White Paper

Information Systems Planning: A Strategic Business Capability

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Trevor Lea-Cox has over 30 years experience in senior Information, Systems and Technology Management and CEO roles. He is a past Group-level CIO and director.

In this time he has developed and implemented Information, Systems and Technology strategies and business automation programmes for a wide variety of large and small organizations, including companies and groups of companies. A special focus has been the introduction of new Products and Services using lean and agile techniques and subsequently scaling up, including in the contexts of major business change and joint ventures.

Why is Information Systems Planning Important?

Managing the automation of an Organization on a coordinated and holistic basis is not easy, especially when only limited resources are available to do so.

Each new planning cycle introduces further demands, usually to do more with less - and often there is still the backlog from previous years to manage. Two dominant questions for anyone considering IT Strategy are:

- What are the automation priorities implicit in the organization's Business Strategy and how does IT best respond to the requirements of the business?
- How does one identify and manage an appropriate response to business risk in the current IT application and infrastructure portfolio?

The answers to these questions have very broad implications but they are very strongly influenced by two primary components of the IT Strategy; the Information Management Strategy and the Information Systems Strategy. It is these components that we will concentrate on, in this paper.

[1] "Commercial Off The Shelf"

Contents

Why is Information Systems Planning Important? 1

The Condition of Business Information 3

The Condition of Information Systems 4

The Integration of Information Systems 5

The Information Systems Planning Approach 6

The Basic IS Plan (or IS Planning Matrix) 7

Showing the Information Systems 9

Showing Information Condition 10

Maintaining the IS Planning Documents (Views) 12

Important Implications of IS Planning 12

Information Systems Planning complements many EA Frameworks 12

Deriving the Information Management and Information Systems Strategies 13

Some Key Benefits 13

In Conclusion 14

What Next? 14

Moreover, the Information Management and Information Systems Strategies are invariably tightly integrated. Many organizations choose to automate using COTS[1] systems rather than develop application software of their own and this is a perfectly reasonable and often the most cost-effective approach. However, such decisions can have a profound and long-term impact on the business and on the technology that needs to be deployed. This especially applies to decisions at the ERP[2] systems level.

In developing or updating the Information Management and Information Systems Strategies, there are three very important set of issues that always need to be addressed:

- The condition of the Business Information
- The condition of the Information Systems that manage this information
- The integration of Information Systems and the flow of information across the organization's Supply Chain.

Note that implicit in all these issues are not just the conditions of current Information and Information Systems, but also the impact of changes in the Business Strategy in terms of:

- New systems required
- Modifications to existing systems required
- The impact of these changes on related systems

Information Systems Planning is a powerful set of techniques that help address these issues. The purpose of this paper is to provide an introduction to these techniques and the benefits they bring.

The Condition of Business Information

If information is missing or not up-to-date, poor quality or simply not trusted, this can have a very damaging effect on the decisions and actions taken by an organization. And it can get worse! The problem of synonyms and homonyms in information from different sources frequently creates confusion and sometimes even disaster.

Although from the product automation environment, the loss of NASA's Mars Climate Orbiter in 1999 is an interesting example at the disaster end of the spectrum. The internal dynamics of the Thruster subsystem were designed using English units of measure and all other subsystems used Metric units of measure. This was not picked up at the planning and design stages. As a result when the Thrusters were fired they

[2] "Enterprise Resource Planning". This is a term that has come to mean a large scale system that provides an integrated set of system modules for automating many of the supply chain activities of a business. They are often industry specific but not necessarily so, for example, the systems from SAP. These are so diverse that SAP simply calls them "Enterprise Systems" now.

pushed the Orbiter too close to Mars and hence into an orbit around the Sun, not around Mars!

Even with open standards these problems persist and create significant business integration challenges. Perhaps the most pernicious of these problems occur when different (COTS) systems manage the same information without the controls to ensure that there is only one "version of the truth" of common information. It often leads to a lack of trust in the data and some serious data reconciliation challenges. Furthermore it is exacerbated when one or more of these "systems" uses Office Automation tools, usually introduced as a result of a system deficiency but without regard to the common data standards required.

