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Information management in the global enterprise: an organising framework

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Much has been written over the last decade on managing global enterprises. While the predominant concern of this literature has been strategic in orientation, the management of information is a neglected area. By drawing on a diverse range of literature in the international business, strategic management, organization design, and information system (IS) disciplines this paper develops a conceptual framework for analysing information management in the global enterprise, providing a basis for organising existing literature on the topic and for creating a map of the field. This framework is structured around four domains: global business drivers, global business strategy, global business model and global information strategy. It highlights the role of information technology (IT) as supporting global business strategies while at the same time IT can also be a major catalyst in the globalisation process itself. In the context of the global information strategy, the paper develops a distinction between business infostructure, IT infrastructure and the IS/IT suprastructure. Significant relationships between the four domains of the framework are surfaced and an agenda for action developed.

Introduction

As we leave the 20th century many economists argue that we are entering a truly 'global economy'. At the same time, however, others are questioning whether or not such an exhalted destination will ever be reached, pointing towards increasing regionalism, the difficulties with negotiating the last GATT agreement, and persistent rumblings of protectionism. Yet despite these concerns it would seem that forces are already at play ensuring that a truly global economy, rather than an economy that is a little more international, is about to dawn. Three interrelated phenomena capture the essence of the emerging economy in its inextricable march towards globalisation.

First, dramatic increases in the scale and scope of technology—its cost, risk, and complexity—have rendered even the largest national markets too small to be meaningful economic units (Negroponte, 1995; Tapscott, 1996). Second, the explosive growth of translational strategic alliances signals a fundamental change in the mode of organization of international economic transactions (Lorange *et al*, 1992). Finally, the emerging global economy is integrated through information systems and information technology, facilitating co-ordination through markets rather than organization hierarchies (Jarillo, 1988; Malone *et al*, 1987; Gurbaxani & Whang, 1991; Bradley, 1994). Value is postulated as being created more in networks (Normann & Ramirez, 1993; Coyne & Dye, 1998; Stabell & Fjeldstad, 1998) rather than in hierarchical entities. The result is an electronically networked world economy where national markets are losing meaning as constituent units and geography is no longer the basis for the organization of economic activity. A most visible manifestation of this development was the recent comment made at the annual conference of the German wholesale and foreign trade association, where the association's president stated that German 'companies were losing lucrative niche markets because the Internet made it easier to compare prices and consequently was increasing competition' (Norman, 1996).

Consequently, globalisation and the global enterprise have become a significant domain of research over the last 20 years. The predominant concern of this literature has been strategic in orientation, dealing with issues of location (Porter, 1986a, b; De Meyer *et al*, 1996; Meijboom & Vos, 1997), co-ordination (Roth *et al*, 1991; Jaikumar & Upton, 1994; Meijboom & Vos, 1997) control (Doz & Prahalad, 1981; Egelhoff, 1984; Eisenhardt, 1985), governance (Gomes-Cassares, 1989; Lorange *et al*, 1992), product/market breadth and marketing (Bradley, 1991), supply chain (Christopher & Braithwaite, 1991), innovation (Rugman, 1981; Nohria & Ghoshal, 1997), legislation and government policies (Doz, 1986), international alliances and joint ventures (Kogut, 1988; Nielsen, 1988) and national cultural differences (Hofstede, 1984; Alder, 1986). Critically, outside of some isolated pieces of work, the management of information which is so crucial to the survival and functioning of such enterprises, is neglected. Any reference to information management is

generally portrayed as a technical issue, and seen as being primarily concerned with communication network and technological infrastructures. Consequently, in practice responsibility is usually delegated by senior business managers to technically competent staff in the information technology (IT) organization. The irony is that decisions about IT are essentially business decisions. Further, there is confusion with regard to the use of the phrase 'international technology management' as it is generally conveyed as being concerned with research and development (R&D), innovation and technology (defined in terms of knowledge) transfer.

The objective of this paper is to contribute to our understanding of IS/IT management in the global enterprise and consequently the development of this subfield of research. By drawing on a diverse and comprehensive range of literature in the international business, strategic management, organization and IS disciplines this paper develops a conceptual framework for analysing IS/IT management in the global enterprise, representing the first attempt to integrate such a wide multidisciplinary base of research. It provides a basis for organising existing literature on the topic and for creating a map of the field. It highlights the role of IS/IT as supporting global business strategies while at the same time IS/IT can also be a major catalyst in the globalisation process itself. Significant relationships between the domains of the framework are surfaced and an agenda for action developed.

The global context

Two assumptions underlie the construction of this paper. The first and more general assumption is that managing in the global context is different from managing a single sited organization thus presenting a different set of issues to be addressed. The second assumption, which is specific to the management of information, is that there are value for money benefits and advantages to be gained by managing information on a global basis as opposed to a domestic country or single site. The evidence would suggest that this is the case (Buss, 1982; Keen, 1992; Ives *et al*, 1993; Andreu *et al*, 1994; Deans & Karwan, 1994; Earl & Feeny, 1996).

To put this paper in context and to highlight the enormity and complexity of global operations consider the following scenario (adapted from Dyment, 1987):

> The global corporation, head-quartered in Germany, markets and sells a product that is designed in Milan, Italy, with components manufactured in Taiwan and Korea. It is assembled in Canada, Germany and Ireland and sold as a standard model in South America, and as a model with considerable options in the US, Europe and Australia. Transfer pricing of the components and assembled product is determined with an eye to minimise tax liability. The principal financing is provided from the Euro market based in Frankfurt. Add in the complexities of having transactions in different currencies, with foreign exchange hedge contract gains and losses that sometimes offset trading losses or gains.

While this scenario captures just some of the complex issues involved in global operations at a business level translating business demands into information and systems requirements becomes a daunting task, yet it is one which confronts many organizations on a daily basis.

Managing in the international arena presents a number of concerns and problems not usually faced when operating in a single domestic market. These include:

- Addressing different legislative demands, taxation systems, accounting requirements, currency systems, and environmental standards, particularly outside the borders of the European Union (EU). While the EU is seeking the harmonisation of many of these aspects, the fact is that many anomalies still remain among member countries. Virgin Express, the no frills airline based in Belgium, has long complained about that country's tax and social security regime and recently announced that it would be establishing a new business base in Ireland (King, 1998).
- Dealing with cultural differences both within different operating units and national cultural differences. Even within Europe there is a mosaic of different cultures and ethnic backgrounds. Culture influences both business practices and customer preferences. Language also presents its own challenges.
- Addressing international economics and politics. Consider the intervention of the French government when Hoover announced that it was moving manufacturing from France to Scotland. The stability of political and economic systems varies throughout the globe as does the extent of state intervention, particularly in attracting foreign direct investment (FDI).

Accentuating the global 'problem' are further observations in relation to operating internationally.

- It is very often difficult to distinguish between what one might consider as being 'domestic' and 'international' firms. Even the home base is often deceiving. For example, Honda manufactures more automobiles in the US than in Japan, employs more US workers than Japanese, generates more revenue in the US than it does in Japan, and even exports US designed and manufactured cars to Japan
- In many industries, international business can sometimes be described as a tangled web of international links, often associated with competing firms. For example, despite competing against each other head-to-head, Nike, Adidas and Reebok often use the same manufacturers in South East Asia. In the com-

puter industry, IBM, Digital, Hewlett Packard and Apple are at the same time involved in both collaborating and competing alliances.

Globalisation has become a strategy for many companies of all sizes as they seek to expand their participation in foreign markets. The extent of this 'globalisation' varies from having a sales office in a local market to developing a sophisticated network of business operations fully integrated on a global basis. In the process of becoming increasingly global, many firms are often seen to follow a developmental path from 'international' to 'multinational' to 'global' to 'translational' (Bartlett & Ghoshal, 1989). Briefly, the international stage is characterised by an increasingly autonomous international division, separate from domestic business; the multinational stage is characterised by an increasing duplication of the value chain across countries and local autonomy; and the global stage is denoted by increasing geographic integration of activities and strategies; the translational model is characterised by ". . . increasingly specialised units worldwide . . . linked to into an integrated network of operations that [enables] them to achieve their multi-dimensional strategic objectives of efficiency, responsiveness and innovation" (Bartlett & Ghoshal, 1989, p 89). For most international companies, however, the transnational model is more an aspiration than a reality (Turner & Henry, 1994).

Even the smallest economic unit is not immune from the effects of globalisation as they increasingly face competition from 'foreign' companies for market share. And with the advent of the Internet, every firm with a World Wide Web presence can be seen as a global player (Quelch & Klein, 1996).

Information management in the global enterprise

The global organization seeks to manage the interdependencies among geographically dispersed multi-site operating units, for example between manufacturing facilities, distribution centres and sales offices all at different locations. Information is the mechanism through which this integration is achieved and IT is increasingly being used to integrate and manage geographically dispersed operations. At the same time IT is reducing communication and transaction costs and enabling new structures and processes providing global organizations with new organising possibilities (Malone *et al*, 1987; Eccles & Nolan, 1994; Boudreau *et al*, 1998; Jarillo, 1998). New models for value creation are possible with value being created in 'networks' as opposed to 'chains' (Normann & Ramirez, 1993; Coyne & Dye, 1998; Stabell & Fjeldstad, 1998).

Yet, this management of information which is so crucial to the functioning of global enterprises has until recently been neglected in the research literature. As recently as 1991 Deans and Kane reported that a comprehensive review of the relevant literature revealed very little academic research. Similarly, the international business literature has tended to ignore the IS functional area. Palvia (1998) portrays the cumulative research base to date as being descriptive and opportunistic. Any reference to information management is generally portrayed as a technical issue and seen as being primarily concerned with communication networks and technological infrastructures. While these are important aspects, a more comprehensive treatment is required.

A survey at the beginning of the decade showed that more than half of the 100 major multinational corporations surveyed in 1991 did not, or rarely considered, IS/IT in strategy development (Amdahl, 1991). This survey also reported that the percentage of corporations that regard IS/IT as a component of their global strategy development was as low as 14%.

