

## KNOWLEDGE-BASE AND ONLINE SELF-SERVICE

Sonya H.Y. Hsu  
Business System Analysis and Technology Department  
B.I. Moody III College of Business Administration  
University of Louisiana, Lafayette  
[SonyaHsu@louisiana.edu](mailto:SonyaHsu@louisiana.edu)

Siva K. Balasubramanian  
Stuart School of Business  
Illinois Institute of Technology  
[sivakbalas@stuart.iit.edu](mailto:sivakbalas@stuart.iit.edu)

Ramendra Thakur  
Marketing and Hospitality Department  
University of Louisiana, Lafayette  
[ramendra@louisiana.edu](mailto:ramendra@louisiana.edu)

Songpol Kulviwat  
Department of Marketing and International Business  
Frank G. Zarb School of Business  
Hofstra University  
[mktszk@hofstra.edu](mailto:mktszk@hofstra.edu)

### ABSTRACT

With a B2C orientation, this research focuses attention on knowledge-base (KB) capabilities and their relationships with customers' self-service experience in conjunction with repeat purchase intention. Using structural equation modeling, our analyses of experimental survey data show that both KB capabilities and self-service experience are significantly and positively related to purchase intention. Overall, this research makes two key contributions: (1) the concept of information search and relational marketing for decision-making is integrated into the study of KB; (2) it analyzes KB from a customer's perspective instead of the organizational perspective that characterizes prior work. Implications for future research are discussed.

Keywords: Information search, knowledge base, online self-service, self service technology, self-efficacy.

### 1. Introduction

Today's economy is characterized by a rapid rate of change, globalization, knowledge-intensive product-designs, and after-sales services. These factors intensify the competitive environment where knowledge is regarded as an organizational asset and knowledge management (KM) implementation supports the organization in developing innovative products [Chen and Su 2006]. In developing innovative products, the goal is to enhance customers' satisfaction with product purchases. Similarly, in the realm of customer support, KM projects attempt to improve customer satisfaction by reducing wait times or by improving access to meaningful knowledge online [Davenport and Klahr 1998]. For example, Hewlett-Packard (HP) reaped two key KM benefits: a cost reduction of 50 percent in answering customers' calls over a two year period, and the ability to hire less technically experienced support analysts without affecting performance [Davenport and Klahr 1998]. It is not surprising that IT services (including maintenance and support) accounted as much as 17% of HP sales [Standard & Poor's 2006]. Additionally, KM projects have the potential to significantly enhance service appeal. Self-service -- often considered a cost-cutting measure -- can be a significant value adder in KM-aided e-business firms such as Dell, Amazon, eBay, and Half.com [Tiwana 2001]. Such e-retailers are important because nearly 50% of online shoppers consider new electronic products, upgrades, or replacements for broken parts. Furthermore, 57% of 2,535 consumers surveyed by Jupiter Research [INSIGHT 2005] indicated that the efficiency of service resolution affected their decision to purchase.

Although the introduction of self-service initially yields cost savings and operational efficiency, some leading firms now emphasize customer growth and competitive differentiation in an increasingly complex and dynamic marketplace [Miller 2007]. To win or retain customers, they have to deliver superior online customer experience, such as high quality and relevant content that addresses different needs across the sales cycle, such as those that become salient during product research, actual purchase, or after sales service. For most e-businesses, retaining customers is the toughest challenge; however, an organization can serve these needs by managing their customer knowledge base carefully.

Given the Internet's 24x7 access characteristic [Birgelen et al. 2002], customers now demand instant pre-purchase and/or post-purchase service when they need it. This requires careful harnessing of customer data. Every online interaction with a customer may evolve into a transaction, provide the opportunity to introduce a new service, ask for repeated businesses, or at least track customers' online behavior to improve future customer experience. Capturing transactional data such as order history is a first step to improve customer service or self-service. KM tools help source, collect, combine, filter, and analyze data to generate actionable information. They are key facilitators for marketing, sales, and support functions [Miller 1956]. More advanced case-based reasoning systems have demonstrated great potential in customer service areas such as troubleshooting product problems [Chen and Liou 2002].

This research study reflects an empirical emphasis. It also breaks new ground with an application focused around the computer purchase process. More specifically, we analyze the impact of customers' knowledge base (KB) about computer products on business-customer relationships. We also investigate the impact of computer KB on customers in problem-solving and technical support areas.

Our research is motivated by two reasons. First, although a few prior studies have considered how customers' experiences with products and/or services may enhance their purchase intention, no study has explored how customers' self-service experience may enhance their behavioral intentions. Second, our study identifies the importance of product attributes and their impact on both customer's self-service experience and their purchase intention. We also examine the following two research questions:

- What is the impact of KB on customers' computer purchase intention?
- What are other factors that impact customers' computer purchase intention?

The next section presents theoretical rationales for a conceptual model that draws from the following disciplines: social psychology, marketing, and information systems. We then outline the study methodology, discuss the measures used for the constructs in our model, and present our results, limitations, conclusions and directions for future research.

## 2. Literature Review

### 2.1. Theoretical Foundation

Consumer intention to use a product/service is a construct that has attracted considerable research attention. Researchers maintain that consumers are driven by the value [Zeithaml 1988; Jacoby and Olson 1985; Seva and Helander 2009] of products/services. Value, representing what consumer gets in return for the price paid, depends on their knowledge about products/services and how they evaluate the total benefit derived by using the products/services of a particular brand. In other words, significant customer knowledge and positive user experience reduces any uncertainty associated with a specific purchase. A customer's knowledge about the product or service should positively impact both his/her attitude and the intention to respond. Valuable insights on the resultant behaviors emerge from self-efficacy theory [Bandura 1986] and self-service technology [Meuter et al 2003] research.

*Self-efficacy* is defined as "beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands" [Wood and Bandura 1989]. For example, in the context of electronic commerce, one can argue that customers will have confidence in their ability to complete an online transaction. If a customer is knowledgeable in using the product or service, they will have a positive experience with the product. In other words, higher the customer's KB about a product, higher their intention to purchase similar products or services. On the other hand, if a customer is not knowledgeable about the product/services, they are more likely to be disappointed after using it. Such disappointment is likely to adversely impact their intention to purchase the product/service in future. Self-efficacy theory derived from social psychology literature plays a significant role in influencing customer's information processing activity related to purchasing a product or service. Customers' processing of information about products/services depends on their prior experiences. Information processing theorists approach learning primarily through past experiences stored in the memory. According to Miller [1956], effective encoding of information is based on prior experiences. Similarly in

the context of KB and self-services one can argue that if a customer has a good KB about computer products then their experience with the self service technology (SST) as well as their purchase intention should be positive.

From the other side of customer purchase, Bose and Sugumaran [2003] provide a framework that integrates customer relationship management with knowledge management. Their framework promotes CRM processes that can provide knowledge-based and analysis-driven interaction with customers [Bose and Sugumaran, 2003, p. 6]. This framework also extends its capability to intranet and extranet that organizes different knowledge sources from documents, applications, data warehouses as well as customers' responses from purchases, repairs and feedbacks. As mentioned in the following section, "one system" [Smith and Fingar 2006] orchestrated by the life cycle of knowledge reuses, creation and management should speed up the internal operations as well as the CRM processes. Bueren et al. [2004] utilized action research to derive a "customer knowledge management process model" from triggers by the customers who receive information or services or by the enterprises who deliver information or services to customers. The knowledge base not only engages customer and enterprises to interact with each other but also is built upon those interactions besides "knowledge for customers" and "knowledge from customers" [Bueren et al., 2004]. Knowledge for and from customers is rooted in the "knowledge about customers." The shared understanding between enterprises and customers is the foundation of relationship marketing that is not limited to just marketing but sales and after sales services.

