December 2002

ENTERPRISE SYSTEMS AND SOCIAL NETWORKS: EXTENDING USER ACCEPTANCE THEORY

Glen Murphy
Queensland University of Technology

Artemis Chang
Queensland University of Technology

ENTERPRISE SYSTEMS AND SOCIAL NETWORKS: EXTENDING USER ACCEPTANCE THEORY

Glen D. Murphy and Artemis Chang
Queensland University of Technology,
gd.murphy@student.qut.edu a2.chang@qut.edu

Abstract

Few organisational theorists would dismiss the impact of information technologies on organisational function. However, the increasing complexity of information systems and their increasing integration with organisational function puts into question the utility of research and theory based on past technologies possessing different characteristics. In particular the increasingly sophisticated nature of Enterprise Wide (EW) systems and their degree of organisational impact warrant further investigation. The paper presented here has two distinct aims. The first is to critically examine the nature of Social Network Theory (SNT) and its ability to help researchers understand the impact of EW systems on organisational function. The second is to put forward a social network model of EW technology acceptance, outlining its theoretical contribution. A number of propositions derived from the model are put forward throughout the paper. The first being that EW technology will have an observable impact on organisational function. Second, that organisational social networks will be altered as a result of the changes. Third, that the established social networks will influence individual behaviour and attitudes to the new system.

Keywords: User acceptance; enterprise systems; social network theory; model

Organisations intending to adopt Enterprise Wide (EW) technology do so usually for a specific number of reasons. Principally these reasons revolve around issues of efficiency, responsiveness and/or control, the representations of which manifest themselves in changes to work processes, information and data flows (Davenport 1998; Koch 2001; O'Mahoney & Barley 1999). However, a number of organisations, including a number of high profile multinational firms, have experienced difficulties in realising the benefits offered by EW technology (Bingi, Sharma & Godla 1999). Unexpected outcomes experienced by firms include implementation delays, reduced productivity, lost customers, user resistance and poor data management by employees (Battacherjee & Hirchhiem 1997; Chung & Snyder 2000; Martin, 1998). The highly sophisticated and integrated nature of this type of system can have significant social and human impacts when introduced into an organisation (Huber 1990). It is suggested that the unexpected outcomes mentioned above can be primarily attributed to the impact of EW systems on the existing social networks of an organisation.

This paper intends to use Social Network Theory (SNT) to examine the dynamic interaction between an organisation's social networks and EW systems. While SNT has been used in several studies to examine the impact of networks on the use of technology, the reverse cannot be said. However, examining only the effect of social networks on IT usage avoids the potentially significant impact that EWIS technology can have on an organisation. As mentioned, the increasing sophistication of EWIS are allowing unprecedented networking capabilities within organisations. Changes to work processes, information flows and access to data represent a technology capable of impacts far greater than have been experienced by organisations in the past. Therefore, it is posited that while the impact of networks on the adoption of technology continues to develop a strong body of knowledge, little is still understood about the converse impact of technology on social networks. It is argued that in order to properly understand the interaction between EW technology and social networks one must examine the reciprocal flows of influence and the dynamic interaction between the two.

This paper critically reviews the use of social network theory to examine user acceptance and argues the need for an alternate approach. Instead, a model of user acceptance is put forward explicitly recognising the role of EW technology in the acceptance process. A number of propositions derived from the model are also put forward. The first being that EW technology will have

an observable impact on organisational function. Second, that organisational social networks will be altered as a result of the changes. Third, recognising a reciprocal degree of influence, that established social networks will also influence individual behaviour and attitudes to the new system. In order to understand the need for an extended model of user acceptance and social networks it is vital to understand the peculiar and specific nature of EW systems. The characteristics that differentiate EW technology and hence require a re-examination of previous theory and research is dealt with below.