Most of the IS/IT research literature is 'domestic' in orientation (Emery, 1990; Deans & Kane, 1991; Deans & Ricks, 1991; Roche, 1996), i.e. addresses the management of IS/IT from a single site or business unit within an individual country. Some research has identified issues with managing IT in the global context (Ives & Jarvenpaa, 1991a, b; Roth *et al*, 1991), issues specific to chief information officers (CIO) of global organizations (McFarlan, 1992), and there has also been some recent publication on managing international IS projects (Tractinsky & Jarvenpaa, 1995) and the effect of electronic communication on co-ordinating global companies (Janssens & Brett, 1994). In addition, there are a limited number of case studies dealing with aspects of global IS/IT management (Clemens & Row, 1991; Huycke & Oliff, 1993; Jelassi & Dutta, 1993; Bechler & Marchand, 1994; Ives & Jarvenpaa, 1994; Ross, 1995). Despite this dearth of literature, 'global information technology' is emerging as a sub-discipline within the IS field recognition of the increased importance of IT in globalisation and in managing the global company. There is now a journal devoted to the area, the *International Journal of Global Information Technology*. In addition, a working group has been established under the auspices of the International Federation for Information Processing (IFIP) to promote research and the exchange of best practice in this area.

In summary, the existing research literature reveals little by way of guidance for managing IS/IT in the global enterprise. One paper has noted that '. . . the literature [on managing global IS/IT] remains fragmentary, offering only partial and potentially contradictory normative implications for managers' (Ramarapu & Lado, 1995). Indeed, a more recent study concluded that '. . . the global information systems challenge appears to be more complex than commonly suggested . . . there are no easy and straightforward prescriptions for

practitioners involved with global information systems' (Earl & Feeny, 1996).

Information management in the global enterprise: an organising framework

In spite of the above conclusion, there are two central themes which emerge from what little research exists in the global information technology field. The first suggests the criticality of matching global IS/IT strategy to global business strategy (Ives & Jarvenpaa, 1991a, b; Earl & Feeny, 1995). The second advocates the linking of global organizational design strategies with tactics for providing information technology support (Karimi & Konsynski, 1991; Chismar, 1994). Different structures influence information flows within the organization (Egelhoff, 1982, 1991; Lee & Leifer, 1992; Neumann-Alkier, 1997) and IT plays a crucial role in allowing organizations to implement global business strategies which depend on complex organizational and decision-making structures (Chismar, 1994). The logic is that in implementing a global strategy the organization constructs a specific business model which is supported and enabled by IT while at the same time cognisance is taken of the opportunities provided by IS/IT in enabling innovative global strategies and novel structures (Rayport & Sviokla, 1994, 1995; Evans & Wurster 1997). IT is also driving the globalisation process with technologies such as the Internet and World Wide Web allowing even the smallest company the opportunity to operate on a global scale (Quelch & Klein, 1996).

Figure 1 presents a framework for analysing information management in global enterprises. This framework builds on the work of Earl (1989), Pyburn (1983) and Ward and Griffiths (1996) in aligning IS/IT strategies and business strategies, that of Henderson and Venkatraman (1993) and Broadbent and Weill (1993) in developing strategic alignment models, Earl (1996a) in his articulation of the organizational fit framework (OFF) and the approach of Ives *et al* (1993) for global IS strategy formulation. It combines this research with the international business literature, the strategic management literature, the organizational design literature and the IS/IT literature in developing this framework.

The framework highlights the two key influences of the global information strategy as being the organizations global business model and its global business drivers, thus developing the contention that host organizational characteristics influence 'IS organizational arrangements' (McFarlan & McKenny, 1983; Lee & Leifer, 1992; Earl *et al*, 1996). It also recognises the opportunities which IT offers in providing new strategic options while at the same time facilitating new possibilities in terms of organization for strategy implementation. IT can impact the global business model in that it enables new organizational structures and opens new configuration possibilities, particularly in relation to supporting virtual structures. The drivers of the globalisation process itself are greatly affected by technological developments. IT, for example, facilitates the drive towards mass customisation (Boynton *et al*, 1993).

The four domains of this framework are interdependent. A change in any one dimension may require a corresponding change in any or all of the other three. This aspect is discussed later in the paper. In the sections that follow each of the domains is explored in isolation

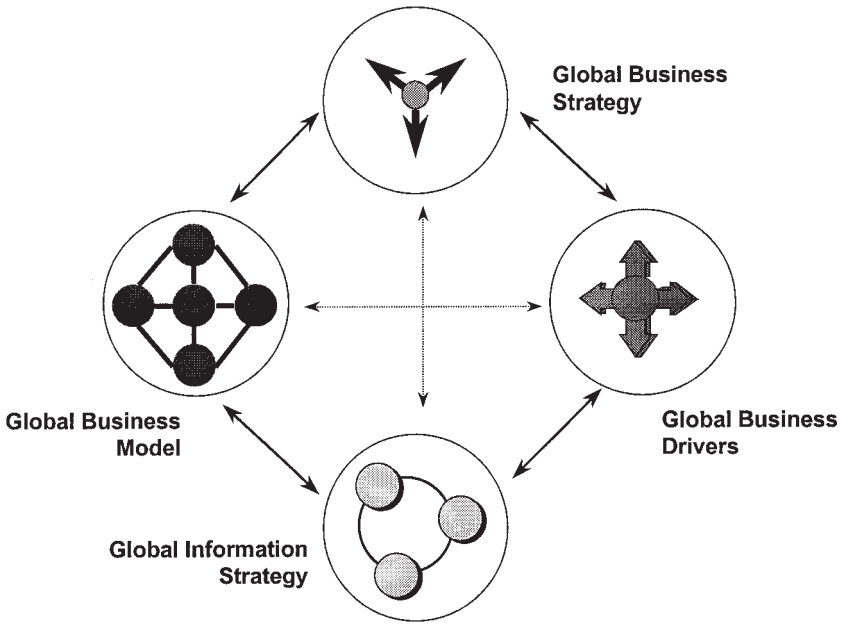

Figure 1 An organising framework for information management in the global enterprise.

as within each there are a number of issues to address. The impact which IT has on each of the domains is also examined. While the focus of analysis is on the management of IS/IT it is crucial to understand the business and organizational context before attempting to address IS/IT issues (Earl, 1989; Henderson & Venkatraman, 1993; Ward & Griffiths, 1996).

Global business strategy

There has been much debate recently concerning the nature and content of strategy: what it is? (Hamel, 1996; Porter, 1996); and whether or not it really matters? (Whittington, 1993). Aside from the issues raised in this debate, there is considerable agreement that an organization requires an overarching vision in order to give it not only guidance but to also frame the globalisation process. In this context, strategy can be defined in terms of choices pertaining to the positioning of the business in the product and market arena. It addresses issues such as the extent of comparative relationships (joint ventures and strategic alliances) and distinctive competencies defined in terms of the basis under which the organization competes (for example, delivery reliability, relationships, price, quality, etc). Prescriptions suggest that in developing the global strategy, it is paramount to first identify those aspects of strategy which should be globalised (Yip, 1995, p 6).

There are two central features to a global business strategy (GBS) which can be gleaned from the literature: scope of the organization's activities and governance (see Figure 2). Scope basically refers 'to the business the organization wants to be in'. It is concerned with issues of products and markets: what products/services will the organization sell?; where does the organization want to compete?; on what basis?; and in which markets? The second dimension, that of business governance, refers to the kind of relationships which the organization wishes to have with external business partners. While such relationship can vary from loose to tight (Venkatraman, 1991) organizations usually have a range of different relationships (Bensaou & Venkatraman, 1996). Depending on the governance stance the extent and nature of joint ventures (Gomes-Cassares, 1989) and strategic alliances (Jarillo, 1988; Lorange *et al*, 1992) are determined.

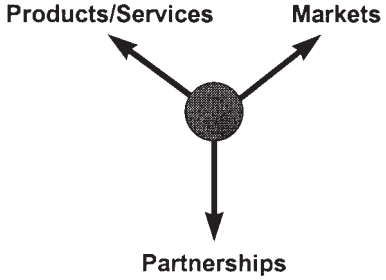

Figure 2 The global business strategy.

Information and communications technologies are having a profound impact on the strategic options of the global firm opening up new opportunities and avenues (Sampler, 1998). Technologies like the Internet now permit even the smallest of organizations to extend their reach and scope of operations enabling them to reach new market segments and new geographical regions (Quelch & Klein, 1996). Information has also become embedded in many traditional products and services; for example most of the global package delivery companies now permit customers to track their packages as they move towards their destination. IT also enables new product and service offerings to be made. Many banks are now using their automated teller machine (ATM) network to provide products and services which fall outside the realm of traditional banking services. In Spain, for example, ATMs can be used to purchase theatre and cinema tickets.

IT can also be critical in facilitating partnerships (Henderson, 1990; Konsynski & McFarlan, 1990). It empowers companies to compete, ironically, by providing them with new ways to cooperate. 'Information partnerships' facilitated by the sharing of customer data, can provide a basis for differentiation (Konsynski & McFarlan, 1990). For example, it can provide organizations the opportunity to participate in joint marketing programmes, take advantage of new channels of distribution, capitalise on opportunities for cross selling, or offer novel incentives and services.

Once defined, an organization's global business strategy gives direction to the global business model, i.e., how it organises for global operation. Yet in developing the GBS, sight must not be lost of the drivers of the globalisation process: the global business drivers.

Global business drivers

A company 'goes global' for a number of reasons including access to foreign markets, to sourcing resources, to exploit significant economies of scale, to raise capital at lower costs, to exploit a strategic advantage like a technological lead, to capitalise on lower factor costs, to extend the reach of the business, etc, (Porter, 1980; Doz, 1986; Kogut, 1985). Consequently, brands, distribution, marketing, manufacturing and decision-making must be viewed from a global perspective.