Note that when information to and from Customers and Suppliers are taken into account the potential for all these problems is magnified. Here conflicts are inevitable and need to be managed very carefully. This highlights the need for not only a common "data dictionary" but also common data formatting standards and controls.

The Condition of Information Systems

Business conditions are constantly changing and the Business Strategy needs to be adjusted regularly to compensate for this. When this happens it usually creates new requirements for information and the systems that manage this information.

Assessing the impact of changes in business requirements can present a big challenge, especially if a broad picture of the Information Systems portfolio and all the relationships between the systems is not available. Furthermore it is highly likely that a significant change in Business Strategy will require changes to more than one (inter-related) system.

Organizations also mature and in doing so, their business processes become more sophisticated. Again this creates new requirements for information and the systems that manage this information. If an organization has automated using COTS systems this can become a big problem, especially when a COTS system does not provide the new functionality and information required and there is little chance that the COTS system supplier will upgrade the system appropriately, or on a timely basis.

A similar problem exists where in-house or contracted developers do not have the capability (capacity and skills) to keep the information systems they maintain up-to-date. It introduces the issue of how to manage "legacy" systems.

Incidentally, the use of Cloud Computing solutions includes similar issues to those affecting COTS systems. However, there is frequently the added complication of the terms of use and more specifically the accessibility to not only the systems provided, but also to the organization's information, especially if something goes wrong and the relationship sours for some reason.

The Integration of Information Systems

Essentially the focus here is securing the easy and uninterrupted flow of information throughout the organization and its supply chain.

It is highly unlikely that an organization will be able to automate all its business processes using a single, integrated set of systems. As a result systems integration and information synchronisation is a constant issue. For example, staff information is frequently required to configure many different systems, if only for access security. The same information, often with a lot more detail is required by the organization's communication systems, for example, MS Exchange. A lack of standards and facilities for information synchronisation in this respect can create significant problems.

As most organizations automate largely using COTS systems (including ERP systems), special attention needs to be given to the integration of these systems to facilitate the uninterrupted flow of information during Information Systems Planning and developing an appropriate strategy. An ERP system offers many benefits in this respect but it creates other types of risks. For example, if the organization specialises and excels in one business area, or has some unique requirements for some reason, the corresponding system may not provide sufficiently sophisticated facilities for an acceptable level of automation.

Systems integration does not only happen at the information level. It is important that a seamless flow of work happens at the process level too. If it doesn't, staff usually find (very creative) ways to fill the gaps to make their jobs easier. More often than not, this complicates rather than simplifies subsequent attempts to upgrade systems.

An issue that has been growing in importance for many years is the demand for integration of systems across organizational boundaries. Consider the following diagram:

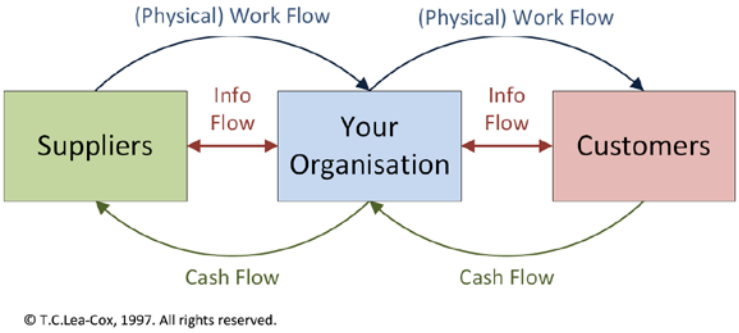

Figure 1: The Impact of poor quality Information Flow

If the information flows within and between organizations is disrupted for some reason, it has great capacity to disrupt the physical work flow and hence the flow of cash between organizations and their Customers and Suppliers. This points to some even more important systems integration issues between organizations. Incidentally, although standards such

as SOA[3] are very useful in this respect, it is an approach that does not necessarily facilitate integration at this level, especially if a COTS approach to automation has been adopted.

