The Conundrum of IT Management

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Abstract

This paper presents a robust argument as to why it can be difficult for chief information officers (CIOs) to deliver business value from investments that their organizations make in IT with contemporary organizational structures, authority patterns, processes and mindsets. This argument is built on the subtle premise that organizations should not seek to merely manage IT but to manage the delivery of business value through IT. It takes the view that this latter quest is knowledge-based and that the knowledge resources to successfully deliver this value are distributed throughout the organization. Crucially, this knowledge is not located solely within the IT function, presenting a challenge for the CIO for its integration and coordination. With the CIO having little or no jurisdiction over all required knowledge, its deployment will therefore be fragmented. The conundrum of IT management is how to deliver value through IT without having access and authority over necessary resources. Research and practitioner implications of this analysis are highlighted.

Keywords: IT Value, Competencies, Knowledge, Social capital, IT management

INTRODUCTION

One of the great blunders of history was the belief that California was an island floating off the western coast of North America. Indeed, this view was widely accepted until well into the late 18th century. The error was a result of sound Cartesian reasoning. Spanish explorers coming from the south had encountered the tip of the Baja Peninsula; voyaging further north they sailed into the Straits of Juan de Fuca. When they connected the first point to the second they created the Gulf of California.

Yet, for many years, strong evidence to the contrary did not sway this dominant belief. When Father Eusebio Kino and his missionaries crossed over to the peninsula of California in the late 17th century he found, much to his surprise, that he didn't need a boat to get to New Albion. Kino published his map in 1705 and sparked a barrage of criticism. The missionaries were even told that they must have been in the wrong place! Renowned Dutch cartographer Herman Moll added his weight behind this position proclaiming that “California is undoubtedly an island. Why, I have had in my office mariners who have sailed round it.”

It was only when missionaries rose high enough in the Church were they in a position of influence to persuade King Ferdinand VII of Spain to the contrary. And in 1747 the King issued an edict stating that California is not an island, but indeed part of the North American mainland.

Just like California in the 18th century, the IT function[1] is typically portrayed as an island, separated from the rest of the organisation. Indeed, IT is seen as a resource that can be managed from within a box on the organisation's map – just look at any organisation chart. Yet research clearly indicates otherwise; IT cannot be managed as an island but must be fully integrated with the mainland. But is the orthodoxy that hindered the recognition that California was not an island, a reflection of the same myopia that is affecting how organizations currently choose to manage IT? Are managers navigating from a map that clearly is erroneous, but for whatever reason they still chose to follow despite all the evidence that it is inaccurate?

We have been conducting research over the last number of years that is exploring how organizations can maximize the value delivered through information technology. From our data, it is clear that we are faced with a conundrum. Many chief information officers (CIOs), like the missionaries of the 18th Century, recognize that to deliver value from their organization's IT investment they need more engagement from executives and users from right across the organization. They acknowledge that they are attempting to influence people and decisions as well as encourage involvement and the promotion of actions that do not strictly fall into their realm of authority. And while conceding this, they also realize that if IT is to deliver value they must also wrestle with aspects of the organization that can encourage behaviors to the contrary. While delivering value through IT is an organization-wide endeavor, a lot of executives fail to accept that they too have a responsibility. The IT specialists can build the technical infrastructure and systems, but can never deliver the changes in

[1] The label 'IT function' is used in the paper to refer to that unit in the organization responsible for information systems and technology. Titles include IT Department, Information Services, Information Management Department, Computer Services, and IS Division. This unit is also typically assigned responsibility for data and information.

organization processes, work practices and business models that will ultimately see the creation of business value – at least not with current structures, processes, authority patterns and mindsets. Part of the reason is the lack of a comprehensive map that accurately reflects the terrain. This paper draws such a map and highlights obstacles in navigating using this map. The implications of this analysis are profound.

IT AS AN ISLAND

IT has often been likened to an island. Early metaphors were of "islands of automation" or of the "information archipelago"[2], referring to the silos of technology that had sprung up in the proceeding years that could now be integrated by networking technologies. Indeed, how most organisations manage IT today is premised on the basis that IT is positioned as an island, separate from the "mainland" organisation. Just look at all the organisations with distinct IT functions. Chief Information Officers are appointed to run these organizational units with a remit to marshal the information, systems and technology resources. Often, they are even physically located at a different site – an island away from the mainland. In many cases they have their own budget. All those employees outside of "IT", as the IT function is colloquially referred to, are seen as working in "the business". Thus, even words and language propagate this separation.

[2] J.L. McKenney and E. W. McFarlan, 'The information archipelago', *Harvard Business Review*, September-October, 1982, pp. 109-119; Jan-Feb, 1983, pp. 145-156; and July-August, 1983, pp. 91-99.

In assessing the logic behind contemporary IT management, the conclusion can only be that it is underpinned by a belief that the value of IT is in its possession.[3] The challenge for the IT unit is thus to "get the technology in" and it is consequently structured and managed for this purpose. While organizations do seek benefits from their IT investments, most put in place elaborate plans to implement the technology but few ever consider developing similar plans for the realisation of the expected benefits.[4] Consequently, the failure rate of IT projects continues to be high.[5] One lesson is clear from the experiences of the last 40 years: in deploying technology, it does not necessarily follow that expected benefits will flow.

Of course many executive teams do recognize that information is a key corporate resource and must be managed effectively and in a pro-active manner. Indeed, it has long been acknowledged that, as a resource, IT has the potential to enable the achievement of competitive advantage.[6] This requires planning, and today many companies have developed information systems strategies. Yet delivering value requires more than the articulation of a strategy for information systems and technology. The required changes enabled and shaped by technology – resulting from the implementation of the strategy – must be managed effectively and only executives

[3] This is a fundamental assumption behind Nicholas Carr's controversial paper. See N. Carr, 'IT doesn't matter', *Harvard Business Review*, March, 2003.

