

LUISS GUIDO CARLI UNIVERSITY

XX Ph.D. in Management Information System

Impacts of ICTs on the
temporal dimension of organizational culture:
a literature review and a case study

Synthesis

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Introduction

In the existing literature about ICTs and the organization of work, organizational dimensions like distribution of authority and control, standardization, centralization, specialization of labour, organizational size have received great attention, both in the perspective of the technological imperative, in the organizational imperative model and in the structuration theory perspective (Ravagnani, 2000).

Much less attention has been given to the study of the relationship between ICTs and the temporal dimension of the organization of work, in spite of the fact that we can consider the time dimension as one of the fundamental variables in organizational analysis since the early scientific management movement (i.e. Taylor, 1903; 1911).

Today it is generally accepted that information technology, when implemented in organizations, speeds up business processes at an enormous rate and thereby saves the adopting organizations a great amount of time. Nevertheless, in spite of its significance in temporality, research on temporal impacts of information technology in organizations is still limited (Lee and Whitley 2002).

Empirical studies on this topic have started to appear regularly during the last decade (Sahay 1997, 1998; Lee 1999; Lee and Liebenau 2000; Sawyer and Southwick 2002; Scott and Wagner 2003; Kvassov 2003; Sarker and Sahay 2004; Prasopoulou et al. 2006), gaining a stable attention which has led in 2002 to the publication of a special issue of *The Information Society* on “Time and IT”.

Speeding up the pace of work activities, foster workers’ polychronicity, promote shifts from “batch” logic to “flow” logic, improve synchronization among organizational units are just a few examples of some important objectives pursued by firms when they adopt systems like Workflows or ERPs.

Such objectives are related to potential changes in the temporal organization of processes and activities, but also to potential changes in mental attitudes and assumptions people have towards time and time use in the workplace.

Organization studies have long acknowledged time as a fundamental dimension of organizational culture (Schein 1985, Hofstede 1991) and it has been underlined that, besides being a condition for the coordination of activities and the production of organizational outputs, the temporal organization of work activities, processes, routines constitutes a “pattern” which plays a fundamental role also as a template for organizing behavior: a cognitive and cultural framework which helps people make sense of actions and events in the workplace (Barley, 1988).

It has also been pointed out that temporal patterns and assumptions are as well an expression of the specific culture of different organizational units and professional groups within a firm (Gherardi and Strati, 1988; Dubinskas, 1988; Butler 1995), thus conveying a strong symbolic value for both individual workers and groups.

Both these cognitive and cultural functions of temporal patterns contribute to their strength and permanence in organizational units and work groups, suggesting that changes in the temporal dimensions of organizational culture potentially conveyed by information systems are not to be taken for granted – on the contrary, they might affect, positively or negatively, the achievement of the expected temporal performance of the system.

Based on the above considerations, the work we propose intends to give a contribution to this area of studies, through the following objectives:

- Presenting a review of the literature on time as social and cultural construct, with a focus on how the temporal dimension has conceptualized in organizational literature.
- Presenting a review of the state of the art of theoretical and empirical scientific contributions on the temporal impacts of ICTs in organizations
- Presenting the results of a case study which investigates the impacts of the introduction of a workflow system on the temporal assumptions of three organizational units within a company and tests the hypothesis that the temporal assumptions existing in organizational units before the introduction of the system can affect it's the way it is used, thus facilitating/hindering the achievement of the expected performance conveyed by the system.

The case study presented here has been conducted in the Italian branch of a multinational manufacturing Company, where a Workflow System has been introduced in order to improve Customer Service processes.

