Association for Information Systems
AIS Electronic Library (AISeL)

AMCIS 1996 Proceedings

Americas Conference on Information Systems (AMCIS)

8-16-1996

Impacts of Information Systems on the Temporal Order of Organizational Work: An Exploratory Study

Heejin Lee
Department of Information Systems, London School of Economics and Political Science, leeh@lse.ac.uk

Impacts of Information Systems on the Temporal Order of Organizational Work: An Exploratory Study

Heejin Lee
Department of Information Systems
London School of Economics and Political Science
Houghton Street, London WC2A 2AE, UK
E-mail: LEEH@LSE.AC.UK

1. Introduction

Time is one of the most fundamental dimensions of human existence along with space. Our life is so firmly embedded in time that we often do not recognize it. We take time for granted as if it were purely natural. However, time is as social and cultural as anything else such as rituals and customs. As such, time may interact with, and be affected by anything that makes up the social world. Information technologies have become an essential part of our everyday life. Not a day passes unaffected by information technologies. Impacts of information technologies on individuals, work groups, organizations, and further society are enormous. Because time is a social construct, and information technologies dominate every aspect of organizations, time is shaped by information technologies in organizations.

This project examines how information technologies, here an EDI application, affect temporal orders in organizational work. These have been investigated in trading companies in Korea. We need more concrete knowledge about temporality and information technologies if we are to develop sound information systems which fit in with our culture of working life. And we need to know how people in organizations cope with such changes in temporality caused by information technologies, reorganizing their time. This project attempts to answer these questions.

2. Literature review

This research has its origin in the semiotic approach to organizational information systems (Stamper, 1973; Liebenau and Backhouse, 1990). Semiotics is the study of signs. In the study of organizations, semiotics considers organizations as systems in which signs are used to get work done. The information system is in its own right a message, a cultural phenomenon (Stamper, 1973, p.109). Semiotics has four major branches in which we can consider different properties of signs respectively; pragmatics, semantics, syntactics, and empirics. They represent a range from the most social to the most technical aspects of communication. The relationship between culture and information systems is dealt with in the branch of pragmatics. One of questions which pragmatics addresses is how culture is affected by information technologies. Stamper employed the evaluation framing from an anthropological work (Hall, 1959). It provides a systematic way of analyzing cultural impacts when a new technology is introduced to an organization. In Hall's usage, there are ten general aspects of culture; association, subsistence, gender, territoriality, temporality, learning, recreation and human, defence, exploitation, and interaction. Stamper suggests that we need to examine those aspects in order to understand cultural implications of a specific information system in an organization. This temporal research shares the aim to understand how information systems affect culture, that is, the way we live, more specifically the way we work in organizations.

There is little research which directly investigates the effects of information technology on temporal aspects of organizations. My literature review revealed only two relevant studies (Barley, 1988; Failla and

Bagnara, 1992). Failla and Bagnara focus on the relationship between time in decision making and information technology. The introduction of information technology causes profound changes in the time-frame patterns of the decisionmaking process. These changes are not limited to decision-making processes. Information technology eliminates rigidity in work rhythms, giving flexibility. The organization of work is increasingly becoming less rigid in terms of time-patterns. This is especially true in the case of professional work performed in offices with information technology support. The applications of information technologies to knowledge-based activities generates work methods that cut across the 'traditional' sequence of events, changing the duration customarily regarded as 'appropriate'. The effect of these changes is to disrupt the traditional work rhythms. In this sense, information technology helps to eliminate or diminish the importance of time-frames generally accepted as appropriate for performing a given activity (Failla and Bagnara, 1992, p.678). The impacts of information technology on time assume different patterns depending on the stage in the development of information technology as applied to the automation of routine activities, decision support technologies, and virtual reality technologies. Each stage has a different meaning in terms of time.

While Failla and Bagnara remained at a conceptual level, Barley empirically studied how technologies alter the temporal order of radiological departments in hospitals. There are two different ways to organize time: doing one thing at a time and several things at once. The former is called a monochronic culture; the latter a polychronic culture. In a monochronic culture people seek to structure activities and plan for events by allocating specific slots of time to each event's occurrence. In a polychronic culture individuals place less value on temporal order, tend to accept events as they arise, and engage in multiple activities simultaneously (Barley, 1988, p.158). All new computer-based radiological technologies enhanced the temporal symmetry of radiologists' and technologists' work by restructuring the duration, sequence, temporal location, and rate of recurrence of events in the radiologists' day. The monochronicity of the radiologists' world increased. Thereby the radiologists' experience became more closely aligned with the flow of the technologists' work. Furthermore the symmetry contributed to the decreased conflict between radiologists and technicians, and changed the social relationships between them.