[4] See, for example J. Ward, S. de Hertogh and S. Viaene, 'Managing benefits from IS/IT investments: an empirical investigation into current practice', paper presented at *Hawaii International Conference on Systems Science* (HICSS), January, 2007; and C. Lin and G. Pervan, 'The practice of IS/IT benefits management in large Australian organizations', *Information & Management*, Vol. 41, No. 1, 2003, pp. 31-44.

[5] For recent figures see the British Computer Society report *The Challenge of Complex IT Projects*, London., 2004

[6] See F.W. McFarlan, 'Information technology changes the way you compete', *Harvard Business Review*, May-June, 1984, pp. 93-103; and B. Ives and G.P. Learmonth, 'The information systems as a competitive weapon', *Communications of the ACM*, Vol. 27, No. 12, 1984, pp. 1193-1201.

and users outside of the IT organization can accomplish this.[7] Employees must additionally have the ability not only to use the resultant systems and functionality but also to work with information.[8] And as IT becomes increasingly intertwined with business strategies and operations it is recognized that many decisions traditionally made by IT specialists within the IT function should be devolved out into "the business."[9]

What is mapped out above is a landscape with activities and requirements that are not capable of being solely managed from within a box on the organization chart – from an island away from the mainland. At a recent IT Leadership Forum[10] I posed the question to a group of CIOs as to what they considered their job to encompass? In their responses, building systems, managing vendor relationships, providing technology leadership and creating visions of IT-enabled opportunities were all mentioned. But they also pointed to additional activities that are critical to the success of IT in delivering business value, the primary objective of investments made in IT. Influencing and persuading others, achieving engagement, and coaxing involvement were keywords in the subsequent discourse. For many of them, core challenges are convincing "the business" that IT projects are ***really*** about business change and thus securing the necessary buy-in and involvement for initiatives. They also stressed that

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[7] J. Peppard and J. Ward, 'Unlocking sustained business value from IT investments', *California Management Review*, Vol. 48, No. 1, Fall 2005, pp. 52-70; L. Markus 'Technochange management: using IT to drive organizational change', *Journal of Information Technology*, Vol. 19, No. 1, 2004, pp. 4-20.

[8] G. Ferguson, S. Mathur and B. Shah, 'Evolving from information to insight', *MIT Sloan Management Review*, Winter, 2005, pp. 51-58; S. Devaraj and R. Kohli, 'Performance impacts of information technology: Is actual usage the missing link?' *Management Science*, Vol. 49, No. 3, 2003, pp. 273-289; T.H. Davenport, 'Saving IT's soul: human-centered information management', *Harvard Business Review*, March-April, 1994, pp. 119-131; and T.H. Davenport and L. Prusak, *Information Ecology: Mastering the Information and Knowledge Environment*, Oxford University Press, New York, 1997.

[9] J.W. Ross, and P. Weill, 'Six IT decisions your IT people shouldn't make', *Harvard Business Review*, November, 2002, pp. 85-91.

[10] Held at Cranfield School of Management, February 21st, 2006.

the key challenge they face is marshalling resources and people that are not under their direct control yet are fundamental to the delivery of business value. One CIO summed up this quest as "fighting against the tide" – attempting to come ashore but being pushed back by more powerful forces.

In response to these demands, CIOs have attempted to manage around the periphery of their units, particularly at the interface with the rest of the organization. Many have established liaison roles and appointed relationship managers to work with business units (BU) and line of business (LOB) managers to articulate their information and systems needs and then translate these into technical requirements. Instituting service level agreements (SLAs), another popular strategy, highlights IT's commitments to deliver certain services against specific criteria and defines the penalty for failing to meet targets. Committees and other cross organizational forums are also established to get encourage and involvement of non-IT staff in decision making about IT. Spending time with other C-level executives is seen as a critical part of the role of the CIO.[11] Many even talk about "bridging the gap" between their IT function and the rest of the business – building a bridge between the island and the mainland.[12]

However, having endured years of being pushed back in an attempt to come 'on shore', recent evidence would suggest that the CIO is retreating back to the island and managing from there. With the increasing popularity of the concept and practice of IT

[11] M.J. Earl and D. Feeny, 'Is your CIO adding value', *Sloan Management Review*, Spring, 1994, pp. 11-20; and 'Are CIO obsolete?' *Harvard Business Review*, March-April, 2000, pp. 55-63.
[12] See J. Peppard, "Bridging the gap between the IT organization and the rest of the business: plotting a route", *Information Systems Journal*, Vol. 11, 2001, pp. 249-270; and J. Peppard and J. Ward "'Mind the gap': diagnosing the relationship between the IT organization and the rest of the business", *The Journal of Strategic Information Systems*, Vol. 8, No. 2, 1999, pp. 29-60

service management, particularly ITIL,[13] the CIO is attempting to specify precisely the service levels that the IT function will contract to meet. The ITIL service management framework presents a set of best practice processes for delivering IT services "into" the business from a separate IT unit. Even with outsourcing, the notion that services and applications can be delivered "into" the organization by an outside external service provider (ESP) is promulgated. Additionally, new delivery models, including application service providers (ASPs) and utility computing, are all premised around the provision of IT-based services into "customers" – again delivering services from the island to the mainland.[14] A critical weakness of these approaches is that they assume that the user is the consumer of IT services, failing to acknowledge the value derived from IT is often not only co-created but context dependant.

