Journal of Management Information Systems
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/mmis20

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Published online: 08 Dec 2014.

To cite this article: RAJIV KOHLI , SARV DEVARAJ & M. ADAM MAHMOOD (2004) Understanding Determinants of Online Consumer Satisfaction: A Decision Process Perspective, Journal of Management Information Systems, 21:1, 115-136

To link to this article: http://dx.doi.org/10.1080/07421222.2004.11045796

Understanding Determinants of Online Consumer Satisfaction: A Decision Process Perspective

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Journal of Management Information Systems / Summer 2004, Vol. 21, No. 1, pp. 115–135.

0742–1222 / 2004 $9.50 + 0.00.

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ABSTRACT: As business-to-consumer online shopping grows, e-commerce channel providers will need to explore ways to anticipate consumers' needs to deliver an efficient shopping experience. Yet the consumers' decision-making process and its relationship to the selection of the online channel are not well understood. Utilizing Simon's decision-making model, we examined support for decision-making phases using 134 online consumers. We also extended the model to include consumers' cost savings and time savings, as well as their satisfaction with the e-commerce channel. Structural equation modeling results indicate that the online shopping channel supported the overall decision-making process. In particular, we found strong support for the *design* and *choice* phases of online consumers' decision-making process. Our results also indicate that support for the decision-making process was mediated by the cost savings and time savings gained by the online consumers and led to their greater channel satisfaction.

KEY WORDS AND PHRASES: B2C e-commerce, business-to-consumer commerce, consumer decision-making, e-commerce, online selling channel.

A STUDY BY PEW INTERNET RESEARCH found that online shopping has gone from novelty to utility and that an increasing number of customers are spending more time shopping electronically for books, music, and airline tickets [24]. Nielsen/NetRatings indicate that in the holiday season of 2003, online shopping increased by over 35 percent over 2002, with consumers responding that 19.7 percent of their holiday budget was spent online, up from 16.3 percent in the previous year [6].

Despite the growing appeal of e-commerce, online sales represent less than 2 percent of the overall retail business. Forrester Research forecasts that retail online sales will continue to see growth of up to 25 percent [25]. This presents a significant opportunity for stakeholders in the online channel. While the robust year-by-year growth of the business-to-consumer (B2C) online shopping trend is encouraging, there are lingering consumer concerns about online shopping. Recent research has attributed the erstwhile failures of e-commerce to several factors, including the failure of the online shopping applications to understand consumer needs at specific points in their online shopping decision-making process. Zeng and Reinartz observe that

> the Internet has a very differentiated impact along the various stages of the consumer decision-making process and the true value-added of the Internet to consumers materializes at very specific points in the purchase process. The empirical evidence shows that the ecommerce initiatives so far have been focusing mostly on increasing the effectiveness of online search, paying much

> less attention to facilitating online transactions, and almost completely ignoring the importance of helping consumers make better decisions. [58, p. 108]

This observation suggests that e-commerce supports some parts of the consumers' decision-making process better than others. Thus, it is important for businesses to understand consumers' decision-making steps, how support for these steps impacts their satisfaction, and the impact the e-commerce channel has on consumers' time and cost when making a purchase. The objective of this research is to investigate the impact of the e-commerce channel decision support capabilities on the consumers' decision-making process, and the factors that lead to consumer satisfaction. The contributions of decision support systems (DSS) to managerial outcomes such as saving time and developing alternatives to optimize time [35, 49] and costs [14, 15] are well established; however, their contribution in the e-commerce arena is relatively novel, particularly in relation to the process of consumer decision-making.

Understanding the online consumers' decision-making process plays a central role in a retailer's ability to design and deploy systems that cater to the consumers' needs. By understanding the steps of the consumer's decision-making process, a retailer can reduce the tangible as well as cognitive costs by providing supporting information and helping consumers choose one of several alternatives. Providing too much information may cause unnecessary interruptions in the shopping process, whereas properly placed interruptions can increase viewing time and result in an environment conducive to a completed sale [57]. In this way, the online channel can guide the consumer to a successful decision, one that results in a completed transaction at a lower cost. Experiences such as these are likely to improve consumer satisfaction and encourage consumers to continue using the online channel. Consumer satisfaction plays an important role toward business profitability, because repeat consumers generate more revenues. This is mainly because it costs less to retain existing customers than to find new ones. Development of an e-commerce system often involves significant investment by channel developers as well as sellers, and the success of such investment may depend upon how well the online channel supports the consumers' decision-making process.

DSS are defined as computer-based information systems designed to support various steps of the decision-making process in an unstructured environment [28, 42]. An unstructured decision is one that is not based on steps of a highly quantitative procedure, but rather upon heuristics [42]. In other words, a structured decision environment has a distinct step-by-step solution, such as an inventory reorder process or calculation of a payroll. On the other hand, unstructured or ill-structured decision environments do not have such clear steps; instead they support the decision-makers to structure the decision situation and support their decision-making capabilities. Given that online shopping decision scenarios can consist of several decision variables at each phase where a consumer can use computer-based support, the decision is not of a "highly quantitative procedure" and hence can be regarded as unstructured. The amount of available information can exceed the consumer's ability to process, compare, and view the various relationships among items of interest. The consumer's cognitive abilities may also limit the rational evaluation of various alternatives. An

online shopping channel can provide decision support capabilities for searching, comparing, and finally recommending a product to the consumer.