EW Characteristics

EW type systems claim to allow a "seamless integration" of data throughout an organisation (Fan, Stallaert & Whinston, 2000). These systems are designed to allow single entry data recording and tracking, as well as rapid "real time" information retrieval by multiple users. Their intention is to provide a single integrated data model for several core business functions such as sales, distribution, human resources, accounting and inventory (Al-Mashari & Zairi, 2000). The best current examples of EW packages are enterprise resource planning (ERP) packages such as the market leader SAP R/3.

EW technology can be differentiated from alternate information technologies by three fundamental capabilities. The first concerns the ability of EW technology to alter the movement, distribution and transfer of data and information. The potential for this increasingly integrated technology to change work processes, roles, communication patterns, and reporting relationships are all areas requiring further investigation (Chung & Synder 2000; Huber 1990; O'Mahony & Barley 1999). The second is concerned with, in the majority of cases, the mandatory nature of EW system use. A significant amount of past research has examined the voluntary use of technologies such as E-mail systems or "support" packages such as Lotus Notes or word processing packages. This characteristic also leads to the third key area. In contrast to previous information technologies (such as those previously mentioned) EW technology tends to have an integral linkage to the task requirements and organisational work processes of users. The specifics of this technology type therefore require a re-assessment of established theory and its utility in explaining EW systems acceptance. One theory previously used to examine user acceptance has been Social Network Theory (SNT). The next section will critically review previous attempts by researchers to use SNT in relation to IT acceptance.

Social Network Theory and User Acceptance

A number of studies demonstrate the role of social networks on the usability and success of information systems. Zack & McKenney's (1995) research emphasised the role of social context in IT usage. They noted that similar functional groups operating in different contexts adapted their usage of the technology to suit their social context. This built upon Fulk's (1993) work identifying a link between individual attitudes to communication technology and work group affiliations. Orlikowski, Yates, Okamura and Fujimoto (1995) found that a users interaction with a newly introduced system was significantly influenced by the activities of select network actors. The political effect of key stakeholder reactions to newly introduced information technology has also been identified by Brown (1998; 1995). The findings of such research can be represented in a simple form outlined in Figure 1. below.

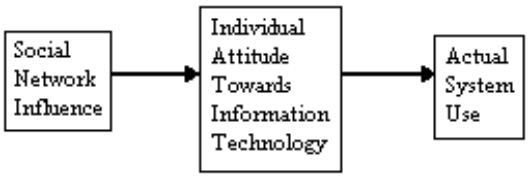

Figure 1. A Simple Social Network Diagram of Technology Acceptance

Essentially the argument put forward by technology researchers using SNT is that social networks are an individuals' primary source of influence in relation to their attitudes towards new technology and a key determinant of their eventual behaviour. While a significant amount of research tends to support this position it is not without its flaws. An especially valid consideration relates to the technology type under examination in many of these studies. Many examine communications technologies (e.g. E-mail) or systems where usage is voluntary (e.g. Zack & McKenney 1995), few deal with systems demonstrating EW capability. As already discussed, one of the defining characteristics of EW technology is the manner in which it can alter the flow of information and allow greater access to data (Davenport 1998). Changing or redistributing access to information resources may result in incomplete networks, shifting balances of power and possible negative impacts on existing social networks (O'Mahoney & Barley

1999). While social network analysis has been used to examine and explain attitudes to newly introduced IT, few studies have investigated the effect of advanced technologies on social networks. Outlined below is a social network model of EW technology acceptance that helps to better explain the impact of introducing such a technology into an organisation.

Proposed Social Network Model of EW Acceptance

It is suggested that up until this point few researchers have considered two key issues addressed by the model put forward in Figure 2. below.