What these initiatives have in common is that they are based on a similar ontological view: that IT is an artifact that can in fact be managed. This position stems from the misguided belief that the value of IT is in its possession. We have already noted that most projects are run on the basis of *"implement the technology and the benefits will automatically flow."* Yet we know that IT is not like real estate or precious stones; just because an organization possess it does not necessarily mean it is of any value or that benefits identified in any investment proposal will occur. Yet, its management is approached in such a fashion.

Our analysis suggests that the origin of this practice is that the wrong question is being addressed. In posing the question, *"how can the management of IT be improved"*, the solution inevitably leads down a route that is inappropriate. The task is

[13] Jan Van Bon, *Foundations of IT Service Management, Based on ITIL*, Van Haren Publishing, 2005.
[14] See Nicholas Carr's arguments in respect of impact of utility computing. N. Carr 'The end of corporate computing', *MIT Sloan Management Review*, Spring, 2005.

not to "manage IT", but to understand the role that IT can play in the production of business value and to therefore manage the delivery of this value *through IT*. This objective provides a substantially different focus. I have seen many organizations look to improve the contribution of their IT function to business performance. This leads them down the path of focusing improvement efforts *within* the IT function and is premised on a belief that "the problem" lies there. However, in posing the question as to how the value the organization derives through IT can be improved leads to an altogether different response.

MANAGING IT TO DELIVER BUSINESS VALUE

Thus, an alternative perspective is to seek *not* to manage IT *per se* but to manage to deliver value through IT; a subtle but profoundly different objective. This quest is premised on the proposition that IT is in fact something that *cannot* be managed directly, at least all the ingredients that are necessary for value to be delivered. This perspective proposes that delivering value through IT *is* a knowledge-based practice and must thus be centered around the marshalling, harnessing and exploitation of knowledge. That is, the activities and tasks associated with delivering business value through IT are all concerned with deploying knowledge. For example, developing an IT strategy is a knowledge-based task. So is building systems. Using information effectively is critically dependent on the application of knowledge. In fact, technical infrastructure is the embodiment of knowledge: knowledge that has been deployed by systems architects, developers, communications experts, etc. in its design and construction. Outsourcing arrangements can be similarly viewed as knowledge based; indeed, many organizations argue that they have outsourced their IT to an ESP or

vendor as it will provide them with access to knowledge that they do not currently possess.

By establishing an IT unit, whatever its label, the assumption can only be that all the knowledge necessary to deliver business value through IT can be located in that function. Yet evidence clearly concedes that knowledge from other areas of the organization outside of the IT function is required if this value is ultimately to be delivered. For example, prescriptions around the IS strategy process demand the involvement of executive management if it is to be effective.[15] Why? Because there is incomplete knowledge in the IT function to successfully develop this strategy. IT project teams are typically composed of both IS specialists and managers and users from the business. Why? Because the all knowledge and skills to successfully implement the new IT system are not resident within the IT function. Indeed, a recent study noted that "[a] project team, set up to design and implement a large-scope IT system, is essentially tasked with integrating distributed knowledge."[16]

What we are claiming is that the necessary knowledge to deliver business value through IT is distributed throughout the organization. Crucially, it is not located solely in the IT function and under the jurisdiction of the CIO. In fact, much of the knowledge required is under the control of other C-level executives. This is why it has been stressed as being of crucial importance for the CIO to build relationships with these executives: to ease access to knowledge resources under their control. If not, access to this knowledge will be difficult if not impossible. Even with access, the

[15] J. Ward and J. Peppard, *Strategic Planning for Information Systems*, John Wiley & Sons, Chichester, 2002.
[16] S. Newell, C. Tansley and J. Huang, 'Social capital and knowledge integration in an ERP project team: the importance of bridging AND bonding', *British Journal of Management*, Vol. 15, S43-S57, 2004.

organization must have the capability to coordinate and integrate this knowledge, a challenge we shall address later in the paper. If all the required knowledge cannot be harnessed then it is then unlikely that business value through IT will be delivered. This is the conundrum of IT management: *how to deliver value through IT without having access or authority over necessary knowledge and resources.*

The genesis of the situation that I am painting can be traced back to how we design organizations. As organizations grow in size, they are faced with managing the inevitable increase in complexity. One or a small number people can no longer perform all the required activities and make decisions. So, what do we do? We break the organization down into different functional areas, each with their own remit, staff and responsibilities. Marketing becomes responsible for marketing and promotion activities. Manufacturing looks after the production of products. The sales department generates orders from the marketplace. Finance manages the flow and stewardship of money. IT, well, looks after IT, the data and information resource together with the associated technology.

The re-engineering movement that begun two decades ago recognized the problems inherent in this functional way of structuring work and acknowledged that organizations don't *really* this way.[17] It encouraged organizations to adopt a more process-oriented approach as processes, in transcending functional silos, better captured how work was actually performed in the organization. But IT is not a process and cannot be managed as such. It is also different than other resources: information and systems permeate all activities, jobs and organizational processes. All employees,

[17] M. Hammer, 'Re-engineering work: don't automate, obliterate', *Harvard Business Review*, July-August, 1990.

from CEO to front-line staff to back-office operatives, are both producers and consumers of information. While it has become somewhat of a cliché to state that information is the lifeblood of the organization, it really is. We cannot therefore decouple IT from the context within which it is deployed and manage it in isolation.

How then can all the required knowledge to deliver business value through IT be harnessed? How can this knowledge be integrated and coordinated? This is a challenge that all organizations face and in the following sections these questions are explored.