Research studies by Venkatesh [2002] and Anderson [1996] suggest that customers' anxiety in technology usage is related to perceptions, intentions, and attitudes of customers in using the technology (e.g., computer usage), as well as actual performance and ability of the user. These findings are compatible with insights reported by Davis [1986] using his Technology Acceptance Model (TAM). Specifically, Davis reports that if customers find the technology useful and easy to use (due to customers experience, knowledge, and product attributes, among others), it will have a positive impact on their attitudes, thereby influencing behavioral intention to use the technology. Therefore, based on self-efficacy theory and self service technology literature, one can argue that several factors (such as customer's knowledge about products/services, their experiences with technology, and product attributes, among others) together influence their purchase intentions. Customer knowledge management (CKM), however, based on the enterprises' capability combines different sources to collect information about, from and for customers. CKM, created by enterprises, provides a different perspective to relational marketing besides SST or knowledge-base uses.

## 2.2. Knowledge Base and Self Service Technology

In order to accumulate a comprehensive knowledge base (KB), a key consideration is to constantly replace old or outdated cases with problem solutions that are more recent and more effective. To create and study an in-depth KB, it is instructive to capture employees' expertise regarding products and processes [Chen and Liou 2002]. When service representatives develop solutions for customers' problems, these "solutions" can be stored and reused. All accumulated solutions become KB repositories that may be further integrated into a knowledge management (KM) system. When this KM concept is extended to e-commerce contexts, the focus shifts to external elements of knowledge i.e., products and customers.

"One system" [Smith and Fingar 2007] of knowledge base and its management is a key to streamline business processes that involve selling products to customers, and solving post-purchase hardware/software problems by IT support and self-served customers. This "one system" should be compiled and created based on the needs, interactions, inputs from different parties, i.e., sales representative, IT support, customers, and prospect customers. KB should include different facets such as: 1) the firm's knowledge about customers; 2) the firm's knowledge base that facilitates customers to make judgment for their purchases and to help resolve their problems; and 3) customer's knowledge about the computer products and self-served problem solving after purchase. An effective KB system may increase customers' problem solving behaviors for some purchases on their own, and also enhance their positive experiences with the purchased product.

### 2.2.1. Knowledge base

Chen and Liou [2002] identified four major activities that link KM to online environments: 1) Identify and capture: e-commerce provides abundant opportunities to capture knowledge from customers; 2) Adapt and organize: knowledge captured should be adapted and organized via condensing, categorizing, and connecting; 3) Share and distribute: a KM system should provide easy access to knowledge while addressing security issues; 4) Use and create: knowledge once obtained can be used by people or embedded in a system that enhances its functionality. A solid understanding of these four activities will help firms to capture customer-related knowledge, thereby establishing a customer centric business environment that enables firms to better manage customer interactions [Bose and Sugumaran 2003]. The customer management activities described earlier play a direct role in the process of knowledge accumulation. Many organizations that offer customer support rely on KM techniques to capture support knowledge and make it available to front-line staff to help serve customers better. Examples include

frequently asked questions (FAQs) from simple listings of the knowledge base, knowledge repositories of solutions to numerous customer issues, customer inquiries and answers, and customer product questions and recommendations [Davenport and Klahr 1998]. Case-based reasoning systems are used to capture specific knowledge, such as trouble shooting product problems in customer service or technical support [Davenport and Prusak 1998; Shani and Chalasani 1992]. For example, any newly solved problem should be added to the KB system for future reference [Chen and Liou 2002]. Additional features such as relevant ranking and glossary may significantly improve the KB system. Feedback from customers about products allows e-commerce sites to establish a knowledge acquisition mechanism that elicits knowledge about products and their usage. KB applications often feature an unstructured online repository of documents and textual content [Davenport and Klahr 1998]. In some customer support environments, the “search” for solutions to problems is not time-critical [Davenport and Klahr 1998]. Often, a keyword search yields too many solutions to filter through. For these reasons, the Case-Based Reasoning (CBR) approach remains the most common technology for problem solutions. CBR systems capture and provide access to customer service problem solutions [Davenport and De Long 1998], in addition to serving as devices that facilitate online self-service. This approach highlights specific problem cases and corresponding solutions from the past; it also provides a framework to retrieve similar cases when a new problem is identified. The system searches for similar known cases given the description of a current problem. It directs questions at users to narrow down the search toward the correct solution.

Search engines that use more than one user queries include Boolean searches, Bayesian inferencing, Fuzzy logic systems, natural language processing, and combinations thereof that add proprietary variations. Distribution knowledge involves more than knowing how information is disseminated, such as what kind and how much information ought to be disseminated [Grover and Davenport 2001]. Some firms adopt technology to filter knowledge based on a user’s predefined categories of importance. This can be easily done by setting a special account for customers who desire fast access to specific knowledge.

Note that the experience and feedback gained from using existing knowledge creates new knowledge that, in turn, may launch another knowledge cycle. In a similar vein, database marketing aids an online KM system by collecting information about past, current, and potential customers to build a database to improve marketing efforts [Shani and Chalasani 1992]. Database marketing may even develop new type of market segments that are refined and customized [Ali and Erdener 1997]. The interactive process between service providers and customers is not based on a single transaction but a series of encounters over time. As relationships build up, those in turn facilitate future interactions. Further, marketers recognize valuable customers who are worth cultivating because a firm can meet their needs more effectively than others [Ali and Erdener 1997]. To make this relationship between customers and companies work efficiently, customer databases are needed as along with a reference system, such as a KB system. A strategy that integrates the accumulation of the relevant customer database with KM will enable firms to achieve knowledge transparency, knowledge dissemination, knowledge development, and knowledge efficiency i.e., all the core concepts of the customer knowledge management process model [Bueren et al 2004].

In e-commerce environments, customer management activities include the acquisition of new customers, relationship building, post-purchase services, and customer retention efforts. Firms implement KM systems primarily to foster customer intimacy and to provide better service [Chen and Liou 2002]. In a competitive marketplace, the KM systems are utilized for differentiating the products offered to customers and/or to increase repeat customers. For example, the KB framework embedded in Dell.com is known for its ability to inform, educate, and empower users to effectively search and choose among a large array of options while customizing a computer’s configuration.

### 2.2.2. Self service technology

Self service technology (SST) enables consumers to serve themselves without involving service providers [Meuter et al. 2005]. SST can range from simple kiosks for ATMs or online self-check-out procedure at a hotel room [Lee and Allaway 2002] to more complicated services such as problem-solving decision process for computer issues. Problem-solving processes usually require a more interactive and more sophisticated knowledge management system to facilitate quick response. Kolodinsky et al. [2004] describes two kinds of SST – active and passive. Passive SST can be installed and monitored by users after the set-up while active SST requires continuous interaction regarding users’ needs and other inputs.

We may say that passive SSTs accommodate simple customer tasks while active SSTs fulfill more complicated tasks. Jayasimha and Nargundkar [2006-2007] offer a conceptual model that explicitly notes that customers may incur an emotional cost in SST-adoption decisions. This emotional cost may be related to a key construct in our study (i.e., self-service experience). SSTs enable customers to produce their own service encounters within a convenient time frame. To assess customer satisfaction on SSTs, prior research [Doyle 2007] offers several criteria: speed, process efficiency, cost savings, and service recovery (with reliability, real-time accessibility, convenience,

and quick help). One goal of our study is to advance our understanding beyond kiosk-based simple or passive SSTs by offering insights on active SST-based KB systems.

