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IOS PROJECT MOTIVATION AS A DETERMINANT OF PROJECT ACTIVITIES AND BUSINESS CAPABILITIES

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Abstract

Interorganizational systems (IOS) are a relatively common technology in mid-to-large organizations, and much research has been conducted into why firms adopt these systems, and the types of benefits obtained. However, IOS development projects, which is where the adoption becomes crystallized, and where specific ways to use an IOS are made possible, has been largely ignored and so are poorly understood. In this paper, we describe the IOS Motivation Model that explains how motivation determines project activities within the limits imposed by environmental affordances. We argue that motivation — the reason an IOS project is initiated — is a key determinant of the activities performed in a project and, through these activities, the types of business capabilities obtained. Two motivation types, activity control and market position, are explained in detail. Two case studies are then presented to exemplify IOS implementation projects that correspond to these two motivation types, and illustrate more clearly how motivation influences the pattern of activities performed in an IOS project. This is important for firms planning IOS implementation projects and for researchers in understanding the importance of IOS project-level motivation and its interaction with organizational strategy.

Keywords: Inter-organizational system, strategy, motivation.

1 INTRODUCTION

Interorganizational systems (IOS) are increasingly a standard component of the IT infrastructure for mid-to-large organizations. These systems automate information flows between organizations, typically to streamline the operations of a supply chain management system, but they may also be used to coordinate other boundary-spanning activities, such as product design. The large body of research into these systems has particularly looked at adoption influences and post-adoption impacts. Adoption studies explain the importance of selected environmental and organisational factors, such as partner pressure or IT readiness, on the intention to implement an IOS (Markus & Tanis 2000). Post-adoption impact studies, on the other hand, examine the relationship between system attributes (e.g. integration) and business outcomes (Subramani 2004). Few studies, however, have examined the intermediate step, the implementation process, which is where intentions, designs, and capabilities become actualized.

Understanding this intermediate stage helps explain IOS impacts, but involves more than just looking for general relationships between IOS characteristics and outcomes (e.g. integration and cost). As Subramani (2004) observes, to explain why particular outcomes are achieved, one must first know what the system was *intended* to achieve. A conceptualization of IOS projects that incorporates intentionality is therefore required. The idea that technologies are appropriated, proposed by DeSanctis and Poole (1994), is useful in this context because it helps to explain why diverse outcomes may be observed, even when the technology and the context of use are held constant.

We develop the concept of intentionality in IOS projects by proposing that project motivation determines project activities, and through them, business outcomes. Our theory builds considerably on descriptive exploratory work by Peffers et al. (1998), Rahim et al. (2006, 2007) and Smith et al. (2007) to provide detailed theory about the types of motivation that are possible, as well as specific project activities likely to be observed for these motivation types. In this paper, we focus on exchange (transactional) systems, a common type of IOS application. Collaborative IOS projects are described briefly, but an in-depth analysis is beyond the scope of this work.

This paper is organized as follows. We first theorize how motivation affects the implementation process for an IOS and describe in detail a typology of IOS project types, with that theory constituting the primary contribution of this paper. We then present two exemplar systems, in the form of case studies, to explicate these concepts. In other words, like Hirschheim and Klein (1989), cases are used as a rhetorical tool rather than as a formal test of the theory. Finally, we describe the implications of this work for theory and practice, and directions for future research. The article provides a new vehicle for theorizing about the nature, purpose, and practice of information systems development.

2 THEORY AND PROPOSITIONS

Organisational motivation, the central concept in this theory, refers to the type of issue or deficiency that an organisation is trying to address when initiating an action. Motivation is related to technology capabilities in that a technology will usually be implemented to help solve a specific problem. IT solutions often provide capabilities beyond those specifically required, but one should not confuse project intent with technical potential. Project intent refers to the specific goals of a project, whereas potential refers to all capabilities regardless of whether they are actualised through the project.

