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Does time matter? The role of ICT in shaping temporal assumptions

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DOES TIME MATTER?

THE ROLE OF ICT IN SHAPING TEMPORAL ASSUMPTIONS

Abstract.

Despite its importance to temporal issues, research into the temporal impacts of information technology in organizations is still limited. On the other hand, organizational culture research shows that the way time is perceived and collectively organized reflects assumptions that are an expression of the specific organizational setting, underscoring that cultural assumptions are an important contributory factor to the strength and direction of organizational change. In this contribution, we investigate the role ICT can play in promoting changes in the temporal dimension of organizational culture, and seek to assess whether temporal assumptions can affect the way a new system is used, thus facilitating/hindering the achievement of the expected results. This research-in-progress paper presents some preliminary results of a multiple case study, showing what types of 'temporal performance' management expects to see thanks to the introduction of a workflow system, and showing that managers have different levels of awareness about potential temporal performance of the system. Preliminary results also seem to confirm that, after the introduction of the workflow, some temporal dimensions of organizational culture of the departments involved present some significant changes, which confirm hypothesis 1 of the study, but also some contradictory effects that seem to confirm hypothesis 2.

Introduction

It is generally accepted that, when implemented in organizations, information technology hugely speeds up business processes, thereby enabling the adopting organizations to save a great deal of time. Despite its significance in temporal terms, research on the time impact of information technology in organizations is still limited (Lee and Whitley 2002).

Empirical studies on this topic began to appear in the last decade in the journals of both Organization and IS discipline (Sahay 1998; Lee 1999; Lee and Liebenau 2000; Orlikowski and Yates 2002; Sawyer and Southwick 2002; Scott and Wagner 2003; Sarker and Sahay 2004; Prasopoulou et al. 2006). Accelerating the pace of work processes, fostering workers' polychronicity, promoting shifts from "batch" logic to "flow" logic, and improving synchronization among organizational units are just a few examples of some key objectives that can be pursued by firms when they adopt systems like Workflow or ERP. Such objectives, which we will refer to as expected *temporal performances*, are related to potential changes in the temporal organization of processes and activities, but also to potential changes in people's assumptions on time and time use in the workplace.

What do we mean by assumptions on time?

Organization studies have long acknowledged time as a fundamental dimension of organizational culture (Hofstede 1991); Schein as well, in his study on organizational culture (1988), maintains that organizational culture has groups' dominant *assumptions of time and space* embedded within it and describes a variety of "assumptions on time" that characterize different organizational cultures. Schriber and Gutek (1987), in their empirical research, also described rules about time as specific "*dimensions of organizational culture*" and found that these cultural features varied across organizations and working groups. It has been underscored that, in addition to being a condition for the coordination of activities and the production of organizational outputs, the temporal organization of work processes constitutes a framework that plays an essential role also as a template for organizing behavior: a cognitive and cultural framework that defines the activities and routines of both people and organizational units, used by people to make sense of actions and events in the workplace (Barley, 1988). In his study on *temporal patterns* in the organization of activities in hospitals, Zerubavel (1979) found that various types of schedules worked as "cognitive maps" used by personnel to provide a background, a "repertoire of what is expected, likely or unlikely to occur within certain temporal boundaries" [p.125]. Temporal assumptions thus represent an expression of the specific organizational and professional culture that produces them, conveying a symbolic value for the individual and the group of workers. Finally, assumptions on time can also be an expression of the specific sub-culture of different departments and professional groups within a firm (Lawrence&Lorsch 1967; Gherardi and Strati 1988; Dubinskas 1988). Therefore, the relevance of temporal assumptions as both a cultural framework and a cognitive map can be considered a factor that contributes to their strength and permanence within a given organizational context. As a result, the introduction of technologies with the potential to bring changes to this domain also involves a challenge to many of the cognitive orders and cultural values on which organizational actors rely.

