Exploring Information Management

Andy Bytheway
Old Mutual Chair in Information Systems
Faculty of Economic and Management Sciences,
University of the Western Cape
Private Bag X17
BELLVILLE 7535
Republic of South Africa

abytheway@uwc.ac.za

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Abstract

Published definitions and reported experiences of "information management" are still relatively few. One published example is based on the experiences of the senior management of BP Exploration, where a simple model referred to as "Jacob's ladder" was adopted with considerable success. This model is compared with other published models and a consolidated model is derived as a basis for further work.

Introduction

A case of success

As the 1990's loomed, John Browne (Chief Executive Officer) was deeply concerned at the cost of IT operations in BP Exploration ("BPX"). With his new Chief Information Officer, John Cross, he was determined to do something about it. They analysed most of the 900 IT applications in operation at BPX and classified them on a portfolio basis that revealed the strategic significance of each, based on future strategic potential and current operational relevance [Cross & Earl (1997)].

Some 65% of the IT investment was revealed to be in the "support" category, where there was little or no future potential and little current relevance. This is the category where (arguably) there is no real value to the organisation other than the containment of costs and the fulfilment of statutory obligations. So, they closed down those applications that looked to have no value on the basis that, if any of them were important, then someone would tell them and let them know. This proved to be almost half of the applications running at that time. Then they set about re-defining the relationships between the IT function and the rest of the business and reducing the IT workforce through a programme of aggressive outsourcing [Earl 1995, Cross 1995, Cross & Earl 1997]. In the short and medium term the outcome was seen as very successful.

A candidate for generalisation?

This is an interesting story and it is worth pursuing the references for more details, but underlying the success that eventually was delivered to BP Exploration through these actions, the deployment of a simple management model was one important factor that made it all possible. This model was dubbed "Jacob's ladder" [1], because it alluded to a ladder of management concerns that reaches from "low" levels of concern with infrastructure to "high" levels of concern with corporate strategy. We are driven to ask whether this model could be deployed in other organisations to assist with information management, and whether it might have wider potential for research and learning design (for example).

This paper describes the model, compares it to certain other similar models, and develops a consolidated view of how this kind of thinking helps us to manage the complexities of IS and IT management in an organisational context. The objective of this consolidation was to provide a foundation for research, and for the design of teaching and learning.

[1] In the Bible, it is written that Jacob laid his head on a stone and slept, and had a dream:

> [10]And Jacob went out from Beersheba, and went toward Haran. [11]And he lighted upon a certain place. And tarried there all night, because the sun was set; and he took of the stones of that place, and put them for his pillows, and lay down in that place to sleep. [12]And he dreamed, and beheld a ladder set up on the earth, and the top of it reached to heaven: and behold the angels of God ascending and descending on it. [Genesis 28:10-12]

There is also a child's toy known as "Jacob's Ladder", where wooden blocks appear to tumble down a pair of ribbons to which they are attached, and there is a machine that demonstrates electric sparks – rising from a low to a high level – known by the same name.

Managing the business-IT relationship

People as "mechanics" or "drivers"?

It is dangerous to make sweeping generalisations even if they are based on a wide reading of the literature, but one feature of life today is that management thinking about information systems is still driven more by the *technology* than anything else. Although there is an emerging body of literature that tries to address the broader issues of IT such as governance, strategy and even ethics, the first assumption that people often make is that we need to understand and manage the technology before we can or should do anything else - the IT Manager is even seen as someone who must take responsibility for everything to do with IT.

This is patently untrue. Do we have to understand how to remove, recondition and reinstall a car engine in order to be a good driver? No, we do not. Do we even have to know how the engine works, what a crankshaft is, or what a thrust bearing is, to be a good driver? No, we do not. Driving a car well has got almost nothing to do with understanding the automotive technologies that make the car work: it has almost *everything* to do with understanding road conditions, anticipating danger, and applying an appropriate degree of caution in using the public highway. So why do we need to understand information technologies to gain the benefits of information systems?

Three definitions to get us going

The automotive analogy is so clearly true that we must take heed of it, and apply it to our world of information systems and information management. We can propose three definitions that will get us started:

- **Information technology** is the set of technology components that can be engineered together in order to build an information system. Information technology can be broadly seen as encompassing *hardware*, *software* and *communications* components.
- **Information systems** are engineered from information technology and work to process, store and move information within an organisation. Information systems may or may not include a human component, but they usually do rely on some human effort in order for them to work.
- **Information management** is the regime that oversees the investment in new information systems and the operation of existing systems. Information management requires the deployment of a diverse range of management skills in order to successfully deliver the benefits of information systems investments.

