

2002

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Recommended Citation

Periasamy, K. Pelly; Loong, Ho Wei; Ming, Poh Wei; and Wei, Bok Chuan, "Organizational Structure for Electronic Commerce: A Qualitative Investigation" (2002). *ECIS 2002 Proceedings*. 97.

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ORGANIZATIONAL STRUCTURE FOR ELECTRONIC COMMERCE: A QUALITATIVE INVESTIGATION

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ABSTRACT

Business model and technology seem to be the mantra for companies, especially dot.com start-ups, entering e-commerce. In the hurry to be quickly functional in the e-economy, many appear to be ignoring critical factors such as organizational structure. Only a few seem to recognize the need to examine if their structure and arrangements are appropriate for e-commerce. This paper examines the issue of organizational structure for e-commerce. It discusses the findings of a qualitative study of 10 e-commerce companies in Singapore. The research concludes that though the conventional functional structure appears to be also the current norm for e-commerce organizations, the appropriateness of the matrix structure for e-commerce has been recognized and companies are starting on this route.

1. INTRODUCTION

The mantra for companies - startup dot.coms and established brick and mortar - entering the e-commerce world is "e-business models" and "technology exploitation" (Feeny, 2001; Porter, 2001). Other critical issues such as organisational arrangements and structure seem to be ignored in the hurry to have an e- presence as quickly as possible. These companies seem to think that with the right e-strategy and technology capabilities, success is assured. What they seem to forget is that one needs to be appropriately structured and organized to be able to deliver effectively and efficiently the strategies and capabilities planned. Perhaps this "oversight" could be one of the contributing factors to the prevailing collapse in the dot.com world.

Authors such as Symon (2000) argue that new forms of organizational structure are closely linked to technology implementation. Hinds and Kiesler (1995) contend that new technologies require organizations to restructure and adopt new ways of working. Hammer and Champy (1993) suggest that when organizations reengineer their business processes using IT, structure would also have to be correspondingly reengineered. There are others who argue otherwise and contend that technology does not determine organizational structure (e.g. Grint and Woolgar, 1997), but such argument is being increasingly challenged by the Internet and World Wide Web and their implementation in organizations (Symon, 2000).

Much of the above-mentioned and other literature examine the impact of technology on organizational structure. The issue of the right organizational structure for exploiting technology has not been adequately researched. One often comes across the relevance of new structures such as the matrix structure for high-technology companies and knowledge-based businesses such as management consulting (George and Jones, 1999). But the topic of appropriate organizational structure for e-commerce lacks both adequate research and deliberation, perhaps because e-commerce is still taking shape. E-commerce is set to transform business practices in the 21st century (Feeny, 2001). The transformation in e-commerce organizations, however, requires more than just the establishment of an e-commerce department; it may be necessary to revise the whole of the organization's structure (Corbitt, 2000).

This paper examines the issue of organizational structure for e-commerce. It discusses the findings of a qualitative study of 10 e-commerce companies in Singapore. The research concludes that though the conventional functional structure appears to be also the current norm for e-commerce organizations, the appropriateness of the matrix structure for e-commerce is being recognized and companies are starting on this route.

2. ELECTRONIC COMMERCE

E-commerce can be defined as the deployment of IT/Internet and telecommunication technologies in the interest of commerce and to conduct commercial transactions electronically. It is an interconnected marketplace which facilitates the exchange of a wide variety of products and services over the Internet. E-commerce organizations are primarily of two types:

- Pure dot.com e-commerce companies - businesses that primarily sell their goods and services through the Internet. They usually have no shop-front and generally have a single office as their physical location.
- Hybrid e-commerce companies - brick and mortar (companies with a building where actual commercial transactions take place) which enhance and further their regular business by exploiting e-commerce. This is done by establishing a separate e-commerce department to work with the whole company, or a subsidiary company with e-commerce as its primary focus.

Every business process requires some movement and an exchange of information. Moving that information electronically, without human intervention, reduces the time it takes to complete each process. With Internet, an organization can get closer to its suppliers and partners, and interact with its customers quicker and at virtually no cost. A Web site that is well integrated into the business cycle of a company can offer customers more information quickly. For example, Dell tracks each computer ordered through the manufacturing and shipping process, and its customers are able to know the status of their orders at any time.

