Actors' misaligned interests to explain the low impact of an information system – A case study

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ARTICLE INFO

ABSTRACT

The lack of success of information systems has been studied extensively. However, often only the implementation of an information system is studied without analysing the consequent effects on its adoption and later use. Our paper uses actor network theory to show how successful implementation and adoption can lead to a low level of later use and lack of achievement of the declarative goals. The same actors may form networks leading to a successful outcome in one particular situation but not in another. In such a way seamless implementation can hinder the subsequent use and hide problems from the management. An analysis of a case study of an information system's implementation, adoption and later use in a primary school allows a better understanding of the reasons for the subsequent low use.

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1. Introduction

The diffusion of newly developed information systems ("ISs") in an organisation often does not bring the expected benefits (Urbach, Smolnik, & Riempp, 2009). Even if the technical development is appropriate and the IS is successfully implemented in an organisation, for various reasons the desired impact often does not materialise. In order to fully understand these reasons, the activities and happenings during the phases of the IS diffusion process, namely the implementation, adoption, and later use, have to be carefully studied.

Due to the importance of the subject all three phases have been extensively studied. IS implementation has been examined with respect to various kinds of systems such as customer relationship management, knowledge management, business intelligence and content management systems (Hendricks, Singhal, & Stratman, 2007; Pan, Hackney, & Pan, 2008; Sykes, Venkatesh, & Gosain, 2009). Similarly, the adoption of those information systems has been well researched either through use of the technology acceptance model or similar theories (Hwang, 2005) or by attempting to prepare generic or case-specific critical success factors (e.g. Borman & Janssen, 2013; Trkman, 2010). The phase of later use has been well studied using success models such as the Delone and McLean model (Dwivedi, Kapoor, Williams, & Williams, 2013; Floropoulos, Spathis, Halvatzis, & Tsipouridou, 2010; Petter & McLean, 2009; Trkman & Trkman, 2009).

However, in previous studies usually only the implementation was studied without considering the interconnection of adoption and later use (Eze, Duan, & Chen, 2013; Rosemann & Vessey, 2008). Further, most previous studies did not study the interaction of technology-related and social factors in various phases of the IS diffusion process that importantly influence its final outcome. Thus, unsurprisingly previous research reports a large share of projects that failed due to human, organisational and technical factors (Irani, Sharif, & Love, 2001; Pan et al., 2008). The purpose of the paper is to increase understanding of this phenomenon and illuminate the problems organisations face when trying to implement and use information systems.

Accordingly, an analysis of all three phases of the IS diffusion process is needed. The complex interplay between actors such as technology, management, users, the internal IT department and consultants/IS developers needs to be studied to gain a complete picture of the outcome at a certain moment in time. When analysing the outcome of an IS it is insufficient to rely simply on the self-reported opinions of managers or end-users who claim that the IS has had a positive impact on the organisation. A brief analysis of the outcome (by e.g. surveying end-users) can give misleading results since the beliefs are shaped by possible prejudices as a consequence of what happens during these diffusion phases. Our paper employs actor–network theory ("ANT") to study the complex interplay among various actors that influences implementation, adoption and later use. ANT is a philosophical discipline which treats human, non-human, individuals, and groups as equally powerful actors in social networks (Callon & Latour, 1981).

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In order to conduct an in-depth case study, a relatively simple example of an IS that requires a high level of engagement of end-users was selected. The paper thus considers a case study of a primary school and its IS diffusion process. The case involves a relatively small and informal environment that is ideal for a detailed analysis of the formation of relationships and networks. The main research question is how successful implementation and adoption can cause a low level of later use. Further, we aim to show how the same set of actors may form a successful network in one particular situation but not in another by defining two kinds of a network's interest: either the declarative interest (one which is formally set), or the de-facto one (one which, although informal, is real).

The paper's structure is as follows: first, previous findings on the implementation, adoption and later use phase of the IS diffusion process are summarised. Under-researched topics are identified. Afterwards, ANT is presented along with its role in IS research and previous attempts at the visualisation of actor networks. A longitudinal case study of the IS diffusion process of an information system in an organisation is presented and analysed with the help of ANT. Our research's contributions to ANT and IS diffusion research are then discussed along with the limitations of our study and further research opportunities.