Adopting the perspective of organizational culture, this research –in-progress paper seeks to contribute to the research on the temporal impacts of information technology in organizations, presenting a multiple case study that investigates the role ICT can play in promoting changes in the temporal dimension of organizational culture, and tests the hypothesis that temporal assumptions shared by people before a system is introduced can affect the way it is used, thus facilitating or hindering the achievement of the results the system is expected to convey.

Assumptions about time: a dimension of organizational culture

Schein (1985) in his study on organizational culture, maintains that organizational culture has groups' dominant *assumptions of time and space* embedded within it and describes several "assumptions on time" that characterize different organizational cultures. Schriber and Gutek (1987) describe as well "*norms about time*" as specific "*dimensions of organizational culture*", proposing scales to measure these dimensions. Besides being a fundamental condition for the coordination of activities and the production of organizational outputs, the temporal organization of work processes, as pointed out by

Barley(1988) plays an important role also as “an interpretive framework for rendering action in the setting meaningful” [p. 125]. In other words, organizational actors evaluate and make sense of events occurring during their own activity or other people’s activity using the temporal framework as a scheme of expectations to judge whether results and behaviours are appropriate.

Temporal patterns represent thus an expression of the specific organizational and professional culture which produces them, conveying a symbolic value, for the individual worker and working groups: according to Dubinskas (1988), the socially constructed character of time is such that all “times” existing within the high technology organizations of his study could be considered as “symbolic nexes around which coalesce issues of order, power, self definition and knowledge”.

As an example, in Barley’s study (1988) the different temporal organization of work of two professional groups, radiologists and radiological technicians, was also a representation of the different hierarchical and professional status of the two groups: given the “temporally unpredictable world” (p. 145) of the radiologists, technicians never knew when radiologists would be available and had to hunt for them whenever they needed one; radiologists on the contrary , given the predictable and highly scheduled ”tempo” of technicians, always knew when they could summon up one of them.

Another example: Zerubavel found that a major aspect of the socio-temporal order expressed by the “schedule” of coverage in hospitals was that it functioned “as a moral order”, an expression of some fundamental organizational values like responsibility towards the patients, fairness towards staff members. Consequently, it was also a criterion to judge the appropriateness of personnel’s behaviour: some actions were considered “legitimate”, for example, only at the end of a shift, but not at the beginning. In this view, the temporal dimension appeared central for the definition of the “boundaries of norms”. The relevance of temporal assumptions as a framework and a cognitive map can thus be considered a factor which contributes to their strength and permanence within a given organizational context, consequently the introduction of technologies which have the potential to bring changes in this domain involves also a challenge to a multiplicity of cognitive orders and cultural values on which the organizational actors rely. On the other side, like all other social structures, they have a provisional nature and change over time (Bluedorn and Denhardt 1988; Ancona et al. 2001), also in association with technological innovations.

Study Aim and Research Questions

The purpose of this study is to investigate the role ICT can play in promoting changes in the temporal dimension of organizational culture: does the introduction of a new system contribute to change shared assumptions about time and time use in the workplace? Can ICT help transform the way people view time and the ‘appropriate’ way to collectively organize it within a given context (at organizational/ department/group level)? Can temporal assumptions affect the way a new system is used, thus facilitating/hindering the achievement of the expected ‘temporal performance’ conveyed by the system? Our investigation into these issues is based on a multiple case study including three companies where a Workflow System was introduced in several organizational departments with the aim of improving cross-department processes, and addresses two main research questions:

- 1) Does the introduction of the workflow system transform the temporal assumptions shared by people in organizational units, thus achieving the expected temporal performance, and, if so, to what extent?
- 2) Do the temporal assumptions that exist in organizational units before the introduction of the system affect the use of the system, thus facilitating/hindering the achievement of the expected temporal performance?