The thesis is organized in nine sections including this Introduction:

- In **Section 2** a review of the literature on time as social and cultural construct is presented, with a focus on how the temporal dimension has been conceptualized in Organizational literature.
- In **Section 3** the cognitive and cultural functions of temporal patterns are analyzed and a review of frameworks for the analysis of the temporal dimension in organizations constitutes the first step in order to select the framework for the empirical study.
- Focusing on the specific literature on the temporal impacts of ICTs in organizations, **Section 4** analyzes contributions from the IS and Organization disciplines on the topic which examines what kind of technologies have been taken in consideration in these studies, what theoretical frameworks adopted and what epistemological standing and methodologies, in order to propose a critical review on the state of the art of research on this topic.
- The empirical part of the research is proposed in **Section 5** which describes the aim and motivation of the study, its theoretical framework, the design of the research and the methodological option.
- In **Section 6** the results of the study are presented and discussed, together with its limitations.
- **Section 7** draws the conclusion of the thesis.
- **Section 8** includes the references .
- **Section 9** presents the attachments.

Time as a social and cultural construct and conceptualizations of organizational time

Sociological (Durkheim, 1965 Merton and Sorokin, 1937; Gurvitch, 1964; Zerubavel, 1981; Giddens, 1984;), anthropological (Hall, 1959, 1983) and organizational literature (Lawrence and Lorsch, 1967; Clark, 1985; Schein 1985; Bluedorn and Denhardt 1988; Gerschick, 1988; Gherardi and Strati, 1988; Hofstede 1991; Butler; 1995; Trompenaars, 1998; Orlikowski and Yates 2002) have contributed to conceptualize time as a social and cultural construction, opening the way to a view of time as plural, multifaceted, relative, culturally determined, embedded in contexts and practices.

Anthropological and sociological studies point out that our notions of time and temporal routines are deeply entrenched and directly related to the way we see the world (Zerubavel, 1981; Dubinskas 1988) and the presence of a known, reliable temporal structure is considered central to the way we interpret objects and events.

As far as organization theory is concerned, there has been a shift from a view of time as objective, external, universal (i.e. in Taylor) to the consideration of the internal, particular time of single organizations. The cultural perspective on organization has acknowledged time as a fundamental dimension of organizational culture (Hofstede, 1991 Schein, 1988, Schriber and Gutek, 1987), and in the last two decades conceptualizations of 'Organizational time' have driven attention to the co-existence of a plurality of internal and particular times and temporal patterns within each organization (Schriber and Gutek, 1987; Gherardi and Strati, 1988; Butler,1995).

Studies on the temporal implications of ICTs in organizations

Research on the temporal implications of information technology in organizations, though still limited, has started to gain a stable attention during the last decade, during which empirical studies on the topic have started to appear in top ranked and medium ranked Journals of Information Systems and Organization disciplines, leading in 2002 to a special

issue of *The Information Society* entitled “Time and IT”, dedicated to this area of investigation.

We propose a literature review of these studies, in order to examine what concepts of time and theoretical frameworks have been used to analyze the temporal dimension; what typologies of IT have been taken in consideration as relevant from a temporal point of view, what epistemological perspectives and methodologies have been adopted in empirical studies on the topic so far.

The literature examined includes sixteen papers (one theoretical and fifteen empirical papers) covering in particular the last decade, with the exception of the seminal study by Barley (1988) which is examined here because his approach and the theoretical framework he proposed has represented a milestone for many subsequent contributions.

The papers included in this review come from both journals of Organization discipline and IS discipline: *Organization Science*, *Organization Studies*, *Academy of Management Journal*, *European Journal of Information Systems*, *Information and Organization*, *Accounting, Management and IT*, *Journal of Management Information Systems*, *Information and management*, *The Information Society*.

In order to present a synthesis and a critical analysis of the literature examined, we will address the three following questions:

- What are the concepts of time and the theoretical frameworks adopted to analyze the temporal dimension, and are there any prevalent ones?
- What epistemological perspectives and research methods have been adopted, and are there any prevalent ones?
- What typologies of IT have been taken in consideration as relevant from a temporal point of view?

The studies examined acknowledged the conceptualization of time as social construct, adopting theoretical frameworks derived from anthropological and sociological studies and from organizational culture research.

Among the frameworks adopted in empirical studies, those derived from sociological and anthropological studies (Zerubavel, 1979; Hall 1983) have revealed to be particularly

fertile, especially in order to investigate the consequences of technology introduction and use on the temporal organization of business processes and work activities.

