

Module 2

Strategic Information Systems and Enterprise Systems

Overview

In this module, you look at the evolution of Strategic Information Systems Planning (SISP) approaches and explore why these have had to change to suit the new networked organisation of today. SISP has undergone some radical changes, but from the perspective of this course, the most important change has been the need to encompass interorganisational strategies in an externally focussed “co-opetitive” strategic framework. This module will examine the four stages of IS evolution and, for each, the particular focus required of SISP.

Upon completion of this module you will be able to:

- *describe* the evolution of the SISP process through four stages of IS,
- *apply* SISP to business networks,
- *describe* management of decision making,
- *identify* Data-Gathering systems, and
- *explain* Expert Systems.



Outcomes



Terminology

Strategic information systems

Strategic information systems are systems that are used to support or shape the competitive strategy of the organisation: its plan for gaining or maintaining competitive advantage or reducing the advantage of its competitors (Wiseman 1988). Frequently, such systems extend beyond the bounds of the organisation itself to its customers or clients, suppliers and competitors.

Geographic information systems (GIS)

Geographic information systems (GIS) are a special category of DSS that use data visualisation technology to analyse and display data for planning and decision making in the form of digitised maps. The software can assemble, store, manipulate, and display geographically referenced information, tying data to points, lines, and areas on a map.

Transaction processing systems (TPS)

Transaction processing systems (TPS) are the basic business systems that serve the operational level of the organisation. It is a computerised system that performs and records the daily routine transactions necessary to conduct business.

Introduction

Background to planning theory

As the use of computers and telecommunications has changed over time, so too have the approaches to planning the utilisation of an organisation's information, information systems (IS), and information technology (IT).

The established approaches to information systems suitable to an era of inward-focused automation of basic activities are unlikely to be suited to an age where a major role of IS is to connect the organisation to others in the business environment. The business and IS/IT planning approaches that were appropriate in the 1960s era of hierarchical integrated organisations were found wanting in the emerging, interconnected business environments of the 1990s. This is even more the case in the coming environment of highly interdependent firms. Each will focus on core competencies and each will be increasingly dependent on IS/IT to support and manage core business activities and maintain alliances.

In previous units we have looked at a number of factors in contemporary business environments that indicate a need for new forms of business and IS/IT planning. One of these factors is the growth in the number and complexity of Interorganisational Operating Systems (IOS) which stretch between two or more organisations with distinct and probably different structures, strategies, business processes, IT infrastructures and organisational cultures. Another factor centres on the business models adopted for virtual organisations or extended enterprises with important alliances and linkages to suppliers and business partners. These factors, which have their own organisational momentum, gain complexity from the significant changes involving globalisation, electronic commerce, new technological developments, and the like. The combined complexity gives critical importance to new approaches to planning – to envisioning the future of organisations that are appropriate to and effective in contemporary business environments.

Claims may be made that the whole notion of planning is an anathema in contemporary business environments. Some managers are sincere in believing that the need for responsiveness, flexibility, and agility, so often touted as the hallmarks of success in the new “e-environment” of business, are the antithesis of formal planning. Others bring a stylistic objection to such planning and dismiss it as being too ponderous and bureaucratic, and too much based on an unchanging, forecastable future, to be of much help. However, little empirical evidence supports such



claims, whereas seen in retrospect, the damage from unplanned decision-making has been sufficient to earn it the label “capricious.”

Whatever your view of the subject, be assured that this module will not make you lose sight of the new business ecology of interdependent organisations in which Strategic Information Systems Planning (SISP) occurs today. If you work in this area already, you will recognise the sophistication needed to plan strategies on behalf of enterprises with increasingly blurred boundaries and increasingly important connections and interconnections.

How IS planning has evolved

The evolution of IS planning is somewhat linked to the spread and development of computer-based IS in organisations. We can identify four eras or stages of computing in organisations to date. The first was the data processing (DP) era, followed by the development of Management Information Systems (MIS), and thirdly the growing importance of Strategic Information Systems (SIS). Finally we have the current stage of Interorganisational Operating Systems (IOS) or Extended Business Networks.

First three-era model of IT

The earliest information systems were developed in the early 1960s. During the last 30 years, the field of IT has changed significantly. It now represents a different set of aims, means and responsibilities than was typical in organisations in the 1970s, or in the 1980s. To understand this philosophical change, we may divide this period into three eras of IT and study how this shift has taken place. These eras are:

1. Data processing (DP) era (1960s onwards)
2. Management information systems (MIS) era (1970s onwards)
3. Strategic information systems (SIS) era (1980s onwards)

Managing and controlling IT in an organisation in these three eras involves different approaches, many of which are determined by the applications possible and undertaken. The essential characteristics of the three eras are summarised below.

Data processing (DP) era

The data processing (DP) era is generally identified as beginning in the 1960s, when the emphasis was primarily on applying the new found technologies of computing to the automation of basic business transactions and so achieving efficiency gains for the organisation.

Typically, this process of automation took place function by function, and the planning horizons were primarily constrained by a project-by-project outlook and system implementation. At this time systems were developed according to simple economic criteria (can we automate this process to do

it more cheaply?) with little regard to related systems. “Localised exploitation” describes the deployment of IT. Fragmented islands of automation developed within organisations. The subsequent planning efforts were remedial in that their aim was to develop interfaces between these disparate systems.



Figure 2.1 DP Era – The Evolution of IS/IT Planning (Burn, Marshall and Barnett, 2001)

This era is dominated by information systems that have as their primary function the processing of predefined (business) transactions to produce fixed-format reports on schedule. Their principal use is to automate the basic business processes of the organisation. Typical transactions handled by these systems are payroll records, customer orders and purchase orders. In addition, these systems could also provide predefined exception reports based on the transactions processed.

As these systems processed the transaction data of the organisations without producing much management information, they are called data processing systems (DPS), which also explains why this era is called the data processing era. As these systems mainly processed business transaction data, they are also referred to as transaction processing systems (TPS).

In this initial period of fast growth, the main objective was to replace the manual systems with the automated ones. Data processing application opportunities were identified by inspection, by observing the performance of routine tasks and concluding that computers could be programmed to perform them. With experience, systems were also developed in other areas such as manufacturing, marketing and purchasing.

Data processing systems were adequate when the environmental challenge was to deploy the newly arrived information (mainly computer) technology to automate manual operations, to develop efficient applications that could reduce or avoid organisational costs. But these systems, apart from processing the transaction data, did not meet the information needs of managers and professionals, as the systems were incapable of producing ad hoc reports on demand.

Management information systems (MIS)

As more data became stored across the organisation and with the advent of more flexible and user-friendly tools, managers were encouraged and

increasingly enabled to access data from more than one of the “islands of automation” that created, manipulated and stored records for the organisation. They were provided with new tools for the job through what were called Management Information Systems (MIS).

As well as continuing the task of business process automation characteristic of the DP era, the new MIS thinking took a broader view of organisational activity. Within MIS systems the effectiveness of managerial performance and decision making was highlighted, with IS planning focusing more on developing a portfolio of information systems that supported and facilitated management decision making and the effective monitoring and control of employee activities.

