

Developing Dynamic IT Capabilities – A Systems Perspective

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Abstract

Many organisations still have difficulty obtaining value from their IT spend. The literature indicates that two ways of improving this situation is via better strategic business/IS alignment and the development of a dynamic IS capability. It is argued that the development of these skills occurs within a complex, dynamic social system and have the characteristics of wicked problems and are poorly investigated using the dominant IS research paradigm.

A systems perspective demonstrates why many organisations are unable to improve strategic alignment and develop dynamic capabilities. Feedback within the social system inhibits changes in managerial and organisational behaviour. It is demonstrated that the effect of feedback loops within the work environment means that simple remedies such as the call to improve communication between business and IS managers or to change organisational structure, that are common in the IS literature, are likely to be ineffective.

One property of a complex system is that the act of understanding a problem is also an act of changing the situation. The research reported here allows managers to understand how the social system in which they operate limits their understanding and choices for action. This understanding may then allow them to improve their situation, develop an IT related dynamic capability and, eventually, improve firm performance.

Keywords: IS/business alignment, dynamic capabilities, complex problems, grounded theory

Introduction

Many organisations have discovered that they do not gain a particularly good return on their investment in information technology (Brynjolfsson and Yang 1996). A number of authors maintaining that this is either because the firms are unable to manage their IT effectively (Stratopoulos and Dehning 2000) or that management has not become “IT savvy” (Weill and Ross 2009).

It has been argued that superior IT performance is reliant, in part, on effective strategic information systems planning and alignment of the IS to business. However, it has also been demonstrated that many firms are still unable to manage these processes. Chan questions why we have not mastered alignment. She found that a feature of a high degree of alignment was a strong informal structure within firms. This informal structure either encouraged, or was a result of, communication between senior business and IS managers. This facilitated learning within each other's domain. Using Weill and Ross' (2009) terminology, these firms are able to become IT savvy as a result of the shared learning and ability to manage IS within the firm.

Similarly, Earl (1993)(Earl 1993) describes five different approaches to strategic information systems planning. He claims that one of these, the organisational approach, is superior to the remaining four. Again, this approach is predicated on communication, teams of senior business and IS managers, and mutual learning. Those firms using this approach did not appear to have specific planning schedules – planning was a continuous learning exercise that encompassed a high degree of flexibility in the resulting strategies that were focussed on organisational goals. Additionally, these firms tended not to have separate IS plans – they were a part of the overall business strategy. This is supported by Weill & Ross (2009) who claim that a characteristic of an IT savvy firm is that “... *IT is at the heart of highly effective management*” (pp. 7-8). Although only a part of the solution, in an IT savvy firm “... *IT is never an afterthought... Rather it forms the basis for each firm's competitive*

capabilities” (p. 8).

In contrast, Weill & Ross (2009) detail typical responses by other firms to poor IS performance. These include: throwing more money at IS but without changing management or IS behaviour; drastically cutting IS spending as it is not providing competitive advantage and therefore, by definition, must be a cost centre; fire the CIO as he, or she, must be to blame for the poor performance; and outsourcing the IS function to make the problem go away, but without changing behaviour in other parts of the firm. In all of these responses the firm does not develop a capability to conduct its business differently as it is considering the IS function in isolation.

In their study of alignment using a punctuated equilibrium model, Sabherwal, Hirscheim et al. (2001) found that after an organisational crisis, where business strategies changed, some firms were able to maintain an appropriate alignment between business and IS strategies whilst others tended to revert to the previous position. That is, some of these organisations learned a new way of utilising the IS resource compatible with new business strategies whilst others did not.

It would appear, then, that the major difference between those firms that are able to use their IS resource effectively and those that cannot is their ability to learn different ways of using that resource. This is normally achieved as a result of communication, collaboration and learning between senior business and IS managers. Learning different ways to use a resource, in this instance IS, is the development of a dynamic capability.

Dynamic Capabilities

The study of dynamic capabilities as a means of developing competitive advantage has been growing in importance for some 15 years. It is an extension of the resource based view of the firm which argues that a firm's competitive advantage arises from the mix of its resources (including capital, assets and knowledge) rather than its position within a market. However, there has been some confusion defining exactly what a dynamic capability is (Zahra, Sapienza et al. 2006). Rather than limiting the definition to those capabilities developed within a dynamic, or turbulent, environment Zahra, Sapienza et al (2006) define dynamic capabilities as “*the abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker(s)*” (p. 918). Simply, substantive capabilities are those skills and knowledge that allow an organisation to use its resources efficiently and to conduct business processes. Dynamic capabilities are the skills and knowledge required to envision different ways of using resources and to develop and implement different business processes. The former is the “way we do things around here” whilst the latter is the ability to choose and then change the way things are done. Appropriate choices may then lead to competitive advantage (Teece, Pisano et al. 1997). Within the context of this paper, IS (including IT and human resources) is a resource.