Empirical research on this topic, though still limited, has covered in the last decade a wide range of different information systems and technologies, which we classified based on their purpose as: automation of routine activities and business processes, decision support technologies, communication and groupware technologies. The contributions investigated EDI, GIS, ERP, MIS systems implementation and use; mobile technologies use, and groupware systems use and implications for distributed teams.

As far as the epistemological standing is concerned, in the group of empirical papers examined there is so far a prevalence of constructivist and interpretivist perspectives compared to positivist approaches, which is not in line with the overall tendency in IS research.

Coherently with the prevalence of interpretivist perspectives, from a methodological point of view, the empirical studies examined privilege qualitative methods: the majority of papers present case studies and longitudinal case studies (nine papers), showing a prevalence of ethnographic techniques for data gathering (observation, participant observation, open ended and semi-structured interviews).

As far as research design is concerned, coherently with the theoretical frameworks adopted, interpretivist studies and studies mutuating structuration perspectives are focused on the interplay between ICT's and the social context of its implementation and use, thus considering the temporal dimension an important feature of the social context which contributes to shape the processes of implementation and use but is in its turn dialectically involved in changes occasioned by the introduction of ICTs.

This circular scheme is evident in papers adopting Structuration theory (Orlikowski and Yates 2002; Maznevski and Chudoba 2000), ANT (Scott and Wagner 2003), in Sawyer and Sothwick's contribution (2002) and Prasopoulo et al.'s contribution (2006).

An exception to the previous considerations is the study by Barley (1988): though his point of departure is a structuration perspective, in this study he focused, as he stated, on the *technically induced change* of computer-based radiology equipment on temporal order

and social relations, and in describing his findings he underlined the effects the introduction of CT scanners produced on the temporal order, treating the latter, in a way, more as a dependent variable.

In other interpretivist contributions (Sahay 1997, 1998; Sarker and Sahay 2004, Sorensen and Pica 2005) the attention is even more focused on the social context, in the effort to analyze its influence on technology implementation and use, mostly investigating the opposite verso (if compared to Barley, 1988) of the relationship between ICTs and temporal dimensions of social context and work.

On the other hand, the reverse direction of the relationship is investigated in positivist papers, where research design is conceived so as to point out the effects or impacts of ICTs use on the temporal dimension in organizations - whether referred to business processes, as in Lee (1999) or Lee and Liebenau (2000), to worker's attitudes and productivity as in Kvassov (2003), communication processes and group dynamics as in Montoya-Weiss et al. and Massey et al. -.

That is to say, the temporal dimension is treated here as a dependent variable, with the exception of Lee (2003) who, in his paper on the use of group calendric systems, concludes underlying that the social aspects influence the use of the system and that developers of GCS should become "more knowledgeable about phenomena surrounding the use of GCS in organizations than relying on the simple concept of time, clock time". (p. 163).

These considerations about epistemological perspective and research design in the papers examined lead us to remark that still limited attention is paid to the topic from a positivist perspective, with particular regard to contributions which examine if and to what extent assumptions on time and temporal structures/orders existing in organizations and workgroups affect the implementation, use, and outcomes of ICTs.

The impact of a workflow system on the temporal dimension of organizational culture: a case study

Motivation, aim of the study and research questions

Speeding up business processes, time saving, shifts from “batch” logic to “flow” logic, polychronicity of workers, synchronization among organizational units are just a few examples of some important objectives pursued by firms when they adopt systems like, for example, Workflows or ERPs.

These objectives can be referred to as “temporal performance”, since they are related to potential changes in the temporal organization of processes and activities, but as well to potential changes in mental attitudes people have towards time and time use in the workplace, attitudes which, as pointed out in the previous chapters, are recognized by organization studies as features of organizational culture and also expression of the specific culture of different organizational units and professional groups within a firm.