3. ORGANIZATIONAL STRUCTURE

Organizational structure is “the formal system of task and reporting relationships that controls, coordinates, and motivates employees so that they cooperate and work together to achieve an

organization's goals." (George and Jones, 1999, p. 529). Structure is central to an organization's effectiveness. The structure must fit the environment, enable deployment of organizational resources including technology in an efficient way, and support the company's strategy and culture (Nahavandi and Malekzadeh, 1999). It has five basic components

- Reporting relationships
- Span of control
- Departmentalization
- Allocation of responsibilities
- Coordination

These five components are configured into specific structures by defining how employees should operate in terms of the following factors:

- Formalization
- Specialization
- Standardization
- Hierarchy
- Centralization
- Differentiation
- Integration

The configuration is done with reference to the following three basic organizational structures: functional, divisional, and matrix (George and Jones, 1999):

3.1 Functional Structure

This is the simplest and most popular form of structure. It is hierarchical and involves grouping employees by their functional specialization, such as Marketing, Human Resource, etc. People who contribute to the same function are placed into same departments so that they can collectively deliver the function required by the organization.

This structure is appropriate in a low uncertainty, stable environment, and for small to medium-sized organizations that focus on control and efficiency [Nahavandi and Malekzadeh, 1999]. As an organization grows, additional departments (functions) are created. The ability to meet new functional needs as they arise is one of the key benefits offered by functional designs. Since all employees performing the same or similar functions work together and share resources, economies of scale prevail. This structure also encourages work units and individuals to be highly specialized, offering potential for greater efficiency.

The downside of this structure, however, is that it encourages separate functional units to go their own ways and develop their own perspectives. There is hence a risk of functional priorities superseding organizational goals and objectives. In addition, top management, which has the task of integrating various functional activities, may soon find itself overloaded with inter-functional conflicts and challenges. Baron and Greenberg (1990) also note that this structure encourages individuals to focus on routine tasks within their own units, reducing the opportunity for innovation. Hammer and Champy (1993) point out that functional structures can be an obstacle to business process reengineering as organizational processes typically transcend at least a few functions.

3.2 Divisional Structure

The divisional structure groups employees by the products or services they work on, or according to their geographical locations or markets served. Within each division, the structure could be functional or matrix. The divisional structure is appropriate for large organizations that face an uncertain environment, have demands for quick response to customers, and command considerable resources.

Such organizations focus on optimal customer service and typically have decentralized management reporting to top management at the corporate headquarters.

Divisional structure offers several advantages. First, it offers greater organizational flexibility, allowing quicker response to changing external conditions. Since each unit specializes in a particular product line, service, market or region, it can be sensitive to shifts in competition and customers' needs. Second, as each unit is largely self-contained, divisional structure design heightens concern with overall results. It promotes healthy competition among individual divisions, while contributing to overall organizational effectiveness. Third, because divisions are of a manageable size, coordination between them may be easier [Baron and Greenberg, 1990].

On the other hand this structure has several drawbacks, the most severe being the loss of economies of scale from the duplication of functional departments within each division. Since each department within operating units would be smaller than a single combined one, the opportunities for career advancement and employee development would be limited. This may in turn pose a long-term problem for talent-retention. Problems of coordination across divisional lines may also arise. In fact, in extreme cases, actions taken by one operating division may have an adverse impact on the outcome of others, e.g. cannibalization of products [Baron and Greenberg, 1990].

3.3 Matrix Structure

The matrix structure is based on flexible project teams that include both functional specialists and product or project specialists. The goal of the matrix is to provide a high level of integration between function and product, and to do so without using extensive resources. It ensures a high level of cross-unit collaboration and accountability.

The matrix structure is appropriate for organizations that face a highly uncertain environment and are under pressure both to be efficient and to respond to customers quickly. It is recommended particularly for high-technology and biomedical engineering firms (George and Jones, 1999). Its strength lies in its ability to facilitate coordination when the organization has a multiplicity of complex and interdependent activities. The structure facilitates the efficient allocation of specialists. It achieves economies of scale by providing the organization with both the best resources and an effective way of ensuring their efficient deployment. The matrix structure also increases the ability of the organization to respond rapidly to environmental changes. The structure draws its strength from the expertise of the cross-functional team, enabling projects to be managed with people skilled in multiple disciplines [Gordon, 1996].