Many levels and perspectives

It is the final definition, of "information management", that gives us a clue as to the real managerial challenge. There are indeed many levels of management activity that require different skills and competencies on the part of the IT manager – much more than just managing the IT. From managing difficult supplier relationships (in order to acquire the best selection of technology components) to dealing with strategic issues in the board room (to deliver to the business what it needs), the typical IT manager is pulled in many different directions and really does have to have a very wide range of skills.

And let's not forget the people that IT managers have to deal with. On one side, they have a crew of skilled IT people, all of whom are probably wondering whether they couldn't earn a great deal more money elsewhere: they have to be kept happy and remunerated appropriately. On the other side, the IT manager has a potentially difficult community of "users" any or all of whom could be upset by a simple error or omission, that might cause them to lose many hours of work if things are not done properly in the IT department.

Arguably, these challenges are more difficult to deal with than other functional managers face, such as in marketing, or personnel, or production. The traditional challenges that IT management faces include supply-side issues, demand-side issues and people. Put technology into the mix, and project management, and quality control, and service management, and you have a combination of issues that is truly difficult to deal with.

Increasing problems faced by the IT manager

These problems with IT management have emerged over several decades, from the early days when the application of IT was very limited – perhaps just a payroll here and a book-keeping system there – to the modern day when the scope of new systems can be very wide, and the expectations of users are so high.

When we consider the breadth of IT applications today it is not surprising that new problems have emerged and many old ones still prevail. These continuing difficulties in the relationship between a business and its information systems function demand that we look at the nature of the relationship between the two, and the means whereby we manage the components of that relationship in order to serve the business well. We will learn that information systems managers need to engage with the business (and with others) at several levels – more than is typically the case for other managers, as mentioned already – and that appropriate mechanisms are needed to support those engagements.

Relationship with the business

The relationship between the typical IT department and the rest of the business continues to be a troubled one for many organisations. Efforts to understand the relationship and deal with it more effectively continue, but at one level (technology) the issues being faced by IT managers change continuously and at another (strategy) the IT manager is often simply not heard. The sum of this difficulty continues to frustrate our efforts to provide business with the information systems services that it needs.

We need to understand the components of the relationship between the business and its IT specialists. Traditionally, the components of the relationship are seen as being centred on the activities of "development" (systems development and implementation), and "operations" (the provision of ongoing operational services to keep new systems working, sometimes over an extended period of time). IT departments are often organised into these two domains of activity, where a Development Manager and an Operations Manager report to the Director of Information Services; the actual words used might vary, but the sense of them is often exactly this.

Research indicates that more than "development" and "operations" need to be addressed if the relationship is to be managed well.

"Stolen with pride …"

In recent years there has been a surge of interest in information systems management, beyond the "development" and "operations" viewpoints. There has been an extended effort to take ideas

from other disciplines and apply them in information systems management, in order to address the problems.

For example, interest in the 1980s in strategic business management led to an extensive examination of information systems strategies, and a new body of literature about the contribution of information systems to business strategy emerged. Many generic strategic analysis tools (such as the value chain and the product portfolio matrix) were adopted and adapted for use in information systems strategy analysis. At about the same time (but at a more operational level) ideas about "project management" and "quality management" were adopted and, as the 1990s approached, a very strong interest developed in "IT service management". In each of these areas there was an existing rich literature that explained how famous companies managed to deliver high levels of product and service success that delighted their customers. So, why not apply these theories to IT management? This is exactly what was attempted.

But, after all this effort, when you ask users today what they think of the IT services they receive they will often still reply with a disparaging comment. Even when the IT department takes an initiative to improve things users are sceptical, simply because it was an idea that came from IT rather than from the business. "We know about the IT people, don't we? It'll never work here", they will remark.

Service management remains one of the areas where there is still potential to improve things, and because it sits at the very interface between the IT function and the business, it is worth further examination. Service management requires that levels of expected service are defined, measures put in place, and a management regime established that will ensure that targets are met. A phrase we use to describe this is "service level agreement". When led by the IT department, service level agreements tend to be designed at the level of the technology ("*99.98% server availability*") rather than at the level of the business ("*No more than one email delivery failure per month*"). Who cares that the server was available, if it was not doing its job? We need to be very careful to devise measures of delivery within the IT-business relationship that are comprehensible and meaningful to the user community. That means reaching up from the technologies to the activities and processes within the business, and measuring process efficiency rather than technology availability. If server availability is known to have a strong correlation with business service, then by all means measure it. But if it does not, then don't adopt the pretence that server availability is a true measure of service – it is not. We need to find something that will truly indicate business performance, not technology performance

The question of performance

Talk to a production manager and you will find that he is only interested in business performance, probably measured by the volume and quality of product that has been produced. Talk to a marketing manager, and she will only be interested in business performance measured by the satisfaction ratings of customers who choose to buy the products marketed by the company. This is perfectly natural and proper, and one might ask what, if anything, has information systems service performance got to do with business performance?

