

Chapter 10

A FRAMEWORK FOR THE INVESTIGATION OF THE INSTITUTIONAL LAYER OF IT DIFFUSION

Using stakeholder theory to analyse electronic commerce diffusion

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Abstract: Information technology diffusion is a complex process that has been studied from various perspectives and levels of analysis. Most studies have been done at firm level seeking to find the ways a technical innovation is introduced and used by a company. In this paper we look at the institutional layer of IT diffusion by investigating the interaction between actors in the demand and supply side of the diffusion process. We argue that stakeholder analysis is a useful tool for the examination of such interactions and we propose a framework for the investigation of the diffusion of electronic commerce. The framework can be useful for policy makers seeking to apply effective diffusion mechanisms at local, regional or national level.

Key words: IT innovation diffusion, stakeholder theory, electronic commerce

1. INTRODUCTION

Electronic commerce is a new technological phenomenon that has the potential to offer great advantages to companies and individuals. Although the benefits of electronic commerce adoption seem to be obvious (e.g. (Hoffman et al. 1996; Peppers and Rogers 1997) there is evidence that it hasn't been adopted in full. The discussion in the media about the initial success and later failure in "dot.com" companies (see for example (The

Economist 2001)) is an indication of the insecurity related with investments in electronic commerce.

The most widely reported barriers (e.g. (Farhoomand et al. 2000; OECD 1998)) related to electronic commerce adoption are mostly derived from factors such as lack of awareness about electronic commerce opportunities as well as lack of trust to electronic transactions. That makes diffusion of electronic commerce a complex issue for policy makers seeking to create a critical mass of user-companies. Additionally, the interorganizational nature of electronic commerce makes the participation of a number of stakeholders wider making the examination of their roles, views and concerns an interesting subject.

In this paper we recognize the need for in-depth investigation of issues related with electronic commerce diffusion and we propose a framework for its examination by using stakeholder theory. The paper is structured as follows. In the next two sections the innovation diffusion theory is presented with emphasis on its developments in information technology and electronic commerce in particular. Sections 3 and 4 present stakeholder theory and particularly its use in the information systems and electronic commerce literature. In section 4 a framework for synthesizing innovation diffusion and stakeholder theory for the examination of electronic commerce diffusion is proposed. The paper concludes with section 5 where a summary of the paper and ideas for the application of the proposed framework is presented.

2. DIFFUSION OF IT INNOVATION

There are various theories relate to the diffusion of innovations taking three main perspectives (Baskerville and Pries-Heje 2001). The micro perspective focusing on the internal nature of a single innovating organization and the meso and macro perspective analyzing how extra-organizational power dependencies shape the diffusion process. The most dominant and authoritative work of the latter perspective is that of Rogers's. His work has been widely sited although his framework, that has been developed during the last 35 years, has been debated (e.g. (Kautz and Pries-Heje 1996); (Elliot and Loebbecke 2000)) it is the first well-known and widespread framework for the diffusion of innovations.

According to Rogers the innovation-decision process, in which a decision-making unit passes from first knowledge of an innovation to the decision to adopt or reject it, plays a crucial role for the diffusion of an innovation. In this process five steps are defined:

- *Knowledge* occurs when a potential adopter learns about the existence of the innovation and gains some understanding of how it functions.
- *Persuasion* occurs when a potential adopter forms a favourable or unfavourable attitude towards an innovation.
- *Decision* occurs when a potential adopter undertakes activities, which lead to the adoption or rejection of an innovation.
- *Implementation* occurs when an innovation is actually put to use
- *Confirmation* occurs when an adopter seeks reinforcement of an innovation-decision that has already been made, but the adopter may reverse this previous decision if exposed to conflicting messages about the innovation.

The rapid technological change and growth in the complexity and sophistication of computer and telecommunication systems made the diffusion of information technology a crucial issue for policy makers worldwide. Damsgaard (1996) in his study on the diffusion of Electronic Data Interchange (EDI) defines three specific layers of the diffusion process. These are the organizational, industry and environment layers.

- The **organizational layer** consists of individual users and organizational bodies using the information technology.
- The **industry layer** consists of organizations and institutions sharing a stake in the same function, market area, or part of the value system.
- The **environmental layer** is divided into two sub regions: the institutional layer and the regulatory layer. The *institutional layer* consists of entities such as international agencies, trade associations and higher education institutions. These affect the diffusion by shaping the interaction between actors such as technology providers and potential users and thereby promote the use of the technology. The *regulatory layer* is related with telecommunication, business and privacy regulations applied by government regimes in order to set the normative boundaries for interactions between the trading partners.