According to the SST literature [Meuter et al 2003; 2005], customers' intention to buy or not to buy a particular technology is driven by technology anxiety (TA). According to these authors, TA is defined as the fear of use or anticipated use of self service technology. The Meuter et al [2003] study notes that TA can be reduced if the customer is knowledgeable and has experience with the technology. Such knowledge and experience should drive customer's purchase intention. A customer's TA may also be reduced by explaining the importance of the product attributes (e.g., service/warranty, technical support, among others). A recent study by Pavlou et al [2007] has indicated that any uncertainty associated with using a product or service could be the key barrier in online transactions. Similarly, in the context of our study, we can say that customer's lack of experience in using computers and its related products should increase their technological anxiety and reduce their purchase intention.

### 3. Relationships between Constructs

In this section, we examine relationships among our four model constructs shown in Figure 1: KB of a computer product (KBCP), self-service experience (SSE), purchase intention (PI) and product attributes (PA). More specifically, we develop five hypotheses based on the proposed research model (Figure 1). The predictor variables in the model were allowed to correlate with each other because it is presumed that a customer familiar with KB of computer products should also understand the importance of attributes of such products.

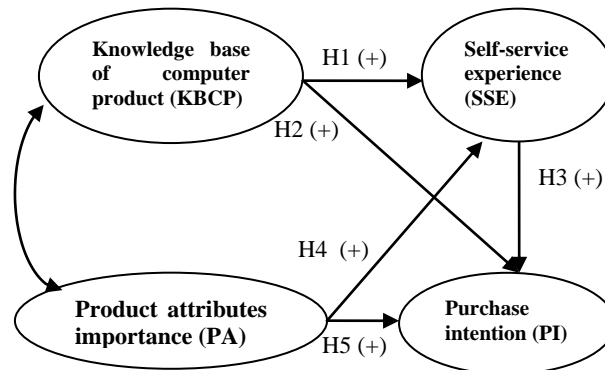


Figure 1: Proposed Model

#### 3.1. KB of Computer Product and Self-service Experience/Purchase Intention

A KB system is deemed effective if it progressively lowers the extent to which customers are required to process information or reuse knowledge. It is therefore appropriate to focus on KB effectiveness measures that are directly related to information processing or knowledge use. For example, if the organization provides relevant knowledge about its computer products to its customers, such knowledge is likely to enhance customers' self-service experience with its products. Another example is the ease of use of SST. The easier customers find the usage of SST the greater their usage experience, and greater the value created by the technology for them. Similarly knowledge intensive organizations invent user-friendly products, thereby adding value to the product, whose value increases over time because learning effects improve user performance. One may also argue that as customers' KB about computer products increases over time, the diffusion process for such products is facilitated because knowledge enables experience.

Wei et al. [2011] investigate Internet group purchasing involving social networking communication. Their results showed four stages, information accumulation, interaction and examination and accommodation, to monitor group purchase phenomena. This research demonstrates the revolutionary process of Internet purchase from individual to social buying. The first stage of recognize a brand and search its information is very crucial for the buying decision. If the consumers were convinced by the information content, they would buy the products or services and then even advocate this brand for future purchases. Furthermore, user interface quality and information quality of e-commerce websites were found to have a significant positive impact on consumer satisfaction [Eid 2011]. Eid's [2011] study also found a strong positive relation between user interface quality and customer trust.

The nexus of self-service and KB leads firms to new opportunities for retaining or attracting customers. Researchers [Gritt and Schelmetic 2005; Beatson et al. 2007] have noted that SST influences service encounters. Although KB often entails the investment of significant resources by a firm, these costs may be outweighed by benefits such as reductions in the duration of the service process and labor costs and service contacts [Seva and

Helander 2009]. Studying the comparison shopping agent-based decision support system (DSS), Pathak [2010] uses four components, data, models, interfaces, and user specific customization to design the customer interfaces. The product information was focused on details and specifications, user reviews and ratings, availability, trend for leads, editorial reviews and ratings [Pathak 2010]. In addition to product information, price, promotion and merchants were also considerations for DSS design. In a similar vein, for a computer product firm, KB offers the potential to improve both the customization of service delivery and delivery speed [Berry 1999], thereby enhancing customer self-service experience. These positive outcomes, in turn, influence customers' purchase intention [Lin et al. 2006].

Surprisingly however, the integration of self-service and KB has attracted limited research attention. Researchers [e.g., Kumar et al. 2005] have investigated related themes with a focus on search behavior. They report that customers' interaction with technology during online shopping reduced search costs and influenced purchase intention. We therefore propose the following two hypotheses:

***H1: Customers' perceptions about KB of computer products are positively related to their self-service experiences.***

***H2: Customers' perceptions about KB of computer product are positively related to their purchase intentions.***

### 3.2. Self-service Experience and Purchase Intention

The services literature suggests that providing more personal control to customers in the technology age reduces their perceived risk. This is because their SST experience enhances their perceived value of the SST and their adoption intention [Lee and Allaway 2002]. Research has proposed SST attributes as success factors that increase customers' satisfaction [Beatson et al. 2007; Seva and Helander 2009] that in turn influences future purchase intention. These technology-related attributes include reliability, convenience, customization and enjoyment [Beatson et al. 2007]. In a similar vein, a positive customer SST experience is likely to increase that customer's adoption intention. Other studies [Bolton et al. 2000] posit that customers' service experiences positively impact their repeat purchase intentions.

Zhu et al. [2007] suggest that SST interfaces (i.e., features that provide comparative information and interactivity to enhance SST effectiveness) are likely to increase customers' perceived control. By their definition, comparative information reduces information flow and engages customers in the decision-making process with a greater sense of self-determination [Davenport and De Long 1998]. Similarly, interactivity provides customers with a greater sense of self-control. For example, customers may filter or prioritize information as they deem fit. Zhu et al. [2007] also suggest that of the combined presence of several SST features is likely to burden users such that the effectiveness of SST diminishes. In other words, in information overload contexts, customer behaviors may lag intentions to purchase a product or service.

Through the development and operation of KB systems, the value of mission-specific expertise can be leveraged through explication and knowledge sharing. Although the easiest and most impressive benefits from KM projects involve money saved or earned, they are also the most difficult to attribute uniquely to KM systems. It is often difficult to identify or isolate the financial impact of KM, since KM programs often compete against other business initiatives for scarce resources; they must be assessed in terms of measurable returns to a potential investment in that area for the organization [King 2001]. Although performance is notably difficult to measure, we assess KB performance by focusing on self-service experience and repeated purchase intentions. Thus, it is hypothesized:

***H3: The self-service experience customers positively affect future purchase intention.***

### 3.3. The Importance of Product Attributes and Self-service Experience/Purchase Intention

According to Kotler [1995], delivering customer value is the key for corporate success. It is vital for an organization to understand how value is assessed by customers. There are several studies [Barbeau and Qualls 1984; Berkowitz 1986; Rajendran and Hariharan 1996; Bettencourt and Gwinner 1996; Due et al. 2003; Seva and Helander 2009]. The literature in marketing, management and psychology disciplines indicate that the process of customer value formation depends on a given product's attributes. For example, to compete effectively, firms have to provide a quality product for a reasonable price. Such attributes enhance customers' value perceptions about the product and their willingness to buy [Rajendran and Hariharan 1996]. Focused on information quality, system quality and service quality, Sun [2010] provides a research model that was validated by a survey of 140 online auction sellers at uBid.com. From this research, information, system and service quality affected relationship quality significantly. In turn, this relationship significantly impact on customer commitment and their retention.