Diverse reasons have been cited for using IOS technology, including enhancing cooperation, increasing bargaining power, improving process efficiency, and even survival (Johnston & Vitale 1988). These reasons are not surprising given the capabilities of IOS as a technology. Many reasons are “transactional” (in the broad sense of the term) in that they are concerned with improving the efficiency of organisational systems, particularly sales or purchase process; others are strategic in nature and aimed at changing or maintaining relationships with external bodies, particularly the relative amount of bargaining power held by partners. Dividing motivations in this way is common in the lit-

erature, with influential studies including Johnston and Vitale (1988) and Subramani (2004) modelling IOS impact as a function of whether the application is relational and transactional or just transactional. IOS technology, however, is useful for more than just transacting and managing supply chains. Some systems support cooperation between groups without any exchange of planning information, and the relational focus of these systems can also vary. We now explicate these issues.

2.1 Relational Investment

Because IOS technology is a communication tool that requires cooperation between organisations just to be implemented, an IOS project can be thought of as an investment in a relationship-based resource. This relational investment can be low (i.e. arms-length relationship), or could be high, meaning that the relationship is very close with significant integration, perhaps even to the extent that partners see each other as an extension of their own firm (Sahay & Mohan 2006). For a low relational investment, some idiosyncratic technology will be present (e.g. EDI template), but the primary focus of projects is on developing internal systems and processes to achieve an operational benefit such as cost reductions. These projects do not aim to expand business opportunities, only to improve internal operations. By contrast, when investment is high, the focus is on supporting more externally focused goals such as creating business opportunities or preventing the loss of existing business (Madhok & Tallman 1998). The motivation focus is therefore on developing resources that are embedded in (specific to) the relationship and non-salvageable should the relationship end. This type of electronic integration between organizations using inter-organizational systems has even been discussed as an alternative to actual financial ownership of adjacent value-added stages of the supply chain (Zaheer & Venkatraman 1995).

2.2 IOS Purpose

The inherent relational nature IOS technology (to communicate with a business partner) also means that any classification of motivations must take into account the cooperative intent of the system. Computer-based collaboration research commonly classifies cooperation on the basis of whether it is more transactional (market exchange) or collaborative (Markus & Christiaanse 2003). An exchange-oriented IOS enables arms-length trading and supply-chain management (e.g. EDI), whereas a collaboration system supports cross-organizational work-flow, particularly development or design work, and so will involve some type of cooperative work system. Web 2.0 tools are particularly suited to this application (Lee & Lan 2007). IOS use for transacting and IOS use for collaborating are therefore conceptualized as distinct patterns of appropriation for interorganizational technologies.

2.3 IOS Motivation Types

We combine relational investment and IOS purpose in Figure 1 to form four motivation types, which we label activity control, market position, long-term partnership, and short-term project. The *activity control* motivation type is internally oriented, primarily concerned with transactional efficiency via automation. For the *market position* motivation type, the project is concerned with securing business opportunities and developing a relationship, although project work is directed at facilitating exchange rather than supporting cooperative development or design. The *short-term project* motivation type is concerned with supporting cooperative development or design, but the relationship is not expected to endure, and so relational investment is kept to a minimum. Finally, the *long-term partnership* type is both cooperative and involves a significant relational investment. For example, the project may be intended to provide or support a significant level of operational integration between firms.

		IOS Purpose	
		Exchange	Collaborate
Relational investment	High	Market position	Long-term partnership
	Low	Activity control	Short-term project

Figure 1: IOS Motivation Types

3 MOTIVATION – PROCESS – OUTCOME CHAINS

We propose that the motivation behind an IOS project (the reason a project is initiated) determines the pattern of activities performed, but within the limits imposed by environmental affordances, and that each pattern will result in a firm obtaining or enhancing particular business capabilities. Figure 2 presents the model examined in this research. For IOS projects, it shows relationships among patterns of motivations, affordances, activities, and business capabilities.

In our model, motivation is not the same as business strategy. A business strategy is a general pattern of *organizational* behaviour (Miles & Snow 2003), whereas project motivation is the justification for a specific project. Because motivation expresses (or is closely related to) a specific deficiency, it is reasonable to assume that activities will be structured accordingly, but this is not to say that organisations always achieve what they intend, only that intentionality influences technology outcomes. This reasoning is consistent with evidence from studies of IT project behavior, which show that the specific problem *and* the way in which it is framed influence the types of issues considered in system investigation and the analysis activities performed (Keil 1995). Investigation and analysis, in turn, affects how the business problem is actually solved, and the specific solution implemented (Markus & Tanis 2000).