To develop dynamic capabilities senior management must be able to perceive opportunities to productively change existing routines or resource allocations, have the willingness to undertake such changes, and the ability to implement these changes (Zahra, Sapienza et al. 2006, p. 918). This implies that senior management has the skills and ability to understand existing routines (processes) and resource allocations and be able to estimate their contribution to overall firm performance. It also implies that they have the skills and abilities to envision different ways of using a resource (i.e. developing different routines) and can make a choice between alternatives that is consistent with the overall strategy of the firm. In an IS sense, they must be able to understand how to use IS within the firm to best advantage. However, many managers and firms appear unable to do this (Weill & Ross, 2009, p. 5). Most of the literature emphasises the importance of learning in the development of dynamic capabilities (Teece, Pisano et al. 1997; Tripsas and Gavetti 2000; Zollo and Winter 2002; Zahra, Sapienza et al. 2006). In particular, the paper by Tripsas & Gavetti (2000) documents the fortunes of a firm (Polaroid) that was unable to learn and develop dynamic capabilities. Senior management remained committed to a business model that had been made redundant by changes in technology and customer preferences. Even in hindsight when presented with clear evidence of the failings of the business model many managers remained convinced that it was still viable. They were completely unwilling to change their existing substantive capabilities.

The responses by senior management to poor IS performance noted earlier are also examples of an

inability to develop a dynamic capability and change existing routines. It appears that this situation occurs because of forces within the social system in which managers, both business and IT, operate.

It has been argued that a firm is a social system that exhibits the characteristics of complex systems (Mason and Mitroff 1981; Sterman 2000). One of the characteristics of such systems is the prevalence of wicked, or messy, problems. One symptom of these is that participants believe that there is a problem, but they can't quite grasp, or define, it. Similarly, the problem often appears to be intractable. Whatever measures are taken to alleviate the problem don't seem to work, either in the short or long term. Anecdotal evidence would indicate that this is a typical scenario for many firms when considering IS.

Complex Systems and Wicked Problems

According to Mason and Mitroff (De Wit and Meyer 2004) wicked problems have a number of properties. Some of these are shown in Table 1, below, where they are compared to tame problems. The latter can normally be precisely defined, involve relatively few variables and the line of cause and effect can be readily established. They are appropriately investigated using the dominant IS research paradigm (Orlikowski and Baroudi 1991).

Property	Tame Problem	Wicked Problem
Ability to formulate the problem	Can be exhaustively formulated and written down	No definitive formulation
Relationship between problem and solution	Formulation is completely separate from any solution	Every formulation corresponds to a statement of solution and vice versa
Testability	Solution can be tested. Mistakes and errors can be identified	No single criteria that determines whether solution is correct or not. Solutions can only be good or bad compared to one another
Finality	There is a clear solution and end point that can be determined via a test	No stopping rule. As there is no test for a solution, it is never known whether the problem is totally solved. Improvements are conducted indefinitely
Tractability	An exhaustive list of permissible operations used in solution	No exhaustive list of permissible operations used in solution
Explanatory Characteristics	Can be stated as a "gap" between desired and actual state. Reason for gap can be clearly identified	Many possible explanations for gap between desired and actual state. Depending on which explanation one chooses, the solution takes a different form
Level of Analysis	Proper level of generality can be found for bounding the problem and identifying its root cause	No identifiable root cause. Every problem and solution become causes for other problems. One is never sure the problem is being addressed at the proper level
Reproducibility	Can be abstracted from real world. Experiments can be conducted to find correct solution	One-shot operation. Once a solution is attempted you can never undo what has been done. No trial and error
Replicability	Same problem can repeat itself in different environments	Every wicked problem is unique
Responsibility	No-one blamed for not solving a tame problem. But, can receive rewards for its solution	Because there is no abstraction from real world the solver must accept responsibility for any perceived deterioration in the situation. As there is no way of knowing when a wicked problem has been solved,

Property	Tame Problem	Wicked Problem
		acclaim for improvements are very rare.

