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**Article (Accepted version)
(Refereed)**

Original citation:

Pouloudi, Athanasia and Whitley, Edgar A. (1997) *Stakeholder identification in inter-organizational systems: gaining insights for drug use management systems*. [European Journal of Information Systems](#), 6 (1). pp. 1-14. ISSN 0960-085x

DOI: [10.1057/palgrave.ejis.3000252](https://doi.org/10.1057/palgrave.ejis.3000252)

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Available in LSE Research Online: January 2015

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***Stakeholder identification in interorganizational systems:
gaining insights for drug use management systems***

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Latest update: July 24, 1996

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Abstract:

Interorganizational systems operate in an area where there are many interested parties. If the views of these interested parties are not explored and taken into consideration before and during the development of an interorganizational system, it is likely that the implementation of this system will be disappointing. This paper describes one approach to exploring these views through the use of stakeholder analysis. More specifically, it describes how to identify the stakeholders, a process that has been overlooked in the stakeholder analysis and interorganizational systems literature, and examines the perceptions of a number of stakeholders in the drug use management field in the United Kingdom.

Introduction

It is well documented in the information systems literature that the development of an information system normally requires the participation of a number of interested parties and the extent and effectiveness of their participation is likely to influence the success of the resulting system (e.g. Mumford & Weir, 1979; Checkland & Scholes, 1990; Cavaye & Cragg, 1995). Typically these participants include the developers and users of the proposed new information system. However, there is a broader range of people, groups or organizations who are interested in the development of the information system, are likely to be affected by its use or are in a position to influence its development. This broader range of 'stakeholders' is particularly evident in the case of interorganizational

systems as these exist across organizations and therefore are influenced by more loosely defined actors. Identifying these stakeholders and exploring their perspectives is a complicated task but essential in our view for understanding the complexity of the interorganizational context.

The aim of this paper is to enhance our understanding of this disparate context which affects the development and implementation of interorganizational systems by considering a range of participants or stakeholders broader than those previously considered in the information systems literature (e.g. Galliers & Sutherland, 1991; Lee & Gough, 1993; Ruohonen, 1991). In particular, our understanding of stakeholders is based on Freeman's definition, according to which "a stakeholder in an organization is any group or individual who can affect or is affected by the achievement of the organization's objectives" (Freeman, 1984, p. 46). Since we are looking at interorganizational information systems, we consider in particular individuals, groups and organizations who can affect or be affected by the interorganizational system under study.

As an example, we use the area of drug use management, where information systems are being increasingly used both to manage information on patients, on drugs and on the costs of drugs and to monitor and evaluate the effectiveness of drug use policies. Such information systems may be developed to serve the purpose of particular organizations: insurance organizations wishing to minimise costs, hospitals managing tight budgets or government health agencies seeking the most effective health care provision. As a result, the computer based information systems used in the domain vary significantly in terms of size, scope, complexity, types of organizations involved and area of application. Examples of systems include pharmacy management systems within hospitals, sophisticated on-line prescription systems for family doctors (GPs), EDI links between drug manufacturing companies and pharmacies and the PACT (prescription analysis and cost) system which gathers, compares and reports on prescribers' habits.

In the following section we review the different ways that information systems researchers have considered the participants in systems development. It shows that as the focus moves from small scale, internal systems to strategic and interorganizational systems, the range and importance of interested parties increases, but suggests that all too often the role of many of these parties is ignored. We then discuss the inadequacies of other stakeholder analysis approaches in identifying stakeholders. Using insights from other theoretical perspectives, such as the network approach (e.g. Axelsson & Easton, 1992; Håkansson, 1987; Håkansson, 1989), which have influenced the study of interorganizational systems we suggest a more rigorous approach to stakeholder identification. This approach is then used to identify the stakeholders who can influence the development of drug use management systems. In so doing, we also highlight the complexity of the existing situation. Finally, we discuss the benefits and shortcomings of the proposed stakeholder identification process and suggest further steps for stakeholder analysis in the context of interorganizational systems.

A review of participants and stakeholders in information systems development

The notion that successful information systems can only be developed in conjunction with a range of 'interested parties' is nothing new and the benefits of doing so normally become apparent when the systems move away from being experiments with technology and attempt to become integrated in an organizational setting (Whitley, 1991). We wish, however, to draw attention to the difference between the participants in the information systems development process and stakeholders. Participants are taken to be individuals, groups or organizations who take part in a system development process. We define stakeholders as these participants together with any other individuals, groups or organizations whose actions can influence or be influenced by the development and use of the system whether directly or indirectly. In order to demonstrate this difference, we present in this section a brief review of the main forms of information systems

development that currently exist, highlighting the participants (and the stakeholders) in each form of system development.

The development of small systems

Small systems are taken to be systems that help support some part of the work of the organization, without being fundamental for the whole organization. For example, a system that tracks the details of postgraduate applications for a university department may be considered to be a small system as it is only used by the department and has no formal links to other parts of the organization.

These types of systems are typically developed by a small project team which may consist of a system programmer, a manager (problem owner) and representatives from the target user group. Such a project will typically have been agreed by the managerial level of the user group and will be undertaken within a limited budget and timescale. The participants in the development process are explicitly known and there are unlikely to be other stakeholders who have any real influence (although they may have been more visible in getting the project approved originally).

Organization wide systems

Organization wide systems are qualitatively different because the services they provide underpin the entire operations of the organization. Therefore, while the small scale system may be readily accepted by a user group because it is tackling a particular problem they face, organization wide systems are more likely to face resistance to change. One reason can be that some parts of the system may challenge existing power structures (Keen, 1981).

The issue of resistance to change has been explicitly addressed in the information systems literature, particularly within the socio-technical approach (e.g. Mumford & Weir, 1979; Land, 1982; Land & Hirschheim, 1983), which advocates that the basis of support for a system can be broadened by soliciting and incorporating a wider range of opinions. Thus, for example, the ETHICS method (Mumford & Weir, 1979; Mumford, 1995) seeks to empower the users of the new system so that they can design the kind of work environment they will feel happy using (or cannot so easily reject, since they designed it).