An interesting approach to the examination of the environmental layer of information technology diffusion has been made by King et al. (1994) in their effort to understand the role of the government and other institutions in IT innovation. The authors observe that although the objectives of IT-related programmatic statements issued by various government agents are clear the mechanisms that used for the mobilization of government leadership seem to be inefficient. They argue that these difficulties in the application of IT diffusion policies are related with inefficient analysis of the role of institutions involved in the IT diffusion process.

In this paper we use the categorization made by Damsgaard (1996) for the examination of the electronic commerce diffusion process as this work is located at the institutional layer of the environmental layer. Additionally, we

follow the argument of King et al.(1994) about the importance of examining the role of various institutions involved in IT-diffusion. Based on the premise that a systematic examination of their roles, interests and interrelations will have interesting contributions to theory and practice, we propose the examination of the roles and interests of institutions involved in the diffusion of electronic commerce.

3. DIFFUSION OF ELECTRONIC COMMERCE AS TECHNOLOGY INNOVATION

Electronic commerce has a great effect on traditional ways of conducting business. The exchange of data within and between organizations or even business sectors is essential for its implementation and triggers organizational transformations and business processes reengineering (Wilkins et al. 2000). Changes associated with innovations related with electronic commerce use range from fundamental changes in the economies of nations, to changes in the way industries function, right through to changes in organizational practices and processes (Applegate et al. 1996; Tapscott et al. 1998)).

The effects of electronic commerce use in business and society are so profound that have been associated to those of “the steam engine, electricity, the telephone and assembly line” (Kalakota and Robinson 1999). Thus, electronic commerce, can be viewed as a kind of technology innovation since it is based on telecommunication technologies and business practices that introduce new methods in:

- Communications (e.g. (Chellappa et al. 1996))
- Business transactions (e.g. (Bryntse 1998; Crocker 1996; Currie 1999; de Kare-Silver 1998; Henning 1998))
- Market structure (e.g. (Fong et al. 1997; Giaglis et al. 1999)),
- Education (e.g. (Daniel 1999; Murison-Bowie 1999))
- Work (e.g. (Doukidis et al. 1998; HCWD 2000))

A considerable effort has been made in the literature to examine adoption patterns and diffusion practices for electronic commerce as a technology innovation. For example Wilkins et al. (2000) examine the theories of diffusion of innovation, organizational innovativeness and process theory to as they can be used for the implementation of electronic commerce into an organization. The authors focus on the purely technical issues of electronic commerce systems development and have a company and not the diffusion of innovation as a public policy.

Marshall et al. (2000) also examine the adoption and diffusion of electronic commerce and particularly to the car industry in Western

Australia but focus on the managerial and organizational needs of the specific industry sector. Similarly Thompson (2000) examines the adoption of a portal for the business community of Western Victoria in Australia.

Furthermore, Lederer et al. (2000) and Magal and Mirchandani (2001) use the technology acceptance model (TAM) (Davis 1989) to examine how the ease of use and usefulness predict application usage in the World Wide Web. Gefen and Straub (2000) also use TAM to study how the perceived ease of use (PEOU) influence the users' purchasing behaviour on the Internet. TAM has also been used by Pavlou (2001) to predict users intentions to transact electronically by integrating trust in electronic commerce. Another application of TAM has been made by Featherman (2001) who the individual adoption of Internet-based e-payment systems. Additionally, Elliot and Loebbecke (2000) use the Five Stages Innovative Process Model (Rogers 1995) to examine the adoption of four diverse pilot implementations of smart-card payment systems. In all the above cases the researchers study the adoption of a specific electronic commerce technology by individual users. There is no reference to the diffusion mechanisms used to influence companies to use and invest on electronic commerce.

The diffusion of electronic commerce to small and medium size companies has been recently investigated by Corbitt and Kong (2000); Debreceeny et al. (2000); Kendall et al. (2001). The researchers focus on the investigation of the barriers related with electronic commerce adoption in Singapore and not with the diffusion mechanisms that could be used for decrease those barriers. Additionally, Riemenschneider and McKinney (2001) analyse the differences in the beliefs of small business executives regarding the adoption of web-based electronic commerce.

Finally, Boon et al. (2000) examine the adoption of Internet as a means for the promotion of electronic commerce by local governments in Australia. The research focus on one the diffusion mechanisms used by one of the actors involved in the electronic commerce diffusion process with no reference to other related entities and practices.

According to the analysis above, the research about the diffusion of electronic commerce has been focused either on the adoption of Internet technologies by individual uses or the implications that the adoption of electronic commerce has for a firm or an industry sector. It is apparent that the environmental layer for electronic commerce diffusion has been neglected in the literature with most provident focus on the organisational and less to the industry layer.

This paper tries to bring into the fore the issues related with the interaction between actors involved in the environment layer of electronic commerce diffusion. The systematic investigation of their roles, interests and interrelations could prove useful. Stakeholder theory that examines the

impact of different viewpoints of participants in an organisational situation could be proved useful for this analysis. In the next sections the stakeholder concept is introduced and the possibility of its application in the electronic commerce diffusion process is investigated.