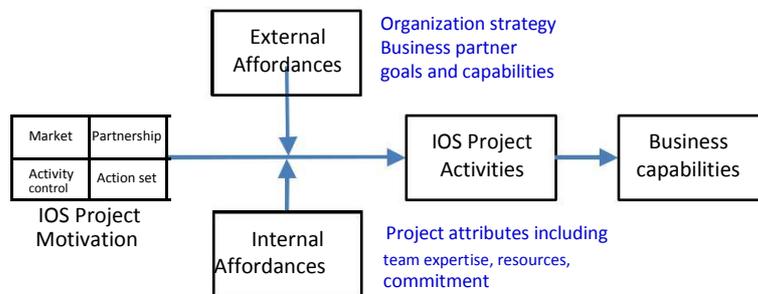


Figure 2: IOS Motivation Model (Motivation, affordances, activities, capabilities)

3.1 Affordances

Environmental affordances are *possibilities* for action created the environment, and so both allow and suggest particular actions. An affordance can be embodied in objects or social practices, but should not be confused with the object/practice. Rather, it is an opportunity presented by an environment to perform specific actions (Gibson 1977). For a project, environmental affordances can be internal or external (to the project). Internal affordances are created by characteristics of the project, such as experience or budget, but may also emerge through project activities (Markus & Tanis 2000). External affordances are circumstances and practices outside of the project including business strategy, the strategy and capabilities of external partners, and industry standards.

Business strategy is perhaps the most important external affordance (although partner strategy and capabilities will also play a role). The Miles and Snow (2003) typology of organizational strategy is used widely to describe four patterns of strategic behaviour: defenders, prospectors, analyzers and reactors. Defender organizations specialize in a market niche, and defend that niche to ensure a stable and secure market position. It is common for these organizations to be cost-focused, and have a high reliance on formal procedures. Prospectors focus on diversification and growth, and so are always on the lookout for new market opportunities. Analyzers combine defender and prospector strategies. Efficiency and flexibility are both important for these organizations. Reactors, the final category, do not have a stable strategy, but instead respond to market conditions on an ad-hoc basis.

3.2 Business Capabilities

Business capabilities, the final component of the model, represent project outcomes. At this point, specific appropriations are embedded in the technology but still latent (to be crystallized when the IOS is

used), and particular business capabilities enabled. The specific technical capabilities enabled depend on the technology implemented (or enhanced) during the project. However, because it is here that the IOS moves from development to the production environment, research into the relationship between IOS attributes and business outcomes is relevant. The relational investment dimension primarily describes whether these outcomes will enhance internal or external capabilities. A small relational investment implies an internal focus, for example improving efficiency, monitoring, and coordination within the firm, whereas a large relational investment implies a more external focus on enhancing inter-firm relationships, or improving monitoring, and coordination between firms (Child et al. 2005). The IOS purpose dimension, at the top of Figure 1, describes activities as *exchange focused* or *collaboration focused*. Exchange-focused projects tend to result in operational improvements, particularly more efficient sales and inventory management processes, and better information which improves monitoring of performance and better coordination of supply-chain activities (Chatterjee & Ravichandran 2004). IOS-based communication here will be mainly unidirectional, and involve exchange of structured transaction-related data such as EDI documents (Barrett & Konsynski 1982). Collaboration focused projects attempt to integrate processes, and so involve collaboration and coordination work activities, not just outcomes (Markus & Christiaanse 2003). IOS-based communication here will be bi-directional, and may involve rich unstructured communications (Sánchez & Pérez 2005).

4 APPLICATION OF THEORY

Two motivation types, activity control and market position, are now explained in detail. They represent extreme relational investment positions, and so allow us to describe contrasting effects. These motivations are shown in Figure 1 within the *exchange* segment, and so represent motivations for exchange applications, perhaps the most common of all IOS applications.