Since organizational culture includes groups’ dominant assumptions of time (Schein 1985) and plays an important role in shaping the social consequences of technology (Robey and Azevedo 1994), a consequence of technology relates to how these assumptions may be redefined. Moreover, since organizational contexts have their own norms about time, we find that even around the same technology, the nature of linkages between context and process can be quite different, bringing about a variety of outcomes and consequences (Barley 1986, 1988; Robey and Rodriguez-Diaz 1989; Orlikowski 1991; Robey and Sahay 1996, Orlikowski and Yates 2002).

These considerations about epistemological perspective and research design in the existing literature(see previous Section 3), lead us to remark that still limited attention is paid to the topic from a positivist perspective, with particular regard to contributions which examine if and to what extent assumptions on time and temporal structures/orders existing in organizations and workgroups influence the implementation, use, and outcomes of ICTs.

Coherently with the consideration on the state of the art on research on the topic the purpose of the study is to investigate if and to what extent the introduction of a Workflow System transforms the temporal assumptions of the organizational units where it has been adopted, and to test the hypothesis that the temporal assumptions shared by people in organizational units before the introduction of the system can affect the way it is used, thus facilitating/hindering the achievement of the expected temporal performance conveyed by the system.

According to these purposes, the study intends to investigate two hypothesis:

- 1) The introduction of the workflow system transforms the temporal dimensions of organizational culture of the departments adopting it.
- 2) The temporal assumptions existing in departments before the introduction of the system affect the way it is used, thus facilitating/hindering the achievement of the expected temporal performance.

The case study presented here has been conducted in the Italian branch (employing 350 people) of a multinational manufacturing company, where a Workflow System (Lotus Notes) has been introduced in order to improve the Customer Service processes.

The case study was selected according to the following criteria:

- possibility to perform the study at a stage of the implementation of the system which was advanced enough to measure people's perceptions of the changes in the temporal dimensions.
- Type of system and organizational process: the workflow system was considered by the company as critical for its potential to achieve results in terms of temporal performance
- Type of organizational process: possibility to carry on the study on a process which required the cooperation of several different organizational units, all of them adopting the system.

The case of this Company was thus suitable for the study because, the workflow system had been introduced about eight months before the fieldwork started, contributing to change customer service processes and procedures in the company, a change whose objectives were highly related to temporal performance (as the director of the IT and Organization Department pointed out, “our aim was to give faster answers to customers ,speeding up the process; but we also wanted people to change their mentality and shift from a ‘batch logic’ to a ‘one piece flow logic’”).

Among Customer Service activities, one domain to which Notes has been applied was chosen for this research: the Complaint Management Service, because it is the most prominent customer service activity in the Company, and because it requires the coordination of three different departments.

The units of analysis of the study were the three departments where Lotus Notes has been implemented in order to improve their cooperation and contribution to the Complaint Management Process: the so called “Customer Point”; the “Orders Management” unit within the Sales Department; the Storehouse and Logistics Department.

5.2 Research Design and Theoretical Framework

Research Design

The research design, summarized as follows, was aimed at describing the temporal performance expected by the management and describing and measuring differences in temporal assumptions among units before the introduction of the system. The second objective was to measure changes in the temporal assumptions after the introduction of the system, testing the hypothesis 1 and 2.

The case study was developed in two phases, which we briefly describe as follows:

Phase 1

- Investigation of the *temporal performance expected* by the managers adopting the system.

Data source: individual semi-structured interviews; project documentation.

Interviews were addressed to managers who adopted and implemented the system, in order to investigate several dimensions of the temporal performance they expected from its introduction.

Phase 2

- Measurement of the temporal dimensions of culture existing in the four departments involved *before and after* the introduction of the system.

Data source: individual semi-structured interviews; questionnaires based on Likert scales

Questionnaires and interviews were addressed to both managers and employees working in the four departments where the system was introduced.

This phase of the research has two aims: first, describing and measuring differences in temporal patterns *among units* before the introduction of the system. The second objective was to measure to what extent the expected temporal performance had been actually achieved in different organizational units, and to test the hypothesis that the different temporal assumptions existing in the units affect in different ways the use of the system thus facilitating/hindering the achievement of the expected temporal performance.