The globalisation process requires that decisions concerning a number of global business drivers (GBD) are made. These drivers both promote and constrain the globalisation process framing the strategic choices. In addressing these drivers, a balance must be struck between a number of countervailing forces. These forces are local flexibility, global integration and efficiency, global effectiveness and the leveraging of knowledge (see Figure 3). It should be noted that the concept of 'global business driver' in this paper is much broader than that of Ives *et al* (1993) who view global business

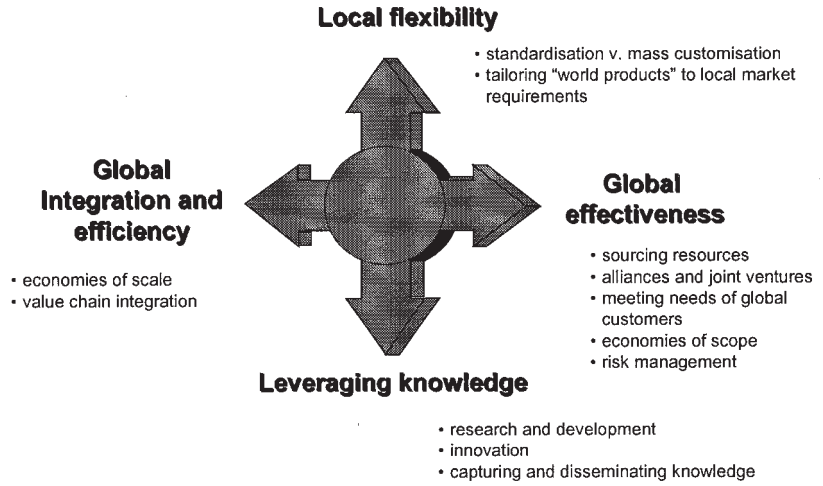

Figure 3 Tensions in a global company: defining the global business drivers.

drivers as 'those entities that benefit from global economies of scale and scope, and that contribute to global business strategy' (p 146).

Local flexibility: entails addressing the extent of the requirement to be responsive and adaptive to customer requirements and local market conditions. For example, adopting 'global' products to local markets or the ability to respond rapidly to changing customer preferences. Diversity among national markets in market structure, industry structures, distribution channels, manufacturing processes and customer needs may require local responsiveness (Doz & Prahalad, 1984). Costs and other factors can affect the extent to which local flexibility is feasible. However, brands may enable global standardisation of products and services.

Global integration and efficiency: is concerned with minimising duplication of effort and leveraging scale economies. Operating internationally demands the close integration of all activities along the value chain no matter where they are geographically undertaken. International scale economies are derived from cost reduction achieved through the accumulation of volume across country locations and international aggregation of market segments (Kogut, 1991).

Global effectiveness: entails ensuring that overall operations meet effectiveness aspirations. The critical issue is to ensure that the 'whole is greater than the sum of the part' capitalising on synergies between operating units. For example, the global sourcing of raw materials, or the mandatory requirement to manufacture in a host country before being permitted to sell into that country, or addressing global customer needs in a local market. International scope economies arise when existing international operations benefit from the introduction of additional activities or products, since the cost of additional products may be less than the individual costs, or can arise from the fact that the cost of the joint production of two or more products can be less than the cost of producing them separately (Ghoshal, 1987).

Leveraging knowledge: Bartlett and Ghoshal (1987) stress the need for the global corporation to manage the flow of 'intelligence, ideas and knowledge'. A critical task is to ensure that there is no 're-invention of the wheel' and that knowledge and learning is captured and simultaneously shared throughout the organization. Despite this assertion very little is known about how knowledge actually develops in globalising firms (von Krogh *et al*, 1996). The organization may also choose to enter into strategic alliances (Kogut, 1988) or devise a cooperative strategy (Nielsen, 1988) to develop knowledge or have access to knowledge which it lacks.

Balancing these four tensions requires strategic trade-offs, for example between the requirement for local flexibility and scale economies or balancing scale with strategic and operational flexibility, but it is only in addressing these trade-offs that an organization can begin to determine its global business model and it is this business model which defines information and system requirements and strongly influences the deployment of IS/IT (Karimi & Konsynski, 1991; Chismar, 1994). Information technology can impact these drivers by permitting the organization to address them in different ways (see Table 1). It can at the same time facilitate strategies which can lessen tensions which exist in the physical world. The Internet, for example, offers organizations the opportunity to extend their global reach (Gurbaxani & Whang, 1991) enabling both scale and scope economies to be addressed. Technologies can also enable the organization to achieve both global effectiveness and local flexibility. At the same time, technologies such as enterprise systems (ES), can enhance global integration and efficiency but pose problems for local flexibility (Davenport, 1998).

Table 1 IT and global business drivers: some opportunities

Global business drivers	*Opportunities provided by IS/IT*
Local flexibility	• Flexible manufacturing systems permitting low volume, high variety production in small batch size • Mobile computing enabling sales teams to focus on local customers • Point of sale (POS) systems collecting local customer information for local decision making
Global-integration and efficiency	• EDI enabling exchange of design and inventory information between operating units • Workflow systems • Video conferencing • Enterprise Resource Planning systems such as those from Baan and SAP AG
Global effectiveness	• The Internet as an electronic market • Business scope extension through the Internet • International private virtual networks • IT applications providing a single point of contact for global customers
Leveraging knowledge	• E-mail for organizational communication • Groupware facilitating the sharing and exchange of knowledge • Expert systems capturing knowledge and making it available to the wider organization • Access to information via online data bases • Corporate Intranets

The global business model

The global business model (GBM) refers to the structures and processes in place in order to operationalise the strategy of the business. It is through this model that the day-to-day activities of the global organization are facilitated. There have been many empirical studies that have examined the relationship between strategy and organizational design in multination corporations (MNC) (Stopford & Wells, 1972; Egelhoff, 1982, 1988; Daniels *et al*, 1984, 1985). In developing the global business model five specific dimensions can be determined from this research literature; these are capabilities, configuration, co-ordination, control and culture.

Capabilities

Through articulating the vision and business objectives the required business capabilities underlying the business strategy can be defined. The focus is on capabilities to deploy resources, usually in combination, in order to effect a desired end (Amit & Schoemaker, 1993). Capabilities are firm specific (Rumelt, 1991) and develop over time (Prahalad *et al*, 1990; Grant, 1991) and unlike resources, are not tradable over time. They often contain tacit aspects making them difficult to imitate (Spender, 1993).

Configuration

Refers to decisions concerning the deployment of value chain activities around the globe, specifically the geographical location of resources (people, plant, finance, expertise, etc) (Porter, 1986b) to deliver the required capabilities. Configuration decisions are essentially business decisions and have many influences:

– often governed by regulatory requirements;
– strongly influenced by financial implications, for example transfer pricing, tax implications and wage rates;
– customer preferences with customers often preferring locally produced products/services;
– strength of trade unions and industrial relations situation can effect location decisions;
– communication and infrastructure systems;
– proximity to markets;
– governmental inducements (Kogut, 1991), for example 10% manufacturing tax in Ireland can be a major attraction in making investment decisions;
– arbitrage cost differences in factors of production (Kogut, 1991) providing a cost advantage to the producer (Rugman & Hodgetts, 1995, p 225);
– economic and political stability are key influences on location decisions.

While resources are tangible, capabilities are intangible and difficult to imitate (Dierickx & Cool, 1989; Collis & Montgomery, 1995). A company can gain a 'comparative advantage' through locating activities in certain areas. Such advantage may be due to differences in factor costs across country locations (Porter, 1980; Kogut, 1985; Ghoshal, 1987). Competitive advantage influences the decisions of what activities and technologies along the value added chain an organization should concentrate its investment and management resources (Kogut, 1985).

Co-ordination

Concerned with managing the interdependencies (Roth *et al*, 1991) of a complex network of operations brought about through selecting specific configurations. The increased uncertainty and complexity resulting from international competition makes co-ordination a critical success factor (Pfeffer & Salancik, 1978).

The firm selects a coordination structure by jointly determining its decision authority structure ('who decides what') and its information structure ('who knows what') (Anand & Mendelson, 1997). In essence,

co-ordination entails defining what it is that must be managed:

- understanding the value system and the value-added contributions of activities;
- defining the extent of coupling of global value chain activities (i.e. the interdependencies among activities in business processes), particularly in exploiting synergies;
- relatedness at corporate strategy, i.e., the extent to which a firm expects to achieve synergies across its business units (Gupta & Govindarajan, 1984; Porter, 1985; Hoskisson *et al*, 1993);
- understanding the 'information intensity' of business processes;
- identifying local business practices, perhaps due to cultural factors, and their impact on global processes.

Control

Process by which management influence other members of an organization to implement the organization's strategy. The management control system should enable management to control the essential strategy of the company. Formalisation is the degree to which organizational norms are defined explicitly. Control includes:

- formal structural mechanisms, such as parenting style defining the nature of the relationship between the centre and subsidiaries and the roles and responsibilities of each (Gould & Campbell, 1986);
- defining the nature of the relationship between subsidiaries (or business units) due to global processes and the requirement for lateral co-ordination;
- informal (based on personal relationships) or trust (Ouchi, 1980). Control can also be exercised through informal networks, for example it may be the outcome of moving managers around (Edstrom & Galbraith, 1977);
- integrating mechanisms such as taskforces and committees, used to develop collaborative efforts among organizational sub-units, are seen as critical to managing international operations (Barlett, 1983; Egelhoff, 1984; Turner & Henry, 1994). They are also instrumental in creating a single managerial philosophy within the organization (Roth *et al*, 1991);
- market governance structures (Williamson, 1985) or internal economy (Benson, 1975);
- allocating responsibility to senior executives for business units and geographical areas of functional responsibilities (Turner & Henry, 1994);
- transferring organizational culture overseas (Jaeger, 1983) or socialisation through in-house training (Turner & Henry, 1994).

Culture

Cultural differences due to operating in different countries and different marketplaces, different business pressures and different influences (Hailey, 1994). What are the basic business practices in operation which differ from the 'home' country and what is their impact (Myers *et al*, 1995)? There are also company-specific cultural issues, which often overflow into power and politics.

