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EMERGENT FORMS OF IT GOVERNANCE TO SUPPORT GLOBAL E-BUSINESS MODELS

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ABSTRACT

A critical aspect of global e-business information technology (IT) governance is ensuring that it is integrated and that it generates economic viability of a company. Poorly thought through purposes will result in poor IT governance, the aim is to improve IT governance and business efficiency and effectiveness. A normative framework for global e-business IT governance is developed in this paper drawing on research evidence from information systems development and organization study. It proposes fundamental re-directions in global e-business IT governance thinking and it applies to companies that seek to integrate Internet, Intranet and Web technologies into their business activities in some form of an e-business model. Such integration is termed the fusion of IT and business to develop an e-business. The framework explains and elaborates e-business strategies for coping with emergent organizations and planned aspects of IT. The basic premise of the proposed framework is that organization, especially virtual organization, is both planned and emergent, diverging from the dominant premise of central control in IT governance.

INTRODUCTION

In essence, information technology (IT) governance addresses how to design and implement effective organizations by creating flexible IT and information systems (IS) structures and processes. IT governance in a global e-business context has to cater for intensive competition, cultural diversity, and various fluctuating economic conditions. A static model of IT governance (see Eickelmann, 2000) and organization cannot adequately address these issues. There is evidence from researchers in IS development (for example Baskerville et al., 1992) and organization design (Mintzberg, 1979) that reveals the emergent nature of both. How global e-business IT governance can be

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conducted is addressed in this paper on the basis of this body of evidence.

IT Governance is "the organizational capacity to control the formulation and implementation of IT strategy and guide to proper direction for the purpose of achieving competitive advantage for the corporation." (Van Grembergen and Saull, 2000). The prime aim of IT governance is to contribute to business activity in terms of lower costs, satisfied customers and better quality products or service provided by a company. Governance assumes accountability, making improving the channels of accountability an important feature of IT governance, especially accounting for return on investment. Many problems need to be addressed by the IT function: weak planning, rapid business and environmental change, and management involvement are some. The emergent process of IT governance reveals that managers need to understand that they are neither all-powerful nor powerless to effect change. Rather, they are in partial control of emerging processes that result in new organizational designs. They need to consider the importance of global business management, cultural diversity, ethics and advanced production and information technologies, as the boundaries between the Internet and customer strategy continue to merge. This paper presents some fundamental re-directions in e-business IT governance strategy thinking and proposes a framework for global e-business IT governance and organizational design as both a planned and an emergent process.

There is a difference between IT governance and global e-business governance. The focus of IT governance is to seek efficient and effective ways of using IT in business. It seeks optimal solutions. Global e-business governance is concerned with facilitating and managing business processes and relations among suppliers, partners and customers over digital networks, as well as ensuring efficiency and effectiveness. This difference underpins the need for fundamental re-directions. The reason for describing the re-directions as fundamental is that unlike previous digital technology, Internet technologies are fluid and seek to cater for contextual, situated and semantic real-time information management.

Management strategies are concerned with reaching a specific destination, and in particular with how to reach the destination. Company strategies are unique and difficult to differentiate from a specific company's values, goals and mission. Organizations cannot expect to extrapolate or borrow a strategy from another company. What works strategically for one company may not have the same impact on another organization. Similarly, e-business IT governance is affected by an organization's unique culture and working practices, and should reflect its own goals and ambitions.

CONTRIBUTION

This paper contributes to global e-business IT governance by examining premises in research and practices. The underlying premise in IT governance is that thorough central planning and its execution will result in success. Instead, fundamental re-directions are proposed to enable strategy formulation. The e-business IT governance framework developed applies to companies seeking to integrate Internet technologies into business activities in some form of an e-business model. This is termed the *fusion* of IT and business. The framework itself is built on the premise that (a) Internet technologies that enable e-business are inherently fluid and (b) that the organizations in which the technologies are applied are themselves emergent. It explains and elaborates e-business strategies for global IT governance capable of coping with such fluid technologies and emergent organizations, whilst acknowledging the importance of planning IT. These factors pose challenges for researchers and practitioners in IT Governance. The framework enables strategies for global e-business IT governance to be developed based on the recognition that organization, especially virtual organization, is both planned and emergent, diverging from the dominant premise of central control in IT governance. It should therefore appeal to both communities of IS developers and organization designers interested in IT governance.

The framework proposed in this paper is not a prescriptive IT governance package that can be replicated across all organizations or even for all time in a particular organization. Its purpose is to enable decision-makers to take a holistic and alternative view of IT governance and to enable them to find their own appropriate mechanisms for devising an IT governance strategy that fits their particular organization. This approach is based on the increasing literature on emergent organizations and its corresponding affect on IS development and IT governance (Pawson et al., 1995; Truex 1999; Patel 1999). Some authors state that IS development in IT governance is possible without formal methods (Baskerville et al., 1992). The framework for global e-business IT governance developed in this paper regards the problem as one of recognizing and accommodating emergent activity rather than focusing purely on planned rational governance.