A major drawback of the matrix is that greater expertise in managing multidisciplinary teams is required; it places greater demands on the project manager. People from different functional areas may have difficulty working well together. The matrix structure also puts employees into a state of confusion due to its violation of the unity of command. In short, members of the organization would have two bosses to report to instead of one. This creates a problem for performance evaluation and employee accountability [Nahavandi and Malekzadeh, 1999].

None of the structures discussed are perfect. An organization may move from one to another over time. Whether a particular structural option works for an organization depends on the fit among the contextual factors of environment, resources, technology, strategy and culture.

4. RESEARCH ISSUES

A research model was developed to investigate the right organizational structure for e-commerce operations (see Figure 1).

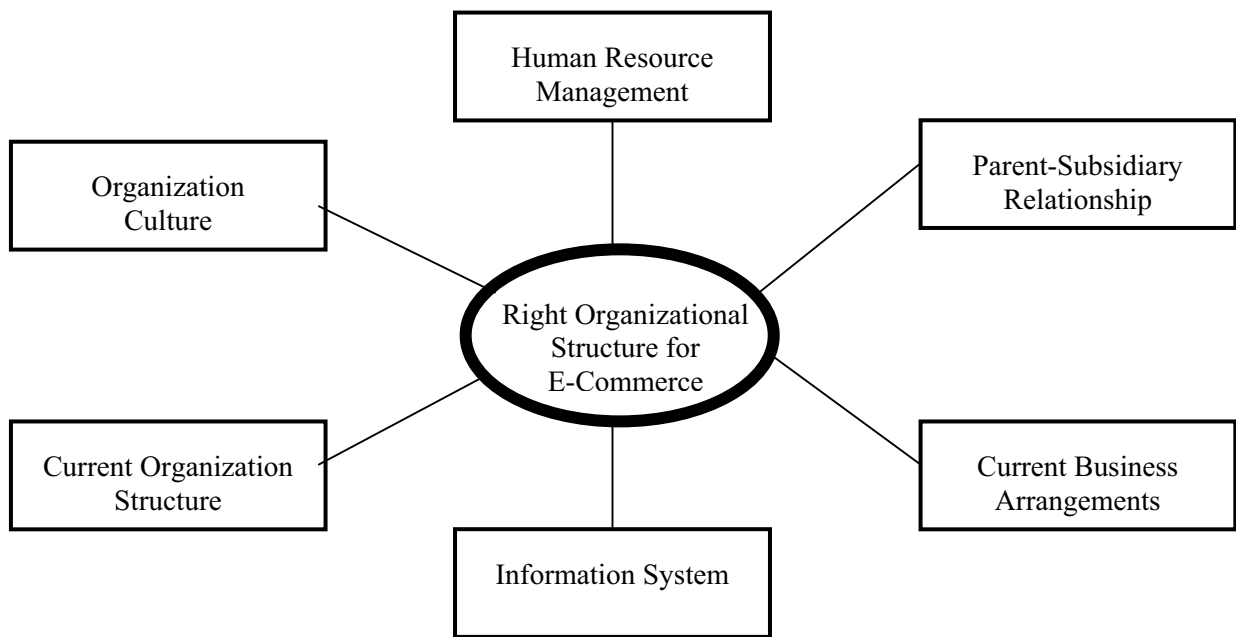


Figure 1: Research Model

While many factors are relevant to the structure of an organization, some are more significant than others. The more significant ones relevant to e-commerce – organization culture, current organization structure, human resource management practices and information system/infrastructure - were identified for investigation on the basis of relevant e-commerce and organizational behavior literature (e.g. George and Jones, 1999; King et al; 2002; Laudon and Laudon, 2002; Nahavandi and Malekzadeh, 1999; Rayport and Jaworski, 2001; Symon, 2000; Treen, 2000). Our observations on e-commerce ventures by established businesses such as OCBC Bank/Finatiq.Com, SPH/Asiaone.Com, and Barnes & Nobles prompted us to include “current business arrangements” and “parent-subsidiary relationships” in the research model in relation to hybrid and parent-subsidiary cases.

For more comprehensive articulation of the research objectives and to focus the study, we defined the following questions to complement to the research model:

- What are the current trends in organizational structure for e-commerce operations?
- Why do such trends exist?
- What is the ideal organizational structure for e-commerce?

