TOWARDS A MOTIVATIONAL THEORY OF TECHNOLOGY IMPLEMENTATION PROCESSES

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Abstract

Managing the selection and implementation of information technology is a critically important activity, but significant gaps exist in our understanding of that process. This paper proposes an alternative research approach, in which the motivation to implement a system is the starting point for understanding subsequent adoption processes. The paper has three main components: first we justify the use of motivation as the key to understanding adoption activities and outcomes for bundled (divisible) technologies. We then illustrate the operation of our theory with simplified examples of interorganizational system implementations. Finally, we list key conceptual and methodological requirements for analyzing implementation processes using this method.

Keywords*: implementation, acceptance, enterprise systems, interorganizational systems.*

1 INTRODUCTION

Managing the selection and implementation of information technology is a critically important issue for organizations, particularly when the technology is complex and expensive. Interorganizational systems (IOS) and enterprise resource-planning systems (ERP) are two examples of this type of technology. The importance of this topic is reflected in the large amount of technology adoption research conducted since the earliest days of the Information Systems discipline (e.g. Lucas Jr. 1975, Glennon 1978). Through that work, researchers have attempted to gain a better understanding of a range of technology adoption issues, particularly the greatest influences on the decision to use a technology, and the timing of that decision (Jeyaraj et al. 2006). That research has been criticized strongly by a number of researchers, however, most notably Rogers (1976, 1995), Lyytinen and Damsgaard (2001), and Fichman (2004), who cite a raft of problems including: a scarcity of work that treats technology implementation as a process that unfolds over time (research tends to focus on the initial adoption decision), an overwhelming focus on the individual (rather than the organization) as the unit of analysis, and a tendency to treat a system merely as a technological artifact (information systems have systemic, social and technical elements).This paper is organized as follows. In the next section, we describe our motivation-based processual theory of technology adoption, and justify the use of motivation as the key to understanding adoption activities and outcomes for bundled (divisible) technologies. We propose that system implementation activities are best though of as a chain of related events, initiated and influenced strongly by the motivation underlying the decision to proceed with the system. We then illustrate the operation of our theory using simplified examples. Finally, we list key requirements for using a process-focused method and explain why those requirements are particularly problematic in past technology implementation research. Each problem is described in detail, and the ways in which a process-based approach addresses those limitations is explained.

2 UNDERSTANDING IMPLEMENTATION THROUGH MOTIVATION

Our central argument is based on two key points. Firstly, the motivation to adopt a system defines many of the activities performed when implementing the system, and even affects fundamental design, technical capabilities. Process-focused theories and methodologies must be used to understand the full impact of motivational influences on these activities because system implementation is not a discrete event but rather a series of events in which each activity helps to define, frame, and direct subsequent activities. Adopting this processual view differentiates our approach from prior technology adoption studies, which implicitly treat implementation as an event by examining only the initial adoption decision (ignoring later activities).Our second justification for this position is that large and complex organizational systems are systemic in nature (not just technical artifacts) and can be unbundled. In other words, organizational systems are assemblies or bundles of technologies and processes that can be disassembled, and reconfigured. Lyytinen and Damsgaard (2001) argue that this characteristic of organizational systems has generally been ignored in the diffusion of innovations literature — although their criticism also applies to the wider technology acceptance literature — with the result that past research has (1) assumed (unrealistically) that a technology must be accepted or rejected in its entirety, and (2) failed to recognize that the significance and "meaning" of these systems varies from one context to another.Analyzing these systems using a processual approach overcomes these objections by allowing researchers to account for the context-specific nature of a system implementation. For example, an out-of-the-box ERP implementation and a more customized solution are likely to present vastly different challenges throughout the implementation process. Using a process approach allows longitudinal tracing of these effects as well as an examination of contextual influences. Our model is shown in Figure 1. It begins with motivation and proceeds through the definition of success criteria, investigation and analysis, implementation activities, and organizational outcomes.