4.1 Activity control

The activity control motive is a long-established reason for entering cooperative relationships (and IT projects in general). Essentially, organizations experiencing financial pressures try to reduce the cost of administrative activities to offset perceived weaknesses (Child et al. 2005). Activity control has been found to motivate many IOS implementations, with these systems designed to reduce the cost of document handling and storage, and to create indirect savings by lowering the incidence of data-handling errors and data-processing related delays in business processes (Riggins et al. 1994).

Initiation: If an IOS project is initiated as a cost-saving initiative, the business case for the project will be based on financial benefits, particularly cost-savings (Peffer et al. 1998). 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 immediate consequence of this focus is that the project is a short-term investment requiring a quick payback. Examples of this approach are described in detail by Peffer et al. (1998) and Rahim et al. (2007), with IOS investment motivated by the goal of lowering data entry errors and labor costs. Automating achieved these goals, but long-term concerns such as improving information quality or strategic positioning were ignored.

Development: This type of project is concerned with short-term cost-efficiency, and so is operational rather than strategic. Project activities, costs, and the payback period will be specified in detail, and there will be a clear allocation of project responsibility. In the development/execution phase, project performance measures and rewards will also emphasize cost-control, with the result that project monitoring will involve frequent meetings and focus on the consumption of rather than delivery of outputs (Lockamy & Hit 1995). The emphasis on detail suggests that a predictable and highly structured methodology (e.g. SDLC) may be preferred, although due to the low-cost, short-term emphasis of this motivation, a highly time-focused light methodology, particularly Agile methods such as Scrum or Extreme Programming, may be more common (Rico 2007). Post-implementation, this motivation is likely to involve a formal review, but mainly in terms of whether the project was run efficiently.

Post-implementation: This motivation involves a transaction-focused project and a small relational investment. Business capability improvements will therefore be internally oriented (e.g. improved activity monitoring or process efficiency), and focus on operational systems, particularly inventory management and exchange systems. In addition, IOS-based communication will be essentially a unidirectional transfer of well-defined and highly structured transaction-related data such as EDI documents.

Risks: A problem with the activity control motivation, however, is projects that cannot be shown to reduce costs in the short-term will not be approved even if they will ultimately provide strategic benefits. In addition teams may be rewarded for completing a project quickly at the expense of quality.

4.2 Market position

Under the market position motivation, cooperation is a mechanism for changing relative dependencies within an alliance. The purpose of cooperation here is to increase or protect the “top line” revenue stream of the organization (and to build long-term profitability), as opposed to the expenditure control focus of the activity control motive. This motivation is therefore externally-focused. This type of cooperative motivation was first described by Emerson (1962) in his seminal paper on power-dependence relationships. It holds that the power-dependence status within an alliance is changed when 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 also often described using transaction cost economics terminology, which characterizes these partnerships as constituting: (1) non-salvageable, relationship-specific investments such as customized processes, (2) substantial information exchange via more direct access to partner systems, and (3) interdependent technological and functional systems (Child et al. 2005, Zaheer & Venkatraman 1995). Subramani (2004) illustrates this motivation in his description of the development by a mattress manufacturer of a make-to-order and quick delivery IOS to help a retailer to reduce inventories while improving customer service. The retailer ultimately became reliant on the manufacturer’s system, and so helped to replace an arms-length relationship with a more idiosyncratic partnership.

Initiation: Overall, this type of project is concerned with long-term strategies (e.g. reduce underlying inefficiencies) and so framed as a strategic issue. Activities conducted in the investigation phase will therefore be concerned with how the project contributes to the firm’s ability to achieve its strategy.

Development: In the development/execution phase, an iterative methodology may be preferred to allow for input from both internal and external parties, and project performance (and rewards) will be based on results. Due to its strategic importance, this type of project will be championed by a senior figure, and external orientation means that the business partner will have substantial involvement.

Post-implementation: Post-implementation, this motivation is likely to involve progressive identification and elimination of problems, particularly by prototyping new ideas and enhancements to further enhance the system. As with the activity control motive, IOS-based communication will support well-defined and highly structured transaction-related data such as EDI documents. However, communication between partners *about* the IOS (and related activities) will be ongoing.

Risks: This motivation also carries risks, however. Firstly, a long-term focus makes it easier to excuse poor project management, such as an extending deadline or a project that devours resources without ever reaching a conclusion (Keil 1995). Secondly, although long-term relationships tend to be highly beneficial, investing in the relationship may actually reduce long-term flexibility (Child et al. 2005).

