

THE ORGANIZATIONAL EFFECTS OF E-COMMERCE

A Cross-sectional Study

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Abstract: Electronic Commerce (EC) is increasingly perceived as a mainstream element of the marketing strategy. With more firms trying to extract value from the virtualized and global marketplace of the 21st century it is essential that managers effectively address the problems related to the organizational adoption and internal implementation of EC. The paper evaluates the aptitude of the stages model, one of the well-known approaches describing the adoption of EC, in accurately mapping and explaining this complex process. Based on a study of ten commercial firms the study concludes that in the majority of cases the stages model does not adequately describe the EC adoption process. The model suffers from a fundamental flaw, namely overlooks the irregular pattern of the EC assimilation in the internal organizational processes who are shaped by EC with different intensity, in different ways and at different times rather than in a linear way the stages model suggests.

The paper proposes a more flexible approach recognizing the complexity of this process and providing a more accurate and representative picture of the EC adoption by commercial firms.

1 THE ONLINE BUSINESS IMPERATIVE

The Internet is widely considered as the most important technological and commercial innovation of the 90's and all indicators point to it as the technology likely to shape the marketing practice of the future years. The Internet entered the commercial field as a technological novelty and after a heavily hyped period that ended in the 2000 with a high tech melt-down has become today the basis of what is commonly known as E-Commerce, a standard feature of the mainstream commercial landscape (García-Dastugue and Lambert, 2003; Barwise and Farely, 2005; Brodie et.al, 2006).

Responding to the growing commercial importance of the online marketplace millions of traditional businesses already embraced E-Commerce as part of their corporate, business and functional strategy (Krell and Gale, 2005). The wide acceptance of E-Commerce by consumers and businesses as a major commercial channel indicates that firms failing to create an attractive and customer-centric web presence deprive themselves from the opportunity to add new revenue streams to their business, improve customer relationships and

improve their profitability by obtaining synergies between their physical and online operations (Amit and Zott, 2001; Mustaffa and Beaumont, 2002, Lumpkin et al., 2002).

2 EFFECTS OF THE INTERNET / E-COMMERCE ON THE ORGANIZATIONAL STRUCTURE: THEORETICAL BACKGROUND

The adoption process of E-Commerce by commercial organizations has been treated in the literature along two broad lines:

1. As a contingency issue: this approach has been discussed among others by Thong (1999), Wang (2000), Truong and Subba Rao (2002) and Teo and Pian (2003). The contingency model proposed by Truong and Subba Rao (2002) identifies three categories of factors affecting the adoption process (Organizational, Technological and Environmental) that combined lead to different degrees and forms of E-Commerce adoption. More recently Krell and

Gale (2005) proposed a process model addressing different contingencies involved in the migration of traditional organizations to E-Business.

2. As a stages process describing the adoption of the Internet as a journey through different levels of organizational adoption, a process particularly popular by business consultants in the late 90's. El Sawy et al. (1999) proposed a six-level framework of enterprise transformation on its way to E-Commerce with emphasis on the organizational aspects influencing this process. Earl (2000) discussed a six-stages process with more emphasis on strategic issues. Furth and Jensen (2000) from the Roland Berger Strategy Consultants proposed the e-Transformation 3-wave model. The consulting firm PricewaterhouseCoopers developed a 4 stages model, similar to NerveWire's model described by Gossain S., Kenworthy R., (2000). More recently Subba Rao et al (2003) discussed a four stages model that more or less summarizes the past experience on this issue. According to their concept E-commerce can be introduced by organizations in different degrees of intensity leading to four broad categories or adoption stages. In each of these stages companies have different strategic objectives and aspirations, expressed in varying degrees of managerial commitment and resource allocation.

In a nutshell the stages model of Subba Rao et al. (2003) describes four distinctive phases of E-Commerce adoption:

a. Presence: is the simplest form of e-commerce adoption. Organizations in this stage employ static informational sites playing the role of a virtual brochure. The online activity is very little or not at all integrated in the internal organization.

b. Portal: in this stage online interaction with customers is possible. Interactive elements of this stage include ordering facilities, active product feedback, customer feed-back in the form of quality surveys, information on inventory data and search capabilities.

c. Transactions integration (TI). In this stage the company web site allows for financial transactions like ordering and payments online. Other forms of interaction like sharing of information by means of virtual communities and electronic auctioning are common in this stage.

d. Enterprises integration (EI) refers to complete integration of business processes to the extent that the online business becomes an integral part of the existing physical, traditional organizational body. This level of integration requires a high degree of collaboration between organic parts of the firm and integration with other parties forming the organization's value chain.