Figure 1: Motivation oriented process model

Note that we do not begin with system capabilities, top management support, organization size, or other factors closely associated with the decision to adopt. In our model, these factors merely make some outcomes easier or harder to achieve, but they are not reasons to adopt in their own right. For example, technical capabilities help determine what can be done with a system, but are not the system's purpose.Somewhat surprisingly, the role of motivation has not been examined in much depth in prior research. Instead, researchers have most often tried to develop factor-based IOS implementation models with high explanatory power (Premkumar et al. 1997, Chau and Hui 2001, Chwelos et al. 2001), or tried to account for the range of benefits obtained from such systems following implementation (Cavaye and Cragg 1995, Lee and Lim 2003, Subramani 2004). Peffers et al. (1998), who describe the IOS implementation efforts of six firms, and detail for each whether each project is initiated internally or externally, the primary motivation, implementation problems, and the post-implementation impact, is a notable exception, as is recent work by Rahim et al. (2006, 2007), who propose that "techno-economic" and "socio-political" motivations affect the types of implementation activities performed. This research builds on those studies by developing a more detailed, theory-based explanation of how the motivation to adopt an IOS affects subsequent system investigation, and implementation activities, how the system will be used, and long-term consequences for the adopting firm.

3 THE DEFINING ROLE OF MOTIVATION

We particularly highlight the rationale (motivation) to adopt a technology in our model because, logically, motivation must shape subsequent activities; essentially, activities will be designed to achieve objectives. This line of reasoning is supported by empirical evidence that motivation defines the criteria by which the implementation process and subsequent performance of the system will be assessed (Swanson 1994, Bergman et al. 2002), as well as subsequent activities related to that decision, such as how it is justified, implemented, and used (King and Gribbins 2002, Rahim et al. 2007). Motivation even appears to determine key aspects of the interorganizational relationship(s) that are integral to system implementation, including partner choice, governance mechanisms adopted, and the division of labor (Child et al. 2005). To demonstrate our framework, we next describe motivational impacts using two example motivations, resource-efficiency and market power, for a hypothetical interorganizational system (IOS) implementation.

3.1 Resource efficiency

The resource-efficiency motive is a long-established reason for entering cooperative relationships (e.g. see Schermerhorn 1975). The essential argument is that organizations experiencing financial pressures, particularly financial distress, will try to modify business practices to offset perceived weaknesses. For example, a company may outsource business functions to a partner who offers specialization and production economies of scale and superior management practices (Domberger 1998). Resource efficiency is believed to motivate many IOS implementations; these systems are designed to reduce the cost of interorganizational transactions by reducing the direct cost of document generation, processing, transmission and storage, as well as creating indirect savings by reducing the incidence of data-handling errors (and associated re-processing costs) and the number of data-processing related delays in business processes (Riggins et al. 1994).Two distinct types of resource efficiency are commonly described in the literature, one where the aim is to save money in the short term through more efficient transaction processing (Dai and Kauffman 2002), and another where the aim is to implement a more efficient organizational structure by transforming key processes (Clark and Stoddard 1996, Boudreau et al. 1998). For the sake of brevity, we will describe only the transactional efficiency variant. Using that motivation, the technology is justified on financial grounds (e.g. cost-benefit). This focus on transactional efficiency means that the system does not represent a strategic investment (DiRomualdo and Gurbaxani 1998), and any changes to business processes are directed towards automated transaction processing rather than business transformation. Chen and Williams (1998) and

Kheng and Al-Hawamdeh (2002) describe examples of this approach, where companies invest in IOS infrastructure motivated by the potential to improve efficiency (fewer data entry errors and lower labor costs). In these cases, where the IOS is seen simply as way to process transactions more efficiently, implementation efforts tend to be directed towards automating operational systems. Typically, improving the depth and quality of management information (sometimes described as "informating") is not seen as a priority. The main problem that has been identified with the "efficient transaction" motivation is that these automation focused systems provide only modest performance improvements (if any), and put the firm at a long-term competitive disadvantage compared to those that also transform business processes (Clark et al. 1996).