These five decision dimensions are interdependent (see Figure 4) and successful implementation of any global business strategy would require these dimensions to be aligned. For example, the location of R&D facilities can have implications for the transfer of knowledge (von Krogh *et al*, 1996). Cultural factors can also affect the attitudes of people in relation to sharing knowledge and best practice (Szulanki, 1996). In practice, configuration decisions strongly influence co-ordination and control decisions and define the cultural context.

IS/IT both supports and drives the global business model. It enables new organization designs to overcome the spacial and temporal dispersion that accompanies increased global reach (Boudreau *et al*, 1998). Building on the pioneering work of Lawrence & Lorsch (1967), we find that as an organization expands overseas its information processing capacity must increase. IS/IT is needed for co-ordination (Emery, 1990) as the essence of co-ordination is the communication and processing of information (Malone *et al*, 1987). IT reduces communication and transaction costs while at the same time it also makes different types of configurations possible through its co-ordination capabilities (Chismar, 1994; Malone & Crowston, 1994). Capitalising on this phenomena, organizations can depend less on hierarchy and more on markets as co-ordinating mechanisms (Malone *et al*, 1987; Gurbaxani & Whang, 1991; Evans and Wurster, 1997). However, culture might have an impact on co-ordination dictating that IS/IT knowledge based in one jurisdiction may not be applicable in other countries (Tricker, 1988; Raman & Watson, 1994) or

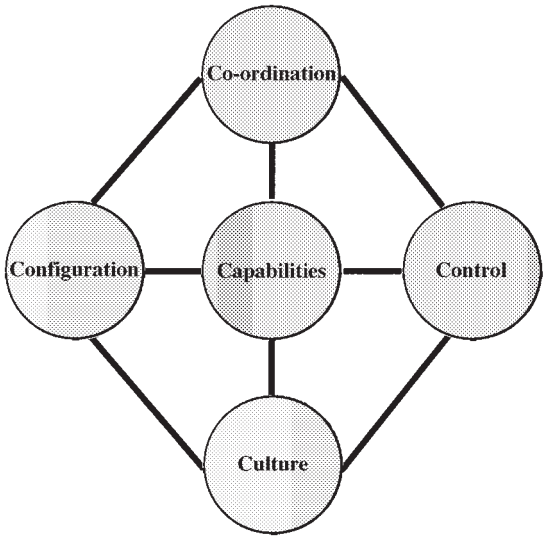

Figure 4 Interdependencies among dimensions in developing the global business model.

that an IT application developed in one national culture for use in another may present its own set of unique problems (Shore & Venkatachalam, 1996).

Global information strategy

Thus far we have been primarily concerned with an organization's global business strategy and how it organises for the implementation of that strategy. We have seen how this strategy is influenced by global business drivers which define the framework within which this strategy is formulated and implemented. The duality of IT is that it not only supports the strategy of a business but can also create strategies through the opportunities which it provides. For example, technologies like the Internet now permit transactions to be conducted in a computer mediated environment which has profound implications for the very nature of business itself (Rayport & Sviokla, 1995) enabling the redesign of business networks or the redefinition of business scope (Venkatraman, 1991). We have also seen that IT can influence global organization design choices, enabling innovative configuration opportunities which are not possible without significant use of information technology.

The concern of the global IS/IT strategy domain is how information, information systems and information technology support the GBM, facilitate the GBD and consequently help in achieving the overall global business strategy of the organization. While the terms information systems (IS) and information technology (IT) are often used interchangeably, this paper uses these two terms precisely (c.f. Earl, 1987, 1989; Checkland & Holwell, 1998; Ward & Griffiths, 1996). Without wishing to enter into a philosophic debate (see, for example, Backhouse *et al*, 1991) information and information systems predate computer, communications and networking technologies (the IT) and have always existed in organizations. Indeed, information is often portrayed as the lifeblood of an organization and, following this analogy, the systems are its veins directing the flow of blood. It is the organization's global business model and global business drivers which give focus to this flow and define the purpose and function of this information in the global enterprise. Borrowing a concept from economics, IS is demand oriented, i.e. it defines the organization's demand for information and systems to support and enable the strategy of the business and for core competency leverage. Anand and Mendelson (1997) present an appealing use of the term IS to refer to the organisation information structure, with the information system implementing its information structure.

On the supply side there is IT, which is concerned with how that demand is to be met. It addresses not just the technologies but also includes corporate data, IT competencies and skills and knowledge to specify, develop and maintain the technology (Earl & Sampler, 1998; Feeny & Willcocks, 1998). The choice of supply side options is increasing with organizations no longer compelled to source all IT resources in-house. Options range from sub-contracting software development to the wholesale outsourcing of all technical requirements. However, even with 'total outsourcing' there are aspects of IT management which should remain in-house (Dutta, 1996; Lacity *et al*, 1996) and which place new responsibilities on the IT organization, such as managing relationships with the outsourcing vendors (Venkatraman & Loh, 1994) and identifying appropriate ways to use the market (Cross, 1995; Lacity *et al*, 1996). Research highlights that many firms outsource their IT without giving sufficient attention to requisite information and systems decisions (Lacity & Hirschheim, 1995; Dutta, 1996; Earl, 1996b).

Yet, even recognising the distinction between IS and IT there must also be a governance structure put in place in order to manage the different aspects of information and system requirements between the centre and the business units and laterally across all the business units. Similarly, the global organization must insure that 'islands of automation' do not sprout up, severely limiting the flow of information and potentially damaging the competitive elements of the global business strategy. While IS provides the context for IT (Checkland & Holwell, 1998), the organization must put in place structures and processes which define responsibilities across all operating units as well as drafting the mechanisms for dealing with disputes.

From this discussion, three components of the global information strategy can be defined. Illustrated in Figure 5, these are

- the global business infostructure model;
- the global IT infrastructure model;
- the global IS/IT suprastructure model.

The global business infostructure model

The definition of the global business model will demand specific information and systems requirements depending on the decision choices made in relation to the global business drivers and the global business strategy. Information systems must be harmonised with the structure of the organization they support (Karimi & Konsynski, 1991; Chismar, 1994; Anand & Mendelson, 1997) and are the mechanism for managing organizational interdependencies (Rockart & Short, 1989).

The global infostructure is business driven defining how information and systems support the organization in its pursuit of competitive strategies. It involves identifying for global and local business processes their associated information and system requirements. Some business processes will be truly global while others will be less so in order to incorporate the requirement for local

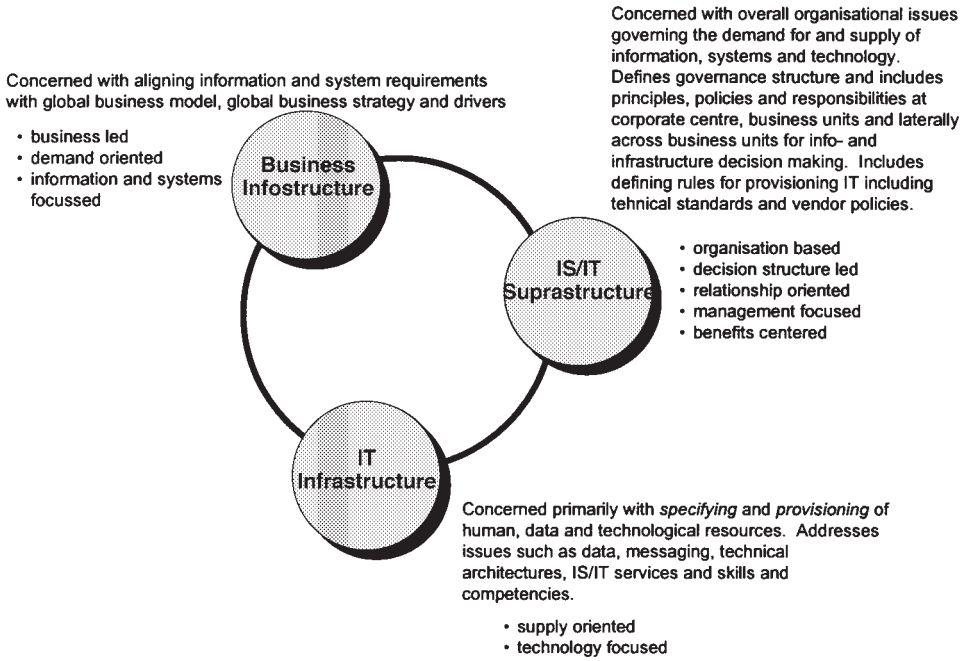

Figure 5 The global information strategy.

flexibility. Traditional IS planning approaches can be useful here in determining the applications to support both current and future business strategies, however sight should not be lost of how resources are organised (Lambert & Peppard, 1993).

The critical aspect of the business infostructure is the business management understanding of how information and information systems support the choices made for the dimensions of the global business model, for example, to support both co-ordination and control decisions or balancing configuration and co-ordination aspects. Reference has already been made to the fact that new information and communication technologies can provide new possibilities for organising global operations and these should also be considered in defining the infostructure model.

The global IT infrastructure model

The global IT infrastructure model is concerned with the technical and human resources necessary to develop, maintain and support the required applications and technologies to enable and support the global infostructure model. Activities addressed by this model include IT development and maintenance, local and wide area networks as well as the provision of IT services such as the help desk and IT training.

From a conceptual perspective, the IT infrastructure provides the shared foundation of IT capability for building business applications (Weill & Broadbent, 1998). Yet, a central problem with IT infrastructure is that it is usually not adequately planned for. The IT organization has generally been "obliged to grow its IT infrastructure clandestinely, by small increments hung on the shirt-tails of particular applications for which a direct benefit can be demonstrated" (Index Foundation, 1993, p 22).

Although the concept of IT infrastructure is not well defined in the literature, the following distinguishing features can be discerned (Brophy & Monger, 1989; Turnbull, 1991; Weill, 1993; Ross *et al*, 1996; Weill & Broadbent, 1998):

- It is shared across either multiple applications, processes, departments or business units, depending on how the organization is structured (the GBM).
- Provides the capability for a range of business opportunities.
- It provides a capability which may not be used.
- In its own right IT infrastructure does not deliver any direct benefits, *per se*. This is one reason why traditional investment appraisal approaches may be inappropriate (Brophy & Monger, 1989; Parker & Benson, 1989; Turnbull, 1991; Powell, 1992; Weill, 1993) and that such investments should include an evaluation of their 'embedded options' (Sharp, 1991).