Activities for these two motivation types are summarized in Table 1. Each is an ideal type, in that each describes project activities and outcomes that are theorized to be associated with a particular motivation. No actual project should therefore be expected to conform exactly to a theoretical account. Furthermore, the projects we describe as resulting from a given motivation are complex processes with multiple dimensions, but are theoretical exemplars, not categories of actual projects. The processes and outcomes we propose are, in effect, hypotheses regarding relationships between constructs. However, unlike the traditional hypothesis-testing approach, a typological theory such as ours does not

specify relationships between a unidimensional first-order construct and a dependent variable. Rather, it describes patterns among the constructs for each ideal type, and how each pattern produces specific observations for dependent variables (Doty & Glick 1994). Our theory should therefore be thought of as one that allows a researcher to assess the similarity of an actual project motivation to an ideal type, and on that basis to test relationships between the motivation and project activities.

Project phase	Activity	Activity control	Market position
Initiation	Senior management approval required	Yes	Yes
	Focus of business case	Short-term payback	Business position
	Work with multiple business areas		Yes
	Clear allocation of project responsibility	Yes	
	Calculate project cost in detail	Yes	
	Prepare a thorough project plan	Yes	
	Specify project success criteria	Yes	
Development	Work closely with multiple business areas		Yes
	Project owner or "champion"		Yes
	Confront and resolve conflict		Yes
	Frequent progress meetings	Yes	
	Monitoring method	Inputs	Output/Result
	High-level of partner involvement		Yes
Post-implementation	Formal review	Yes	
	Formal procedure to identify & fix flaws	Yes	
	Prototype new ideas/enhancements		X

Table 1: Summary of project activities for each IOS motive

5 RESEARCH METHOD

A multiple case study approach (two cases) was used in order to explicate theory using real IOS projects (Yin 2003). The unit of analysis is an IOS implementation project within an organisation, concentrating on the construct *IOS motivation type*. We focus in this paper on the "exchange" purpose within the IOS Motivation Type model, on the basis that transactional systems, such as EDI, are a dominant IOS application, and therefore of great practical significance (future work will report case studies for other motivation types). The two cases assessed represent the two motivation types theorized for the exchange purpose, and therefore provide theoretical replication (Yin 2003).

To allow us to assess whether differences in IOS project activities were a result of differences in motivation, we ensured that external and internal affordances to the projects were as similar as possible. This meant selecting firms that were as similar as possible. In particular, each had recently implemented a new IOS, operates at a similar level in the same industry (Tier 1 suppliers to automotive assemblers), and employs a similar organisational strategy (defender). Profiles of each of the two firms involved in the case studies are provided below.

In the data gathering phase, we were given full access to key decision-makers closely associated with the IOS implementation project (three senior managers with technical and/or business roles in each firm) who explained the specific issues that management was hoping to address, the implementation process, outcomes, and challenges faced. Data collected was first coded to indicate the construct discussed, and codes then analyzed using pattern matching logic (Yin 2003) to assess the whether the patterns predicted for each motivation corresponded to the patterns actually found in the case data. The case studies are considered to be exemplars of each of the two motivation types.

Carolina is a small-to-medium sized enterprise that operates out of three locations, two in a southern suburb of Melbourne, Australia, and one in South Carolina. It has a turnover of around \$US 10M, is privately owned, employs approximately 120 staff, and manufactures dies, metal-cast products, and injection-molded plastic components, primarily for the automotive industry. Information processing is

conducted using desktop computers, with most of the materials planning and other quantitative work performed using in-house developed Excel-based applications. Carolina's production system is primarily based on just-in-time principles, with most production lines employing Kanban principles and supported by lean inventory management. Carolina produces for all major automotive assemblers, but is dependent on Toyota for the bulk of its business. The case study is concerned with a major IOS project involving the implementation of a Kanban-based supply components system for Toyota.