Previous literature has generally examined the impact of a DSS on managers' decision-making process in various business situations. Few studies have examined the decision situations in the e-commerce channel area, especially those in which the consumer is a decision-maker. Silverman et al. [50] have observed that e-commerce sites too often fail to support buyer searches and decision-making, resulting in loss of sales and of customer repeat business. Lipshitz and Bar-Ilan [33] recommended that further research should be conducted to validate the decision-making process in actual e-commerce situations. Specifically, recognizing that the electronic medium may have greater marketing potential than any of its predecessors, there have been calls for understanding the steps in the decision-making process and the subsequent post-purchase consumer satisfaction in Internet purchases [22, 39].

Clearly, the decision-making process can vary depending on the type or price of the product, among other factors. Consistent with previous research in the area, our research examines products that most consumers purchase online, such as books, CDs, airline tickets, and flowers. Within this context, our findings will help understand how and at what stage the e-commerce channel lends support to consumers' decision-making process. This, in turn, will help to enhance online channel capabilities to better support consumers' online decisions. Briefly, the research presented here makes the following contributions—first, we present a theoretical perspective, based on previous similar studies (e.g., [51, 52]), from which we model online consumers' decision-making steps. Second, we build upon previous decision process studies by adding new constructs and hypothesizing how these constructs relate to the *choice* phase of Simon's decision-making model. In doing so, we draw upon the transaction-costs literature to contextualize our research findings. Third, we empirically show that the proposed research model is capable of explaining decision support capabilities of the online channel. Finally, we contribute new ideas for practice by illustrating why organizations (e.g., online channel operators) may employ tools for providing comparative features and prices to save consumers' time, cost, and increase their satisfaction with the online channel.

Transaction-Cost Theory and Decision-Making Process

PRIOR TO UNDERTAKING THIS EMPIRICAL STUDY, it is important to understand, from a theoretical perspective, how online consumers make purchasing decisions. In scenarios where online consumers are about to purchase a product or service from a seller via an online channel, one can assume that they will maximize their utility, subject to some budget and time constraints. For example, the total cost for a product or service must be less than or equal to the price they are willing to pay for the product or service and the time they are willing to spend in executing the online transaction. We refer to these as transaction costs. Under the classical economic theory of perfect competition, the consumers should be able to make a decision to purchase the product or service at

a fixed cost and time; and the Internet, or another such channel, should have little or no role to play in it. However, perfect competition is almost never seen in practice, where market imperfections mitigate such factors as perfect information, market prices, and features of commodities. Therefore, transaction costs may vary significantly, and transactions cannot be executed without incurring further costs in terms of time and money. Digressions from the above-mentioned ideal transaction decision-making process give rise to additional transaction costs [8, 9].

Given the factors that are common in less than perfectly competitive markets, the above-mentioned problem is complex, because there are two forces working against the online consumers. First, the distribution of transaction costs for a product or service is not known to them. Second, in many cases, the available information about the product or service in question is ambiguous at best. Consumers can improve their decision-making process and minimize their transaction costs by searching the Internet to find the commodity that matches their requirements. This search process using the Internet is, however, costly, since the online consumers will incur additional time, effort, and infrastructure cost to arrive at a decision. It can be assumed that the consumers will undertake this search until the marginal benefit of searching equals the marginal cost of searching [55]. They are likely to conduct transactions in a way that minimizes their cost in terms of time and money. Transaction-cost economics (TCE) explains the theoretical rationale that consumers make to minimize transaction costs [46].

When consumers purchase a product or a service, they must go through a number of decision-making steps. In his classic work, Herbert Simon [52] proposed a decision process comprising three distinct phases—*intelligence, design,* and *choice.* In the intelligence phase, the decision-maker recognizes the problem at hand and gathers information about the problem situation. The design phase is marked by structuring the problem situation, developing criteria, and identifying the various alternatives through which the problem can be solved. In the choice phase, the decision-maker chooses the best alternative that meets the criteria, and makes the final decision. Following the three phases, the decision-maker uses the feedback from the results of the decision to review how well the process was executed. Such reflection on the past process can form a basis of the intelligence phase for future decisions. Although generic and simple in nature, Simon's decision-making model has been applied and validated in a wide array of situations [22, 33, 35].

In integrating the TCE theory put forth by Coase [8] and Simon's decision-making model, we infer that transaction costs will include such ex ante costs as those incurred in gathering information about the problem situation (intelligence), identifying various alternatives through which the problem can be solved (design), and choosing the best alternative that meets the criteria (choice). We also surmise, primarily from the economic point of view, that ex post time and cost savings will impact consumers' choice of the online channel. We also hypothesize that satisfaction with the online purchase as an ex post variable will directly impact overall customer satisfaction with the online channel and, therefore, consumer loyalty toward the channel. As stated earlier, consumer loyalty plays an important role toward channel preference and use.