In addition, IS planning came to involve the development of organisational policies to prioritise organisational information requirements and to coordinate the roles of empowered end users and the IT department in an increasingly complex IT environment. IS planning was thus concerned with an explicit attempt to integrate at both a technical and informational level, and thus changes envisaged for the organisation would involve elements of internal integration.

It is important to note that planning during both the DP and MIS eras was primarily internally oriented. The primary function of information systems developed in this era, called management information systems, was to provide two new capabilities to the users: enquiry – flexible data base access initiated by ad hoc user requests (for searching an item of information) and analysis – flexible user-driven processing (such as generating “what if” scenarios for testing implications of planning models). These capabilities were mainly useful for managers and professionals in satisfying their information needs. That is why these systems are called management information systems.

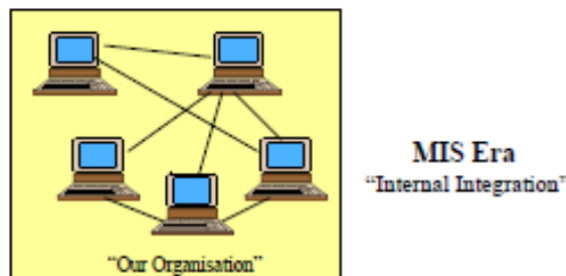


Figure 2.2 MIS Era – The Evolution of IS/IT Planning (Burn, Marshall and Barnett, 2001)

During the last decade, the use of management information systems by managers and professionals has grown exponentially, stimulated by the increasing supply of sophisticated software tools for end-user computing available on mainframes, micros and through outside time-sharing services.

The tasks that use management information systems are often ill-defined. While some MIS do automate tasks previously performed manually (such

as sales analysis and job scheduling), others reflect creative applications often developed by end-users. Another reason for end-user computing has been the availability of innovative software such as spreadsheets, fourth generation languages (4GLs) and financial planning packages such as IFPS.

The emergence of these systems has given another direction to information management business. Unlike DPS, MIS depend primarily on time-sharing and, more recently, on powerful microcomputer technology. Target users for MIS are managers and professionals rather than the clerical and supervisory level staff. Also, unlike DPS, these systems are aimed at supporting the managers and professionals rather than replacing them by automating their tasks. The systems supporting specific decisions have come to be known as decision support systems (DSS). These systems are not simply to provide higher quality information from the use of decision models and data bases. Rather, they are meant to improve the quality of the managerial decision process itself.

Similarly, the systems which are specifically designed for top management (executives) have been called executive information systems (EIS). Nowadays, EIS are being introduced at an increasing rate. Many organisations throughout the world such as Philip Morris, Medicare, and banks either have them or will have them in the near future. There are two reasons for this worldwide growth of EIS. First, modern IT makes these systems both more powerful and more palatable than the old paper-based MIS. Secondly, EIS accommodate the accelerating pace of business and the simultaneous need to make organisations more flexible by reducing layers of management.

In general, there is a trend to systems that combine features of DSS, EIS, and conventional MIS and which are often called management support systems (MSS). Unlike DPS, which have an efficiency focus, the main pay-off of these systems is in enhancing the effectiveness of their users. The development of these systems obviously needs systems analysts who are not only trained in IT but also skilled in business disciplines such as finance, strategic planning, logistics and marketing. Many of them also have backgrounds in management science and operations research.



Figure 2.3 Strategic Information Systems (SIS)

Extending the scope and range of existing DP and MIS-type systems, the 1980s and 1990s saw the advent of strategic IS (SIS) systems geared to improving an organisation's competitive position, to changing the way business is conducted, and/or to establishing close links to business partners and customers. SIS are viewed as flexible, externally focused, and driven by business initiatives and requirements. The emphasis in planning thus shifts to understanding customer requirements and the business environment, with efforts directed to aligning IT efforts with the articulated business strategy. Thus there was a shift in ISP (as planning was known before Internet Service Providers took over the acronym). Instead of using IT essentially to plan basic support services, planners and other managers recognised the potential of IT to offer competitive advantage and began relying on ISP as a key enabling factor in the achievement of business strategy. Another important shift involved the recognition that process design considerations would often be woven into the nexus of business strategy-IS strategy. The transformatory impacts of IT were becoming more evident.

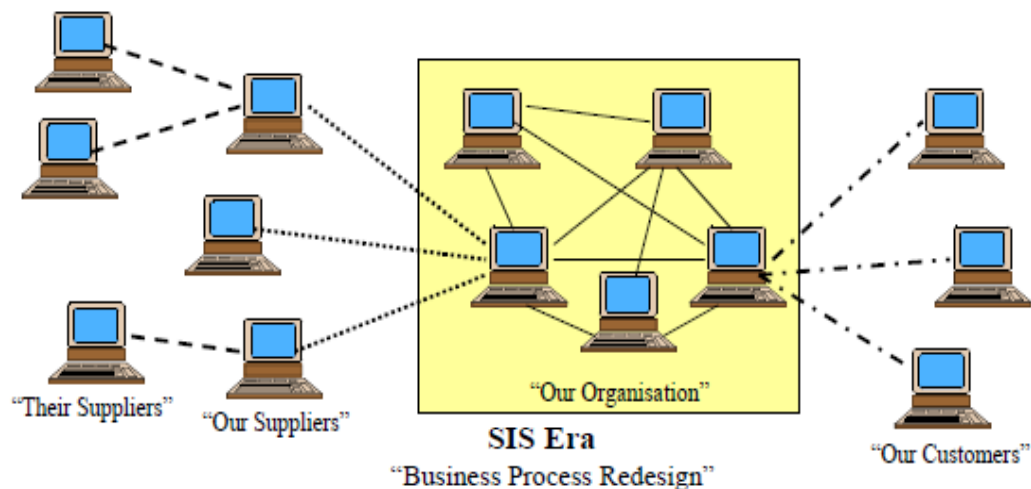


Figure 2.4 SIS Era – The Evolution of IS/IT Planning (Burn, Marshall and Barnett, 2011)

Strategic information systems (SIS)

Strategic Information systems are systems that are used to support or shape the competitive strategy of the organisation: its plan for gaining or maintaining competitive advantage or reducing the advantage of its competitors (Wiseman, 1988). Frequently, such systems extend beyond the bounds of the organisation itself to its customers or clients, suppliers and competitors. Thus, the use of telecommunications is often central to the implementation of an SIS.

An SIS has three characteristics (McNurlin and Sprague, 1989, p. 59):

1. It significantly changes business performance as measured by one or more key indicators. Whereas a DPS or an MIS/MSS

might provide a 30 per cent return on investment, an SIS can return 10 times that amount.

2. An SIS contributes to attaining a strategic goal. If a system is one of the few components that is critical to the successful attainment of a business goal, such as increasing the sales volume of a product by a specified percentage, then it is an SIS.
3. A system is an SIS if it fundamentally changes the way the company does business, or the way it competes, or the way it deals with its customers or suppliers, as for example by opening up a new distribution channel for a company's products or services. A strategic information system was installed when supermarkets such as TESCO (U.K.) Park'n Shop (U.S.) and Wellcome (H.K.) developed their cyber stores on the Internet and thus created a new distribution channel.

An SIS differs from other systems in two other ways (McNurlin and Sprague, 1989). SIS development will not conform to conventional system development life cycles. When a new service or product is being created, the IS to support it (the SIS in question) cannot be completely specified and added to the way the firm does business.