The Information Systems Planning Approach

The three different perspectives above give us some good clues of what is required to prepare Information Management and Information Systems strategies:

- Condition of Information:
    - o We need a means to highlight what information is managed in the organization, in enough detail to make macro-level decisions but with the ability to drill down to a lower-level of detail when this is required.
    - o Furthermore this needs to be in a simple structure which will help assess the quality of information wherever it is used in the organization.
- Condition of Information Systems:
    - o We need a means to highlight which systems are used (or are being planned to be used) for automating the organization's business processes.
    - o Also we need a way to highlight the assessed condition of each Information System, preferably in a highly visible way.
- Integration of Information Systems:
    - o We need a means to highlight what information is shared between processes and hence, between information systems
    - o Ideally we also need a means to highlight which system has been selected to manage the "master version" of each category of business information that is common to more than one system.

Information Systems Planning is a surprisingly simple way of getting to understand this complex area of IT and one that is not too difficult to set up. In my experience it produces the single most important set of management documents for preparing a coherent and comprehensive Information, Systems and Technology Strategy. Furthermore these documents are all based on one key document, the "IS Planning Matrix" or simply the "IS Plan".

[3] Service Oriented Architecture.

The Basic IS Plan (or IS Planning Matrix)

In its most elementary form the IS Planning Matrix is simply a matrix showing the relationships between:

- The organization's Business Processes
- The organization's main Categories of Information.

A key issue is what is the appropriate level of granularity required? It needs to contain sufficient detail about the processes performed in the organization but not so much detail that it becomes difficult to see the "big picture". In turn this level of detail affects the granularity of the details captured about the information managed by these processes.

- If the granularity is too high (and only the highest level processes and information categories have been identified), the relevance and usefulness of the matrix will be very limited.
- If the granularity is too low, the process to collect the information will take too long and will not necessarily deliver any extra benefit.

For example, consider the following processes:

- Direct the IT function
- Manage the IT function including its assets and resources

Clearly these two processes are too high level and do not provide nearly enough granularity to be of use. But equally, a two page list of over fifty processes performed by the IT function will provide far more detail than is required for strategic planning purposes. The correct balance is somewhere in between.

Although there are a number of other issues to consider when preparing the IS Planning Matrix there is one more key issue. The person (facilitator) leading the collection of the information to produce the IS Planning Matrix has one further very important role. They need to be able to uncover what processes are actually performed so they accurately reflect the current maturity of the organization. Equally it is important not to overstate the sophistication of the processes as this subsequently causes confusion and complexity.

The following set of diagrams is a much simplified extract from an IS Plan for a small Group of Retail companies. More specifically they show how the basic IS Planning Matrix can be used to identify and highlight problems in the Information Systems portfolio that need to be addressed.

The following diagram shows the (simplified) extract from the IS Planning Matrix. Remember that this is the IS Plan in its initial and most basic form. Nevertheless, it highlights what information is managed in the organization and provides a simple structure for subsequent analysis which is also highly scalable.

Processes by Function	Customer		Supplier Principal	Supplier Order	Customer Order	Shipment	Stock Product	Invoice/ POD	Service Repair Job	Claims	Account	Staff	Staff - Job
	Retailers	Public											
GROUP PROCESSES													
Service Centre													
Plan, order & expedite spares reqts.			X	X		X	X		X				
Manage & admin .total spare inventory							X		X				
Manage spares costing						X							
Capture details of product repairs	X	X			X		X		X	X			
SC Repairs (process set 1)	X				X		X		X				
Repair product and track job progress							X		X	X		X	
Invoice & despatch products, close job	X	X			X		X		X			X	
COMPANY PROCESSES													
Operations - General													
Prep. & impl. Ann. Opnl. Strat.& budgets	X	X	X	X	X	X	X	X	X	X	X	X	
Operations - Purchasing													
Prepare purch. plans, fcsts.	X		X	X	X	X	X				X		
Negotiate purchasing terms & conditions	X		X	X	X	X	X			X	X		
OP Suppliers (process set 1)	X		X	X	X	X	X				X		
OP Suppliers (process set 2)			X	X	X	X	X			X	X		
OP Suppliers (process set 3)			X	X		X	X			X			
Manage local and sundry suppliers				X	X	X	X			X			
Operations - Telesales/Customer Care													
Receive and process orders	X				X		X	X					
OT Support (process set 1)	X	X	X	X	X		X	X					
OT Support (process set 2)	X	X					X						
Operations - Warehousing & Distrbn.													
Prepare stock distrn. plans with Distributor	X				X	X	X						
Provide stock shipment details						X	X						
OWD Stock Movements (process set 1)	X	X				X	X						
OWD Stock Movements (process set 2)	X	X		X	X		X	X					
OWD Stock Movements (process set 3)	X	X						X					
OWD Stock Movements (process set 4)	X	X			X		X	X					
OWD Stock (process set 5)					X		X	X		X	X		
OWD Stock (process set 6)	X		X		X		X	X		X	X		
Authorise payment to distributors	X				X			X		X	X		
Operations - Components													
Plan usage with factory							X						
Order and pay for components required			X	X							X		
Manage stock of components										X	X		
Operations - Security and Safety													
Manage stock risk							X			X			X