5. RESEARCH METHODOLOGY

The e-commerce domain is in its early stages. While a survey could help to clarify questions on status and ongoing practices, the findings might be of only transitional value due to the domain’s highly dynamic nature. We wanted to conduct a comprehensive study of a specific issue to shed some light on a subject lacking adequate research. We therefore chose to conduct an exploratory study through case studies. We were pleased to find support for our research methodology in Symon (2000) and Sonnentag (2000) who argued for more qualitative work in this subject area.

5.1 Case Study Sample

The domain of e-commerce can be defined in terms of B2B (business to business) and B2C (business to customer) as well as pure dot.com and hybrid. As the latter categorization is more closely related to structure, we decided to define our sample in terms of this categorization. We approached a random set of 50 e-commerce companies in Singapore to participate in the study. In spite of follow-up efforts, only 10 companies finally agreed to participate. We decided to proceed with the ten as we felt that the in-depth investigation opportunity provided by them would compensate for the small sample size.

The sample consisted of 5 dot.coms and 5 hybrid companies. As shown in figure 1, 2 companies were the result of joint ventures, 3 others were subsidiaries of parent companies, 4 were independent private limited companies and 2 were publicly listed. Table 1 provides further information on these organizations. We classified the organizations by size on the basis of number of employees: small = “< 20 employees”; medium = “20 to 50 employees”; large = “> 50 employees”. The conventional financial parameters – turnover/revenue – were not used as the companies were in different stages of development, making these financial measures less meaningful for classification of size. For confidentiality reasons, the identities of the companies are not being revealed.

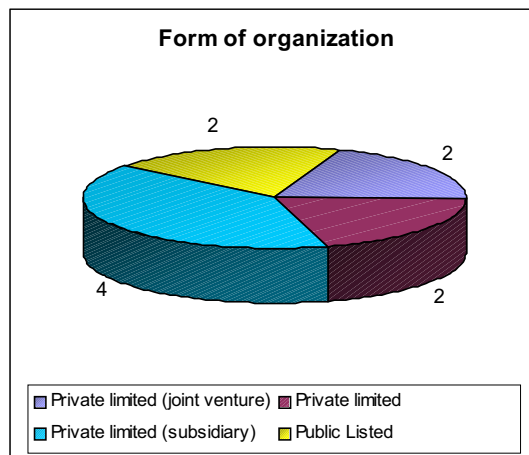


Figure 2: Profile of Sample

Table 1: Profile of Case-Study Organizations

Organization	Size	Type	Products	Form
A	Small	Dot.com	Household goods	Private limited (joint venture)
B	Small	Dot.com	Books	Private limited (subsidiary)
C	Small	Dot.com	On-line auction	Private limited
D	Small	Dot.com	Billing services	Private limited
E	Medium	Dot.com	Information portal	Private limited (subsidiary)
F	Large	Hybrid	Telecommunication	Private limited (joint venture)
G	Large	Hybrid	Household goods	Public listed
H	Large	Hybrid	Books	Private limited (subsidiary)
I	Medium	Hybrid	Flowers	Private limited (subsidiary)
J	Medium	Hybrid	Bed and bath	Public listed

5.2 Interview

A questionnaire was prepared for conducting the case study interviews (see Appendix). It was structured on the basis of the research questions and research model. Open-ended questions were used so that interviewees could respond freely rather than be restricted to a predefined response structure. The questionnaire was pre-tested on a few professors and students to ensure its validity and clarity.

Newspapers, business magazines, annual reports, company web sites and other information sources were consulted to obtain comprehensive information on the case study organizations before and after the interviews. Face-to-face interviews from October to December 2000 were conducted with selected business and IT executives in the ten companies. The duration of each interview was about 1.5 hours. Where questions were later found to have been not adequately answered, a follow-up telephone call was made to the interviewee for clarification.

6. ANALYSIS AND DISCUSSION

The data on each case study were documented as separate case study write-ups using the research model as a template. This approach enabled the analysis of the research data to be done in a structured manner. The qualitative analysis conducted is presented below using the same template.

6.1 Organization Culture

Table 2 summarizes data on two key aspects of organization culture: relationships and atmosphere. These two were chosen for analysis as they are often featured in dot.com stories such as Hotmail and Yahoo.

