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Recommended Citation  
Johnston, Robert; Shanks, Graeme; Rahim, Mahbubur; and Smith, Stephen, "From Intention to Motivation: Developing a Motivation-based Model of IOS Adoption and Implementation" (2007). *ICIS 2007 Proceedings*. 116.  
http://aisel.aisnet.org/icis2007/116

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FROM INTENTION TO MOTIVATION: DEVELOPING A MOTIVATION-BASED MODEL OF IOS IMPLEMENTATION

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Abstract

Interorganizational systems (IOS) are increasingly being implemented throughout supply chains, attracting the attention of many researchers seeking to understand this phenomenon. We argue that the activities performed during the implementation process and the post-adoption outcomes associated with these systems can be traced back to the principle motivation underpinning the adoption decision. In developing our theory, we critique the predominant technology acceptance and diffusion of innovations based approaches as they apply to the implementation of IOS technology, and present an alternative theoretical model based on a firm’s motivational intent. We argue that differences in motivational intentions largely explain system implementation processes and outcomes. Theory-based motivational scenarios are presented to make specific predictions regarding the impact of motivations on which system investigation and development activities are performed, and their short and long-term implications for an organization.

Keywords: Interorganizational system, technology acceptance, motivation
Introduction

The use of interorganizational systems (IOS) in trading and other cooperative activities between suppliers and customers is becoming increasingly common. IOS is actually the generic label for a class of complex (multi-component) electronic commerce technologies, involving software, interorganizational business processes, and technical infrastructure (Steinfield et al. 2005). The specific capabilities of these systems vary from one organization to another, but, in essence, these systems are designed to help companies share information and to integrate key business processes across companies including procurement, sales, and billing. Most IOS implementations include electronic data interchange (EDI) capability, but they can also support joint planning and collaboration tools. Key attributes of this class of technology therefore are that the systems are divisible (can be implemented in part), highly flexible (can support multiple business goals), and operate across organizations. These three attributes together create significant opportunities and challenges for both managers and researchers.

We know from prior research that most firms adopt an IOS motivated by external competitive pressures, such as customer requirements (El Sawy et al. 1999), although some take a more proactive stance, motivated by a desire to obtain competitive advantage (Premkumar et al. 1997). We also know that systems vary greatly from one company to another, including the extent to which they are integrated with other systems (Truman 2000), the amount of use (Son et al. 2003), and the benefits obtained (Riggins and Mukhopadhyay 1994). What is not clear, however, is the relationship between these findings. That is, does a firm’s motivation to adopt an IOS affect the implementation process, the technical characteristics of the system implemented, or longer term outcomes to the firm?

Past research has not explored these questions in any depth. Adoption studies, such as Chwelos et al. (2001) or Premkumar et al. (1997) generally attempt to find IOS implementation predictor variables with high explanatory power, such as external pressure or top management support (although see Nagy (2006) for a more nuanced discussion). Others try to account for the range of benefits obtained from such systems following implementation (Cavaye and Cragg 1995; Lee and Lim 2003; Subramani 2004). The events between the decision to adopt and ultimate use of the system, however, have been largely ignored. 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.

In developing our argument, we first review commonly used technology adoption theories as they apply to IOS adoption. We argue that studying IOS adoption using either diffusion theory (Premkumar et al. 1994) or the technology acceptance model (Chau and Hui 2001; Grandon and Pearson 2004) is problematic due to a lack of fit between IOS characteristics and the assumptions of these theories. The conceptual solution proposed is an implementation process model in which the motivation to adopt an IOS influences the activities performed as well as how they are performed. That model is then defined in detail using a synthesis of theories relating to organizational cooperation and IOS usage to explain the relationship between the specific corporate motivation underlying the implementation of an IOS (why it is implemented), the design of that system (how it is implemented), and the potential longer-term consequences for the organization. We refer to that model throughout this paper as the IOS motivation process model (MPM).

The MPM contributes to the Information Systems literature by highlighting the role of motivation as a driver of IOS adoption processes and outcomes, and developing the conceptual foundation for future empirical studies of IOS implementation. The practical implication is that, by understanding their own motivations for IOS adoption, potential IOS adopter organizations can obtain insights about how to initiate appropriate adoption processes. These insights, in turn, can reduce the uncertainty and risk associated with IOS adoption in organizations.