An SIS will generally change the focus of IS development from its function to its use. What becomes critical here is the use of IT to support or shape strategy rather than the capability to process transactions or do query and analysis. SIS planners should, therefore, discover application opportunities through reflection, by thinking about how the use of IT can enable the organisation designed at the outset. Such contemplation requires that an SIS be created first as a prototype, tested on a small scale by the customers, and then iteratively developed into full scale.

Another difference is that user-manager (and perhaps customer) involvement is crucial in SIS development because it changes the way the business operates.

A strategic information system may be either a DPS or an MIS or MSS. The dimension which makes a system strategic is its direct support or shaping of the competitive strategy of the organisation. An SIS is a new information management product line. It targets new user groups providing new benefits that are not delivered by either DPS or MIS in their traditional forms. It links the IS effort directly to the business, securing a competitive edge by finding, getting and keeping clients. An SIS frequently requires the activities of the IS development to be extended. It may require new hardware and software as well as additional personnel and an organisational and cultural change. An organisation will rely heavily on an SIS to satisfy its competitive goals.

These strategic information systems have three essential characteristics:

1. They significantly change the business performance of the firm
2. They contribute to attaining a strategic goal

3. They fundamentally change the way the company does business or the way it competes

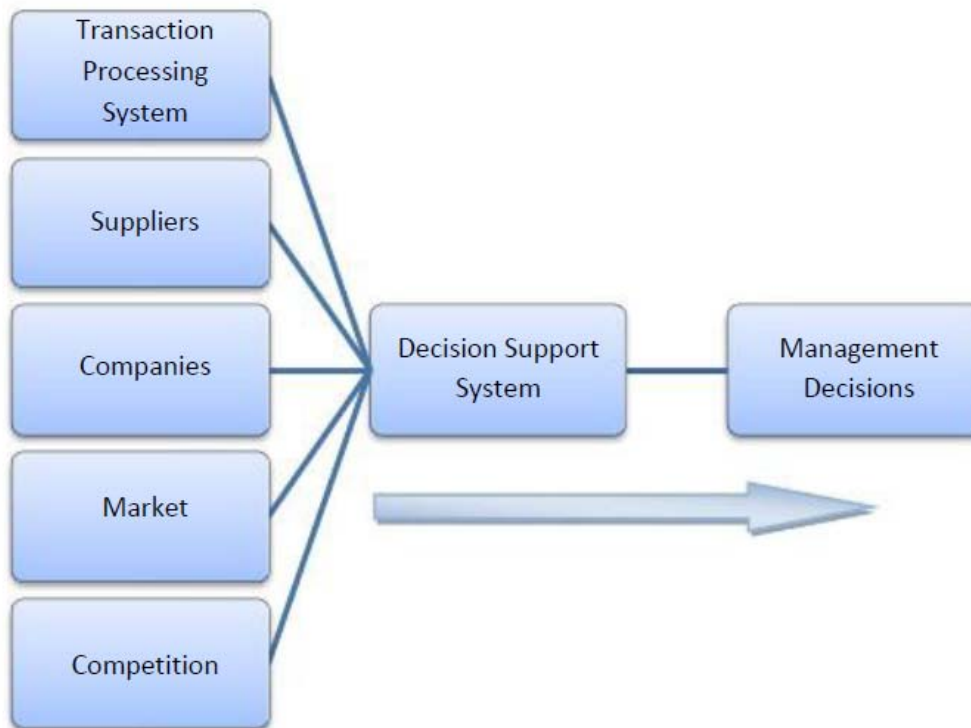


Figure 2.5 Strategic Information Systems for decision making

A strategic information system may be either a data processing system or a management information system (or management support system). The dimension which makes a system strategic is that it directly supports or shapes the competitive strategy of the organisation.

It may be re-emphasised here that these eras do not actually represent sequential relationships in time, that is, it is not that the DP era ended when the MIS era started nor that the MIS era ended when the SIS era started. In fact, the era derives its name from the state-of-the-art IT systems available at that time. As such, during the MIS era, MIS was the state-of-the-art but still some (rather many) organisations continued to use DPS and, thus, stayed back in the DP era. Similarly, even now in the SIS era, there are many organisations which are still in the MIS, or even in the DP, era!

Planning for SIS

The emerging tools, unprecedented scope of systems thinking, and intense management interest in IT caused planning thinking to change significantly during the SIS era. Such thinking was still focussed primarily on structures internal to the organisation. For the first time,

however, planners were encouraged to look outwards from their organisation into the external business and IT environments. The external environments were believed to offer insights into appropriate developments to protect, defend and reposition the organisation. The IT lens was newly seen as relevant to identifying particular business opportunities, as well. External forces could sometimes even have the effect of initiating an investment decision.

ISP was now underpinned by the recognition that success in the modern business environment might be contingent upon strategic and appropriate IS/IT investments. The power of capital had a new face: if invested in IT, it could transform existing business processes. Lest the breadth of the SIS Era network illustration suggest otherwise, note in passing that although SISP planners made gestures of concern regarding the external environment, they did not usually or routinely engage with the external environment in the planning of interorganisational systems.

By the mid-1990s, it was reasonably well established that some sort of formalised SISP was an appropriate undertaking for most organisations. SISP was to be closely allied to the organisation's business planning activity. The accepted wisdom at that time suggested, however, that SISP should only be attempted once a business strategy had been developed and articulated, and hence an understanding reached of the direction the organisation was planning to follow for the next few years – its goals, its objectives, its core business processes and its change agenda, for example.

With this business strategy established and a shared understanding reached among executives, an IS plan could be developed, determining the information and information systems needed to support the business strategy, and thus guiding investment decisions into the future. Once an IS plan was defined, an organisation's technology requirements could be articulated, such that the technological infrastructure and hardware would be made available to support and enable the provision of relevant information and information systems. An iterative and generative process was envisaged, recognising a general trend of establishing a business strategy, then an IS strategy, and finally an IT strategy, but acknowledging the constraints and pressures in the real world which might act to limit the strategies somewhat. Given the rate of technological change, and the potential and impact that modern IT could have directly on business strategy, at the outset of this process it was important to be aware of technological advances that might affect or alter the chosen or desired course for an organisation (Henderson and Venkatraman, 1994).

Issues of strategic alignment between the business and IS/IT came under increased scrutiny, with frameworks developed to help alignment or "fit." Figure 2.6 is a typical example.