Table 2: Organization Culture

Org. →	A	B	C	D	E	F	G	H	I	J
Relationship beyond work	Yes	Yes	Yes	Yes	No	No	No	No	No	No
General atmosphere	Informal	Informal	Informal	Informal	Formal	Formal	Formal	Informal	Informal	Informal

As shown in table 2, employees of four companies shared personal relationships beyond work. This practice was limited to the smaller dot.coms; it was not present in the medium-sized dot.com. Employees in the hybrid organizations did not have beyond-work relationships. While the evidence does not support the existence of a relationship between dot.com and off-work employee relationships, group dynamics offers an explanation for the behavior noted in the case studies – members of smaller groups tend to be more cohesive (George and Jones, 1999); such cohesiveness contributes to relationship beyond the workplace.

As for formal/informal working arrangements, the general atmosphere in seven companies was informal. Backed by a foundation of personal relationships, companies A to D developed an informal culture. Interestingly, company E and companies H to J, which were medium-sized or large, had an informal culture despite the absence of beyond work relationships. This poses an interesting question: Could this informal atmosphere be attributed to the demands of e-commerce operations?

A formal culture requires information to flow in a predetermined, standardized manner for effective management and control. The result is that information is often "trapped" in the hierarchies or in bottlenecks. This may not be a serious problem in a stable environment. E-commerce organizations, however, operate in a dynamic environment and require fast information flow within and beyond the

firm (Wang, Head and Archer, 2000). An informal culture has the effect of pulling employees together and lessening the psychological barriers between the hierarchies of the firm and enabling information to flow faster (Hill and Jones, 1998). Organization-wide sharing of information and knowledge is critical for e-commerce where goods and services have short product life cycles (Gray and Debrecey, 2000). Relating these arguments to the research evidence, we contend that an informal culture is conducive, if not necessary, for e-commerce operations.

6.2 Human Resource Management

We focused on a few important aspects of human resource management viewed as being highly relevant to major business transformations such as e-business – job rotation and multi-skilling; employee empowerment; motivation (Hammer and Champy, 1993; Lewis, 2001).

(a) Job rotation and multi skilling

Table 3 summarizes the multi-skilling and job rotation policies of the case studies. Seven companies practiced multi-skilling. The employees in these firms were equipped to perform one of a few jobs or play different roles at the same time by performing varied tasks. For the larger firms, the hybrid companies, multi-skilling was of value for job rotation amongst employees. Such a practice enabled development of individuals as well as help to address manpower inadequacies in any area in the company. For the smaller e-commerce companies, the dot.coms, multi-skilling served as a contingency of human resource ; due to the small staff size, an employee would often have to double up in different roles.

Table 3: Job Rotation and Multi-Skilling

Org. →	A	B	C	D	E	F	G	H	I	J
Multi-skilling	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
Job rotation	No	No	No	No	No	No	No	Yes	Yes	Yes

Firms that emphasize strict departmental specialization would find its employees having a myopic view about its business. Such companies may encounter problems in reacting to the dynamic Internet environment because departmentally specialized employees would lack the macro vision and skills to react to changes in customers’ preference and competitors’ challenges (Pearce and Robinson, 2000) - such an organizational practice would not be appropriate for e-commerce. With job rotation, enabled by multi-skilling, employees are able to view the business from multiple perspectives since they would work in different departments at some time (Nonaka, 1991). This would allow employees to have a broad, macro view of the company and the industry it is in, as well as build relationships with people in various functions. Such an arrangement would be conducive for e-commerce operations especially in the larger firms. The research evidence supports this proposition.

Despite the absence of job rotation, employees of dot.com companies may not necessarily have a tunnel vision of the business. This is because they frequently perform more than one role or cover one another’s job due to manpower shortage. It could be this need which fosters multi-skilling in the smaller e-commerce firms.

(b) Employee empowerment

Table 4 shows the empowerment policies practiced by the case study organizations. Empowerment, the transfer of job-related authority and responsibility from management to frontline employees, was evident in five companies; four of them were hybrid companies, older establishments. The other five companies that did not practice empowerment were relatively new. Out of the five companies that

practiced empowerment, three companies empowered frontline staff; the remaining two (H, J) empowered their executive and supervisors respectively.