IOS adoption: Commonly used theories

Studies of technology adoption tend to use either diffusion of innovations theory (most notably Rogers (1995)) or the broad technology acceptance literature (e.g. Davis 1989) as a theoretical foundation. In the diffusion tradition, researchers investigate “the process by which an innovation is communicated through certain channels over time among members of a social system” (Rogers 1995, p. 10). In other words, in the diffusion tradition, technology
adoption is a social change process; researchers thus tend to investigate issues such as the stages involved in the decision, the role of communication channels, and the influence of personal, social, and economic characteristics on the timing of the adoption decision. Interestingly, the methodology and research questions typically employed in the diffusion paradigm have changed little since Ryan and Gross’s (1943) original landmark study into the adoption of hybrid corn by farmers in Iowa (see Rogers (1995)). This consistency over many thousands of studies has resulted in substantial body of cumulative research into selected impacts of technology-based social changes.

The technology acceptance literature is similarly concerned with the adoption decision, focusing on the factors associated with an intention to adopt/use a technology, and with the relationship between intentions and actual adoption/use. Three theoretical models, collectively referred to as Technology Acceptance Theories (TAT), stand out within the adoption-intention approach: the Technology Acceptance Model (Davis 1989), the Theory of Reasoned Action (Fishbein and Ajzen 1975), and the Theory of Planned Behavior (Ajzen and Fishbein 1980). Two of these models, the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB), are illustrated in Figure 1. TAM, derived from TRA, proposes a beliefs → attitude → intention → behavior causal chain, in which (1) perceived ease-of-use and perceived usefulness predict attitude towards using a technology, (2) attitudes predict the intention to use the technology, and (3) intention predicts actual use. TAM has been refined and extended since the initial model (e.g. TAM2, proposed by Venkatesh and Davis (2000), and the Unified Theory of Acceptance and Use of Technology (Venkatesh et al. 2003)) although the basic elements of the attitude→ intention→ action causal chain have not changed in any substantial way. The theory of planned behavior (TPB), a reconceptualization of the Theory of Reasoned Action, is similar in its prediction that subjective norms and one’s attitudes predict intent jointly, and that intent predicts adoption behavior. Diffusion models are therefore useful for assessing influence or timing issues, while TAT models predict intentions and whether a technology will ultimately be used.

Limitations of TAT and diffusion theory for studying IOS technology

Neither tradition, however, is particularly concerned with the question of how technology is implemented or used following initial adoption. For example, Premkumar et al. (1994), analyzing data from 201 firms that had already implemented EDI, report a number of variables that appear to predict adoption. Unfortunately, important issues related to that decision were not investigated, including why the technology was adopted, how it was implemented, and the specific capabilities of the system. To be fair, the majority of diffusion-based studies analyze IOS adoption using a similar research approach. Nevertheless, the approach used, in which firms are surveyed to determine which factors best predict adoption, is based on three problematic assumptions. Specifically, adoption studies (1) implicitly assume that the technology is a discrete package with (2) a single-application, and (3) that the adoption decision will result in complete acceptance or complete rejection (Fichman 2004; Fichman and Kemmerer 1999).

The reality of IOS technology adoption, however, tends to be very different (Lyytinen and Damsgaard 2001). Firstly, an IOS is generally not so much a discrete technology as a combination of technology, organizational processes, and people. Implementation therefore involves technical components as well as social elements such as work procedures. Secondly, IOS technology is flexible (more than one application). Indeed, although EDI is the most widely implemented IOS function, the current generation of IOSs also support business collaboration and interaction activities far beyond the capabilities of early EDI-based efforts (den Hengst and Sol 2002). Finally, because an IOS is a complex bundle of technologies (rather than a discrete application), capabilities are often adopted piecemeal rather than via an all-or-nothing approach (Lyytinen et al. 2001).

These issues together form a significant research gap, and developing a new theoretical perspective on the technology adoption process to fill that gap is the focus of this paper. In the next section we develop a theoretical model of motivation-based effects, which proposes that the rationale for adopting a system (the expectations that
form the motivation to adopt) largely determines how it will be implemented and used (design and use), and the long-term consequences of each motivation-implementation-usage pattern.