The remainder of the paper is organized around the central problem that addresses global e-business IT governance as combined planned governance with emergent needs. Whilst planning is a vital aspect of IT governance, the pace of economic change nationally and internationally quickly makes plans outdated. Business needs for IT and IS tend to emerge as a result of organizational and economic factors thus e-business models, as discussed in the following section, need to encompass emergent activity. The business rational for e-business requires a broader scope for IT governance, taking into account both IT and business issues. The e-business IT governance framework itself is built on radical re-directions from traditional IT governance discussed in the section on radical re-directions. The framework section details activities that need to be continuously carried out to ensure plans are relevant to business needs and account for emergent needs. A critical aspect of e-business IT is the development of organizational interfaces, which traditional IT governance has not had to deal with. These interfaces, for example between customer and organization or business partner and organization, are vital for the success of e-business IT governance. The conclusion reached is that global e-business IT governance should be regarded both as a systematic and organic approach to IT resource management.

EMERGENCE IN IS AND OF ORGANIZATION

The past application of IT has seen the automation, support, and re-design (re-engineering) and transformation of business activities. IT governance is becoming progressively complex through these phases of IT application to business. The current move is towards new 'models' of e-business. The new e-business models require strategy formulation and careful IT governance through prescribed methods, for example IT balanced scorecard (Van Grembergen, 2000), but there are also fundamental aspects of e-business that IT governance needs to consider that prescribed methods cannot cover.

Corporate design, information, and knowledge are intertwined. Information and knowledge are a prime element of organization design, and e-business technology has enabled the complex integration of all three in e-business models such as e-shop, e-mall or third-party marketplace (Timmers, 1999). Organization theorists assert that information processing and coordination of work tasks are central features of an organization (Gailberth, 1977; Mintzberg, 1979; Groth, 1999). Following the history of industrial design, the premise in IT governance and IS development is that computer-based information processing requires central design. The use of IT for information processing makes central IT governance and designs an invalid proposition in the 21st century organization.

The various interfaces between a company and its customers, partners and employees need to be both functionally relevant and easy to use. Certain interfacees such as customers cannot be trained to use e-business IT systems. The design of these interfaces is critical to the success of an e-business. The new e-business organization requires a multidisciplinary team to deliver relevant and effective solutions. Designers, creatives, psychologists and developers all can contribute to the novel e-business systems. IT governance and design needs to be local and in actual-time (when it is required). So modern

information processing in organization requires an amethodological or distributed governance too. In methodological approaches the analysis, design, and implementation of IS solutions to organizational problems are separated and controlled centrally. The Deferred System's Design (DSD) amethodological approach proposed by Patel (Patel 1999) enables organizations to delay design decision-making to mitigate risk, and permit procedural, operational or policy problems to be resolved locally. E-business systems in banking incorporate DSD (Theotokis, 1997) to allow emergent and tailorable information processing needs to be facilitated locally.

E-BUSINESS MODELS

A distinction between e-commerce and e-business is necessary to appreciate the magnitude of change in the business and operational activities that e-business has created for IT governance. It may be argued that e-commerce is the use of IT to support business activity. E-commerce equals business plus technology that is limited in scope to transaction-based information flows, for example EDI. E-business in contrast is the complex fusion of IT and business activity that necessitates the governance of IT to focus or refocus on the economic aspects of the business. The very economic survival of an e-business company rests on the efficacy of IT and the successful integration of internal and external business processes. E-business equals business, plus technology, plus economics, as it brings about a new facet of the economy, namely the e-business economy. The new economics of e-business cover for example supply chain management, customer relationship management, and human resources. This new link of IT with economics and the need for business organizations to be agile means that rather than a hard-wired e-business strategy (simple planning and implementation) companies require re-wireable business agility (organic IT governance and flexible systems) (Allen and Boynton, 1990). This is possible with networked organizations that exist as virtual structures, but only if the corresponding IT governance strategy is equally flexible.

Global e-business IT governance cannot be accomplished with the traditional models of aligning IT strategy with business strategy. Earl (Earl, 1999) succinctly sums up the evolution of IT strategy making by formulating three problems. The first is the perennial problem of aligning business strategy with IT strategy. Two, the periodic problem of securing business opportunity that IT strategy may raise. The third is the paradigm problem of integration, which he calls 'information business strategy'. The new e-business models as defined by Timmers (Timmers 1999) address the third problem and are a fusion of IT and business activity that make economic viability of a company the central concern of IT governance. The fundamental difference between the new e-business models and the traditional view of aligning IT support or even transforming business (Venkatraman, 1991) is that in the new fused e-businesses, IT is integrated into business activity. Integration is such that the boundary between pure business activity and pure IT support is non-existent. It is thus described as a fusion of business activity and IT that has resulted in unprecedented organization structures that themselves require a radically different governance and which call for a radical re-thinking in IT governance. The question of managing such novel organization structures is the single most critical issue that strategists and organizational theorists have to resolve.

