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# IT MANAGEMENT PRACTICES AND THE RETAIL E-COMMERCE SITE

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**Abstract**

*Managers and researchers would benefit from both an understanding of the organizational practices that result in more featured e-commerce sites and an understanding of the particular features that contribute to firm performance. A Web-based survey of 458 managers of business-to-consumer e-commerce revealed that two organizational practices - CEO commitment and planning - generally resulted in more robust sites whereas business process redesign, did not. It also showed that more features contributed to firm performance. Four site features, namely publishing applications, catalog applications, interactivity, and interfaces, predicted firm performance at a statistically significant level, while surprisingly, two others, transaction applications and server performance, did not. In effect, this research contributes by demonstrating the general importance of the organizational practices and site features, while raising questions about business process redesign and the two particular site features.*

**Keywords:** E-commerce, e-commerce strategy, web site design, e-commerce planning, IT management practices

## Introduction

Retail organizations today are increasingly implementing e-commerce sites and adding features to existing ones. Management needs to know whether the features result in better firm performance to help it decide which to implement. A robust e-commerce site - one with many contemporary features - may or may not influence such performance. Past research has shown CEO commitment, business process redesign, and IT planning as key IT management practices but has not examined their roles in e-commerce in particular. Understanding whether or not such practices produce more featured sites could help managers decide which to emphasize. This research tested hypotheses in e-commerce within the retail industry concerning the impact of those practices on e-commerce site features and the impact of the site features on firm performance.

## Theoretical Basis

A robust site is presumed to facilitate business-to-consumer e-commerce. A literature review identified seven critical site features. *Interactivity* differentiates e-commerce from traditional commerce by allowing consumers to respond to a retailer's advertisements almost instantly via e-mail questions or by seeking information from linked pages (Dutta et al., 1997). *Publishing applications* provide nearly unlimited document space for retailers at a low cost (Hurwitz, 1998). *Community applications* enable the sharing of common interests that can encourage consumers to return to a site (Rayport and Jaworski, 2001). *Catalog applications* extend traditional, direct marketing to allow consumers to search catalog contents easily (Hurwitz, 1998). *Transaction applications* allow consumers to order online (Hurwitz, 1998). *Server performance* is important because online consumers are typically busy and want a site to load quickly (Deitel et al., 2001). The *interface* of a site makes a first impression on a potential consumer and with rich product descriptions and easy navigation, may encourage visitors to prolong their browsing and purchase (Rayport and Jaworski, 2001).

Four hypotheses use these features to represent site robustness. Generally, the justification of each hypothesis is based on related theory for IT in general with e-commerce as a specific example of IT. For example, CEO involvement in IT projects is widely believed to affect the success of the projects (Newman and Sabherwal, 1996). E-commerce site construction, as a type of IT project, thus depends greatly on top management commitment.

Top executives' clear indication of their commitment to e-commerce can be necessary to bring about the decision to initiate or even expand a site. Many physical retailers fear that their own online store will compete with their physical one (Kalakota and Robinson, 2001) so top management support increases the likelihood of such a robust site feature as *transaction processing*, which enables the company's online store to compete with its physical one.

These are examples of arguments that support the following hypothesis:

H1: Organizations, with more CEO commitment to e-commerce, have more robust e-commerce sites.

Business process redesign is recognized as one of the most important tools for transforming organizations when the business environment changes (Grover et al., 1993). It is also widely used for the re-optimization of organizational processes and structures when new IT is introduced (Orman, 1998). The ability to redesign business processes is critical for delivering strategic IT applications in organizations (Clark et al., 1997). To compete in the new business environment of e-commerce, many organizations are thus redesigning their business processes.

Many have redesigned their marketing and sales processes to fit e-commerce better (Amor, 2000). This has been necessary because the job of the sales force has shifted from simply convincing customers to buy to helping them do so. With e-commerce, the sales force spends less time finding current prices and features of products, filling out forms, and performing other routine work. Instead, it spends more time trying to attract new customers and keep old ones.

Many have also redesigned their customer service processes for their online stores. Such service depends more on IT than it did in traditional stores. Emphasis on customer support and service needs is driving information systems priorities more than ever before (Sawy and Bowles, 1997). As a result, one would expect process redesign to be producing more robust e-commerce sites with such services features as *catalog applications*, *transaction processing*, and *interactivity*.

These are examples of arguments that support the following hypothesis:

H2: Organizations, with more business process redesign to fit e-commerce, have more robust e-commerce sites.

IT planning is a critical organizational issue (Galliers, et al., 1994). Similar to information systems planning, e-commerce planning is reasonably seen as critical to the success of organizations conducting business through their e-commerce sites.