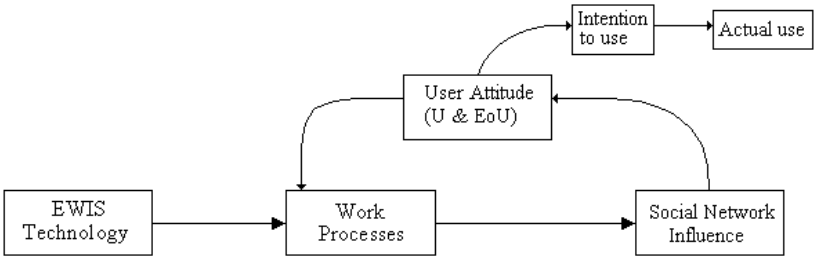

Figure 2. Social Network Model of EW User Acceptance

The first concerns the attention to one particular type of technology and its specific characteristics. As discussed at the beginning of the paper EW systems can be clearly differentiated from earlier information technologies. By concentrating the model on one technology type the model can also be seen to be responding to calls for a greater attention to the technology under examination (Orlowski & Iacono 2001).

The second relates to the issue surrounding the "reciprocity of influence" and is considered the most significant contribution. Previous examinations of social networks and newly introduced technologies assumed a uni-directional flow of influence, from network to technology. The newly proposed model indicates a duality of influence, arguing that while normative attitudes within social networks may indeed determine rates of user acceptance it is also possible that introducing EW technology will alter social network configurations. This has a number of significant consequences and if supported empirically will greatly assist researchers in their understanding of what occurs in an organisation undertaking the implementation of an EW system. The model proposed here is not merely an addition of constructs. Rather, it represents the considered development of a model into one more accurately representing what occurs when introducing EW technology into an organisation. The model represented in Figure 2. has the potential to explain with greater clarity the origin of user resistance, the emergence of political conflict, user acceptance rates and actual utilisation of a newly introduced enterprise wide information system.

Model Components

The model represented in Figure 2. has a number of significant differences in comparison to that represented in Figure 1. While social network influence is obviously maintained, three additional constructs have been included. The four principle components of the model are defined below.

EW technology: The core aim of this system type is to link multiple organisational functions (finance, logistics, HR, production, sales etc.) via an integrated, process driven, data stream. These systems are characterised by "single point entry" of information / data recording as well as real time processing of data. EW technology is also widely touted for its capacity to decentralise information and data access. While a number of vendors produce EW systems with expected proprietary differences in functionality, all can been seen to demonstrate the characteristics outlined here.

Work processes: The term "work processes" is used to describe a wide range of task and function related activities that may be affected by the introduction of a EW system. The nature, extent and details of both the changes and the "processes" involved will differ from organisation to organisation. However, examples of the types of work processes and the changes experienced are increases in lateral (horizontal and inter-group) communication (Lau, Wong & Law 2001) increases in workload monitoring and scrutiny, shifts in resource and information providers as well as changes in accountability and audit trails of work (Haines 1999).

User attitude: This component represents an individual user's attitudes towards the system and their intention to use the system. The operationalisation of this construct will involve the use of attitudinal components developed by Davis (1989), namely perceived *Usefulness* and perceived *Ease of Use*.

Social network influence: This term represents the transmission of attitudes within social network configurations towards the newly introduced system. By including this component the model attempts to recognise social network configurations as effective conduits for prevailing attitudes within a social context. However, in effect this component represents attitude transmission through any number of networks that an individual may be part of within the organisation. For the purposes of this model this component deals with the network configurations associated with spatial proximity, relational proximity and positional proximity (discussed below in Proposition 2.).

A number of propositions can be derived from the above model, these are presented below.

Proposition 1. EW technology will change communication and data flows, work processes and access to information for decision making.

Contemporary EW systems have the potential to significantly affect the work processes and organisational function. This to a large degree is due to the significant differences between information technology researched in the past and the wide ranging, complex capabilities of contemporary enterprise wide systems, so called "third wave" systems (Forster 2000). EW systems claim to allow a "seamless integration" of data throughout an organisation (Fan, Stallaert & Whinston 2000). These systems are designed to allow single entry data recording and tracking, as well as rapid "real time" information retrieval by multiple users. Their intention is to provide a single integrated data model for several core business functions such as sales, distribution, human resources, accounting and inventory (Al-Mashari & Zairi 2000).