Global IT governance and IS design in these new organization structures is inextricably tied with scaling. Scaling is the ability to support larger organization structures. During the industrial revolution, the need for organization meant that the craftsman's skills were split into design and subsequent production to enable scaling. Specialists in design and planning addressed the problem of organizing and defining the organization (Groth, 1999). Organization itself becomes a form of problem solving. Global e-business IT governance in essence is about scaling. E-business solutions implementations require scale and a global perspective developed through a careful analysis of business rationale. For global companies IT governance is concerned with design and planning the application of IT organization-

wide. And yet, it is also concerned with meeting variable and local needs of subsidiary companies and divisions.

We have come a full circle in the 21st century and returned to the re-incarnated craftsman - the knowledge worker - in the e-business organization in virtual teams. Unlike the single craftsman with his craftshop, the knowledge worker has to work in a team and across a distributed organization. Like the craftsman, the knowledge worker has to specialize, often to very high levels of granularity, but unlike the craftsman, the knowledge worker has to communicate and co-ordinate within a team and across an organization, increasingly now across a virtual organization in many global companies. The medium and mode of this communication is now largely IS, making its design a critical aspect of organization design and IT governance itself, and in improvements in effectiveness and internal productivity gains.

Emergent and predicted information and knowledge is communicated and shared in organizations. Available technologies that reflect emergence have given rise to alternative organizational structures (Berners-Lee, 1999) largely based on intranets and extranets, different ways of supporting business processes, and novel ways of working. The new e-business organizational forms are based on information and knowledge assets and seek to facilitate knowledge creation. Deferred system's design (DSD) can be an integral aspect of these new organizations (Patel, 1999), because it seeks to design tools that enable organizing virtually and defers IS design decisions to employees to mitigate risk. DSD has the potential to address the problem of emergent information needs as part of balanced IT governance, balanced between planned activity and emergent needs.

E-business IT Governance and Business Rational

Governance is a multifaceted activity requiring the efficient and effective uses of resources to achieve desired aims. In e-business IT governance it is the ability to manage IT, develop strategies, and create systems that are relevant to business operations and customers who interface with an organization. IT governance involves building a professional IT capability that is able to offer business strategic advantages. The value contribution of IT can be determined by considering facets of global e-business IT governance such as:

- Develop an IT strategy, and undertake critical strategic and operational reviews. Strategy formulation requires an imagination to use IT capability to build better relationships with partners, customers and employees
- Develop and manage the distributed IT/IS systems, e-crm and e-technology infrastructures
- Ensure that business-critical projects are completed
- Define methods, tools, and processes
- Define best practices
- Manage application development
- Manage outsourced providers and multi-site procurement policies
- Ensure effective IT services delivery strategy to business segments that lead to internal productivity gains
- Develop key performance indicators
- Critically review current organization structures and capability and implementing cost savings to improve efficiency and effectiveness

Underlying all the above activities is the aim of meeting operating needs of a company. Any IT governance mechanism should be rooted in business logic. For global companies with e-business aspirations various segments of business need to be considered: marketing, human factors, customer relations, and business-to-business relations. In terms of marketing, a company needs to consider how its e-business strategy supports its overall mission and communications objectives. It needs to develop a one-to-one or mass customization marketing strategy over the Internet for customers and the extranet business partners. It needs to determine how to relate digitally with its customers. In terms of human factors, a company needs to assess how

its customers will respond to digitized interaction. E-CRM strategies need to be customer focused and, as explained in the following section, appropriate customer-organization interaction models need to be developed. This may require developing easy-to-use interfaces for customers who are simply interested in purchasing items or services. Finally, in terms of business to business, a company will need to assess how to develop the interaction between itself and its business partners and suppliers.

Most e-business models tend to overlook the customer as an integral aspect of an e-business. E-business IT governance needs to be customer-centric. The customer is regarded as an operational aspect of e-business in the framework presented in section 5. No physical boundaries exist between a business and its partners, suppliers or investors, or between a business and its customers in an e-business. Business processes that deliver a product or service now extend virtually to the customer. Dell the personal computer manufacturer produces customized products through its corporate portal, linking its operational process directly to the customer. Thus both suppliers and business partners, and critically customers now become operational issue in e-business enterprises, and e-business IT governance. Business processes that link directly to customer requirements mean that IT governance too needs to consider the company's customer in its systems development approaches and strategies. Amazon.com and Yahoo! are examples of companies that operate beyond notions of business transformation, they are truly networked organizations that are superimposed on transient physical and organizational structures. The role of IT governance is such organizations is beyond the simple management of the IT tool. It involves ensuring the very economic viability of a company.

Deferred System's Design and Implications for e-business IT Governance

The Deferred System Design (DSD) approach does not seek to predict specific future uses of IT/IS or develop designs based on predicted requirements. In DSD, the IS design is based on predicting what users will require in order to implement adaptability mechanisms in systems. '*A deferred system is deferred until the user decides what the system will become.* In philosophical terms, this provides for ontological and epistemological relevance of the system to users' *being*. In business terms, it caters for the situated needs of system users. An example of a deferred application, which a user may create, is a financial derivatives product that may be demanded in a particular set of market conditions that emerge, and which could not have been predicated when the system was designed' (Patel et al, 2000a). This type of user is termed an *action developer*. (Patel, 2002b).