3.2 Market power

Under the market power motivation, cooperation is a mechanism for gaining power over competitors or business partners. That is, the cooperation may be focused on changing relative bargaining power within the alliance, or the competitive success against rivals in the market. The *within-alliance* power strategy is often described using transaction cost economics (TCE) terminology; TCE proposes that the relative bargaining power within an alliance is particularly affected by asset specificity (Williamson 1987). In particular, parties within the alliance can change their relative power by making investments in relationship-specific assets to generate higher levels of dependence. Subramani (2004) describes how a mattress manufacturer implemented a make-to-order and quick delivery IOS to allow a retailer to reduce inventories while improving customer service. The long-term impact of the make-to-order system was an increase in the manufacturer's bargaining power.The *market dominance* strategy is typically evaluated using market power theory (Hymer 1976, Porter 1980). This theory holds that cooperation is an opportunity for firms to change their position within an industry (i.e. motivated by strategic concerns). For example, Hymer (1976) describes how individually weak firms can form a defensive coalition to secure their position, and how companies can form offensive coalitions to develop competitive strengths. Child et al. (2005) describe the OneWorld alliance between British Airways and other airlines as an example of this strategy, with the information and resource sharing involved potentially giving members an advantage on key routes.These characteristics of the market power motivation suggest that the system analysis and design phase will emphasize information requirements (not cost-efficiency), and that the actual implementation efforts will be directed towards creating more specialized, relationship-specific assets (technology and business processes) on the basis that specialized assets potentially generate more value than generic assets, and can create exit barriers for business partners (Subramani 2004). A large amount of cooperation is required from business partners for this strategy to succeed. Implementation activities associated with this motivation therefore are not just technical: success also depends on relationship building activities and the cooperation of trading partners (Subramaniam et al. 2000).

3.3 Motivation chain illustrated

These motivation chains are illustrated Figure 2, each divided into motivation, investigation, implementation, and long-term risk/consequences stages, representing the pre-implementation (planning), implementation, and use activities. The steps shown are, implicitly, a series of testable propositions regarding the influence of motivations adoption and implementation activities. Testing the model is the next step in a larger research program currently in progress. Of course, resource efficiency and market power are not the only two motivations available. In principle, our approach supports analysis of a wide variety of motivations and technologies. Other possible motivations include gaining access to improved information, improving image/reputation, and preventing loss of business (external coercion); alternative complex systems include enterprise systems, customer relationship management systems, and inventory management systems.

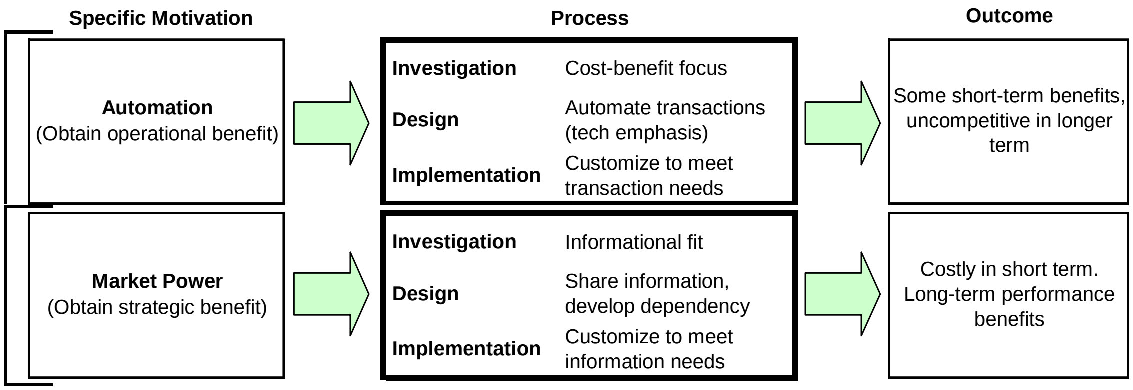

Figure 2: Two possible motivation chains for an IOS implementation

4 REQUIREMENTS FOR ANALYZING IMPLEMENTATION PROCESSES

Using a motivation-based processual approach has many conceptual advantages over static influence models, which simply map relationships between variables. It also, however, imposes a number of conceptual and methodological requirements on investigations. Three of these are particularly worth noting, because they have been identified as serious limitations within the wider technology acceptance literature. These are: (1) analyze the adoption process in its entirety, (2) recognize that the flexible and divisible nature of systems affects the fundamental nature of the technology studied, and types of problems it addresses, and (3) recognize that motivations create causal chains in which the motivation underlying a project determines the activities performed and how they are accomplished. Each requirement will now be explained in more detail.