The additional complexity when considering IT infrastructure, particularly in the global content, is the debate between 'fit' and 'flexibility' (Jarvenpaa & Ives, 1994). The logic of 'fit', which is a cornerstone of strategic alignment (Henderson & Venkatraman, 1993), demands that investments in IT are aligned to business requirements. However, the nature of IT (its legacy aspect coupled with rapidly changing business requirements) means that 'flexibility' is also an imperative. Jarvenpaa and Ives (1994) have examined the 'fit versus flexibility'

debate concluding that flexibility of IT is a necessary requirement for the successful exploitation of IT in a global context. This puts a tremendous strain on the part of IT infrastructure planning as it requires particular foresight in IT strategy formulation.

The concept of IT infrastructure is further blurred by the lack of precision in the usage of the term. A variety of terms can be found in the literature, such as architecture (Brophy & Monger, 1989) and platform (Madnick, 1991), and these are often used interchangeably with their meanings undefined. From the literature, however, key elements of the IT infrastructure can be identified. These are data, transaction messaging, technical architecture, IS/IT services and skills and competencies (Madnick, 1991; Keen, 1993; Weill, 1993; Ross *et al*, 1996; Feeny & Willcocks, 1998).

Data: the basic elements of information; the 'factual raw material which becomes information' (Checkland & Holwell, 1998).
Transaction messaging: the traffic generated by the applications through the processing of data.
Technical architecture: the technical frameworks for operating systems and hardware—ensuring that intercommunication is technically possible.
IS/IT services: the service aspect of the IT organization which includes applications development, applications maintenance, security, help desk and IT training.
Skills and competencies: the requisite skills and competencies required by IS professionals to maintain the infrastructure.

In summary, the IT infrastructure defines the infrastructural requirements to support the global infostructure model. Yet it must also address the need for flexibility to deal with changing business priorities. One of the reasons why organizations often choose outsourcing is the belief that the vendor will provide them with this flexibility; this may not always be the case (Clark *et al*, 1998).

Global IS/IT suprastructure model

The management of 'demand' and 'supply' in the global context is complex. The debate is traditionally portrayed as swinging between centralisation and decentralisation although the 'middle ground' has become an appealing alternative (Buchanan & Linowes, 1980; Von Simson, 1990; George & King, 1991; Hodgkinson, 1996). Von Simson (1990), for example, subscribes to an IT organization design with IS/IT roles played by both a central IT organization and the business units and prescribes a 'centrally decentralised' IT organization with strong dotted line reporting relationships. In a similar vein the federal structure is often seen as capturing the benefits of both centralisation and decentralisation. With such a structure, business units receive a responsive service from decentralised IT functions, whilst at the same time a corporate IT function provides group-wide IT services and exerts some degree of central leadership and control of IT activities (Hodgkinson, 1996). Table 2 summarises the dominant structural types which can be identified from the literature, highlights the advantages of each type for the global enterprise and identifies the critical management issues.

From this stream of literature examining the role, function and position of the IT organization a number of observations can be made. First, business infostructure and IT infrastructure, as defined in this paper, are generally treated in a similar fashion; no distinction is made between different decision types. For example, there is an implicit assumption that if IT infrastructure decisions are centralised then IS planning is similarly centralised. It is feasible for significant aspects of the IT infrastructure to be centralised while IS planning may be predominantly decentralised.

Second, the archetypes identified in Table 2 are based around a premise of control of resources. For example, independent global IT operations is seen as advantageous for individual business units as the available IT resources is under the control of business unit management rather than the corporate centre. While implementing customised designs for business units leads to higher co-ordination costs (Porter, 1985; Ghoshal & Nohria, 1993), a growing body of evidence suggests that global firms with custom managed business units outperform firms which force an 'indiscriminate fit' (Gupta, 1987; Bartlett & Ghoshal, 1990). However, little empirical studies have been undertaken investigating the most appropriate structure for the IT organization and the positioning of decision rights. There has been some recent work on capabilities for the IT organization (Feeny & Willcocks, 1998) and general imperatives for the IT organization (Rockart *et al*, 1996). While insightful, these are framed within a single business unit rather than specifically within the content of a global company.

Third, a further problem with the archetypes identified in Table 2 is that these are structural arrangements, saying nothing about which aspects of the infostructure or infrastructure are managed centrally, which are devolved, and the rules which govern such decisions. Positioning the IT organization and defining its role, at both corporate and business unit level as well as structures, processes and responsibilities, raises a number of questions which make it unique among organizational resources. Managing IS/IT raises certain questions concerning scale, infrastructure planning and risk (Earl *et al*, 1996). It is likely that there are distinct advantages to be gained through standardisation (Butler Cox, 1991). Therefore, it seems logical to suggest that there are aspects of infostructure and infrastructure management which should be managed centrally and others which individual business units are permitted to have more

Table 2 Summary of global IS/IT structural arrangements

Structural arrangements for the IT organization	*Strategies for managing global IS/IT*	*Advantages*	*Critical management issues*
Independent global IS/IT operations	Subsidiaries pursue independent system initiatives	Business units have ownership Users control IS/IT priorities Responsive to BU's needs	Integration Variable standards of IS/IT competence 'Reinvention of wheels' and duplication of effort Little synergy and integration Cost
Headquarters-driven global IS/IT	Corporate-wide IS/IT solutions imposed on subsidiaries	Scale economies Control of standards Critical mass of skill	Politics Unresponsive Does not meet every business unit's needs Effect on customer
Informal co-operation in global IS/IT	Informal social networking between the head office and foreign subsidiaries Usually brought about by movement of key IS/IT personnel	Awareness of IS/IT issues in the global enterprise	Co-ordination and direction setting Leaving too much to chance
'Federalism' (integrated global IS/IT)	Balancing central control and local autonomy without losing the advantage of world-wide co-ordination and integration	Group-wide IS/IT strategy and architecture with devolution where appropriate	Complexity Execution Timing Defining 'where appropriate'

discretion over (Cross *et al*, 1997; Brown & Magill, 1998). For example, telecommunications and other infrastructure which are shared across the global company may require centralised control, given global co-ordination requirements, while IT help desk support may be more effective if localised. Even with the latter decision the issue of scale economies must be factored into any choice.

The challenge is to determine the appropriate balance between responsibilities and activities that can be devolved and those which should be retained centrally. Consequently, applying the principles of federalism means that there must be a mechanism for deciding how to divide the activities and responsibilities between the centre and the business units, for devising rules setting the parameters for both info- and infrastructure decisions, and for the satisfactory resolution of any conflicts which may emerge.

Developing this requirement, the suprastructure recognises the need to treat the management of the corporate business infostructure and the IT infrastructure differently. It is conceivable for the IT infrastructure to be centralised but for much of the decisions concerning the infostructure to be devolved to the business units. The infostructure defines the support that information and information systems will provide to the business. While it is generally recommended that IS planning be conducted at business unit level (Earl, 1989; Ward & Griffiths, 1996), it is probably more appropriate to have some aspects of the IS strategy defined centrally in a multiple business unit organization (Butler Cox, 1991).

As the IT infrastructure is concerned with defining systems and services to meet current and future infostructure requirements, decision rights may need to be more centralised (Butler Cox, 1991, p 23) and responsibility assigned at a higher level in the corporation (Earl, 1989). It has been recommended to position IT strategy at the level at which business plans are co-ordinated (Butler Cox, 1991). Two aspects of the IT infrastructure should be distinguished: specifying and provision. Specifying is concerned with the development of the IT infrastructure strategy; literally, the technologies and resources which will be used to support and provide the infostructure. It is a decision with long-term implications, and probably revisited once a year or when major strategic changes take place. The provisioning of IT is ongoing and represents the actual operationalisation of the strategy.

While Earl and Sampler (1998) have used the term 'market management' to refer to the management of both supply and demand, the conceptualisation of suprastructure is much broader. Suprastructure encapsulates defining the framework for operating and decision-making within the global company; in short defining governance. It defines reporting relationships, budgeting process, cost recovery mechanisms, defines the IS planning process,

identifies who is involved, defines a benefits management process for delivering benefits from IT, and signals how relationships are managed. It determines local and global responsibilities and the relationship between headquarters and business units and between the business unit themselves. It also addresses how IS requirements are prioritised, defines approaches to investment appraisal, determines appropriate project management methodologies, specifies policies regarding hardware and software, and allocates roles and responsibilities.

For example, in addressing the IT infrastructure dimensions, the following aspects will be considered:

Data management: the extent to which data supplied by applications can be used by corporate-wide applications and across the extended enterprise.
Transaction messaging: the extent to which that traffic generated by the applications can be handled correctly by the rest of the global computing systems.
Technical architecture: specifying the technical frameworks for operating systems and hardware—to ensure that applications built in one location can be successfully reused in other places without the need for major changes to the technical infrastructure and that intercommunication is technically possible.
IS/IT services: defining those services which are best provided on a global scale and those more appropriate to provide locally.
Skills and competencies: the requisite skills and competencies which will be required by IS professionals to maintain the infrastructure.

Figure 6 presents a schematic illustration of the IS/IT suprastructure. It requires determining the principles, policies and responsibilities for both the infostructure and infrastructure at the corporate, business unit, and laterally across business units.

Principles are 'simple, direct statements of an organization's basic beliefs about how the company wants to use IS/IT in the long term' (Davenport *et al*, 1989). These are akin to the concept of 'IT Maxim' as espoused by Weill & Broadbent (1998). Policies are rules or laws specifying what 'not to do' as well as 'enablers' (Earl *et al*, 1996; Weill & Broadbent, 1998) which provide the paramenters for operating within.

Defining responsibilities requires delineating where responsibility for decision-making lies within the global enterprise. It entails defining the aspects of infostructure and infrastructure which the centre and business units have authority over.