The espoused benefits of such systems are numerous. These include: greater information and knowledge management; improved decision making capability; increased flexibility; efficiency gains through process integration and standardisation; improved information access and communication between organisational units, and in some cases, shifts in organisational structure and hierarchy (Al-Mashari & Zairi 2000; Bingi et al. 1999; Carlson 2001; Martin 1998; Pereira 1999; O'Mahoney & Barley 1999). The benefits of the new technology result from the system's ability to provide alternate communication and resource transfer pathways. More importantly EW technologies allow broader access to information resources required for organisational decision making. Huber (1990) identified a number of capabilities that could be realised by such technology. He argued that wider access to critical data and resources would result in changes to the amount and type of individuals involved in decision making; a decrease in face-to-face decision making; a redistribution of decision making concentration; and a reduction in the number of hierarchical levels required to carry out organisational decision making.

A dominant theme within the EW literature is the deterministic nature of this technology type, "one major criticism of enterprise systems is their tendency to impose their own logic or business process on companies" (Davenport 1998). The highly integrated nature of EW technology and organisational function ensures that system use is no longer a voluntary act, but a necessary one in order to fulfil job requirements. Some have gone so far as to suggest that in many cases organisations would benefit from a deliberate attempt to alter their work processes to match the protocols set by the introduced system (Bingi et al. 1999; Pereira 1999). This has been supported by a small amount of research suggesting that an increased level of IT / work process integration is not only inevitable but can lead to intended performance outcomes (Brandyberry et al. 1999; Hitt & Brynjolfsson 1997; Mitchell & Zmud 1999). Therefore, it is argued that the unique characteristics of EW technology, along with contemporary organisational requirements (flexibility, responsiveness, decentralised autonomy) will result in a number of changes. Principally these changes will be concerned with alterations to communication and data flows, changes to work processes and broader access to information for decision making.

Proposition 2: The adoption of EW technology will alter to varying degrees the social network structures within the organisation.

While social network theory (SNT) has long been the domain of sociologists, the utility of the approach has received an increasing level of support among organisational theorists. Its capacity to link the micro and macro elements of organisational research allows a unique perspective to be gained, one not offered by more conventional forms of organisational research (Tichy, Tushman & Fombrun 1979). A key assumption among social network theorists is that the social context surrounding an individual is the primary source of reference for the interpretation and development of perceptions regarding expected behaviours and relationships with others (Meyer 1994). As organisations are essentially socially constructed artefacts, SNT provides a mechanism to

understand the social composition and context of an organisation. Consequently this allows researchers for example, to better understand variations in individual attitudes and behaviour (Nohria 1992), to identify and understand the role of sub-groups within an organisation (Fombrun 1982) and to understand the power distributions within organisations (Tichy et al. 1979). While social network analysis has been used to examine and explain attitudes to newly introduced IT, few studies have investigated the effect of advanced technologies on social networks.

In simple terms a network can be defined as a set of nodes and the set of ties representing some relationship, or lack of, between the nodes (Brass 1995). Demonstrating the versatility of the network perspective, nodes can be categorised as individuals, groups, departments, organisations or entire communities. The principle unit of analysis when examining social networks is the nature of the relationships between each actor node, not the actors themselves (Brass 1995). The strength of the relationships, combined with perceived position and legitimacy of each actor and the extent of their connection to other actors are all considered key determinants of behaviour within organisations (Podolny & Page 1998).

The changes resulting from the adoption of EW technology are in many ways only the visible artefacts of changes experienced by an organisation. How an organisation reacts and deals with the changes, and the extent to which it realises the intended benefits of the adopted system are really only understood by examining the impact of these changes on its' social networks. Important to note is that multiple networks can be in existence at any one time. A brief review of the literature will identify a variety of networks capable of impacting on attitudes, behaviour, organisational processes and function. Three major networks discernible within organisations are networks formed around the spatial, positional and relational proximity of users. The next three propositions concern themselves with the impact of EW systems on each of the three network types.