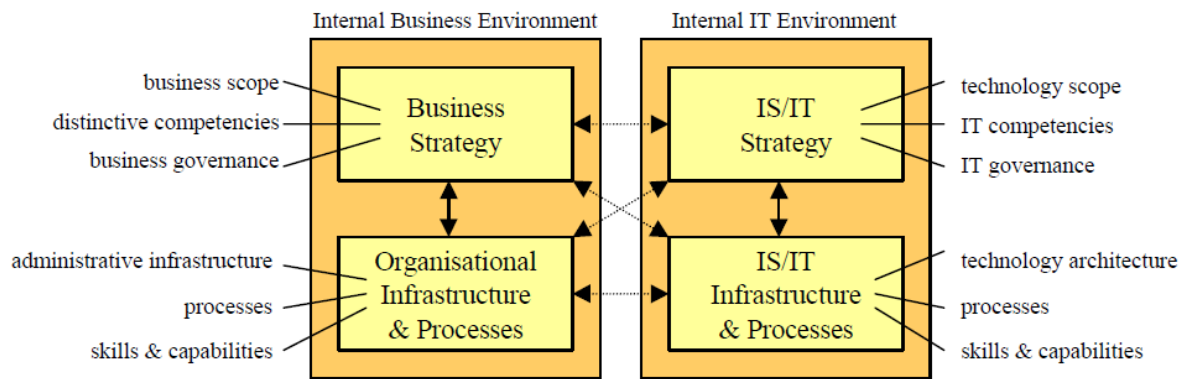


Figure 2.6 Achieving Strategic Alignment (Burn, Marshall and Barnett, 2011)

For simplicity in subsequent discussions, the business components will jointly be described as the internal business environment, and similarly, the IT components as the internal IT environment. In Figure 2.7 you witness an example of one of the frameworks that was developed for SISP during the 1990s (Henderson and Venkatraman, 1992). Essentially, this framework underpins directly an approach to SISP articulated by Ward and Griffiths (1996).

However, it is very general in nature; most modern SISP methods would employ a variety of different tools and techniques to accomplish exactly what this framework encapsulates.

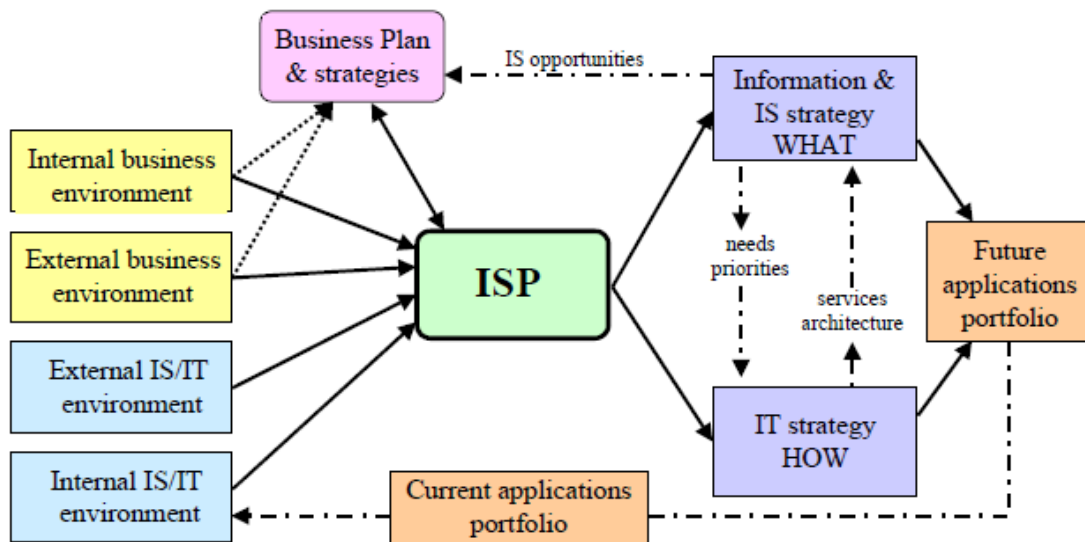


Figure 2.7 A Framework for SISP (Burn, Marshall and Barnett, 2001)

Characteristics of information process systems

In simple terms, this SISP framework suggests the following assumptions:

- That a business plan, setting the general future direction for an enterprise, is an important source of input to the SISP effort.
- That the SISP should consider the organisation's external business environment (competitive, economic, social and political, for example) and how IS/IT can be deployed to act as a buffer, neutralise, or capitalise on the effects of these forces, depending on the competitive situation of the organisation involved. A consideration of how IS/IT may reduce or minimise threats to the organisation and how IS/IT may help the organisation avail itself of opportunities are thus important components of SISP. **An example of an approach which might be used is Competitive Forces Analysis (Porter, 1980).**
- That the SISP should consider the internal business environment of the organisation, to understand the strengths and weaknesses, skills and competencies, and so on, with emphasis on understanding if, and how, IS/IT can build on and support the strengths while reducing or eliminating the weaknesses. **An example of an approach which might be used is SWOT Analysis.**
- That an understanding of the external IS/IT environment regarding technological advances, the use (and the degree of success of that use) of IS/IT by relevant outsiders, and so on, is also a vital ingredient in the SISP process. **An example of an approach which might be used is Environmental Scanning.**
- That an understanding of the internal IS/IT environment – including issues such as how well existing IS/IT currently serve the institution, existing skills and competencies, and inventory and evaluation of existing IS/IT assets and resources, areas of weakness and limitation, known future needs, and so on – is also an essential component of SISP. **An example of an approach which might be used is Critical Success Factors (CSF), (Rockart, 1979), or Value Chain Analysis (Porter, 1984).**
- That out of the SISP process would be derived both an IS and an IT strategy. The IS strategy articulates needs and requirements for information and information systems now and into the future to best support the achievement of organisational goals and objectives. The IT strategy identifies the technological and infrastructure requirements to provide the required information and information systems. **An example of an approach which might be used is IBM's Business Systems Planning (BSP).**
- That the SISP articulates a future applications portfolio which is closely aligned to the business strategy and designed so as to maximise the potential and impact of IS/IT on the achievement of



business goals and objectives. **An example of an approach which might be used is Portfolio Analysis (McFarlan, 1984).**

Fundamental to this framework is the iterative and ongoing nature of SISP. Thus over time, the future applications portfolio will become the current portfolio. Furthermore there is a distinct sense in which SISP should not be regarded as a one-off (or a once-a-year) activity but should manifest itself as much in everyday thinking and reflection about the use of IS/IT in the business as in any formalised planning process. This point is important, and is assumed in much of the subsequent discussion about SISP.

The framework basically suggests that the organisation should look out into their external business and IS/IT environments, take note of trends, threats, opportunities, and so on, and then basically plan internally their own information, IS and IT requirements. The plan should be devised such that perceived opportunities could be exploited and perceived threats averted or destroyed through an appropriate investment in and use of IS/IT. This framework primarily presents the organisation as an “island” operating independently within its business environment while acknowledging the impacts of the external business and IS/IT environments. While outside views and information may be sought and used as input to the SISP process, SISP is seen as being primarily an internal, and somewhat independent, activity.

Strategic planning for emerging business models

Adopting a business network focus for strategic planning

We move now to consider the changing realities of the business environments in which many organisations now operate. From this assessment, we question the appropriateness of the SISP framework to support and inform IS planning activities in emerging business forms. The word “bureaucratic” has been used advisedly to describe a formal and methodologically-based strategic and IS/IT planning regimen. Its pace and complexity have chafed many managers wishing to see their firms readier for the increasing pace of change and the concomitant need to reposition organisations in an increasingly interconnected and dynamic business environment. A typical response has been to move to a more flexible, lighter and less-bureaucratic mode of strategic thinking. This move also includes a move from rigour and analysis in strategic planning towards a softer, more creative, intelligently opportunistic and more collaborative strategic thinking mode that emphasises values and culture along with business goals, objectives and directions.