Table 4: Employee Empowerment

Org. -	A	B	C	D	E	F	G	H	I	J
Employee empowered?	No	No	No	Yes	No	Yes	Yes	Yes	No	Yes
Who is empowered?	-	-	-	Frontline	-	Frontline	Frontline	Executive	-	Supervisor

In today’s dynamic e-commerce environment where customer loyalty is difficult to establish, empowerment allows frontline employees the opportunities to manage and handle customers needs quickly. But empowerment is only meaningful if the frontline staff are empowered (Robbins, 1997). This is because frontline staff constantly interact with customers, suppliers and other third parties. Empowerment of frontline staff to serve customers more effectively has been advocated for business process reengineering (Hammer and Champy, 1993). Though the research data does not offer any clear indication as to the matter of empowerment, the need for empowerment in e-commerce is evident. After all, e-commerce is not just an exercise in BPR but is a paradigm shift in business, bringing a firm even closer to its customers and suppliers.

(c) Motivation

According to Herzberg’s motivation-hygiene theory, the factors leading to job satisfaction are distinct from those that lead to job dissatisfaction (George and Jones, 1999) (see Table 5). "Hygiene" – the formal organizational arrangements for employees to function - is necessary but is not sufficient to achieve employee performance; that would require "motivation". Motivation factors are characteristics that people find intrinsically rewarding and lead to job satisfaction, and consequently better performance

Table 5: Hygiene and Motivation Factors

Hygiene Factors	Motivation Factors
Company policy and administration	Achievement
Supervision	Recognition
Work conditions	Work itself
Salary	Responsibility
Personal life	Advancement
Relationship with supervisor	Growth
Relationship with peers	
Relationship with subordinates	
Status	
Security	

Data on the key aspects of human resource policies were collected. These are summarized and tabulated in Table 6. With reference to the motivation-hygiene theory, aspects 1 and 3 are motivators, while 2, 4 and 5 are hygiene factors. The majority in the case-study sample had at least one motivator to motivate and retain employees. The findings of this study concur with Herzberg's theory. "Hygiene" alone would not be enough for employee performance in e-commerce firms. "Motivation" is

particularly critical for e-commerce as it also supports employee creativity and multi-skill development, both of which are essential for e-commerce.

Table 6: Key Aspects of Human Resource Policies

Human Resource Policy Aspects	Frequency of Occurrence in Sample
1. Employee Involvement in Decision Making	4
2. Relationship with Management	4
3. Advancement	3
4. Stock Options (i.e. Salary)	3
5. Job Security	1

6.3 Information System

Proper IT infrastructure, offering the required reach and range of services, is essential for any e-business venture. Likewise, the quality of an organization’s information system (IS) can be a key determinant of its performance. Level of IS integration is becoming an important parameter of this quality (Laudon and Laudon, 2002). Schneider and Perry (2001) contend that the nature of e-commerce - cross functional systems - mandates the integration of information system within a firm. This was found to be the case in all the case study organizations. The study, therefore, focused on IS integration with partners, a need highlighted by Lewis (2001) and Treen (2000) as essential for some types of e-business. Table 7 summarizes the data.

Table 7: Information System Integration

Org. →	A	B	C	D	E	F	G	H	I	J
IS integration with partners	No	No	Yes	Yes	No	No	No	Yes	No	No

Only 3 companies had integrated their information systems with their partners’. Only 1 of the hybrid companies had an integrated IS. The interviewees clarified the reason for this situation - linking an existing or new system with that of a partner is not an easy task; issues of standards, interfaces, protocols, compatibility and security have to be addressed. This would take time and significant effort from both parties.

The value of integration was recognized by the interviewees - ability to share information, provide timely feedback and engage in seamless electronic transactions. Such an arrangement would enable the organization to integrate the whole value chain into a focused process where efficiency and effectiveness could prevail. Firms with well integrated IS would be able to ‘look down or up’ the value-chain with great ease. This increases the speed of information flow, feedback and response. For example, customers whose IS are integrated with suppliers’ can look into the inventory database of the suppliers to check the level of inventory. It can feedback to the suppliers easily if they find that the supplier’s inventory level is low.

Without a satisfactory level of IS integration between an e-commerce firm and its partners, its value chain is likely to be less than effective (Schneider and Perry, 2001; Treen, 2000). An e-commerce firm's value chain not enabled by an integrated information system can turn out to be a source of competitive disadvantage.