Consistent with this notion of a customer's value proposition, the service literature suggests that the customization of service delivery and customer support by frontline employees enhances the customer service experience. Moreover, this process is also a key to generating customer satisfaction [Bettencourt and Gwinner 1996]. Recent studies by Du et al [2003] highlight the importance of incorporating customer preferences into product specifications in order to enhance the customer experience. Along similar lines, one can argue that the

perceived importance of product attributes (e.g., service warranty, customization, technical support, among others) is positively related to perceptions of the customer service experience.

Seminal studies in the consumer behavior literature [Barbeau and Qualls 1984, Berkowitz 1986] underscore the importance of product attributes as key determinants of consumers' behavioral intentions. As noted earlier, studies also indicate product attributes influence users' experiences. A recent study [Seva and Helander 2009] explored the relationship between cell phone attributes and user experience. Results showed that the importance of cell phone attributes such as cell phone features, and the support that the cell phone industry provides to its customers, exerted a positive and significant influence on customers' product usage experiences as well as their purchase intention. Similarly, if a customer is knowledgeable about the computer products then his/her online self-service experience for such products are likely to be positive as well. Therefore, we hypothesize:

**H4: The importance of product attributes is positively related to customers' self-service experience.**

**H5: The importance of product attributes is positively related to customers' purchase intention.**

All five hypotheses above are depicted in the Proposed Model depicted in Figure 1.

#### 4. Research Method

This research includes three studies focused on: 1) evaluation of online KB of websites of selected computer firms; 2) attributes considered in decisions to purchase a computer; and 3) the possible service encounter during a problem-solving process. We chose several computer brands featured in the desktop and laptop categories in the *Readers' Choices* survey conducted by *PC Magazine*. The first and second studies took about 15-20 minutes to complete within a laboratory environment. The last study lasted another 10 minutes followed by a survey (please see Appendix A) that took 15 minutes to complete. Participants in the lab experiments and survey were offered a potential reward (an one in five opportunity to win a \$5 certificate) for assisting this research project.

The first study asked participants to evaluate the attributes they considered important to decide on a computer brand. The consideration set for this decision may include 11 *Readers' Choice* computers. Based on the results of *Readers' Choice* survey, readers rated their computers on reliability, technical support and repair services. For this study, we included attributes such as price and customization in addition to the attributes from the *Reader's Choice* survey. Another aspect focused on a problem-solving mechanism with study participants placed in three different settings -- 1) they chose a computer problem and used available information to solve that problem; 2) they were assigned a problem and used available information to solve that problem; 3) they were assigned a problem and directed to a knowledge-base (self-service) to solve the problem. After the experiment, the respondents answered items that (a) captured their experiences while searching within the KB system of a particular website, (b) purchase intention, and (c) evaluations of the Web KB system.

Participants included 318 junior students enrolled at a major university in the Midwest. Those participants were required to take programming classes as prerequisites before they elected MIS track in their management program. Both the survey and the experiment were conducted in a computer lab environment. The researchers sought participants who could comfortably navigate a KB system online. Participants from lab sections of MIS classes (300-level) appear especially appropriate for this study because they use computers extensively. More important for this study, they are likely to be KB users after having purchased computers for their personal use. According to Gallagher, Parsons, and Foster [2001], a college student sample may be a better sample than a random sample for a study involving computers, because students are relatively more competent in using computers and they know more about the different features of the computer technology. Further, a study by the Pew Internet & American Life Project [Horrihan 2003] provided evidence that the "young, tech elite" represents one of the most significant groups to use computer technologies as well as spends more than average on all sorts of technology goods and services. These members are described as being more likely to be college educated than normal and they have an average age of 18-22 years. Thus, college students are a particularly relevant and appropriate sample to use in this study.

##### 4.1. Description of Respondents

Table 1 shows the profiles of computer purchase-related habits. As evidenced, price is the main concern (33.66%) for computer pre-purchase, followed by technical support (28.97%); and the ability to customize the computer products (21.49%). Interestingly, reliability features have the least impact in the pre-purchase phase (4.67%). Frequent computer problems encountered after purchase included technical problems with systems locking up (28.27%) and existing application (ranking third with 16.52%). The Internet connection ranked second with 18.85 percent.

It is interesting to see most users (75.5%) rarely seek the KB at the company's website; only few (6.9%) do this often. The bulk of engagements with technical support include the traditional 2-way interactive human approach via telephone (36.88%); non-interactive human engagements such as chat or the Web accounted for 4.43% and 8.36% respectively.

Table 1: Computer Related Purchase Habits

Measure	Items	Percent
Pre-Purchase: Ranking brands on attribute	Price	33.66
	Reliability	4.67
	Customization	21.49
	Service & Warranty	11.21
	Technical Support	28.97
After Purchase: Types of Computer Problems	Problem with existing application	16.52
	System locking up	28.27
	Downloading software/drivers	10.00
	Connecting to Internet	18.85
	Problems installing software	7.31
	Upgrades/replacement	8.08
	Reinstalling OS	5.77
	Help with setup/installation	5.20
After Purchase: Means of interacting with technical support	Telephone	36.88
	E-mail	12.79
	In person	24.75
	Web	8.36
	Chat	4.43
	Remote Control	1.31
	Tech on site	10.66
	Others	0.82
Time seeking the KB at the company's Website	Rarely	75.50
	Occasionally	17.60
	Often	6.90

#### 4.2. Measures

Four constructs [e.g., knowledge base of computer products (KBCP), product attribute importance (PA), self-service experience (SSE), and purchase intent (PI)] of research interest were measured by thirteen items shown in Table 2. These items were extracted from previous studies. Our study also followed three steps to develop new measurement scales: item generation, measure purification and measure validation [Diamantopoulos and Sigauw 2006]. Notably, our study is exploratory in nature and each item is derived from previous literature. Items belonging to KBCP and PA constructs are treated as reflective instead of formative, in the spirit of utility theory, which has fundamentally guided the bulk of the consumer behavior and information system literature. Reflective constructs are used for concepts such as perceived ease of use, perceived usefulness, and satisfaction [Petter et al. 2007]. Reflective constructs, according to [MacCallum and Browne 1993], are observed measures affected by an underlying latent, unobservable construct. The direction of causality is from the construct to the items, the construct is reflective while formative construct directed causality from the items to the construct [Petter et al. 2007]. More specifically, the rationale here is that user's knowledge base construct (KBCP) or perception of Product attribute importance (PA) will inform or influence the benefit/utility/perception associated with the indicator items that measure these constructs. The following explanations are provided to operationalize each construct.

The construct of knowledge base of computer products (KBCP) describes how customers use knowledge base online with a certain brand in mind. This construct includes ease of navigation of the KB, information quality about problem solution, search function, advanced search techniques, and other techniques. Specifically, advanced techniques refer to further search within the original set of search results which provide relevance to the search or rank the search results. The item of "other techniques" is interactive or useful function to the search results, for example, discussion board, feedback box or print/save function for the customers' convenience. Self-service experience (SSE) refers to the experience in problem-solving by using online KB by customers on their own. The construct includes KB experiences that are helpful, happy, user-friendly, and immediate responses offered by the supporting technology. The product attribute importance (PA) is operationalized as possible factors for customers to select a certain brand of computer product. From previous studies [Barbeau and Qualls, 1984; Rajendran and Hariharan 1996], and product features available from several computer products, the researchers found service/warranty, technical support and customization to be relevant to customers' choices. However, price and reliability are not important enough to be reckoned in this study. The last item, purchase intent (PI), is also a dependent construct. The only item "consider buying this brand again because of its online knowledge base" is used in this construct after initial factor analysis. More details on these four constructs are available in Appendix A.