Proposition 2a: The adoption of EW technology will alter to varying degrees the network structures within the organisation concerned with spatial proximity.

The first and arguably the most obvious organisational social networks are those based around simple direct contact (Meyer 1994) or spatial proximity (Rice & Aydin 1991). *Spatial proximity* is the degree to which individuals are in close geographical or physical contact with each other. Meyer (1994) compares this network to a communicable disease, observing that the transmission of attitude and perception occurs through direct contact of individuals. The extent to which the introduction of EW technology will alter this form of network is dependant on the specific nature of the system. In some cases due to the introduction of electronic communication or increased availability of data, spatial interaction between individuals may actually decrease. In other cases people may change who they interact with, bypassing previous sources of information and advice and contacting new sources. In either case it can be seen that EW technology, by altering work processes and information flows may in many cases alter networks associated with spatial proximity.

Proposition 2b: The adoption of EW technology will have limited impact on the network structures within the organisation concerned with positional proximity.

A second, commonly discussed network is one based around structural equivalence (Meyer, 1994) or positional proximity (Rice & Aydin 1991). Similar to Fombrun's (1982) attribute network, *positional proximity* is concerned with individuals occupying the same position or being structurally proximate, occupying the same roles and consequently the same obligations, status and expectations. Individuals within a positional proximity network are usually indirectly connected due to their similar perspectives, similar socialisation experiences, and their exposure to similar hierarchical controls (Rice & Aydin 1991). The general lack of direct contact between members of this network type however would tend to indicate a reduced level of impact resulting from a EW adoption. Unless the introduction of this system type was accompanied with a radical organisational re-structuring for example, it would be unlikely that individuals located within a positional proximity network would be affected.

Proposition 2c: The adoption of EW technology will alter to varying degrees the network structures within the organisation concerned with relational proximity.

Another network identified by Rice & Aydin (1991) concerns what has been termed relational proximity. *Relational proximity* relates to a communication network in which actors repeatedly interact as they process resources and information, a key element being the extent to which units (individuals/groups) interact indirectly and directly. Fombrum (1982) identified networks of a similar nature, those concerned with cognitive (information / data) and objective (goods) transactions. It is these network types that are considered the most likely to be affected by the introduction of EW technology. By its very nature and function EW technology is inherently linked to the distribution, management and dispersion of information throughout an organisation. It is considered likely that in order to achieve the information and data flows required by EW's the manner in which people

communicate and access information will be significantly altered. These changes will by default alter the social networks constructed around relational proximity.

A limited amount of empirical evidence tends to support the arguments above. Haines (1999) documented the changes in social structure experienced by an organisation moving from a manual filing process to an electronic data warehouse. Essentially the new system shifted the source of expertise away from those previously responsible for the manual filing to those responsible for the maintenance and processing of electronic data. Whereas the filing department in the past had occupied a high degree of centrality due to their physical command over files, their lack of IT competence meant they were either bypassed for information or they themselves had to seek previously unsolicited advice. The change in system and work process in effect changed the social networks with regard to relational proximity and quite possibly spatial proximity. Barley (1990) depicted a similar scenario, describing how the introduction of new medical technologies altered both spatial and relational proximity networks. Younger, more technologically adept radiologists were observed to increase their centrality due to their perceived expertise in diagnosing new forms of data. Older, more experienced radiologists were again either bypassed (perceived as lacking in knowledge) or initiated contact with the younger practitioners in order to obtain advice. Other studies, such as that by Burkhardt and Brass (1990) have confirmed Barley's (1990) observations noting that individuals demonstrating proficiency in newly introduced technology tended to increase in centrality and power at least temporarily.

Therefore it would seem that to varying degrees individuals do change patterns of interaction following the implementation of EW technology. Primarily these changes involve the transmission of resources, at the very least information, but other more potent resources include ideas, attitudes opinions and behaviours. An obvious consequence is the resulting change in networks based around relational proximity, individuals changing who they repeatedly interact with, exchanging information and data. The changes may also have altered the social networks in relation to spatial proximity. This is particularly clear in Barley's (1990) study as the younger radiologists were seen to interact with individuals that in the past may have consulted the older, more experienced practitioners instead. Therefore, it is considered possible that the introduction of EW technology into an organisation can have a significant effect on the established social networks of an organisation.