Table 1. Properties of Wicked Problems after Mason & Mitroff, 1981, in De Witt & Meyer (2004)

To complicate matters further, according to Sterman (2000) social systems usually exhibit dynamic complexity with symptoms of such systems being that they are:

Dynamic: systems change over time, but at varying time scales. A bull market can continue for many years then collapse in a short period of time.

Tightly Coupled: Actors in the system interact with each other, reacting to each others actions.

Governed by Feedback: An actor reacts to another's action. A third actor may then react to this action. Effects can flow through the system and eventually return to the instigator of the first action. This first actor then must react to the impetus. The action taken here may, or may not, be consistent with the initial action. Time delays within the system often mean that the first actor does not realise that the final impetus he, or she, is reacting to is a result of the first action he, or she, took. The second set of actions may actually negate the intent of the initial action.

Nonlinear: Cause and effect are rarely proportional. Often a minor action taken locally may have a dramatic impact at some distant part of the social system.

History Dependent: A series of consistent decisions may limit actions in the future. It becomes "the way things are done round here." History can also bound our understanding of a problem situation, limiting choices.

Self Organising: Related to the above. Once a system has learned to behave in a particular way, it is very difficult to change the behaviour.

Adaptive: in contradiction to the above, actors and the system can learn new ways of reacting to stimulus. However, not all learning is beneficial. The adaptation may actually be destructive.

Counterintuitive: Cause and effect are often separated by time and space. The underlying cause for a particular effect is regularly misdiagnosed.

Policy Resistant: Most of the above mean that any changes to the system often (mostly?) do not lead to the desired result. In many instances well-meaning actions will lead to a deterioration in the situation.

Characterised by Trade-Offs: The time delays between cause and effect often mean that, even when an appropriate action is taken, there is a deterioration in the situation in the short term before a long term improvement. The reverse also occurs. For example, cutting costs often leads to short term trading improvement but impairs the firm's ability to react to changes in the environment in the future (Sterman 2000).

It appears, then, that both substantive and dynamic capabilities are developed within complex, dynamic social systems and are subject to the characteristic behaviour of such systems. Similarly IS/business alignment, the subject of this research, is developed in a complex, dynamic social system. The objective of this research was to understand why some organisations are able to achieve a satisfactory level of IS/business alignment whilst others cannot. It was believed that, rather than simply adopting the dominant IS research paradigm (Orlikowski and Baroudi 1991), an alternative methodology that could embrace complexity and provide explanation would be more appropriate. Such a method is grounded theory (Orlikowski 1993; Glaser and Strauss 1999; Douglas 2004).

As the research progressed, and a substantive theory emerged, it became clear that IS/business alignment and the development of dynamic capabilities are linked. It also became clear that the effect of feedback loops within a firm's social system can either enhance or inhibit the development of both dynamic capabilities and alignment.

Methodology

The research reported here used the Glaserian form of grounded theory to understand the nature of IS/Business alignment. This allowed the emergence of a substantive theory grounded in the collected data rather than forcing data to fit pre-determined categories as can occur in the Strauss and Corbin (Strauss and Corbin 1990) version of grounded theory (Glaser 1992). Data were analysed from an interpretive perspective, using a constructionist epistemology (Crotty 1998) and using the interactive coding family. The latter does not assume linear causality but rather "... *mutual effects, reciprocity, mutual trajectory, mutual dependency, interdependence, interaction of effects, covariance. This code is an effort to capture the interacting pattern of two or more variables, when the analyst cannot say which comes first. Nor does it matter, probably*" (Glaser 1978). This coding family allows the adoption of a systems, or holistic, perspective of the problem situation embracing the characteristics of wicked problems and the dynamic complexity of social systems outlined above. The substantive area being studied, alignment between business and IS, has been extensively researched in the past (Chan and Reich 2007) but much of this research has used a positivist epistemology and has largely been reductionist in nature. It was believed that the use of grounded theory using a constructionist epistemology and the interactive coding family would therefore provide a different perspective of a well researched area.

In total sixteen IT and four business managers were interviewed. Subjects represented a number of industries and organisations of various sizes from small to medium manufacturing firms within Australia, to very large Australian based financial and fast moving goods manufacturers and multi-national organisations. They were also selected to represent various levels of management from a managing director to line managers. This was to address an issue identified by Ciborra (Ciborra 1997) where most previous IS/business alignment research has been conducted at the executive level. Ciborra's argument is that we don't know what is happening at lower levels of an organisation.