Table 2: Measurement Items in the Research Model

Construct	Items	Literature references
Knowledge base of computer products (KBCP)	-Ease use of KB -Quality of KB -Search function -Advanced techniques -Other techniques offered	Berry, 1999; Kumar et al. 2005; Lin and Hsieh 2006; Gritt and Schelmetic 2005; Beatson et al. 2007;
Self-service experience (SSE)	-Helpful -Feel happy -User-friendly -Immediate response	Lee and Allaway 2002; Walker et al. 2002; Beatson et al. 2007; Zhu et al. 2007; Seva and Helander 2009
Product attribute importance (PA)	-Service/warranty -Technical support -Customization	Barbeau and Qualls, 1984; Rajendran and Hariharan 1996; Due et al. 2003; Seva and Helander 2009; Pathak 2010; Sun 2010; Eid 2011; Wei et al. 2011
Purchase intent (PI)	Consider buying the brand again because of KB	Lin and Hsieh 2006; Beatson et al. 2007; Eid 2011; Wei et al. 2011

## 5. Analyses and Results

Structural equation modeling technique (EQS 6.1) was used to test the proposed model. A two step process of structural equation modeling (SEM) was used for analysis. First the measurement model was tested to ensure that the items measured the underlying constructs and then we tested the structural model.

### 5.1. Measure Validation

We used confirmatory factor analysis (CFA) to model the 13 items against the four proposed constructs. The results indicated that the normalized estimate of multivariate kurtosis was 48.62, exceeding the recommended cutoff point of 3. Following Bentler's [1989] recommendation for such instances, we used the robust maximum likelihood estimation method. The measurement model indicated a good model fit with root mean square error of approximation (RMSEA) of 0.05, CFI of 0.92, incremental fit index (IFI) of 0.92. After establishing good model fit, each construct was assessed for unidimensionality, reliability, convergent and discriminant validity.

Table 3: Measurement Model, Reliability, and Average Variance Extracted

Construct	Items	Standardized loadings	Internal consistency reliability ( $\alpha$ )	composite reliability	Average variance extracted (AVE)
Knowledge base of computer products (KBCP)	-Ease of KB	0.80	0.83	0.87	0.72
	-Quality of KB	0.82			
	-Search function	0.78			
	-Advanced techniques	0.71			
	-Other techniques	0.66			
Self-service experience (SSE)	-Helpful	0.82	0.82	0.80	0.61
	-Feel happy	0.79			
	-User-friendly	0.76			
	-Immediate response	0.74			
Product attributes (PA)	-Service/warranty	0.86	0.73	0.78	0.64
	-Technical support	0.83			
	-Customization	0.71			
Purchase intent (PI)	Consider buying the brand again because of KB	0.67	N/A	N/A	N/A

\* All factor loadings are significant at  $p = 0.05$

$$\text{Composite Reliability} = \frac{(\sum \text{Standardized Loading})^2}{(\sum \text{Standardized Loading})^2 + \sum (\text{Standardized Error})^2}$$

$$\sum (\text{Standardized Error})^2 = \sum (1 - \text{Standardized Loading}^2)$$

According to [Meuter et al. 2005] a construct is said to be unidimensional when all items measuring that construct have a standardized loading that is 0.50 or above. In our study, this threshold is met by all items corresponding to each model construct (overall, the values range from 0.66 to 0.86). Results also indicated that the Cronbach alpha coefficient (reliability) of all four model constructs exceed 0.70, the threshold value for acceptable reliability [Nunnally 1978]. Thus, each model construct is deemed to be reliably measured. Besides computing reliability as an index of internal consistency, we also calculated the composite reliability of each of the four constructs. Results show that the composite reliabilities equal or exceed 0.45. Table 3 shows standardized loadings, internal consistency reliability, and composite reliability values.

We also assessed construct validity (i.e., convergent validity and discriminant validity). According to [Campbell and Fiske 1959], convergent validity assures that the concepts that should be related theoretically are interrelated in reality. In contrast, discriminant validity conveys the degree to which concepts that should *not* be related theoretically are, in fact, *not* interrelated in reality. A construct is said to satisfy the condition of convergent validity if the average variance extracted (AVE) estimates exceed 0.50 [Fornell and Lacker 1981]. Discriminant validity is demonstrated when the shared variance (squared correlation) between any two constructs is less than the square root of the AVE for items measuring the constructs [Fornell and Lacker 1981]. Refer to Table 4 for evidence in support of convergent and discriminant validity.

Table 4: Convergent and Discriminant Validity Matrix

Construct	KBCP	PA	SSE	PI	Mean	S.D.
KBCP	<b>0.85</b>	0.29	-.05	0.26	4.96	1.38
PA	0.084	<b>0.78</b>	-.04	0.52	4.09	1.35
SSE	0.002	0.002	<b>0.80</b>	-.06	1.12	0.42
PI	0.067	0.270	0.004	<b>0.67</b>	3.53	1.91

KBCP = Knowledge base of computer products; PA = Product attributes Importance; SSE = Self-service experience; PI = Purchase intent. Diagonal elements represent the square root of the average variance extracted (AVE) between the constructs. The numbers above the diagonal elements are the correlations between the constructs. The numbers below the diagonal elements are the shared variances (or squared correlations) among constructs. For discriminant validity, diagonal elements should be larger than off-diagonal elements.

### 5.2. Hypothesis Testing

Once the measurement model was tested, we assessed the structural model. The structural model was based on four constructs and thirteen items that measured those constructs. The fit indices of the structural model indicated a good model fit with RMSEA of 0.05, CFI of 0.92, IFI of 0.92, and NNFI of 0.90. With respect to standardized path coefficients for the structural model, results indicate that two of the five hypothesized paths that were tested for significance (path from knowledge base of computer products to self-service experience and self-service experience to purchase intention) were statistically significant at the 0.01 level. One path (from knowledge base of computer products to purchase intent) was statistically significant at the 0.15 level. However, two paths (from product attribute importance to purchase intention, and from product attribute importance to self-service experience) were found to be non-significant. Figure 2, Tables 5 and 6 show summary results for the final structural model, including standardized path coefficients and model fit indices. The results also indicated that the total variance of the purchase intention of the customers explained by the three constructs KBCP, PA and SSE was 93.4%.

Table 5: Standardized Path Coefficients and t-Values for the Structural Model

Parameter estimates structural paths	Standardized path coefficients	t-value	Results
H1: KBCP -> SSE	0.30	3.36**	Yes
H2: KBCP -> PI	0.13	1.4*	Yes (partially)
H3: SSE -> PI	0.92	8.65**	Yes
H4: PA -> SSE	-0.01	-0.12	No
H5: PA -> PI	-0.03	-0.29	No

\*p < 0.15; \*\*p < 0.001

KBCP = Knowledge base of computer products; PA = Product attributes; SSE = Self-service experience; PI = Purchase intent.