Figure 2: The Basic IS Planning Matrix

Two further tips:

- Since the IS Planning Matrix is the root of much subsequent analysis it is worth ensuring that it is of good quality from the start and that this quality is maintained.
- Initial preparation the IS Planning Matrix including the initial analyses of the business are best done as a short project which will require collaboration with representatives of all the functions in the organization. The process is best led by a qualified and neutral facilitator.

Showing the Information Systems

One of the next steps is to identify the current systems that are used to manage the information and to overlay these onto the planning matrix. This is not necessarily easy especially when systems automate only part of a process or information group. If this happens it is useful to colour-code the systems used to enable easy recognition.

Note that this view does not have to be restricted to current systems and can be easily extended to show system coverage in respect of planned new and upgraded systems.

The following diagram shows the basic IS Planning Matrix marked up with the actual and planned systems for automation of the business processes shown:

Processes by Function	Customer		Supplier Principal	Supplier Order	Customer Order	Shipment	Stock Product	Invoice/ POD	Service Repair Job	Claims	Account	Staff	Staff - Job
	Retailers	Public											
GROUP PROCESSES													
Service Centre													
Plan, order & expedite spares reqts.			X	X		X	X		X	Stock Management - Spares			
Manage & admin .total spare inventory							X		X				
Manage spares costing						X					Costing Spares		
Capture details of product repairs	X	X			X		X		X	X			Service (Job)
SC Repairs (process set 1)	X				X		X		X				Management
Repair product and track job progress							X		X	X		X	
Invoice & despatch products, close job	X	X			X		X		X			X	
COMPANY PROCESSES													
Operations - General													
Prep. & impl. Ann. Opnl. Strat.& budgets	X	X	X	X	X	X	X	X	X	X	X	X	Operations MIS
Operations - Purchasing													
Prepare purch. plans, fcsts.	X		X	X	X	X	X				X	Purchase Order Management (incl. Shipping)	
Negotiate purchasing terms & conditions	X		X	X	X	X	X			X	X		
OP Suppliers (process set 1)	X		X	X	X	X	X				X		
OP Suppliers (process set 2)			X	X	X	X	X			X	X		
OP Suppliers (process set 3)			X	X		X	X			X	Supplier Management		
Manage local and sundry suppliers				X	X	X	X			X			
Operations - Telesales/Customer Care													
Receive and process orders	X				X		X	X				(Customer) Order Management	
OT Support (process set 1)	X	X	X	X	X		X	X					
OT Support (process set 2)	X	X					X	Techical Support (Help Desk)					
Operations - Warehousing & Distrbn.													
Prepare stock distrn. plans with Distributor	X				X	X	X					Stock Management (incl. Receipt & Distribution, cf. Servicing also)	
Provide stock shipment details						X	X						
OWD Stock Movements (process set 1)	X	X				X	X						
OWD Stock Movements (process set 2)	X	X		X	X		X	X					
OWD Stock Movements (process set 3)	X	X						X					
OWD Stock Movements (process set 4)	X	X			X		X	X					
OWD Stock (process set 5)					X		X	X		X	X		
OWD Stock (process set 6)	X		X		X		X	X		X	X	Supplier Distributor, Management	
Authorise payment to distributors	X				X			X		X	X		
Operations - Components													
Plan usage with factory							X					Purchase Order Management (cont.)	
Order and pay for components required			X	X							X		
Manage stock of components										X	X	Stock Management (cont.)	
Operations - Security and Safety													
Manage stock risk					Stock Management (cont.)		X			X			X