ORGANIZATIONAL COMPETENCIES TO DELIVER BUSINESS VALUE THROUGH IT

The notion of organization competencies provides a device to focus the integration and coordination of knowledge for particular purposes.[18] A competence is an organization's capacity to deploy resources, in this case primarily knowledge, using organizational processes, to affect a desired end.[19] Importantly, a competence represents a bundle of skills and knowledge rather than a single, discrete skill or item

[18] The notion of a 'competence' has its origins in the resource-based view (RBV) of the firm. This perspective points to the importance of internal firm-specific factors in explaining variations in the performance of organizations, particularly over a period of time. A basic assumption of RBV is that resources are distributed heterogeneously across organizations. See J.B Barney, 'Firm resources and sustained competitive advantage', *Journal of Management*, Vol. 17, 1991, pp. 99-120; J.B. Barney, 'Asset stocks and sustained competitive advantage: a comment', *Management Science*, Vol. 35, 1989, pp. 1511-1513; J.B Barney, 'Strategic factor markets: expectations, luck, and business strategy', *Management Science*, Vol. 42, 1986, pp. 1231-1241; R.P. Rumelt, 'How much does industry matter?', *Strategic Management Journal*, Vol. 12, No. 3, 1991, pp. 167-185; B. Wernerfelt, 'The resource-based view of the firm: ten years after,' *Strategic Management Journal*, Vol. 16, 1995, 171-174. B. Wernerfelt, 'A resource-based view of the firm', *Strategic Management Journal*, Vol. 5, 1984, pp. 171-180.

[19] R. Amit, R. and P.J.H. Schoemaker, 'Strategic assets and organizational rent', *Strategic Management Journal*, Vol. 14, 1993, 33-46.

of knowledge.[20] Competencies are thus the collective knowledge of the organization in initiating or responding to change "that is built into the organization's processes, procedures and systems, and that is embedded in modes of behavior, informal networks and personal relationships."[21]

In the course of our research we have identified six competencies that all organizations must possess if they are to have any chance of IT investments delivering value.[22] These competencies resonate around a model that describes a comprehensive map of what the organization must exhibit for this purpose. Illustrated in Figure 1, the model provides a framework to structure the knowledge required to deliver value through IT and is a comprehensive itinerary of innate organizational abilities.

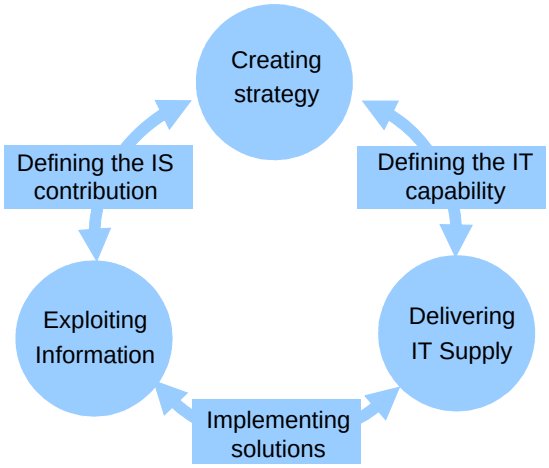

FIGURE 1 The new map of IT management: a blueprint for competencies to deliver value through IT.

[20] Hamel, G. and Prahalad, C. K. *Competing For the Future*, Harvard Business School Press, Boston, MA, 1994.
[21] D.J. Collis, "Organizational capability as a source of profit" in B. Moingeon and A. Edmonston, eds., *Organizational Learning and Competitive Advantage*, Sage, London, 1996.
[22] The original research identified that these 6 competencies can be decomposed into 26 'micro-competencies'. For the purpose of this paper and the arguments presented, working with these 6 competencies is sufficient. See J. Peppard, R. Lambert and C. Edwards, "Whose job is it Anyway?: Organizational information competencies for value creation", *Information Systems Journal*, Vol. 10, No. 4, 2000, pp. 291-323.

We have labeled these six competencies as: Creating strategy, Defining the IS contribution, Defining the IT capability, Exploiting information, Implementing solutions and Delivering IT Supply. They are defined as follows:

Creating strategy	…the ability to identify and evaluate the implications of IT based opportunities as an integral part of business strategy formulation and define the role of IT
Defining the IS contribution	…the ability to translate the business strategy into processes, information and systems investments and to formulate change plans that match the business priorities
Exploiting information	…the ability to maximize the benefits realized from the implementation of IT investments through the effective use of information, applications and IT services
Defining the IT capability	…the ability to translate the business strategy into long term information architectures, technology infrastructure and resourcing plans that enable the implementation of the strategy
Implementing solutions	…the ability to deploy resources to develop, implement and operate IT business solutions, which exploit the capabilities of the technology
Delivering IT supply	…the ability to create and maintain an appropriate and adaptable information, technology and application supply chain and resource capacity

What is critical to recognize is that the knowledge elements of each of these competencies will be a combination of business-based and technically-focused knowledge. It is through the coordination and integration of this diverse knowledge base that each of these competencies is revealed in an organization.[23] For some competencies, more business knowledge will be required. For others, technical knowledge will dominate. Figure 2 provides an indicative view of the distribution of knowledge across the organization that is required for each of the six competence domains. What it highlights is that the balance of business and IT knowledge required for each of the competencies is likely to vary. For the Delivering IT supply competence, for example, most of the knowledge and skills are likely to be technically grounded. At the other extreme, for the Creating strategy competence, the knowledge and skills are primarily located in "the business" although some IT knowledge is required for this competence to be effective.