Clayton is the regional subsidiary of a major Tier 1 supplier and has business relationships with every local assembler as well as component retailers. The automotive division that is the focus of this study is located in Melbourne, and employs around 1,500 staff. Information processing is conducted using a sophisticated SAP-based system (installed in 2000), with many custom-developed routines and reports. EDI capability was initially implemented around 1995 at the request of major customers. This capability has been progressively extended in response to further requests from major suppliers and customers, and the company is gradually introducing EDI communications with smaller customers and suppliers. The production system is also based on just-in-time principles, with a mixture of Kanban production lines and MRP demand forecasting. Clayton is not completely dependent on any one customer, but neither does it see itself as being the dominant party in its relationships. The case study is concerned with a recent major IOS project involving a consignment stock system.

6 CASE STUDY DESCRIPTION

The business strategy as described by senior managers in both case firms corresponds closely to the defender type. Both businesses are specialized and operate in a mature industry (primarily motor vehicle parts manufacturing). For a defender, the main entrepreneurial challenge is to ensure a stable and secure market position in the long-term. They tend to protect their position by implementing and refining established and standardized technical processes to ensure that activities are highly efficient. This approach is evident in statements from managers of each company:

"We need to embrace lean manufacturing to become more cost-effective, and if we are cost-effective, Toyota is looking at its list of suppliers now. We have been told that they're looking at us supplying on the next model, which is beyond 2011, so it's almost a situation where we're doing it for two reasons: for the ongoing success of the business, but also to appease Toyota. We want to be on the shortlist [of the ten preferred suppliers]." [Carolina Managing Director]

"In this company, you can't get too far without convincing management that what you want to do will save some money. You will find that is probably the case in any automotive business because it is the toughest. Therefore the margins are minimal, but the turnover is huge. It is immediate and longer-term cost-savings we are after. So cost savings must be direct, like on every sale, and indirect, like in terms of running the business cheaper and responding to a customer's requirements quickly. A happy customer means potentially more customers, and more sales. [Clayton Manager]

Defender projects are characterized by a focus on improving the efficiency of existing operations, and careful top-down planning. However, each firm is achieving this objective in a different way. Carolina has a "whole of business" approach that requires multiple areas (e.g. warehouse, manufacturing, purchasing, accounting, sales) to make complementary changes to processes. In addition, it is more concerned with eliminating waste in the long-term than controlling short-term project expenditure:

"[Toyota] tell us to do all this, but we have our own plans. We started on lean [manufacturing] before Toyota got involvement with our company. When they found out we had spent quite a lot of money putting lean [manufacturing processes] in, they brought us into their top 10 preferred companies and they're now spending a lot of money with us [on process improvement projects]" [Carolina Managing Director].

We use the 5S methodology [an iterative waste-elimination method]. ...With just-in-time you have to be really tight. That's why we can't rush [the implementation] or we'll fall apart. ...it has cost us a fair bit so far. I don't think we will recover the cost soon. The previous system was simpler for us. Eventually, when we go completely Kanban we will recover it." [Production Manager]

Clayton, on the other hand, is very concerned about controlling project expenditure, and relies on frequent progress meetings, and strict adherence to a defined project methodology to ensure that projects finish on time and on-budget. There is little evidence of outside partner involvement.

"For every project we have to specify the benefits. This includes qualitative benefits and cost-recovery.

Then we have to provide the estimate of the cost as part of the budget preparation. Once everything has been approved, we create an internal order, with a budget. It says "this is how much we allocate for this project, this is the cost-centre". As the project is running, I will check cost against budget to see how we are going. How often we do a major review depends on the project. As part of the project preparation we actually specify how often we are going to review, not only cost, but any activity on the project compared with the plan. So for this project, which is an 8 million dollar project, we have what we call four gates: the critical milestones for the project. We review the plan, what was achieved, issues, risk analysis, and costs. We also do a weekly review where the team meets to discuss the implementation." [Clayton Manager]

Post-implementation, each has a different review and follow-up mechanism, and each even assesses the benefits in quite different ways. Clayton's review mechanism, like project execution, is highly formal, but the benefits are seen in operational terms (not strategic), and so project success and evaluation of future opportunities are similarly operational:

"We also have post implementation follow-up 5 years after the project. What we do, for example, we look at technical issues. What sorts of errors do we get, what is the reason for those errors? Second part is looking at the benefits to the business. When we started EDI, we started seeing the benefits of it straight away. It is much more reliable, less error-prone than manual entry. Now when we finish an EDI process with one of our customers and they see the benefits of it, we go out and advertise it to our other customers, and say 'look we will both benefit if we go EDI.'" [Clayton Manager]

For Carolina, the continuous improvement philosophy adopted (5S) means that the project is under constant review, with frequent re-evaluation of performance, and regular prototyping of innovations. Benefits from the IOS are seen quite differently. For example, improved information and internal control, and a more secure customer relationship were cited at various points during the interview, but controlling the cost of administrative procedures was not mentioned at all:

"Definitely we have learned lessons from it. The idea of visual management and all that sort of stuff. I think we are taking as much as we can from it. The information we are getting is a lot better. I mean it has benefited us because it has smoothed our production out. It has gotten rid of the fluctuation, and as we slowly increase in demand, we can see what we need to do to cope." [Carolina Production Manager]

7 CASE STUDY ANALYSIS

Table 2 summarises the above observations. Each case has been selected because it conforms closely to an ideal type: Clayton to *activity control*, and Carolina to *market position*. Both firms are trying to maintain good relationships with customers (to defend market share), and have justified projects on the basis of efficiency improvements, as one would expect of defenders. However, Clayton's IOS project approval process required a detailed justification and to show immediate cost-savings with a short-term payback, whereas Carolina's project was expected to cement the firm's relationship with a major customer, and so protect or expand future revenue streams. In other words, Clayton's initiation process is inward looking, attempting to meet objectives by minimizing process costs, and Carolina has an external focus in which it attempts to strengthen a relationship in the short-term, while hoping that "cost-downs" generated by the project will recover expenditure eventually. On this basis, Clayton's motivation is more like the "activity control" type, and Carolina's like the "market position" type.

Development activities are similarly distinct, and consistent with the respective pattern established in the initiation phase. That is, consistent with the internal focus of the activity control motivation, Clayton has little business partner involvement, inventory-control and IT were the only departments with any significant involvement (and only IT was involved in the actual development phase) and treats the project as more of an operational concern with stringent controls over time, expenditure, and activities. For Carolina, by contrast, the project is a strategic concern, evidenced by the seniority of the project owner, the significant (and expensive) preparatory work to ensure that the project does not fail, and the iterative method employed, which focuses monitoring efforts on results rather than inputs.

Finally, in the post-implementation period, Clayton is continuing its reliance on formal procedures, with a defined review cycle, and a well-defined process for identifying and fixing problems. Carolina, on the other hand, consistent with its outcome orientation, has no formal review procedure, but is instead monitoring production continuously to both address problems as they occur, and enhancing the system by prototyping new ideas (mainly adapting control techniques used by business partners).

Some risks are evident, however. For Clayton, the internal focus of projects (only cost-reduction projects are approved) may be problematic in the long run. In the short-term, the project reported may help Clayton to differentiate itself on the basis of cost, but that strategy is rarely sustainable (Miles & Snow 2003). Carolina’s long-term focus is also a problem, particularly given the difficulties facing the automotive industry as significant parts of the world experience a severe economic slowdown. In particular, by adopting a long-term focus, Carolina risks over-investing in efficiency and in binding its future to the success of a single business partner. A severe economic slow-down could mean that long-term expectations of growth will not be met, making recovery of short-term expenditure much less likely. In addition, any problems experienced by the business partner will now affect Carolina far more directly (although the alternative may nevertheless have been even worse).

Project phase	Activity	Clayton	Carolina
Initiation	Senior management approval required	Yes	Yes
	Focus of business case	Short-term payback and intangible benefits	Business position
	Work closely with other business areas	No	Yes
	Allocation of project responsibility	Large operational project run by project manager	To senior manager
	Calculate project cost in detail	Yes	
	Prepare a thorough project plan	Yes	
	Specify project success criteria	Yes	
Development	Work closely with other business areas	No. Project confined to a single business area	Yes, significant from most business areas
	Project owner or “champion”		Senior manager as sponsor & champion
	Confront and resolve conflict	In regular team meetings	No conflict reported.
	Frequent progress meetings	Weekly meetings	Only occasional
	Monitoring method	Inputs vs. budget	Output/Result
	High-level of partner involvement	No	Yes
Post-implementation	Formal review	Major review after 5 years	
	Formal procedure to identify & fix flaws	Yes	No. Ad hoc fixes
	Prototype new ideas/enhancements		Yes