The answer, interestingly, is that it has a great deal to do with the business. Increasingly, front-line business functions are directly dependent upon information systems for their effective working and therefore increasingly we find that business performance is directly affected by the quality of information systems services. One study showed significant differences in the criticality of certain parts of a businesses and the level of attention paid to the quality of information services provided to them [Bytheway et al, 1996]. So, it is imperative that we find a means to relate information systems performance to overall business performance.

We will not achieve this with "network availability" and "helpdesk responsiveness" statistics. We need to understand the mechanisms that more directly relate the quality of information systems services to business success (or failure).

Examples of problems arising

We need some examples of the problems that are evident in business today. Selected anecdotes provide us with some examples of the discontinuity between the IT function and the rest of the business:

- In one pharmaceuticals company, a network support engineer had been asked to help with a strategic planning meeting that was looking at new ideas for automated production engineering. He wanted to make a contribution, but there was no acknowledged mechanism (within the IT support function that he was working for) that allowed this kind of involvement with the business, and he was told that he would not be allowed to attend the meeting. In effect, he had to cheat on his management to get involved – he went to the meeting anyway, and in the event his contribution was central to the successful outcome. It could so easily have gone the other way.
- In a global telecommunications company, the European marketing manager had a department with a large number of dedicated and skilled people – in the region of 55 staff at the time in question. Some of these users were becoming very expert indeed in the use of advanced desk top computing and web site development (they were known as "super-users") and he wanted to capitalise on their skills and enthusiasm to innovate with new web based systems. The IT department insisted that "proper" procedures of approval had to be applied and therefore they (the IT people) proved to be more of a hindrance than a help. In the event, these inappropriate procedures preventing anything at all from happening.
- In a large chemical company, the Commercial Director was leading a project that included a good deal of new systems development work, but also major business changes that would require careful planning and execution. Having no people who were skilled in project management, he turned to the IT department who had a number of people classified as "Project Managers" and "Senior Project Managers". He invited them to join the project control board for their project management skills, and was surprised when the project plan soon began to go seriously wrong. The IT project managers had been wildly optimistic in the resource planning, and things were behind schedule and over budget within only a few months of the official project launch. He had believed that they could manage *any* kind of project, but they could not. He had no idea where to turn next for help.
- In a manufacturing company the engineering director wanted to have the IS support people help him with the design of a new configuration management and document control system, but he didn't even bother to ask. He knew that the 65 information systems staff were fully committed to other application development projects (but he did not know the details of a single one – clearly, none of these projects were for him or, if they were, the information systems people had not told him). He struggled on without their assistance and as a result the rest of the business was unaware of what he was doing, and the benefits of document management were very limited.

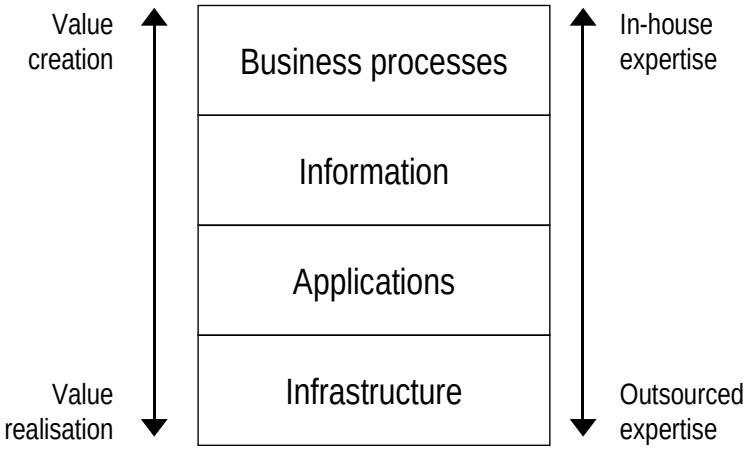
What we learn from these examples is that information systems departments are behaving in an inflexible way, and that there are serious communications problems between them and the

businesses that they are supposed to serve. The level and variety of service provided falls short of what is needed.