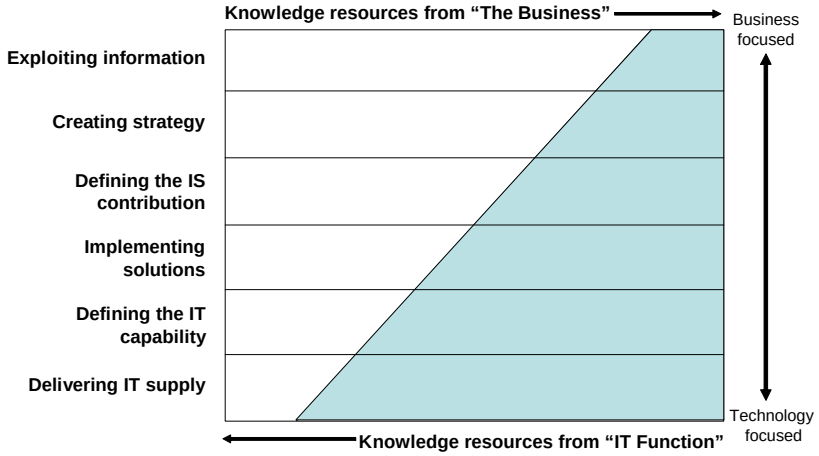

FIGURE 2 Distribution of knowledge and skills for competencies: business bias or technology bias.

[23] R.M. Grant 'Prospering in dynamically competitive environments: organizational capability as knowledge integration', *Organization Science*, Vol. 7, 1996, pp. 375-387.

What our research clearly indicates, and this is the crucial point, is that the resource elements, i.e. the knowledge and skills, underpinning each of these competencies are not located solely in contemporary IT functions.[24] Consequently, these six competencies do not reside in any one functional area. This surfaces the challenge of establishing, developing and nurturing these competencies within existing "functional" structures and authority patterns. The wider the span of knowledge being integrated, the more complex is the challenge of exhibiting competence.

In our work with a large global telecommunications equipment manufacturer, their executive management team assessed the performance of the IT supply competence relatively well. This was probably due to the fact that much of the knowledge elements underpinning this competence were under the direct control and responsibility of the organization's CIO. She could marshal the necessary IT knowledge elements underpinning the manifestation of this competence. Performance within the other competence domains was assessed as being significantly weaker. This was most likely due to their component knowledge resources being dispersed throughout the organization with no mechanisms in place to integrated and coordinate the knowledge underpinning each of the competencies. Essentially, no one individual had authority over all employees with the required knowledge nor were there mechanisms to integrate and coordinate the necessary knowledge for each of the competencies.

[24] J. Peppard, R. Lambert and C. Edwards, "Whose job is it Anyway?: Organizational information competencies for value creation", *Information Systems Journal*, Vol. 10, No. 4, 2000, pp. 291-323.

IT MANAGEMENT AS KNOWLEDGE INTEGRATION AND COORDINATION

While the notion of a competence defines the required abilities that an organization must exhibit, how these competencies actually come about is less precise. Figure 2 provided a glimpse as to why many organizations are unable to deliver business value through IT, or have difficulty doing so. With knowledge resources distributed organization-wide, many do not have the capability for its integration and coordination. What this analysis indicates is that a key challenge for the organization is to integrate and coordinate the requisite knowledge and skills underpinning each of the competencies.[25]

Knowledge resides in a specialized form among individual organization members, but an individual's ability to integrate knowledge is constrained by cognitive limits: it is just not feasible for each individual to try to learn the knowledge possessed by other specialists.[26] The integration of knowledge does not simply involve the mechanistic pooling of the various "pieces", for example bringing together senior IT and business executives to develop the organization's IS strategy.[27] As a social process, the integration of knowledge also depends on the joint knowledge generation, for example solving problems in an ERP project. This process of collective knowledge generation has been likened to a 'dance' since communication within a group does not

[25] Inkpen and Beamish have examined the issue of knowledge access versus knowledge transfer in detail. See A.C. Inkpen and P.W. Beamish, 'Knowledge, bargaining power, and the instability of international joint ventures', *Academy of Management Review*, Vol. 22, pp. 117-202.

[26] R.M. Grant 'Prospering in dynamically competitive environments: organizational capability as knowledge integration', *Organization Science*, Vol. 7, 1996, pp. 375-387.

[27] I do not wish to give the impression of knowledge as an objective concept. As socially situated, knowledge is in fact an elusive notion that cannot be touched or seen, that resides in people's heads as well as in the relations between them, and embedded in texts and artifacts. See F. Blackler, "Knowledge, knowledge work and organizations: An overview and interpretations", *Organization Studies*, Vol. 16, No. 6, 1995, pp. 1021-1046; and J. Seely Brown and P. Duguid, "Knowledge and organization: a social-practice perspective", *Organization Science,* Vol. 12, No. 2, 2001, pp. 198-213.

simply add knowledge to each individual's knowledge.[28] Rather, communication and exchange can evoke novel associations, connections and hunches such that new meanings and insights are generated.[29]

Recent work exploring social capital in organizations provides a glimpse as to the terrain that must be addressed.[30] Social capital can be seen as networks of strong, personal relationships developed over time that provide the basis for trust, cooperation, and collective action. Thus, it is based on the notion that the collective abilities of individuals are derived from social networks. The central proposition of the theory around social capital is that this network of relationships constitutes a valuable resource for the conduct of social affairs in an organization.

However, how we structure organisations can impede the development of social capital; it may encourage fragmentation rather than integration. For example, IT specialists tend to have their own language and codes of practice. Often, little trust exists between IT specialists and employees from within the business. Indeed, it has been suggested that there can be a cultural difference between employees from the IT function and those from the rest of the business.[31]

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[28] S.D. Cook and J.S. Brown, 'Bridging epistemologies: the generative dance between organizational knowledge and organizational knowing', *Organization Science*, Vol. 10, 1999, pp. 381-400.

[29] S. Newell, C. Tansley and J. Huang, "Social capital and knowledge integration in an ERP project team: The importance of bridging AND bonding", *British Journal of Management*, Vol. 15, 2004, S43-S57. See also V.L. Mitchell, "Knowledge integration and information technology project performance", *MIS Quarterly*, forthcoming.