4.1 Analyze the adoption process in its entirety

The first requirement for a process-based theory is that the activities — as well as the causes and results of those activities — throughout the entire adoption process should be analyzed. This may sound obvious, but the requirement points to a subtle bias in technology acceptance research: that technology adoption research has tended to focus almost exclusively on identifying factors that make people more likely to purchase and/or use a given technology. Rogers (1976), in a critique of marketing research, argues this focus is strongly biased towards the needs of the producer and seller of the technology, and that comparatively few studies assess consumer-oriented issues such as “what information does the consumer need to know to make an intelligent decision?”

In the Information Systems domain, most researchers appear to have designed their study from the perspective of the IT vendor, with the typical question being "what makes people want to adopt a given technology?" (Fichman 2004). Issues of more direct importance to organizations have been largely ignored. For example, few technology adoption studies have been concerned with the question of how the technology is implemented or used following the initial decision to adopt. Focusing on adoption influences is particularly problematic for the IS field due to the large number of systems development projects that fail, and the high rate of abandonment (or non-deployment) of new technologies. These post adoption-decision outcomes are not included in research that examines only the adoption decision (and ignores post-adoption outcomes), but also not included in studies that focus on successful implementations (the majority of studies). Past research that has focused on drivers of adoption may even have exacerbated the technology failure problem. That is, past research has given us a solid understanding of the types of factors that affect technology acquisition and implementation, and how to manage that process in both individual and organizational contexts. That body of research, however, has generally only examined the accept/reject decision, and ignored the question of whether the technology should have been adopted in the first place. In other words, the general thrust of research has been directed at issues that are important to technology vendors – the factors that make acquisition more or less likely. The high rate of failure for new technologies (and the consequent assimilation gap identified by Fichman and Kemerer (1993)) however, suggests that post-acquisition processes are still problematic.

4.2 Recognize the flexible and divisible nature of systems

Our second point is that process-based research requires researchers to allow for context-dependent variation in the definition of the technology, and the conceptual "implementation space." The essential point here is that organizational technologies, such as ERP and IOS systems, are flexible (can support many activities) and divisible (can be adopted piecemeal); they are thus more accurately described as technology *bundles* rather than a discrete technology. For these systems, variation between organizations can be significant, both in terms of the specific components implemented, and in how they operate (and are used). Lyytinen and Damsgaard (2001) suggest that a failure to take into account these differences may, in fact, have compromised many large-scale surveys of IT use. Markus (2000) similarly questions the validity of studies that ignore these system-specific differences. Process-based analysis of IT implementation is less subject to flexibility and divisibility issues than large-scale survey-based research: surveys tend to measure somewhat abstract concepts to allow technically different systems to be treated as conceptually similar; in process-based analysis, however, these differences are key events/issues that must be analyzed explicitly in order to understand events and relationships. For example, our motivation model predicts that motivation largely determines key aspects of the design of a system, as well as how it is implemented and used.The nature of ERP systems provides some insight into the flexibility problem in IS research (although it also applies to IOS and CRM technologies). A characteristic of ERP systems is that they support many business functions (e.g. accounts payable, inventory control, and payroll) and work activities (e.g. information sharing and process automation); indeed, vendors have promoted these systems as a complete solution to organizational information processing needs (Markus et al. 2000). Unfortunately, flexibility is usually ignored in survey-based research into these systems, with most studies simply distributing surveys to companies in a target population (usually more than 100), and asking each respondent a series of standardized (and abstract) questions about the organization's use of that technology (Markus 2000, Lyytinen et al. 2001). Researchers invariably acknowledge that adopting this technology is not simply a matter of purchasing and installing a piece of software; however, the survey research method (often used) does not allow researchers to investigate ERP adoption as a sociotechnical process involving intangible social elements, such as the approach to IT/IS governance, work procedures, and management activities (organizing and managing the firm). That these systems are sociotechnical in nature means that researchers must be quite careful in defining the object of their enquiry: differences in the wider (and just as important) social aspects of the system may make cross-system comparisons difficult, and confound analysis, due to their intricate — and difficult to separate — relationship with the technology. In other words, if two organizations use the same piece of software, researchers should not assume automatically that the systems are comparable. Markus (2000, p. 13) argues that path dependencies created by these sociotechnical issues make attempts to compare the experiences of two different companies presently adopting similar technologies enormously difficult for IS researchers in the sort term, and, in the longer term, hinder the process of producing a cumulative body of knowledge about Information Systems.Like flexibility, divisibility is also not usually taken into account in survey-based research into system adoption, but is explicitly addressed in process-focused research. By divisible technology, we mean technologies for which it is possible to adopt some parts and reject others, but still be regarded as having implemented that technology. Again in the context of ERP, many companies initially implement only a limited subset of available modules (e.g. accounts payable, accounts receivable, and general ledger). Additional major systems, such as CRM, are often sourced from a different vendor and not integrated with other back-office systems (Bygstad 2003). In other cases, many more modules are implemented, and serious efforts are made to ensure that all modules are integrated and function as a single system (Brohman et al. 2003). When dealing with divisible technologies, therefore, researchers must be clear about exactly which technologies (or parts thereof) they are assessing.