No doubt, John Browne at BP Exploration could observe similar problems when he became the new Chief Executive at BP Exploration, and wondered how on earth he was going to bring IT expenditure under control. An early move was to establish a framework for thinking about the different management issues in dealing with IT and the business, and then to educate his executives in its use. This framework is what he termed "Jacob's ladder".

Jacob's ladder

There is nothing complex about Jacob's ladder, pictured at the right as it was conceived at BP Exploration.



It has four main components:

- The **business processes** that deliver business outcomes: *this is the level at which we should measure business performance*.
- The **information** that those business processes need in order to function: *consider that every decision at every point in every business process needs information if it is to be an informed decision*.
- The **applications** (applications of information technology – we often choose to call them "information systems") that store, process, move and deliver information to the places where it is needed: *if there is an application that is delivering information that is not used, then it should be closed down.*
- The **infrastructure** that is the foundation for the information systems to run upon: *this is what we can easily measure – server availability is a classic example – money might be another. We can easily work out what the information technology infrastructure actually costs, but do we know the cost of developing applications and garnering information?*

At each side of the figure are the indicators of value and expertise as seen at BPX. Basically, the need for in-house expertise is evident in the upper part of the figure, because the business of BP Exploration is not systems development and IT infrastructure management, it is exploring for oil. Their argument was that infrastructure and applications development are cost drivers, not value generators, and therefore the economies of scale that come from outsourcing these activities to outsourcing service providers would reduce those costs. Browne argued that value comes from *use* of technology, not from building and owning it – he believed that any advantage that might arise from new technologies would *not* be enduring, but only short lived. Time has proved him right.

John Cross (the Chief Information Officer) had a similar viewpoint, that the value was in the upper part of the model [Cross and Earl, 1997]:

> … we realized that value seldom is achieved through developing software, but instead comes from owning information. We now focus on who owns information and where they are located in the industry value chain.

The difference between value creation and value realisation (at the left hand side of the model) is not immediately obvious. Value *creation* is about seeing the strategic potential for improved use of information in the business; value *realisation* was, for BP Exploration, a question of ensuring world-class delivery of IT services. Service management rears its head yet again.

This is how Jacob's ladder was summarised in the paper published by Cross and Earl [1997]:

> A model created by XIT [*the BP Exploration IT function*], called "Jacob's Ladder" or the "IT Value Chain", became important in formulating the logic of what to outsource and in setting expectations with all potential suppliers. This model was developed to aid BPX [*BP Exploration*] in focusing its activities by helping it to understand the areas in which the internal IT function could add value in terms of additional revenue) versus those activities where the main contribution was cost saving, in which case the marketplace might be more attractive because of the additional potential savings due to economies of scale. For BPX, the model suggests that if BPX outsourced the commodity, industry-generic activities of applications, and infrastructure-building to a competitive market-place, the residual and reskilled IT personnel could help the business create value from information use and sharing and from redesigning and optimizing business processes.

And so, Jacob's ladder was a means to decide what jobs were best undertaken by BP Exploration itself and which jobs were best "outsourced" to external companies that specialised in services of one kind or another. In this way, internal IT staff could be redeployed and set to work in ways that were much more beneficial to the business than working on IT infrastructure; it is much more economical to have the infrastructure managed from outside, by people who really understand it.

That is what happened. BP Exploration significantly reduced the IT headcount, they dramatically reduced IT costs, and they appointed a consortium of outside contractors to deal with much of the IT work that they had previously done themselves.

Other models

Jacob's ladder is interesting because it is very real, in the sense that it worked for BP Exploration and assisted them in radically redefining the role of the IT function. John Browne even bought a child's toy[2] called "Jacob's ladder" for each and every senior manager to have on their desk, to remind them about the separation of high level and low level ideas.

We need to examine whether there is any academic work that has taken a similar view and provided an equally or more effective framework for thinking.

One long-standing framework was published by Zachman some years ago [Zachman, 1987]. In his original paper (which has been widely referenced and which embodies ideas that he is still developing) he argued for six levels of systems thinking, loosely along these lines:

- The objectives and scope of the business
- Models of the business
- Models of the information systems that serve the business
- Models of the technologies that serve the information systems
- Techniques and tools for the representation of information systems
- The component elements of the actual functioning system

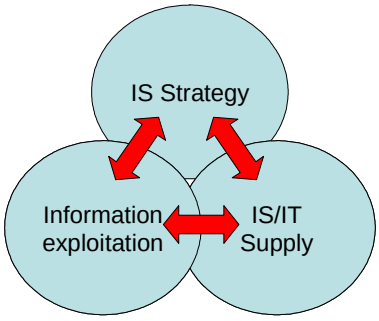
[2] This toy is the one referred to earlier – a string of wooden blocks, connected by ribbons in such a way that the blocks can be made to appear to be "falling" down the string.