Theoretical framework

The framework adopted in order to describe and measure the temporal dimensions of organizational culture is based on a set of concepts which have been operationalized and tested in previous research in psychology of work and organizational culture (Schriber 1985; Schriber and Gutek 1987; Bluedorn et al. 1999), integrated with concepts drawn from the work by Zerubavel (1979), which have been adopted in order to assess more aspects of the temporal order within organizational departments which were not included in Schriber and Gutek's model.

Both Schriber's and Bluedorn's instruments and Zerubavel's dimensions have been subsequently adopted to study changes in the temporal dimensions of organization occasioned by the introduction of information systems (Barley 1988; Lee 1999; Lee and Liebenau 2000 Kvassov 2003, Pouloudi et al. 2006).

Schriber’s work, based on data collected from 529 respondents from 51 work groups in 23 organizations, has developed and tested 15 Likert scales measuring perceptions on norms about time that have become standard measurement tools in studies at the work group and organizational levels of analysis.

Bluedorn et al.’s work , based on data collection from 2 samples of 205 and 115 respondents from 2 organizations, has developed and tested a Likert scale instrument (Inventory of Polychronic Values) in order to measure the cultural dimension of polychronicity introduced by Hall in his ethnographic work (Hall, 1959; Hall, 1983).

For the purpose of this study, the conceptual framework, synthetically described in the following table, took in consideration the following dimensions, summarized in table 2.

	<u>Temporal dimension</u>	<u>Definition</u>	<u>Author</u>
	<u>Scheduling</u>	Perceived importance of scheduling, defined as an activity which “concerns location in the temporal realm and gives organizations a framework for constructing temporal boundaries”	(Schriber 1985; Schriber and Gutek1987)
	<u>Deadlines</u>	Perceived importance of meeting deadlines , defined as the temporal start and stop points, which can be external or internal to the task	(Schriber 1985; Schriber and Gutek1987)
	<u>Sequencing of tasks</u>	The importance attributed to the order in which activities and tasks	(Schriber 1985;

		take place	Schriber and Gutek1987)
	<u>Punctuality</u>	The degree of rigidity to which deadlines are adhered.	(Schriber 1985; Schriber and Gutek1987)
	<u>Work Pace</u>	Rate at which activities can be accomplished: it concerns the speed of work and people's expectation to work fast.	(Schriber 1985; Schriber and Gutek1987)
	<u>Quality versus Speed</u>	Norms to which people adhere regarding trade-offs between the quality of work and the speed of work over time	(Schriber 1985; Schriber and Gutek1987)
	<u>Autonomy of time use</u>	The amount of freedom the worker perceives he has in setting schedules for the completion of his tasks over time	(Schriber 1985; Schriber and Gutek1987)
	<u>Synchronization and coordination</u>	It measures the perceived degree to which people manage their performances simultaneously (synchronization) or they manage the performance of tasks in coordinated sequence.	(Schriber 1985; Schriber and Gutek1987)
	<u>Awareness of time use</u>	People's awareness of how they use their time on the job and	(Schriber 1985;

		expectations that they know how long they take to perform activities	Schriber and Gutek1987)
	<u>Allocation</u>	The perception that the amount of time devoted to tasks or activities is too tight and not enough.	(Schriber 1985; Schriber and Gutek1987)
	<u>Polychronicity (IPV)</u>	the extent to which people prefer to be engaged in two or more tasks simultaneously and believe that is the best way to do things	<u>Bluedorn et al., 1999)</u>
	<u>Temporal symmetry</u>	the extent to which different groups/ organizational units share the same temporal order	<u>Zerubavel, 1979, Barley, 1988</u>
	<u>Social cycles :</u>	the regular recurrence of events and processes: it attempts to profile the cycles in work activities experienced over time.	<u>Zerubavel, 1979</u>