The major form of data collection was via semi-structured interviews (Fontana and Frey 1994). As predicted by Dey (1999) the earlier interviews tended to be less focussed becoming more focussed, both in the questions being asked as well as in the theoretical sampling of subjects (Glaser and Strauss 1999), as the substantive theory emerged from the data. The increased focus also meant that interview time tended to decrease from about 2 hours in early interviews to 40 minutes for later interviews. Theoretical sampling continued until saturation occurred – when no new conceptualisations emerged from the interview data, no new properties of categories emerged and no new relationships between categories were emerging (Dey 1999; Urquhart 2001).

A myth of grounded theory is that the researcher can enter a research area as a 'blank slate' (Urquhart and Fernandez 2006). As the current researcher was familiar with the extant literature some method was needed to limit the impact of this knowledge on collection and analysis of data. This was achieved via the use of three unstructured focus groups (Stewart and Shamdasani 1990; Morgan 1998) as the initial data collection technique. Two of these unstructured focus groups consisted of six and four IT managers each and the third consisted of three business managers. The use of unstructured focus groups reduced the facilitators influence and transferred power to the participants (Blackburn and Stokes 2000). This ensured that subjects discussed issues of importance to them, not what the researcher thought they should discuss. Analysis of focus group data then informed the semi-structured interview instruments so reducing the impact of a prior knowledge of the area being researched (Campbell 2009).

Ten of the sixteen subject IT managers were participants of the focus groups. One of these participants was also interviewed individually. One IT manager (a CIO) was interviewed individually twice but was not a member of a focus group. Of the sixteen IT managers, three were either CIOs or the senior IT manager for the firm. The remaining IT managers ranged from very senior managers (immediately below CIO) to project and line managers.

Of the four business managers interviewed, three took part in a focus group. One of these was also interviewed individually. They ranged from a managing director and an executive level manager in a large multi-national organisations to senior line managers.

All interviews were recorded and transcribed with most then analysed using open coding at a theme level to allow the emergence of overall themes and concerns (Coffee and Atkinson 1996). These

transcripts were then analysed for a second time with coding at a line or sentence level to identify categories. Coding at this level also limits the influence of a priori reading (Charmaz 2000; Dick 2002). As theoretical sensitivity improved, the last interviews were coded selectively at the categories pertinent to the emerging theory (Glaser 1978). Nvivo was used as an aid to manage categories and text coded to categories.

Developing Dynamic Capabilities – A Systems Perspective

The core problem of participants was the difference between espoused and enacted strategies, *strategy ambiguity* in Figure 1. It can occur for many reasons including changes in the environment and competitors actions. It can also occur where the *measurement and motivation* of staff is not appropriate to the particular strategy (Kerr 2003). In addressing this gap both business and IT managers were limited in their ability to understand the situation and then to take action. The coding family used during analysis indicated that this was due to the interactions between variables within the social system in which managers operate. These interactions often prevent managers gaining any new understanding and to take actions that differ from those previously taken within that organisation. This is now demonstrated. Evidence to support the argument being developed is available in the full research report located at <http://epress.lib.uts.edu.au/dspace/handle/2100/650>. An abbreviated version is within Campbell (2008).



Figure 1. A theory of strategic alignment. It also explains why many organisations are unable to develop a dynamic IT capability

In many organisations *IS Status*, which includes its sub-categories of *History of IT/business relationships*, *Perception of IT* and *Perceived role of IT*, is often low (Avison, Cuthbertson et al. 1999). The participants of this research indicated that this then impacts the *mental models* of all managers – how they perceive other variables within the model and their interactions. Where *IS*

status is low business managers are not inclined to *communicate* and develop a *relationship* with a low status IT manager. They do not perceive any value to themselves in such actions. The IT manager then reacts to this situation and tends to withdraw from engaging with business managers, thus reducing the level of *IS status* even further. A vicious cycle develops where IT managers withdraw further and further from engaging with the business and, therefore, business managers are increasingly disinclined to communicate and develop relationships with them. Given this situation it is extremely difficult for managers to develop trust, a shared system of meaning and shared domain knowledge as each variable is dependent on the others (Nahapiet and Ghoshal 1998). A number of participants commented on this type of scenario. A senior project manager within an IT consulting firms said that:

“... things are already in place with history. Things that happen in the past and it takes a very professional view to get past mistakes and bad experiences and still work together...”