4. THE STAKEHOLDER CONCEPT

The concept of “stakeholders” was embedded in the management thinking and research since the publication of the seminal book, “Strategic Management: A stakeholder approach” by Freeman Freeman (1984). The use of the term varies significantly, showing that the term itself is not self-evident. There most classic definition is the one proposed by Freeman (1984):

“A stakeholder in an organisation is (by definition) any group or individual who can affect is affected by the achievement of the organisation’s objectives” (p. 46)

This definition leaves the notion of stakeholder open to include virtually anyone. Certainly, there are a number of definitions that exist between these two extremes (e.g. (Cornell and Shapiro 1987; Hill and Jones 1992; Nasi 1995)).

As the nature and purpose of stakeholder theory is concerned there is a diversity of opinions on the subject. Donaldson and Preston (1995) propose a classification framework defining three aspects of stakeholder theory:

- The *descriptive* aspect means that “the theory is used to describe and sometimes to explain, specific corporate characteristics and behaviours” (p. 70)
- The *instrumental* aspect means that “the theory is used to identify connections, or lack of connections, between stakeholder management and the achievement of traditional corporate objectives” (p.71)
- The *normative* aspect means that “the theory is used to interpret the function of the corporation, including the identification of moral or philosophical guidelines for the operation and management of corporations” (p. 71)

In the following sections we study the extension of stakeholder concept from management literature to information systems in order to examine the possibility of its application to electronic commerce policy making.

The use of the stakeholder term in the information systems literature was initially used to describe the knowledge gap between managers (users) and

technical specialists (e.g. (Currie 2000)). Similarly to the management literature, there is confusion regarding the definition of the term stakeholder as well as about its nature and purpose. The study of these approaches reveals that the application of the stakeholder notion in the information systems field is predominantly instrumental or descriptive with very little reference to the normative aspect (Pouloudi 1999).

5. STAKEHOLDERS IN INNOVATION DIFFUSION

The notion of stakeholders is embedded in the innovation diffusion literature without the explicit reference at the term. More specifically, Rogers (1995) describes diffusion networks in order to emphasise the importance of interpersonal network influences on adopters both in their coping with the uncertainty of new ideas and in convincing them to adopt innovations. The notion of the opinion leadership is predominant in his work defining *opinion leaders* as: “individuals who lead in influencing other’s opinions about innovations” (p.281). Another important notion in Roger’s work is that of the *change agent* that is: “an individual who influences clients’ innovation-decision in a direction deemed desirable by a change agency” (p.335).

Brown (1981) also refers to diffusion agency that he defines as the public or private sector entity through which an innovation is distributed or made available to the population at large. He gives examples of such entities like retail and wholesale outlets, government agencies or non-profit organisations. Other entities he describes are the *propagators* that defined as: “profit or non-profit motivated organisations or government agencies acting to induce the rapid and complete diffusion of the innovation” (p. 52).

In the case of IT diffusion and especially at its environmental layer King et al. (1994) recognise the importance of institutional intervention in IT diffusion process and list a number of institutions that influence IT innovation. These are: Government authorities, international agencies, professional and trade and industry associations, research-oriented higher education institutes, trend-setting corporations, multi-national corporations, financial institutions, labour organisations and religious institutions. The authors also mention the role that other entities such as the media and the black market can exert regarding IT innovation.

The role of intermediating institutions such as professional, trade and industry associations in the IT diffusion process has been highlighted by Damsgaard and Lyytinen (2001) in their investigation of how industry associations intervened in the diffusion of Electronic Data Interchange (EDI) in Denmark, Finland and Hong Kong. Similarly Swan and Newell (1995)

examine the relationship between professional associations and their members for the diffusion of the Production and Inventory Control (PIC) in Canada.

An explicit use of the stakeholder notion in the diffusion of electronic commerce has been made by Nambisan and Agarwal (1998). The authors identify two key groups of stakeholders – the end users (or customers) and the application or service providers. Using stakeholder and social network theory, they examine the diffusion of national information infrastructure (NII) in Singapore.

The identification of the stakeholders and the description of their roles, interests and interrelations have not been introduced systematically in any of the studies of innovation diffusions described above. Thus, tries to combine the innovation diffusion and stakeholder theory in order to make an in-depth analysis of the process of electronic commerce diffusion as it is described in the next section.

6. A FRAMEWORK FOR THE INVESTIGATION OF ELECTRONIC COMMERCE DIFFUSION

In the previous sections it was made obvious that the institutional layer within the environment layer of electronic commerce diffusion has not been analysed thoroughly and there is need for further investigation in the field. Additionally, although the investigation of roles and relationships among actors in the diffusion process is reported in the innovation diffusion literature as an important issue the notion of stakeholders has not been used systematically.