Integration between business planning and information systems planning is crucial for the IS function to effectively support business strategies (King and Teo, 2000). E-commerce planning similarly needs to be integrated into business planning in order to gain the maximum advantages of e-commerce. Organizations want their e-commerce functions to support their business strategies and thus they need a formal, strategic plan for e-commerce. As a result, their e-commerce site features are expected to be more robust. For example, if a business strategy is to serve customers better, then the organization would likely employ more extensive server availability.

These are examples of arguments that support the following hypothesis:

H3: Organizations, with more e-commerce planning, have more robust e-commerce sites.

Many studies indicate that the effective and efficient use of IT is a key factor explaining why some firms succeed while others do not (Bharadwaj, 2000). For example, organizations that adopt electronic data interchange can achieve dramatic performance improvements (Lee, et al., 1999). Retailers with a quick response program have demonstrated higher performance (Palmer and Markus, 2000). The use of IT, such as e-mail, groupware, and electronic meeting systems, can influence operational and managerial decisions (Teng and Calhoun, 1996).

The adoption of other e-commerce site features is similarly expected to affect firm performance positively. For example, the *interactivity* of a user friendly site attracts more visitors. Such *interface* features as ease of navigation and customization for cross

selling and up selling not only make customers stay longer at the site, but also spend more. The search function of *catalog applications* can provide products and services better tailored to their needs (Sawy, et al., 1999). Also, the rich product descriptions of *publishing applications* can facilitate customer decision making. More robust sites with such features as these are expected to produce more sales. Hence:

H4: Organizations, with more robust e-commerce sites, have greater firm performance.

## Methodology

Subjects were retail managers responsible for their firm's e-commerce. E-mail addresses were taken from two major portals. Sections 1, 2 and 3 of the survey had the practices (Table 1), site features (Table 2), and firm performance items (Table 3). Section 4 had demographics items.

**Table 1. Potential Determinants of E-Commerce Site Features**

| **CEO commitment to E-commerce** |
|---|
| Our top executives have clearly indicated their commitment to e-commerce |
| Our top executives have championed e-commerce within the company. |
| Our top executives have shown that e-commerce is important to the company. |
| **Process redesign** |
| We redesigned our inventory management process to fit our e-commerce. |
| We redesigned our marketing and sales process to fit our e-commerce. |
| Improving company processes is a key part of our use of e-commerce. |
| **E-commerce planning** |
| We have a formal, long-term strategic plan for e-commerce. |
| We have clearly identified our e-commerce project priorities. |
| We regularly measure the bottom-line effectiveness of our e-commerce projects. |

The organizational practices items were borrowed from a retail industry study of the effects of IT (Powell and Dent-Micallef, 1997) with one item added to CEO commitment to bring the total number of items within each factor to three. The firm performance items were borrowed from the same study with "information technology" changed to "electronic commerce" to fit the current study. The site features items were constructed by the authors via a thorough literature review.

To improve the reliability and validity of the data, the questionnaires were evaluated rigorously by face-to-face pilot testing by five local e-commerce retailers. The survey was revised after each of the first four pilot tests to make it clearer and easier for managers of e-commerce sites to complete. The fifth pilot test resulted in no changes to the instrument.

A short message was e-mailed to the organizations' e-commerce sites at the 4,088 companies with email addresses on the two portals. The recipients were asked to forward the message to the manager of their site who was then asked to click on a link to go to the survey Web site. A few days after the first email, the authors sent non-respondents a second, similar message. The total number of useable responses was 473 for a response rate of 12 percent.

Two hundred forty-six firms reported their annual sales, with an average of $2,400,000 and a median of $78,000. One hundred ninety-seven firms reported their online store profits with an average of $250,000 and a median of $16,000. Four hundred fifty firms reported their organizational size with an average of 408 and a median of 10 employees. On average, 9 employees worked on their organizations' e-commerce sites with a median of 3.

**Table 2. E-Commerce Site Features**

| |
|---|
| **Interactivity** |
| Our Web site responds quickly to email queries. |
| Our Web site lets customers easily summon a human to answer questions. |
| Our Web site readily accepts orders worldwide. |
| **Publishing Applications** |
| Our Web site publishes clear answers to frequently asked questions. |
| Our Web site publishes important company policies (i.e., on credit, privacy, or payment terms). |
| Our Web site publishes useful general company information (e.g., company history, background, phone number, and physical location). |
| **Community Applications** |
| Our Web site makes extensive use of bulletin boards for customer interaction. |
| Our Web site makes extensive use of audio conferencing for customer interaction. |
| Our Web site makes extensive use of chat rooms for customer interaction. |
| **Catalog Applications** |
| Our Web site allows customers to compare multiple products easily. |
| Our Web site allows customers to search the catalog contents easily. |
| Our Web site returns answers to catalog searches that fit customer profiles well. |
| **Transaction Applications** |
| Our Web site allows customers to complete their orders online easily. |
| Our Web site allows customers to complete their orders online securely. |
| Our Web site provides up to date order tracking for our customers. |
| **Server Performance** |
| Our Web site generally loads quickly. |
| Our Web site loads quickly during sudden, large volume surges. |
| Our Web site infrequently crashes. |
| **Interface** |
| Our Web site provides rich product descriptions using multimedia. |
| Our Web site is easy to navigate. |
| Our Web site provides links to direct customers easily to related items. |

