategy formation and implementation.</td>
<td>Duality of structure, three modalities, practical</td>
<td>Single Case Study</td>
<td>Document analysis</td>
<td>Formal and structurational analysis</td>
<td>Grounded Narrative Broad-Ranging Bracketing</td>
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<td>consciousness and routinization</td>
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<td>Interviews</td>
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<td>Data collection: 5 months divided in two phases</td>
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<td>Period covered: 12 years</td>
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<td>Yates, Orlikowski (1992)</td>
<td>To explain organizational communication as a structuration process by adapting the concept of genre from rhetorical theory.</td>
<td>Duality of technology, social rules</td>
<td>Documentary historical analysis</td>
<td>9302 messages posted</td>
<td>Historical analysis</td>
<td>Grounded Narrative Visual Mapping Broad-Ranging Bracketing</td>
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<td>Interviews</td>
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<td>Period covered: 1 century</td>
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<td>Yates, Orlikowski and Okamura (1995)</td>
<td>To use the concept of genre as an analytical device to study how organizational actors used a new electronic medium within a specific social context to produce certain communicative practices.</td>
<td>Bases on earlier work (above) where Giddens’ notion of structuring process was applied.</td>
<td>Field study</td>
<td>9302 messages posted</td>
<td>Qualitative textual analysis (genre analysis)</td>
<td>Grounded Narrative</td>
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<td>Data collection: 15 months</td>
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