Assumptions about time: a framework for the analysis

The theoretical framework adopted in this study to describe and measure the temporal dimensions of organizational culture is based on a set of concepts which have been operationalized with Likert scales and tested in previous research into the psychology of work and organizational culture (Schriber and Gutek1987; Bluedorn et al. 1999).

The framework was then integrated with concepts drawn from the ethnographic work by Zerubavel (1979) and Barley (1988) 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.

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 (1959).

Both Schriber's and Bluedorn's instruments have been adopted to study changes in the temporal dimensions of organization occasioned by the introduction of information systems (i.e. Lee 1999; Lee and Liebenau). We investigated these dimensions by submitting questionnaires to employees and managers within the departments involved by the introduction of workflow systems. We also cross-checked these dimensions with the results of the content analysis of semi-structured interviews gathered within the firms. We will now explain the meaning and the relevance to our study of the dimensions considered in the conceptual framework. From Schriber and Gutek (1987) the following dimensions were drawn: Deadlines, defined as the importance of defining and meeting deadlines, temporal start-and-stop points of activities and Scheduling defined as the importance of scheduling (an activity that "concerns location in the temporal realm and gives organizations a framework for constructing temporal boundaries"). In the case of introduction of a workflow system, we could expect these dimensions to be relevant because the system could help introducing a more definite scheduling of the process, visualizing due deadlines for the deliveries and dates of completion of different parts of the process, thus strengthening perceptions and norms about the importance of meeting deadlines.

Synchronization and coordination: this dimension is related to the perceived importance of cooperating with others and working in a coordinated way or as a team. For the specific purpose of our study, this dimension was investigated because the workflow system was linking many different organizational units, thus the importance attributed to cooperation, coordination and teamwork among different organizational units was very relevant and could show significant changes.

Sequencing: the order in which activities and tasks take place; the authors 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 a workflow 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.

Autonomy of time use: the perceived amount of freedom workers have in setting schedules for completing their tasks over time; The authors state that 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. The variable was thus 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.

Awareness of time use: people's awareness of how they use their time on the job and expectations that they know how long they take to perform activities. 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 tighter coordination with other organizational units due to the introduction of the system could bring as a consequence more awareness over the way they use their time. Speed vs. Quality: rules that people follow on trade-offs between the quality of work and the speed of work over time.

Work Pace: rate at which activities can be accomplished: the speed of work and people's expectations to work fast. It 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. This dimension was included because strictly related to speed: the introduction of ICTs 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.

Allocation: the amount of time devoted to a task or activity; can be considered a measure of work overload in that it defines the degree to which schedules seem too tight for activities/jobs; 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 Schriber 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", "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.

We included as well in our framework the dimension of polychronicity, as defined by Bluedorn et al. (1999) the extent to which people in a culture prefer to be engaged in two or more tasks or events simultaneously; and believe their preference is the best way to do things

The cultural dimension of monochronicity and polychronicity were first introduced by Hall (1959) at the level of national cultures. At organizational level a polychronic culture would value behaviors where individuals do several things at once, 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) We could expect polychronicity to be a relevant dimension to investigate since it a workflow system allows to have access and deal with a plurality of information at a time in a constant flux; moreover it allows to be connected and react in a flexible way to the flux of information, activities and queries of people working on the same processes in other departments.

In this study we included other two dimensions drawn from the ethnographic work by Zerubavel (1979) and Barley (1988). The first is the notion of Social cycle, defined by Zerubavel (1979) as a 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. We will briefly recall 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, we adopted the concept 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.

From a methodological point of view, the two dimensions of social cycles within departments and temporal symmetry among departments were investigated through the content analysis of semi-structured interviews gathered within the firms.

Ultimately, we propose the construct of “Expected temporal performance”, which we define as the whole of the expectations expressed by managers with regard to temporal issues, such as process acceleration, changes in people’s time orientations, changes in the temporal dimensions of a departmental culture etc. This aspect was investigated through the content analysis of semi-structured interviews gathered within the firms.