6.4 Current Business Arrangements: Distribution Channels

While the issue of legacy would not be applicable to a fresh start-up, it is clearly relevant to established businesses venturing into e-business. In particular, current business arrangements such as distribution channels are particularly significant for hybrid firms (Wilkinson, 2000). We wanted to examine this particular issue in view of its importance. The data on the five hybrid organizations in our sample are summarized in Table 8. Three hybrid organizations relied on existing channels for conducting their business. Internet orders captured on company websites were relayed to the relevant departments where they were processed together with orders obtained via other channels such as telephone and post.

Table 8: Distribution Channels for E-Commerce

Org. →	F	G	H	I	J
Reliance on existing channels	Yes	Yes	Yes	No	No

According to Gray and Debrecey (2000), the biggest challenge facing hybrid companies is controlling the cannibalization of sales from their existing operations and trading channels. It appears that hybrid companies that typically conduct their web and brick & mortar operations using the same distribution resources may face conflicts between the two trading channels (Wilkinson, 2000). We can therefore conclude that hybrid firms face possible conflicts between the web and the brick and mortar operations. In the light of this argument, the establishment of Finatiq.Com (<http://www.finatiq.com.sg>) as an independent Internet bank in Singapore is a sound e-commerce structure and strategy adopted by OCBC bank (<http://www.ocbc.com.sg>), one of the big four banks in Singapore (Yang and Papazoglou, 2000).

6.5 Parent-Subsidiary Relationship

The relationship of a subsidiary with its parent can be defined in terms of decision-making responsibilities. This relationship is a key factor for understanding the structuring of a business subsidiary engaged in e-commerce. We therefore decided to study the parent-subsidary relationship.

Table 9: Parent-Subsidiary Relationship: Decision Responsibilities

Org. →	B	E	H	I
Does the e-commerce subsidiary make significant decisions?	No	Yes	Yes	Yes
Type of decisions made by subsidiary (decentralized decisions)	Few	Operations	All decisions	All decisions
Type of decisions made by parent (centralized decisions)	Most decisions	Strategic	-	-

Only four of the case study firms in our sample were subsidiaries of parent companies (see Table 9). Of the four, three were decentralized entities. Company H and I were totally decentralized, with authority to make all decisions. However, company E only had the authority to make operational decisions; the parent retained authority to make strategic decisions. Holding companies of H and I viewed their e-commerce subsidiaries as part of their diversification strategy, thus allowing all decisions to be decentralized. On the other hand, the holding company of company E appeared to view

its e-commerce subsidiary as another means to sell its products and services. It kept the strategic decision making authority centralized to enable the group to reach its objectives in an organized, cohesive manner.

Parent companies of e-commerce subsidiaries typically decentralize decision-making authority to enable the latter to better react to the dynamic Internet environment. Decentralization also enhances the creative and innovative abilities of the e-commerce subsidiaries. This is a step in the right direction for achieving results in e-commerce. Symon (2000) concurs with our argument.

6.6 Current Organizational Structure

Table 10 shows the organizational structure adopted by the case study organizations. The matrix structure was practiced in only two firms - a dot.com and a hybrid. Another hybrid adopted divisional structure with a functional structure within. The other seven had a functional structure.

Table 10: Current Organizational Structure

Org. →	A	B	C	D	E	F	G	H	I	J
Structure	Function.	Functional	Matrix	Functional	Functional	Matrix	Divisional	Functional	Functional	Functional

The literature review on organizational structure, however, suggests the matrix structure as the preferred model for e-commerce (George and Jones, 1999). Biggs (2000) is emphatic that the functional "hierarchical structure no longer provides what organizations need to successfully run an e-business. Distributed interconnectedness is the order of the day." Treen (2000) argues that as e-commerce continues to standardize, streamline and simplify capabilities, "the old feudal structure of specialized operations will become even more dysfunctional. The value that technology has to offer can only be created and captured by re-engineering the company's structure, processes and organizational behavior. Executive empires must give way to 'executive Olympic rowing teams'." The knowledge economy and e-commerce "demands a new kind of executive, one who freely shares ideas and expertise across the company while remaining fiercely committed to business unit performance" (Hansen and Oetinger, 2001). The matrix structure develops and supports such executives and employees.

A first glance at the research data does not suggest the matrix structure as the choice for e-commerce. However, taking into consideration the interview anecdotes and the fact that the e-commerce firms are still in transition, we can say that there is support for matrix as the structure for e-commerce. Blending the arguments from the literature with the findings of this study, the case for matrix structure for e-commerce is clearer.