This approach to levelling our thinking is in very much the same vein as Jacob's ladder, but it is a richer and more powerful expression of the same idea. Too complex to be useful to busy business people, perhaps? Probably. These six levels of systems thinking are each cast by Zachman as rows in a matrix with six other areas of concern cast as the columns – Function, Data, Network, Organisation, Schedule and Strategy (see the figure). Thereby he presents us with 36 points of intersection – too many to work through quickly and quite demanding on the abilities of one person. Again, we are reminded of the complexities that we are struggling to deal with in managing IT.

	Data	Function	Network	Organisation	Schedule	Strategy
Context						
Enterprise						
System						
Technology						
Technology representation						
Technology components						

36 points of intersection

There are other examples of levelled business models. For example, in European standardisation [CEN, 1995] a similar framework has been used to organise plans for information systems engineering standards. In a university these ideas have been the basis of a meta-model for the organisation of research [Hess, Brecht & Örstele, 1994]. Both of these projects were aimed at producing a framework that would act as a reference model, that would co-ordinate and harmonise more detailed work on specific issues within the wider domain: the first was concerned with international standards for information management and the second with the evaluation of different methods of systems analysis and implementation. Both are complex models and are not easily adopted by managers who have primary responsibilities to deliver results to a business.



Other research has addressed similar ideas and (like BPX) embodied them into a simpler form, but with the intention of establishing a framework for managing the requisite information management competencies [Peppard, Lambert & Edwards, 2000]. An interesting feature of this work (from the Cranfield School of Management) is that it highlights three areas of management concern – IS/IT strategy, IS/IT supply, and IS/IT exploitation (see the figure) – and then points out that it is the areas *between* these three that are most challenging (as indicated by the arrows in the figure). Broadly speaking, these common areas include strategy implementation, systems delivery, and the delivery of strategic benefits – all notoriously difficult even in the most progressive organisations. The Cranfield work proposes six "macro competencies" based on this model, and substantiates the proposal with a very detailed review of the literature that vindicates it – this must be one of the most definitive lists of references concerning information management that is available [Peppard *et al*, 2000].

Differences in the models

The differences between the simplicity of Jacob's ladder and the other models (particularly the Zachman model) can be summarised as follows:

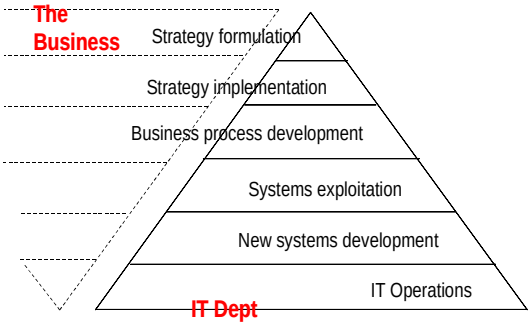
- Zachman gives us breadth – he has additional layers above Business Processes, concerned with the whole enterprise and its context. We can summarise that as the strategic layer, but

we must note that strategy formulation is *not* the same thing as strategy *implementation* – the latter is very much more difficult than the former. He also gives us an additional layer underneath infrastructure concerned with the representation of systems, but we do not really need to be concerned with that because that is solely the preserve of the IT specialist.

- Zachman sees function and data (and the other columns) as orthogonal to the vertical scale, whereas Jacob's ladder puts processes above information. The intimate relationship between the concepts of process and information can be made relatively complex (as it is in the CEN and *Metamodell Prozessentwurf* models) or it can be seen as one thing – a model of how the business system works.
- The Cranfield model gives us simplicity. This "three-bubble" model has been found to be extremely useful for rapidly positioning problems and opportunities. Despite its simplicity it is backed up by a very large number of questions (almost 250 in number, but unpublished at the time of writing) that allow an assessment of information management competency to be undertaken. One of the problems with this model is finding a means to select the right questions from the overall set, so as to sufficiently inform an analysis of competency without burying the organisation in workshops and questionnaires.
- The CEN and *Metamodell Prozessentwurf* models are far more explicit about the detail of information systems and IS applications. Hence they provide a level of detail that stands as some kind of backup in cases where detail is needed (but risks the patience of a busy manager).

