Adoption of E-Commerce in SMEs

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INTRODUCTION

Just because e-commerce technologies seem like useful tools that may assist a small to medium enterprise (SME) do its business better, it does not necessarily follow that these technologies will be *adopted* by this business. The implementation of an e-commerce system in an SME necessitates change in the way the business operates, and so it should be considered as an innovation and studied using innovation theory.

Electronic commerce (e-commerce) is concerned with how computers, information systems and communications technologies can be used by people to improve the ways in which they do business. As e-commerce necessarily involves interactions of people and technology, any study of how it is used by a small business must be considered in a socio-technical context. Although there is no universal consensus on what constitutes e-commerce, it must be considered to contain elements of information systems, computer hardware technology, business processes, communications technologies, and people. The complexity of studies in e-commerce is due, to a considerable degree, to the interconnected parts played by human actors and by the multitude of non-human entities involved. Small business managers, sales people, staff involved in procurement and warehouse operations, computers, software, Web browsers, Internet service providers (ISP), modems, and Web portals are only some of the many heterogeneous components of an e-commerce system.

BACKGROUND: ADOPTION OF E-COMMERCE BY AN SME

In this article we will argue that the decision to adopt, or not to adopt a new technology is not a straightforward one and has more to do with the interactions and associations of both human and non-human actors involved in the project than with the characteristics of the technology itself (Tatnall, 2005). Information systems are complex socio-technical entities, and research into their implementation needs to take account of this complexity, which will only be seen if it is reported in all its "messy reality" (Hughes, 1983). Research into the implementation and operation of these systems needs to take this heterogeneity into account and to find a way to give due regard to both their human and non-human aspects.

One view of the adoption of an electronic commerce innovation by a small to medium enterprise suggests that decisions are made primarily based on perceptions, by business managers, of the characteristics of the technology concerned. Such an "essentialist" approach (Haslam, 1998) involves consideration of the "essential" characteristics of the technology. Innovation diffusion (Rogers, 1995) uses this approach and is based upon the following elements:

- characteristics of the innovation itself,
- the nature of the communications channels,
- the passage of time,
- and the social system.

Another approach that has recently gained prominence is the Technology Acceptance Model (TAM), formulated by Davis and his colleagues (Davis, 1986, 1989; Davis, Bagozzi, & Warshaw, 1989). Davis identifies three major determinants of technology acceptance (or adoption) suggested by previous research studies that relate to cognition and effectiveness:

- perceived usefulness and
- perceived ease of use

to which are sometimes added attitude toward using technology and behavioral intention. TAM then attempts to use these factors to explain technology adoption.

Using approaches of this sort, the researcher would probably begin by looking for characteristics of the specific e-commerce technology to be adopted, and the perceptions, attitudes, advantages, and problems associated with its use. The next step would be to suggest that the adoption, or rejection, of this technology by an SME was due largely to these characteristics. We contend that while there may be some validity in such an approach, it is unlikely to provide the complete explanation as it would miss other influences due to inter-personal and intra-business interactions, and to the backgrounds of the people involved.

INNOVATION TRANSLATION

We argue that actor-network theory (ANT) has much to offer in a situation like this. A researcher using an actor-network approach to study innovation would concentrate on issues of network formation, investigating the human and non-human actors and the alliances and networks they build up. They would investigate how the strength of these alliances may have enticed the small business to make the adoption or, on the other hand, to have deterred them from doing so (Tatnall, 2002; Tatnall & Burgess, 2006; Tatnall & Gilding, 1999). While some research approaches to technological innovation treat the social and the technical in entirely different ways, actor-network theory proposes a socio-technical account in which neither social nor technical positions are privileged.

Actor-network theory argues that interactions between actors are heterogeneous and denies that purely technical or purely social relations are possible. It considers the world to be full of hybrid entities (Latour, 1993) containing both human and non-human elements. Change, in the ANT view, results from decisions made by actors, and involves the exercise of power. Latour (1986) argues that the mere possession of power by an actor does not automatically lead to change unless other actors can also be *persuaded* to perform the appropriate actions for this to occur.

In our experience it is often the case that when a small or medium business is considering a technological innovation it is interested in *only some aspects* of this innovation and not others (Tatnall, 2002; Tatnall & Burgess, 2002, 2006; Tatnall & Davey, 2005). In actor-network terms it needs to *translate* (Callon, 1986) this piece of technology into a form where it can be adopted, which may mean choosing some elements of the technology and leaving out others. What results is that the innovation finally adopted is not the innovation in its original form, but a translation of it into a form that is suitable for use by the recipient small business (Tatnall, 2002; Tatnall & Burgess, 2006).

In many instances a small business proprietor will adopt e-commerce because a friend is using it, or because they know a competitor is using it, or because a son or daughter learned about it at school (Burgess, 2002; Tatnall, 2002; Tatnall & Burgess, 2006). The nature and size of each small business, the intra-business interactions in which they engage, and the backgrounds and interests of particular individuals in each are also likely to have had an important affect that would, most likely, have been ignored by the essentialist approach offered by innovation diffusion or TAM. Actor-network theory, in examining alliances and networks of human and non-human actors, provides a good foundation from which small business adoption and use of e-commerce can be researched. The ANT approach will be further amplified in the case studies that follow, particularly in respect of the identification of actors and networks.

CASE STUDIES OF TECHNOLOGY ADOPTION

This article now offers several brief case studies in which actor-network theory has provided a means by which adoption (or non-adoption) of technology can be explained. In each case, data for the study were obtained through semi-structured interviews with the proprietors and personnel of the businesses involved.

1. Adoption of a Portal by a Storage and Transport Company

The business to be considered in this study is a medium-sized Melbourne company, with about 50 employees, that stores frozen food and transports it to supermarkets and other locations around the country. It became clear from the study that the transport company had "not really been into computers" and had only recently started coming to grips with this technology.

Although the manager had some idea of the benefits to his company of using the portal, he had no clear plan for using it. It was just "a really good idea." The reasons he adopted this innovation thus had little to do with the characteristics of this technology, and much more to do with his involvement with the local business community and because of his belief that the portal had the potential to improve business in the region.

2. Adoption of Internet Technologies by a Rural Medical Practice

Rural medical general practitioners (GPs) in Australia have not been rapid adopters of ICT, and this has been of concern to both the commonwealth government and to medical industry bodies (Tatnall, 2005). Many ICT products have been developed to support GPs in all aspects of their work in Australia (GPSRG, 1998), and much research and development in this area has already been undertaken. It is apparent, however, that GPs are not making as much use of these systems as they could be (Burgess, Darbyshire, Sellitto, Tatnall, & Wenn, 2003a).

A study of 1200 randomly selected general practices from across Australia (GPCG, 2001) identified the main uses GPs make of computers. Although a large number of respondent practices (89%) were computerized, it does not necessarily follow that computers are being directly used by the GPs themselves. Major uses identified were administrative functions (85%), clinical functions (76%), script writing (60%), general referral letters (57%), and receiving pathology and other test results electronically (57%). While these figures suggest that most GPs make some use of ICT,

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