Workflow introduction and time-related assumptions at Alpha, Beta, Gamma: Research Design

The research, currently in course, is designed as a multiple case study (Yin, 2003), coherently with the descriptive and explanatory aim of the research project.

Our research is based on the study of three cases. In all the three companies, which we will call Alpha, Beta and Gamma, a workflow system was introduced or is being introduced, in order to improve processes requiring the coordination of several different organizational departments.

The relevance and significance of these cases to our study is confirmed by the fact that each of them: a) introduces the same type of technology solution b) applies the same type of technology to different processes c) represents different project phases.

While Alpha, Beta and Gamma are three different kinds of companies, they have several key features which make them comparable for the purpose of our study: they are medium sized companies, operating in the service sector; and each of them has at least a 7 years story, which made possible to consolidate a peculiar organizational culture.

The study develops in two phases, having two different objectives: *Phase 1* Investigation of the *temporal performance expected* by the managers adopting the system. *Phase 2* Investigation of the temporal dimensions of culture existing in the three departments *before and after* the introduction of the system.

Data collection

Data is collected through documental analysis, semi-structured interviews with IT and Organization managers, department managers and employees of the three organizations, and questionnaires based on Likert scales addressed to both managers and employees.

We first gathered background information through the analysis of company documents concerning the project and then collected data through semi-structured interviews and questionnaires with the managerial level and with employees.

We interviewed so far from three to fifteen people in two out of three companies and collected 37 questionnaires in one company (one case is complete and research is still in progress in the other two companies).

Table 1. Three cases: a preliminary comparison

	Alpha	Beta	Gamma
Project aim	Managing the complaint management process	Managing the accounting passive cycle	Managing projects
Project sponsor	ICT and Organization dept.	Administration dept.	Organization Dept.
Implementation phase of the workflow system	Completed	In progress	Start up
Number of organizational units	3	3	3
Number of workers involved	37	30	25
Expectations on Temporal performance	1. Speeding up the complaint management process	1. Speeding up the passive administrative cycle process	Research in progress

	2. Reducing temporal misalignment among different departments 3. Shifting from a “batch logic” to a “flow logic” 4. Shifting from “indefinite urgency” assumptions to “definite deadline” assumptions	2. Respecting payments deadlines	
Changes in temporal assumptions	Increase of temporal symmetry Increase of synchronization/coord. Increase of deadline awareness Adjustment of social cycles (partly)	Increase of scheduling Increase of awareness of time use Increase of temporal symmetry Adjustment of social cycles (partly)	Research in progress
Main facilitators	Internal workshop	Internal technical support	
Main constraints		Workflow design and usability (beginning)	

Case I: Alpha - Research results

The first case study was conducted in the Italian branch, employing 350 people, of a multinational manufacturing company. The Italian branch delivers commercial and distribution services to Italian customers. Here, a Workflow System (Lotus Notes) was introduced to improve Customer Service processes, in particular, the Complaint Management Service, the most prominent customer service activity, which requires the coordination of three different departments. As we will describe later, the workflow system was considered critical due to its potential to achieve results related to temporal issues. The company supported the change management process by organizing an internal workshop, held by the IT and Organization manager with the involvement of the department managers, which took place during the design phase in order to share the objectives and optimize the fit between the features of the complaint service process and the new system. The system had been introduced about eight months before the fieldwork started in July 2007, thus the implementation stage was sufficiently advanced to enable us to measure possible changes in the temporal assumptions within the departments.

Expected temporal performance. The analysis of managerial interviews showed that the main objectives inherent the introduction of the workflow system were widely shared and that expectations were very much related to temporal issues. Four expectations, relevant from the temporal viewpoint, turned out to be widely shared by all managers:

1. Speeding up the Complaint Management Process

This meant accelerating the individual activities that make up the process, like the gathering of documentation on the customer's order, collecting information about the specific problem encountered, monitoring the customer's “complaint dossier”, and reducing the overall “lead time” of the process in order to provide faster answers to customers. “Lead time” was a very common expression used and the cross-analysis with the Workshop documentation confirmed it as one of the project's key goals. It also meant reducing duplications and the time needed to produce and store physical documents: “less paper” was a common remark of all managers.

