Transnational Information Systems: Development and Management Issues

PAUL MANTELAERS, Delft University of Technology, The Netherlands
WANDER VAN DEN BERG, Delft University of Technology, The Netherlands

An increasing number of transnational information systems (TIS) is being developed and operational. This paper describes a study that attempted to gather information from an empirical setting as a basis for theory building. The authors have studied three cases in an attempt to take some early steps towards guidelines for the development and management of TIS. General conclusions based on the analysis of the three cases are drawn.

Introduction

The Problem

Transnational information systems (TIS) are systems that cross national as well as company borders. Development and management of TIS is not straightforward. The inter-organisational and international nature of these systems may introduce various organisational and technical problems. One major reason for this may be that the participants are independent in most aspects and autonomous with regard to their own proprietary information systems. Another potential cause of difficulties is the international context, which introduces cultural, legal and language difficulties among participants.

However, the globalisation of the economy gives rise to an increasing demand for information systems that transcend national boundaries. Developments in information and communication technology now make it possible to support many processes and tasks that cross company and national boundaries. Alternatively, economic and political developments create demand for TIS. This demand is clearly evident within the European Union in the context of a European market for persons, goods, capital and services. Similar developments can be seen on a global scale due to increased internationalisation.

As to their international and interorganisational dimension, most individual TIS are being developed up to now on an ad hoc basis. Currently there are no known general techniques, tools or guidelines to help develop and manage TIS. Practical experience and empirical research, however, show that many problems and solutions at first glance appear to be specific to a particular development effort, but often they are not unique at all. As the needs and opportunities for TIS become more prevalent, the call for generalised knowledge and guidelines increases. Organisations want to know how to avoid difficulties and, if problems should occur, how to address them. Organisations that consider to use, develop, manage, or participate in TIS may benefit from the availability of structured “dos and don’ts.”

The Literature

Studies addressing the combined trans-organisational and trans-national IS setting are lacking. There is, however, a stream of literature concerning the development of information systems linking parts of multi-nationals located in different countries (Deans and Kane, 1992; Palvia and Palvia, 1994). Apart from research about global systems there is also a substantial body of writing about systems crossing company boundaries. Much of the early discussion about interorganisational systems (IOS) focused on competitive benefits of developing IOS (Porter and Millar, 1985) and on facilitating and inhibiting factors in the development process (Reich and Benbasat, 1990). More recently research has taken on a more realistic approach, pointing out that not all IOS provide benefits to all participants (Webster, 1995), that IOS may involve risks and conflict (Kumar and van Dissel, 1996) and that IOS involve management of relationships among participants (Meier, 1995).

The general impression is that, findings from literature on IOS and global systems are relevant for TIS. The combination of systems crossing organisational as well as national
boundaries has hardly been mentioned in the literature. The use of IT in TIS is a fairly recent phenomenon and this may explain the dearth of research in this area.

**Outline of the Paper**

This paper describes a multidisciplinary case study into three cases regarding TIS development and management. It is an attempt to take some early steps towards guidelines for the development and management of TIS. In view of the fact that very little existing research is available about TIS, this study focused on gathering information from an empirical setting as a basis for theory building.

The paper proceeds as follows. First, the research approach will be lined out and the three cases will be discussed briefly. Then, the main TIS issues and other issues that emerged during the research are summarised. In the last paragraph a few concluding remarks are added.

**Research Approach**

Within the public sector in the European Union alone, about 30 TIS are operational or under development (Kroon, 1997). Experience and knowledge based on these systems tend to remain within the organisations involved unless an attempt is made to collate and generalise the lessons learned by individual organisations. For this reason it was decided to conduct an empirical study addressing a wide range of TIS issues in order to present this accumulated experience and knowledge to other interested parties, as well, using inductive case research methods and employing a multi-disciplinary research team.

**Issues to be addressed in an Empirical Study**

One way of studying TIS issues is to distinguish issues in the informational, organisational and institutional domains. Parsons (1960) first discussed these distinct but complementary areas of responsibility and control; he argues that they are three quite separate domains within an organisation. We adopted this concept to categorise difficulties and potential solutions during the process of development and management of TIS. Parsons used the term ‘technical domain’ to denote the technical suborganisation; we have changed the term to ‘informational domain’ to underline the fact that this area of attention concerns data, procedures and people as well as the technical aspects of hardware, software and communications. Organisational issues refer to TIS-induced adaptations of organisational structures, business processes, regulations, skills, standards and ways of working. Institutional issues concern policy identification, political or competitive power struggles, role models as well as the formulation and development of decision-making arrangements among participating organisations to ensure that the new order is accepted, adhered to and continues to operate effectively.

A second dimension for studying TIS issues concerns the various phases of the systems development process—from identification of the need for a TIS through to the management of an operational TIS. Various authors (Turner, 1988; Martin, 1989) provide different names for separate development phases, divide the system development process into different numbers of phases, and describe the development process with or without iteration and feedback loops. However, authors generally agree that (1) the need for a system should be identified and requirements drawn up; (2) logical and physical design and building of the system has to take place; (3) the system has to be implemented; (4) the operational system has to be managed, updated and adapted over time. We used these four phases to categorise difficulties according to stages of TIS development.

A third way of looking at the TIS area is to determine whether TIS issues lie in the interorganisational domain or the international one. A question was whether the same or similar difficulties would arise if the system would be developed on a national basis (inside a particular country), that is, without any complication as results from the international setting of the relevant information systems. It was important to determine whether TIS problems are caused primarily by the international dimension or by the fact that TIS require cooperation among and coordination of multiple autonomous organisations.

**Case Studies as Research Method**

Case research was selected as the appropriate research method. Carrying out a number of case studies would provide rich data which is important in the process of theory building (Yin, 1994). Observation of phenomena and relationships in a variety of settings forms the basis for conceptualisation and generalisation. Hence, studying the development processes of existing TIS—being guided by existing constructs, keeping an open mind to uncovering new relationships, and subsequently conceptualising from finding—is a sound method for formulating guidelines for TIS development and management.

Selection of cases was based on several criteria. Cases had to concern TIS but had to be sufficiently dissimilar to provide a rich picture of the problem area. Hence, cases were included from the private sector (TAPS), the public sector (TRANSIT) as well as a mixed sector case (EUCARIS). The focus in these three cases was on computerised transnational systems. TIS in the cases had to support a primary process in the organisations and cases had to involve systems that were operational even if only in an early version. Cases need not be highly successful; in fact we preferred to have cases which had encountered or were facing difficulties. An additional criterion was the requirement that organisations had to be willing and able to participate in the study. The researchers had no relation with the developing organisations.

**A Multi-Disciplinary Research Team**

Since this was an exploratory study, it was decided to