The business environment that is rapidly developing is one in which distinct boundaries between organisations diminish and dissolve as organisations enter into a variety of possible relationships of varying degrees of strength and commitment with their suppliers, their business customers, their business partners, their end consumers, and even their business competitors. The respective fates of collaborating enterprises become increasingly intermingled; these interdependent business

environments being described as an “interconnected ecology of firms,” or “symbiotic networks.” This is shown in Figure 2.7 in contrast to the organisation as an “island” notion that was argued to be assumed by the SISP framework previously described.

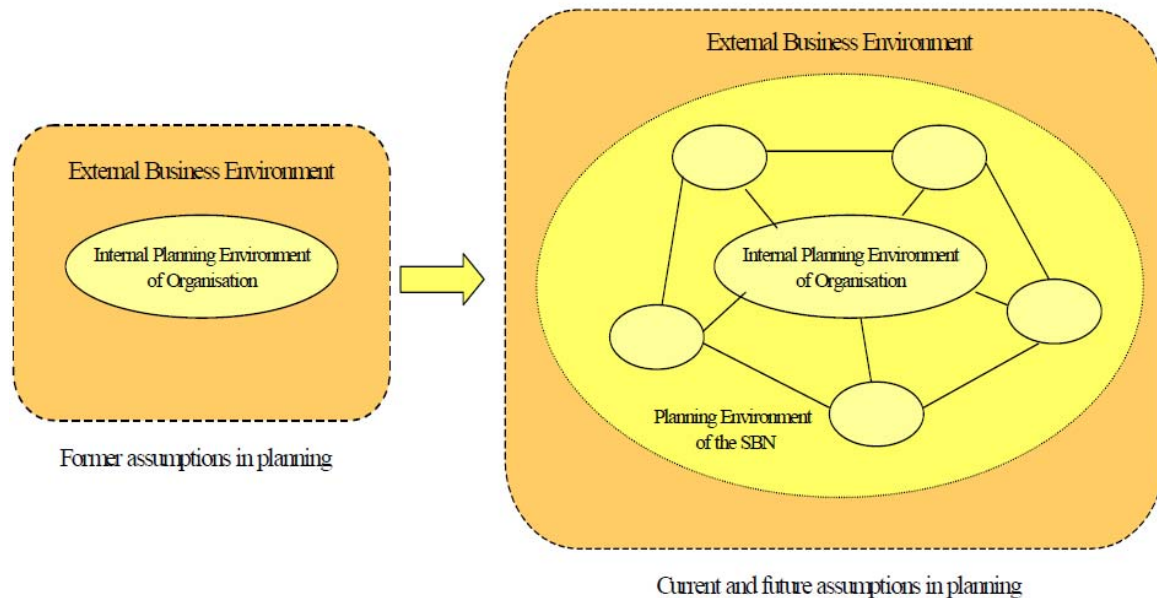


Figure 2.8 Planning adopts a business network focus (Burn, Marshall and Barnett, 2001)

The question that can thus fairly be posed at this stage is whether the ISP framework of the mid-1990s offers an appropriate model for the strategic business networks of the next century.

Developing planning strategies for the networked organisation

There has been no real sense in which SISP has been viewed or presented as an inter-organisational activity, where SISP is taking place simultaneously in a number of organisations whose operations have become highly interdependent and interconnected. As we discussed, SISP cannot sensibly be undertaken in one part of the “organism” or “ecosystem” (Moore 1996) without also being conducted in other parts of the e-market at much the same time.

Admittedly some “big” players still use market dominance to stretch their systems outwards into other, smaller players in an industry, simply through enforcing their adoption and compliance, but electronic commerce networks and marketplaces of interconnected small and medium enterprises imply that these might be the exception rather than the norm.

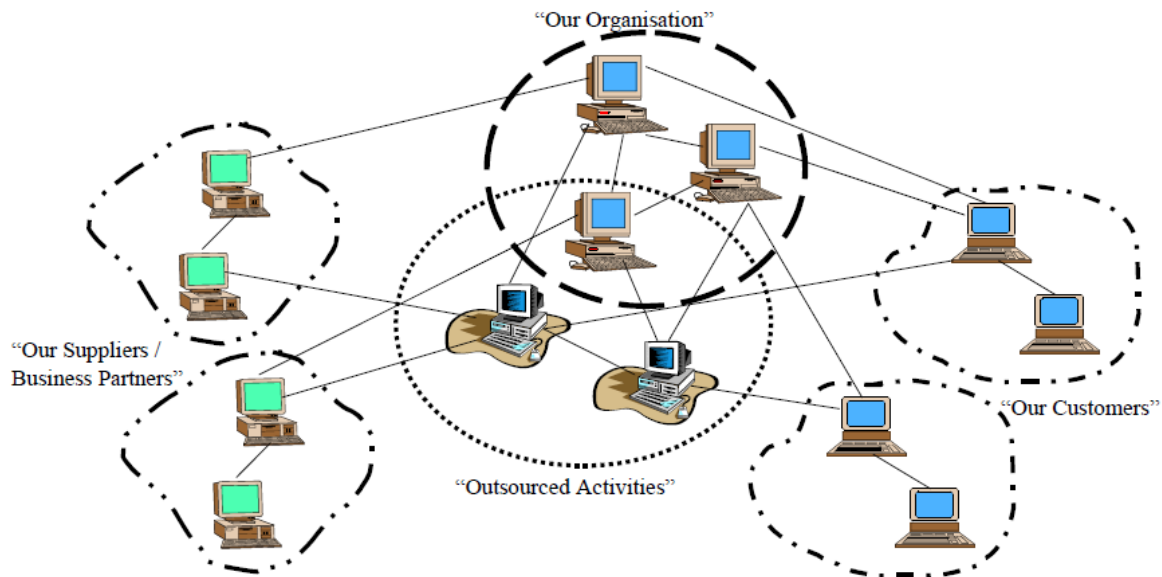


Figure 2.9 Interconnected Ecologies of Firms

If the model of the virtual organisation, the agile organisation, or the strategic business network becomes more prevalent, then there are important ramifications for SISP. Notions of organisational boundaries blur, implying that notions of corporate ownership of particular databases may need to be reconsidered, as must the concept of corporate data as an important resource. So too must concepts of business processes change. As organisational boundaries become more “rubbery” and porous than previously, concepts of internal and external processes, and hence ownership of and responsibility for business processes change. As both loose and tight linkages are sought to suppliers and business partners, to satellite entities to whom former activities have been outsourced, and to customers, through a heavy reliance on IT to communicate, coordinate and control activities in this organic structure, then it is inappropriate to continue to regard SISP as something done within a single organisation for reasons of efficiency, effectiveness and competitive advantage.

As the strategic business network develops and matures, collaboration can be expected to develop on at least three levels. At a strategic level, arguably two important and ongoing tasks will be to articulate a shared vision and purpose for the collaboration, and to develop shared goals and objectives throughout the life of the strategic business network. At a more tactical level, there must be collaboration and planning for specific projects or ventures, and the organisation must devise strategies for knowledge management and transfer. And at a much more operational level, mechanisms need to be in place to ensure that people have the information resources and support they require to accomplish these tasks.

Participating in the collaboration, however, and hence becoming part of the network business environment, is likely to cause changes to individual internal business environments. Each individual organisation’s interaction with the external business environment will be mediated

through the network business environment, at least to the extent of their collaboration.