[30] See, J. Nahapiet and S. Ghoshal "Social capital, intellectual capital, and the organizational advantage', *Academy of Management Review*, Vol. 23, No. 2, 1998, pp. 242-266; P. Adler and S-W. Kwon "Social capital: prospects for a new concept", *Academy of Management Review*, Vol. 27, pp. 17-40; and D. Cohen and L. Prusak *In Good Company: How Social Capital Makes Organizations Work*, Harvard Business School Press, Boston, 2001.

[31] J. Ward and J. Peppard, 'Reconciling the IT/business relationship: a troubled marriage in need of guidance,' *The Journal of Strategic Information Systems*, Vol. 5, No. 1, 1996, pp. 37-65.

Understanding the social capital underpinning the six competencies requires an analysis of existing social networks in the organization and corresponding ties between employees (a structural analysis); the existing shared language, frames of meaning, and stories (a cognitive analysis); and the level of trust and reciprocity between organizational members (a relational analysis). While the structural dimension determines the extent and ease of access to knowledge, the latter two are key ingredients in its integration and the generation of new knowledge.

Figure 3 maps the dimensions of social capital and outcomes closely allied with knowledge integration. It illustrates that access to knowledge is dependent on an individual's network of contacts and ties as well as the nature and content of the relationship between parties.[32] Recognition of the value of collaboration is based on the ties that people have together with having shared language to aid mutual understanding.[33] The motivation to share and combine knowledge and collaborate is underpinned by trust and obligations that can be defined by the role, position and standing that individuals have in the organization.

CIOs do attempt to facilitate this coordination and integration of knowledge, although they may not always recognize this as an objective of the initiatives they promote. Many have appointed relationship managers as a link between the IT function and rest of business. While such initiatives cultivate access to knowledge, i.e. affect network ties, it may not directly impact knowledge integration. In reality, they usually act as translators of requirements or reporters of problems. Table 1 illustrates some typical

[32] See Alder and Kwon for a more detailed analysis of this point. P. Adler and S-W. Kwon "Social capital: prospects for a new concept", ***Academy of Management Review***, Vol. 27, 2002, pp. 17-40.
[33] W. Tsai, 'Social structure of "cooperation" within a multiunit organization: coordination, competition, and intraorganizational knowledge sharing', ***Organization Science***, Vol. 13, 2002, pp. 179-190.

initiatives that are often implemented and the dimension of social capital that they are most likely to affect. What it clearly highlights is that a number of initiatives are necessary if all dimensions are to be stimulated.

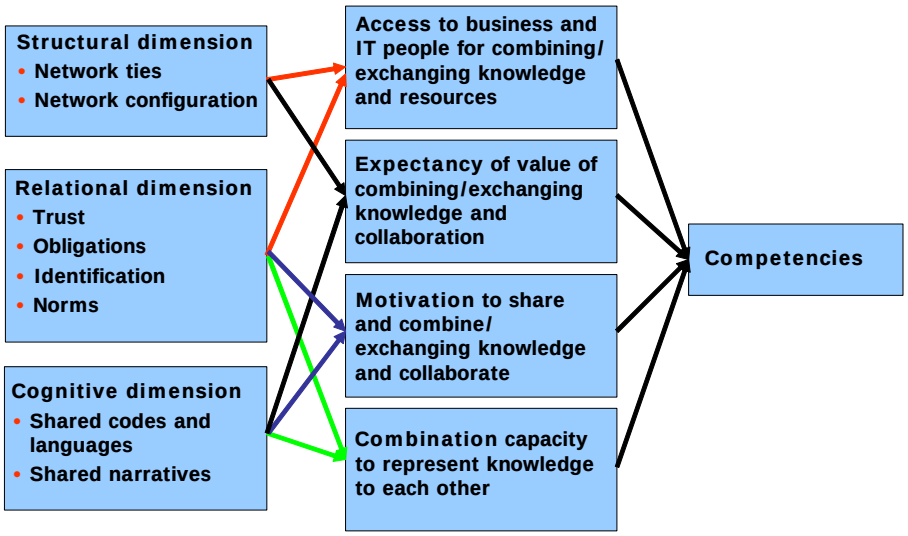

FIGURE 3 Dimensions of social capital, social outcomes and organizational impacts. (Adapted from Nahapiet and Ghoshal, 1998).

Many CIOs have established educational programmes to improve IT staff's knowledge of the business. This overcomes the fact that it can be difficult to get business engagement, i.e. access to their knowledge, so the CIO attempts to build this knowledge inside the IT function. However, this does not overcome the requirement for business and IT people to work together, i.e. integrate and coordinate their knowledge, if competencies are to be developed. To this end, education programmes for non-IT staff are also instigated to create awareness of IT issues and highlight their role in delivery of the expected benefits of IT investments.[34]

[34] For a illustration of such initiatives see B.C. Wheeler, G.M. Marakas and P. Brickley, "From back office to board room: repositioning global IT by educating the line to lead at British American Tobacco", *MIS Quarterly Executive*, Vol. 1, No. 1, 2002, pp. 47-62.

Dimensions of social capital	Typical "IT" initiatives
Structural	• Instigating joint IT and business project teams • Mandating that business staff lead IT projects • Establishing IT governance structures (e.g. steering committee, technology forum) • Appointing relationship managers • Establishing communities of practice
Relational	• Ongoing communication and staff briefings • Setting IT related performance objectives for employees • Rotating staff across functions and business units • Co-location of IT and business staff • Informal social gatherings (e.g. "IT open days") • Appointing relationship managers • Implementing charge-back mechanisms
Cognitive	• Encouraging IT staff to speak using non-technical language • Educational programmes • Implementing charge-back mechanisms

TABLE 1 Social capital and organizational initiatives.