Hypotheses Development

It has been empirically established in the literature that DSS significantly affect the intelligence, choice, and implementation phases of the decision-making process [14]. Management information systems (MIS) and transaction processing systems (TPS) have also been used by managers to support their intelligence activities [48]. Fazlollahi and Vahidov [13] recommend the use of genetic algorithm-based DSS for designing alternatives in the design phase of the decision-making process.

It is likely that the e-commerce channel has inherent characteristics that support certain phases of the decision-making process proposed by Simon and others. Due to superior search capabilities [58], the e-commerce channel, for example, may be well suited to support the intelligence phase. Combined with the criteria for product selection, the multiple sources of information available through the e-commerce channel can reduce consumers' search costs and support their intelligence phase, and, subsequently, they can lead to the development of a plan to evaluate the alternatives available for making the decision. This ability to establish a plan and criteria for alternatives' evaluation supports the consumer's design phase outlined in Simon's decision-making model. Finally, the information and criteria selection support the selection of a product that meets the consumers' needs. Haubl and Trifts [22] suggest that interactive decision aids in the online shopping environment may have the potential to drastically transform the way in which consumers search for product information and make purchase decisions. Thus we propose the following two hypotheses:

> *H1: The e-commerce channel support for the* intelligence *phase will lead to support for the* design *phase of the decision-making process.*

> *H2: The e-commerce channel support for the* design *phase will lead to support for the* choice *phase of the decision-making process.*

Cost Savings

Cost savings have been a major draw for online customers [45]. Prices on the Internet are found to be 9–16 percent lower than on the conventional shopping channels, as is the price dispersion [5]. Yet some researchers cast doubt over the online cost savings [37]. They suggest that the fundamentals of the retailing business will not change and that customers will continue to value characteristics that will lead them to the conventional channel. Nevertheless, there is evidence that online channel customers save costs by purchasing products with the precise features they need, thereby not having to pay for features they do not need [21]. Therefore, in addition to access to competitive pricing information [30], cost savings occur due to maximum value drawn from the price customers pay on the e-commerce channel. These findings suggest that consumers may discriminate among online prices and conventional channel prices and may be drawn to the online channel due to lower prices and cost savings. This leads us to our next hypothesis:

H3: A well-supported decision-making process in the e-commerce channel will lead to consumers' cost savings.

Time Savings

Previous studies have found that information systems act as intermediaries between the buyers and sellers in the electronic marketplace and, as such, reduce buyer search costs [3, 22]. A reduction in buyer search costs translates into time savings. Todd and Benbasat [56] empirically established that decision-makers place a high value on effort minimization. Achrol and Kotler [1] suggest that, in a networked economy, the role of marketing is undergoing revolutionary changes in which it will now have to act as an agent of the buyer instead of an agent of the seller. They further suggest that marketing, in that capacity, will have to provide real-time market information. This will inevitably translate into time savings for online consumers. This leads to the following hypothesis:

H4: A well-supported decision-making process in the e-commerce channel will lead to consumers' time savings.

Channel Satisfaction and Decision-Making

Recent changes in the American Customer Satisfaction Index (ACSI) indicate that satisfaction among American consumers has been declining, primarily due to dissatisfaction with services [16]. The ACSI study also finds that customer satisfaction is more quality driven than price or value driven. Given that the online channel already provides a convenient way to acquire products, this represents an opportunity for online retailers to find ways to increase customer satisfaction.

Previous studies in the online shopping area have explored the steps in the consumer decision-making process as antecedents of consumer satisfaction. Kalakota and Whinston [27], for example, used the consumer mercantile model (CMM) to investigate the steps in the consumer decision-making process as antecedents of consumer satisfaction. Antecedents for B2C success explored by past studies underscore supporting consumers' decision-making process to establish satisfaction with the electronic channel. Prior research in e-commerce found support for consumers' continuance intention, referred to here as channel preference, as being driven by satisfaction with initial service [4]. Shaped during the online purchase process, consumers' attitudes and beliefs regarding convenience and security concerns have significant effects on their intention to purchase online [32]. Once a consumer has decided to purchase, the transaction should be efficient and satisfactory [31]. Recently, the process of channel choice has been the basis for an integrated model to measure consumers' satisfaction with the online channel [11].

While past research has demonstrated that decision support for consumers can lead to higher satisfaction with the channel, more research is needed to validate the mediators

of such decision-making support. We suggest that satisfaction with the channel occurs because consumers benefit from the superior choices (resulting from better online support for decision-making) they are able to make. This leads to savings in cost as well as time.