Influence of motivational effects on IOS adoption and use

A motivation-driven implementation process model

Organizational motivation affects implementation activities and post-implementation outcomes in the MPM. But what do we mean when we talk about the motivation of an organization? Given that our unit of analysis is an IOS implementation project, we are obviously not describing human cognition or an emotional state. As a result, theories that define motivation in terms of variables such as self-efficacy or perceived enjoyment (e.g. Gruen et al. 2005; Igbaria et al. 1996) have little or no relevance to our discussion. Instead, motivation, in the context of this paper, refers to high-level organizational objectives that are the basis for initiating a project. In other words, motivation is the business justification for activity; the answer to the "why are we doing this?" question.

In the context of technology implementation, we argue that why an organization decides to adopt an IOS influences how that project is conducted and what is implemented. Evidence for this activity sequence can be found in the system development literature, which indicates that both the specific problem and how it is framed influence the focus adopted by the system development team, including the types of issues considered in system investigation and analysis activities (Hodgkinson et al. 1999). Investigation and analysis, in turn, affects how a business problem is solved, including the technology selected and the features implemented (Markus and Tanis 2000).

Applied to IOS implementation activities, this principle can be re-expressed as: “the motivation to implement an IOS determines the implementation activities performed, how they are performed, and the ultimate out comes for the organization resulting from implementing that system.” This general motivation-adoption-outcome model is shown in Figure 2. Note that because we predict that motivation affects both which activities are performed and how they are performed, implementation is represented as a type of “black box”. Specific activity sequences within the process box are predicted to vary according to the motivation, and so are not shown.

The MPM differs from EP theories in some important ways, however. EP theories are conceptual lenses that help us analyze past events in terms of motivations and institutional forces without making specific predictions about how either should influence outcomes. Markus and Robey (1988) actually refuse to acknowledge a dominant cause of change in their EP theory, claiming that behavior cannot be predicted a priori either by the intention of individual actors or by the conditions of the environment. The MPM, in contrast, asserts that different configurations of implementation activities will be observed for each motivation, with the caveat that the external environment and organizational capabilities moderate the relationship between motivation and outcomes (i.e. implementation process). This difference in emphasis means that the MPM, like EP theory, can be used to explain outcomes in terms of goals, influences external to the organization, and organizational (internal) factors. Unlike EP theory, however, the MPM can be used to explore alternative motivation scenarios.
stating “what companies think they are about [sic.] when they adopt enterprise systems must figure somehow in the ways they approach the enterprise system experience and in the outcomes they achieve” (p. 180).

Our theory also draws on work by Peffers et al. (1998), who describe the IOS implementation efforts of six firms, detailing for each the motivation, implementation activities, and the post-implementation impact, and by Rahim et al. (2006; 2007), who propose that “techno-economic” and “socio-political” motivations affect the types of implementation activities performed. We build on those studies by developing a more detailed explanation of how the motivation to adopt an IOS affects investigation, and implementation activities, how the system is used, and long-term consequences for the adopting firm.

Note that no explicit reference is made to project-success factors, such as organizational resources or technical readiness (Jeyaraj et al. 2006). Their absence is deliberate: we want to explain variation in the activities performed rather than whether a technology will be adopted or the success of the implementation project. Factors with no direct conceptual influence on the types of activities performed are therefore outside of the scope of the model.

Example motivation – process – outcome chains

The effect of differing motivations on cooperative relationships has been a research theme for many years in the literature on interorganizational cooperation (e.g. Hymer 1976; Schermerhorn 1975). A large number of specific motivations are described in that literature, although (fortunately) surveys tend to cluster these into just a few motivational categories. For example, Schermerhorn (1975) describes three types of motive (resource scarcity, value expectancy, and coercive pressure), while Child et al. (2005) describe seven motives (risk reduction, scale, technology needs, competition, trade barriers, overseas expansion, and resource complementarities).