However, for busy managers detail is *not* what is needed. We must conclude that all of these models have something interesting to offer but that it would be useful to pull them together in order to have a single, and hopefully simple, model to work with.

For example, an exemplar that is widely cited is Maslow's hierarchy of needs [Maslow, undated]. Maslow proposes a hierarchy of individual social needs from the low level of safety, food and warmth to the high level of community acceptance and respect – this he terms "self actualisation". The idea established in BPX is somewhat similar in that it proposes a hierarchy from IT infrastructure to business information and business processes.



The figure presented here shows how the general idea as advanced by Maslow can be deployed to understand the different layers of management concern, in dealing with the deployment and strategic management of information systems. The pyramid at the right is the conventional way of presenting Maslow's hierarchy but here it is applied to (and annotated according to) the work of the IT Department; at the left is a suggestion that the business shares and connects with each of these levels, but as the level of concern rises the IT department loses influence and the business takes it over – this is similar to the idea from Maslow that the individual has a variable degree of influence in a community, depending on the level at which they are seen.

This model is particularly interesting in light of the difficulty that IT specialists (and even IT managers) have in relating with the rest of the business. If we understand what it is that raises the standing of an individual in a community, perhaps we will understand how to lift the standing of IT people and their management.

An evolution of Jacob's ladder

A new model that attempts to incorporate all the best thinking that has been found and summarised above is presented below. It has been developed with certain objectives.

Objectives

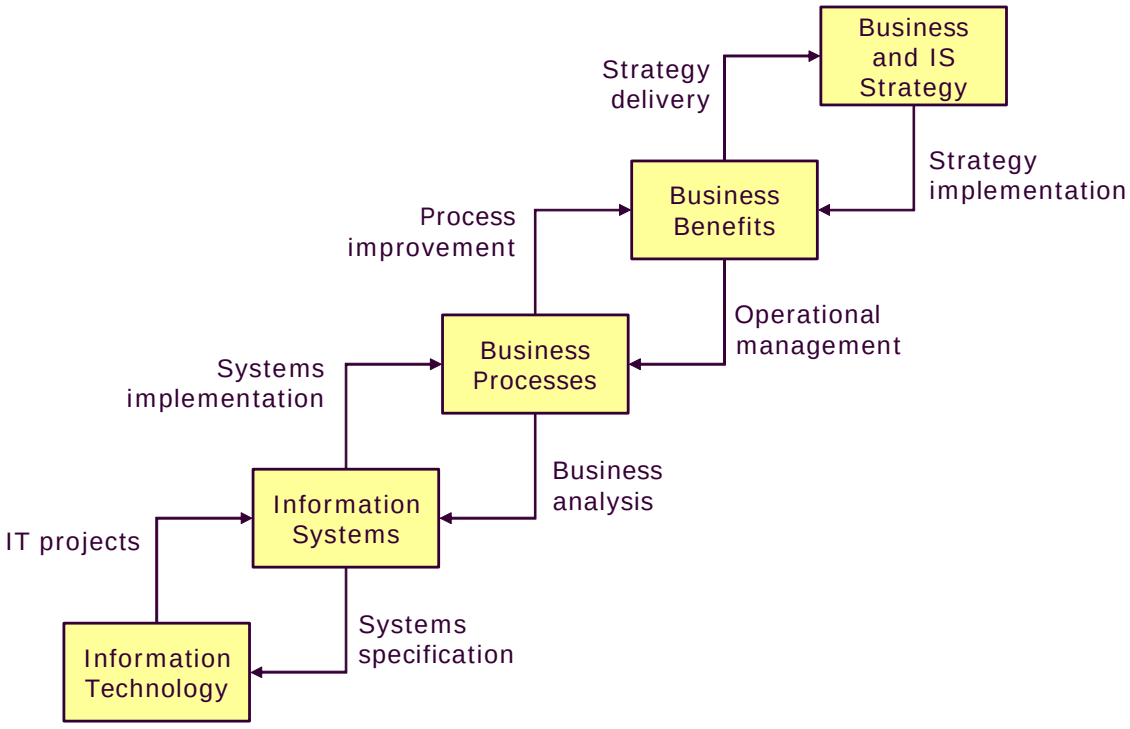
- To provide a complete framework that encompasses all relevant portions of the models described above, from infrastructure to strategy.
- To allow an analysis of the different involvement of IT specialists and business people at different levels of managerial concern.
- To maintain the simplicity that is found in the BPX and Cranfield models
- To maintain the interesting idea that there are "foci" or "nodes" within conceptual models such as these, and that it is the *gap* between the nodes that are potentially the most interesting.
- To provide a conceptual model that can stand as the foundation for research and learning in the general domain of Information Management.
- To adopt the scope of Zachman's rows, but not the columns; if we want to debate the differences between data models and process models, and networks and people, then we can comfortably do so within each of the layers.
- To adopt a view that reflects the managerial activities and processes that prevail at the different levels, thereby making the model more useful to a busy manager.