IT implications of network and alliance planning

Two considerations go hand in hand: the SISP required for strategic business networks, and internal and external IT environments. Each organisation in an IOS or EVN individually possesses an IS/IT maturity and legacy which they bring to the strategic business network. Issues to do with the compatibility of the respective IT technical infrastructures, compatibility of management attitudes to IS/IT, and stages of maturity with respect to IT, need to be addressed here. So too does the use of and reliance on consultants, as individually, the organisations may have had very different histories and experiences in this regard. A simple model of staged growth of e-business is presented in Table 2.1. We will return to this and expand it further at the end of this module.

1. Stage	Web site
2. Presentation	Static web site – brochureware
3. Communication	Tailored to trading partner – view inventory/orders in hand
4. Interaction	Order placement or bids
5. Fulfillment	Links to back-end fulfillment systems
6. Collaboration	Dynamic interaction and virtual decision making

Table 2.1 Stages of Strategic Development in e-business

A strategic planning model for the networked organisation

Figure 2.9 presents a model which takes into account the particular nature and requirements of strategic business networks (SBNs) in an age of cross-boundary systems and the need for business alliances to integrate systems for rapid response. Referring back to Figure 2.9, note that there are parallel changes to the outputs of the SISP. An emergent strategy for the strategic business network will be articulated, detailing the information, IS, and information management required to support and enable the activities of the strategic business network into the future (whatever that is perceived to be).

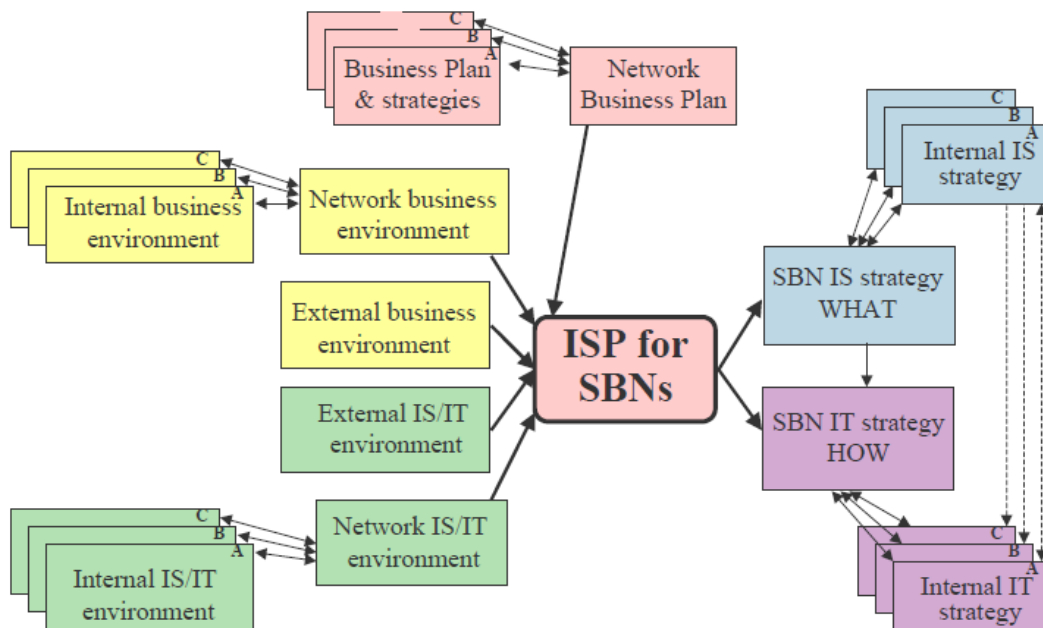


Figure 2.10 A Revised Model for SISP in strategic business networks (SBNs)

Also considered in the SBN IS strategy are concerns regarding IT human resource requirements and change management strategies. This strategic business network IS strategy will likewise affect the respective internal IS strategies of each organisation or SBN, and will be shaped and limited by those internal IS strategies. An IT strategy for the strategic business network will also likewise be derived.

The relative size and power of the collaborating partners must be comparable in order for this framework to apply; for example, it has not been designed for a star-alliance model of collaboration in which one central player has the power, size and dominance to dictate courses of action and requirements to other collaborating partners. The strategic business network referred to here is much closer to the notion of a Market Alliance or Value Chain Alliance where no player is in the position, or has the predisposition, to dominate the others.

If one organisation does dominate, then the leadership for SISP of its strategic business network will default to the structures (if any) in place within that organisation.

What should the leadership look like for a more equitably structured SBN? Is leadership required that is external to the network (perhaps in the form of an independent consultancy), or can a team drawn from the senior ranks across collaborating enterprises be created that provides sufficient drive and vision to sustain the ISP activity? And who will accomplish the continual boundary-spanning that is vital to SISP? Individuals from each organisation must operate to articulate their organisation's issues, concerns and needs to the team while serving to

communicate ongoing progress and decisions of the team to their respective organisations.

The concept of the “learning organisation” has come about because of the short shelf life of professional knowledge and the competitive necessity of renewing and exchanging information abundantly every day in a modern firm or public service. Prior learning of inter-organisational teamwork is emerging as a secret ingredient in the success of SBN planning. The theory we are advancing here is that the learning involved in establishing routine, transaction-based inter-organisational systems enables people, mentally and psychologically, to establish connections at a more strategic level. A successful history among the collaborators in the planning and development of a specific system may be necessary before there is a willingness to engage in any inter-organisational SISP.

However well-balanced, an SBN’s leadership needs to employ new techniques that emphasise strategic thinking and positioning (as distinct from formal bureaucratic planning) and that focus on the nature and richness of partnerships and alliances would also enhance the strategy process for the extended value network. While such techniques as value chain analysis and critical success factors identification can reveal important dynamics of the external business network, they do not focus naturally on the issue of the number and nature of synergistic partnerships that is best for the organisation.

Behavioural models of SISP need to change as well. Too often it seems that SISP is regarded as a formal, finite activity, done to produce a specific document (the IS plan), and then is no longer done for some time. This view is completely at odds with the view that planning in turbulent and uncertain times is so vital and increasing that it permeates everyday thinking about IS/IT.

In the next module you will see how the use of the Value, Supply and Demand chains to develop planning for IOS supports the new positioning- and partnership-minded leadership just discussed.

Management of decision making

Management wants to know the levels and types of information available and the information systems support the business processes of their organisations. We will look at different ways of classifying information systems based on the organisational levels and businesses and how it can help them.

Levels of information systems

There is no perfect system and no single system can provide all the information required for an organisation. Different kinds of systems based on different benefit, domain, and levels in an organisation are developed to provide different organisational interests according to strategic, management, and operational levels and functional areas, like

sales, marketing, manufacturing, production, human resources, finance and accounting. Three main categories of organisational levels are:

1. Strategic level
2. Management level
3. Operational level

Strategic level - Senior management deals with strategic issues and long-term trends, both in the organisational and external environment. Their main concern of information systems is matching changes in the external environment with existing organisational capability.

Management level – Middle management level typically provide periodic reports rather than instant information on operations. Information systems serve the monitoring, controlling, decisionmaking, and administrative activities. Some management-level systems support non-routine decision making. They tend to focus on less structured decisions for which information requirements are not always clear.