**Table 3. Firm Performance Measures**

| |
|---|
| Our firm's financial performance has been outstanding |
| Our firm's financial performance has exceeded our competitors' |
| Our firm's sales growth has been outstanding |
| We have been more profitable than our competitors |
| Our firm's sales growth has exceeded our competitors' |

## Data Analysis

Structural equation modeling (SEM) was the primary analytical tool (Fornell, 1987). The EQS software program. was used with the conventionally accepted goodness of fit standards of the Satorra-Bentler scaled chi square divided by degrees of freedom (<3.0), the comparative fit index (>.90), and the robust comparative fit index (>.90).

The first step in this analysis was to assess the e-commerce site features using confirmatory factor analysis (CFA). After deleting two items due to cross-loadings, the goodness of fit standards were met. Convergent validity, examined via t-tests for the factor loadings, item reliability, construct reliability, and average variance extracted, was supported (Fornell and Larcker, 1981; Hatcher, 1994). Discriminant validity, examined via a chi-square difference test, variance-extracted test, and confidence interval test, was also supported.

The second step was to test CEO commitment to e-commerce, process redesign, e-commerce planning, firm performance, and a composite measure of the e-commerce site features to see if they were five distinct constructs. CEO commitment to e-commerce, process redesign, and e-commerce planning each had three items (see Table 1). E-commerce site features had seven, each representing the average of a factor validated in the previous subsection (see Table 2). Five items measured firm performance (see Table 3). After deleting one item, the analysis showed reasonable support for goodness of fit, convergent validity, and discriminant validity. The third step tested hypotheses with SEM. H2 was not significant. H1, H3, and H4 were ($p < .001$).

Regressions were then used to better explain the effect of the three independent variables on particular site features (i.e., to understand H1, H2, and H3 in greater depth) and the effect of site features on firm performance (H4). One regression used the three practices as independent variables and the six site features as dependent ones. A second used six independent variables, one for each site feature, and firm performance as dependent variable. Tables 5 and 6 show the results.

**Table 5. Multivariate Regressions: Practices on Features**

| Resources | Inter-activity | Publish. Apps. | Catalog Apps. | Trans. Apps. | Server Perform. | Inter-face |
|---|---|---|---|---|---|---|
| CEO Commitment | .15* | .24*** | .13* | .38*** | .21*** | .18*** |
| Process Redesign | .09* | .04 | .14** | .00 | .04 | .09* |
| EC Planning | .10 | .17*** | .20*** | .08 | .18*** | .16*** |
| R-square | .09 | .19 | .16 | .24 | .17 | .20 |
| F-value | 15.57*** | 35.00*** | 28.34*** | 47.87*** | 31.54*** | 37.32*** |

*p<.05 **p<.01 ***p<.001

**Table 6. Multivariate Regression: Site Features on Firm Performance**

| |
|---|
| **Interactivity (**Coef.= .17, p<.001) |
| Our Web site responds quickly to email queries. |
| Our Web site lets customers easily summon a human to answer questions. |
| **Publishing Applications** (Coef.= .17, p<.01) |
| Our Web site publishes clear answers to frequently asked questions. |
| Our Web site publishes important company policies (i.e., on credit, privacy, or payment terms). |
| Our Web site publishes useful general company information (e.g., company history, background, phone number, and physical location). |
| **Catalog Applications** (Coef.= .16, p<.01) |
| Our Web site allows customers to compare multiple products easily. |
| Our Web site allows customers to search the catalog contents easily. |
| Our Web site returns answers to catalog searches that fit customer profiles well. |
| **Transaction Applications** (Coef.= .06) |
| Our Web site allows customers to complete their orders online easily. |
| Our Web site allows customers to complete their orders online securely. |
| **Server Performance** (Coef.= .03) |
| Our Web site generally loads quickly. |
| Our Web site loads quickly during sudden, large volume surges. |
| Our Web site infrequently crashes. |
| **Interface** (Coef.= .18, p<.01) |
| Our Web site provides rich product descriptions using multimedia. |
| Our Web site is easy to navigate. |
| Our Web site provides links to direct customers easily to related items. |
| R-square=.13; F=11.43 (p<.001) |

## Discussion

The analysis supported three of the four hypotheses. That is, CEO commitment (H1) and e-commerce planning (H3) predicted e-commerce site robustness, and site robustness predicted firm performance (H4). However, business process redesign did not predict site robustness (H2).

