

**ORGANIZING FOR E-BUSINESS: THE IMPLEMENTATION OF
MANAGEMENT PRINCIPLES IN ELECTRONIC COMMERCE**

by

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ABSTRACT

This paper reviews some key structural and design dimensions of organizations and how they apply to electronic business and the virtual organization. The paper reviews the relevant literature on design of electronic commerce organizations. Although few studies have dealt with these issues, the paper highlights some research questions that emerge from the literature, and examines selected dimensions, such as formalization, departmentation, and inter-organizational relations. The paper concludes that electronic commerce organizations are faced primarily with design issues, so that conventional knowledge of structural dimensions is highly applicable to this new business phenomenon.

(Keywords: e-business; organization design; structural dimensions; electronic commerce)

1. INTRODUCTION

In recent years there has been a dramatic increase in companies practicing electronic commerce. Two basic modes of organizing such companies have emerged. The first is a branching-out of a “brick-and mortar” company, by installing an e-commerce (“click-and-mortar”) division, subsidiary or spin-off (Kolakota et al., 2001; Patel and McCarthy, 2000). The second is an enterprise initiated as an electronic commerce company (dot.com), without previous organizational links to a traditional “brick-and-mortar” organization (Deitel et al., 2001; Fingar et al., 2000).

Both modes of corporate practice of electronic commerce require redesign, recalibration, and even restructuring of key organizational dimensions. In addition to issues of the new business model for such companies, there is also the question of applicability of traditional *organizational* dimensions to this new format of conducting commerce. As electronic markets and electronic commerce proliferate, there has been a marked increase in scientific studies of this phenomenon. The emerging conventional wisdom suggests that electronic commerce is different enough to warrant an in-depth examination of traditional organization design (Picot et al., 1997; Wang, 2000; Zupan, 1999).

This paper reviews the relevant literature on the use of organizational dimensions in electronic commerce. The paper then proceeds to highlight the research questions that emerge from the literature, and to examine selected structural dimensions such as formalization, departmentation, and interorganizational relations and networking. Some propositions are suggested for selected dimensions in e-commerce organizations.

1. THEORETICAL BACKGROUND

The relevant literature on organizations and electronic commerce is concentrated on the strategic aspects of e-business and on the uses of internet technologies in the business acumen (Cheng, 2000; Holland and Lockett, 1997). There is a lack of a theory of the use and management of technologies in e-commerce companies (Rahul and Biju, 1999). Most studies of e-commerce utilize

models and conceptual frameworks from management of information sciences and technologies (Lee, 1998; Patel and McCarthy, 2000).

Thus, these studies examine issues of the flow of information and the variables associated with uses of information technology in organizations. Little, if any, attention is given to the structural and process dimensions of e-businesses.

Similarly, a substantial number of studies emphasize the strategic attributes and the competitive position of e-commerce, both as an activity within “brick-and-mortar” companies, and as stand-alone internet enterprises. In these studies the unique attribute of the electronic corporation are taken into consideration. The result are studies that attempt to explain how these companies compete and what contributes to their successes or failures in their respective markets. Picot et al. (1998) used transaction cost, principal agent theory, and property rights theory to study the emergence and growth of electronic markets. Holland and Lockett (1997) have suggested that market variables in the growth of electronic markets “. . . are tempered by individual firm strategies reflecting investment, network structure, and IOS choices” (p. 475).

Studies of Organizational Variables

By and large the phenomenon of electronic commerce remains uncharted. Systematic studies of e-enterprises are very few, and even fewer explore the role that structural and process variables play in the design of these organizations. Two exceptions may be noted. The first involves research on interorganizational and networks. Johnston and Gregor (2000), for example, had proposed the examination of electronic networks of organizations at the industry level. Similarly, Holland and Lockett (1997) and Kampas (2000) have also argued that inter-organizational relations may contribute to our understanding of how e-commerce organizations evolve and succeed.

A second exception includes studies of specific industries, and a detailed roadmap to improvement of an e-commerce organization. For example, Zupan (1999) offered a simplified strategy for e-commerce in the apparel industry, and Lee (1998) studied financial electronic data interchange in the financial sector.

But what these studies failed to address are issues of organization and design of e-commerce enterprises when set apart from traditional (“brick-and-mortar”) companies. Wang (2000) argued that “Electronic commerce should be viewed less as a phenomenon of business on-line and more as a challenge of organization design” (p. 49). Yet, this statement is illustrative of the trend in the literature: emphasizing the business on-line aspects at the expense of systematic examination of organization design and redesign (Amor, 1999; Deise et al., 2000).