Another example was a senior IT manager within another consulting firm who said:

“... the current philosophy in our [IT] group is... very conflict oriented. There's a whole history of things that have gone sour and many people and managers are very defensive”

A senior IT manager within a large Australian financial institution then indicated :

“... It's that budgetary cycle. It's a yearly review even though it's supposed to be a strategy, the projects happen within a year. So people are always looking for money to do what they have to do for the business this year. It's not a long term view. So, a lot of that is based on our history, back when a number of events occurred in the early 1990's. Confidence in IT was lost and so a lot of autonomy was removed from the IT organisation and so the account [function] basically came in to drive IT and took a lot of the business management out of it. ... so that's why at the moment it's like 'Here's a project. Fill that order and deliver something.’”

This situation then impacts the development and implementation of both business and IS strategies. When asked if he was aware of his organisation's IT strategy, a senior business manager within the Australian branch of a large multi-national consumer goods manufacture said:

“... we are only getting it through the formal meetings and communications. IT here right now is split into two. One is the traditional IT shop, the support and the like. They've been here for a long time, a lot of them.... I think 12 years is the average... That's about 10 years and 6 months too long. They're not well regarded. They're seen as dysfunctional, closed and not communicating. And I would be most surprised if they communicated their strategy to anyone.”

In this particular firm the IT group was being side-lined in a major IT project. Business managers, outside consultants and contractors were responsible for the implementation of an ERP system worth AUD\$30million. In contrast to the IT function this group, according to the same manager, ensured regular updates and *“...used local managers as the voice to give credibility to what they're doing.”*

All of the CIOs in the organisations studied where this type of situation occurred reported to the Chief Finance Officer (CFO), not the Chief Executive Officer (CEO). Although these organisations indicated they wanted to gain competitive advantage via the use of IS emphasis was placed on IS cost containment, guaranteeing that the organisation as a whole perceived IS as a cost centre. This is an example of goal displacement – where one result is desired, but the incentive schemes guarantee a different result (Kerr 1995). Interactions between variables actually encourage IS managers to withdraw from the business and concentrate on the delivery of a low cost, reliable IT service. The attitude of many IS staff tends to become “I do what I'm told.”

Participants of this research indicated that where IS status, and consequently shared system of meaning and shared domain knowledge is low then it is unlikely that business and IS managers are able to collaborate in the development of strategies and plans. In none of the firms studied where IS status was low was the CIO involved in business strategy development. It appeared that due to the emphasis on cost containment the strategic information system plan concentrated on how the IS function would deliver services and projects at minimum cost. Naturally IS staff react to these pressures, concentrating on the cost of projects not their efficacy. In most instances the CIO was not involved in the selection or planning of projects and in many instances the first knowledge of a new

project was when the CIO was provided the specifications, budget and deadline. Planning in these firms appeared to be similar to the administrative approach to SISP identified by Earl (1993). Business units submitted projects which were then prioritised, usually on a cost basis, by a business steering committee. A consistent complaint of CIOs where this occurred was that each project was considered separately. There was no connection between projects and no overall strategy to allow IT to contribute to long term competitive advantage.

Participants also reported that where IS status was low then there tended to be a physical separation of the IS function from the business (*organisational structure* in Figure 1). One CIO reported that it was company policy for new staff to be given a tour of the firm. This applied to everyone except IT staff. The CIO had been in this organisation for quite some time before she was allowed to meet production managers who were located two floors away.

It appears, then, that where IS status is low there is a physical and mental separation of the IT department from the business. This develops into a culture that reinforces the prevailing situation. Staff within these firms may develop very efficient routines that support the work they are conducting. This could include the selection, development and deployment of IT projects. However, they are totally unable to learn innovative ways of employing IT to gain long term competitive advantage. That is, they may have efficient substantive capabilities, but no method of developing dynamic capabilities. However, this does not have to be the case.

A completely contrary situation can occur where *IS status* is high. Due to equal status, business and IS managers actually want to *communicate*, develop *relationships* and *trust* and thus learn a *shared system of meaning* and then develop *shared domain knowledge*. These managers collaborate. By doing so, IS managers are able to understand the goals that business managers are attempting to achieve regardless of whether they are contained within official strategies and plans. The emphasis of IS managers in such a situation is adding business value whilst keeping their customers happy. A number of managers within the study, both business and IS, indicated that in such an environment they are often involved in informal discussions on solving business problems and how IT could be used within the business to gain long-term competitive advantage. An IT line manager within a multi-national fast moving consumer goods firm gave an example:

“How do you know if what you're doing is in the right direction if you don't have these relationships? You develop the networks, you develop an understanding of what the business wants, or the strategy that is required. If you didn't have the relationship you couldn't be in alignment, because what would you be in alignment with? You wouldn't know anything.”