Global information management does not take place in a static environment but within a world which is constantly changing both in business and technology terms. Not only has this consequences for both the business infostructure and the IT infrastructure but also for the design of the suprastructure. For example, new technologies and new technological standards emerge and these will be evaluated for the applicability to the organization. Business strategies change requiring changes in the global business model. The economics of production might shift requiring a new configuration of business activities. All this suggests that it will be necessary to have an organizational body which will oversee changes and additions to the suprastructure as well as addressing any disputes which may emerge: a meta decision-making forum. The evidence suggests that this will be a central function with a group composed of both senior business and IT staff from the centre and business units (Butler Cox, 1991; Starre & de Jong, 1998). With input for business and IT as to the most appropriate actions to take, suprastructure decisions are made within this forum.

Concluding remarks

The purpose of this paper has been to develop an organising framework for information management in the global enterprise. Drawing on a diverse and comprehensive literature base, the conceptual framework presented in the paper extends the traditional prescription of aligning the information management strategy with business strategy suggesting that, particularly in the global context, both the drivers of the globalisation process as well as how the business organises itself in the international arena exert a major influence.

The framework recognises the central role which

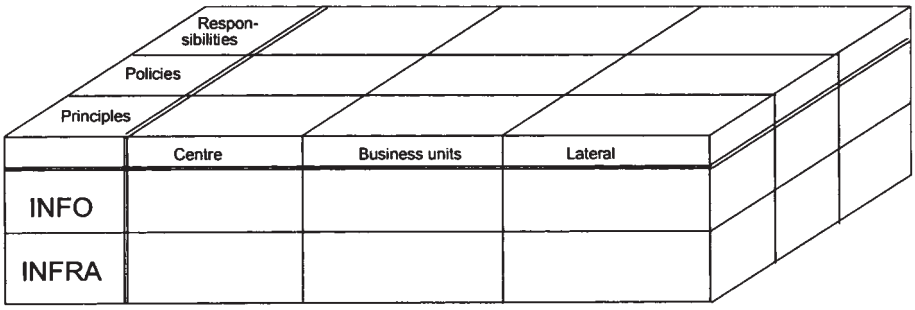

Figure 6 Schematic illustration of the IS/IT suprastructure.

IS/IT can play in global operations. IS/IT can both support and enable new strategies, new structures and offer new trade-off possibilities. At the same time, IT provides opportunities in organising for global operations enabling new configuration and control strategies and provides novel ways to leverage capabilities. The global business drivers are themselves strongly influenced by developments in technology, affecting the globalisation process itself.

The interdependent nature of the four domains suggests that changes to any one dimension will probably require corresponding changes in the others. For example, a new global strategy may require a novel organizational model; increasing the requirement for local responsiveness is likely to place a high coordination overhead on the organization. However, this framework is not an alignment mechanism but further development could potentially lead to such an outcome. Such a mechanism would enable an assessment to be made of the fit between each of the four domains of the framework. While each of the four domains may be examined in isolation they do not function is isolation.

The global information strategy is portrayed as having three interdependent components: the business infostructure model, the IT infrastructure model and the suprastructure. It is perhaps issues surrounding the suprastructure which are least addressed in the research literature. Guidance in the design of the global IT organization, defining specific decision-making responsibilities and establishing parameters for both infostructure and infrastructure decisions is an area requiring more research. This paper has suggested a concept centred around defining principles, policies and responsibilities for both infostructure and infrastructure decisions at both the centre and business units and laterally across the organization.

One research question which would greatly improve our understanding of the global information strategy domain is the extent to which host organization characteristics influence IT organizational arrangements. How do elements of the global business model influence the global information strategy? Do particular configurations or patterns of control for the GBM have a dominant global information strategy? Addressing these questions would be useful in regard to establishing best practice.

Much of the research in global information management is based on the assumption of a homogeneous global IT base. This is unlikely to be the case. It is more probable that there will be different stages of IS/IT maturity in business units, markets, customers, and among business partners. What are the implications of this? Trade-offs are likely to be required but what governs the making of these decisions? What guidance can be provided to organizations in such situations?

A related issue which is not adequately addressed in the research literature is dealing with the management of information after mergers and acquisitions. There is the problem of how best to assimilate the newly acquired or merged organization with a different business infostructure and IT infrastructure. What strategies are possible and under what circumstances is one selected?

This paper does not attempt to present a blueprint for formulating a global information strategy. What it has done is present the elements which are important to consider in developing this strategy. It does highlight that the global information strategy cannot be developed outside of an understanding of the other domains. More frameworks and models are needed in order to help in addressing questions relating to these elements.

IT directors/CIOs in global companies face a complex set of issues to deal with in regard to the management of their function. In this paper an attempt has been made to provide an organising framework which imposes some structure to the issues which require consideration. Yet, as the paper has highlighted, considerable research is urgently needed if IS/IT is to contribute to corporate success. By presenting an organization framework it is hoped that we have taken a step forward in this direction.

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References

Alder NJ (1986) *International Dimensions of Organisational Behaviour*. Kent Publishing, Boston, MA.

Amdahl, (1991) *Globalisation: The IT Challenge*. Amdahl Executive Institute, Hampshire.

Amit R and Schoemaker PJ (1993) Strategic assets and organisational rent. *Strategic Management Journal* **14(1)**, 33–46.

Anand KS and Mendelson H (1997) Information and organisation for horizontal multimarket coordination. *Management Science* **43(12)**, 1609–1627.

Andreu R, Ricart JE and Valor J (1994) Information systems planning at the corporate level. In *Strategic Information Systems: A European Perspective* (Ciborra C and Jelassi T, Eds), pp 25–52, John Wiley & Sons Ltd, Chichester.

Backhouse J, Liebeneau J and Land F (1991) On the discipline of information systems. *Journal of Information Systems* **1**, 19–27.

Bartlett CA (1983) MNCs: get off the reorganisation merry-go-round. *Harvard Business Review* March-April, 138–147.

Bartlett C and Ghoshal S (1987) Managing across borders: new organizational responses. *Sloan Management Review*, Fall, 43–53.

Bartlett CA and Ghoshal S (1989) *Managing Across Borders: The Transnational Solution*. Harvard Business School Press, Cambridge, MA.

Bartlett CA and Ghoshal S (1990) Matrix management: not a structure, a frame of mind. *Harvard Business Review* July-August, 138–145.

Bechler KA and Marchand DA (1994) *Digital Equipment Corporation International (Europe): Fitting Information Technology Architecture to Competitive Restructuring – Going Local and Global*. Case Study POM 167, International Institute for Management Development, Lausanne, Switzerland.

Bensaou BM and Venkatraman N (1996) Not by partnership alone: managing a portfolio of relationships. *INSEAD R&D Working Paper*, No. 96/30/TM, Paris, France.

Benson JK (1975) The interorganisational network as a political economy. *Administrative Science Quarterly* **20**, 229–249.

Boudreau M-C, Loch K, Robey D and Straub D (1998) Going global: using information technology to advance competitiveness of the virtual transnational organisation organisation. *Academy of Management Executive* **12(4)**, 120–128.

Boynton C, Victor B and Pine BJ III (1993) New competitive strategies: challenges to organisations and information technology. *IBM Systems Journal* **32(1)**, 40–64.

Bradley F (1991) *International Marketing Strategy*. Prentice Hall, Hemel Hempstead.

Bradley SP (1994) The role of IT networking in sustaining competitive advantage. In *Globalisation, Technology and Competition: The Fusion of Computers and Telecommunications* (Bradley SP, Hausman JA and Nolan RL, Eds), pp 113–142, Harvard Business School Press, Boston, Massachusetts.

Broadbent M and Weill P (1993) Improving business and information strategy alignment: learning from the banking industry. *IBM Systems Journal* **32(1)**, 162–179.

Brophy JT and Monger RF (1989) Competitive capacity from an integrated IS infrastructure. *Information Strategy: The Executive's Journal* Winter, 26–33.

Brown CV and Magill SL (1998) Reconceptualizing the context-design issue for the information systems function. *Organisation Science* **(9)2**, 176–194.

Buchanan JR and Linowes RG (1980) Making distributed data processing work. *Harvard Business Review*, September-October, 143–161.

Buss DJ (1982) Managing international information systems. *Harvard Business Review* September-October, 153–162.

Butler Cox Foundation (1991) *Managing the Devolution of Systems Responsibilities*. Research Report 81, Butler Cox Foundation, London.

Checkland P and Holwell S (1998) *Information, Systems and Information Systems: Making Sense of the Field*. John Wiley & Sons, Chichester.

Chismar WG (1994) Information technology and the coordination of global organisations. In *Global Information Systems and Technology: Focus on the Organisation and its Functional Areas* (Deans PC and Karwan KR, Eds), pp 479–492, Idea Group Publishing, Harrisburg, PA.

Christopher M and Braithwaite A (1991) Managing the global pipeline. *The International Journal of Logistics Management* **2(2)**, 55–62.

Clark T, Zmud R and McCray G (1998) The outsourcing of information services: transforming the nature of business in the information industry. In *Strategic Sourcing of Information Systems* (Willcocks LP and Lacity MC, Eds), pp 45–78, John Wiley & Sons Ltd, Chichester.

Clemons EK and Row MC (1991) Information technology at Rosenbluth Travel: competitive advantage in a rapidly growing global service corporation. *Journal of Management Information Systems* **8(2)**, 53–59.

Collis DJ and Montgomery CA (1995) Competing on resources: strategy in the 1990s. *Harvard Business Review* July-August, 118–128.

Coyne KP and Dye R (1998) The competitive dynamics of network-based businesses. *Harvard Business Review* January-February, 99–109.

Cross J (1995) IT outsourcing: British Petroleum's Competitive Approach. *Harvard Business Review* May-June, 94–102.

Cross J, Earl MJ and Sampler JL (1997) Transforming the IT function at British Petroleum. *MIS Quarterly* December, 401–423.

Daniels JD, Pitts RA and Tretter MJ (1985) Organising for dual strategies of product diversity and international expansion. *Strategic Management Journal*, **6**, 223–37.

Daniels JD, Pitts RA and Tretter MJ (1984) Strategy and structure of US multinationals: an exploratory study. *Academy of Management Journal* **27**, 292–307.