What then accounts for the prevalence of the functional structure in the sample? The e-commerce firms employed the functional structure for the following reasons:

- It was practiced in the parent organization and by others.
- Work scope and reporting relationships are clearly defined by this structure.
- It is easy to implement a familiar structure.

Notwithstanding the state of practice, the matrix structure was still preferred by the majority of the e-commerce firms in this study. They realized its value but found it difficult to implement quickly - e.g. dual chains of command challenge fundamental organization orientation; negotiating shared responsibilities, resources or priorities can create confusion among employees (Pearce and Robinson, 2000). Furthermore, the functional legacy in the parents of hybrid firms had to be challenged for e-commerce operations to adopt a matrix structure - this required significant effort. A progressive incremental effort would achieve this goal more easily, as was clarified by the interviewees from the hybrid firms. In the case of the start-up dot.coms, the functional structure offered a quick proven route

to be operational in minimum time; they could not afford the luxury of experimenting with the emerging matrix structure. But ultimately they will have to adapt and adopt a structure appropriate for their fast changing environment. They cannot escape a fundamental law of nature – the dinosaurs found this out too late (Suutari, 2001).

Cross-functional collaboration has become an increasing concern for companies facing rapid changes in the 21st century; the silo-functional structure is not conducive for addressing these challenges. The matrix structure, with cross-functional teams as its core strength, can help e-commerce companies to deal with these challenges such as a shortened product life cycle (Pearce and Robinson, 2000).

7. CONCLUSION

Though this study involves a small sample size, it has served our needs for a preliminary exploration into organizational structure for e-commerce. Further research involving larger samples and focused investigations in this important area is suggested. We believe that our study would be of value to such research.

In conclusion, we recommend that e-commerce companies in general should consider adopting the matrix structure. A functional structure could suffice in the early stages to get things started quickly. But a matrix structure would be necessary in the long term for viability and success. Cross-functional teams allow expertise to be shared and permit the teams to see through a business idea from cradle to grave when it is replaced by a more innovative idea. Issues such as informal culture, employee empowerment, multi-skilling and job rotation, motivation factors and parent-subsidiary relationship and decentralized decision-making are all covered adequately by the matrix structure. The matrix structure does not impede or hinder integration with partners (virtual organization working arrangements and integrated information systems). In establishing or progressing towards the matrix structure, due attention needs to be given to the limitations and disadvantages of the matrix structure.

The matrix structure draws on the expertise of cross-functional teams, and has the attributes of a decentralized organization with an informal culture where empowered employees equipped with multi-skills are able to effectively deliver results. Coupled with proper organizational infrastructure (including a well-integrated information system) and right incentives to motivate and retain talents, an e-commerce organization that adopts or progresses to a matrix structure has a better chance of success in the turbulent digital economy. While having an appropriate organizational structure may not assure e-commerce success, not having the right structure can be a major obstacle.

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APPENDIX: QUESTIONNAIRE FOR CASE STUDY INTERVIEWS

A) General (from secondary sources - e.g. Annual Report, Websites)

1. Company history, background, profile and performance
2. Number of employees
3. Products and services
4. Customers and partners
5. E-business activities

B) Structure

1. Organization chart – HQ, subsidiary, divisions, functions, departments
2. Levels of hierarchy ; span of control
3. Physical structure - functional, divisional, matrix or team-based

C) Culture

1. General atmosphere and norms

2. Formal/informal communication channels – e.g. does management adopt an open door policy; do superiors lunch together with employees; annual or regular events for staff
3. Information and knowledge sharing – mechanisms and incentives

D) Human Resource Management

1. Multi-skilling of employees
2. Job rotation practice
3. Empowerment – extent and levels
4. Motivation of workers

E) Information System

1. Characteristics of enterprise information system
2. Internal and external integration - Is the database accessible by employees? By partners?
3. For **hybrid** organizations, does the existing information system support electronic commerce?

F) Current Business Arrangements

1. Business arrangements – what, why, how , who , where
2. Distribution channels

G) Parent-Subsidiary Relationship

1. Type and nature of relationship
2. Decision making responsibilities
3. Centralized/decentralized arrangements

H) Comments and Opinion on E-Commerce and Organization Structure