The failure to support H2 is probably the most interesting finding. Business process redesign typically affects back-end more than front-end processes. The site features in this study, however, generally represent front- more than back-end features. Perhaps many retailers have not integrated back and front-end processes well enough to enable back-end process redesign to affect front-end features. For example, such a back-end endeavor as inventory management redesign might not have impacted such front-end features as customer order entry (as in *transaction applications*) and the promulgation of company policies (as in *publishing applications*) very much.

A closer look at the individual site features as in Table 5 showed that business process redesign did predict *interactivity*, *catalog applications*, and *interface*, but not *publishing applications*, *transaction applications*, and *server performance.*

The former three features may be more closely related to business process redesign. Perhaps process redesign better enhances such features. For example, *Our Web site lets customers easily summon a human to answer questions* (an *interactivity* item) requires the integration of data and voice communications, which is much different from traditional all-voice or all-data processes and would thus be a target of process redesign. *Interface* depends on business process redesign because the changes from traditional face-to-face communications to technology-based screen-to-face communications open for new, more efficient business processes.

One the other hand, *publishing applications*, *transaction applications*, and *server performance* may be less related to internal activities where business process redesign can have an effect. For example, the *publishing applications* items deal with providing conventional retailer information that would typically already be available in existing printed documents, and hence might not be affected by business process redesign. The *transaction applications* items deal with completing orders online easily and securely, and hence are highly technology dependent and thus often outsourced so that the business process redesign of an individual firm may not affect this feature so much. Finally, organizations often outsource their hosting to a service provider and therefore rely on the provider to manage it. As a result, individual firm's business process redesign would less likely affect *server performance*.

A closer look at the individual site features also showed that e-commerce planning, although an overall predictor of site features in H3*,* did not predict *interactivity* and *transaction applications*. Perhaps the long-range nature of planning discounts quick responses to email queries or the summoning of a human to answer questions (the two items in the *interactivity* construct). Perhaps the long-range nature of planning does not affect *transaction applications* as much as other features because the IT of easy and secure online ordering (the two items in *transaction applications*) is changing too fast to plan very well. Recent reluctance to replace SSL software with the newer, more secure SET may reflect that difficulty in planning (Turban et al., 2002).

Hypothesis 4 stated that organizations with more robust e-commerce sites have greater firm performance. The SEM supported this hypothesis. The multivariate regression pointed out that four of the site features—*publishing applications*, *catalog applications*, *interactivity*, and *interfaces*—predicted firm performance at a statistically significant level while two others, *transaction applications* and *server performance*, did not. The unexpected failure of the latter two is more interesting than the theoretically-based support for the former, and may be somewhat surprising.

In their early years, many e-commerce retailers did not consider profit their top priority, but instead sought branding and market share. Thus, *transaction applications* might not have made an important contribution to their performance.

Also, *server performance* may have typically been outsourced. Management might have viewed it as a new, high cost without a fast return. Thus, quickly loading sites, even during sudden, large volume surges, and infrequent crashes appeared not to produce revenue to offset costs despite the widely presumed importance of site speed and reliability.

## Implications for Researchers

The current research supported three of the four hypotheses. In addition to failing to confirm the effect of business process redesign on site features, it also found that e-commerce planning did not predict *interactivity* and *transaction applications*; business process redesign did not predict *publishing applications*, *transaction applications*, and *server performance*; and

*transaction applications* and *server performance* did not predict firm performance. The authors speculate about why the data failed to support those relationships. However, future researchers might investigate them more closely to assess if that speculation is accurate or if better explanations might exist.

Moreover, as e-commerce technology evolves, new features will appear. Thus future research might investigate the affect of practices on them and their affect on performance.

The current research examined e-commerce retailers. Future researchers could break such retail down by product line. They could also examine such industries as manufacturing, wholesale, services, and others. They could incorporate an investigation of such new approaches as auction, pay-per-view, and advertising-supported business models.

Finally, the current research measured firm performance as the perceptions of the e-commerce site manager. Future researchers might attempt to obtain more tangible measures.

## Conclusion

As e-commerce continues to mature and new features emerge, managers may find it increasingly difficult to determine the features they need for their e-commerce sites. This study contributes by helping them understand the impact of their practices on their site features and the impact of the features on performance. It also contributes by helping researchers understand the relationships among practices, site features, and performance.

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