2. Phases of the IS diffusion process

The IS diffusion process includes three interlocking and mutually influencing phases of implementation, adoption and later use. As such, the IS diffusion process is not limited to technical development and implementation of the software but also includes adoption and later use. As summarised by Siau (2010), the results of this process include information quality, individuals' use and satisfaction. An isolated study of implementation, adoption and later use can paint an incomplete picture. The transition between these three phases of IS is namely not a straightforward causal relationship (Smith, 2006) and the process is inherently complex and entails several human and technological issues. The result of one phase can have a considerable positive or detrimental effect on the next one. As emphasised by Mitev (2009), we need to study the initiation and diffusion of the project to understand its impact. As such, "the implementation line" between studies of technology development and use needs to be crossed.

It is therefore important to study all three phases of the IS diffusion process together to improve our understanding of why and how information systems are used, what determines the intensity of their use and the impact of the IS on the organisation. We thus follow the recommendation of Cho, Mathiassen, and Gallivan (2009) who suggest formulating stage models to explain how an adopting organisation gains exposure to and experience with a new system over time.

2.1. Implementation

Implementation includes activities to put an IS into operation (adapted from, Grover & Goslar, 1993). The aim is to implement the IS in a specific environment. A decision to implement is made due to social influence, regulatory and market pressures or after having carefully built a business case (Curtis & Payne, 2008; Lapointe & Rivard, 2007). The company may either develop its own IS or implement a pre-developed one. The decision to embrace a pre-developed and tested IS may reduce development risks. However, even such implementations can fail due to multiple organisational, social or technical factors such as unrealistic expectations, a lack of resources, uncooperative customers, the weak management of contractors or even political rivalry (Pan et al., 2008). The successful implementation of ISs remains a theoretical and practical concern because many of them are either rejected by end-users or not fully used (Sharma & Yetton, 2003). One of the main potential caveats is users' resistance to the implementation of ISs. This has been identified as an important reason for the failure of new ISs and hence needs to be understood and managed (Kim & Kankanhalli, 2009).

2.2. Adoption (as the start of use)

Use starts with activities leading towards embracing the new IS – the adoption. Adoption is a process through which an individual or other decision-making unit moves from their first knowledge of an innovation, forming an attitude to the innovation, and making a decision to embrace or reject the new IS (Rogers, 2003). Adoption-related activities may start before the release of the IS with e.g. training or awareness activities. The adoption thus includes two inter-related types of activities. First, the activities of an organisation which positively influence the adoption in general (e.g. organised training) and, second, the activities of an individual user that result in the IS starting to be used.

The overall aim of adoption is mainly focused on an individual user's decision to accept the technology (adapted from, Dasgupta, Granger, & McGarry, 2002). Previous research on adoption by individuals was analysed with either the Theory of Reasoned Action or with the Technology Acceptance Model and its extensions such as the Unified Theory of Acceptance and Use of Technology. One of these theories' greatest strengths is their generalisability across a wide range of technologies and settings (McCoy, Galletta, & King, 2007, Venkatesh, 2006). This research stream chiefly highlights the need for the perceived usefulness and ease of use of the technological solutions since users' behavioural intention depends on the perceived difference between these two constructs. Hundreds of papers have suggested and statistically proven various extensions to these well-known theories. Such research gives a good insight into the reasons for IS adoption, noting that technology characteristics, security, reliability, trust, personal experience, convenience, personalisation and relative advantage influence individual adoption. A better understanding of them would enable us to design effective organisational interventions that might lead to increased user acceptance and use of new IT systems (Venkatesh & Davis, 1996).

However, the individual's technology adoption in an organisational setting is not a simple decision based on perceived usefulness and perceived ease of use. Given that groups often utilise technologies to perform their tasks, it is critical to study how they adopt them (Sarker, Valacich, & Sarker, 2005). For example, an individual's resistance would generally not be sufficient to seriously affect the use of IS, whereas the resistance of a whole group can (Lapointe & Rivard, 2007). Moreover, the success of a group's adoption is not merely the sum of individual decisions because if we assume that all users react similarly and that their reactions are normative and rational then important aspects of the social, psychological and organisational processes through which ISs are diffused and used will be overlooked (Chiasson, Reddy, Kaplan, & Davidson, 2007). Therefore, adoption in an organisational setting is a consequence of complex social interactions shaped by the characteristics of the technological solution. Interactions with co-workers can determine a particular employee's ability and desire to use a solution (Sykes et al., 2009). This has sometimes been neglected since the focus has primarily been on the individual adopting the IS with the context of the adoption together with the fact that social influences have at most been limited to a few explanatory or moderating variables (Jeyaraj & Sabherwal, 2008) such as the opinions of colleagues (Kim & Kankanhalli, 2009).