Proposition 3: The extent to which individuals will accept and use the newly introduced system will depend on the influence of their social networks.

One of the major criticisms of IT research in the past, among others, has been its highly deterministic approach to the role of IT in organisations. While it may be intuitively appealing to consider technology as a primary catalyst for organisational change it neglects to consider what Giddens (1993) refers to as the "duality of structure". Giddens' (1993) point was that while individual action and behaviour is to a certain extent constrained and determined by social context, social context is also determined by human agency and interaction. The failure of past research to acknowledge the role of individual action and the influence of social context in determining the use of IT is considered by many to be a significant oversight (Markus & Benjamin 1997; Orlikowski & Barley 2001). Therefore, it is important to realise the dual role played by social networks in the adoption of EW technology. While established social networks of the firm may be altered by the introduction of new technology, research suggests that they also play a role in determining the adoption and absorption of technology into an organisation.

A growing amount of evidence demonstrates the critical role played by social networks in determining individual attitudes and use of newly introduced technology. Brown & Quarter (1994) examined the impact of social networks on employees decision processes. Their evidence demonstrated that individuals tended to value information sourced from individuals within their established social networks. Individual decision patterns tended to follow network structures and importantly, individuals tended to consider the social network implications of decisions before making them. Burkhardt (1994) also found that individual attitudes and reactions towards technology were affected by their social context. It was determined that different networks influenced attitudes in different areas Direct contact or spatial proximity tended to influence beliefs about personal mastery but structural equivalence had a greater effect on individual attitudes and behaviour.

Network structures based around group or work units appear to be most effective in transmitting attitudes among network members (Meyer 1990). Research examining communication technologies using network analysis has shown that group norms and levels of attraction can influence positive attitudes, assessments of usefulness, and actual use of newly introduced technology (Fulk 1993; Schmitz & Fulk 1991). Research carried out by Zack & McKenney (1995) clearly demonstrated the impact of group structure on technology absorption. Their research examined different groups, with similar functional responsibilities and structure but operating in different social contexts (e.g. co-operation, communication openness, management philosophy). The use and adoption of the newly introduced technology was shown to be dictated by the established social structure of the group and appropriated in such a way that supported/reinforced the existing structure.

Therefore, based on the argument and research presented above it is considered vital that organisations wishing to adopt EW technology consider the effects of existing social networks. While the newly introduced technology may impact on various aspects of work function, established social networks will also determine to varying degrees how the system is perceived and used. Networks relating to spatial, structural and relational proximity have all been shown to determine in some way the manner in which an individual perceives the usefulness of a system, their ability to use the system and the manner in which it is incorporated into their work processes.

Proposed Research Methodology

The most appropriate method of testing the above propositions would appear to be through a series of comparative case studies of between two or three organisations. Data collection would involve a combination of sociometric and psychometric measures. Ideally the study would be longitudinal in design, requiring data to be collected over a defined period. Participants would be requested to fill out a questionnaire of approximately 20 – 30 items depending on the stage of the research. Data collection would occur 3-4 times over a 12-18 month period. The methods suggested here are variations of those undertaken by previous social network researchers such as Meyer (1994), Rice & Aydin (1991) and Ibarra (1993). Where appropriate network data will be analysed using UCINET V for centrality (in-degree & closeness), cliques, coalitions (T3), density and network roles such as stars, bridges and liaisons (Tichy et al., 1979). An approximate time line for data collection is provided below.

T1 **Pre implementation**: Questionnaire (sociometric items) distributed to ascertain social network structures approximately 3 months prior to system implementation

T2 **Pre – "Go live"**: Questionnaire (psychometric items) distributed to ascertain attitudes towards the system 1-4 weeks prior to system go-live

T3 **Post Implementation**: Questionnaire (sociometric and psychometric items) distributed to ascertain attitudes towards the system and network configurations 3-6 months post implementation.