2. Reducing temporal misalignment among different departments

Customer Point operators, who are subject to daily pressure from customers, were far more aware of the delays suffered in providing the customers with answers (“defining the dossier”) compared with other departments, which latter had other priorities and followed their own activity cycles. The workflow system was expected to facilitate departmental “alignments” on priorities and deadlines. This kind of objective can be better explained using Zerubavel's concept of temporal asymmetry: these departments didn't share the same “temporal order”, each of them having its own scheduling and activity cycles, which obstructed the complaint management process.

3. Shifting from a “batch logic” to a “flow logic”

The system was expected to make it easier for people to deal with issues instantly, as they arose and without waiting until they had accumulated a “pile of dossiers” on their desk. As the IT and Organization manager put it. “We want people to change their mentality, from a ‘batch logic’ to a ‘flow logic’, which means dealing with problems and requests as soon as they show up”. These remarks referred to the tendency to organize the activity in recursive “cycles”, occurring in some cases merely once a week (i.e. the storehouse operators were reported as checking the queries coming from the Customer Point only once a week) and also to a preference to do one type of activity at a time (monochronicity). Reduction/ elimination of such cycles and enhancement of polychronicity were the objectives in this case.

4. Shifting from “indefinite urgency” assumptions to “definite deadline” assumptions

Managers reported that the appreciation of the level of urgency of a “dossier” was left to the individual operators, who, based on their experience and willingness, judged whether a complaint case was more or less urgent. There was no sharing of common deadlines for dossier definition and responses given to both internal and external clients: this resulted in a general feeling of uncertainty, well expressed by all managers when they stated that “everything is urgent here”, and that “in general, there has always been a rule that any complaint must be processed within 24 hours”. Managers admitted that it could take up to ten days in some cases.

Changes in temporal assumptions. Data from the employee questionnaires collected in the three departments were triangulated with data from ten in-depth interviews carried out with the four managers and six employees, enabling us to analyze the temporal dimensions of each department’s culture and assess the perceptions of change in these dimensions before and after the introduction of the system. For the purpose of this article we will focus on the analysis of the main changes in the temporal assumptions, following the introduction of Lotus Notes.

Data analysis showed a significant increase in three dimensions - *deadlines and scheduling, synchronization and coordination* and *temporal symmetry* among departments - after the introduction of the system. Deadlines were not perceived as so important before the introduction of the system. Although the respondents reported that there was a belief that “everything is urgent” and a general rule that “overall, all complaint dossiers should be opened on the day the complaint arrives”. Others reported that “we didn’t really think of deadlines, it was more indefinite”. According to the results of the questionnaires, the value of this dimension scored very high eleven months after the introduction of the system. Respondents reported that what really made the difference was the introduction of a formalized classification of complaints based on the expected completion time and the visualization of dossiers flagged by a colored tag, which was visible to the operators of all departments, thus reminding them of the existence of a deadline and that it required alignment among departments.

The introduction of this system of deadlines and of the colored tag “artifact” represented a liaison between departments: using Barley’s concept of *symmetry*, the three units now share a common deadline system and have to meet aligned deadlines, which has increased the overlap among their different temporal orders. The value of *synchronization and cooperation* among departments ranked very high in all three departments and was perceived as having increased significantly because the sense of “teamwork” with the other departments had also increased. Customer Point operators reported that, pre-Lotus Notes, the synchronization with other departments was very poor: other departments were reported as “having their own time”, “creating bottlenecks”, “being slow to give answers”. All the interviewed customer service operators shared the strong conviction that this situation had improved significantly with the introduction of the workflow system because their requests are now transmitted instantly through Notes and the date and hour of the request, as well as the other department’s response, are recorded. On the other hand, operators from other departments reported that the system made it “simpler and quicker to gather and send documents because the databases are now interconnected”.