Similarly, in soft systems methodology (Checkland, 1981; Checkland & Scholes, 1990; Stowell, 1995) the perceptions of a wider range of interested parties, not just users, are recorded and form the basis for the description of a new system. The resulting 'rich picture' that describes the problem situation is then used as the basis for the system requirements. Whilst soft systems methodology does not label these people as stakeholders, within our definition they are.

Both ETHICS and soft systems methodology attempt to widen the purely technical side of the systems development to include further internal stakeholders -in the case of soft systems methodology also to external parties with an interest in the system. Whilst these approaches broaden the notion of information systems stakeholders beyond those active involved in the system's development, they tend to concentrate on those stakeholders whose opposition to the system can result in the system being abandoned.

Strategic information systems

Implicit in the previous section was the view that developing an organization wide system is beneficial. Reaching this decision is not always easily done and, in many cases, may result in the organization needing to fundamentally re-evaluate its key business processes (Hammer, 1990). In such cases, the development of large scale integrated systems becomes a strategic decision. The conventional wisdom over recent years has been that whilst information technology can be a strategic asset, deciding on where the strategic advantage lies and in which way the strategy should be developed is one which cannot be left purely to the information technology function (Earl, 1989; Porter & Millar, 1985; Galliers & Sutherland, 1991; Galliers, 1993). Typically, strategy development requires a combination of good technical skills, an understanding of possible technological developments and a firm grasp of the nature of the business. Thus the decision making process involves a wider range of stakeholders than the previous stages. At this level questions cannot be answered on the basis of current work processes and technology alone. Thus, whilst an organization-wide information system that brings operational benefits to the business (e.g. computerization to enhance productivity and automation of processes) affects mainly those involved in the work process, strategic use of information technology should also include a thorough understanding of opportunities and threats in the broader business environment (Galliers, 1993).

Interorganizational systems

At present, most strategy development focuses on changing the information handling practices of an individual organization, but there are increasing trends towards examining interorganizational links which are both enabled and prompted by the development of telecommunications technologies. The primary example of this at present is the

increasing use of electronic data interchange, to the extent that it has now become, at least in some sectors, a strategic necessity rather than a source of competitive advantage (Benjamin *et al*, 1990; Meier, 1995; Reekers & Smithson, 1996).

In these situations, the question of who participates in the information systems analysis and development process becomes more difficult to address as the decision is no longer an internal one. Problems of resistance to change and motivation to participate in information systems development become qualitatively different when applied between organizations (Cavaye, 1995a). Staff may be persuaded that using a new system is best for the operation of their organization, but may not be so easily convinced if the benefits are accrued by other organizations.

Participants or Stakeholders?

The information systems (in the broad sense of the word) described in the previous sections were either contained within the organization or between consenting organizations. Increasingly, however, there are interorganizational systems which are too complex to fit into any of these existing system development models.

For example, the drug use management process in the United Kingdom, and the information systems to support it, are larger than any individual organization or organizations. The process is made up of many different actors, some who have consenting relationships (for example, between drug suppliers and hospital pharmacies), some who have statutory relationships (for example, between the prescription pricing authority and the drug dispensers) and some who have no direct relationship at all. However, each of these stakeholders is to some degree inextricably intertwined with the others and cannot act independently. This is due to the peculiar nature of the drug use management domain, whereby those who order the drugs (prescribers: hospital doctors,

GPs, nurses) are different from those who consume the drugs (patients) and different from those who are charged for their use (third party payers, such as insurance companies).

As a result, the number of stakeholders involved in system development and use is far greater than that of most traditional organizational systems. Moreover, because the interrelations of these stakeholders are complex and often indirect, they are all to a greater or lesser extent in the position to influence—and at the same time be affected by—the function of an information system in the domain. An illustrative example is the recent establishment of NHS-wide networking, an interorganizational network which has been developed to improve the electronic exchange of information between the members of the British National Health Service (NHS Executive, 1994b). However, use of the network is currently boycotted by the doctors, who believe that their patients' privacy is at stake (Davies, 1996).

In the following section we suggest a method for identifying these stakeholders, so that their different perspectives can be understood and used for a more realistic interorganizational systems development.

Stakeholder identification

There is a broad divergence of views in the literature as to who should be considered a stakeholder. This is related to the fact that different researchers or practitioners use stakeholder analysis for different purposes or in a different context. For example, Freeman (1984) and Eden and van der Heijden (1993) use the concept of stakeholders primarily as a tool for examining the external environment of a given organization. This is expected to assist managers with strategic decision making. Wood *et al* (1995) suggest

the use of stakeholder analysis in combination with other analysis approaches as part of an interpretive framework for business process reengineering. Preston and Sapienza (1990), Goodpaster (1993), Evan and Freeman (1993), Jones (1995) and others argue that stakeholder analysis is an ethical alternative to serving exclusively the interests of an organization's shareholders. In the information systems literature, the emphasis is often on communication problems within the organizational environment; hence, many authors refer to the different objectives of systems developers, decision makers, and other user groups which are the stakeholders they consider (e.g. Galliers & Sutherland, 1991; Lee & Gough, 1993; Ruohonen, 1991; Lacity & Hirschheim, 1995). What is common in these different approaches to stakeholder analysis is that they fail to provide a practical technique for actually identifying stakeholders.

While in many cases even a definition or a specification of who the stakeholders are is omitted as self-explanatory (e.g. Galliers, 1995), other approaches base their analysis on either a list of stakeholders that are specific to a given context or suggest a checklist that includes different, usually generic, types of stakeholders, a list which is implicitly considered to have universal value. In the first case, as for example in the OPADE project (Venot *et al.*, 1992) where the patient, the prescriber, the care provider, the manager, the community pharmacists and the hospital pharmacists are identified as some of the main stakeholders in the prescribing process, there is hardly an indication of how the particular stakeholders have been identified. Similarly Savage *et al* (1992) list a number of "typical key stakeholders of a rural hospital" in the United States but do not explain how these were identified. In the second case, the identification of stakeholders rests on the identification of broad categories of internal or external actors that are taken to be valid for all organizations (e.g. Richardson & Richardson, 1992; Hill & Jones, 1992; Wallace, 1995). Freeman (1984) goes a step further, suggesting that a generic stakeholder list should eventually lead to the identification of specific stakeholders (e.g. competitor A and competitor B rather than 'competitors'). While in both cases the importance of

identifying the stakeholders is recognized, the stakeholders emerge as the end product of a process of stakeholder identification which is not explained.

