# Assessment of E-Strategy

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## ABSTRACT

This paper incorporates various e-business strategies into a unified construct of e-strategy, which is defined as the electronic means used by organizations to achieve their intended purpose. It is measured as a second-order factor composed of three different dimensions. E-strategy evaluates how organizations electronically conduct their business relationships with various entities, including business partners (B2B), consumers (B2C), and employees (B2E). Structural equation modeling using EQS is used to provide a preliminary test of the new model. Results obtained from 220 respondents suggest that the e-strategy construct and its three sub-constructs meet all the criteria for construct validation. To provide some indication of its predictive validity, e-strategy is tested against business performance where positive and significant results have been obtained.

## INTRODUCTION

As e-business has become essential in our economy, organizations have begun to demand a return on their investment in such endeavors (Damanpour and Damanpour, 2001). An extensive and diverse body of literature has been produced regarding e-business. Much of the research is theoretical and there is not much of a consensus within the literature when it comes to defining and assessing e-business strategy (e-strategy). Thus, there is a need to encompass all this knowledge into an integrative construct of e-strategy. The main objective of this paper is therefore the conceptualization of a new e-strategy construct and the preliminary validation of its measurement tools. This goal responds to the call made by Boudreau et al. (2001) who indicate that more emphasis should be put on instrument validation when conducting research in information systems. The relationship between e-strategy and business performance is also investigated as a way of assessing the predictive validity of this construct (Venkatraman, 1985).

The first section offers a brief literature review of e-strategy. The methodology used to develop the e-strategy measurement tool and collect data is presented next. The findings are then depicted and discussed. The last section provides a discussion and addresses the limitations and implications of this study as well as future directions for research.

## E-STRATEGY

Strategy is generally defined as "either the plans made, or the actions taken, in an effort to help an organization fulfill its intended purposes" (Miller and Dess, 1996, p. 38). IT strategy refers to "how" the technology is used to improve organizational benefits (Earl, 1989). Therefore, the term "e-strategy" is defined in this paper as the "electronic means used by organizations to achieve their intended purpose". Borrowing from the literature on business strategy, strategic information systems, and e-business, we suggest an e-strategy construct that comprises three dimensions: B2B, B2C, and B2E. Explanations for each one follow.

*Business-to-Business e-Strategy* refers to the electronic means used to facilitate an organization's relationships with other businesses. Inter-organizational cooperation can assist companies in deriving a competitive advantage. The e-commerce procurement life cycle outlines how technology is important in facilitating relationships between businesses (Archer and Yuan, 2000), which is an important aspect of successful B2B initiatives (O'Keeffe, 2001; Galbraith and Merrill, 2001). The perceived value of the relationship, inter-firm trust, and relationship commitment are indications of healthy business interactions (Hausman, 2001). Communication and collaboration are crucial parts of developing relationships between businesses (Olesen and Myers, 1999; Olkkonen et al., 2000) and can even enable supplier collaboration in developing products and specifications (Parker, 2000; Burgess et al., 1997).

*Business-to-Consumer e-Strategy* refers to the electronic means used to facilitate relationships and transactions with the consumers of products or services. Easing the purchasing process for consumers with the use of technology can lead to increased sales and is thus a valuable asset to businesses (Lee, 2001; Bontis, 1998). B2C is also facilitating the process of building relationships with consumers who shop over the Internet (Wang et al., 2000). It can be used to customize communication and content for specific consumers, increasing the ability of companies to enhance consumer relations (Jiang, 2000). The analysis of consumer purchasing and browsing patterns can lead to a greater understanding of consumers (Phau and Poon, 2000). Software agents and decision support systems can be employed to learn about and to serve consumers better (Sproule and Archer, 2000).

*Business-to-Employee e-Strategy* refers to the electronic means used to facilitate communication among employees as well as between employees and management. B2E can be used to enable employee development, innovation, and training (Adeoti-Adekeye, 1997; Udo, 1998; Bontis, 1998; Kuei et al., 2001; Maier and Remus, 2001). It can also allow employees access to an increased amount of information (Ang et al., 2000).

This review reveals that each dimension of e-strategy has been studied separately. Although this groundwork is important, organizations tend to implement all of them in a complimentarily way (Turban et al., 2004). Therefore, there is a need to provide both researchers and practitioners with an integrative understanding of what e-strategy is and how it can be measured using these three dimensions.