Table 2. Conceptual framework

Concepts

Scheduling and deadlines The items constructed by Schriber and Gutek measure the perceived importance of scheduling, defined as an activity which “concerns location in the temporal realm (e.g. a 10:00 a.m. meeting) and gives organizations a framework for constructing temporal boundaries” Based on Mc Grath and Rotchford (1983), the authors state that scheduling allows the possibility of prediction and resolution of temporal uncertainty. The temporal boundaries defined by scheduling can be further defined in terms of the closely connected activity of setting deadlines, which are defined by Schriber

and Gutek as “the temporal start and stop points, which can be external or internal to the task, or both. Deadlines for single-activity tasks are based on temporal constraints external to the task. Deadlines for interdependent tasks are based both on the temporal constraints external to the final task in the sequence or and on the temporal constraints internal to the task sequence itself” the scale of nine items built by the two authors measure the perceived importance of scheduling and meeting deadlines .

This dimension was relevant in the context of our study, and included in the framework because from the initial exploratory interviews of the case study it came out that one of the expected outcomes of the introduction of the system was that it would help introducing a more definite scheduling of the process, visualizing due deadlines for the deliver and dates of completion of different parts of the process, thus increasing perceptions of the importance of meeting deadlines.

Sequencing

The author distinguish this concept from scheduling stating that “scheduling is laying out a pattern of activities anchored to points in time within a specific time-measurement system, sequencing is the ordering of activities over time within that system” A specific order/sequence in time may be “inherent in the task, or prescribed by the individual who controls the process”.

In our research this variable was relevant because the introduction of the system can interfere with the customary sequence workers adopt in carrying out the daily activities (if any), both interrupting the sequence with queries coming from other subjects or departments, or prescribing a new sequence, embedded in the automated process.

Punctuality

Though defined as “the degree of rigidity to which deadlines are adhered”, Schriber’s and Gutek scale measured indeed general importance of punctuality at work, with items like “People get upset when you’re late for work” and “if people arrive late for work, they will feel rushed all day”.

Even if not directly related to the object of the present study, we included it as a measure of the general attitudes towards punctuality in the work environment.

Pace

Is the rate at which activities can be accomplished (i.e. the speed of activity or the number of activities that can be done within a given interval). Allocation, scheduling, deadlines depend on pace. The concerns the perceived speed of work and people's expectation to following their own rhythm, take breaks and so on rather than work fast. Each culture appears to have a pace that is considered appropriate for activity (Levine & Wolff, 1985).

This dimension was included in the framework because strictly related to speed: the introduction of ICTs, as pointed out before, is often associated to the objective of speeding up processes, which could result in increasing the work pace or, on the contrary, to slow it down because automation of phases of the process could facilitate worker's activity, eliminate duplications of activities and so on.

Quality versus speed

The concept define the norms to which people adhere regarding trade offs between the quality of their work(i.e. doing things well; making good decisions) and the speed of work over time (i.e. doing things fast, making quick decisions).

We expect speed to be a relevant dimension to investigate in that the introduction of Information technologies is almost implicitly associated with expectations to speed up processes thus enhancing values associated to speed and urgency of tasks completing or decision making. Moreover, in the specific context of our case study, the workflow system was applied to customer service processes, that is to say activities directly connected to the relationship with and satisfaction of clients, which makes the issue of trade off between quality of service and speed crucial.

Autonomy over the use of time and time boundaries

Autonomy is defined as the amount of freedom the job holder perceives he has in setting schedules for the completion of his or her tasks over time. This dimension is also related

to scheduling, although it is not a direct characteristic of it. It's a secondary effects of scheduling, and reflects a more abstract level of the temporal environment.

Consequently the variable was included in our framework because variations in schedules and deadlines, sequencing, and work pace due to the introduction of the system could bring as a consequence workers' perceptions of enhancement or limitation of their autonomy over the way they use their time.

Synchronization and coordination of work with others trough time

When work requires that more than one task or activity is involved, and tasks may be performed by individuals or groups, It measures the degree to which people manage their performances simultaneously (synchronization) or they manage the performance of tasks in coordinated sequence with others.

The three item scale proposed by Schriber and Gutek presents indeed items which measure in general perceptions about the importance to cooperate with others and work in a coordinate way, or as a team.