The increase of these three dimensions confirmed also the achieving of *three expected temporal performances*: the lower level of misalignment among departments, the adherence to defined deadlines, and the speeding up of the customer complaint process.

This kind of evidence would seem to confirm the first hypothesis of the study, that the introduction of workflow systems has the potential to transform the temporal assumptions shared by people in organizational units. Nevertheless, it is important to note 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 with both the innovations introduced by the system and the effectiveness of the workshop as a change management strategy.

To the contrary, the dimensions of *polychronicity* and *sequencing* showed no significant change, while the *social cycles* characterizing the departments revealed contradictory patterns of change.

These dimensions were associated with the achievement of the objective whereby, in performing their activities, workers would *shift from a batch logic to a one-piece flow logic*.

Polychronicity scored low in the questionnaires gathered from all three departments.

When triangulated with the interview data, the result was explained in this way: in all departments the workflow was recognized as fostering polychronicity because all data and documents were stored in a single database, making it “easier to open and close items related to different activities simultaneously, having links immediately available”.

On the other hand, employees pointed out that they didn’t like working this way and that there wasn’t yet a shared belief that this way of working was “better”. High scores of *time allocation* dimension cross-confirmed that there was a feeling of an increasing work overload. Further, when under pressure to deal with overloads, operators shifted back to batch logic: for example, Customer Point operators during phone call peaks (twice a day) interrupted their other activities to concentrate on answering the phone, admitting that “messages in Lotus were left on stand-by”. Another case was when they had a number of administrative tasks requiring high levels of concentration: they adjusted with colleagues in order to divide labor based on specialized activities and followed a monochronic logic. Interestingly enough, as far as *Social Cycles* are concerned, the interviews showed that, though the pressure toward a “flow logic” had increased, operators retained their previous cycles: at Customer Point, the activity is still organized around the “phone call peaks” and four main daily cycles are still in place. This influenced, as pointed out in the previous section, a use of the workflow system that is not yet thoroughly in line with the expected “flow logic”. The same happened in Storehouse and Logistics, where the importance of *sequencing* is a key feature of the departmental culture and where monochronicity is high. Here, operators reported that there had been an adjustment between the social cycles of their activity and the need for more polychronicity: they used to follow a five-six day cycle in complaint management activity: i.e. the “pile of paper” here was left to grow until, finally, they dedicated one entire day to this specific, time-consuming activity. The presence of this cycle expresses the “batch logic” they followed. In addition, this created a noticeable *temporal asymmetry* with Customer Point operators, who were left waiting for answers for up to a week. This department is characterized by another typical *cycle*, the Morning/Early afternoon cycle. In the morning, ordinary activity takes place; at one p.m. afternoon planning starts, while deliveries take place through to five p.m. At present, complaint management has been re-allocated according to this second cycle: Lotus Notes is checked in the morning and, accordingly, complaints start to be checked in a more “flow oriented” logic. This allocation of the complaint management activity to the morning/early afternoon cycle has enhanced the symmetry with Customer Point. In this case, the shift to a “flow logic” has been partly obtained through an adjustment to existing social cycles and to a still strong orientation to monochronicity in departments. To summarize, our findings suggest that the persistence of two temporal dimensions of organizational culture - monochronicity and sequencing - and the strength of the social cycles existing within the departments have influenced the use of the system and the achievement of one important expected temporal performance, the shift to a flow logic. This result seems to support our second hypothesis that temporal dimensions of organizational culture can affect the use of the system, thus having an impact on and even hindering the achievement of the expected temporal performance.

Case II: Beta – Preliminary results

Beta is a company created by a consortium of about twenty banks in northern Italy. It provides full outsourcing services to the banks belonging to the consortium, employing about 250 people.