An implicit assumption of the stages models is that in different stages of E-Commerce adoption the effects on internal processes are uniform and consistent. It has however been argued that the influence of E-Commerce on internal organizational processes can be non-linear and complicated (Barnes et al. 2002). Earl (2000) basing his analysis of a six-step stages model argues that the introduction of the Internet in organizations is an evolutionary process placing different emphasis on different processes in each stage while Krell and Gale (2005) conclude that the migration to E-Business is in fact a complex organizational challenge.

3 RESEARCH HYPOTHESIS AND METHODOLOGY

In line with the view that E-Commerce implementation can have different effects on the organizational operations Constantinides, (2002) identifies two distinctive groups of organizational processes where E-Commerce must be embedded:

- Front Office processes i.e. processes related to marketing strategy
- Back Office processes i.e. the processes related to the organic structure.

This distinction is used as basis for a more detailed and deeper look on the organizational effects of E-Commerce in different stages. The front and back office processes plotted against the four stages model of Subba Rao et al. (2003) are illustrated in Table 1.

Having defined the main stages of E-Commerce adoption and the two clusters of organizational processes likely to be affected (Front Office, Back Office), the next step is to examine whether the processes belonging to each of the two clusters are affected in a similar manner during the different stages of the E-Commerce adoption process.

The hypothesis of the study is that internal organizational processes are not necessarily affected in a linear manner in the different stages of the adoption process as the stages model suggests.

Accepting the hypothesis would indicate that commercial firms introduce E-Commerce in many different ways rather than in stages and with different degrees of urgency per organizational process.

The study was conducted by means of a survey on the practices followed by ten USA commercial firms based in Boston, San Francisco and Los Angeles in integrating EC as part of their commercial model. The companies were randomly selected and belong

Table 1: The four stages of E-Commerce adoption against the front and back office elements.

	Presence	Portal	Transaction	Integration
Front-office				
Back-office				

very diverse industry branches. The study is based on structured interviews with top executives (CEO’s and CIO’s) as to the company’s approach to EC. The purpose of the interviews was to identify the effects of E-Commerce on a number of Front Office and Back Office processes and determine whether these processes are affected in similar degrees per stage, as the strict application of the stages model implies.

The organizational processes that were evaluated in the survey were drawn from the classic Value Chain model of M. Porter (1985). The Porter framework distinguishes two categories of internal business processes, the secondary or supporting activities and the primary ones

The supporting activities are expanding along the whole organizational body: Firm Infrastructure, Human Resource Management, Technology Development and Procurement. The primary activities (Inbound logistics, Operations, Outbound logistics, Marketing sales and service) are represented as a series of blocks in the lower part of the model.

The large numbers of the processes in the Porter model (nine) presented a major complexity; analyzing the effects of E-Commerce in all these processes would make the study very complicated and extensive. In this respect it was decided to focus on the most important and representative processes per cluster: one secondary activity (Procurement) and three primary ones (Inbound Logistics, Operations, and Marketing/sales).

For reasons of additional efficiency the processes of procurement and inbound logistics were merged

into a single category since from the practitioners’ point of view these two activities are closely related.

In order to obtain comparable answers a number of standardized generic EC functionalities or generic activities were identified as descriptors of the business model per stage; they range from simple informational functionality in the presence stage to integrative functions in the integration stage. (Table 2). The interviewed managers were asked to identify to what extend the Internet was supporting these functions within the organizational processes in question (Inbound Logistics/Procurement, Operations, Marketing/Sales).

An indicative example in the logistics/procurement function: a company using the internet in order to inform suppliers about its intention in buying a certain product but not allowing for online tenders would qualify as being in the “Presence” stage. If customers were allowed to react on line by submitting an offer then the qualification for this function would be “Portal” and if the web site would allow an online auction or online ordering and online settlement the qualification would be “Transaction”. In case the ordering, invoicing and physical delivery processes were fully automated then the process in question would find itself in the “Integration” stage.

The hypothetical scores on the table indicate differences between the 3 processes as well as between the Back Office processes themselves. The results in this example (Back Office Integration: 3, Front Office Integration: 1) highlight a discrepancy between the Front and Back office EC adoption in each functional cluster; the company finds itself in the transaction stage with regard to Back Office processes but in the Presence stage with regard to Front Office activities.

4 THE RESULTS PER ORGANIZATION

The results of the individual tables are summarized in Table 3 and illustrated in Graphic 1.

Table 2: The classification framework of the organization effects of E-Commerce.

	PRESENCE	PORTAL	TRANSACTION	INTEGRATION
GENERIC FUNCTIONS	Information	Information Promotion Relationship	Information Relationship Promotion Transaction	Information Relationship Promotion Transaction Co-development Knowledge management

Matrix 1: Example of evaluation table; hypothetical example demonstration the scores.