3. Research method

This research employs the case study method. There are many advantages of the case study in information systems research (Benbasat, 1987). One of them is that a case approach is an appropriate way to research an area in which few previous studies have been carried out. As revealed in the literature review, time itself has been rarely explored in organizational studies as well as in the information systems research. Little is known about time and information technologies. For such unexplored subjects, the case study method helps us discover new concepts and relationships between them for further research.

Case studies were conducted in three companies (2 trading companies and 1 exchange bank) participating in the trade automation project in Korea, KTNET. It is an EDI application. It has radically changed procedures for import and export in trading companies and banks. This project traced changes in temporal orders of organizational work caused by the new EDI technology.

4. Dimensions of temporal order and some propositions

Information technologies are generally said to speed up the flow of work processes and, thereby allow us to save time. However, that is all the knowledge we have about the relationship. We do not know what happens other than the speeding-up and the time-saving. The project was designed to illuminate more concrete aspects of temporality and information technologies in organizational work.

To investigate how information technologies affect temporality in organizational work, we first need to know what constitutes temporality. That is, for an analytical purpose, it is necessary to devise a set of variables which help to understand various aspects of temporality. I name them 'dimensions of temporal order'. From Zerubavel (1981) and Barley (1988), five temporal dimensions were selected to investigate temporal changes in working processes of trading companies.

- Duration is concerned with the amount of time devoted to a task or activity.

- Sequence refers to the order in which activities and tasks take place.

-Temporal location concerns the location of activities and tasks at particular points over the continuum of time.

- Deadline is the fixed time by when work should be done.

- Cycle refers to the periodic regularity in which work is completed repeatedly.

Data were collected by internal documents, interviews, and observations. At the beginning of the field work, I collected as much material (primary and secondary) as I could to enhance my knowledge of work procedures in the companies. At the same time, I made open-structured interviews with IS persons in charge of the KTNET implementation in their own companies, focusing on how work was changed by the new technology. Then semi-structured interviews were conducted with workers whose work was affected. Observations played a complementary part.

Having investigated changes in dimensions of temporal order, I gained the following initial findings. They will be analyzed in detail as the research goes on.

1> KTNET increases flexibility in organizational work.

2> Internal flexibility does not guarantee external flexibility.

3> KTNET tends to increase the polychronicity in a work place.

4> The implementation of KTNET requires a temporal readjustment among the organizations concerned.

5> Changes in social relations in organizations are also observed in some areas.

5. Expected contributions

This project will bring a detailed account of the relationship between temporality and information technologies, not just simple knowledge of how much the speed of work is accelerated and what amount of time is saved. It will help us to understand concrete patterns in which information technologies affect temporal order in a work place.

In addition, it will contribute by increasing our knowledge of cultural impacts of information systems in organizations. The knowledge in turn will contribute to the successful implementation of information systems. It is said that many systems have failed because developers and systems analysts did not take into account social, political, or cultural aspects of information technologies in organizations, and it is recommended that they should take them seriously when implementing information systems in organizations. However the recommendation has so far remained just a principle. There has been little work to be consulted, especially for cultural impacts of information systems. Even a little knowledge of how information technologies shift the temporal order in organizations will contribute to the development of effective information systems.

References

Barley, S.R. "On Technology, Time, and Social Order: Technologically Induced Change in the Temporal Organization of Radiological Work," in *Making Time: Ethnographies of HighTechnology Organizations*, F.A. Dubinskas (ed.), Temple University Press, Philadelphia, 1988, pp. 123169.

Benbasat, I., Goldstein, D. and Mead, M. "The Case Research Strategy in Studies of Information Systems," *MIS Quarterly* (11:3), September 1987, pp. 369-387.

Failla, A. and Bagnara, S. "Information Technology, Decision, Time," *Social Science Information*, (31:4), 1992, pp. 669681.

Hall, E.T., *The Silent Language*, Doubleday, Garden City, 1959.

Liebenau, J. and Backhouse, J. *Understanding Information - An Introduction*, Macmillan, London. 1990.

Stamper, R. *Information in Business and Administrative Systems*, Wiley, New York, 1973.

Zerubavel, E. *Hidden Rhythms: Schedules and Calendars in Social Life*, The University of Chicago Press, Chicago, 1981.