The previous discussion leads to the following two hypotheses:

H5: Cost savings *resulting from decisions made through the e-commerce channel will lead to higher consumer* satisfaction *with the channel.*

H6: Time savings *resulting from decisions made through the e-commerce channel will lead to higher consumer* satisfaction *with the channel.*

Research Design

Study

TO ASSESS CONSUMERS' EXPERIENCES with the online and bricks-and-mortar channels, we solicited participation from shoppers in the community, as well as undergraduate and graduate students in business administration at a private university. We used a membership list of a local social and cultural organization to contact the consumers in the community. The solicitation was carried out primarily through phone and e-mail. If the individuals agreed to participate in the study, we followed up by in-person contact. The other set of subjects, students, were contacted by one of the researchers by making a brief in-class presentation, followed by a request to the instructor of each course to allow his or her students to participate in the project. We contacted a total of 200 individuals, out of which 171 agreed to participate in the study. Each participant was asked to "register" by filling out a brief survey of demographic information.

We then introduced the participants to the study requirements and directed them to a Web site created for the purpose of supporting the present study. The Web site specified that the objective of the survey was to capture their shopping experience with the online channel vis-à-vis the conventional store. In addition, the Web site listed frequently asked questions (FAQ), links to online comparison-shopping Web sites, researchers' contact information, and the survey questionnaires. Each participant filled out the survey after shopping via online and conventional channels. The survey captured the participants' perceptions of how well the online channel supported the steps in their decision-making process, and their satisfaction with the online channel. During the introduction to the study, we emphasized that the survey pertains to their experience with the channel in question as opposed to the vendor. In addition, the survey began with a statement reiterating the same. All survey responses were captured online and automatically stored in a database. Pitkow and Recker [43] recommend online automated surveys for ease of use, low overhead, and reliability.

While a majority of the purchases were books or CDs, the sample also included purchases such as airline tickets, flowers, and apparel. Nielsen/Netratings found that in the 2003 holiday season, music and video/DVDs accounted for the category with

the highest sales, with consumers spending $1.6 billion, an increase of 46 percent from the previous year [6]. Previous studies have also captured online consumer behavior regarding their purchase of items such as books and CDs [5, 23, 31, 34].

As an incentive to complete the tasks for the study, each participant who completed the survey was provided with a gift certificate of $20. The gift certificates were redeemable at any business establishment in a local shopping mall or the college bookstore. Although the nature of the study did not lend itself to controlled laboratory settings, we required that the subjects list the seller of their purchases, the items purchased, the price of each item, the amount of time spent on each purchase, and the date of each purchase. In addition to providing data needed for the study, these responses also served as a confirmation that the subjects indeed participated in shopping for the products in question and complied with the study requirements. Further, to minimize biases due to "recall" and "carryover" effects and order of purchases, we required half the respondents to purchase first from a bricks-and-mortar store and the other half to purchase from an online store first, and allowed a week's time to elapse before they made the second purchase.

Respondent Profile

Our final usable sample consisted of 134 complete and valid responses. The age of respondents varied from 19 years to 49 years, with a mean age of 24 years. Of these, 41 percent were female and 59 percent male. Work experience ranged from no work experience (students) to 22 years, and the mean was 4 years. A vast majority (86.6 percent) of the respondents had prior experience in purchasing products online.

Data and Variables

Most of the constructs employed in the study were assessed through seven-point Likert scale survey questions derived from the published literature. As stated earlier, the three stages of consumer decision-making in our model—*intelligence, design,* and *choice*—formed the decision-making variables. Several past studies have utilized the scales for capturing decision-makers' evaluation of the role of support aids in supporting various stages of decision-making [2, 7, 13, 14, 20, 29, 35, 44, 47]. Scales and items for satisfaction were utilized by a recent study of e-commerce metrics [11]. In each case, we adapted the scales for our research design.

The questions used to construct the intelligence phase address the recognition of the problem and the effort involved in gathering information that will aid in making the decision. We employed a three-item scale (see Appendix A) to capture the *intelligence* phase. We first examined whether the items constituting the scale represented a single factor (unidimensionality) using factor analyses. All items loaded onto a single scale with all factor loadings greater than 0.68. A measure of the reliability or internal consistency of the scale is Cronbach's α. The α-value for this scale was 0.72. Given that these are new scales, the threshold of Cronbach's α acceptability for new scales is 0.60 [41]. Higher reliabilities usually occur as future studies further refine

the measurement scales. The variance extracted by the scale is 60.97 percent (Table 1). We present details on divergent validity of all scales employed in the present study later in this section.

As discussed earlier, the design phase is characterized by the decision-maker structuring the problem situation, developing criteria, and identifying the various alternatives for fulfilling the shopping need. We employed a three-item scale that taps into the decision-maker's ability to identify various alternatives, establish criteria for making the purchase decision, and narrow down the choice based upon these. Factor analysis of items included in the scale loaded on a single factor with factor loadings greater than 0.86. Thus the scale demonstrated strong unidimensionality. Next, we examined Cronbach's α as a measure of reliability, which was 0.84. Finally, the percent variance extracted was 75.82 percent. Thus the scale for *design* demonstrated adequate unidimensionality, reliability, and variance extracted (Table 1).