Interestingly, these motives are generally not cited in the conceptual research literature on IOS adoption and use. Instead, IS research into IOS issues typically distinguishes between voluntary and involuntary adoption, using transaction cost economics theory (e.g. Bakos and Brynjolfsson 1993; Clemons et al. 1993) as the conceptual basis for proposing that a narrow range of economic issues (such as reducing coordination costs and increasing productivity, or pressure from a powerful trading partner) motivate IOS adoption and use. Notable exceptions include Johnston and Vitale (1988), Hart and Saunders (1997) and Mukhopadhyay et al. (1995), who apply theories of market power to IOS adoption, Bouchard and Markus (1996) and Harrington and Beard (1996), who use impression-management theory to explain how reputation (image) considerations can influence adoption behavior, and Iacovou, Chwelos, and colleagues (Chwelos et al. 2001; Iacovou et al. 1995) who describe unmotivated adopters — an interesting situation where adoption occurs without any active involvement by the organization.

We now synthesize this diverse set of theories to describe four broad motivations to adopt an IOS: resource efficiency (internal economic focus), market power (external economic focus), reputation (non-economic focus), and coercive pressure (externally imposed solution). Our list includes the motivations that have been mentioned in past IOS studies (e.g. Iacovou et al. 1995; Peffers et al. 1998), as well as motivations not specifically mentioned previously. In addition, sub-categories (the specific motivations) are provided to provide a more detailed and defensible theoretical grounding for each motivation, and more nuanced predictions.

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 stress, will try to modify business practices to offset perceived weaknesses (Bens 2002). Resource efficiency is believed to motivate many IOS implementations, with these systems designed to reduce the direct cost of document generation, processing, transmission and storage, and to create indirect savings by lowering 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 described in the literature, one where the aim is to save money through incremental process improvement (Dai and Kauffman 2002), and another involving transformation of key processes (Boudreau et al. 1998; Clark and Stoddard 1996).

**Incremental process improvement**

The first of these resource efficiency motives, *incremental process improvement*, refers to a situation where a firm adopts IOS as a cost-saving initiative rather than as a strategic investment, and justifies the project purely on financial grounds (e.g. cost-benefit). Johnston and Vitale (1988, p. 160) characterize the approach as being driven by the question “how do I automate what is being done?” rather than the more strategically driven question of “how could our firm's objectives best be accomplished?” The focus on transactional efficiency means that the system is unlikely to represent a strategic investment (DiRomualdo and Gurbaxani 1998), and any changes to business processes will be 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 investments in IOS infrastructure were motivated by the potential to improve efficiency (fewer data entry errors and lower labor costs). In those cases, the IOS was designed to automate processing (a minor change) without making any fundamental changes to existing processes, and improving the depth and quality of management information, sometimes described as “informating” (Zuboff 1985), did not motivate implementation project activities. 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 may put the firm at a long-term competitive disadvantage compared to those that also transform business processes (Clark et al. 1996).

**Process transformation**

The second type of resource efficiency motive, process transformation, is characterized by a desire to use the data management capabilities of an IOS as the basis for transforming key processes. These transformational IOS projects tend to be strategic, with a focus on integrating systems and improving the depth and quality of information available to decision-makers (Smithson and Hirschheim 1998). The combined technology and process improvement focus of the transformational motive has been found to result in substantially greater benefits than can be obtained through either improving technology or revising processes individually (Clark et al. 1996). Johnston and Mak (2000) provide an in-depth description of this type of motivation in their discussion of Coles Myer’s IOS strategy. They show that the Coles Myer IOS implementation, is regarded as a strategic necessity by top management and a key part of a larger effort to increase efficiency throughout the supply chain, and so has been accompanied by large-scale re-engineering projects. In other words, the IOS is not an end in itself, but rather, a platform for advanced process “infrastructure” such as just-in-time or vendor-managed inventory (Bernstein et al. 2006). A potential disadvantage of this type of IOS-enabled transformation is that it may facilitate the creation of a relationship “lock-in effect” by business partners, and thereby increase the risk and impact of opportunism (Subramani 2004).

**Market power**

Under the market power motivation, cooperation is a mechanism for gaining power over business partners or competitors, either by changing relative dependency within an alliance, or using the alliance as a way to combine individually weak organizations into a stronger coalition. These methods were first described by Emerson (1962) in his seminal paper on power-dependence relationships (and are still relevant). In that work, the power-dependence status within an alliance is changed using a codependence strategy, while attempts to combine individually weak organizations are known as *coalition formation* operations.