1. RESEARCH QUESTIONS: WHAT NEEDS TO BE STUDIED

The lack of a body of research that addresses the *organizational* dimensions of electronic commerce leads to a quest for detailing what needs to be studied. Such a research program may be approached from two complementary perspectives, shown in Figure 1.

The first perspective includes traditional organizational dimensions, *as they apply to e-commerce*. Research questions would include: How similar or different are these dimensions in an e-commerce organization? and, Why are there similarities or differences between “brick-and-mortar” and “click” organizations for each of the dimensions?

Figure 1: Complementary Perspectives of Studies of Organizational Dimensions and e-Commerce

UNIQUE ASPECTS OF E-COMMERCE ⁽²⁾	ORGANIZATIONAL DIMENSIONS ⁽²⁾			
	Formalization	Departmentation	Centralization	Technology
Electronic Markets				
Information Technologies				
Virtual Organization				
Network Characteristics: Portability; Tele-attributes; Instant Communication				

(1) This is only a sample of dimensions.

(2) This list is illustrative, not exhaustive.

A second approach is the study of the unique attributes of electronic commerce organizations. Research questions would include: How do characteristics or attributes such as virtuality, portability, and instant communication influence the performance and the competitiveness of electronic commerce companies?; and, How do such attributes contribute to the uniqueness of these organizations in their own markets and when competing with non-electronic markets? (Belleflamme, 2001; Cross and Baird, 2000).

This paper takes the first perspective; by examining selected traditional dimensions of organizational analysis of structure, as they apply to e-commerce. These dimensions are: formalization, departmentalization, centralization, and complexity. These dimensions were selected as a sample of often-studied structural dimensions in organization design.

The research questions related to this perspective address the issue of applicability of such structural dimensions to the unique aspects of e-commerce organizations. So, for each of the dimensions we ask:

- (1) How is this dimension applicable to e-commerce organizations? Are there any differences in its use in the analysis of the structure of the e-commerce organization from its use in “traditional” (brick-and-mortar) organizations?
- (2) Is the dimension adequate and capable of providing an analysis of the design of the e-commerce organization that would explain differences between such organizations based on design and structural variables?

4. ATTRIBUTES OF ELECTRONIC COMMERCE

How is electronic commerce different from traditional modes of business? The primary difference lies in the networking capabilities and the virtuality of the business. There is vast use of information and telecommunications technologies that allow for portability, instant communication from anywhere, at any time, and the ability to offer access to unlimited databases of information about products and services. The distinctions of Business-to-Business (B2B) and Business-to-Customer (B2C) also allow for instant transfer of information, independently of place and time of day, and the ability to manipulate unlimited amounts of data in virtual storage. Clearly, there are far-

reaching implications for organizing and managing the marketing function, and such issues as the “business model,” the role of branding, and cost-per-transaction. Networks allow for instantaneous orders and information exchange in what is termed: The “24×7 world” (Waters, 2000).

Networking also facilitates cooperation among vendors and with customers. Such trends require changes in processes of communication, control, and product flow within the e-commerce organization—thus influencing the composition of its value chain (Lynn Markus and Benjamin, 1997; Mort and Knapp, 1999).

Another attribute of e-commerce organizations is the networking beyond the boundaries of the enterprise, thus forming inter-organizational workflows, combined with problems associated with technological standards, connectivity, and cultural differences. This phenomenon of the “extended enterprise” creates a myriad of *structural* challenges (Aalst, 2000; Boddy and Boonstra, 2000; Rockart, 1998).

Electronic Commerce and Structural Analysis: Between Order and Chaos

There have been a few attempts to prescribe some structural architectures that would allow e-commerce organizations enough flexibility to survive in the dynamic electronic environment. This is often called the “e-driven paradigm,” in which the environment favors a mix of chaos and order in the structure of e-organizations (Stacey, 1992; Ulrich, 2000).

Dee Hock, former CEO of Visa International, had suggested the concept of the “chaordic organization” in which complexity is combined with chaos-like non-linearity in actions and in behavior, vis-a-vis environmental threats and challenges (Hock, 1999; Hock, 2000). In a short treatise of 24 pages, Hock stops short of detailing *how* such organizations would be designed in order to become “chaordic” (Hock, 2000). Rather, Hock’s arguments and basic concept of the chaordic format are predicated on the belief that such a structural architecture is inherent in successful e-business. Organizing chaos and structure has also been coined as, for example, a “quantum organization” (Youngblood and Renesch, 1997).