T4 **Post Implementation**: Questionnaire (sociometric and psychometric items) distributed to ascertain attitudes towards the system and network configurations 9-12 months post implementation

Conclusion

A number of significant benefits may be realised by organisations adopting EW technology. However, the peculiar and specific nature of the technology often results in a number of significant changes to organisational social network structures. The extent to which the newly introduced system affects established social networks can determine whether organisations realise the proposed benefits of the system, or experience a number of unexpected outcomes, such as user resistance and reduced productivity. This paper has argued that in order to properly understand the interaction between EW technology and social networks one must examine the reciprocal flows of influence and the dynamic interaction between the two. To this end a number of propositions were offered demonstrating the highly inter-dependant nature of both elements. Propositions one and two discussed the changes to work function and the subsequent changes to network structure resulting from EW adoption. Conversely, proposition three examined the impact of social networks on user attitudes and behaviour towards the new system. Important to note is that this paper represents an evolving process of thought and consideration. In addition to testing the above propositions it is acknowledged that more work is required to develop a more sophisticated understanding regarding the "reciprocity of influence". However, recognising the need to consider the duality of structure when examining this type of sophisticated technology is considered a valuable beginning to better understand the impact of EW on organisations.

References

Al-Mashari, M. and Zairi, M. "The effective application of SAP/R3: A proposed model of best practice," *Logistics Information Management*, (13:3): 2000, pp. 1-10.

Battacherjee, A. and Hirchheim, R. "IT and organizational change: Lessons from client / server technology implementation," *Journal of General Management*, (23:2): 1997, pp. 31-46.