Process of evolution

The origins of this model can be traced back several years, but it has only recently become possible (through a funded research project) to test it with peers and establish its acceptability and usefulness. Because the model is needed for organising research and learning, it was tested in discussion with a number of parties including business representatives, teachers and researchers. The academic view included the requirement that the model adopt a consistency, and as a result the *boxes* represent a node within which knowledge of concepts is required, and the *arrows* represent activities that are typically found in an organisation and that connect the nodes, through the co-operative efforts of people from different disciplines and from different levels. The words on the arrows give a strong sense of systems development (at the lower levels) and strategic analysis and implementation (at the higher levels). In reviews, it has been agreed that the middle portions are the most interesting because they are the least understood. We are still learning how information technology and systems investments enable and ultimately deliver organisational strategy, and here we propose that business process is the critical layer of management where most organisations fail to manage effectively, especially in the delivery of the intended benefits of a new information system.

The model

The model is presented below, and the paragraphs that follow make brief comments about each primary component of the model.



Information technology

For many years "Information Technology" was a phrase that was used to refer to almost everything in the realm of computers and systems in business. As the model makes very clear, it is a long journey from investing in information technology components to delivering the benefits of that investment.

We need to be careful to use the phrase "Information Technology" to refer to the technology alone. Here we view information technology as the hardware, software, databases and communications networks that comprise the automated components of an information system. Each of these – hardware, software, databases and communications – breaks down into its own complex hierarchy of components. For example, software includes operating systems, middleware, application software, browsers, language systems and so on. A full "family tree" of information technology components would be very complex and need not concern us here. Here we are interested in how we manage these things, not how we engineer them.

Having said that, the skills required to engineer these technologies and to make useful systems out of them are difficult to learn, and do not sit well with the requirements of business people who just want the system to be delivered to their desks and who are not interested in the complexities of technology. Hence, if we are to manage information technology successfully, we need to encourage the proper use of the phrases "Information Technology" and "Information System" to indicate that there are two layers of different activity and management concern, that are related but separate from each other.

Information system

We often use the words "information" and "system" without thinking what they might mean. Just take the word "system" alone - it has many uses and many nuances, from talking about

national politics ("political system") to obscure technologies ("network management system"). "Information" is one of those words that seems to make less and less sense the more you think about it. The combination of the two words is often seen as synonymous with "information technology" or just "IT", but here we will make a very clear distinction: an information system is a combination of automated and human actions that processes information for some organisational purpose.

In this way, an information system has to be a reflection of the business, its style of operation and what it actually does, just as a house is a reflection of what we want to do at home and the way we want to live. The analogy with housing is a useful one: to build a house we need bricklayers and carpenters, and to build an information system we need programmers and database designers; the house is specified by an architect, an information system is specified by a business analyst.

This analogy with houses is not to "put down" the skills of programmers and database designers, because as soon as you investigate what makes up an information system and compare it with what makes up a house, you realise that information systems are infinitely more complex than houses. (And, on the other hand, there is much to admire in the skills of a good bricklayer and a good carpenter that is often missing in the work of programmers and database designers).

Business process

It is some ten years since the world of business management first became excited about "business process re-engineering". For some time, experts argued about the differences between re-engineering and re-design. Some of the early thinking has since been discredited.

However, the business process is still a very important idea and we now understand more about how we can manage it. A lot of the ideas come from systems thinking, and in one sense business process management is an extension of management thinking that takes the best advantage of systems thinking and systems practice.

So, what is a business process? Isn't it just something to do with business activities? No, it is usually something that is seen or even defined from outside an organisation: a business process is a high level component of a business, that delivers perceptible value to external stakeholders. A business process is normally seen as delivering value to one or more stakeholders in a business, whereas the lower level activities that serve it consume resources and drive costs. There may be fewer than five or six processes in a business, even in complex cases such as insurance or aero-engine manufacture; on the other hand, a typical business will have hundreds or even thousands of activities. It is important that managers take a process view in order to serve the needs of their stakeholders at the same time that they take an activity view in order to control costs.