CIOs operating in this type of environment also appeared more likely to be involved in business strategy development and to report to the CEO. This is a completely opposite situation to that found where IS status is low. Many managers indicated that the development of *communication*, *relationships*, *trust*, *shared system of meaning* and *shared domain knowledge* encourages further interaction that then adds to the level of these variables. This provides the environment in which dynamic capabilities can develop.

There are many reasons why either one of these environments develop. The important thing is that, once developed, the interaction of the variables within Figure 1 reinforce that environment. It is unhelpful to recommend that CIOs develop relationships with senior business executives. Where IS status, and the value of all other variables to the left side of Figure 1, is low then any approach to a business manager is likely to be rejected. Equally, any approach by a business manager is likely to be rejected by IS managers. People react without thinking and according to established organisational precedents as it is efficient. This is tacit knowledge at work.

It is extremely difficult to improve a situation where the IS function is isolated, mentally and physically, from the business. Significant change normally occurs only during an organisational crisis of some kind (Sabherwal, Hirschheim et al. 2001; Campbell 2008). It is during these periods that organisational members are amenable to considering different ways of working and cooperating and therefore have the chance of tipping the feedback system shown in Figure 1 from a vicious to a virtuous cycle.

A senior IT manager within a large Australian financial institution gave an example from his previous place of employment, a similar financial institution. This firm was in a situation where it had to treble its share price within a short period of time. The executive effectively “locked” many senior business and IS managers in a room for 3 months and demanded that they develop ideas and possible projects to achieve the goal. During this period both business and IS managers learned that they could cooperate and work together. Eventually many of the proposals were grouped by the executive and then implemented. The business goal of trebling the share price was achieved. However, the new relationships between business and IS managers remained. Now, whenever a new business project is proposed, IS managers are immediately included in planning so that the firm can maximise the benefits of its IT resource. That is, the firm had learned a new way of using its resource and developed new substantive capabilities. However, for a dynamic capability to develop the firm must learn how to continually develop new ways of utilising its resources so that it can react to changes in a timely manner rather than allowing a crisis to develop. This will require a continued, strong, trusting relationship between business and IS managers where they can discuss business problems in an informal manner. This is the situation reported by Chan (Chan 2002) when she investigated organisations that had a high level of IS/business alignment.

Sabehwal, Hirschheim et al. (2001) found that a crisis is not a guarantee of change. The forces within the feedback system shown in Figure 1 may be so strong that the status quo is maintained throughout the crisis. Business and IS managers are unable to learn different ways of working and gaining advantage from the IT resource. Additionally these authors indicated that the previous situation may re-assert itself over a period of time. An explanation is that one or more of the variables within Figure 1 may be of such value, or strength, and endurance that it is able to influence the behaviour of the entire system over time.

However an organisational crisis is not mandatory to achieve change. As mentioned in the introduction, a property of wicked problems such as this is that the act of understanding and defining the problem corresponds to a statement of solution and vice versa. To address a wicked problem managers must have some understanding of how it is being sustained. Once managers understand how the system reinforces itself then they have a choice when confronted with a decision. This decision may, on the surface, appear to be trivial. Another senior IS manager within a law firm gave an example. Traditionally the firm partners and IS section had not worked together particularly well. A new partner then entered the firm. He approached the IS manager with a request. Note that although not specifically investigated it appears that the attitude of this partner was different to that of his peers when approaching the IS manager. In any event the IS manager decided to respond positively. The request was acceded to and a small implementation conducted. The partner was happy and in the words of the IS manager “communication happened”. This led to further requests, also acted upon. Eventually other partners realised that the new partner was able to improve his performance due to the IT he was able to utilise. At this point other partners also started to approach the IS manager with requests. The organisation had learned a new way of operating and using its IT resource.

In both these examples it could be convincingly argued that the firm had learned new ways of managing its IS resource. Other authors have argued that the way in which the IS resource is managed provides competitive advantage, not the quantity or quality of the IT itself (Stratopoulos and Dehning 2000).