## METHODOLOGY

This section describes the research model, the operationalization of the constructs, the data collection, and its analysis. Measurement tools have been developed to validate the e-strategy construct, which is assessed as a second-order factor. B2B, B2C, and B2E e-strategies are measured as first-order constructs and are consequently components of e-strategy. To verify the predictive validity of this proposed construct, the link between e-strategy and business performance has also been tested using the approach suggested by Venkatraman (1985) when he developed a new measurement of business strategy (STOBE, STrategic Orientation of Business Enterprises). The research model is illustrated in Figure 1.

To respond to the plea made for better MIS research instrument validation (Boudreau et al., 2001), particular attention was devoted to the process of developing and validating the e-strategy instrument. Following Churchill's (1979) recommendations, a large number of items were generated and an iterative purification procedure was followed in order to uncover the most relevant items to e-strategy. Clear constructs for e-strategy were lacking at the beginning of the survey development.

*Figure 1. Research Model*
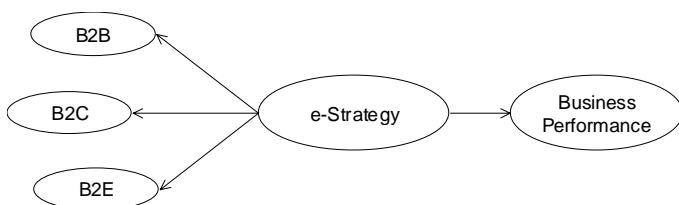


The constructs discussed in the literature review emerged after sorting and re-classifying the items. Guidelines proposed by Venkatraman and Grant (1986) were also followed during the construct development process.

As done by Moore and Benbasat (1991), the card-sorting technique was used to ensure the validity of all dimensions of the e-strategy construct. The web-based survey instrument was then pre-tested three times. The items, as well as the web-design, were modified after each pre-test. The first two pretests were conducted with MIS professors and the last one was completed by IS practitioners. A five-point Likert scale was used with "highly unsatisfied", "neutral", and "highly satisfied" as anchors. A "not applicable" option was also made available.

Each page of the final web-based survey provided the definition of one dimension of e-strategy followed by its corresponding items. Table 1 shows the definition of each e-strategy dimension and the list of all items used during the survey along with their literature source. Definition and items used to measure business performance were also provided.

## DATA COLLECTION AND ANALYSIS

A web-based survey was considered appropriate for this study. Since no suitable database existed, the process of gathering email addresses was automated using software agent technology. The agent was programmed to collect email addresses from stock market data providers using company ticker symbols to avoid duplication. Addresses were collected from the American Stock Exchange, Dow Jones, Nasdaq, and Toronto Stock Exchange. Email addresses were obtained for a total of 4538 companies in the US and 1593 companies in Canada. As the head of IT/IS strategy was targeted, recipients who did not hold such a position were asked to forward the email to that person.

Of the 6131 email invitations to participate in the study, 1059 were undeliverable, leaving 5072 delivered emails (3827 in the US and 1245 in Canada). 220 respondents completed the survey, resulting in an overall response rate of 4.34% (3.21% in the US and 7.95% in Canada). Of the 220 respondents, 33% were from the manufacturing industry, 14% from services, and 9% from communications with the remaining respondents being from various industries (finance, health, mining, etc.). In terms of organization size measured in number of employees, 19% had less than 100 employees, 26% had between 100 and 500 employees, and 55% had more than 500 employees. The top four job titles were IT/IS Manager (20%), Director IT/IS (16%), CIO (14%), and VP IT/IS (11%). The remaining respondents occupied other various management positions (manager, director, CEO, CTO). Respondents had an average of 4.7 years of experience in their current position and 7.9 years with their company.

Three sets of t-tests were performed to determine any significant differences among respondents. The first set of t-tests compared respondents at an executive level to respondents at a managerial level. The second set of t-tests examined answers from respondents holding an IT/IS related position and those occupying a non-IT/IS related one. Finally, the third set of t-tests was conducted between Canadian and US respondents. None of these revealed any significant differences on any constructs under study. Skewness values ranging from -0.019 to -0.806 and a normalized Mardia coefficient of 9.69 indicated that the data followed a normal distribution. On average, there were only two missing values (0.91%) per respondent.

## RESULTS

EQS, a Structural Equation Modeling (SEM) tool, requires complete data for all cases on all measured variables. Mean replacement was thus performed on missing values as suggested by Bentler (1995). SEM also necessitates that the data set comprises 10 times as many cases than the number of measured variables in the model (Bentler, 1995; Byrne, 1994). The minimum required here is 210 cases. Therefore, a sample of 220 respondents is sufficient.