One of the major problems of the lack of a systematic stakeholder identification approach is that generic stakeholder lists are not appropriate for all contexts. For example, generic stakeholder lists would fail to identify all relevant information systems stakeholders, first because distinct stakeholder groups such as the systems' developers and users are not included on the generic stakeholder groups suggested in the strategic management literature and second because:

“[I]n the literature, IS stakeholders fall into three main groups: users, management, and IS professionals. Unfortunately, this classification is much too coarse and, in most cases, inadequate, as it conveys the role prescriptions associated with the design of an IS. It does not reveal the actors' actual interests with regard to IS; instead, it focuses on intended and observable aspects, ignores conflicts inside these three groups (cf. Markus 1983; Kling & Iacono 1984; Franz & Robey 1984), and provides a much too simplistic view of the IS and how it affects an organization's members' interests” (Lyytinen & Hirschheim, 1987, p. 262).

It is worth noting that the only significant attempt at a more systematic approach to stakeholder identification comes from Lyytinen and Hirschheim (1987) who suggest four criteria to guide the stakeholder identification process: (1) the nature of information systems, i.e. more stakeholders can be identified if the information system is seen from different perspectives: symbolic, communicative and organizational dimensions of the system are as important as the technological dimension (2) the type of relationship of the stakeholder to the information system, (3) the direct or indirect 'depth of impact', (4) the level of aggregation which may vary between individual, groups or larger collectives. In a later paper, Lyytinen (1998) adds the external vs. internal dimension as a fifth criterion.

In the interorganizational systems literature, the criteria that have implicitly been used are the second and third, as researchers have concentrated in two distinct groups of stakeholders (even though the term stakeholder is not necessarily used): those initiating and sustaining the systems ('hubs' or 'sponsors') and those participating ('spokes' or 'adapters'). This distinction is very useful for studying the different roles of these groups, the different advantages they accrued or expect from the interorganizational systems as well as the different options that they have in setting their strategic direction (e.g. Webster, 1995; Reekers & Smithson, 1996; Cavaye, 1995b). However, the distinction between 'hub and spokes' is not applicable in all interorganizational systems applications and is particularly inadequate in complex domains, such as that of drug use management.

One approach that has been used as a theoretical tool for the study of interorganizational systems (e.g. in Cunningham & Tynan, 1993; Reekers, 1995) is the network approach, which has been used in the social network literature (e.g. Knoke & Kuklinski, 1982; Scott, 1991) and in the industrial network approach (e.g. Axelsson & Easton, 1992; Håkansson, 1987; Håkansson, 1989). This is very relevant for interorganizational systems because it focuses on the broad network of relationships between firms rather than on a single firm or individual relationship. In particular, the network consists of three closely interlinked components: actors, resources and activities. Some important characteristics of this approach, which are relevant to our discussion of stakeholders, are the premises that a network is heterogeneous, dynamic, "stable but not static" (Easton, 1992, p. 23) and as such, that it "always contains an element of both cooperation and conflict" (Håkansson, 1989, p. 16)

The definition of actors in a network, "those who perform activities and/or control resources within a certain field" (Håkansson, 1987, p. 14), closely resembles our definition of interorganizational systems stakeholders, although it does not encompass those who at a given time are passive recipients of (although affected by) the actions of

the network. The similarity of the concepts of actors and stakeholders and the relevance of the network approach to interorganizational systems creates an interesting opportunity to bring together the stakeholder analysis and the network approaches. In this paper, however, we will limit the integration of the approaches to the issue of stakeholder identification.

Axelsson (1992) argues that “to identify who the actors are in certain situations is one of the primary issues” (p.195) but fails to provide a mechanism for identifying actors (or stakeholders). It is our intention in this paper to bring together ideas from the network and the stakeholder analysis approaches, as well as the interorganizational systems literature, to suggest a systematic and comprehensive approach to stakeholder identification. In order to ensure that this approach leads to drawing a dynamic picture of the domain, we avoid creating a model which would be more likely to reveal only static instances of stakeholder topography. Since we take an interpretive stance (Walsham, 1993), we do not envisage creating a single stakeholder map.

Instead, our approach aims at understanding how stakeholders are perceived in this domain and is based on a number of principles that characterize the behaviour of stakeholders. These principles, primarily heuristic in nature, are derived from our preliminary research in the area of drug use management but have been subsequently verified by similar ideas in the stakeholder analysis and the network literature. They have therefore assisted us in identifying further stakeholders in the domain under investigation. We believe that the use of these principles to identify stakeholders results in a flexible and dynamic technique that allows modifications according to the particular context and at different points in time. These principles are examined in detail in the following paragraphs.

Principle 1. Stakeholders depend on the specific context and time frame

We have given some examples of authors who consider the environment of a business organization as having similar types of stakeholders, regardless of the actual type of business (e.g. Richardson & Richardson, 1992; Hill & Jones, 1992; Wallace, 1995). This is reasonable in as far as decision makers in an organization need to consider employees, customers, suppliers, competitors etc. as broadly defined groups that affect and are affected by the organization's behaviour. However, a detailed identification of stakeholders will eventually come up with different groups of stakeholders, depending on which organization's or which system's stakeholders one seeks to identify. The domain in which an organization or system operates also affects the set of stakeholders. For example, 'competition' means different things in the public and in the private sector, so that 'competitors' is an inadequate generalization for an organizational stakeholder. Also, customers of different products of the same company, or customers with different attitudes to the same product, may need to be examined separately (Freeman, 1984).