Thus, a framework that investigates the institutional layer of electronic commerce diffusion using innovation diffusion and stakeholder theories is proposed here. More specifically, the Roger's (1995) innovation decision process (presented in section 2) is extended by introducing the two main stakeholder groups reported by the author, the change agent and the decision making unit.

The aim of this framework presented in figure 1 is to have a way of organising research undertaking in the field of electronic commerce diffusion. The dark grey area in the figure represents the first phase of an empirical work where the descriptive aspect of stakeholder theory can be used to identify entities acting as change agents and decision-making units. The light grey area represents the send phase of the analysis where using the instrumental and normative aspects of stakeholder theory the characteristics of the decision making unit and the communication channels used by the

change agent will be analysed along the five phases of the innovation-decision process.

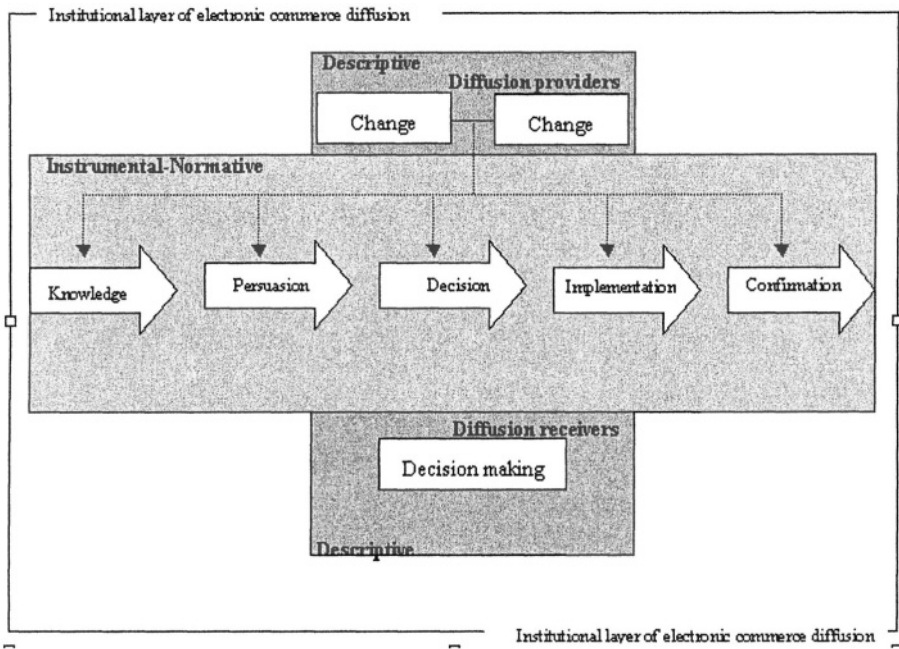


Figure 1. A Framework for Investigating Electronic Commerce Diffusion

7. SUMMARY-POSSIBLE APPLICATIONS OF THE PROPOSED FRAMEWORK

This paper gave a critical overview of the innovation diffusion literature and IT diffusion in particular. It was made evident that the institutional layer of innovation diffusion has not been investigated thoroughly, as most of the research in IT diffusion literature is focused at the organisational or industry layers. The institutional layer consists of entities that affect the diffusion by shaping the interaction between actors such as technology providers and potential users and promote the use of the technology. We argued that the use of stakeholder analysis can be a useful tool for research at that layer using the example of electronic commerce as a type of IT innovation.

Additionally, a framework that synthesises innovation diffusion and stakeholder theories is proposed as a practical instrument to investigate the diffusion of electronic commerce. Such a framework can be useful to policy

makers seeking to promote electronic commerce to the business community at local, regional or national level. Specifically, the framework has been applied in two empirical contexts related to electronic commerce diffusion (Papazafeiropoulou 2002). The first one was a European Commission funded project with the participation of chambers of commerce and business consultants active in the electronic commerce diffusion to Small and Medium Size Enterprises (SMEs) from eight countries. There the framework was used in order to identify the role of stakeholders involved in diffusion activities in three levels of adoption categories. The results of this study have been later used for the examination of the electronic commerce diffusion in SMEs in Greece within a relative initiative of the European Commission (go-digital).

The results of those studies gave an insight to the behaviour of different stakeholders and the underlying reasons for their behaviour, offering suggestions to policy makers seeking to promote electronic commerce technologies to SMEs.

Finally we believe that the framework can be used in the future by researchers involved in the investigation of various technology innovations at the institutional layer. Such technologies can be mobile computing or broadband Internet. We believe that an in-depth investigation of the views, interactions and dependencies of stakeholders involved in IT diffusion can help policy makers develop effective strategies for the promotion of IT innovation in the business community and general public.

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