The first step in SEM consists of performing the measurement model depicting the links between the latent variables and their observed measures. Three indices are used to assess the goodness of fit of the models assessed with the EQS. First, the ratio of chi-square on the number of degrees of freedom provides a good index of fit of the model and is preferred over the chi-square alone which is too sensitive to sample size (Bentler, 1995; Hartwick and Barki, 1994). A ratio value smaller than 3 indicates a good fit of the model (Hartwick and Barki, 1994). Second, the Comparative Fit Index (CFI) is known as a stable goodness of fit index for the structural model. A CFI greater than 0.9 indicates a good fit of the model (Bentler, 1995; Byrne, 1994). Finally, the Average Absolute Standardized Residual (AASR) provides an indication of the proportion of the variance not explained by the model. An AASR smaller than 0.05 is considered appropriate (Bentler, 1995; Byrne, 1994). The resulting measurement models assessing the e-strategy and business performance constructs are respectively presented in Figure 2 and 3. All indices for both constructs meet the goodness of fit criteria, except for the business performance $c^2$/df ratio, which is higher than 3.00. This, however, is overcome by a CFI of 0.95 and an AASR of 0.003, both values being above the recommended threshold.

The second step in SEM is the evaluation of the relationships among the latent factors. The final model is presented in Figure 4. A very good overall fit of the model was achieved with the CFI reaching a more than acceptable level at 0.92, the $c^2$/df ratio of 2.12 below the threshold of 3, and an AASR index of 0.045 also below the recommended level. The

*Table 1. Constructs' Definitions and Items of the Questionnaire*

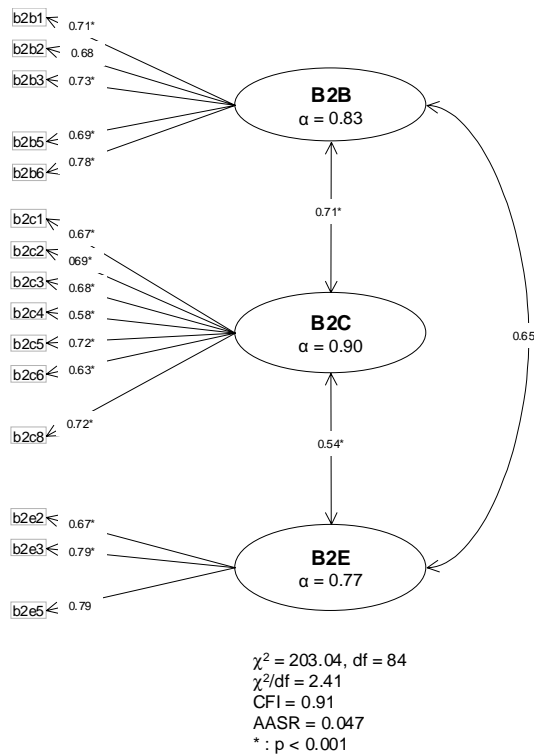| **Business-to-Business e-strategy:** | *Electronic means used to facilitate relationships between your business and other businesses* | |
| --- | --- | --- |
| B2B1 | Develop closer relationships with business partners | Galbraith and Merrill, 2001 |
| B2B2 | Enable inter-organizational collaboration in developing products and specifications | Parker, 2000; Burgess et al., 1997 |
| B2B3 | Enable information sharing with business partners | Warkentin et al., 2001 |
| B2B4 | Assist the procurement of goods and services from suppliers | Hooft and Stegwee, 2001; Archer and Yuan, 2000 |
| B2B5 | Enable negotiation | Simeon, 1999 |
| B2B6 | Increase business partner trust | Hausman, 2001 |
| **Business-to-Consumer e-strategy:** | *Electronic means used to facilitate relationships and transactions with the consumers of your products or services* | |
| B2C1 | Gain a better understanding of consumers | Sproule and Archer, 2000; Bontis, 1998; Ang et al., 2000 |
| B2C2 | Reduce consumer service response time | Bontis, 1998 |
| B2C3 | Provide consumers with product and service information | Wen et al., 2001; Perry and Bodkin, 2000 |
| B2C4 | Allow consumers to make online transactions | Wen et al., 2001; Aldridge et al., 1997 |
| B2C5 | Achieve a closer relationship with individual consumers | Wang et al., 2000 |
| B2C6 | Provide consumers with company specific information | Wen et al., 2001; Perry and Bodkin, 2000 |
| B2C7 | Measure consumer satisfaction | Pre-test |
| B2C8 | Build consumer loyalty | Lee, 2001 |
| **Business-to-Employee e-strategy:** | *Electronic means used to facilitate communication between your employees and to help them in carrying out their jobs* | |
| B2E1 | Enable collaboration between employees | Cheng et al., 2001 |
| B2E2 | Enable training of employees | Bontis, 1998 |
| B2E3 | Enable employees to find other employees with specific expertise | Maier and Remus, 2001 |
| B2E4 | Improve communications between employees and management | Gunnigle et al., 1998; Kuei et al., 2001 |
| B2E5 | Document knowledge of employees | Pre-test |
| B2E6 | Provide universal access to information | Detlor 2001; Ang et al., 2000 |
| B2E7 | Increase employees' productivity | Udo, 1998; Sohal et al, 2001 |
| **Business Performance:** | *How your organization is performing on …* | |
| BP1 | Market share | Venkatraman, 1985 |
| BP2 | Sales growth rate | Venkatraman, 1985 |
| BP3 | Net profits | Venkatraman, 1985 |
| BP4 | Return on sales | Venkatraman, 1985 |
| BP5 | Return on investment | Venkatraman, 1985 |
| BP6 | Revenue growth relative to the competition | Venkatraman, 1985 |
| BP7 | Market share gains relative to the competition | Venkatraman, 1985 |
| BP8 | Net profits relative to the competition | Venkatraman, 1985 |
| BP9 | Return on investment relative to the competition | Venkatraman, 1985 |