Thus, although general groupings of stakeholders can be useful as a guideline, context remains of primary importance for ensuring that appropriate individuals, groups or organizations are considered. As time goes by, changes in context lead to further changes, which will probably be reflected in the set of stakeholders. The importance of the context, or the environment within which an organization operates has been addressed in detail in the organization theory literature (e.g. Emery & Trist, 1965; Lawrence & Lorsch, 1967) as well as in the study of interorganizational relations (e.g. Håkansson, 1989; Forsgren *et al* 1995). Forsgren *et al* (1995) in particular stress the importance of time in business relationships and argue that "the relationships have a past and a future. They cannot even be conceived without history" (p. 25). The importance of context has also been stressed in the information systems literature (e.g. Checkland, 1981; Lederer & Mendelow, 1990; Walsham, 1993) and more recently in the interorganizational systems literature (e.g.

Bensaou & Venkatraman, 1996; Cavaye, 1995b; Klein, 1996; Orlikowski *et al*, 1995; Reekers, 1995). The implication for stakeholder identification is that it needs to be a dynamic process, that can afford the instability and uncertainty of organizational reality, whereby new players enter the domain while others choose or are being forced to leave (Malone *et al*, 1989, give examples of how this may happen in the case of electronic markets).

Principle 2: Stakeholders cannot be viewed in isolation

It is evident from the previous discussion that each stakeholder cannot be viewed as a single entity of the interorganizational arena. Rather, it is the interrelations between the different stakeholders that make up one of the most interesting components of the study of stakeholder behaviour; they reveal a complex network of interactions, interests and power games. Indeed, some of the interactions can be visible and direct, such as formal exchange of information, or more subtle and indirect whereby an action by a market leader can impact decisions by others. Although the complexity of these relations is recognized in the industrial network literature (for example, Håkansson, 1989 argues that “relationships involve exchanges, and therefore in themselves represent activities” (p. 22), and are thus a key component of the network and Easton, 1992 (pp. 25-26), argues that the focal relationship “cannot be managed in isolation from the other relationships a firm has”), the emphasis in the interorganizational systems literature often rests with exploring the one-to-one relationship of the organization under investigation with each particular stakeholder separately or with a group of stakeholders (e.g. ‘hub and spokes’ (Webster, 1995) or sponsor and adaptor (Cavaye, 1995b) relationships). Also, most stakeholder analysis approaches, because they adopt the perspective of the focal organization (e.g. Mason & Mitroff, 1981), emphasise the interrelations of each stakeholder separately with the focal organization. The approaches of Freeman (1984) and Eden and van Heijden (1993) are broader in this respect, as they consider the power

and interest of the different stakeholders, but these are also judged in respect to the focal organization and are not used in the process of stakeholder identification. In a complex domain such analyses are likely to be inadequate. Isolated study of one-to-one relationships maybe particularly misleading because an over-simplistic view of reality is adopted, ignoring the importance of a ‘stakeholder’s stakeholders’.

Principle 3: The position of each stakeholder may change over time

As the number of stakeholders and their interrelationships change over time, their roles and standpoints can be directly affected. This can be realized for a number of reasons, some of which are presented here. First, a particular stakeholder may participate in more than one stakeholder category, which may have different—and possibly conflicting—objectives and priorities. For example, individuals can be part of the organization where they are employed, and where they hold specific positions, be part of a professional association and at the same time participate in a software development project as a representative of the system’s users. In this case, even the same person may at different times ‘wear different hats’, i.e. have a different role, different responsibilities and follow different agendas.

Second, changes in the environment, such as changes in legislation or the available technology, may have significant effects in the relationships between various stakeholders. For example, the establishment of EDI links between organizations can redefine organizational boundaries as well as the traditional ‘customer’ and ‘supplier’ roles (Cash & Konsynski, 1985; Hoogeweegen, 1995).

Also, stakeholders may be forced to change their position relative to other stakeholders, ‘adapt’ (Håkansson, 1989) or in fact, may benefit from an opportunity to do so, as other

stakeholders react to changes in the organizational environment, imitating or leading in the application of new plans, structures, programs.

Principle 4: Feasible options may differ from the stakeholders' wishes

Because stakeholders often have different interests (e.g. Eden, 1996; Lyytinen, 1988; Wallace, 1995), they follow different agendas and try to achieve different goals. Given that these goals may be conflicting, the most likely scenaria for the future may not correspond to the wishes of all stakeholders, particularly as they need to adapt in the context of interorganizational relations (Håkansson, 1989). Other reasons that a stakeholder's vision of the future may not come about may simply be that this vision is not realistic. Also, stakeholders may be unable to plan effectively for the realization of their wishes. Finally, environmental factors, including the lack of technological means or human skills, as well as adverse moves from other more powerful stakeholders, may render certain desirable changes impossible.

Implications for stakeholder identification and analysis

We have discussed how these four principles presented in the previous paragraphs are supported in theory. We also found that they were supported in practice, as illustrated in the next section. However, we found that they have not been explicitly stated or used in existing stakeholder analysis approaches. Most importantly, they have not been applied to support the identification of stakeholders or to provide practical guidelines for the identification of stakeholders by other researchers. This can be the result of a number of reasons. On the one hand, a single, generic, and hence 'context free' stakeholder map is simpler to analyze and explain in broad terms the potential role of different types in stakeholders. On the other hand, for those authors concerned with conducting stakeholder

analysis within a specific context (e.g. Savage *et al*, 1992), it seemed appropriate to identify only the relevant stakeholders. Besides, as stakeholder analysis has tended to be used for only one organization, drawn only from the perspective of that organization's management (Mason & Mitroff, 1981), the generation of multiple stakeholder maps did not seem applicable or necessary.

It is our thesis that we must use all these principles if we intend to understand organizational and interorganizational reality, explain past circumstances and use the conclusions to plan realistically for future activity. For this purpose, we address the implications that these principles have for the identification of a broad range of stakeholders in an interorganizational context.