A more systematic and detailed study of internal structures of e-organizations was a survey of 300 large corporations by the consulting company Towers Perrin (Melymuka, 2000). Although the

survey examined e-commerce activities in traditional companies, its findings also apply to stand-alone entities.

The survey found that no single department in the large corporation takes responsibility for e-commerce activities, and that fewer than 20 percent have adapted such processes as planning, performance management, and charge management to electronic format. The survey concluded that e-commerce activities are hindered by the existing structure and culture of traditional organizations (Chavez, Leiter, and Kiely, 2000).

The survey examined overall corporate behavior, yet stopped short of exploring internal dimensions of organization design and their applicability to e-commerce. Such slack in the extant literature is the focus of this paper, particularly with regard to the detailed examination of selected structural dimensions in the e-commerce paradigm (Mahadevan, 2000; Nault, 1998).

5. SELECTED DIMENSIONS

As stated above, four structural dimensions have been selected for this paper, as a sample of traditional and well-researched variables. By successfully applying such conventional analysis to e-commerce organizations, it may be possible to argue that, in the context of their structural design, such organizations are not much different from non-electronic organizations, (Werther, 1999; Daft, 2000).

Formalization

Formalization is generally defined as the extent to which there are rules, procedures, regulations, specifications, and policies in the organizations, all of which apply to the task of the organization *and* to work behavior (Banner and Gagne, 1995). These are all made available to the members of the organization, as well as to stakeholders (such as customers and vendors) by written and well publicized records.

A corollary attribute of formalization is the degree to which formal rules etc. are institutionalized and enforced. The higher the formalization, the more standardized operations and behavior will become. The more rules are enforced, the more control is exercised by the organization over its members and even its stakeholders.

Formalization is helpful in creating a work environment where routine work can be easily institutionalized, so that training and control are conducted with relative ease and high efficiency. However, highly formal structure tends to stifle innovation and reduce the organization's ability to change and to adapt to the dynamics of its external environment. It has also been shown that formalization tends to inhibit the flexibility of entrepreneurial organizations (Hall, 1998).

How is Formalization Applicable to E-Commerce Organizations?

An entrepreneurial e-commerce organization is a stand-alone entity, generally young, operating in a highly dynamic environment. While its organization probably began as a group of fellow risk-takers around the founder, its growth calls for a more formal and routine approach. The electronic market provides a dynamic environment of accelerated competition and technological challenges. Thus, formalization increases as specialized functions are formed, and the need for routinization of operation and for control is increasingly manifested in a growing structure. Similarly, in the mature company embarking on e-commerce spinoffs, the entity that branches out tends to assume the characteristics of the entrepreneurial organization (Chandrashekar and Schary, 1999).

When traditional organizations engage in e-commerce without spinning off this activity, a highly formalized structure will be imposed on the initial e-commerce entity, with the high probability that it would be a barrier to performance and to survival in the electronic market (Chavez, Leiter, and Kiely, 2000).

In the initial formation of networks and the expanding enterprise, flexibility is a key attribute that contributes to successful expansion. However, as integration and standardization become necessary, and as technology and connectivity are sought to establish common links and on-going shared processes, routinization is encouraged and formalization increases in the form of policies, standards, norms, and behavioral rules (Hesselbein and Goldsmith, 2000).

Thus, there is agreement among scholars that initial ventures into electronic commerce will more probably succeed if the structure of the e-organization exhibits low formalization and minimal effort to institutionalize its content. The level of formalization in the internal structure of e-

organizations is a good measure of their growth pattern, and a good indicator of their potential success and survivability.

Departmentation

This dimension is also known as “divisionalization,” and is defined as the grouping of organizational roles or tasks into specific units, because of similarity in the job to be done, skills and knowledge required for the job, and the levels of such skills (Shafritz and Ott, 2000). There are four major types of departmentation: by functional area, by product, by customer, and by geography.

Functional departmentation is normally the first attempt of an organization to structure itself according to the *specialized* tasks and skills necessary to achieve the goals of the entity. Members and skills in sales, finances, or manufacturing are thus congregated into specialized units and differentiated in the evolving structure. A similar principle applies to division by product, in which all specialties related to a product or product-line are brought together into a differentiated unit of the structure. Departmentation by customer and geography follows the same rationale.

A common type of departmentation is the hybrid form of matrix design, combining, for example, function and product or project classifications. Start-up organizations in e-commerce sometimes find the flexibility of a matrix design very attractive. Its officers and employees engage in various tasks simultaneously, thus creating a de-factor matrix structure.