**Codependence**

In the codependence strategy an organization invests in relationship-specific assets to make its business partner dependent on it, thereby producing codependence in the relationship. This power strategy is often described using transaction cost economics (TCE) terminology; TCE (Williamson 1985) proposes that parties within the alliance can
change their relative power by making investments in relationship-specific assets that bind the business partner into a relationship (or at least create a significant disincentive to break the relationship). Dyer and Singh (1998) propose that these partnerships are characterized by: (1) investments in relationship-specific assets (generally non-salvageable investments) such as customized software and processes, (2) substantial information exchange via direct access to partner information systems (i.e. organizational boundaries become “permeable”), and (3) interdependent technological and functional systems.

Subramani (2004) describes how a mattress manufacturer implemented a make-to-order and quick delivery IOS to help a retailer to reduce inventories while improving customer service. In the long-term, this make-to-order system increased in the manufacturer’s bargaining power: the more powerful firm (the retailer) reduced inventories (and so became reliant on quick delivery), but also redesigned the organization’s structure (e.g. fewer warehouses) and implemented procedures to take advantage of the make-to-order. In other words, the IOS provides the infrastructure needed for a firm to replace an arms-length market-based relationship with a more idiosyncratic partnership.

Coalition formation
In the coalition formation strategy, individually weak firms form a coalition to compete more effectively against a common rival (e.g. transform two independent relationships with a rival, A-R and B-R, into a single (AB)-R relationship) is typically evaluated using market power theory (Hymer 1976; Porter 1980). Market power 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).

Image
Organizational image and reputation considerations have been demonstrated in many studies to have a strong influence on organizational behavior. For example, Marakas and Robey (1996) claim that patterns of organizational IT acquisition and deployment within organizations have been influenced by individual and professional image requirements since the earliest days of computing. Reputation and image considerations also appear to explain adoption behavior between firms, with a number of studies showing a strong peer influence effect (Hannan 1998; Mizruchi 1990), particularly in highly competitive markets (Bothner 2003). Bouchard and Markus (1996) present a compelling argument that these considerations have played a role in the timing and scope of many IOS adoption decisions, and Rahim et al. (2006; 2007) provide evidence that, at least in some cases, IOS adoption has been driven solely by a desire to improve the corporate image.

Despite the strength of these findings, the body of research that has assessed the role of image considerations, or impression-management as it relates to IOS implementations (and in implementations of other systems) is arguably deficient because it does not explore the corporate image motive in any depth. Impression-management research distinguishes between defensive and assertive techniques when describing how organizations attempt to manage the corporate image (Rosenfeld et al. 1995). The distinction is important for our IOS motivation model because, although both focus on image management, each is associated with different goals, activities, and outcomes.

Defensive
Defensive tactics, also called protective or repudiative tactics (Roth et al. 1988), attempt to re-establish a positive identity or remove negative typifications by denying or minimizing connections with undesirable characteristics or events. Imitating a close rival (e.g. installing a similar system) to avoid negative impressions is a typical example of defensive reputation management. For a corporation that adopts an IOS as a defensive measure, the primary aim will
be to minimize the perceived image gap between the corporation and its rivals. Being seen to adopt a system similar to those used by rivals is more important than economic considerations. More strategic activities, such as integrating the IOS with other systems, are also unlikely to represent priority activities. A more significant problem, however, is that the imitation motive may lead to a less rigorous design process with the desire to be seen to be using the system regarded as more important taking advantage of the system’s capabilities. Simply imitating may therefore result in some of the prerequisites for improved performance, such as process redesign and internal integration, to be overlooked. Furthermore, adopting in this way is associated with a phenomenon Fichman and Kemerer (1999) refer to as the assimilation gap, a situation where a technology is acquired by many but only implemented fully by a few (with the remainder never implementing, not implementing fully, or abandoning shortly after implementation).

**Assertive**

Assertive tactics, also called attributive tactics (Roth, Harris and Snyder, 1988), attempt to establish a desired identity in the eyes of others. Unlike defensive tactics, which attempt to repair a damaged image, assertive tactics try to create an image. Self-promotion, a common image-enhancement tactic, aims to convey an impression of competence by claiming competence or strength in particular skills or abilities, and appears to be particularly common when the claims are for important audiences or occasions (Gordon and Stapleton 1956).