The first principle, which assumes the contingency of who the stakeholders are on time and context, can be translated into two propositions for researchers. First, it is only meaningful to draw a stakeholder map taking into account the particularities of the context and the domain under investigation. Second, any stakeholder map has to be regularly reviewed for changes over time. In other words, the generic checklists of stakeholder groups that are often suggested in the literature are inadequate for drawing a realistic picture of a specific interorganizational environment at a given time, except perhaps momentarily.

The second principle stresses the importance of stakeholder interrelations, some of which can be indirect and very complicated. Therefore, a stakeholder map cannot be regarded as complete if only direct links from a particular organization to other actors in the environment are considered. Instead, since we are interested in the broader network of interorganizational links, we should examine how each stakeholder is linked with (e.g. communicates, exchanges information, influences or is influenced by) other stakeholders. In practice, this signifies that in a complex domain the identification of one stakeholder

can lead to the identification of others. Thus, the identification of stakeholders needs to be an iterative process where the stakeholder map becomes continuously broader to cover all relevant stakeholders.

According to the third principle, the position of stakeholders may change over time, which is often a result of the stakeholder's reaction to changes in the context (cf. first principle) or is also bound to be influenced by the history of the stakeholder and the stakeholder's stakeholders. The importance of the historical context (e.g. Walsham, 1993) means that we should not limit the investigation of the stakeholders or their viewpoints to a specific point in time. On the contrary, a long-term perspective that looks into the changes of the stakeholders' viewpoints over time (also regarding their views of who the stakeholders are) is necessary to reveal the reasons behind previous decisions or courses of action and at the same time can serve as a guideline for exploring realistic future scenarios. In the case of interorganizational systems development, this may be important for identifying stakeholders that are favourable or unfavourable to the systems.

Similarly, because the stakeholders have different ideas about appropriate future images, which they may or may not be able to realize (fourth principle), it is necessary to consider the political issues that underpin stakeholder interrelations and result in changes in their role and position over time. Clearly, the feasibility of a stakeholder's wishes will also be contingent on economic and technological factors (e.g. is the suitable technology available, at a price the stakeholder can afford?). Here, however, we particularly stress the importance of politics as these are often less visible than (and possibly not independent of) economic and technical constraints. The implication for stakeholder identification and analysis is that power relations and the politics of the domain under investigation need to be considered so that changes in stakeholder status and behaviour can be explained and, possibly, anticipated.

In conclusion, within a specific context, the process of stakeholder identification and analysis needs to be iterative, adopting a long-term perspective in exploring who the stakeholders are and which are their viewpoints. This idea of an iterative, evolutionary, long-term process has already been described in a different context, namely knowledge acquisition for small and medium size enterprises (Whitley *et al.*, 1992). The 'Spring Model' suggests a pragmatic approach to problem solving and decision making by guiding future action partly based on past situations. This is done in an evolutionary process that is not linear but follows a sequence of loops of incremental refinements. These ideas can also be applied in the identification and analysis of stakeholders' viewpoints in an interorganizational context (Pouloudi & Whitley, 1996).

Finally, we should not that although it has been argued that "networks are stable but not static" (Easton, 1992, p. 23), the stability may not be true for all types of interorganizational networks (Miles & Snow, 1992). Indeed, the moves of each stakeholder, whether tactical, strategic or reactive, are expected to affect the others, to a degree that will often depend on the influence of the stakeholders who originated the change. Coalitions or other forms of groupings can then alter the reactions of other stakeholders and are likely to generate further changes. As this instability alters the picture of the network of stakeholders over time, all stakeholders form different visions about their future roles and act accordingly, to the extent that these reactions are not hindered by the movements of other stakeholders. These ideas become clearer in the following section, where we apply the principles of stakeholder behaviour to identify stakeholders in the drug use management domain in the United Kingdom.

Preliminary findings

The purpose of this section is to illustrate both how the ideas of the previous section were developed and how these ideas have in turn been used to explore the environment of drug use management systems in the UK.

Drug use management systems are information systems which electronically assist the management of the drugs life cycle, that is their prescription, distribution and dispensing, as well as the monitoring and evaluation of these activities and any related policy making.

Stakeholder identification

In the drug use management domain, information needs to be exchanged across different organizations. What makes this information exchange more complex is the fact that different organizations are concerned with different aspects of this information (e.g. some recipients of information are interested in clinical aspects whereas others are more interested in administrative data or in cost information). Having little prior understanding of the information needed to support drug use management or of the level of computerization in the domain, we started identifying the stakeholders of drug use management systems by interviewing representatives from two 'obvious' stakeholder groups: suppliers and users of such systems. It was obvious that users of drug use management systems would be family doctors (GPs), pharmacies, and hospitals. We also expected that representatives of the government would be stakeholders of the drug use management process, but were uncertain of who these representatives or what their role would be. Also, we considered pharmaceutical companies and patients as other obvious stakeholders of the process. These 'obvious' stakeholders are listed in the second column of Table 1.

In order to enrich our understanding of the role of these stakeholders for drug use management and identify further stakeholders a number of interviews were conducted with respondents from the broad groups of stakeholders mentioned. More specifically, six interviews were conducted formally at the sites of the respondents, two of which (Southmead Hospital and Royal Hampshire County Hospital) were hospital pharmacists using a hospital information system to support their activities while two others (TDS Healthcare Systems and HBO & Company Computer Centre) were suppliers of hospital information systems. The fifth respondent was Boots The Chemists, a major chain of pharmacy stores in Britain, and the sixth the Prescription Pricing Authority (PPA), a special health authority within the NHS, mainly responsible for collecting and checking prescribing information and authorizing related payments; the information received is extremely rich and is then fed back to individual GPs and health agencies to audit prescription habits and expenditure. Brief meetings were also held with a representative from the Merck and Co., Inc. pharmaceutical company and with the director of LSE Health Research Centre at the London School of Economics, a general practitioner and a nurse in a general practice with low level of computerization.