Barley, S. "The alignment of technology and structure through roles and networks," *Administrative Science Quarterly*, (35) 1990, pp. 61-103.
Bingi, P. Sharma, M. and Godla, J. "Critical issues affecting an ERP implementation," *Information Systems Management*, (16:3), 1999, pp. 7-15.
Brandyberry, A. Rai, A. and White, G. "Intermediate performance impacts of advanced manufacturing technology systems: An empirical investigation," *Decision Sciences*, (30), 1999, pp. 993-1020.
Brass, D. "A social network analysis on Human Resource Management," *Research in Personnel and Human Resources Management*, (13), 1995, pp. 39-79.
Brown, A. "Narrative, politics and legitimacy in an IT implementation," *Journal of Management Studies*, (35), 1998, pp. 35-59.
Brown, A. "Managing understandings: Politics, symbolism, niche marketing and the quest for legitimacy in an IT implementation," *Organization Studies*, (16), 1995, pp. 951-969.
Brown, J. and Quarter, J. "Resistance to change: The influence of social networks on the conversion of a privately-owned unionized business to a worker cooperative," *Economic and Industrial Democracy*, (15), 1994, pp. 259-282.
Burkhardt, M. and Brass, B. "Changing patterns or patterns of change: The effects of a change in technology on social network structure and power," *Administrative Science Quarterly*, (35), 1990, pp. 104-127.
Carlson, P. "Information technology and organisational change," *Journal of Technical Writing and Communication*, (31:1), 2001, pp. 77-95.
Chung, S. and Snyder, C. "ERP adoption: A technological evolution approach," *International Journal of Agile Management Systems*, (2:1), 2000, pp. 24-32.
Davenport, T. "Putting the enterprise into the enterprise system," *Harvard Business Review*, (76:4), 1998, pp. 121-131.
Davis, F. "Perceived usefulness, perceived ease of use and user acceptance of information technology," *MIS Quarterly*, (13), 1989, pp. 319-339.
Fan, M. Stallaert, J. and Whinston, A. "The adoption and design methodologies of component-based enterprise systems," *European Journal of Information Systems*, (9), 2000, pp. 25-35.
Fombrun, M. "Strategies for network research in organizations," *Academy of Management Review*, (7), 1982, pp. 280-291.
Forster, N. "The potential of third-wave technologies on organisations," *Leadership and Organization*, (21), 2000, pp. 254-262.
Fulk, J. "Social construction of communication technology," *Academy of Management Journal*, (36), 1993, pp. 921-950.
Giddens, A. *Social theory and modern sociology,* Cambridge, England, Polity, 1993.
Haines, D. "Letting "the system" do the work: The promise and perils of computerization," *The Journal of Applied Behavioural Science*, (35), 1999, pp. 306-324.
Hitt, L. and Brynjolfsson, E. "Information Technology and internal firm organization: An exploratory analysis," *Journal of Management Information Systems*, (14:2), 1997, pp. 81-101.
Huber, G. "A theory of the effects of advanced information technologies on organisational design, intelligence, and decision making," *Academy of Management Review*, (15:1), 1990, pp. 47-71.
Ibarra, H. "Network centrality, power and innovation involvement: Determinants of technical and administrative roles," *Academy of Management Journal*, (36:3), 1993, pp. 471-501.
Koch, C. "Enterprise resource planning: Information technology as a steamroller for management politics," *Journal of Organizational Change Management*, (14:1), 2001, pp. 64-78.
Lau, T. Wong, Y. and Law, M. "Information technology and work environment – does it change the way people interact at work?," *Human Systems Management*, (20), 2001, pp. 267-279.
Markus, M. and Benjamin, R. "The magic bullet theory in IT-enabled transformation," *Sloan Management Review*, Winter, 1997, pp. 55-68.
Martin, M. "Enterprise Resource Planning software," *Fortune*, February 2, 1998, pp. 149-151.
Meyer, G. "Social information processing and social networks: A test of social influence mechanisms," *Human Relations*, (47), 1994, pp. 1013-1037.
Mitchell, V. and Zmud, R. "The effects of coupling IT and work process strategies in redesign projects," *Organization Science*, (10:4), 1999, pp. 424-438.
Nohria, N. 1992. "Is a network perspective a useful way of studying organizations ?," in *Networks and Organizations,* Nohria, N and Eccles, R. (Eds.), Boston, Harvard Business Press, pp. 1-22.
O'Mahoney, S. and Barley, S. "Do digital telecommunications affect work and organisation ? The state of our knowledge," *Research in Organisational Behaviour*, (21), 1999, pp. 125-161.
Orlikowski, W. and Barley, S. "Technology and institutions: What can research of information technology and research on organisations learn from each other ?," *MIS Quarterly*, (25), 2001, pp. 145-165.
Orlikowski, W. and Iacono, C. "Desperately seeking the "IT" in IT research – A call to theorising the IT artifact," *Information Systems Research*, (12), 2001, pp. 121-134.

Orlikowski, W. Yates, J. Okamura, K. and Fujimoto, M. "Shaping electronic communication: The meta-structuring of technology in the context of use," *Organization Science*, (6), 1995, pp. 423-444.

Pereira, R. "Resource view theory analysis of SAP as a source of competitive advantage for firms," *The DATA BASE for advances in Information Systems*, (30:1), 1999, pp. 38-46.

Podolny, J. and Page, K. "Network forms of organisation," *Annual Review of Sociology*, (24), 1998, pp. 57-76.

Rice, R. and Aydin, C. "Attitudes toward new organizational technology: Network proximity as a mechanism for social information processing," *Administrative Science Quarterly*, (6), 1991, pp. 219-244.

Schmitz, J. and Fulk, J. "Organizational colleagues, media richness and electronic mail,". *Communication Research,* (18:4), 1991, pp. 487 –524.

Tichy, N. Tushman, M. and Fombrun, C. "Social network analysis for organizations," *Academy of Management Review*, (4), 1979, pp. 507-519.

Zack, M. and McKenney, J. "Social context and interaction in ongoing computer-supported management groups," *Organization Science*, (6), 1995, pp. 394-422.