Figure 3: The Basic IS Planning Matrix showing Information Systems

The main uses of this systems view are:

- To show where the organization has and has not been automated, which addresses one of our key requirements
- To highlight where the information is shared (or even duplicated) by different systems. In this case the IS Plan addresses only part of one of our key requirements but it provides clear direction of where to look for a more detailed view.
- The systems can also be colour coded in “heat map” form to show the assessed current condition of the systems themselves.

Showing Information Condition

An important and very useful view is to show the assessed current condition of the organization’s information on the IS Planning Matrix with the systems overlaid. The combined information frequently provides an unambiguous picture of Information Systems development and maintenance priorities that is easy for all managers in the organization to understand.

The following diagram shows our previous example but now with the current condition of business information (in heat map form) overlaid.

Processes by Function	Customer		Supplier		Supplier Order	Customer Order	Shipment	Stock Product	Invoice/ POD	Service Repair Job	Claims	Account	Staff	Staff - Job
	Retailers	Public	Principal	Other										
GROUP PROCESSES														
Service Centre														
Plan, order & expedite spares reqts.			X	X	X		X	X		X	Stock Management - Spares			
Manage & admin .total spare inventory								X		X				
Manage spares costing							X					Costing Spares		
Capture details of product repairs	X	X				X		X		X	X			Service (Job)
SC Repairs (process set 1)	X					X		X		X				Management
Repair product and track job progress								X		X	X		X	
Invoice & despatch products, close job	X	X				X		X		X			X	
COMPANY PROCESSES														
Operations - General														
Prep. & impl. Ann. Opnl. Strat.& budgets	X	X	X	X	X	X	X	X	X	X	X	X	X	Operations MIS
Operations - Purchasing														
Prepare purch. plans, fcsts.	X		X		X	X	X	X				X		Purchase Order
Negotiate purchasing terms & conditions	X		X		X	X	X	X			X	X		Management
OP Suppliers (process set 1)	X		X		X	X	X	X				X		(incl. Shipping)
OP Suppliers (process set 2)			X	X	X	X	X	X			X	X		
OP Suppliers (process set 3)			X	X	X		X	X			X	Supplier Management		
Manage local and sundry suppliers				X	X	X	X	X			X			
Operations - Telesales/Customer Care														
Receive and process orders	X					X		X	X					(Customer) Order Management
OT Support (process set 1)	X	X	X	X	X	X		X	X					
OT Support (process set 2)	X	X						X	Techical Support (Help Desk)					
Operations - Warehousing & Distrbn.														
Prepare stock distrn. plans with Distributor	X					X	X	X						Stock Management (incl. Receipt & Distribution, cf. Servicing also)
Provide stock shipment details							X	X						
OWD Stock Movements (process set 1)	X	X					X	X						
OWD Stock Movements (process set 2)	X	X		X	X	X		X	X					
OWD Stock Movements (process set 3)	X	X							X					
OWD Stock Movements (process set 4)	X	X				X		X	X					
OWD Stock (process set 5)						X		X	X		X	X		
OWD Stock (process set 6)	X		X	X		X		X	X		X	X		Supplier Distributor, Management
Authorise payment to distributors	X			X		X			X		X	X		
Operations - Components														
Plan usage with factory								X						Purchase Order Management (cont.)
Order and pay for components required			X		X							X		
Manage stock of components											X	X		Stock Management (cont.)
Operations - Security and Safety														
Manage stock risk						Stock Management (cont.)		X			X			X

Figure 4: The Basic IS Planning Matrix showing Systems and Information Condition

This diagram is exceptionally useful for preparing the Information Management and Information Systems Strategies but it can also be used in other ways, for example, to help evaluate how well a proposed new system will meet organizational information requirements.

Not only does this view address the requirement to assess the quality of the information used by the organization, it also helps to assess the condition of the information systems. It provides very good clues to which systems may be under-performing and why. It also frequently shows exactly where IT resources can be most productively employed for shorter-term benefit; mainly for those business functions or departments that use the information from these systems.