Operational level - Operational managers keep track of the elementary activities and transactions of the organisation, such as sales, receipts, cash deposits, payroll, credit decisions, and the flow of materials in organisations. The principal purpose of information systems at this level is to answer routine questions and to track the flow of transactions through the organisation.



Figure 2.11 Categories of information systems in organisations

Stages of information systems

Information systems serve the major business functions, such as sales and marketing, manufacturing and production, finance and accounting, and human resources. A typical organisation has strategic, management and operational level systems for each functional area:

- Senior level system forecasts sales trends over a specified period.
- Management level system tracks monthly sales by territory and reports where sales exceed or fall below required levels.
- Operational level system records daily sales and orders.

Systems at each level are specialised to serve each of the major functional areas. Thus, the typical systems found in organisations are designed to assist workers or managers at each level:

- Executive support systems (ESS) at the strategic level;
- Management information systems (MIS) and decision-support systems (DSS) at the management level; and
- Transaction processing systems (TPS) at the operational level.

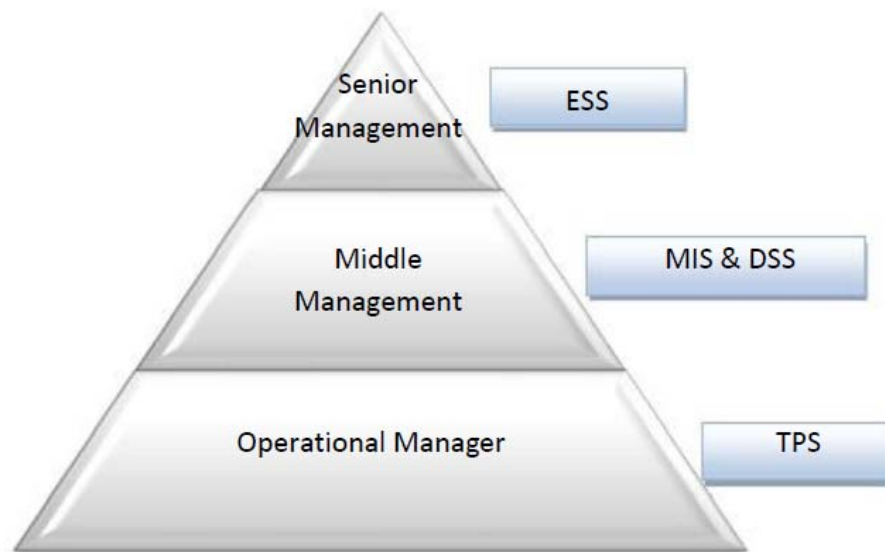


Figure 2.12 The four main types of information systems

This figure provides examples of TPS, DSS, MIS, and ESS, showing the levels of the organisation.

Effects of management information systems on decision making

The various types of systems in the organisation have interdependencies. TPS are major producers of information that is required by the other systems. These different types of systems have been loosely coupled in most organisations. It is definitely advantageous to integrate these systems so that information can flow easily between different parts of the organisation and provide management with an enterprise-wide view of how the organisation is performing as a whole. But integration costs money, and integrating many different systems is extremely time consuming and complex. This is a major challenge for large

organisations, which are typically saddled with hundreds, even thousands of different applications serving different levels and business functions.

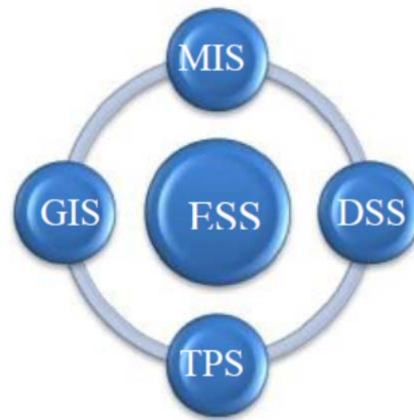


Figure 2.13 Inter-organisational dependencies of systems

Data-Gathering systems

Systems can be used in many ways to support decision making. Systems have become very powerful and sophisticated, providing quality information for decisions that enable the firm to coordinate both internally and externally. These systems help organisations with decisions in supply chain management or customer relationship management by taking data provided by enterprise systems.

Transaction processing systems (TPS)

Transaction processing systems (TPS) are the basic business systems that serve the operational level of the organisation. A transaction processing system is a computerised system that performs and records the daily routine transactions necessary to conduct business. At the operational level, tasks, resources, and goals are predefined and highly structured.

There are five functional categories of TPS: sales/marketing, manufacturing/production, finance/accounting, human resources, and other customised TPS as per requirements. Transaction processing systems are sometimes so critical to a business that if it fails for a few hours, it can cause heavy losses to the organisation. Managers need TPS to monitor an organisation's internal operations and relations with the external environment. TPS are major producers of information for the other types of systems. TPS supplies data to the company's general ledger system, which is responsible for maintaining records of the income and expenses and for producing reports such as income statements and balance sheets.

Management information systems (MIS)

Management information systems (MIS) serve the management level of the organisation, providing managers with reports and often online access to the organisation's current performance and historical records.

Typically, MIS are oriented almost exclusively to internal, not environmental or external, events. MIS primarily serve the functions of planning, controlling, and decision making at the management level. Generally, they depend on transaction processing systems for their data.

MIS summarise and report on the company's basic operations. The basic transaction data from TPS are compressed and are usually presented in long reports that are produced on a regular schedule. MIS transforms transaction level data from inventory, production, and accounting into MIS files that are used to provide managers with reports.

TPS supply summarised transaction data to the MIS reporting system and managers gain access to the organisational data through the MIS. Managers are primarily interested in weekly, monthly, and yearly results. These systems are generally not flexible and have little analytical capability and use simple summaries and comparisons.

Decisions-support systems (DSS)

Decision-support systems (DSS) also help managers to make decisions that are unique, rapidly changing, and not easily specified in advance. They address problems where the procedure for arriving at a solution may not be fully predefined in advance. DSS use internal information from TPS and MIS, and also from external sources like stock prices or product prices of competitors. DSS are designed to have analytical power. They use a variety of models to analyse data, or they condense large amounts of data into a form in which they can be analysed by decision makers.

MANAGEMENT INFORMATION SYSTEMS (MIS)	DECISION-SUPPORT SYSTEMS (DSS)
Management information systems (MIS) provide information on the firm's performance.	Decision-support systems help to support decisions in an organisation.
They produce fixed, regularly scheduled reports based on data extracted from Transaction Processing Systems (TPS). The formats of these reports are often specified in advance.	DSS connects users to structured information flows with main emphasis on models, assumptions, ad hoc queries, and displays in graphic ways.
MIS primarily addresses structured problems and analysis.	DSS supports semi-structured and unstructured problem analysis.
MIS provides managers with reports based on routing flows of data and assists in the general control of the business.	DSS emphasizes change, flexibility and a rapid response to internal and external changes.

Table 2.2 The Difference between MIS and DSS



DSS can support decision making by analysing vast quantities of data, from transaction data or enterprise systems. Data from transaction processing systems are collected in data warehouses for analysis. They support decision making by enabling users to extract useful information that was previously stored in large quantities of data. Online analytical processing (OLAP) and data mining can then be used to analyse the data from the data warehouse. Data mining provides insights into corporate data that cannot be obtained with OLAP by finding hidden patterns and relationships in large databases and inferring rules from them to predict future behaviour. The patterns and rules then can be used to guide decision making and forecast the effect of those decisions.