For a corporation that adopts an IOS as an assertive measure, the aim is not to catch up or generate a financial return directly, but rather to create the impression that the corporation is ahead of its rivals. Similar to defensive tactics, the focus when developing a system will be on enhancing externally visible elements of the system, such as the user interface (or other elements that are perceived as important by customers), although rather than striving to appear similar to rivals, the objective here is to claim superiority (e.g. provide better service). This different emphasis also suggests that the assertive motivation will lead to a more strategic focus, and a consequently larger resource allocation in IOS projects. The image-focus of the motivation suggests, however, that resources are likely to be devoted to transactional functions (customer interaction), not informational functions, resulting in a risk that implementation efforts may have be biased towards enhancing visible or relationship aspects of IOS at the expense of important internal elements, such as process innovation.

**Mandated adoption**

Finally, coercive pressure from a powerful external body, such as government or a key trading partner, has long been recognized as a motivator for organizational cooperation (e.g. Schermerhorn 1975). Systems (and associated processes) adopted in this circumstance have some resemblance to the mandated processes described by Peter Keen (1997); they are implemented to satisfy external obligations (such as legal requirements), and are generally liabilities rather than contributors to a firm’s economic value. From a resource-dependence perspective (Pfeffer and Salancik 1978), coercive pressure is able to be applied when one organization commands resources that are vital for the operation of another organization. This relationship between power and resource provision implies that control activities will tend to focus on issues that are related to the resources provided by the more powerful company. Studies into IOS adoption have described coercive strategies using a variety of theoretical perspectives (e.g. Clemons and Row 1993; Iacovou et al. 1995). A common finding is that many supplier organizations implement IOS technology only at the insistence of a dominant customer and receive little or no benefit themselves. Iacovou et al. (1995), describing adoption motivated by strong external pressure, distinguish between firms who adopt to survive, and unmotivated adopters, who have no desire to implement the technology themselves.

**Survival**

The survival motive is characterized by firms implementing an IOS to preserve an existing business relationship. These firms typically do not possess either the financial resources or the technical infrastructure required for an integrated solution, let alone one that makes use of the advanced business collaboration and interaction capabilities of current generation IOS technologies. Implementations therefore tend to be “out of the box” (not customized), and operated as an add-on to the normal transaction-processing activities of the business. In these circumstances, the theoretical efficiency benefits of an IOS are unlikely to materialize.
Unmotivated

Unmotivated adopters, in contrast, do not see any need for this technology. The lack of interest here is not a resource issue; these firms often possess the resources required to implement a fully featured, integrated system. Instead, these firms perceive that the disadvantages associated with the technology outweigh any likely benefits, and so are not willing to expend resources on the technology. For these firms, adoption is not so much an active decision as something that happens to them. For example, Hart and Saunders (1997) provide a number of examples of firms that supply software at no cost to trading partners to overcome resistance. In these cases, firms implement IOS technology as a “least resistance” approach. Despite this motivational difference with survival-focused firms, the end-result is similar. That is, investigation and analysis is minimal, the system is not integrated (“off-the shelf” stand-alone system), the impact on business processes is minimal, and long-term efficiency benefits are unlikely.

Figure 4: Investigation, design, implementation, and outcomes associated with each motivation
Research propositions

The motivations discussed above are illustrated in Figure 4, which, for each motivation, predicts the processes and outcomes likely to be observed as a testable proposition. For instance, Proposition 1, relating to the incremental process improvement motivation, predicts financial evaluation (e.g. benefit-cost analysis), a reliance on technology-based automation to obtain those benefits, and some short-term benefits (but less in the longer term). Differences between these motivation-based effects are subtle in some cases, but our conceptual framework helps to explain why similar activities within the implementation process may result in quite different outcomes. For example, although discussion of transaction automation generally focuses on economic impacts (e.g. Shaw and Subramaniam 2002), the table shows that automation can also form part of an image-management motive. Studies of economic returns from IOS adoption that do not distinguish between these motives may therefore be biased because they assume falsely that all organizations are attempting to generate a positive return.