Table 6: Model Fit Indices – for the Structural Model

Fit Indices	Acceptable Fit thresholds	Fit indices of proposed model
RMSEA	≤ 0.08	0.05
CFI	> 0.90	0.92
IFI	> 0.90	0.92
NNFI	> 0.90	0.90
90% CI of RMSEA	Between 0 and 1	(0.04, 0.07)

Hair et al. (2010) suggested that a value of RMSEA ranging from 0.05 to 0.08 are deemed acceptable whereas Browne and Cudeck (1993) suggested that a value of RMSEA ≤ .05 indicates a close fit of the model

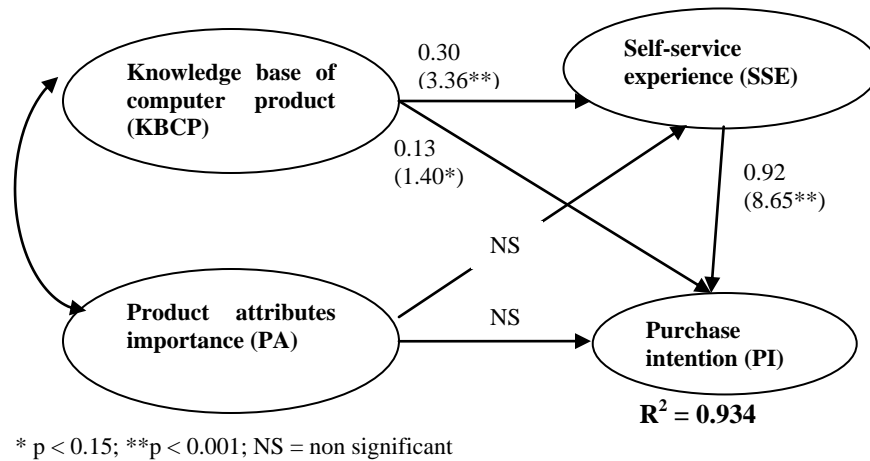


Figure 2: Final Model

## 6. Conclusions

The main objective was to investigate the impact of KB and other possible factors on customers' computer purchase intention. The results revealed that; 1) KB capabilities were significantly and positively related to both purchase intention and to self-service experience; 2) self-service experience was significantly and positively related to purchase intention; and 3) product attributes importance had no contribution to either self-service experience or purchase intention.

### 6.1. Discussion

From the firms and/or marketers' perspective, KB can be useful for promoting and/or retaining their computer product, computer peripheral product, or even an electronic product such as a "smart phone." According to this research, customers "rarely" used online KB (refer to Table 1). However, the customer's experience in solving hardware/software problems may be greatly influenced if they utilize online KB. Further, their attitudes and future purchase intentions are affected by their experience in self-serving processes and the online KB systems they visited. The KB functionality, self-service experience and purchase intention are positively related, in line with previous research [Bettencourt and Gwinner 1996; Lee and Allaway 2002; Due et al. 2003; Gritt and Schelmetic 2005; Beatson et al. 2007; Lin et al. 2006; Seva and Helander 2009].

Product attributes (PA) including service/warranty, technical support and customization are not significantly related to self-service experience and future purchase intent. Although it appears reasonable to assume a relationship between these product attributes and KB, the results show non-significant relationships. As pointed out by Du et al. [2003] and Seva and Helander [2009], customers' preferences are important factors to incorporate in product development. Also, from the Table 1 Computer Related Purchase Habits, price (33.66%) evidently places the highest feature for purchase computer, technical support (28.97%) the second highest and customization (21.49%) the third place. However, after running factor analysis and SEM, the price attributes (refer to the Table 3) is not included in the PA construct. This may contribute the insignificant relationship between PA and SSE. In our study, hypotheses 4 and 5 predicted that product preferences may inform KB use or future purchase intentions. Both hypotheses 4 and 5 are not supported. If we divided the purchase computer in two different time frames, such as pre-purchase and post-purchase, the PA might be more influential in the pre-purchase period. On the other hand, the SSE and PI might be more significant in the post-purchase period. PA and SSE/PI constructs provide customers' value or positive experience but in different time frames. This may explain why those relationships are - non-significant. Moreover, the non-significant relationship involving PI in this study focused on KB experiences that "consider purchase again because of KB" (please see Appendix A).

### 6.2. Practical and Theoretical Implications

Overall, this study provides new insights about the drivers of customers' computer purchase intention. Result show that customers' knowledge base about computer products and their self-service experience are predictors of future computer purchase intention. However, this study also indicated that the importance of product attributes is not a significant predictor of purchase intention. Specifically, these results provide critical insights for practitioners to enhance their understanding of factors that drive customers' purchase intention for computer products. This study demonstrates that if customers actively search information or go through problem-solving process about their purchased or about to purchase product, they are likely to purchase the same brand again if they are pleased with their search process or problem-solving results. Managers should try to enhance the customers' knowledgebase

about computer hardware and software uses because that will positively impact customers' use of self service technology, thereby increasing their purchase intent for such products.

The findings of this study also contribute to KB and self-efficacy literature. Particularly, Bandura's [1986] self-efficacy theory in the social psychology literature suggests that customers' knowledge base of computer products should enhance both their self-service experience and purchase intention. This study is one of the first to provide empirical supports of these relationships. This study also supports the information processing approach to customer learning theory [Hoch and Deighton 1989] extracted from the consumer behavior literature. According to this theory, customers' experiences are likely to shape their behavioral and purchase intentions. Thus, the results provide empirical evidence to this relationship.

### 6.3. Limitations and Future Research

This research has certain limitations. First, it was not possible to split the study sample into two halves for validation purposes due to the relatively small sample size. Moreover, our study focused on one product category (i.e., computer products) and involved analyses of data provided by student participants. It is desirable for future research to replicate our findings with a larger data sample, for other purchase/product types or settings (e.g., non-durable products, such as Webhosting services, digital cameras, cell/smart phones), and with non-student samples (e.g., knowledge workers). The lack of empirical support for hypotheses 4 and 5 suggests the desirability for further research. For example, including two different time frames, such as pre-purchase and post-purchase, may provide new insights about influential factors. Under this scenario, it is plausible that the product attributes may impact before product. Yang and Padmanabhan [2005] stated how difficult to collect data from online firms through experiment or a natural environment about personalized online activity. Instead, they used systematic method to synthesize the evaluation of domain knowledge in the purchase process. Basically, qualitative information may complement this empirical study with more insights.

In this research, the research model is reflective in nature. However, according to Petter et al. [2007], there are quite a few research project mistakenly used reflective construct rather than formative construct. They have laid out four decision rules to follow when deciding either on reflective or formative. From their second decision rule to determine whether a construct is formative or reflective is to examine, "the interchangeability of the measures" [Petter et al. 2007, p. 633]. They further stated if measures that are interchangeable with a common theme are typically reflective. In other words, the common theme is "unidimensional." Formative, on the other hand, may not be interchangeable or may employ different themes. Additionally, as Petter et al. [2007] observe, reflective items account for observed variances and covariances, and reflective indicators minimize "the trace of the residual variances in the 'outer' (measurement) equations" [Fornell and Bookstein 1982, p. 442]. In contrast, formative indicators do not account for such observed variances; they are used to minimize residuals in the structural relationship [Petter et al. 2007].

As one of the limitations to this research, we note that our research has culled measurement items for each model construct from a number of cited studies and that the constructs we operationalized in this study have not been previously studied empirically. To gain further clarity on the issues discussed earlier, we suggest that future research should address the four decision rules in Petter et al [2007] in the context of our model and related advances in structural modeling.