Spin-off organizations who engage in e-commerce upon distancing themselves from the traditional parent company may also opt for flexibility and the choice of a different form of departmentation. Such spin-off units are particularly concerned with faulty lines of communication among divisions or department—however they are departmentalized. Examples include the marketing-manufacturing and R&D-marketing gaps in communication and cooperation. Other examples include departmentation by product lines, geography and client, in which these units are segregated in “silos.” They also tend to develop their own localized cultures, thus magnifying their isolation (Gleadle, 1999; Maltz and Kohli, 2000; Souder, 1988).

Spin-off and start-up (entrepreneurial) organizations make structural choices that will facilitate unhindered interface among units, so that flexibility and dynamic response to market fluctuations are

enhanced. Departmentation that encourages structural isolation is rejected in favor of horizontal integration and the encouragement of mechanisms that enhance communication (Chung, 1994).

Centralization

This dimension is usually defined as the locus of decision making in the organization (Daft, 2000; Shafritz and Ott, 2000). The more centralized the organization, the more decisions are made by very few managers at the top of the organization, with formal mechanisms and channels for implementation of these decisions by subordinates.

Centralized organizations have enhanced coordination and control, but suffer from stagnation and are slow to respond to changes in their environment. Senior managers often lack adequate information from their subordinates to make quality decisions, and their view of the performance and stance of their organizations tends to be myopic and biased (Axley, 1992).

Electronic commerce organizations face the challenges that are considered factors in promoting a decentralized structure. These are the need to rapidly respond to dynamic changes in the environment, and the need to have a relatively free flow of information that leads to good decisions, combined with the challenge to allow work groups to be dynamic and responsive, without having to engage in bureaucratic requests for authorization and for decisions (Greenberg and Baron, 1999).

Similarly, risky situations, in which the outcomes from poor decisions are highly detrimental to the organization, tend to encourage a centralized structure. Top managers weigh flexibility against the risks involved in delegation of authority and may curtail such delegation. Both aspects of centralization are present in electronic commercial organizations.

Frequently, the deciding factor in whether the design will favor a decentralized mode seems to be the manager's interpersonal attachment (nonbusiness relationships) with employees. The more such attachment is present, the more managers trust their employees and opt for decentralized structures (Johnston, 2000).

Complexity

Complexity is traditionally defined as the degree to which an organization is differentiated by the skills, functions, and occupations of its members and its units. Horizontal differentiation is a

term that applies to the degree to which units are differentiated at the same level of the organization's hierarchy (Banner and Gagne, 1995). The more the organization grows, the more it employs specialties who are subsequently formalized as permanent units in the hierarchy, thus creating a differentiated structure. The higher the horizontal differentiation, the more the established differences in unit culture, goals, levels of skills and status, thus leading to increased conflicts and to decline in communication and cooperation to the point of forming "silos" that are resilient to inter-unit collaboration.

In the electronic commerce organization, horizontal differentiation is an essential component of the hierarchy, due to the different *technical* specialties involved with the business. This is particularly true in the differentiation between the technical and the commercial units of the organization. As flexibility is a required feature of the organization, the negative impacts of horizontal differentiation must be wedged against the organization's ability to react rapidly to the changing market. Conflicts and a "silo" mentality between the technical and business units (which are apt to occur as the organization becomes more complex) pose a significant barrier to the organization's ability to be a dynamic contender in the e-commerce market.

Vertical differentiation refers to the number of levels existing in the organization's hierarchy. The flatter the structure, the less its vertical differentiation and the more decentralized it may become. "Tall and wide" organizations suffer from a large number of supervisory and managerial levels, thus creating a structure that hinders the rapid flow of vertical information, decisions, and knowledge. This, in turn, forms a barrier to mobility and to the dynamics of the organization in the e-commerce environment.

Complexity generates problems associated with both horizontal and vertical differentiation. Over 30 years ago, Lawrence and Lorsch (1969) published a classic study of the plastics, food, and containers industries. They suggested that there is a connection between the dynamics of the external environment in these industries, the degree to which companies overcome problems of differentiation—and the commercial success of such companies. Lawrence and Lorsch argued that

successful companies in highly dynamic environments require specialized *integration* mechanisms to overcome the barriers to flexibility that high differentiation tends to engender (McKelvey, 1999).