4.3 Gather evidence of causality

The third requirement of the motivation-based processual approach is that methods and theories must support the discovery and analysis of evidence about causal chains with an emphasis on explaining *why* certain events were (or should be) observed, and the process by which the events occurred. From a methodological perspective, motivation is a particularly important element in analysis of causal relationships, because, as Thalos (2003) points out, "a causal account must illuminate motivations, because doing so illuminates the aims and interests, lacking which we cannot explain why these social practices come to be and not potential others" (p. 105). Understanding motivation is the therefore the key to understanding the chain of events in system acquisition and implementation processes.Interestingly, although demonstrating causality is the objective of much scientific enquiry, it presents many methodological and philosophical problems (Pearl 2000). At the very least, a researcher wishing to prove causality should demonstrate antecedence, dependence, and contiguity (Born 1949). That is, antecedent events or changes in explanatory variables must not occur after the observed outcome, the outcome must be logically dependent on certain events or values, and the researcher must demonstrate the existence of a required chain of contiguous events. These are difficult to demonstrate in the typical static influence model (based on a single-shot post-event survey) which, in the absence of temporal data, lacks evidence for the presence of a causal event sequence. Demonstrating causality using the processual approach similarly should not be attempted using only post-event data. Instead, a combination of data gathering methods should be used, including archival (memos and project documents), interview data, and possibly survey data. Lin et al. (2004) who analyzed the adoption of a new module within a law enforcement support system using a combination of surveys, interviews and archival documents, is an example of how these principles can be applied. It demonstrates causality through a combination of historical evidence (to show the order in which events occur) and logical dependence (that one event should influence another).

5 CONCLUSION

In this paper, we have described a motivation-based processual theory of IS adoption. We have shown how the model works using sample motivations, and described conceptual requirements for motivation-based analysis. Our central argument is that process-based analysis provides significant methodological and conceptual benefits over more commonly used approaches in technology adoption research. Methodologically, the process focus lends itself to multi-method analysis including the use of rich single-site analysis, multiple case studies, and multiple surveys (Markus 2000). At the conceptual level the research approach outlined here provides a framework for assessing causal influences related to the decision to implement a system. For example, using our research model, one can ask which events influenced success or failure. It can potentially also be used to predict issues, such as implementation activities that follow logically from different starting points, and so may help illustrate to decision makers the long-term importance of motivations, particularly the need to ensure that operational issues do not jeopardize long-term plans (Rahim et al. 2006).This research approach is the basis for a wider research program (that we are currently conducting) in which we assess the impact of motivation on the system implementation process. Our initial work focuses on interorganizational systems (Rahim et al. 2006, Rahim et al. 2007). Follow-up work will examine other types of large scale system implementation processes, particularly enterprise systems and customer relationship management systems.

References

Alter, S. (2002), 'The work system method for understanding information systems and information system research,' *Communications of the Association for Information Systems*, 9(6): 90-104.

Bergman, M., King, J.L. and Lyytinen, K.J. (2002), 'Large Scale Requirements Analysis as Heterogeneous Engineering,' *Scandinavian Journal of Information Systems*, 14(1): 37-55.