Future research should also examine other factors that are likely to influence customers' purchase intentions. Factors such as social influence with the technology adoption [Kulviwat et al. 2007]; social relationship and knowledge management systems usage [He et al. 2009]; the role self-efficacy with level of performance or usage of IT [Moores and Chang 2009; Spieker and Hinsz 2004]; and Internet group purchases via social network marketing [Wei et al. 2011] are especially worthy of further investigations.

## REFERENCES

- Abdul-Gader, A. H. and K. A. Kozar, "The Impact of Computer Alienation on Information Technology Investment Decisions: An Exploratory," *MIS Quarterly*, Vol. 19, No. 4: 535-559, 1995.
- Adrian B, R. Schierholz, L. Kolbe, and W. Brenner, "Customer Knowledge Management — Improving Performance Of Customer Relationship Management With Knowledge Management," *Proceedings of the 37th Annual Hawaii International Conference on System Sciences*, Vol 7: 70172b, 2004.
- Alavi, M. "Managing Organizational Knowledge" in Zmud, R. W. *Framing the Domains of IT Management Projecting the Future.....Through the Past*, Pinnaflex Education Resources, Inc, OH, 15-28, 2000.
- Alavi, M., and D. Leidner, "Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues," *MIS Quarterly*, Vol. 25, No. 1: 107 -136, 2001.
- Ali, K., and K.Erdener, "Markets of a Single Customer: Exploiting Conceptual Developments in Market Segmentation," *European Journal of Marketing*, Vol. 31, No. 11/12: 737-895, 1997.

- Almashari, M., M. Zairi, and A. Alathari, "An Empirical Study of the Impact of Knowledge Management on Organizational Performance," *Journal of Computer Information Systems*, Vol. 42, No. 5: 74-82, 2002.
- Anderson, A., "Predictors of computer anxiety and performance in information systems," *Computers in Human Behavior*, Vol. 12, No. 1: 61-67, 1996.
- Attewell, P. "Technology Diffusion and Organizational Learning: The Case of Business Computing," *Organizational Science*, Vol. 3, No. 1: 1-19, 1992.
- Bandura, A. "Social Foundations of Thoughts and Action," NJ: Prentice Hall, Englewood Cliffs, 1986.
- Bailor, C. Self-Service Satisfaction: More customers are adopting Web self-service but not all customers are satisfied, *CRM Magazine*, April 1: 16, 2005; assessed online on July 15th 2010 <http://www.allbusiness.com/company-activities-management/operations-customer/7365991-1.html>.
- Barbeau, J. B. and W. J. Qualls, "Consumers' Perceptions of Attributes and Behavioral Intentions: An Extended Comparison-Level Model," *Advances in Consumer Research*, Vol. 11, No. 1: 143-147, 1984.
- Beatson, A., N. Lee, and L. V. Coote, "Self-Service Technology and the Service Encounter," *The Service Industries Journal*, Vol. 27, No. 1: 75-89, 2007.
- Bentler, P. M. *EQS: Structural Equations Program Manual*, Version 3.0. Los Angeles: BMDP Statistical Software Inc., 1989.
- Bettencourt, LA A. and K Gwinner, "Customization of the service experience: the role of the frontline employee," *International Journal of Service Industry Management*, Vol. 7, No. 2: 3 - 20, 1996.
- Berkowitz, M. "The Impact of Seasonality on the Launch of Infrequently Purchased Products," *Journal of Product Innovation Management*, Vol. 3, No. 4: 251-263, 1986.
- Berry, L.L. *Discovering the Soul of Service*, New York: Free Press, 1999.
- Birgelen, M., K.de Ruyter, A.de Jong, and M.Wetzels, "Customer evaluations of after-sales service contact modes: An empirical analysis of national culture's consequences," *International Journal of Research in Marketing*, Vol. 19, No. 1: 43-64, 2002.
- Bollen, K. A. "A Comment on Model Evaluation and Modification," *Multivariate Behavioral Research*, Vol. 25: 181-186, 1990.
- Bolton, R. N, R.K. Kannan, and M. D. Bramlett, "Implications of Loyalty Program Membership and Service Experiences for Customer Retention and Value," *Journal of the Academy of Marketing Science*, Vol. 28, No.1: 95-108, 2000.
- Bose, R. and V. Sugumaran, "Application of knowledge technology in customer relationship management," *Knowledge and Process Management*, Vol. 10 No. 1:3-17, 2003.
- Browne, M. W. and R. Cudeck, "Alternative Ways of Assessing Model Fit," in K.A. Bollen and J.S. Long (eds.) *Testing Structural Equation Models*. CA: Sage, Newbury Park, 136-162, 1993.
- Bueren, A., Schierholz, R., Kolbe, L., & Brenner, W. 2004. Customer knowledge management-improving performance of customer relationship management with knowledge management. *Proceedings of the 37th Annual Hawaii International Conference on System Sciences*, Vol 7: 70172b, 2004.
- Campbell, D. T. and D. W. Fiske, "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix," *Psychological Bulletin*, Vol. 56: 81-105, 1959.
- Chen, M.; and Y. I. Liou, "Building a Knowledge-Enabled Electronic Commerce Environment," *Journal of Computer Information Systems*, Vol. 42, No. 5: 95-101, 2002.
- Chen, Yung-Hsin and Chao-Ton Su, "A kano-CKM model for customer knowledge discovery," *Total Quality Management & Business Excellence*, Vol.17, No. 5: 589-608, 2006.
- Copulsky, J.R. and M.J.Wolf, "Relationship marketing: positioning for the future," *Journal of Business Strategy*, Vol. 11, No. 4: 16-20, 1990.
- Davenport, T. H., and D. W. De Long, "Successful Knowledge Management Projects," *Sloan Management Review*, Vol. 39, No. 2: 43-57, 1998.
- Davenport, T. H., and Grover, V. Knowledge management. *Journal of Management Information Systems*, Vol. 18, No. 1: 3-5, 2001.
- Davenport, T. H., J. G. Harris and A. K. Kohli, "How Do They Know Their Customers So Well?" *Sloan Management Review*, Vol. 42, No. 2: 63-73, 2001.
- Davenport, T. H., and P. Klahr, "Managing customer support knowledge." *California Management Review*, Vol. 40, No. 3: 195-208, 1998.
- Davenport, T. H., and L. Prusak, *Working Knowledge: How Organization Manage What They Know*, MA, Harvard Business School Press, 1998.
- Davis, F.D, "A Technology Acceptance Model for Empirical Testing New End User Information Systems: Theory and Results," MIT Sloan School of Management, MIT Sloan School of Management, Cambridge, MA, 1986.