The model of structure-environment relationship proposed by Lawrence and Lorsch is especially useful in the analysis of e-commerce organizations. The more dynamic their external environment, the more these organizations will need to attenuate problems of complexity and differentiation by applying mechanisms for integration and coordination. Studies of health networks, for example, had found that differentiation and centralization are useful attributes that allow for clustering these networks into meaningful categories (Bazzoli et al., 1999). These studies also found that the higher the differentiation in these networks, the lower the centralization.

Wetzel and Buch (2000) have also analyzed organizations by using the differentiation—integration model. They argued that “. . . the key to revitalizing many of today’s organizations is through the relentless reduction of differentiation” (p. 18). Such conclusions suggest that in all types of organizations, and especially in those that need a flexible and agile structure, complexity that inevitably accompanies growth must be contained through structural devices such as integrative mechanisms, so as to minimize problems that tend to reduce the organization’s ability to compete in dynamic environments such as electronic markets.

6. **STRUCTURE, ENVIRONMENT, AND PERFORMANCE**

How does structure affect the performance of organizations, and how relevant are structural dimensions to the performance of e-commerce organizations? It has long been argued that the more dynamic the external environment of the organization, hence unpredictability of customer demands, resources availability and similar factors, successful organizations would gravitate toward less mechanistic and more flexible or organic structures (Miles, Covin, and Heeley, 2000). Successful companies seem to adopt structures that favor less formalization, more decentralization, and coordination of differentiated units, thus striving for increased organicity.

But, are such structural characteristics a crucial determinant of organizational performance? Consider the case of eToys, the e-commerce seller, founded by Toby Leak in June 1997. In February 2001, eToys announced that it would be shut down, after laying off over 70% of its workforce during

the previous month (Weintraub, 2001). Conventional wisdom suggests that the failure of eToys was due to *strategic* miscalculations. Regardless of its *internal* structuring, the company would have collapsed because it failed to join its “brick-and-mortar” competitor, Toys-R-Us, in a strategic alliance, overspent on advertising, and had engaged in a spiraling growth pattern. Such strategic mistakes overshadowed structural deficiencies (Weintraub, 2001).

The turbulence of external environments has been shown to influence organizational structure by way of the strategy chosen by companies to manage the dynamics of their market (Gordon et al., 2000). Subject to the mitigating influence of strategic choices, the extant literature has suggested that successful, high-performance organizations (small and large) in dynamic or turbulent environments tend to have certain structural characteristics (Keats and Hitt, 1988). These characteristics are measured by design dimensions such as centralization, formalization, and complexity.

The relationship between structure and strategy has also been shown to be meaningful in organizations facing dynamic environments (Adeyami-Bello, 2000). This relationship is also defined as the “fit” between the structural arrangement and the strategy adopted by the organization (Naman and Slevin, 1993). Simply stated, organizations that employ an organic and flexible structure are more likely to support changes in strategic choices in dynamic environments. Hence, adoption of strategic transformations, such as turnaround and reinvention, resulting in rapid adaptation to environmental changes (Miles, Covin, and Heeley, 2000).

For the e-commerce organization, these findings are an important guideline. Facing turbulent and highly dynamic environments, they must structure themselves in a design that will “fit” the demands such an environment may impose on their strategic behavior. Therefore, a design that provides flexibility and organicity will be correlated with strategic capabilities and with success and performance. Covin and Slevin (1990) for example studied new venture organizations. They concluded that new ventures in emerging industries (such as e-commerce organizations) have a high correlation between their level of performance and their level of organicity.

6. CONCLUSIONS

Electronic commerce organizations are faced with a dynamic environment that requires flexibility and structural abilities to rapidly react to the turbulence of market changes. The literature on traditional and entrepreneurial organizations has established the crucial role that structural dimensions play in the performance and the success of such organizations. The same conclusions can be implemented in e-commerce organizations.

These organizations are better served when they adopt a structure that offers flexibility and organicity—measured by design dimensions of formalization, departmentation, centralization, and complexity. Thus, e-commerce organizations can learn from the experience of “brick-and-mortar” and new ventures. The relationship between environment, strategy, and structure is as relevant to e-commerce as it is to traditional organizations.

As we accumulate empirical knowledge on this relationship, we may now address the unique attributes of e-commerce by asserting that this knowledge is highly relevant to their structuring and to their success. Any organization, whether “brick” or “click,” when faced with the challenges of a highly dynamic external environment, must employ its design dimension in such a manner as to provide it with adequate agility and organicity, so that drastic strategic choices may be implemented in a timely and successful fashion.

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