Davenport TH (1998) Putting the enterprise into enterprise systems. *Harvard Business Review* July-August, 121–131.

Davenport TH, Hammer M and Metsisto TJ (1989) How executives can shape their company's information systems. *Harvard Business Review* March–April, 130–134.

Deans CP and Kane D (1991) *International Dimensions of Information Systems and Technology*. PWS Kent, Boston, MA.

Deans CP and Ricks DA (1991) MIS research: a model for incorporating the international dimension. *The Journal of High Technology Management Research* **2(1)**, 57–81.

Deans CP and Ricks DA (1993) An agenda for action for research linking information systems and international business theory. *Journal of Global Information Management* **1(1)**, 6–19.

Deans PC and Karwan KR (1994) Exploring the globalization of the organisation: new realities for information systems design, information technology applications, and strategy. In *Global Information Systems and Technology: Focus on the Organisation and its Functional Areas* (Deans PC and Karwan KR, Eds), pp 16–30, Idea Group Publishing, Harrisburg, PA.

De Meyer, Van Dierdonck R and Vereecke A (1996) Global plant networks in European multinational. *INSEAD R&D Working Paper*, No. 96/22/TM, Paris, France.

Dierickx I and Cool K (1989) Asset stock accumulation and sustainability of competitive advantage. *Management Science* **35(12)**, 1504–1514.

Doz Y (1986) Government policies and global industries. In *Competition in Global Industries* (Porter ME, Ed), Harvard Business School Press, Boston.

Doz Y and Prahalad CK (1981) Headquarters influence and strategic control in MNCs. *Sloan Management Review* Fall, 15–29.

Doz Y and Prahalad CK (1984) Patterns of strategic control within multinational corporations. *Journal of International Business Studies* **15**, 55–72.

Dutta S (1996) Linking IT and business strategy: the role and responsibility of senior management. *European Management Journal* **14(3)**, 255–268.

Dyment JJ (1987) Strategies of management controls for global corporations. *The Journal of Business Strategy* **7(4)**, 20–26.

Earl MJ (1987) Information systems strategy formulation. In *Critical Issues in Information Systems Research* (Boland RJ and Hirechheim RA, Eds), John Wiley, Chichester.

Earl MJ (1989) *Management Strategies for Information Technology*. Prentice-Hall, New York.

Earl MJ (1996a) Integrating IS and the organisation: a framework of organisational fit. In *Information Management: The Organizational Dimension* (MJ Earl, Ed), pp 485–502, Oxford University Press, Oxford.

Earl MJ (1996b) The risks of outsourcing IT. *Sloan Management Review* Spring, 26–32.

Earl MJ and Sampler JL (1998) Market management to transform the IT organisation. *Sloan Management Review* Summer, 9–17.

Earl MJ, Edwards B and Feeny DF (1996) Configuring the IS function in complex organisations. In *Information Management: The Organizational Dimension* (Earl MJ, Ed), pp 201–230, Oxford University Press, Oxford.

Earl MJ and Feeny DF (1996) Information systems in global business: evidence from European multinationals. In *Strategic Renaissance and Business Transformation* (Thomas H, O'Neal D and Kelly J, Eds), pp 183–210, John Wiley & Sons, Chichester.

Eccles RG and Nolan RL (1994) A framework for the design of the emerging global organisational structure. In *Globalisation, Technology and Competition: The Fusion of Computers and Telecommunications* (Bradley SP, Hausman JA and Nolan RL, Eds), pp 57–80, Harvard Business School Press, Boston, Massachusetts.

Edstrom A and Galbraith JK (1977) Transfer of managers as a coordination and control strategy in multinational organisations. *Administrative Science Quarterly* **22**, 248–263.

Egelhoff WG (1982) Strategy and structure in multinational corporations: an information processing approach. *Administrative Science Quarterly* **27**, 435–458.

Egelhoff WG (1984) Patterns of control in US, UK and European multinational corporations. *Journal of International Business Studies* **15(2)**, 73–81.

Egelhoff WG (1988) Strategy and structure in multinational corporations: a revision of the Stopford and Wells model. *Strategic Management Journal* **9**, 1–14.

Egelhoff WG (1991) Information processing theory and the multinational enterprise. *Journal of International Business Studies* 3rd Quarter, 341–368.

Eisenhardt KM (1985) Control: organisational and economic approaches. *Management Science* **31**, 134–149.

Emery JC (1990) Editors comments: MIS and global organisations. *MIS Quarterly* March, iii-iv.

Evans PB and Wurster TS (1997) Strategy and the new economics of information. *Harvard Business Review* September-October, 71–82.

Feeny DF and Willcocks L (1998) Redesigning the IS function around core capabilities. *Long Range Planning* **31(3)**, 354–367.

Ghoshal S (1987) Global strategy: an organising framework. *Strategic Management Journal* **8**, 425–440.

George J and King J (1991) Examining the computing and centralization debate. *Communications of the ACM* **34(7)**, 63–72.

Ghoshal S and Noria N (1993) Horses for courses: organisational forms for multinational companies. *Sloan Management Review*, Winter, 23–35.

Gomes-Cassares B (1989) Joint ventures in the face of global competition. *Sloan Management Review* Spring, 17–26.

Gould M and Campbell A (1986) *Strategies and Style: The Role of the Centre in Managing Diversified Corporations*. Blackwell, Oxford.

Grant RM (1991) The resource-based theory of competitive advantage: implications for strategy formulation. *California Management Review* **33(3)**, 114–135.

Gupta AK (1987) SBU strategies, corporate-SBU relations, and SBU effectiveness in strategy implementation. *Academy of Management Journal* **30**, 477–500.

Gupta AK and Govindarajan V (1984) Business unit strategy, managerial characteristics, and business unit effectiveness at strategy implementation. *Academy of Management Journal* **27(1)**, 25–41.

Gurbaxani V and Whang SJ (1991) The impact of information systems on organizations and markets. *Communications of the ACM* **34(1)**, 59–73.

Hailey J (1994) Localising the multinationals: limitations and problems. In *The Challenge of International Business* (Segal-Horn S, Ed), pp 110–126, Kogan Page, London.

Hamel G (1996) Strategy as revolution. *Harvard Business Review* July-August, 69–82.

Henderson JC (1990) Plugging into strategic partnerships: the critical IS connection. *Sloan Management Review* **31(3)**, 7–18.

Henderson JC and Venkatraman N (1993) Strategic alignment: leveraging information technology for transforming organisations. *IBM Systems Journal* **32(1)**, 4–16.

Hodgkinson SL (1996) The role of the corporate IT function in the federal IT organisation. In *Information Management: The Organisational Dimension* (Earl MJ, Ed), pp 247–269, Oxford University Press, New York.

Hofstede G (1984) *Culture's Consequences: International Differences in Work-Related Values*. Sage Publications, Beverly Hills, California.

Hoskisson RE, Hill CWL and Kim H (1993) The multidivisional structure: organisational fossil or source of value. *Journal of Management* **19**, 269–298.

Huycke CB and Oliff MD (1993) *Digital Equipment Corporation International (Europe) (B): Going Local and Global with Information Technology Restructuring*. Case Study POM 159, International Institute For Management Development, Lausanne, Switzerland.

Index Foundation (1993) *Building the New Information Infrastructure*. Index Foundation Final Report 91, CSC Index, London.

Ives B and Jarvenpaa SL (1991a) Applications of global information technology: key issues for management. *MIS Quarterly* March, 33–49.

Ives B and Jarvenpaa SL (1991b) Global information technology: some lessons from practice. *International Information Systems* **1(3)**, 1–15.

Ives B and Jarvenpaa SL (1994) MSAS Cargo International: global freight management. In *Strategic Information Systems: A European Perspective* (Jelassi T and Ciborra C, Eds), pp 221–236, John Wiley & Sons, Chichester.

Ives B, Jarvenpaa SL and Mason RO (1993) Global business drivers: aligning information technology to global business strategy. *IBM Systems Journal* **32(1)**, 143–161.

Jaeger AM (1983) The transfer of organisation culture overseas: an approach to control the multinational corporation. *Journal of International Business Studies* **14**, 91–114.

Jaikumar R and Upton DM (1994) The coordination of global manufacturing. In *Globalisation, Technology and Competition: The Fusion of Computers and Telecommunications* (Bradley SP, Hausman JA and Nolan RL, Eds), pp 169–183, Harvard Business School Press, Boston, Massachusetts.

Janssens M and Brett JM (1994) Coordinating global companies: the effects of electronic communication, organisational commitment, and a multi-cultural managerial workforce. In *Trends in Organisational Behavior* (Cooper CL and Rousseau DM, Eds), pp 31–46, John Wiley & Sons Ltd, New York.

Jarillo JC (1988) On strategic networks. *Strategic Management Journal* **9**, 31–41.

Jarvenpaa SL and Ives B (1994) Organisational fit and flexibility IT design principles for a globally competing firm. In *Research in Strategic Management of Information Technology*, Volume 1 (Venkatraman N and Henderson JC, Eds), pp 1–39, JAI Press.

Jelassi T and Dutta S (1993) Integrating global commercial operations with information technology at BP Chemicals. *Journal of Strategic Information Systems* **2(1)**, 77–95.

Karimi J and Konsynski BR (1991) Globalisation and information management strategies. *Journal of Management Information Systems* **7(4)**, 7–26.

Keen PGW (1992) Planning globally: practical strategies for information technology in the transnational firm. In *The Global Issues of Information Technology Management* (Palvia S, Palvia P and Zigli RM, Eds), pp 575–607, Idea Group Publishing, Harrisburg, PA.

Keen PGW (1993) Information technology and the management difference: a fusion map. *IBM Systems Journal* **32(1)**, 17–39.

King T (1998) Minimum rate misery. *The European* 13–19 July, 7.

Kogut B (1985) Designing global strategies: comparative and competitive advantage value-added chains. *Sloan Management Review* **8(1)**, 15–28.

Kogut B (1988) Joint ventures: theoretical and empirical prospects. *Strategic Management Journal* **9**, 319–332.