The items employed to capture the *choice* phase construct (shown in the Appendix) reflect the decision-maker evaluating the various alternatives and making the purchase. A factor analysis of the items constituting this scale revealed that all items loaded onto a single factor with individual factor loadings greater than 0.76. The measure for reliability, Cronbach's α, was 0.79. Further, the percent variance extracted by the scale was 71.10 percent. Based on the above, we conclude that the scale representing the choice phase displays adequate unidimensionality, reliability, and variance extracted (Table 1).

Performance Variables

The two performance variables we employed were *cost savings* and *time savings* resulting from purchasing online vis-à-vis a conventional store. All participants in the study had purchased the same product from both channels and were thus able to provide responses for these variables. The question for cost saving (shown in the Appendix) asked the participants to state the purchase price for the product including taxes and shipping (if applicable). The difference between the responses obtained for the conventional and online purchase is the variable employed in the analyses. Similarly, we asked respondents to provide us with the time it took to complete their purchase online as well as through a conventional store. As before, the difference between these two values is an estimate of the time saving that is used in the analyses.

Whereas *time savings* and *cost savings* are objective performance measures, we also included a subjective assessment of *satisfaction.* Consistent with recent literature in the area [11], our measure of satisfaction is an overall assessment of satisfaction with the purchase. Since one way to tell if consumers are satisfied is if they recommend their purchase to others, we also included an item that taps into this aspect. The three-item scale for satisfaction is shown in the Appendix. A factor analysis to assess the unidimensionality of this scale revealed a single-factor solution with all factor loadings greater than or equal to 0.81. The percent of variance extracted by the scale was 73.24 percent. Further, a test of the reliability of this scale using Cronbach's α

Table 1. Scale Development

Construct	Number of items	Mean	Standard deviation	Cronbach's alpha	Factor loadings	Variance extracted (percent)
Intelligence	3	5.654	0.816	0.72	0.80, 0.85, 0.68	60.97
Design	3	5.466	0.960	0.84	0.89, 0.86, 0.86	75.82
Choice	3	5.369	0.974	0.79	0.85, 0.90, 0.76	71.10
Satisfaction	3	5.759	0.747	0.81	0.87, 0.83, 0.81	73.24

indicated a value of 0.81. Therefore, the scale was deemed to have satisfied the conditions of unidimensionality and reliability (Table 1).

Discriminant Analyses

Ghiselli et al. [19] presented two tests of divergent validity. The first test involved ensuring that the item-to-total correlations of the items not in the scale be generally lower than those for the items in the scale. The second test involved a comparison of the reliabilities of the scales employed with the interscale correlations. For a scale to demonstrate adequate divergent validity, the reliability of the scale must be significantly higher than its correlation with other scales. Both of these tests indicated sufficient divergent validity for the scales for *intelligence, design, choice,* and *satisfaction* phases.

Analyses

WE PRESENT CORRELATIONS BETWEEN THE CONSTRUCTS employed in the study in Table 2. Several significant correlations can be observed. The correlations between *cost savings* and *satisfaction,* and *time savings* and *satisfaction,* were statistically significant. We also observe statistically significant correlations between *intelligence* and *design,* and *design* and *choice.* A surprisingly high correlation also exists between *choice* and *satisfaction.* Since correlations provide only preliminary insights, our results are based on the research model (Figure 1) estimated using structural equation model (SEM) analysis.

We estimated the research model shown in Figure 2 as an SEM implemented in LISREL [26]. The SEM methodology incorporates the measurement aspects as well as the structural model being estimated**.** It also provides goodness-of-fit indices. Since there is no consensus on a single measure or even a set of measures of fit [38], it is standard practice to report several measures. SEM has been widely applied in the social sciences and marketing literature. Recent empirical research in the information systems area has also harnessed the power of this technique. SEM is a second-generation estimation technique and enables researchers to address a set of interrelated research questions in a single, systematic, and comprehensive analysis [17] by modeling relationships between multiple independent and dependent variables simultaneously [18].

In testing and reporting results on SEMs, Marsh [36] suggests comparing the research model to alternative models along various indices. Therefore, first, we compare the research model to an unmediated model in which *time savings* and *cost savings* were not considered mediators of the relationship between *choice* and *satisfaction.* The rationale for this is to test whether the decision-making stage of choice sufficiently explains satisfaction or whether in fact the mediators of time and cost savings provide a better model fit. Second, we compare the hypothesized model to an independent-model (null model) in which all variables are considered to be unrelated. It is standard practice in SEM analysis to compare the research model to such a benchmark or baseline model.

Table 2. Correlations Among Study Constructs

Variables	1	2	3	4	5
1. Intelligence	1.0				
2. Design	0.747**	1.0			
3. Choice	0.646**	0.788**	1.0		
4. Time saving	0.214*	0.22*	0.261**	1.0	
5. Cost saving	0.127	0.166	0.233*	0.147	1.0
6. Satisfaction	0.628**	0.659**	0.734**	0.316*	0.318*

Notes: ** significant at 1 percent; * significant at 5 percent.