For the specific purpose of our study, we changed the formulation of these items in order to measure this same perception but referred to cooperation, coordination and teamwork among different organizational units (which was the object of our study).

Awareness of time use

The concept is referred to the degree of attention and importance people pay to how they use their time at work (i.e., if they know and plan how long it will take them to accomplish a task or an activity, how worried they are about using their time well).

As in the case of autonomy, the variable was included in our framework because variations in schedules and deadlines, sequencing, work pace, or even tigher coordination with other organizational units due to the introduction of the system could bring as a consequence workers' perceptions of enhancement of their awareness over the way they use their time.

Allocation

It is the amount of time, whether planned or expended, devoted to an activity, regardless of when the amount occurs. It depends on the concept of duration. It can be considered a measure of work overload, in that it defines the degree to which schedules seem too tight for activities/jobs, the feeling people have that they have time enough to get things done.

As for the case of work pace, this dimension was included in the framework because strictly related to speed: the introduction of ICTs, as pointed out before, is often associated to the objective of speeding up processes, which could result in increasing the perception that time to complete activities is tight or, on the contrary, that there is more time because automation of phases of the process could facilitate worker's activity, eliminate duplications of activities and so on.

A few dimensions included in Schiber and Gutek's model were not adopted for this study because not related to its object. They are: "time boundaries between work and non work", which is a measure of how much work related activities and problems trespass the boundary between work time and private life time. "future orientation", which is generally connected to perceptions about how much the firm invests in the future, "routine versus variety" related to the variation of job content in general, which was not relevant in our case since the system was applied to routine activities connected to customer service, and intraorganizational time boundaries because in Schiber and Gutek's formulation it was a measure of the duration of the work-day in different department, which, again, was not the focus of this research.

Polychronicity

The cultural dimension of monochronicity and polychronicity were first introduced by Hall, (1959) at the level of national cultures, as described previously. At the level of organizational culture, a polychronic organization would value behaviors where individuals do several things at once, more activities are scheduled during a period of the day, with short periods of time spent on each of several activities and people dealing with a number of different problems simultaneously. (Bluedorn et al.,1999), who operationalized the concept, defined it as follows.

Polychronicity is the extent to which people in a culture:

- 1) prefer to be engaged in two or more tasks or events simultaneously; and
- 2) believe their preference is the best way to do things

In the case of introduction of a workflow system, we could expect polychronicity to be a relevant dimension to investigate since it allows to have access to a plurality of information at a time in a constant flux, and to be connected to the flux of information, schedules and activities of other people in departments working on the same processes,.

Temporal symmetry / asymmetry

We will briefly recall, from what reported in chapter 3, that this dimension is referred to coordination between the activities of individuals or groups by Barley (1988), who, building on the notions of temporal symmetry/ complementarity/ staggered coverage by Zerubavel, introduces the notions of *temporal symmetry* and *temporal asymmetry* .

According to Barley the first type of temporal coordination implies that individuals or groups share a common pattern of temporal conditions (they share the same schedules, recurrences, and their working activities are synchronized). In the case of temporal asymmetry, individuals or groups operate according to different temporal patterns. The two authors point out that a condition of temporal symmetry constitute a powerful basis of mechanical solidarity among individuals and groups, while temporal asymmetry requires the development of organic solidarity. Moreover, in Barley's study the condition of temporal asymmetry among distinct groups led to conflictual attitudes and relationships, which was reduced when their temporal patterns became more symmetrical.

Though in our study we didn't focus on the punctual mapping of the structural aspects of temporal patterns, the concept is adopted in our study because we have different departments cooperating to one same process, thus temporal symmetries/asymmetries among departments might lead to cooperative/conflictual attitudes and be modified by the introduction of the system.

Social cycle

This concept has been defined by Zerubavel (1979) as regularly recurrent pattern of activities and events, "the time intervals during which sequences of recurring successions

of social activities are completed”. Zerubavel observed that the beginnings and ends of cycles are treated as discrete segments of time surrounded by rigid boundaries.