Kogut B (1991) Country capabilities and the permeability of borders. *Strategic Management Journal* **12**, 33–47.

Konsynski BR and McFarlan FW (1990) Information partnerships – shared data, shared scale. *Harvard Business Review* September-October, 114–120.

Lacity MC and Hirschheim R (1995) *Beyond the Information Systems Outsourcing Bandwagon*. John Wiley & Sons, Chichester.

Lacity MC, Willcocks LP and Feeny DF (1996) The value of selective IT sourcing. *Sloan Management Review* Spring, 13–25.

Lambert R and Peppard J (1993) IT and new organisational forms: destination but no road map. *Journal of Strategic Information Systems* **2(3)**, 180–205.

Lawrence P and Lorsch JW (1967) *Organisation and Environment: Managing Differentiation and Integration*. Division of Research, Graduate School of Business Administration, Harvard University.

Lee S and Leifer RP (1992) A framework for linking the structure of information systems with organisation requirements for information sharing. *Journal of Management Information Systems* **8(4)**, 27–44.

Lorange P, Roos J and Simcic Bronn P (1992) Building successful strategic alliances. *Long Range Planning* December, 10–17.

Madnick S (1991) The information technology platform. In *The Corporation of the 1990s: Information Technology and Organizational Transformation* (Scott Morton MS, Ed), pp 27–60, Oxford University Press, New York.

Malone TW and Crowston KG (1994) The interdisciplinary study of coordination. *ACM Computing Surveys* **26(1)**, 87–119.

Malone TW and Rockart JF (1994) How will information technology reshape organisations? Computers as coordination technology. In *Globalisation, Technology and Competition: The Fusion of Computers and Telecommunications* (Bradley SP, Hausman JA and Nolan RL, Eds), pp 37–56, Harvard Business School Press, Boston, Massachusetts.

Malone TW, Yates J and Benjamin RI (1987) Electronic markets

and electronic hierarchies. *Communications of the ACM* **30(6)**, 484–497.

McFarlan FW (1992) Multinational CIO challenges for the 1990s. In *The Global Issues of Information Technology Management* (Palvia S, Palvia P and Zigli RM, Eds), Idea Group Publishing, Harrisburg, PA.

McFarlan FW and McKenny JL (1983) The information archipelago – governing the new world. *Harvard Business Review*, July-August, 91–99.

Meijboom B and Vos B (1997) International manufacturing and location decisions: balancing configuring and co-ordination aspects. *International Journal of Operations & Production Management* **17(8)**, 790–805.

Myers A *et al* (1995) Top management styles in Europe: implications for business and cross national teams. *European Business Journal* **7(1)**, 17–27.

Negroponte N (1995) *Being Digital*. Alfred A. Knopf, New York.

Neumann-Alkier L (1997) Thinking globally, act locally – does it follow the rule in multinational corporations? In *Proceedings of the 5th European Conference on Information Systems* (Galliers RD, *et al*, Eds), pp 541–552, Cork, Ireland.

Nielsen R (1988) Cooperative strategy. *Strategic Management Journal* **9**, 475–492.

Nohria N and Ghoshal S (1997) *The Differentiated Network: Organizing Multinational Corporations for Value Creation*. Jossey-Bass Publishers, San Francisco.

Norman P (1996) German companies blame Internet for export decline. *Financial Times* 27 March, 1.

Normann R and Ramirez R (1993) From value chain to value constellation: designing interactive strategy. *Harvard Business Review* July-August, 65–72.

Ouchi W (1980) Markets, bureaucracies and clans. *Administrative Science Quarterly* **25**, 129–141.

Palvia P (1998) Global information technology: past, present and future. *Journal of Global Information Technology Management* **1(2)**.

Parker MM and Benson RJ (1989) Enterprisewide information economics: latest concepts. *Journal of Information Systems Management* **6(4)**, 7–13.

Pfeffer J and Salancik G (1978) *The External Control of Organizations: A Resource Dependency Perspective*. Harper & Row, New York.

Porter ME (1980) *Competitive Strategy: Techniques for Analysing Industries and Competitors*. Free Press, New York.

Porter ME (1985) *Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press, New York.

Porter ME (1986a) Competition in global industries: A conceptual framework. In *Competition in Global Industries* (ME Porter, Ed), pp 15–60, Harvard Business School Press, Boston.

Porter ME (1986b) Patterns of international competition. *California Management Review* **28(2)**, 9–40.

Porter ME (1996) What is strategy? *Harvard Business Review* November-December, 61–78.

Powell P (1992) Information technology evaluation: is it different? *Journal of Operational Research Society* **43(1)**, 29–42.

Prahala CK, Doz Y and Hamel G (1990) The core competence of the corporation. *Harvard Business Review* May-June, 79–91.

Pyburn PJ (1983) Linking the MIS plan with corporate strategy: an exploratory study. *MIS Quarterly* June, 1–14.

Quelch JA and Klein LR (1996) The Internet and international marketing. *Sloan Management Review* Spring, 60–75.

Ramarapu NK and Lado AA (1995) Linking information technology to global business strategy to gain competitive advantage: an integrative model. *Journal of Information Technology* **10**, 115–124.

Raman KS and Watson RT (1994) National culture, information systems, and organisational implications. In *Global Information Systems and Technology: Focus on the Organisation and its Functional Areas* (Deans PC and KR Karwan, Eds), pp 493–513, Idea Group Publishing, Harrisburg, PA.

Rayport JF and Sviokla JJ (1994) Managing in the marketspace. *Harvard Business Review* November-December, 141–150.

Rayport JF and Sviokla JJ (1995) Exploiting the virtual value chain. *Harvard Business Review* November-December, 75–85.

Roche E (1996) Multinational corporations—the emerging research agenda. *Journal of Strategic Information Systems* **5**, 129–147.

Rockart J, Earl MJ and Ross JW (1996) Eight imperatives for the new IT organisation. *Sloan Management Review*, Fall, 43–55.

Rockart JF and Short JE (1989) IT in the 1990s: managing organisational interdependencies. *Sloan Management Review* **30(2)**, 7–17.

Ross JW (1995) Johnson & Johnson: building an infrastructure to support global operations. *Working Paper No. 283*, Massachusetts Institute of Technology, September.

Ross JW, Beath CM and Goodhue D (1996) Develop long-term competitiveness through IT assets. *Sloan Management Review* Fall, 31–42.

Rotii K, Schweiger DM and Morrison AJ (1991) Global strategy implementation at the business unit level: operational capabilities and administrative mechanisms. *Journal of International Business Studies* **22(3)**, 369–402.

Rugman AM (1981) *Inside the Multinationals: The Economics of Internal Markets*. Columbia University Press, New York.

Rugman AM and Hodgetts RM (1995) *International Business: A Strategic Management Approach*. McGraw-Hill, New York.

Rumelt RP (1991) How much does industry matter? *Strategic Management Journal* **12(3)**, 167–185.

Sampler J (1998) Redefining industry structure for the information age. *Strategic Management Journal* **19**, 343–355.

Sharp DJ (1991) Uncovering the hidden value in high-risks investments. *Sloan Management Review* Summer, 69–74.

Shore B and Venkatachalam AR (1996) Role of national culture in the transfer of information technology. *Journal of Strategic Information Systems* **5**, 1935.

Spender JC (1993) Competitive advantage from tacit knowledge: unpacking the concept and its strategic implications. *Best Paper Proceedings 1993*, Academy of Management, pp 37–41.

Stabell CC and Fjeldstad OD (1998) Configuring value for competitive advantage: on chains, shops, and networks. *Strategic Management Journal* **19**, 413–437.

Starre D and de Jong B (1998) IT governance and management. *Research Memorandum* Nolan Norton Institute, June.

Stopford JM and Wells LT Jr. (1972) *Managing the Multinational Enterprise*. Longmans, London.

Szulanski G (1996) Exploring internal stickiness: impediments to the transfer of best practice. *Strategic Management Journal* **17** (Winter Special Issue), 27–43.

Tapscott D (1996) *The Digital Economy*. McGraw-Hill, New York.

Tractinsky N and Jarvenpaa SL (1995) Information systems design decisions in a global versus domestic context. *MIS Quarterly* December, 507–529.

Tricker RI (1998) Information resource management—a cross cultural perspective. *Information & Management* **15**, 37–46.

Turnbull PD (1991) Effective investment in information infrastructures. *Information and Software Technology* **33(3)**, 191–199.

Turner I and Henry I (1994) Managing international organisations: lessons from the field. *European Management Journal* **12(4)**, 417–431.

Venkatraman N (1991) IT-induced business reconfiguration. In *The Corporation of the 1990s: Information Technology and Organisational Transformation* (Scott Morton MS, Ed), pp 122–158, Oxford University Press, New York.

Venkatraman N and Loh L (1994) The shifting logic of the IS organisation: from technical portfolio to relationship. *Information Strategy: The Executive's Journal* Winter, 5–11.

Von Simson EM (1990) The centrally decentralised IS organisation. *Harvard Business Review* July-August, 158–162.

Von Krogh G, Roos J and Yip G (1996) Epistemology of Globalizing Firms, in *Managing Knowledge: Perspectives on Cooperation and Competition* (Von Krogh G and Roos J, Eds), pp 203–217, Sage, London.

Ward J and Griffiths P (1996) *Strategic Planning for Information Systems*. 2nd Edition, John Wiley & Sons, Chichester.

Weill P (1993) The role and value of IT infrastructure—some empirical observations. In *Strategic Information Technology Management: Perspectives on Organisational Growth and Competitive Advantage* (Banker R, Kaufmann, R and Mahmood MA, Eds), pp 547–572, Idea Group Publishing, Middleton, Pennsylvania.

Weill P and Broadbent M (1991) *Leveraging the New Infrastructure: How Market Leaders Capitalization on Information Technology*. Harvard Business School Press, Boston, Massachusetts.

Whittington R (1993) *What is Strategy and Does it Matter?* Routledge, London.
Williamson O (1985) *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*. Free Press, New York.
Yip G (1995) *Total Global Strategy: Managing For Worldwide Competitive Advantage*. Prentice Hall International, New Jersey.

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