The implication of the DSD approach for IT governance is that it has to direct IT/IS development according to three design principles. These design principles cater for the type of emergence of IS and in organizations detailed in section 2. The first principle is that IT/IS systems need to be networked or the principle of interoperability. Interoperability caters for new data connections that may arise in the business domain to be facilitated in system terms. The second principle is that systems design should be evolutionary. Evolutionary design is necessary to enable implemented systems to keep pace with business and organization change, primarily affected by the market. The third principle is that the IT infrastructure should be decentralized. Decentralization caters for contextual and situated data management, facilitated by Deferred Design Decisions (Patel, 2002c).

SOME RADICAL RE-DIRECTIONS IN E-BUSINESS IT GOVERNANCE

The e-business IT governance framework elaborated in the following section is built on radical re-directions from traditional IT governance. E-business is the integration of economic, business and technology aspects of business activity. The scope of e-business IT governance is not now simply inward IT management but outward relations covering business partners, suppliers, and critically, customers. Traditional IT governance focused on the technology and its application to business operations, whereas e-business IT

governance is intertwined with business and economic management, with suppliers, business partners and customers. In e-business, IT governance has thus moved onto a different plane, requiring fundamental re-directions discussed below that need to be considered for effective global e-business IT governance.

Traditional IT governance's modus operandi is planning. In global e-business IT governance it is necessary to consider both planned e-business IT and emergent requirements. Modern organizations cannot be viewed solely as planned and directed entities. Organizational life is about *being in the process* and not only about definable structures, especially when considering the virtuality of organization structures. There is evidence that organization structure is dynamic. In terms of IS development, research reveals that developers need to consider the emergent information and knowledge needs of the organization (Baskerville, et al. 1992) in such organic structures. Similarly, strategies should be free to appear at anytime and in anyplace in the organization. There is a 'messy process of informal learning' through which strategies may be formulated. Planning itself needs to be of the rolling wave kind to cater for uncertainty and, possibly, contractual work in systems development.

IS development needs to be re-scoped to include customers, business partners, and suppliers. For e-business, IS development is not simply an 'internal' problem as in traditional IT governance. In e-business it extends outside the organization to include business partners and suppliers, but most critically it needs to include customers. Pure e-business organization is directly linked to its customers through the Internet. Its business processes and operations are driven by this direct interface. As the interface is enabled by IT, its development and the development of associated systems need to involve all interfacees. Thus the very problem of systems development extends outside the organization.

Consequently, e-business IT governance is about developing new interfaces to fundamentally change the way in which an organization interacts with its customers, partners and suppliers. The new interfaces are between:

- Customer - organization
- Partner - organization
- Supplier - organization

These interfaces are vital for the viability of a company and pose a new problem for global IT governance. The problem is how to design efficient business processes that extend to interfacees as well as the interface itself. In some virtual organization forms the customer is a co-producer of the goods or services, for example where the buyer of cars or personal computers can customize the requirement for a product on-line. For the customer-organization interface, one aspect of the problem is how to design interfaces that cater for cultural diversity to be found globally. These interfaces cover both process issues and it's fused IT. The customer-organization interface should be monitored to extract vital business intelligence from customers.

Traditional technology has not had an all-encompassing effect on organization structure and communication. Traditional IT governance has not had to deal with questions of organization structure, except with the notion of business transformation. E-business IT governance by necessity has to consider the all-encompassing effect that the new networking digital technologies have on organization. Internet and web technologies enable organizing virtually. Policies need to be developed to enable organizing virtually, as well as:

- Develop and enable virtual structures, which by definition will change
- Ensure economic viability, not simple business 'fit'
- Develop solutions that are valid at corporate and business unit levels

E-business IT governance is more complex than the traditional alignment of IT with business or deriving business opportunity from IT. It is about integrating IT into the very business, referred to here as fusing IT with business. An e-business should be regarded as an open-ended organizational network. The notion of open systems (Flood and Jackson, 1991) may be one way of conceptualising such

an entity. Another way to think about open-ended organizational networks is as 'webs' (Patel, 2001a). The empirically founded web concept is proposed as a conceptual tool to develop applications better suited for business organizations dealing in information and knowledge with emergent needs. It is consistent with the major content of e-business technology, namely information and knowledge processing, and with the plank of information and knowledge ontology within the proposed framework.

Two other radical consideration are cross-organizational IS development teams and reconceptualizing time and space in a virtual e-business organization. Lee (Lee, 1999) describes temporal changes of export related work in companies using EDI and how IS create temporal symmetry. International businesses have given rise to global and virtual software development teams. These teams are composed of North American and European corporations and companies from the Indian subcontinent. The management of virtual software development team is a new challenge for e-business IT governance.

Tools

There are various reasons why all systems requirements cannot be known in advance to facilitate detailed IT plans and development. The users may not know what is required, or if they do they may not be able to explain or express the problem in terms that are readily understandable and can be modeled. As lack of knowledge will prevent designers from providing detailed system functionality it is necessary for global e-business IT governance to direct the development of local information and knowledge management tools. Global businesses will need to devise and implement varying marketing strategies for local needs. Web-based marketing systems require to incorporate customizing or tailoring tools to allow different product promotions or application tailoring (Wolfgang et al., 1998).