In principle, our approach supports analysis of many technologies, including enterprise systems and customer relationship management systems as well as IOSs. At a more general level, the MPM is designed to answer the research question “what is the role of motivation in explaining differences in the processes performed by organizations when implementing an information system, and the impacts on the firm from using that system?”

Testing the model

The qualitative differences between each motivation just described, particularly the individual pattern of activities, present a number of opportunities for testing our motivation theory. In this case, testing needs to be more subtle than the standard macro-level approach in which the strength of associations between variables is assessed because we are dealing with processes, not just a collection of variables. The key to analyzing at the process level is to recognize that both a motivation and the corresponding “footprint” of implementation activities produce signals that can be analyzed. For example, a pattern analysis technique, such as k-means clustering (MacQueen 1967), could be used on a large dataset to determine the correspondence between activity patterns and stated motivations. Superficial analysis of this type is problematic, however, because the intention-activity relationship described in our theory can be moderated by a variety of forces, both within and outside the organization. Intra-organizational moderating effects include the technical capabilities of existing infrastructure, an organization’s decision-making processes and change management procedures. Extra-organizational moderating effects include legal restrictions, industry norms, the existence of standards and the capabilities of available technologies.

Because these forces can moderate the relationship between intentions and activities, any difference between predicted and observed outcomes must be analyzed carefully. For example, in the case where an activity is predicted but not observed, possible reasons include: (1) the activity could have been performed but was not due to an error, (2) the capability pre-exists in the organization (e.g. provided by a previous project), (3) a constraint within the organization prevented the activity being performed (e.g. limitation of existing infrastructure), (4) the capability is already provided by an external body (e.g. though outsourcing), or (5) an external constraint prevented the activity being performed (e.g. the presence of an industry messaging standard may preclude use of a proprietary standard).

Conversely, an activity could be observed contrary to expectations because: (1) a mistake has been made, (2) there is an internal requirement, not related to the unit of analysis (the implementation to project), to perform that activity (e.g. standard organizational procedures may require a cost-benefit analysis to be performed for all projects), or (3) an external party requires the activity to be performed (e.g. trading partner requirement).

The number of possible influences on outcomes for any given technology implementation project led Markus and Robey (1988) to assert in their emergent process theory that, although systems are generally implemented to achieve specific goals, behavior in and outcomes from a project cannot be predicted a priori either by the intention of individual actors or by the conditions of the environment because (1) participation in organizational decisions is both segmented and discontinuous, (2) because preferences develop and change over time, and (3) the interpretation of the results of actions—the meaning of history—is often problematic” (p. 588). That view of system implementation as a complex interaction of people, technology, and the environment has evolved over time (Markus 2000, 2005; Markus et al. 2000), although the central claim that outcomes cannot be predicted a priori remains.

We argue, however, that emergent process theory takes an extreme and unnecessarily pessimistic approach. Humans, technology, and other environmental forces have agency, humans in the conventional sense of intention, and technology and the environment, because they can both provide specific functionality and suggest ways to perform activities. Therefore, in contrast to the emergent process argument that processes emerge in unpredictable
ways, our motivation theory holds that motivation creates a potential for action, with realization of that potential contingent on the presence of conditions that afford those actions. In other words, the MPM proposes that human intentions will have a significant impact on both what is achieved and how it is achieved, provided affordances in the environment allow those intentions to be realized.

The problem then becomes how to parcel out intra-organizational and extra-organizational influences from motivational effects. Some extra-organizational influences can possibly be controlled through case selection (e.g. select from one industry), although this represents only a partial solution at best. Our theoretical position statement, that motivation creates a potential for action, with realization contingent on the presence of conditions that afford those actions, suggests a number of methodological strategies for solving that problem based on actions and the potential for action. We label these strategies (1) macro-analysis, (2) “chains of causation”, and (3) dual agency.

1. The macro-analysis strategy
Macro-analysis, in which the relationship between intentions and activity sets over a large data set of observations is analyzed, represents a very straightforward solution. This solution has already been mentioned using k-means clustering as an example. In a sense, it is not really a solution at all, given that it only compares observed activities with expected activities in a box-ticking exercise (true/false result), while ignoring environmental influences. For example, in macro-analysis, cases where an activity is not observed would be treated as rejections, even though there are at least five general explanations for such a difference that would not invalidate the hypothesis. In addition, this strategy requires a large data set to conduct meaningful analysis, and does not allow the researcher to make claims regarding causality or to assess whether the environment affords or prevents the various activities predicted.