*Figure 2. e-Strategy Measurement Model*



χ² = 203.04, df = 84
χ²/df = 2.41
CFI = 0.91
AASR = 0.047
* : p < 0.001

*Figure 3. Business Performance Measurement Model*



χ² = 56.65, df = 8
χ²/df = 6.58
CFI = 0.95
AASR = 0.003
* : p< 0.001

*Figure 4. Structural Model*
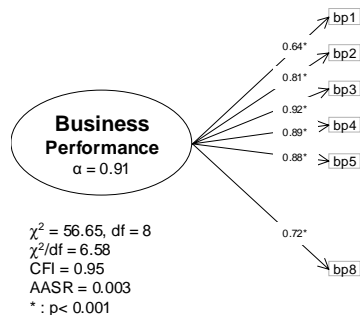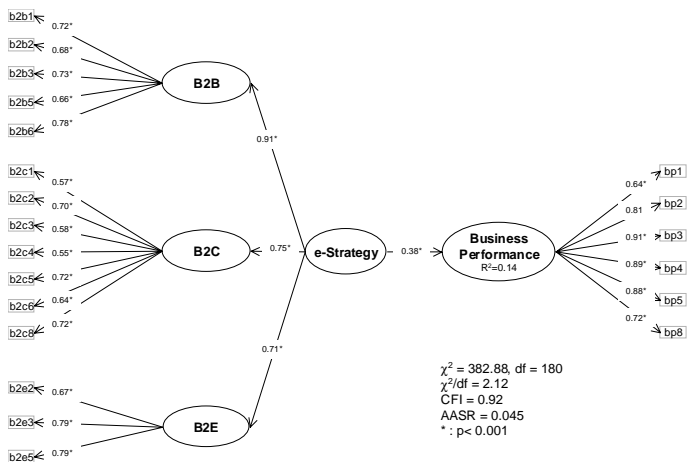


χ² = 382.88, df = 180
χ²/df = 2.12
CFI = 0.92
AASR = 0.045
* : p< 0.001

size and significance level of the paths provide strong support to the relationship between e-strategy and performance.

## DISCUSSION

The overall model was tested with a sample of 220 managers, using a two-step structural equation modeling approach. Collecting email addresses with the software agent technology and conducting a web-based survey turned out to be an efficient way of reaching people. One limitation associated with this approach is the fact that private organizations are not represented. All respondents were from public organizations hence inducing a sample bias even though companies of different sizes and from various industries were included.

The main contribution of this research is the development and validation of an integrative construct of e-strategy that encompasses three dimensions: B2B, B2C, and B2E. The measurement models provided a good fit for the data, furthering the support for the constructs. Overall, the structural model had very acceptable fit. When looking at the links between the e-strategy construct and its respective dimensions, results indicate that B2B has the highest path value, followed by B2C and B2E respectively. This reflects the market evolution of deploying electronic means in fostering electronic relationships. Indeed, the level of B2B activities is estimated to be higher than the one for B2C (Surmacz, 2001; Greenberg, 2004).

Our results provide preliminary evidence that these three e-strategies are complementary and significant when defining e-strategy. The relationship between e-strategy and business performance is highly significant, indicating the potential predictive validity of this new measurement tool. Further validation of the e-strategy construct and its measurement capability are needed. This instrument could also be used when investigating the strategic impact of e-business applications within organizations.

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