During these interviews we used a topic guide as a checklist of issues to discuss and took handwritten notes. At the end of each interview individual reports of the cases were produced, presenting the issues that had been discussed during the interview. It is worth noting that all the respondents were very willing to answer questions and describe the use and impact of information systems in the prescribing process. It is possible that the absence of a tape-recorder, which could have been intimidating, helped them to talk freely during the interview. Certainly their lengthy responses revealed their interest in the domain of investigation as well as the fact that this domain is extremely rich in information.

As a result of these interviews, and having studied the literature regarding the use of computer systems in the pharmaceutical domain in Britain (e.g. Gillies, 1995; Glinn *et al*, 1993; Lea & Morgan, 1993; Rogers *et al*, 1993; Sillince & Frost, 1993) we were able to refine our initial list of stakeholders. Thus, it became apparent that drug use management systems suppliers are quite diversified. Suppliers of software are not necessarily supplying hardware and vice versa; however, some do supply integrated systems. Another important distinction is that suppliers of hospital systems are different from those who supply systems to general practitioners and different from those who supply systems to pharmacies. Furthermore, there is also a number of drug databases providers, who supply dictionaries of medical terms, databases of drugs, their indications, counter-indications, interactions with other drugs and costs.

At the same time it became obvious that, within hospitals, users of drug use management systems have different needs depending on their professional roles. Doctors, pharmacists and nurses were subsequently identified as stakeholders of drug use management systems. Another important stakeholder identified in the course of this research was a user group that was set up by one supplier of hospital systems to ensure that learning and expertise were shared between suppliers and users as well as between users in different hospitals and in different countries. The complexity of the interorganizational system can be seen in the differences in interpretation between the two groups. It is not surprising that the role and success of this user group was interpreted differently by the supplier and by some hospital members.

Also, the Prescription Pricing Authority was identified as a stakeholder on the side of the government, and the interview with them pointed to the role of the Department of Health in setting the nation's policy on health (and pharmaceuticals) and of health agencies, as 'purchasers' of health services from hospitals and fundholding general practices (i.e. groups of GPs administering their own budget) on behalf of the local patient populations.

The role of professional associations such as the British Medical Association (BMA) and the Royal Pharmaceutical Society of Great Britain was also pointed out and insurance companies, as third party payers for drugs were other stakeholders identified (third column of table 1).

The process of stakeholder identification continued with further interviews with the stakeholders identified previously. For example, the discussion about drug safety led to the identification of the Medicines Control Agency (MCA) as a major stakeholder responsible for deciding on and monitoring the safety, quality and efficacy of drugs. Other organizations were also identified as stakeholders because of their presence in events that brought together the stakeholders already identified. Thus, further interviews were conducted on a more informal basis, during the Exchanging Healthcare Information Conference and Exhibition (EHI '94) and the Healthcare Computing Conference and Exhibition (HC '95). Interviewees included EDI or GP systems providers, as well as representatives from the NHS Executive, which is the body responsible for implementing the directions set by the Department of Health in the NHS. In particular we met with members of the Information Management Group, which is responsible for improving the use of information technology in the NHS. We also had brief meetings with representatives from the CCTA (the government centre for information systems), the British Computer Society (BCS) and British Telecom (a main supplier of telecommunication services in Britain). These interviews were significantly shorter in duration and the content was not always centred around the use of drug use management systems, as many representatives of the organizations did not see themselves directly involved in either the use/supply of information technology or in pharmaceuticals. However, we believe that they are clearly stakeholders in the drug use management process since their products affect the potential for information systems development.

The identification of stakeholders that were not directly involved in drug use management has been one of the benefits of this approach. Often these stakeholders themselves doubted that they had anything to do with our research or whether they would be able to tell us anything useful. This response was not surprising given the fact that most presentations and representatives in the exhibitions at EHI '94 and HC '95 were concerned with the health care provision as a whole rather than drug use management. We consider them to be stakeholders despite the fact that they felt they had little direct impact in our area of interest. This because (following the first principle) changes in the health care environment set the general context for drug use management (third column of table 1).

It is evident from the discussion in the preceding sections that these people and organizations (e.g. EDI suppliers, British Telecom, NHS Executive etc.) should be included in the stakeholder map. Considering their inclusion is one of the main strengths of a stakeholder analysis approach. Typically, these people would have been left out of traditional information systems analyses of the domain. However, if these stakeholders are not considered, this could easily result in a failure to understand the current state of the art in the use of information systems in health care provision as a whole. Indeed, many of the interviewees in EHI '94 were concerned with networking between NHS partners, which was at the heart of this conference. In the long term, this is expected to have major implications for the electronic exchange of information which, evidently, also serves the management of drug use processes.

We have argued that one of the strengths of the suggested approach is that a flexible process of stakeholder identification is proposed. This allows the identification of stakeholders that are particular to the specific context and is based on the idea that each stakeholder identified can lead to the identification of others, this process often results

in the identification of stakeholders that initially seem only indirectly related to the research problem.

In practice, this approach to stakeholder identification can be translated to four steps that are carried out iteratively by the analyst. First, some obvious generic groups of stakeholders are identified, using for example the suggestions in relevant literature. In our case, because of our particular interest in information systems, we started by identifying information systems users and suppliers as two first broad categories of stakeholders. Second, the analysts contact representatives from these initial stakeholder groups. In depth interviews are conducted to understand both the stakeholder's perceptions about the environment (who are other stakeholders, what is their relation with the interviewee, what is the role and influence of the various stakeholders, what are the politics underpinning the activities in the domain) and the perceptions of the interviewee about the use of (interorganizational) information systems in the domain over time, emphasizing on what are desirable and what are feasible future options. Rather than asking the stakeholders directly 'who do you think other stakeholders are?' the different answers to this question derived as a result of an open discussion about, in our case, the development and use of drug use management systems. Following the interviews, a fourth stage includes the revision of the stakeholder map by the analyst to accommodate any newly brought out perceptions. Using the new images, the analyst should continue the process by approaching newly identified stakeholders, approaching them, integrating their perceptions with previous analysis findings and so on.