Historically, the level of sophistication of tools in a society reflects its intelligent activity. A tool is effective if it goes beyond what is already possible. It is not possible to achieve an objective without some kind of tools or devised method. A tool is a 'wholly constructed expression of both knowledge and values.' (Groth 1999). Interestingly, there has been a paucity of tools in IS given its pervasiveness in organizations and, during the last decade, in society generally. E-business tools contribute to organization structure, its effectiveness and efficiency. Tool building that facilitates the collective experiences of individuals leads to the design of better and effective tools, as it leads to the design of sophisticated and precise tools that solve the problem at hand.

The type of tools needed for e-business are tailoring tools. Tailoring tools are software mechanisms that enable action developers (people who use systems) to change the behavior of IT/IS systems to suite particular situated needs.

Ontology

Develop ontology of information and knowledge that are not simple data/information processing algorithms. Ontology describes the characteristics of an object or its nature. Such ontological models are developed for knowledge management systems.

A significant aspect of e-business IT governance that is different from traditional IT governance concerns business intelligence and models of customers. E-business solutions require intricate models of customer behavior. The various applications need to be integrated to provide a unified view of not only customers, but also other types of business relations, such as business partners.

Customer-Organization Interface

A new aspect of IT governance is coined here as the customer-organization interface. This interface is the both the technological platform that enables customers to interact with an organization and the understanding of the customer by the business, referred to as customer relation ship management (CRM). The customer-organization interface is a dynamic element of the IT/IS systems that needs to be developed and managed. It is arguably the most important part of an e-business.

The customer-organization interface is developed using Web technology. Its design is important for customer loyalty and the perceived trustworthiness of the e-business to customers. The actual design of the interface should be developed using empirical data as the basis of design decisions.

Customer loyalty can be increased through personalization of services. Personalization is the provision of Web site content to customers based on knowledge of the needs of the customer. Various personalization mechanisms are available.

The System's Environment

A system that is not impacted highly by the environment remains constant. Its architecture and functionality remain stable with minor changes because the human or organizational force for change is nil or minimal. It is difficult to find examples of such systems in e-business systems. A system that has a high environmental impact on it, for example a web-based marketing system needs to change constantly. The forces for change are high and constant on such systems. In general, e-business systems are of the latter type.

The complexity of a customized order processing system such as for personal computers or cars or an electronic biding system such as for auctions increases with the degree of their embededness in the environment. Generally, such e-business systems have a high correlation with the organizational (and economic) environment in which they function. Figure 1 is an organization environment impact analysis of e-business systems that need to cater for organizational emergence. When the correlation with the environment is high, e-business systems need to be developed using DSD as shown in the top right quadrant. Over time, environment impact on systems requires most systems to move clockwise from the bottom left quadrant to the top right quadrant.

Emergent ways of IT governance do not seek to specify fixed systems architecture, so that the future use of IS and its flexibility can be accommodated. Information and knowledge systems that are built on emergent principles such as DSD would be capable of accommodating the complexity of organizational phenomena and change increasingly evident in an e-business economy.

Information and knowledge ontology are not an aspect of current IT governance, especially that concerned with aligning IT with business strategy. This aspect is critical given the inclusion of the customer in the operations of the business. E-business companies will have to develop deeper understandings of their products, customers, and partners through better information and knowledge creation, sharing and analysis in a shifting environment.

GLOBAL E-BUSINESS IT GOVERNANCE FRAMEWORK

The proposed framework incorporates the above points and recognizes that the organizational changes being brought about by e-business technology are profound in that they have radically altered our centuries old view of a company. For the first time in the history of computing and its application to business, the customer is a vital consideration in e-business strategy and planning. The digital link into the customer's home now makes the customer a critical aspect of business operation planning and management. As discussed in the previous section, the inclusion of the customer into business operations requires developing models of customers' interaction thorough electronic interfaces with the organization.

IT governance consists of designing the governance structures and then implementing and managing them. Critically, it also involves being open to unexpected requirements or emergent information or system needs. In its broader sense, governance concerns the development of IT in an organization, its procurement, and its application to business activity. But, as discussed above, e-business IT governance is more than the simple application of IT to business activity. It is the complex fusion of IT with business activity, business partners, suppliers and customers.