The main components of the DSS are the database, the DSS software system, and the user interface. The DSS database may be on a PC or a massive data warehouse. The DSS database is a collection of current or historical data or contains a subset of corporate data that has been downloaded and possibly combined with external data. Therefore DSS database may be a massive data warehouse that is continuously updated by major corporate TPS, including enterprise systems and data generated by website transactions.

Expert systems

Group decision-support systems (GDSS)

The DSS focus primarily on individual decision making. Special systems called Group Decision-Support Systems (GDSS) have been developed to support group and organisational decision making. A group decision-support system (GDSS) is an interactive computer-based system used to facilitate the solution of unstructured problems by a set of decision makers working together as a group (DeSanctis and Gallupe, 1987). Their focus is primarily on communication. GDSS provide tools and technologies geared explicitly toward group decision making and were developed in response to a growing concern over the quality and effectiveness of meetings. The underlying problems in group decision making have been the explosion of decision-maker meetings. GDSS make meetings more productive by providing tools to facilitate planning, generating, organising, and evaluating ideas, establishing priorities and documenting meeting proceedings for others. In a GDSS electronic meeting, each attendee has a workstation. The workstations are networked and are connected to the facilitator's console, which serves as the facilitator's workstation and control panel, and to the meeting's file server. All data that the attendees forward from their workstations to the group are collected and saved on the file server, for example, www.WebEx.com, www.Skype.com and www.Teamviewer.com are the latest web based tools to conduct online meetings.

Geographic information systems (GIS)

Geographic information systems (GIS) are a special category of DSS that use data visualisation technology to analyse and display data for planning and decision making in the form of digitised maps. The software can

assemble, store, manipulate, and display geographically referenced information, tying data to points, lines, and areas on a map. GIS have modeling capabilities, enabling managers to change data and automatically revise business scenarios to find better solutions. GIS can thus be used to support decisions that require knowledge about the geographic distribution of people or other resources in scientific research, resource management, and development planning.

Data from information systems can be made easier and acted on by using graphics, charts, tables, maps, digital images, three-dimensional presentations, animations, and other data visualisation technologies. By presenting data in graphical form, data visualisation tools help users see patterns and relationships in large amounts of data that would be difficult to understand if the data were presented as traditional lists of text. Some data visualisation tools are interactive, enabling users to manipulate data and see the graphical displays change in response to the changes they make.

Executive support systems (ESS)

Executive support systems (ESS) help managers with unstructured and semi-structured problems by focusing on the information needs of senior management. Combining data from internal and external sources, ESS create a generalised computing and communications environment that can be focused and applied to a changing array of problems. ESS help senior executives to monitor organisational performance, track activities of competitors, spot problems, identify opportunities, and forecast trends. ESS are designed to be used by senior managers who often have little direct contact or experience with computers. They incorporate easy-to-use graphic interfaces.

At the strategic level, senior managers use executive support systems (ESS) to help them make decisions. They address non-routine decisions requiring judgment, evaluation, and insight because there is no agreed-on procedure for arriving at a solution. ESS are designed to incorporate data summarised information from internal MIS and DSS and external events, such as new tax laws or competitors. They filter, compress, and track critical data and display data of greatest importance only. ESS provides a view of the organisation's financial performance as measured by working capital, accounts receivable, accounts payable, cash flow, and inventory. ESS can present graphs and data from many sources and tend to make less use of analytical models.

Executive support systems need integrated data from systems designed for very different purposes so that senior executives can review organisational performance from a wide perspective. There are hundreds or even thousands of incompatible systems – pulling such information together and making sense out of it is a major task. Properly configured and implemented enterprise systems can provide managers with timely, comprehensive, and accurate information. ESS based on such data can be considered logical extensions of enterprise system functionality. ESS must be designed so that higher level managers and others can use them



without much training. One area that merits special attention is the determination of executive information requirements.

The most visible benefit of ESS is their ability to analyse, compare, and highlight trends. The timeliness and availability of the data results in needed actions being identified and carried out earlier than previously could have been done. Problems can be handled before they become too damaging; opportunities can also be identified earlier. A well-designed ESS could dramatically improve management performance and increase upper management's span of control. Immediate access to so much data enables executives to better monitor activities of lower units reporting to them.

Enterprise resource planning systems (ERP)

Enterprise resource planning (ERP) systems are based on multiple integrated modules and a common central database. The database collects data from and feeds the data into numerous applications that can support nearly all of an organisation's internal business activities. When new information is entered by one process, the information is made immediately available to other business processes. Enterprise software consists of a set of interdependent software modules that support basic internal business processes for finance and accounting, human resources, manufacturing and production (including logistics and distribution), and sales and marketing. The software enables data to be used by multiple functions and business processes for precise organisational coordination and control. The software is built around thousands of predefined business processes. Organisations implementing this software would have to first select the functions of the system they wish to use and then map their business processes to the predefined business processes in the software.

Module Summary



Summary

This study module began with a review of the evolution of Strategic Information Systems Planning (SISP) and then explored why there is a need to adopt a new model for SISP which encompasses IUS and networked organisations. Within these networked organisations, you must realise, there will be many different stages of growth in development of e-business and so it is essential that we allow for multiple views in the model. You have begun to see how all the elements of systems organisation and management link together. DSS, GDSS, and ESS are systems for decision making, and they create a special set of challenges and opportunities. Systems for decision support provide extraordinary opportunities for increasing the precision, accuracy, and rapidity of decisions made by both managers and employees. Imagine the total impact on the organisation if these systems equip all decision makers in the firm to make better decisions! DSS, GDSS, and ESS can provide the information to help managers and employees make better decisions that will enhance organisational performance, but they do not necessarily create additional value.

Assignment



Assignment

In planning, an impact model is one in which IT opportunities for strategic advantage are identified and will then lead business strategy. Alignment models are where the organisation will identify IT support for business strategies. Select two of the SISP methodologies introduced in the previous section and compare and contrast these. Would you classify them as impact or alignment models?

Using this classification, Plant's e-commerce strategy (as described in the previous module) would be an "impact" model and the seven "S" model would be an "alignment" model. Try to apply these two models to your own organisation. What do you see as their strengths and weaknesses?

Case Study Reading 2.1



Case study

Case Analysis – FedEx Corp.: Structural transformation through e-Business. (2000). The University of Hong Kong.

Read the FedEx case and then answer the four questions which are posed at the end of the case. You should try to consider all of the alternative strategies explored in this course so far and, where appropriate, apply some of these to justify your answer. Remember—there are no correct answers, but yours should be supported by sound reasoning of business models, strategies, technology leadership and customer value services.



Assessment



Assessment

1. Identify three major differences between the four eras of IS: DP, MIS, SIS and IOS. Why do planning methods have to undergo significant change now?
2. Why are SISP methodologies which existed in the 20th century no longer as appropriate for the Internet economy?
3. What do you see as the major problems in adopting this SISP model for the extended business network?
4. How best might you implement this model in an EVN: top down or bottom-up?

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