Business benefits

Surprising as it may seem, European surveys indicate that almost no organisations (fewer than 6%, in fact) make a conscious effort to manage the delivery of the business benefits intended to come from IS/IT investments. Considering the high cost of IT-related projects, this is really surprising. Relatively recent work has developed a workable approach to "benefits management" [Ward & Peppard, 2002]. It is founded on:

- The proper definition, categorisation and structuring of benefits.
- Proper planning to link benefits to process improvement projects.
- The allocation of responsibility for delivering benefits.

- Monitoring and measurement of delivered benefits.
- Seeking out additional benefits that might not have been apparent at the start.

Interestingly, the structuring of benefits referred to above is based on a scheme of dependencies (of business benefits upon new systems, and of organisational strategy on successful delivery of benefits) that closely parallels the ideas and structure of Jacob's Ladder.

Business and IS Strategy

Strategy is about change. Without change, there is no real need for strategy. With change in mind, we can argue that the simplest definition of strategy is:

- knowing where you are,
- knowing where you want to be, and
- knowing how you intend to get there (roughly speaking).

In line with this simple definition, developing new strategies can be quite straightforward and often quite fulfilling. With the basic strategic analysis tools at hand, strategy formulation is not too difficult: it's just a matter of talking to the key players, applying the tools, and summarising what must be done, surely?

Perhaps the formulation stage is relatively simple, but delivering a strategy is not simple - it can be a nightmare of confusion and difficulty. There are no tools that will guarantee the easy implementation of a strategy - just persistent effort to communicate and manage change.

Having a framework for thinking such as that proposed here is helpful in that all role players, at all levels, can see what they must do and why.

Positioning the issues

Earlier in this paper four short stories of difficulty in delivering good information management were presented. Using the model, we can begin to position these problem cases, and illustrate the way that the model works.

- The network engineer was invited to make a contribution to strategy formulation, and therefore was working (exceptionally!) at the top of the model. *We should not be so quick to associate specific job functions with specific levels of involvement in information management – we must avoid the temptation to strongly associate organisational units (and the people who work in them) with one and only one level in the ladder of information management activity. Information is pervasive, so why should we not allow all concerned to engage in discussions about information management?*
- The marketing department "super-users" were seeking help with maximising the exploitation of the systems and facilities that they were using. *We must be careful to recognise the differences between different business processes – here new business benefits were emerging but they were of a kind that was not compatible with the benefits provided for in existing policies and procedures. Understanding the nature of benefits and managing them appropriately is assisted by the model.*
- The director with the project management problem was looking for help with new business process development and implementation. *At first sight, project managing IT should share a lot with project managing business change, but clearly in practice it does not. The model shows us that the two are not the same. Having the model at hand (or, in*

mind) when discussing these situations would make a significant difference and minimise the associated risks. .

- The engineering director was simply looking for a new application development but faced a complete barrier to communications between his world of engineering and the world of the systems developers that could have helped him. *It is interesting that even when IT people reach for engineering disciplines to assist them (project management, configuration management, quality management) it is still difficult to work across the boundary with engineers. Through a shared vision of the process that achieves engineering, without getting bogged down in what the engineering actually is, it should be possible for these two communities to communicate more effectively.*

Using the model we can see that the challenge is to recognise the different levels of management, and to understand that we must migrate thinking from one level to another in a co-ordinated way, and maintain coherency from one to another. We will not achieve that by preventing people normally working at one level from talking to people who normally work at another. Quite the opposite: we need to find ways to encourage communication between and across the layers. When new projects are initiated their scope will be much clearer if they are mapped to the model, so that we can see the mix of technology and business development that is required. We must also remember that we are not dealing with management at six different levels, but with the five gaps that come between them as well.

Conclusion

This model is no more than a collation of ideas from existing similar models and frameworks, but it is hoped that its relative simplicity will make it easy to use, but just as effective as the more complex models that underpin it when the need arises. The purpose of the work reported here was to provide a foundation for information management research, and for learning about information management.

- As a framework for learning, the new model is useful for analysing case studies and for positioning problems, as we did briefly (above) for the four problems that were presented earlier. It is being used (at the time of writing) to design a new programme for management education about information management, in a leading South African financial services organisation.
- As a framework for research, it clearly needs further examination and testing with a degree of academic rigour. It is intended that this shall be pursued, and (at the time of writing) a major research project is being developed around the model. This project has already been reviewed with 72 representatives of a range of public and private organisations, whose issues and opportunities are now incorporated within the model.

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