Table 2: Summary of project activities observed for each case study

8 DISCUSSION, LIMITATIONS, AND CONCLUSION

Our motivation model (Figure 2) proposes that project activities and outcomes depend on the motivation and environmental affordances. According to this model, process and outcome are predicted by what the motivation is able to determine within the constraints of the environment. The two cases help to illustrate the effects of environmental affordances on project activities and business capabilities because both firms have essentially the same business strategy (defender) in the same industry (Tier 1 suppliers in the automotive industry), and both were engaged in a major IOS project. Both firms are highly cost-focused, but, consistent with the typology each has enacted that strategy differently.

A number of limitations must be acknowledged. Firstly, all typologies necessarily simplify reality, particularly ones based on ideal types because these ideals are theoretical abstractions. Indeed, the specific cases reported here were selected because they correspond quite closely to the ideal types described, and so help explicate concepts without any need to explain differences between theory and observations. This research should therefore not be thought of as a test of theory in the hypothetico-deductive tradition, but instead as a form of theory development with detailed explication in the form of multiple case studies. More complex situations that do not clearly belong to any one cell are bound to occur, and these are a challenge to interpret. The simplified view of reality is nevertheless beneficial because it can help explain the principles underlying more complex situations.

A second limitation relates to the top-down (theory-driven) nature of the analysis. Because case details have been gathered and then compared to existing theory, retrospective sense-making (in which people interpret facts selectively according to what is known about the world) is a potential threat to validity. To counter this threat, motivation has been identified on the basis of explicit statements by managers (i.e. the technology application and depth of relationship were apparent from the outset), all cases have been assessed using the same template (thereby limiting the ability to exclude contradictory facts), and recording a rich description of activities has allowed us to assess the *manner in which* each is consistent with theoretical principles (assessment is not based on an arbitrary yes/no decision).

A third limitation is our assumption that intent is fully clarified and specified (or clarifiable and specifiable). That this assumption will not hold in all instances is a boundary condition on the application of the theory, rather than a conceptual limitation. If intent is unclear or unknown, application of the principles will be difficult, but this does not render the ideal types invalid.

Our findings have several implications for practice. Firstly, the motivation to adopt a system appears to affect implementation activities, including the design of the system and how it will be used. This is significant for managers because such design choices, once implemented, are usually expensive and difficult to modify. Secondly, relying on the experiences of other firms as a basis for system implementation decisions is clearly risky without in-depth knowledge of a project, particularly of the motivation. That is, simply knowing that a given firm has a similar structure, strategy, or technology is not a sufficient basis to assess another firm's implementation project.

The major theoretical contribution of this work is our framework for understanding the role of motivation in the activities conducted when implementing a system. Our research model illustrates how motivations affect activities and outcomes for an IOS project, and so informs decision makers about how low-level concerns (project aims) can influence which technology capabilities are actualised, and even long-term plans. In addition, in contrast to the common views of project alignment, our theory does *not* assume that if project activities are aligned with business strategy, business goals should be met. As a general rule, one would expect project goals and corporate strategy to be aligned, and for project impacts to be highest when this is the case. However, the cases presented here indicate that, although strategy is an environmental affordance that suggests particular activities and constrains others, a given project could be structured in a wide variety of ways that are all consistent with the strategy and yet present quite different outcomes, opportunities, and risks to the business. In other words, the high-level nature of strategy means that the boundaries for project outcomes are broad. It is therefore not enough to align a project with corporate strategy; managers must also understand the specific implications that a given motivation has for project activities.

The case evidence presented explicates our argument that motivation affects the pattern of activities performed in an IOS project. The theory applied here is the basis for a wider research program, currently in progress. In future work we will describe other motivations and provide case examples for each. It is important to note that although IOS technology is the specific focus of our program, there is no reason to suppose that the principles we propose do not apply equally to other IT projects

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