Our fieldwork in this company, still in course, takes place in a mature phase of the project, where we can investigate consolidated outputs and changes.

In 2003 Beta introduced a workflow system (docflow) aimed at managing their accounting passive cycle (the whole process leading to suppliers payments), which is, in this company, the most prominent accounting activity since they have a lot of suppliers but very few customers (i.e. banks forming the consortium). This process requires the coordination of three different organizational units: two different offices within Administrative Department, and Purchasing department.

Expected temporal performance.

The analysis of interviews with the managerial level showed that in this case the objectives inherent the introduction of the workflow system were partly related to temporal issues. In this project attention and expectations were initially focused on reducing the production, duplication and storage of physical documents (“reducing paper”); another priority was to create a logical flow in order to decrease information redundancy, and finally to improve quality and reliability of data gathered by administrative department. In this case, compared to the previous one, managers showed a lower level of awareness about the potential of the system from a temporal point of view.

This lower level of awareness is expressed by a poorer articulation, compared to Alpha, of possible time-related objectives going beyond the “speeding up” issue.

Two objectives in this project were explicitly addressed to temporal issues:

1. Reducing the duration of passive administrative cycle process

This was explained as the need to reduce the overall time during which suppliers invoices moved around from one office to another before being paid.

The process required that invoices, once arrived via mail or fax to one of the two offices within Administrative department, were duplicated and sent to buyers operating at the purchasing department (who were responsible for specific contracts with suppliers) for technical check and authorization to payment. Another duplication was sent to the other administrative office for the checking of contractual conditions. During this double check and authorization process, invoice copies could either be left standing by until checks were completed, or move back to the first administration office with a request for keeping the payment suspended, or move back with authorization to payment. The duration of the whole process was described as “*unpredictable*” and it was often difficult to make out why an invoice hadn’t come back and which office was keeping it suspended. For the same reason it was difficult to inform creditors about the state of their payments. Thus the workflow system was expected to speed up the process: partly because of new electronic format of dossiers related to invoices and the possibility to track them along the process, partly because it could facilitate departmental “alignments” on priorities and deadlines.

This kind of objective can be better explained if we refer to the concept of *Awareness of time use* : there was an overall unpredictability of duration of the process for many reasons: lack of awareness of how long each one would take to complete his own check, lack of awareness of reasons why there were delays and in which part of the process. Another aspect of this objective can be related to Zerubavel’s concept of *temporal asymmetry*: the different units, buyers in particular, didn’t share the same “temporal order”, each of them having its own scheduling and activity cycles, which obstructed and made the duration of the process unpredictable.

2. Respecting payments deadlines

Unpredictability of the duration of the process caused delays, which made it difficult for administrative operators to be punctual in meeting payment deadlines. Even if deadlines were set within contracts, administrative operators had to work hard to compensate for delays; moreover, it was difficult to give creditors timely information about the state of their payments.

Changes in temporal assumptions.

We are not able to give a complete account of this case, nor to confirm our hypothesis yet because data collected in this company so far are not complete. Data analysis of the interviews collected so far with managers and employees who are still working in the company and can account for the changes occurred after the introduction of the system, allow us to present only some preliminary results.

A significant increase is perceived by interviewees in three time-related dimensions – *scheduling*, *awareness of time use*, and *temporal symmetry* among departments - after the introduction of the system. On the other hand, *social cycles* seem to have only partly changed.

As far as *Scheduling* is concerned, the workflow introduced and made visible a clearly structured sequence in the process. The operators reported that structured scheduling is now perceived as very important because all operators can locate at what point, in the temporal domain of the process, a single invoice is and what is its advancement state. As administrative operators put it “Now I can see where invoices are and who is in charge for it at any given moment” The increased importance attributed to a more structured schedule reduced as well the feeling of uncertainty about the ongoing of the process, expressed by sentences like: “I feel more in control” “Now the process is under control”.