Born, M. (1949), *Natural Philosophy of Cause and Chance*, Oxford: Clarendon Press.

Boudreau, M.-C., Loch, K.D., Robey, D. and Straub, D.W. (1998), 'Going global: Using information technology to advance the competitiveness of the virtual transnational organization,' *Academy of Management Executive*, 12(4): 120-128.

Brohman, M.K., Watson, R.T., Piccoli, G. and Parasurama, A. (2003), 'Data completeness: a key to effective net-based customer service systems,' *Communications of the ACM*, 46(6): 47-51.

Bygstad, B. (2003), 'The implementation puzzle of CRM systems in knowledge based organizations,' *Information Resources Management Journal*, 16(4): 33-45.

Cavaye, A.L.M. and Cragg, P.B. (1995), 'Factors contributing to the success of customer oriented interorganizational systems,' *Journal of Strategic Information Systems*, 4(1): 13-30.

Chau, P.Y.K. and Hui, K.L. (2001), 'Determinants of small business EDI adoption: An empirical investigation,' *Journal of Organizational Computing and Electronic Commerce*, 11(4): 229-252.

Chen, J.C. and Williams, B.C. (1998), 'The impact of EDI on SMEs: Summary of eight British case studies,' *Journal of Small Business Management*, 36(4): 68-72.

Child, J., Faulkner, D. and Tallman, S.B. (2005), *Cooperative Strategy*, New York: Oxford University Press.

Chwelos, P., Benbasat, I. and Dexter, A.S. (2001), 'Empirical test of an EDI adoption model,' *Information Systems Research*, 12(3): 304-321.

Clark, T.H. and Stoddard, D.B. (1996), 'Interorganizational Business Process Redesign: Merging Technological and Process Innovation,' *Journal of Management Information Systems*, 13(2): 9-28.

Dai, Q. and Kauffman, R.J. (2002), 'Business Models for Internet-Based B2B Electronic Markets,' *International Journal of Electronic Commerce*, 6(4): 41-72.

DiRomualdo, A. and Gurbaxani, V. (1998), 'Strategic intent for IT outsourcing,' *Sloan Management Review*, 39(4): 67-80.

Domberger, S. (1998), *The Contracting Organization: A Strategic Guide to Outsourcing*, Oxford: Oxford University Press.

Fichman, R.G. (2004), 'Going beyond the dominant paradigm for information technology innovation research: Emerging concepts and methods,' *Journal of the Association for Information Systems*, 5(8): 314-355.

Fichman, R.G. (2004), 'Going beyond the dominant paradigm for information technology innovation research: Emerging concepts and methods,' *Journal of the Association for Information Systems*, 5(8): 314-355.

Fichman, R.G. and Kemerer, C.F. (1993), 'Adoption of software engineering process innovations: The case of object orientation,' *Sloan Management Review*, Winter: 7-22.

Glennon, J.T. (1978), 'MIS Systems: The Role of Authority and Responsibility,' *MIS Quarterly*, 2(2): 1-6.

Hymer, S.H. (1976), *The international operations of national firms: A study of direct foreign investment*, Cambridge, MA: MIT Press.

Jeyaraj, A., Rottman, J.W. and Lacity, M.C. (2006), 'A review of the predictors, linkages, and biases in IT innovation adoption research,' *Journal of Information Technology*, 21: 1-23.

Kheng, C.B. and Al-Hawamdeh, S. (2002), 'The Adoption of Electronic Procurement in Singapore,' *Electronic Commerce Research*, 2(1): 61-73.

King, R.C. and Gribbins, M.L. (2002), 'Internet technology adoption as an organizational event: an exploratory study across industries,' in *HICSS'02 - The 35th Hawaii International Conference on System Sciences*, 2683-2692 from.

Lee, S. and Lim, G.G. (2003), 'The impact of partnership attributes on EDI implementation success,' *Information and Management*, 41(2): 135-148.

Lin, C., Hu, P.J.-H. and Chen, H. (2004), 'Technology Implementation Management in Law Enforcement,' *Social Science Computer Review*, 22(1): 24-36.