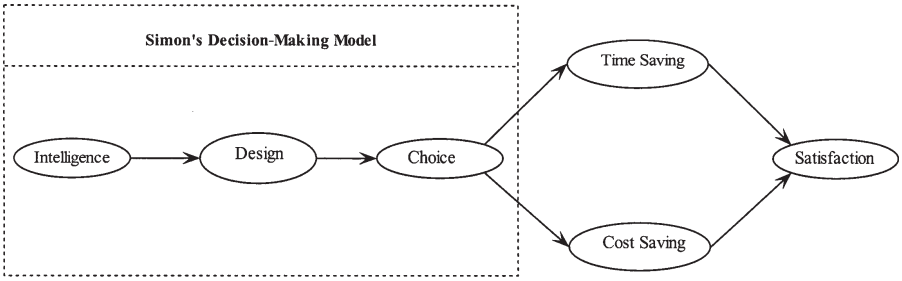

Figure 1. Hypothesized Research Model

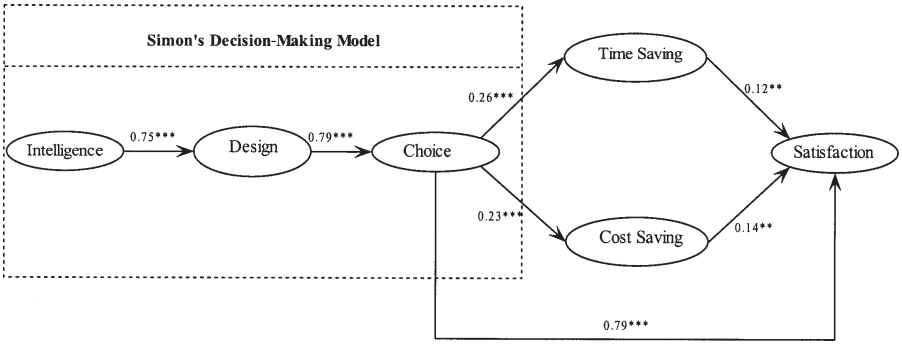

Figure 2. Results of the Hypothesized Model.
Notes: *** significant at 5 percent; ** significant at 1 percent.

A comparison of the statistics for the various models evaluated is presented in Table 3. This, in conjunction with Figure 2, can be used to assess the results of the SEM analyses. As can be seen from Table 3, the hypothesized research model is superior to the unmediated model as well as the independent model. This is evident by the various evaluation criteria commonly employed in SEM analysis.

From Figure 2, we observe that the paths between *intelligence–design* and *design–choice* are statistically significant at the 0.01 level, thus lending support for H1 and

Table 3. Model Fit Statistics

Model	Chi sq/df	GFI	AGFI	RMSEA	NFI	CFI
M1: Hypothesized model	1.98	0.96	0.90	0.085	0.95	0.97
M2: Independent model	30.79	0.47	0.25	0.47	0	0
M3: Unmediated model	3.508	0.92	0.84	0.13	0.91	0.93

Notes: GFI—goodness-of-fit index; AGFI—adjusted GFI; RMSEA—root mean square error of approximation; NFI—normed fit index; CFI—comparative fit index.

H2. Further, *choice* was significantly related, at the 0.01 level, to both *cost savings* and *time savings.* Thus we also find support for H3 and H4 of the study. Finally, the paths between *cost savings–satisfaction* and *time savings–satisfaction* were significant at the 0.05 level as well, thus providing support for H5 and H6. In summary, these results indicate strong support for the proposed research model.

An interesting finding was that while the impact of *choice* on *satisfaction* was mediated (significant at 0.01 level) by *time* and *cost savings,* there was also evidence of a direct effect of *choice* on *satisfaction.* This is revealed by modification indices that are a key part of the output from SEM analyses. Therefore, we allowed for a direct link between *choice* and *satisfaction* in the structural model. The direct path between *choice* and *satisfaction* was also statistically significant at the 0.01 level. We discuss these results and their implications in greater detail in the following section.

Differences in Decision-Making Stages Between Online and Bricks-and-Mortar Purchases

We conducted an additional analysis of the differences along the dimensions of Simon's model. In other words, we wanted to examine what stages in particular are supported by the decision support capabilities of e-commerce. To understand this, we conducted a paired-sample *t*-test of the differences between the stages—*intelligence, design,* and *choice*—for the same respondent between online and bricks-and-mortar stores (see Table 4). Such paired- or matched-sample tests have been found to be of considerable utility [10, 12] because they minimize variance along all other factors (in our case, the idiosyncrasies of the individual respondents, etc.). We observed a statistically significant difference (at the 0.10 level) between the online and bricks-and-mortar environments for the *design* phase. We also found a statistically significant difference (at the 0.05 level) for the *choice* phase. We found no significant difference between the two channels at the *intelligence* phase. In summary, these results suggest that the online channel seems to facilitate the *design* and *choice* phases of the decision-making process substantially more than the *intelligence* phase. We discuss these findings in greater detail in the next section.