What model of IT governance is effective in this environment, planned use of IT, Just do it (JDI) or the emergence model? Planned use of IT is necessary for the known aspects of organizational life, for example a

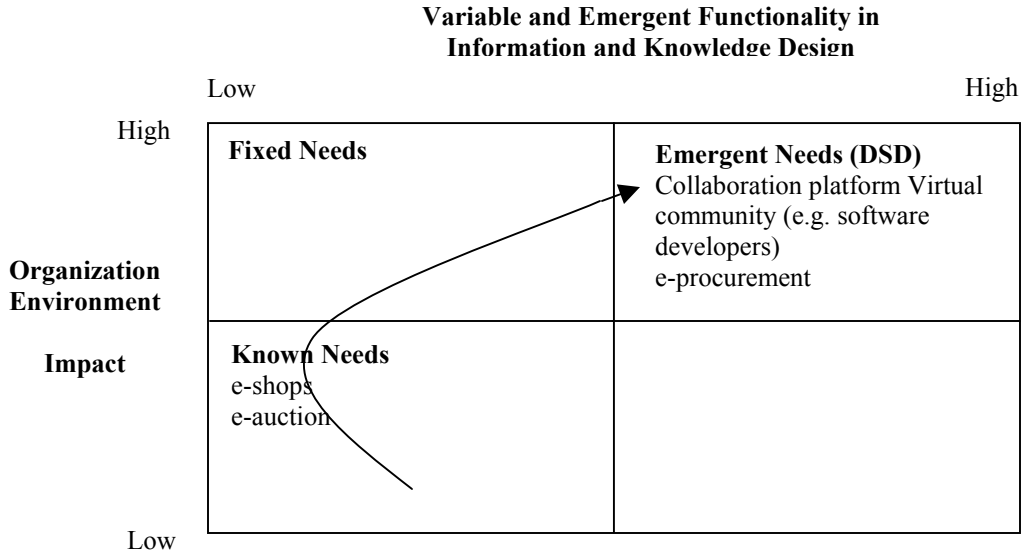

Figure 1. Organization Environment Impact Analysis.

known merger of companies and caters for corporate, inter-departmental and company wide systems. JDI is the empowerment of users to develop systems, made possible with web technologies and caters for local, individual and group needs. The emergent aspects arise in the context of the previoustwo, and take the form of the unexpected from the point of view of IT planners and can be facilitated by DSD. The framework contains all three elements, especially given the recent literature on emergent organizations discussed earlier. Emergence and JDI alone cannot prevail because there will always be a need for corporate level application development, which the IT department can develop.

Premises and Assumptions of the Framework

The e-business IT governance framework is built on the premise (a) that Internet technologies that enable e-business are inherently fluid and (b) that the organizations in which the technologies are applied are themselves emergent. These assumptions need to be explained. Internet technologies, including Web technologies, change rapidly. For example, new methods for marking-up displays continue to emerge from the World Wide Web Consortium. Similarly, organizations tend to change their business processes to reflect increasing cost pressures and market conditions. IT governance has to reflect both these kinds of emergence.

The framework explains and elaborates e-business strategies for IT governance capable of coping with such fluid technologies and emergent organizations, whilst acknowledging the importance of planning IT. The purpose of the proposed framework is to enable thinking on strategies for global e-business IT governance to be developed based on the recognition that organization, especially virtual organization as enabled by Internet technologies, is both planned and emergent, diverging from the dominant premise of central control in IT governance.

As emergence is evident in organizations, it is necessary to think of how to deploy IT/IS in such an environment. The Deferred-Specified IT/IS Matrix (or the Deferred-Specified Matrix) in Figure 2 can be used to map systems and information technologies. The main criterion for mapping is whether the system's environment is static or emergent. Highly emergent system contexts will mean that planning strategies will have limited affect. In contexts where emergence is low, planning will have highest affect. Such mapping is an important aid in developing strategies for e-business IT governance.