Lucas Jr., H.C. (1975), 'Performance and the Use of an Information System,' *Management Science*, 21(8): 908-919.

Lyytinen, K.J. and Damsgaard, J. (2001), 'What's wrong with the diffusion of innovation theory? The case of complex and networked technology,' in *Diffusing Software Products and Process Innovations*, M.A. Ardis and B.L. Marcolin (Eds.), Norwell MA: Kluwer Academic Publishers, pp. 173-190.

Markus, M.L. (2000), 'Conceptual challenges in contemporary IS research,' *Communications of the Association for Information Systems*, 3(1): Article 4.

Markus, M.L. and Tanis, C. (2000), 'The Enterprise Systems Experience-From Adoption to Success,' in *Framing the Domains of IT Management: Projecting the Future.Through the Past*, R.W. Zmud (Ed.) Ann Arbor, MI: Pinnaflex Educational Resources, pp. 173–207.

Orlikowski, W.J. (1996), *Information technology and changes in organizational work*: Chapman & Hall.

Pearl, J. (2000), *Causality: Models, Reasoning, and Inference*, Cambridge: Cambridge University Press.

Peffers, K., Dos Santos, B.L. and Thurner, P.F. (1998), 'Motivation, implementation, and impact of electronic data interchange among US and German firms,' *Information Services and Use*, 18(3): 177-189.

Porter, M.E. (1980), *Competitive Strategy*, New York, USA: Free Press.

Premkumar, G., Ramamurthy, K. and Nilakanta, D. (1997), 'Determinants of EDI adoption in the transportation industry,' *European Journal of Information Systems*, 6(2): 107-121.

Rahim, M.M., Shanks, G. and Johnston, R.B. (2006), 'Understanding IOS Adotion Processes in a First Tier Automotive Supplier Company: Application of the Theory of IOS adoption motivation,' in *The 14th European Conference on Information Systems (ECIS 2006)*, J. Ljungberg and B. Dahlbom (Eds.), Göteborg, Sweden from.

Rahim, M.M., Shanks, G. and Johnston, R.B. (2006), 'Understanding IOS Adotion Processes in a First Tier Automotive Supplier Company: Application of the Theory of IOS adoption motivation,' in *The 14th European Conference on Information Systems (ECIS 2006)*, J. Ljungberg and B. Dahlbom (Eds.), June 12-14, 2006, Göteborg, Sweden from http://is2.lse.ac.uk/asp/aspecis/20060078.pdf.

Rahim, M.M., Shanks, G., Johnston, R.B. and Sarker, P. (2007), 'Organizational Motivation and Inter-Organizational Systems Adoption Process: Empirical Evaluation in the Australian Automotive Industry,' *Journal of Electronic Commerce in Organizations*, (in press).

Riggins, F.J., Kriebel, C.H. and Mukhopadhyay, T. (1994), 'The Growth of Interorganizational Systems in the Presence of Network Externalities,' *Management Science*, 40(8): 894-998.

Rogers, E.M. (1976), 'New Product Adoption and Diffusion,' *Journal of Consumer Research*, 2(4): 290-301.

Rogers, E.M. (1995), *Diffusion of Innovations* (4th Ed.), New York, USA: The Free Press.

Schermerhorn, J.R. (1975), 'Determinants of Interorganizational Cooperation,' *Academy of Management Journal*, 18(4): 846-856.

Subramani, M. (2004), 'How do suppliers benefit from information technology use in supply chain relationships?,' *MIS Quarterly*, 28(1): 45-73.

Subramaniam, C., Shaw, M.J. and Gardner, D.M. (2000), 'Product Marketing and Channel Management in Electronic Commerce,' *Information Systems Frontiers*, 1(4): 363-378.

Swanson, R.A. (1994), *Analysis for Improving Performance: Tools for Diagnosing Organizations and Documenting Workplace Expertise*: Berrett-Koehler Publishers.

Thalos, M. (2003), 'Searle's Foole: How a constructionist account of society cannot substitute for a causal one,' *The American journal of economics and sociology*, 62(1): 105-122.

Williamson, O.E. (1987), *The economic institutions of capitalism*: Free Press.