Table 4. Comparison of Decision-Making Stages: Online Versus Conventional Stores. Paired-Sample *t*-test (Online–Conventional)

Decision stage	Online mean value	Conventional mean value	Difference	*t*-statistic	Probability
Intelligence	5.66	5.68	–0.02	–0.218	0.828
Design	5.49	5.32	0.17	1.451	0.073*
Choice	5.36	5.04	0.32	2.55	0.012**

Notes: * significant at 0.10 level; ** significant at the 0.05 level.

Discussion

THE RESULTS FROM SEM ANALYSES indicate that the proposed research model is able to explain adequately the decision support capabilities of the e-commerce channel and the factors that lead to consumers' satisfaction with the channel. More specifically, our research indicates that online support for gathering information leads to better development of criteria for evaluating decision alternatives. Similarly, online support for the design phase leads to improved support for the selection of an optimal alternative in the choice phase. Simon suggested that, due to bounded rationality, automated support may help decision-makers in choosing the optimal alternative [53, 54]. Silverman et al. [50] have observed that e-commerce sites too often fail to support buyer searches and decision-making, resulting in loss of sales and of customer repeat business. Failure to support the complete decision-making process can result in the customers' switching to a channel that provides better support for a particular stage in their decision-making process. Nunes and Cespedes [40] refer to this as "channel poaching" and suggest that by understanding the type of support required at various stages of the consumer's buying process, the channel can provide such support and close the sale. For instance, a personal computer customer may use the online channel to check the prices and then switch to the conventional channel for the purchase. Recognizing the need for information gathering (intelligence phase), the channel owner can provide links to an independent comparison and rating Web site, thus supporting the consumer's decision-making process.

Our results also indicate that improved online support during the choice phase leads to consumers' time savings. This is consistent with Achrol and Kotler [1], who stated that marketing, in the networked economy, will provide real-time market information that will translate into time savings for online consumers. Our results also showed that online support during the choice phase leads to consumers' cost savings. Lee [30] stated that consumers save costs because they have access to competitive pricing information via the online channel. Our results are also consistent with Grover and Ramanlal [21], who stated that when consumers use the online channel they achieve cost savings by paying only for those features they need.

One of the findings of our research—that higher satisfaction is mediated by consumers' recognition of *time savings* and *costs savings*—reinforces the importance of

online support for the *intelligence, design,* and *choice* phases for optimizing a purchasing decision. Our results also show that online support for the *choice* phase is directly and significantly correlated with overall satisfaction of the purchase decision-making process. This emphasizes that online support for the decision-making process can have a direct impact on satisfaction, even though it may manifest itself indirectly through the mediated effects of time savings and cost savings. This finding is consistent with previous research in e-commerce that found support for channel preference as being driven by satisfaction with the initial service [4].

We found a statistically significant, albeit weak, difference between the online and offline (e.g., brick-and-mortar) channels for the *design* phase (at the 0.10 level) and for the *choice* phase (at the 0.05 level). Interestingly, we found no significant difference between the two channels at the *intelligence* phase. These suggest that the online channel facilitates—at least for the type of products generally represented in our sample (e.g., books and CDs)—the *design* and *choice* phases of the purchasing decision-making process substantially more than the *intelligence* phase. One would expect that, with the abundance of information available, the online channel would support the *intelligence* phase quite well. Our results also contradict the explanation provided by Zeng and Reinartz [58] that the e-commerce channel may be well suited to support the *intelligence* phase due to its superior search capabilities. One conjecture for this contradictory finding is that the items used to tap the intelligence construct deal mainly with getting information on prices, taxes, and quality of products. For the products that form the majority of our research sample (e.g., CDs and books), this process is relatively straightforward both for online and bricks-and-mortar stores. This may be the reason why we do not see significant differences between the two channels. Therefore, this area of research needs to be explored further.

The implications of our findings for businesses utilizing the e-commerce channel are that, first, they must support buyer decision-making phases if they want to attract new customers and keep existing ones. Specifically, they should provide capabilities to support the intelligence phase, given that our research indicates that online businesses are not performing as well as the bricks-and-mortar channel in this area. In providing this support, e-commerce site professionals must realize that appropriate search technology and decision support must be implemented to accomplish this goal. For instance, online channel operators can provide tools such as the comparative price engines provided by CNet.com or Pricegrabber.com, among others. Second, given the role of the online channel as an intermediary to reduce search costs, channel operators can provide comparative features and recommend items so that online shoppers can save time and effort in exercising their choice of the final alternatives. Providing support for decision-making can also help e-commerce channel operators gain insights into consumer preferences, the critical decision points as well as those features that appeal to them in continuing to use the channel. Such learning of the decision-makers' process is highlighted by Simon [52] as a significant benefit, in addition to the automation of decision support technologies. For instance, learning from the decision process can lead to enhancements of shopping portals (e.g., activebuyersguide.com and

Gomez.com), leading to increased consumer satisfaction by offering appropriate guidance at specific steps in the process.