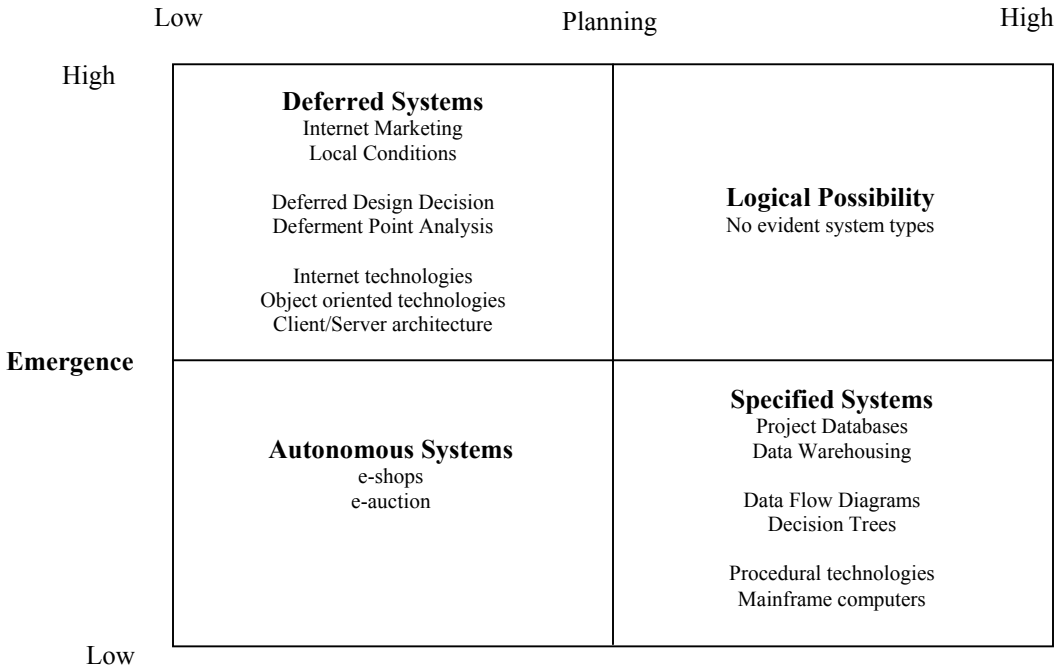

Figure 2: The Deferred-Specified IT/IS Matrix

The mappings in Figure 2 can be used to identify e-business systems that depend on emergent aspects of a company and its market. It shows a mapping of IT/IS along the emergence and planning axis's. Under conditions of high emergent activity, planning IT/IS will be ineffectual hence deferred systems will be required, as shown in the top left quadrant. Under conditions of low emergent activity, planning will be effective hence specified systems will be required, as shown in the bottom right quadrant. The kinds of systems suited for deferment are listed as Internet marketing in the top left quadrant. Those suited for planning are listed as product databases or data warehousing in the bottom right quadrant. The systems design methods suited for deferred systems are listed in the top left quadrant as deferred design decisions and systems deferment points (SDPs) analysis, and data flow diagrams and decisions trees for specified systems in the bottom right quadrant. Deferred systems can be developed using Internet technologies, object-oriented technologies and client/server architecture. Specified systems can be developed using procedural technologies and mainframe computers. In conditions of low emergent activity and low planning, fully autonomous systems are suitable. A logical possibility but not physically evident is the top right quadrant that represents systems that encompass both high emergence and high planning activity. Given the premises and assumptions above it is now possible to detail the framework.

An e-business IT Governance Framework

The essential activities for global e-business IT governance in the framework encompass the analysis in the previous sub-section and the radical redirections discussed earlier. The inclusion of the customer (3) in IS development is critical in e-businesses. In particular, empirical models of customer-organization interaction that cover process and operational issues need to be developed. The issue of planned versus emergent IT governance is covered (1,2,6,7). E-business is highly volatile, both technologically and economically. Such a dynamic environment cannot be catered for in e-business IT governance solely through planned achievement of goals; it also requires mechanisms to respond to unforeseen, opportunistic and emergent events. The essential activities for global e-business IT governance are:

1. Determine business purpose and strategy to define e-business model. Consider what aspects of the business will be digitized and how the IT strategy will add value to the business. Build top level and local channels of governance responsibility and accountability.
2. Determine the virtual structure of the organization; allow for emergent forms and virtual working through DDD and tailoring tools.
3. Develop customer-organization interface and interaction models. It is critical to understand how customers, business partners and suppliers interact with the e-business through the business process (digital) interfaces. Developing interaction models will provide such an understanding.
4. Model personalization to enable customers to interact with the e-business based on their personal needs. Personalized content provision needs to be balanced with Internet marketing. Too much of the later may drive customers away.
5. Develop customer-organization systems. This requires taking the radical step of involving customers in systems design decisions. In the past 'users' were excluded from design decisions but were eventually included when developers realized that systems would more likely be accepted by users if they had a say in how they should be designed. Similarly, there is a need to include organizational interfacees such as customers in the e-business design process.
6. Determine what IS concepts to incorporate. An e-business model can incorporate concepts such as information management, knowledge management and decision support. This will ensure that integrated solutions are provided.
7. Determine the scope for IT outsourcing and the role of consultants. Criteria need to be decided for retaining consultants, and adequate contract and servicing details need to be decided for IT service providers.
8. Determine what business activity, business process, business relations to digitize - supplier relations, customer relations, employee relations. A corollary question concerns how to determine what to digitize. Develop plans for legacy and back-end systems integration with e-business solutions. All digital aspects of the business cannot be predetermined. Some will arise in the course of business activities, and will need ongoing development.
9. Retain flexibility in IT governance to allow for emergent aspects of e-business strategy. View design as a process, not as a discrete event in time.
10. Determine technology-centric ways of working balanced with human needs. We know that technology is changing the way work is done. IT governance has to recognize this fact, and include organizational and work-study in its planning process. This is especially the case with e-business technology planning.
11. Evaluate and procure appropriate e-business technology to enable 1-6 above.

IS Concepts

The development of the IS field, particularly its interdisciplinary development, has resulted in certain concepts that may be regarded as defining modern business activity that contribute to e-business. The interdisciplinary development of IS has resulted in notions of business operation and organization, that in turn need to be incorporated into the new e-business models. Table 1 is a list with short descriptions of IS concepts that need to be incorporated in e-business models. The realization of these concepts in business is a major function of IT governance.

Selecting appropriate technology to incorporate IS concepts, is a significant aspect of the framework (5). For example, if a company wants to manage its customer knowledge effectively, it will need intranet database technologies.