Table 2 indicates how, following this process, our initial ideas about stakeholders in the domain expanded during the different stages of the research. Although we have argued that different stakeholders have different ideas about who other stakeholders are, in this table we have included all the stakeholders identified and have thus chosen not to represent the interpretive character of the process. This diversity of views about who the

stakeholders are has, however, been clear in the interviews. For example, while pharmaceutical companies would clearly perceive the Medicines Control Agency as a stakeholder, suppliers of computer systems to hospitals would not. Nevertheless, the decisions of the MCA affects drug databases and their suppliers, thus they have an indirect impact for suppliers of integrated solutions to drug use management users. Given this complexity of links, particularly between those associated indirectly, we expect this expanding list of stakeholders to be further enriched as more stakeholders are contacted.

From the presentation of the results so far, it is evident how the practical implications suggested in the theory section have been used in practice. Because this was a new research area for us, we used domain-specific literature and interviews with ‘obvious’ stakeholders to identify relevant stakeholders for drug use management (implication of the first principle). We also carried out an iterative stakeholder identification process, as is evident from the drawing of table 1 (implication of the second principle). The attention to the historical context and the relative power of different stakeholders (implications of the third and fourth principles) have been valuable for guiding the interview process and understanding better why the use of drug use management systems was following specific directions or why certain stakeholders became more or less important.

One example that illustrates how the principles of stakeholders behaviour were verified in practice in the drug use management domain is the use of information systems for general medical practice.

In the past, many general practitioners (GPs) chose to develop their own software or purchased inexpensive software, aiming at what they perceived to be cost-effective solutions. However, an increasing number of GPs find themselves in a position where this attitude has to be reconsidered. For one thing, the current push from the NHS for electronic exchange of information (NHS-wide networking), for example by establishing

communication links between GPs and Health Agencies for registration changes and item of service claims, has made the adoption of standards at a national level necessary. At the same time, the Requirements for Accreditation for General Medical Practice Computer Systems (NHS Executive, 1994a) have provided GPs with the incentive to move towards more sophisticated computer systems that satisfied the criteria and standards set by the NHS. In other words, the priorities of GPs in selecting information systems have changed over time, due to the need to improve the communication links with other stakeholders (health agencies) and as a result of the involvement of other external stakeholders (NHS Information Management Group) that were in a position to use incentives to that end. These changes had severe implications for the suppliers of GP systems: many of those that could not meet the requirements for sophisticated solutions were unable to survive in the market. Table 2 summarizes the four principles of stakeholder behaviour and their practical implications and illustrates how the example of GP information systems relates to each of these.

Examples of the viewpoints of the stakeholders

The identification of stakeholders is already an important contribution to unveiling the complexity of the drug use management domain. However, it is necessary to move beyond the identification of stakeholders to an understanding of their roles and interrelations, and their viewpoints about the role of information systems, as this is expected to affect the future of the development and use of drug use management systems. In this section we shall briefly consider some of the results of this research in exploring the viewpoints of stakeholders about the role of information systems in the domain. These findings are drawn from both the literature and the interviews.

First, the introduction and use of drug use management systems bring about changes in the stakeholders' perceptions about the whole drug management process. For example, pharmaceutical companies perceive the complexity of prescription process as a result of the need to serve four different customers: according to a recent interview with Merck's former Chief Executive Officer in the Harvard Business Review (Nichols, 1994), the pharmaceutical industry operates in a uniquely complex marketplace, where companies need to serve at the same time those sponsoring their products, those prescribing, those dispensing and those consuming them.

The ability of these companies to influence their 'four customers' changes as a result of new information systems which can lead to new market opportunities and changes in the structure of the companies. However, they are still restricted by legislation concerning their freedom to approach these customers with their new products. This may change however and drug manufacturers could benefit from existing EDI links to market such products electronically.

From the perspective of drug prescribers, it seems that GPs use more sophisticated computer systems than hospital doctors. These differences between the general practice and the hospital setting can serve as an indication of how the perceptions of the stakeholders can change over time and how the complexity of the environment can interfere with the progress in information systems implementation. Thus, while GPs have become familiar with computerized prescription practices, information systems in hospital pharmacies are still mostly used, according to the respondents, to support dispensing and stock control of drugs.

On-line prescribing is, in general, not available in hospitals, and some respondents found it doubtful whether the facility would be beneficial, given the amount and cost of input that would be needed. At the same time, the dispensing and stock control functions of the

systems were well accepted by the users, because they were easy to use and did not cause any important changes in the working practices. The lack of integration of these systems to the information systems used elsewhere in the same hospital, as in the case of Southmead hospital, prevented doctors from accessing information on prescriptions as well as pharmacists from accessing information about patients and interventions on drug therapies.

In hospitals that implemented a hospital information system, as in the case of Hampshire, the integration of information was better and assured a better information flow, minimization of duplication and better reporting facilities. It facilitated the administration of drugs and hospital administration in general and allowed for other functions such as the broadcasting of messages throughout the hospital. However, an integrated system seems to be more vulnerable to security problems. Indeed, although electronic access had been allowed according to profession and seniority, some security breaches have occurred when doctors asked nurses to use the system on their behalf. This 'fraud' was only revealed when the nurses complained about the extra work they were requested to do.

Finally, we should note that the stakeholders of drug use management systems are more than just the participants in any one system development project. An interesting example arises as a result of the UK Government's reforms of the National Health Service. These reforms have created a large number of independent Hospital Trusts which are responsible for managing their own budgets. These trusts do not normally have the funds to develop hospital information systems from scratch. Thus, they either purchase off-the-shelf systems which they tailor to their specific requirements or the supplier of the system may put them in contact with other users of the supplied software (often American hospitals) to pool their experiences and expertise. As a result, the evolution of these systems may be influenced by hospitals working under a very different cultural and legislative regime (Avgerou, 1994).

In conclusion, the examples of drug use management systems and their perceptions described in this section illustrate that there are no 'good' or 'bad' practices for the development of information systems. Rather, it is a great number of factors that need to be considered and which cannot become apparent unless the viewpoints of the stakeholders are revealed. This paper has provided some evidence of the diversity of existing viewpoints. These need to be further explored so that the wishes of the stakeholders can be taken into account in order to promote and develop more feasible interorganizational systems solutions.