Initiatives like chargeback, where users are 'charged' based on the IT resources and services they consume, can affect relational and cognitive aspects of social capital. One study[35] of 10 organizations' IT chargeback systems and their impacts on business managers' economic decisions and on evaluations of IT and business unit performance reported that respondents in just four of these firms saw chargeback significantly influence IT investment decisions. More significantly, the business unit respondents in these firms offered a more positive assessment of IT than their counterparts at other sites. The study found that differences in chargeback-related outcomes could not be accounted for by looking at differences in the chargeback characteristics that are most commonly described in the IT literature. What was different in these four firms was that chargeback was being used to foster communications between IT and the business units. This communication was generating a rich shared understanding for both parties of the cost and benefits of alternative IT investments and service offerings. These firms were tapping into the

[35] Ross, J., Vitale, M. and Beath, C., 'The untapped potential of IT chargeback', *MIS Quarterly*, Vol. 23, No. 2, 1999, pp. 215-237.

potential of chargeback to facilitate the development of the social capital underpinning the competencies.

There are two other concepts that have relevance to the 'activation' of social capital in an organizational situation: ***bonding*** and ***bridging***. While both relate to individuals in the context of social capital in an organization, their focus differs.[36] Bridging is concerned with the ***external*** linkages of individuals and groups and is necessary when ties between people are 'weak'.[37] For example, having access to knowledge based on a network of relationships. These relationships can be outside the organization's formal structure. Bonding focuses on the ***internal*** relationships of a focal individual and specifically examines the linkages and corresponding collective relationships among individuals and groups within an organization and between organizations. It emphasizes the ingredients necessary for knowledge combination.

Thus, each individual in an organization has a unique network, which will provide a bridge to access the knowledge of others. But strong bonding is also necessary since knowledge integration is a process of social construction by which employees negotiate, achieve and refine a shared understanding through interaction, sense making and collective learning. This often simply referred to as team working or collaboration. Of course, individuals may choose not to use their social capital to gain access to knowledge and/or may not be able to effectively integrate knowledge, for example within an ERP project implementation team.

[36] See Alder and Kwon for a more detailed discussion. P. Adler and S-W. Kwon "Social capital: prospects for a new concept", *Academy of Management Review*, Vol. 27, 2002, pp. 17-40.
[37] This is often referred to as 'boundary spanning'.

While both bridging and bonding aspects are necessary, when we examine the initiatives and practices that are typically implemented, as highlighted in Table 1, we see that the majority focus on 'bridging' with external parties, whether they are outside the IS organization or indeed the organization itself. Initiatives addressing bonding are less pervasive as they are more difficult to operationalize.

In one pharmaceutical company we found contrasting levels of social capital between upstream and downstream activities. In research and development (R&D), research scientists are spending less time at the bench conducting experiments than they did even decade ago. Today, they spend more time using high-end computing facilities with modeling and visualization capability. Recognizing the key role that technology now plays in drug discovery, research scientists and Discovery IT (what the IT unit in R&D is called) work in close partnership to identify opportunities for new IT-based applications. This innovating through IT is underpinned by a strong social capital base. Moving downstream towards manufacturing and sales and marketing the social capital is less developed. The CIO admits that deriving value from downstream IT investments is often elusive; the six competencies have not been developed to the extent required.

Adopting a social capital perspective raises issues when considering the purchase of knowledge, for example through the use of consultants. While this strategy can address the structural dimension of social capital, i.e. providing access to knowledge, there is still the challenge to integrate this knowledge. Although organizations often outsource IT to provide them with greater access to IT knowledge, integrating this knowledge with its own knowledge resources can be problematic. Indeed, it could be

argued that the very practice of IT outsourcing disrupts the social capital underpinning the six competencies. Relationships dissolve; trust may be lost; the vendor might speak a different language, one peppered with the profit motive, etc. With no shared context, the vendor may have little understand of the business of the client, and little motive to share or combine knowledge. Indeed it could be argued that it was for these reasons that Sainsbury cancelled its 7 year £1.7 billion contract with Accenture after just 2 years, having concluded that it would be better able to improve logistics and other operations if it regained direct control of its IT systems and staff.[38]

IMPLICATIONS

The implications of this analysis are profound for both theory and practice. While surveys continue to highlight that there is disappointment in the return from investments made in IT, the discourse presented in this paper illustrates a coherent argument as to why this might be so. Essentially, by not exhibiting *each* of the six competencies it is unlikely that an organization will be in a position to provide a return on IT spend.

That the knowledge underpinning each of the competencies is not located within the boundaries of the IT functions points to the genesis of the problem. It poses the dilemma as to *how* this knowledge can be accessed, mobilized and harnessed. The conundrum is that while the CIO (and the IT function) is typically assigned accountability for delivering business value through IT, he/she does not have the authority over all the necessary knowledge. This raises the pertinent question as to *who* therefore in the organization is responsible for this quest?

The discourse in this essay raises some fundamental questions regarding the role of the CIO, suggesting possibly why the role of the CIO has evolved over the years. The attributes of the job of the IS leader is seen to entail requirements including being a

[38] For an exploration of the backsourcing phenomenon see D. McLoughlin and J. Peppard "IT backsourcing: from 'make or buy' to 'bringing it back in-house", in *Proceedings of the 14th European Conference on Information Systems*, Gothenburg, Sweden, June, 2006.

visionary, a systems thinker, a change master, a reformer, an alliance manager, a politician, a relationship builder, a deliverer, a tactician, and a technical evangelist.[39] It could be that this evolution is being driven by the implicit requirements for knowledge bridging and bonding. Of course, this evolving role does not overcome the need for many individuals across the organization to integrate and coordinate their knowledge if the six competencies are to reveal themselves. Those this suggest that the traditional role of the CIO just too big for one individual? Does this ultimately mean that the task typically ascribed to the CIO is an impossible one?