Many organizational activities may be structured in accordance with such rhythmic patterns, and the introduction of a technology can challenge the configuration of such cycles, for example allowing to work adopting a “flow”, destructured logic rather than a “batch logic” where a cycle of activity is completed before another gets started, or potentially alter the way in which cycles of different organizational units are connected to each other.

Temporal performance

Finally, we define “temporal performance” the ensemble of the expectations expressed by managers who adopted and implemented the workflow system, with regard to speeding up the process, changes in people’s time orientations, changes in temporal dimensions of departments culture.

Results and discussion

The first objective of the study was to assess the temporal performance expected by the managers adopting the system.

The results account for four types of temporal performance expected and widely shared by the management as a result of the introduction of the workflow system:

1. Speeding up the process of Complaint management
2. Reducing temporal misalignment among different departments
3. Shifting from a “batch logic” to a “one piece flow logic”
4. Adherence to defined “deadlines” for dossier definition and answers due to both internal and external clients

In order to test the hypothesis of the research, quantitative data from questionnaires and qualitative data from interviews and company documents were triangulated, accounting for the following results.

Following the introduction of the system, the temporal dimensions of the organizational culture of the three departments involved showed some significant changes which confirm hypothesis 1 of the study, but as well some contradictory effects which seem to confirm hypothesis 2.

In particular, the triangulation of data coming from questionnaires and semi-structured interviews showed that the three dimensions of synchronization and coordination, temporal symmetry among departments, and deadlines and scheduling had increased significantly. after the introduction of the system.

The increase of these three dimensions confirmed as well the achieving of three expected temporal performance: reducing misalignment among departments, obtaining adherence to defined deadlines and speeding up of the customer complaint process.

This kind of evidence supports the first hypothesis of the study, that the introduction of workflow systems transforms the temporal assumptions shared by people in organizational units.

On the contrary, the two dimensions of polychronicity and sequencing didn't show any significant change, and the social cycles characterizing the departments showed contradictory results. These dimensions were associated to achieving the objective that workers would shift from a batch logic to a one piece flow logic in performing their activities.

Evidence suggests that the persistence of two temporal dimensions of the organizational culture, i.e. monochronicity and sequencing, and the strength of the social cycles existing within some departments, influenced the expected use of the system and the achievement of one important temporal performance, the shift to a flow logic.

This kind of evidence supports the second hypothesis of the research that temporal dimensions of organizational culture can affect the use of the system thus hindering the achievement of the expected temporal performance.

It is important to underline that the introduction of the workflow system was combined with an internal workshop involving the managerial level, and that the results we report

were associated by the respondents to both innovations introduced by the system and the internal workshop: the different implications of these two factors on both cultural changes and performance have been only partly assessed and will require further investigation.

Limitations of the study

An important limitation of the study concerns the limits of single case studies, which don't allow generalizability of the results, thus the outcomes of this exploratory research will require further investigation to be confirmed, through replication of in more cases.

Secondly, though data triangulation of quantitative and qualitative data consented to gather richer information and to go through a process of validation by the respondents, we remind the statistical limitations of the quantitative analysis, due to the small sample of respondents which corresponded to the small number of people using the workflow system in some of the organizational units involved of this case.

Third, qualitative analysis was subject to the risk of interpretative bias since the researcher worked alone and the analysis didn't go through a process of double coding and cross checking with other researchers, as suggested by good practices (Miles and Huberman, 1994).

Forth, in view of an extension of this research design to more cases, an further criterion for case selection must be the dimension of organizational units and number system users, for the purposes of quantitative analysis and to give robustness to the results.

This kind of evidence supports the second hypothesis of the research that temporal dimensions of organizational culture can affect the use of the system thus hindering the achievement of the expected temporal performance.

It is important to underline that the introduction of the workflow system was combined with an internal workshop involving the managerial level, and that the results we report were associated by the respondents to both innovations introduced by the system and the internal workshop: the different implications of these two factors on both cultural changes and performance have been only partly assessed and will require further investigation.

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