Conclusions

This paper began by introducing the notion of stakeholders in the context of inter-organizational information systems. We suggested that all the individuals, groups or organizations whose actions can influence the development of the system—whether directly or indirectly—should be regarded as stakeholders since they have a potentially important role to play in the initial and continuing development of interorganizational systems.

In order to help with the identification of stakeholders, we have suggested that this is a process that is subject to a number of principles. These ideas were applied to a preliminary study of the drug use management process in the United Kingdom and quickly showed that the range of potential stakeholders is far wider than first thought. The examples given in this paper are only a starting point, but do demonstrate the utility of applying stakeholder analysis to the problem of developing information systems for drug use management by revealing the underlying complexity of decision making in the domain.

The main contribution of this paper is to suggest a practical method for the identification of stakeholders; this is a process that is very important in complex domains, such as that of drug use management. However, it has been overlooked in the stakeholder literature as well as in its application in the information systems literature. By applying our approach in a domain where information is exchanged between different stakeholders, we have also shown how the industrial network approach and the interorganizational systems literature relate to stakeholder analysis.

Still, further work is required to complete the different images of the stakeholder map as this is understood by the broad range of stakeholders. This entails investigating in further detail the roles of the various stakeholders; the perception of stakeholders about the need for information systems, especially interorganizational at different stages of the drug use management process; the types of links that exist between the different stakeholders (are they direct or indirect, can they be facilitated through the use of electronic means, how strong these links are, are the relations characterised by collaboration or conflict etc.); the relative importance of stakeholders (although we have already shown evidence that different stakeholders have different perceptions about who is 'important'). This last question depends not only on the perceptions of the stakeholders but also on the different criteria that could be applied to that end. For example, interest and power are suggested by Freeman (1984) as two dimensions that can be used for representing the relative positions of stakeholders. It is interesting to consider whether these dimension are relevant, reliable and adequate for considering the relative importance of stakeholders.

In the context of drug use management systems, we should eventually consider what each of the stakeholders would like to do next and compare it with what they are likely to do next, thus providing a clearer understanding of the further evolution of drug use management systems. Furthermore, based on the perceptions of the various stakeholders,

alternative plans can be developed for action, and these tested for their feasibility using, again, the viewpoints of the stakeholders identified.

Despite the importance of this approach in enhancing our understanding of a complex domain where interorganizational systems are in use, it has two important and closely interrelated problems. First, it is difficult to decide where the stakeholder identification process should stop. Because of its iterative character, there is a danger of identifying literally everybody as a stakeholder. In practice however, we found that the number of new stakeholders identified is, after some 'iterations', of the process significantly decreasing. The second related problem is that as more stakeholders are identified, there are more likely to be conflicting accounts of the situation. This on one hand enhances our understanding of the context but on the other hand can create problems for those wishing to take action. The management of conflict in an interorganizational context is highly complex and difficult to address (see for example Kumar *et al*, 1995) and can indeed hinder or delay decision making. Still, the advantage of stakeholder analysis is that it highlights conflicts and does not let decision makers make naive assumptions about the adoption of interorganizational systems. The case of NHS-wide networking, where significant stakeholders' views had been overlooked shows that unless these are taken into account a huge information systems investment may collapse (Willcox, 1995).

We believe that a major benefit from the use of stakeholder analysis in the context of interorganizational systems development is that it can highlight issues that other approaches would neglect, in particular in relation to the different viewpoints of stakeholders and their evolution over time. We hope that by suggesting a systematic approach to the identification of interorganizational stakeholders we have assisted information analysts and decision makers who lack flexible methods to assist them in unveiling and analysing multiple stakeholder perspectives.

Acknowledgements

We are grateful to all those who contributed to this research. In particular we would like to thank those who made useful comments in earlier drafts of this paper, especially Tony Cornford, Leslie Willcocks, Jonathan Liebenau and the anonymous referees for their constructive criticism and very insightful suggestions.

<i>'Groups' of stakeholders</i>	<i>Initial stage: the 'obvious' stakeholders</i>	<i>Second stage: after the literature review and first round of interviews</i>	<i>Third stage: conferences, further interviews</i>
Drug use management systems suppliers	(uncertain of whether specialized suppliers existed)	drug databases providers hardware suppliers/ software suppliers: for hospital systems for GP systems for pharmacies	+ EDI suppliers + telecommunications suppliers +IT consultants
Drug use management systems users	Hospitals GPs Pharmacies	doctors pharmac ists nurses user groups	
Other parties influencing the evolution of drug use management systems	'government' Patients Pharmaceutical companies	PPA Department of Health Health Agencies + Insurance companies + Professional associations (e.g. BMA)	+ NHS Executive + CCTA + Medicines Control Agency + BCS

Table 1: Expanding the list of stakeholders

<i>Principles of stakeholder behaviour</i>	<i>Practical implications for stakeholder identification and analysis</i>	<i>An example of drug use management systems: GP information systems</i>
Stakeholders depend on the specific context and time frame	Stakeholder map has to reflect the domain and to be reviewed over time	Legislation to accredit IS procurement changes the number (and profile) of IS suppliers
Stakeholders cannot be viewed in isolation	Each stakeholder identified can lead to the identification of others	<i>NHS Executive</i> legislation aims to improve electronic communication between <i>GPs</i> and <i>Health Agencies</i> ; the <i>IS suppliers</i> of the latter are influenced
The position of each stakeholder may change over time	The evolution of stakeholders' viewpoints can help explain the past and plan for the future	Evolution of standards changes priorities for procuring IS for GPs
Feasible options may differ from the stakeholders' wishes	Political issues within the domain need to be explored (as well as economic and technical feasibility)	The <i>NHS Executive</i> can influence the market of IS suppliers and the options available to IS users

Table 2: Principles of stakeholder behaviour and their practical implications

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