The analysis presented in this paper strongly suggests that we are possibly addressing the requirement to generate business value through IT in an inappropriate fashion and that it is being approached and viewed through the wrong lens. Seeking to improve the performance of the IT function is likely to achieve little. A central question must be, how do you begin to develop these six competencies? Of course, we do not know the precise make-up of the knowledge that underpins each of the competencies. This is before we begin the challenge to integrate and coordinate it, a task that has so far eluded even organizational scientists. And, if an organization is to go about developing these competences, where does it start and what is the process that can be followed?

The fact is that the majority of organizations have struggled to deliver value from their investments in IT. Those that have come upon a "killer app" is usually due to luck or "serendipity"[40] rather than any formal planning, and the evidence is that few organizations have been able to sustain any competitive advantage achieved through IT over a period of time.[41] This inability to demonstrate sustainability is likely to be due to inadequately developed competencies.

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[39] L.M. Applegate and J.J. Elam, 'New information systems leaders: a changing role in a changing world', ***MIS Quarterly***, Vol. 16, No. 4, pp. 469-490; D. Feeny, B. Edwards and K. Simpson, 'Understanding the CEO/CIO relationship', ***MIS Quarterly***, Vol. 16, No. 4, pp. 435-448; V. Grover, S.R. Jeong, W.J. Kettinger and C.C. Lee, 'The chief information officer: A study of managerial roles', ***Journal of Management Information Systems***, Vol. 10, No. 2, pp. 107-130; M.J. Earl, 'The chief information officer: past, present, future', in M.J. Earl, ed., ***Information Management: The Organizational Dimension***, Oxford University Press, Oxford, pp. 456-484;

[40] C. Ciborra, 'The grass roots of IT and strategy', in C. Ciborra and T. Jelessi, eds., ***Strategic Information Systems: A European Perspective***, John Wiley & Sons, Chichester, 1994, pp. 3-24.

[41] W. Ketttinger, V. Grover, S. Guha and A.H. Segars, 'Strategic information systems revisited: A study in sustainability and performance', ***MIS Quarterly***, Vol. 18, No. 1, pp. 31-55.

However, we are seeing a trend that is moving towards the landscape portrayed in this paper. The continually evolving role of the CIO can be interpreted as an attempt to overcome the limitations of existing organizations structures. The recent interest in IT governance is recognition that decision making authority and responsibility for IT is now distributed right across the organization and that a framework must be established to ensure behaviors lead to the achievement of business value. We have already seen that behavior is a key component of an organization's social capital.

This analysis cannot be ignored, even if an organization argues that it does not depend on IT; it will still have IT systems, run IT projects and utilize IT services. The crucial implication is that all organizations must exhibit these six competencies. Those that don't or are weak in any one competence area are unlikely to optimize the return on any IT investment made.

More philosophically, the discourse in this paper challenges the very use of the phrase "IT management" suggesting that it is inappropriate for the objectives being sought from IT. Organizations should not look to "manage IT", as managing IT directly – assuming that it can be – is unlikely to achieve much. Rather, more appropriate language is required that closer captures the challenge of value delivery through IT.

CONCLUSIONS

The metaphor of an island is indeed apt for framing contemporary discussions around IT management. For far too long "IT" has not only been portrayed as an island, but also managed as one; at many organizations it has been designed and positioned as such. Indeed, many IT functions are often physically located away from the main business sites. While the role of IT in the business has evolved and become fundamental to not only business operations but in many cases to the achievement of corporate strategy, the map that many are managing from today has not reflected this shift. Like the early missionaries remonstrating that California was not an island, the

dominant orthodoxy has not changed to acknowledge the new realities of managing to deliver business value through IT.

In this paper, it is argued that delivering business value through IT is a knowledge-based endeavor. From our research it is clear that the knowledge required to deliver business value through IT is distributed throughout the organization. Crucially, this knowledge is not located solely within the IT function, presenting a challenge for the CIO for its integration and coordination. With the CIO having little or no jurisdiction over all required knowledge, its deployment can therefore be fragmented. The conundrum of IT management is how to deliver value through IT without having authority over necessary resources.

Adopting a competence perspective provides a focus for knowledge coordination and integration from across the organization. This paper presented six competencies that underpin the ability of an organization to deliver business value through IT. Yet in the manifestation of these competencies, the knowledge resources sustaining each of them must be mobilized and harnessed. How this might occur was demonstrated by the notion of social capital. Social capital is premised on the fact that the collective abilities of individuals in an organization – that manifest as organizational competence or incompetence – are derived from social networks. Networks of strong personal relationships, developed over time, provide the basis for trust, cooperation, and collective action. To be effective, social capital also requires a shared language and interpretations of problems and issues.

Analyzing initiatives and practices that organizations engage in to improve the contribution of IT, suggests that most are focused on achieving access to knowledge – bridging. While necessary, it not sufficient: this knowledge requires integration. In addition, therefore, bonding within teams and workgroups and across the organization is also necessary if appropriate knowledge resources are to be effectively harnessed. This is not a trivial task. The challenge for the CIO is to mobilize the social capital underpinning each of the competencies. This will require a variety of initiatives that support both bridging and bonding.

IT is not an island, but a part of the mainland. Until this fact is acknowledged and recognized on the organizational map, organizations will continue to struggle to generate value through IT.