2. The “chains of causation” strategy
A second approach is to adopt a realist philosophical position, in which the aim is to not just document an event sequence, but show that the forces described in a particular case affect the outcomes observed in a causal chain. This chains of causation strategy therefore requires data to be gathered about events, including temporal and dependency relationships, to distinguish causal mechanisms from mere association. Using that data, qualitative techniques, such as event-flow or causal network analysis can be used to trace relationships. A possible weakness with this strategy is that interactions between motivations, technology, and various environmental factors may make causality hard to establish. Furthermore, given Miles and Huberman’s (1994) characterization of this type of method as “close-up” and “unrelentingly local,” it is not clear how researchers should treat causal chains that do not correspond to theoretical predictions (e.g. a difference may be an artifact produced by local conditions).

3. The dual agency strategy
In the dual agency strategy, the researcher needs to document motivations (why the project was initiated), plans (how the project was intended to proceed), observed actions (how the project actually proceeded), and details of internal and external factors that have influenced the realization of intentions. Observations can then be compared to predictions to test hypotheses. We describe this strategy as dual agency in recognition that “agency” (power, influence, instrumentality) resides in humans as well as non-human participants, such as the technology. For example, each technology supports particular activities through inbuilt functionality, but the design typically also suggests activities to perform and ways to achieve those outcomes. In a sense, therefore, the technology is an active participant in process. Achieving an outcome is therefore not just a matter of deciding that something must happen. Rather, it depends on the presence of both an intention and “affordances” in the environment. The dual agency analysis strategy allows the researcher to take into account both human agency (intentions) and other agency effects (affordances) when analyzing mismatching motivation-activity predictions.

Conclusion
This paper has developed a theoretical argument about the effect of motivation on the adoption of IOS technology and its consequent impact on an organization. Developing the motivation-based model is the first step in a wider research program, in which we assess the impact of a range of factors on IOS implementation activities, and thereby extend existing work by Rahim et al. (2006; 2007). Future research will test the propositions shown in Figure 4.

Two main design choices have been made in formulating the MPM. Firstly, we have made the simplifying assumption the each implementation project has only one motivation. In principle, multiple motivations may underlie any implementation project, resulting in a more complex chain of events and set of outcomes that those described here. Secondly, the mechanistic depiction of causal links in our detailed motivation-based model is a stylized depiction of reality: system analysis and implementation is not a linear sequence of discrete activities, with
some iteration typically occurring between phases (Ahituv et al. 1984). The model is nevertheless useful in a research context as a means of structuring analysis of cause and effect relationships.

Making these design choices has allowed us to make several substantial contributions. Firstly, the perspective we have adopted complements research into technology adoption, project success and system impact. Prior work on those topics has provided insight into key system implementation and management issues, but has had little to say about the implementation process. Our approach builds on and synthesizes many of those findings to explain the role played by motivation throughout the implementation process, and therefore provides a theoretical foundation and specific testable propositions for future studies into technology planning and implementation decisions.

A second contribution to theory is the conceptual differentiation made between successful implementation and long-term system impact. Arguably, much of the technology acceptance literature confuses perceived system usefulness with system benefits. For example, if a firm uses the automation capabilities of an IOS to minimize costs, meeting this objective would, no doubt, lead senior management to regard the IOS project as a success (and to rate the system as useful). However, focusing on automation alone means that the firm will not have access to most of the performance benefits from IOS use (Clark et al. 1996), which may not be apparent to management. Simply examining “perceived success” does not distinguish between management perceptions and actual outcomes.

Our theory has several implications for practice. Firstly, it is clear that the driving motivation to adopt a system affects key outcomes, including the design of the system and how it will be used. It is therefore important that key decision makers are aware of the long-term implications of these motives, not least because design choices once implemented are usually expensive and difficult to modify. Secondly, it describes a potential danger associated with using the positive experiences of other firms as a basis for system analysis and implementation decisions. In particular, managers must ensure that they are aware of the motivations underlying those systems and implementation processes, and ensure that their own motivations are similar, or at least compatible.

References

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