Notwithstanding the above findings, this study has some limitations. First, as is the case with such studies, it is quite possible that the comfort level and the decision-making process of e-commerce consumers in the wider population is different than among the participants in our sample. As mentioned earlier, 86 percent of our respondents are previous online shoppers. Second, our research design did not include multiple instances of same-product purchases. Given the cross-sectional nature of the data, our research model represents hypothesized relationships and is not intended to be causal in nature. Third, most respondents bought CDs and books even though they were given choices to buy other products. These are categories with high online purchase share, and therefore our findings need to be validated in the context of other types of purchases.

Our study has several implications for future research. First, it is important that future research studies investigate why no significant difference between the online and offline channels is found for the *intelligence* phase. One would expect online shoppers to be able to gather necessary information to make a sound purchasing decision, given the enormous amount of information available online and the superior search capabilities of the e-commerce channel. Second, future research studies can incorporate longitudinal designs to examine casual relationships among the various constructs studied in the present research. How the consumer's intelligence phase is supported, for example, by knowledge acquired through previous online purchase decisions can be captured well in a longitudinal research design. Third, future studies can also utilize the framework provided in the research presented here to examine decision-making and satisfaction differences between online purchases of products and services, digital products and physical products, and consumer products and luxury products. Fourth, this research can also be expanded to examine the antecedents of channel satisfaction among business-to-business (B2B) users such as electronic intermediaries and exchanges. Other constructs that support steps in the decision-making process and channel satisfaction may also be examined in future research.

Summary and Contribution

THE CONSUMERS' DECISION-MAKING PROCESS and its relationship to the choice of the online channel are not well understood. In this research we present a set of constructs and a method for understanding and supporting consumers' decision-making process. Taken together, constructs for the online consumers' decision-making steps (i.e. intelligence, design, and choice), performance variables (cost savings, time savings), and overall channel satisfaction provide the conceptual basis for our model that we subsequently validate using data from online consumers.

The study makes the following contributions: First, we present a theoretical perspective, based on previous work (e.g., [51, 52]), from which we model online consumers' decision-making steps. To the best of our knowledge, this is the first empirical

study in the e-commerce arena that investigates decision-making steps based upon Simon's model. Second, also based on previous studies, we have added new constructs (e.g., cost savings, time savings, and overall satisfaction derived from using the online channel) and hypothesized as to how these constructs are related to the *choice* phase of Simon's decision-making model. Again, to the best of our knowledge, this is the first study that does so.

Third, we have grounded our overall research in transaction-costs literature. We have shown how the aforementioned constructs and relationships among these constructs are consistent with this literature. Fourth, we have empirically shown that the proposed research model is capable of explaining decision support capabilities of the online channel and the factors that impact consumers' satisfaction with the channel. We have also demonstrated that online support for the decision-making process leads to consumers' time savings and cost savings. This support can also have a direct impact on satisfaction, even though it may manifest itself indirectly through the mediated effects of time savings and cost savings.

Fifth, we contribute new ideas for practice by illustrating why and how organizations (e.g., online channel operators) may employ tools for providing comparative features and prices to save consumers' time and cost, and tools to increase consumer satisfaction with the online channel. Online consumers will be better served when the online channel providers understand how consumers make decisions, and then provide appropriate capabilities to support the decision-making process. For instance, a provider may realize that consumers abandon the transaction after recognizing that an item is priced higher than that of a competitor, or the cost of shipping and handling is too high. In the former case, the channel provider can provide capabilities, such as comparative prices and features, thus supporting the intelligence phase. Similarly, in the latter case, the channel managers can support the design phase by incorporating the shipping and handling costs from different shippers (e.g., FedEx, UPS).

Finally, we contribute by proposing new directions for undertaking future research. We recommend that future research studies (1) investigate why no significant difference between the online and offline channels is found for the intelligence phase, (2) conduct longitudinal studies in the area to examine causal relationships, and (3) examine the antecedents of channel satisfaction among B2B users such as electronic intermediaries and exchanges.

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Appendix. Variables

Decision-Making Stages: Intelligence

1. The objective(s) of the purchase decision were clear to me.
2. It was easy for me to get relevant quantitative (price, taxes, etc.) information needed to make the purchase.
3. It was easy for me to get relevant qualitative (quality, usefulness, etc.) information needed to make the purchase.

Decision-Making Stages: Design

4. I believe it was possible to identify various alternatives.
5. It was easy for me to establish criteria (such as where, when, or price) to make the purchase decision.
6. With the information I had, I was able to narrow down my choices.

Decision-Making Stages: Choice

7. I believe that it was possible for me to evaluate the various alternatives.
8. Evaluation of the various alternatives did not take me very long.
9. It was an easy decision to pick the best alternative.

Cost Savings

10. The difference in total purchase price of the product (including shipping, etc., if applicable) between conventional and online channel?

Time Savings

11. The difference in time spent (approximate number of minutes) spent in making this purchase between conventional and online channel?

Satisfaction

12. Overall, I was satisfied with this online experience.
13. I strongly recommend shopping online to others.
14. It was possible for me to buy the product of my choice easily.