Stages \ Processes	PRESENCE: 1	PORTAL:2	TRANSACTION:3	INTEGRATION:4
Procurement/Inbound logistics Operations		2		4
BACK OFFICE			$(2+4) / 2 = 3$	
Marketing and Sales	1			
FRONT OFFICE	1			

5 CONCLUSIONS

The outcome of the study indicates a wide diversity of approaches in integrating EC into business processes. A general remark one could place is that the appearance

of the "Presence" stage in a number of the cases examined indicates that after more than 15 years of commercial Internet there are still firms apparently unaware of the full potential of this technology, therefore missing the opportunity of expanding and reaching new markets, reducing costs and streamlining their operations.

Next to this general remark the conclusions of the study can be summarized as follows:

- From the ten firms examined in only two of them (G and J) the adoption of E-Commerce has affected both marketing processes (front-office) and non-marketing processes (back-office) in a linear and balanced way. Based on the scores we could establish that in terms of the stages model of Subba Rao et al (2003) firm G is finding itself in the Portal stage while firm J in the Integration stage.

- Eight of the ten examined firms cannot be classified according to the 4-stages model as to the level of adoption of EC. This because of discrepancies between the level of EC integration into different organizational processes

- The ten firms examined seem to place different emphasis on the role of E-Commerce as a corporate strategy tool. Five firms (C,D,E,F and I) have placed more emphasis on the Internet as a marketing tool while for three (A, B, H) the Internet has impacted mostly on their back-office processes.

It must be noticed here that the scope of the study was limited to the level of integration of EC in internal processes therefore the reasons for the differences between processes within the same firm or the differences between firms cannot be explained by the information collected.

The above findings indicate that the influence of E-Commerce on the various corporate processes can

vary in different stages of the adoption process. The hypothesis is therefore accepted: the simple 4-stages model of Subba Rao et al. (2003) is not sufficient to describe the stages of E-Commerce adoption since it overlooks the differences in the adoption pace by the individual organizational processes. It seems that the emphasis placed on transforming internal processes during the introduction of E-Commerce can be different per process and organizations can function in the online environment even if their internal processes are in different levels of "virtualization".

Considering the above defining the EC adoption process as a combination of stages and clusters (back-office, front-office) reveals much more accurately the adoption level of EC than the simple stages model does. The improved approach results in eight different combinations that from the strategic point of view provide a much better and comprehensive picture of the situation. Such a detailed analysis would help managers to identify and correct discrepancies in their general E-Commerce strategy or distinguish organizational processes and areas of weak E-Commerce performance.

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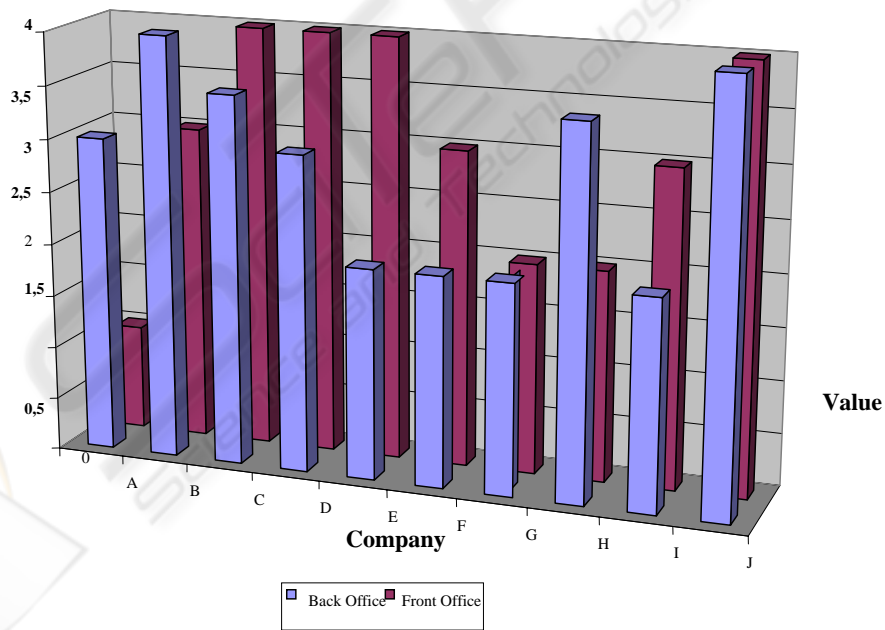
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Graphic 1: Effects of E-Commerce in Back Office and Front Office Processes in ten case studies.

Table 3: E-Commerce stage per Front and back office activities.

Company	A	B	C	D	E	F	G	H	I	J
Back Office	3	4	3,5	3	2	2	2	3,5	2	4
Front Office	1	3	4	4	4	3	2	2	3	4