Table 1: Relevance of IS Concepts to e-business IT governance

IS Concept	Description	Relation to e-business IT Governance
Data	Facts about organizational transactions	Needs to be integrated and available across the intranet or extranet.
Information	Data that is processed to enable decision-making	This information is not limited solely for internal consumption (executives, planners, problem-solvers), but is to be made available to customers to make informed buying decisions, suppliers and business partners.
Knowledge	Knowledge is about ideals to achieve-customer satisfaction, product quality, etc.	Disseminate it widely throughout the organization and enable its creation.
Networked or Virtual organizations	IT enabled organizing	Networks are the essence of e-business. The form and content of networks determines business viability.

EMERGENT FORMS OF IT GOVERNANCE

The dominant view of systems development is mechanistic. Jackson states that: "To develop software is to build a MACHINE, simply by describing it." (Jackson, 1998. p.1). Such a view is true of mechanical devices, but not of social software that supports and augments human social action. Schuler (1994) defines social computing as software that serves as an intermediary or a focus for a social relation. E-business IT governance is concerned with the design and development of such social software. Social software has a direct influence on human behavior; particularly the action humans take in social relations, like business relations such as partners, suppliers and customers.

Most IS design activity happens in projects, and some during the enhancement maintenance phase. Traditional IT governance makes use of projects to develop systems. E-business systems have been developed using the business project framework, as it affords resource management and goal achievement. However, project-based IS design activity does not deal adequately with a number of issues. Emergent requirements, creeping scope, organizational and business impact on the project, are all issues that trouble a project. Yet they are the very essence of IS design activity and that need to be addressed in emergent organizations. Projects restrict software development to professional developers, but there is a need for 'users' to develop systems for local needs (Patel, 2002b).

The 'software crisis' itself can be viewed as a manifestation of postmodernism. We require a new approach that is distributed and sensitive to context. The era of planned releases of systems projects is passed, and business organizations have to extend the functionality of systems over short periods and at low costs in response to various organizational and economic competitive factors, especially in an e-business. Attempts at planning completely all systems requirements in projects have proved unachievable with the usual picture of cost overruns and failed delivery times (Ewusi-Mensah, 1997). New alternative models like the distributed model of open source code development and component-based development are emerging.

It is difficult for e-business IT governance to remain centrally controlled through mechanisms such as project-based development. Table 2 is a sketched categorization of historical approaches to

managing systems development. It charts the move from software development as an 'art' through 'engineering' to the present day 'open source code' conception. The business demands on software are complex and methodologico-project frameworks seem unable to cope. Amethodological decentralized models, like the ones used to develop the Internet, Web, and Linux seem to be successful. Global e-business IT governance requires such a distributed and decentralized model for developing e-business systems.

Fourth generation languages and open source code are examples of high emergence and low planning in the top left quadrant of the Deferred-Specified Matrix in Figure 2 above.

CONCLUSION

E-business IT governance has been conceptualized as encompassing both systematic planned activities and organic emergent needs to ensure successful e-business applications development. E-business models need to cater for emergent requirements and regard suppliers, business partners, and especially customers as integral. Global e-business governance needs a radically different perspective on IS development, organization interfaces, organization structures, and ontologies of information and knowledge. The radical alternative theme is to understand the technological, managerial and organizational (including interfacees) influences that both define e-business and its eventual success.

The framework proposes various activities in IT governance that can cater for the new challenges of global e-business IT governance. The development of electronic supply chains, networks, and customer-facing practices are vital but the question of measuring the success of these developments has yet to be resolved. It is an interesting research question especially in organizations that permit emergent activity and appropriate IT responses to it, both corporate and local.

Planning is a vital aspect of IT governance but the pace of economic change nationally and internationally quickly makes plans outdated. Business needs for IT and IS tend to emerge as a result of organizational and economic factors thus e-business models need to encompass emergent activity. The business rational for e-business requires a broader scope for IT governance,

Table 2. Historical Phases of IT Governance and Development Approaches

Systems Conception and Development Method	Systems Rational & Development Focus (Individual, Coordinated, Central or Distributed) (Aspects of IT Governance)	Reference
Programming as an art	The practice of programming was originally considered 'art'. Individual	Circa 1950s
Structured programming	Emphasise on how software is partitioned and structured. Reflective developers. Individual	Goto statement, Dijkstra (1968)
Software engineering	Apply traditional engineering tools to the 'software crisis'. Coordinated	NATO Science Committee (Oct. 1968)
Project management	Reflective developers in a business project. Central.	Grindley (1986)
Fourth Generation Languages	Action developers. Local	Grindley (1986)
Packaged software (COTS)	Reflective developers and action developers. Central	Brincklin (2000)
Open Source Code	Reflective developers but in a community of practice (not project bound). Distributed	Halloween Document (2001)

taking into account both IT and business issues. Organizations need to implement activities that need to be continuously carried out to ensure plans are relevant to business needs and account for emergent needs. A critical aspect of e-business IT is the development of organizational interfaces, which traditional IT governance has not had to deal with. These interfaces are vital for the success of e-business. Global e-business IT governance should be regarded both as a systematic and organic approach to IT resource management.

The ideas presented in this paper are generalizable. Deferment is applicable to IS development, in particular to developing frameworks in object-oriented programming. It is also applicable to general management of business that has to cope with emerging factors.

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