Every action in the process being tracked, *awareness of time use* seems to have increased because everyone can check how long it takes to everyone else to complete his “to do list”. As an administrative employee put it, “information about ‘bottlenecks’ is now transparent”. Moreover, the system sends automatic warning mails when a due action is not completed, contributing to awareness of one’s own time use as well. As far as *Social Cycles* are concerned, it turned out that, before the introduction of the workflow, both buyers and administrative employees followed a similar rule : the so called “bunch rule” which meant that they would care after invoices payment process when the bunch of invoices was thick enough. This rule is similar to the “pile of dossiers” rule in the previous case. This rule gave rise to cycles which could last from one to two weeks for buyers, while administrative employees followed a one/two days cycle during ordinary periods of the year (when not under pressure for other important tasks, i.e. closing balance sheet). This created *temporal asymmetry* between buyers and the other units. Interviewees reported that these cycles have partly changed: administrative employees state that their activity is now generally driven by the “to do” proposed by the system. Buyers have partly modified their routines, due to the fact that access to electronic documents and data about invoices is much easier than before. Their activity has other priorities, thus many of them continue to take care of this process periodically. Interesting enough, both groups reported that they developed a sort of “bridge” between their different temporal orders based on the artefact of “urgent query”: when requested, buyers are much more flexible and quicker than in the past to give answers on specific and urgent issues blocking a payment. They recognized this “bridge” is now possible because they can have easier access to workflow data wherever they are.

Preliminary conclusions

Despite its importance to temporal issues, research into the temporal impacts of information technology in organizations is still limited. On the other hand, organizational culture research shows that the way time is perceived and collectively organized reflects cultural assumptions that are an expression of the specific organizational setting (at firm, departmental, group level), underscoring that cultural assumptions are an important contributory factor to the strength and direction of organizational change. In this contribution, we have investigated the role ICT can play in promoting changes in the temporal dimension of organizational culture, and sought to assess whether temporal assumptions can affect the way a new system is used, thus facilitating/hindering the achievement of the expected results. The preliminary results of this multiple case study show that managers have different levels of awareness about potential temporal performance of the system.

Case Alpha covered four types of ‘temporal performance’ management expected to see thanks to the introduction of a workflow system. In Case Beta managers showed a lower level of awareness about the potential of the system from a temporal point of view. This lower level of awareness was expressed by a poorer articulation, compared to Alpha, of possible time-related objectives going beyond the “speeding up” issue. Both cases showed that, after its introduction, the temporal dimensions of the organizational culture of the departments involved showed some significant changes, which seems to confirm hypothesis 1 of the study, but also some contradictory effects that seem to confirm hypothesis 2. In case Alpha, significant increases were seen in three dimensions - synchronization and coordination, temporal symmetry, deadlines and scheduling. The increase of these dimensions confirmed the achievement of the three expected temporal performances: the reduction of the misalignment among departments, the shift to definite deadlines, and the speeding up of the

process. This seems to support the first hypothesis of the study, that the introduction of workflow systems helps transform the temporal assumptions shared by people in organizational units. It is important to remember that the system was introduced in tandem with an internal workshop involving the managerial level and that the results reported here were associated by respondents with both innovations introduced by the system and the workshop. Nevertheless, the assumptions underlying the objective that workers would shift from a 'batch logic' to a 'flow logic' in performing their activities failed to show any significant change: data analysis shows that the persistence of two temporal assumptions - monochronicity and sequencing - and the power of the social cycles existing within departments influenced the expected use of the system and the achievement of one important temporal performance, the shift to a flow logic. This supports our second hypothesis that temporal dimensions of organizational culture can affect the use of the system, thus hindering the achievement of the expected temporal performance. Preliminary results from Case Beta also seem to confirm that significant changes were seen in three temporal dimensions - scheduling, time awareness and temporal symmetry. It seems remarkable that in this case these changes can't be considered as planned results but rather as unexpected consequences of the workflow introduction .

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