Conclusion

The research reported here investigated the alignment of business and IS strategies. It demonstrates that both business and IS managers operate within a feedback system that both limits, or bounds, their understanding of a problem situation (alignment of strategies) and then limits the actions that are available to them. Due to an event in the history of a firm the actions of the feedback system can either encourage or discourage communication, mutual learning and collaboration between these management groups. The feedback system then reinforces the particular response.

From a practical perspective, a situation where an IS group is seen as being a cost centre and often unresponsive, unhelpful and uncommunicative is extremely difficult to change. The resulting

perceived role of IS within the organisation as a cost centre and its low status means that it is appropriate to have the CIO report to the CFO. It also makes sense to then physically separate the IS function from other business personnel as they are not part of the firm's core business. The feedback system entrenches this particular belief. Actions of IS personnel will also reinforce the status quo – because they are being measured as a cost centre they react accordingly, giving precedence to cost savings over functionality, usefulness and customer service. They adopt an attitude of “I do what I'm told” (see Figure 1) and remove themselves emotionally from their customers within the business. Business managers will never be satisfied with the service they are receiving even allowing for the low cost involved.

Simplistic solutions such as recommending that the CEO and CIO develop communication and a relationship, or that the formal structure should have the CIO reporting directly to the CEO, are not likely to be helpful. The beliefs inherent in the various variables of the feedback system will to a large extent determine the organisational structure, formal and informal, that is possible.

A more likely reaction to poor performance is one of those identified by Weill and Ross (2009): further cutting the IS budget as it is not providing competitive advantage; firing the CIO as he, or she, must be to blame for poor IS performance; outsourcing the IS function but without changing the behaviour in other parts of the firm; or by contrast increasing the IS budget in a hope to improve performance but without changing management, organisational or IS behaviour (Weill and Ross 2009). It is evident that business and IS managers are dealing with a wicked problem – they know they have a problem, but can't precisely define or identify it. It appears to be intractable in that none of the “solutions” provide long-term improvement (De Wit and Meyer 2004).

In all the responses to poor IS performance noted above the underlying belief system, or mental models, held by personnel has not changed. Neither senior business nor IS management have learned a new way of obtaining advantage from the IS resource. This, then, provides the link to dynamic capabilities – that capability, it has been argued in the literature, that may provide long term competitiveness.

In many organisations the perceived role of IS as a service provider and cost centre will tend to inhibit communication between business and IS managers. This, then, inhibits the development of relationships, trust and credibility, and the development of shared domain knowledge.

Conversely, if the perceived role of IS is one of providing competitive advantage the feedback system shown in Figure 1 will encourage communication and the development of shared domain knowledge that may lead to a dynamic capability – the ability to envisage new ways of using the IS resource to gain competitive advantage – although this is not a given (Teece, Pisano et al. 1997; Zahra, Sapienza et al. 2006).

The contribution of this research is to demonstrate that the behaviour of business and IS managers is constrained by the social system in which they operate. This is complex and dynamic and, when considering the development of a dynamic IS capability, forms a “wicked” problem for managers to contend with. One of the features of a wicked problem is that the act of understanding the problem can lead to improvement action. This provides another contribution of this research:

As stated above, where a problem exists there is no simple solution to either IS/business alignment nor to the development of dynamic capabilities within a firm. However, if managers can become aware of how their actions and decisions impact the behaviour of the feedback system in which they work they may be able to change the behaviour of the system over time. It is possible, although difficult, to change the behaviour of the feedback system shown in Figure 1 from a vicious to a virtuous cycle. In most situations this is a result of an organisational crisis, but it can be due to the self-awareness of participants of the system (Senge 1990).

The work presented here tends to be exploratory in nature – the subjects were few in number and came from organisations located within a small geographical area even though representing firms of various sizes and from various industries. It also addressed the problem area from a particular perspective, although one not normally associated with IS research. Doing so allowed a different view of the problem area. If, as argued, both alignment and the development of dynamic capabilities occur within a complex, dynamic environment then other research adopting non-traditional research

paradigms may yield fruitful results.

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Table of Contents

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Business Transformation through Innovation and Knowledge Management
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[Perceived Benefits and Barriers of e-Business Technology Adoption: An Exploratory Study of the Victorian SME Suppliers](#)

Ali Abu Abid, Md Mahbubur Rahim, and Helana Scheepers

[Communication environment for small and medium enterprises](#)

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