The IS Planning Matrix and its extensions are generally too high level to be able to address the Information Systems integration requirements in

any depth. However, together they do provide most of the contextual information required to prioritise subsequent and more detailed work in this respect.

Maintaining the IS Planning Documents (Views)

Maintaining the IS Planning Matrix and all its extensions, including providing further detail when this is required, is not difficult. Furthermore, it can be done on a prioritised and partitioned basis, for example to provide input for a new programme or project.

Important Implications of IS Planning

Information Systems Planning complements many EA Frameworks

Altogether, the IS Planning Matrix and its extensions provide invaluable input and structure for not only the organization's Information and Information Systems, but also for the Business (Operating) Model. They are invaluable if an Enterprise Architecture (EA) Framework such as TOGAF, Zachman or eTOM has not yet been agreed and implemented. However, even if such a Framework is being used it is a highly complementary approach.

Consider the TOGAF example. Phase C of the TOGAF Architecture Development Method (ADM) addresses the Information Systems Architectures, specifically the:

- Data Architecture
- Application Architecture

The IS Planning Matrix directly addresses this area at the top level of the business and provides a very valuable "top-down" view. It also represents an evolutionary and natural way to develop these architectures that supports one of the most important and demanding IT processes for a CIO, that of developing and maintaining an IT Strategy that integrates well with the Business Strategy and produces results that enable, satisfy and even inspire the rest of the organization. What this means in TOGAF terms is that the IS Planning documents provide an important and valuable feedback loop into Phase B, the development of the Business Architecture.

They also provide a significant amount of contextual information required to develop and maintain an appropriate Technology Architecture and corresponding strategy; Phase D in the TOGAF ADM.

Deriving the Information Management and Information Systems Strategies

The Business Strategy objectives and priorities will normally be the main driver of the Information Management and Information Systems Strategies. However, it is important to account for and to highlight the condition of the organization's Information and Information Systems as these will have a significant impact on decisions made at the Business level.

The IS Planning documents provide a very good and powerful way of communicating these infrastructural issues and problems, especially to senior management and especially if the underlying information has been gathered and analysed in collaboration with staff representing all the functions of the organization.

Perhaps the most important use of the IS Plan, with the greatest implications, is that it also provides an excellent basis for assessing the impact of proposed changes as a result of decisions at the Business Strategy level.

Some Key Benefits

Whereas the IT strategy focuses on the business priorities and on adding value to the business, the IS Plan:

- Focuses on building a solid foundation of administrative and management information systems for the organization.
- Provides a common conceptual view of the organization's systems for management. This is important to avoid misunderstandings about the scope and objectives of systems and talking at cross-purposes.
- Provides an automation "road-map" which helps to eliminate expensive deviations from the best automation "route", particularly in times of growth.

Moreover, because it is a portfolio approach (as opposed to focusing only on a programme or project), it has some special further benefits and implications for the organization's Business Operating Model (at the EA level):

- Although not sufficient on its own, the IS Planning Matrix makes a major contribution to the structure of the organization's Business Operating Model.
- It provides a powerful means to check the completeness of the Business Operating Model.
- It provides an important window into the health of the organization.

In Conclusion

The set of diagrams I have described work very well to support the development of a relevant and effective IT Strategy for an organization and they provide an important and effective means to collaborate, negotiate and integrate with the rest of the organization. I know this because I have personally developed these diagrams for well over fifty organizations (including groups of companies), many of which I have been responsible (and accountable) for the subsequent implementation of the derived Information, Systems and Technology strategy.

Today some organizations have EA departments to do much of this work. In this situation, as a CIO, what I have described would be the minimum analysis (set of documents) that I would expect from the EA department to support the development of the IT Strategy and its component strategies, regardless of which EA Framework was being used.

What Next?

If your organization has not yet set up to produce these IS Planning documents or their equivalent, then it is likely that you are missing out on a big opportunity to improve the effectiveness, performance and credibility of the IT function.

Treat the building of this crucial capability as a small project. Then start as soon as you can to make a big impact on the next Strategic Planning cycle for your organization!

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