- DeSanctis, G., M., J. D’Onofrio, V.Sambamurthy, and M.S. Poole, “Comprehensiveness and Restrictiveness in Group Decision Heuristics: Effects of Computer Support on Consensus Decision Making,” *Proceedings of International Conference on Information Systems*, Boston, MA, 131–140, 1989.
- Diamantopoulos, A., & Sigauw, J. “Formative versus reflective indicators in organizational measure development: a comparison and empirical illustration,” *British Journal of Management*, 17(4): 263-282, 2006.
- Doyle, S. “Software review A strategy for self-service in a telco environment,” *Database Marketing & Customer Strategy Management*, Vol. 14, No. 4: 315–321, 2007.
- Du, X, J. Jiao, and M. M. Tseng, “Identifying customer need patterns for customization and personalization,” *Integrated Manufacturing Systems*, Vol. 14, No. 5: 387 – 396, 2003
- Eid, M. I., “Determinants of E-Commerce Customer Satisfaction, Trust, and Loyalty in Saudi Arabia,” *Journal of Electronic Commerce Research*, Vol. 12, No. 1: 78-93, 2011.
- Fornell, C., and Bookstein, F. L. “Two Structural Equation Models: LISREL and PLS Applied to Consumer Exit-Voice Theory,” *Journal of Marketing Research* Vol. 19, November 1982, 440-452.
- Fornell, C. and D. F. Lacker, “Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics,” *Journal of Marketing Research*, Vol. 18, No. 2: 382-388, 1981.
- Gallagher, K., J. Parsons, and K. Foster, “A tale of two studies: Replicating advertising effectiveness and content evaluation in print on the web” *Journal of Advertising Research*, Vol. 51, No 4:71-81
- Gebert, H., Geib, M., Kolbe, L., and W. Brenner, “Knowledge-enabled customer relationship management: integrating customer relationship management and knowledge management concepts [1].” *Journal of Knowledge Management*, Vol. 7, No. 5: 107-123, 2003.
- Gold, A. H., A.Malhotra, and A. H. Segars, “Knowledge Management: An Organizational Capabilities Perspective,” *Journal of Management Information Systems*, Vol. 18, No. 1: 185-215, 2001.
- Gritt, P., and T. E. Schelmetic, “Seeing The E-Services Big Picture: Online Self-Service Can Pay Huge Dividends, But Requires More Than Simple Automation,” *Customer Inter@ction Solutions*, Vol. 24, No. 2: 66-68, 2005.
- Grover, V., and T. H. Davenport, “General Perspectives on Knowledge Management: Fostering a Research Agenda,” *Journal of Management Information Systems*, Vol. 18, No. 1: 5-22, 2001.
- Hair, J., W.Black, B.Babin, and R.Anderson, “Multivariate Data Analysis,” 7<sup>th</sup> ed., NJ, Prentice Hall, Inc., 2010.
- He, Wei, Qian Qiao, and K. K. Wei, “Social relationship and its role in knowledge management systems usage,” *Information & Management*, Vol. 46, No. 3: 175-180, 2009.
- Hoch, S. and J. Deighton, “Managing What Consumers Learn from Experience,” *Journal of Marketing*, Vol. 53, No. 2: 1-20, 1989.
- Horrigan, J. B., “Consumption of Information Goods and Services in the United States,” *Pew Internet & American Life Project*, Washington, DC., 2003.
- INSIGHT. “Self-Service Satisfaction More customers are adopting Web self-service, but not all customers are satisfied,” *Customer Relationship Management*, April, 2005. Available online [www.destinationCRM.com](http://www.destinationCRM.com).
- Jacoby, J. R., and J. C. Olson, *Perceived Quality*, MA, Lexington Book, 1985.
- Jayasimha, KR, R. Nargundkar, “Adoption of self service bill payment technologies: a conceptual model,” *Journal of Services Research*, Vol. 6, No. 2: 119-134, 2006-2007.
- King, W. R. “Strategies for Creating a Learning Organization,” *Information Systems Management*, Vol.18, No. 1: 12-21, 2001.
- Kotler, P. “Meeting the Supervalue Challenge, in the Marketing Encyclopedia: Issues & Trends Shaping the Future,” in J. Heilbrunn (ed.) *Marketing encyclopedia : issues and trends shaping the future*, Chicago: American Marketing Association: 25-30, 1995.
- Kolodinsky, J., J. Hogarth and A.Hilgert, “The adoption of electronic banking technologies by American consumers,” *International Journal of Banking Marketing*, Vol. 22, No. 4: 238-259, 2004.
- Kulviwat, S., G. C. Bruner, A. Kumar, and S. A. Nasco, “Toward a Unified Theory of Consumer Acceptance of Technology,” *Psychology & Marketing*, Vol. 24, No. 12: 1067-1092, 2007.
- Kumar, N., K. R. Lang, and Q.Peng, “Consumer Search Behavior in Online Shopping Environments,” *e-Service Journal*, Vol. 3, No. 3: 87-102, 2005.
- Lee, J. and A. Allaway, “Effects of personal Control on Adoption of Self-Service Technology Innovations,” *Journal of Services Marketing*, Vol. 16, No. 6: 553-570, 2002.
- Liang, H., & Y. Xue, “Avoidance of Information Technology Threats: A Theoretical Perspective,” *MIS Quarterly*, 33(1): 71-90, 2009.
- Lin, C. J. and P. Hsieh, “The role of technology readiness in customers’ perception and adoption of self-service technologies,” *International Journal of Service Industry Management*, Vol. 17, No. 5: 497-517, 2006.

- MacCallum, R.C., and M.W. Browne, "The Use of Causal Indicators in Covariance Structure Models: Some Practical Issues," *Psychological Bulletin*, Vol. 114, No. 3: 533-541, 1993.
- Meuter, M.L., M.J. Bitner, A.L. Ostrom, and S.W. Brown, "Choosing among alternative service delivery modes: an investigation of customer trial of self-service technologies," *Journal of Marketing*, Vol. 69, No. 2: 61-83, 2005.
- Meuter, M. L., A. L. Ostrom, M.J. Bitner, and R. Roundtree, "The influence of technology anxiety on consumer use and experiences with Self-Service Technologies," *Journal of Business Research*, Vol. 56: 899-906, 2003.
- Miller, G.A. "The magical number seven, plus or minus two: Some limits in our capacity for processing information," *Psychological Review*, Vol. 63: 81-97, 1956.
- Miller, E. "Content Targeting + Actionable Insight = Revenue Growth Online Self-Service Is Finally Getting Interesting," *KMWorld*, March: 56-57, 2007.
- Moore, T. T., J. C. Chang, "Self-efficacy, overconfidence, and the negative effect on subsequent performance: A field study," *Information & Management*, Vol. 46, No. 2: 69-76, 2009.
- Nunnally, J. C. *Psychometric Theory* (2<sup>nd</sup> ed.), New York, NY: McGraw Hill, 1978.
- O'Leary, D. E., and P. Selfridge, "Knowledge Management for Best Practices," *Communications of the ACM*, Vol. 43, No. 11: 281-292, 2000.
- Pathak, B. "A Survey of the Comparison Shopping Agent-Based Decision Support Systems." *Journal of Electronic Commerce Research*, Vol. 11, No. 3: 178-192, 2010.
- Pavlou, P. A., and D. Gefen, "Psychological Contract Violation in Online Marketplaces: Antecedents, Consequences, and Moderating Role." *Information Systems Research*, 16(4): 372-399, 2005.
- Pavlou, P. A., H. Liang, and Y. Xue, "Understanding and mitigating uncertainty in online exchange relationships: A principal-agent perspective," *MIS Quarterly*, Vol 31, No. 1: 105-136, 2007.
- Petter, S., D. W. Straub and A. Rai, "Specifying Formative Constructs in Information Systems Research," *MIS Quarterly*, Vol. 31, No. 4: 623-656, 2007.
- Rajendran, K.N. and H. S. Hariharan, "Understanding value: The role of consumer preferences," *The Journal of Marketing Management*, Vol. 5: 8-19, 1996.
- Sawyer R. E. and P. Dickson, "Psychological Perspectives on Consumer Response to Sales Promotion," in Katherine Jocz (ed.), *Research on Sales Promotion: Consumer Perception of Price Quality Elected Papers*, MA: Marketing Science Institute, 1984.
- Seva, R. R. & M. G. Helander, "The influence of cellular phone attributes on users' affective experiences: A cultural comparison," *International Journal of Industrial Ergonomics*, Vol. 39: 341-346, 2009.
- Smith, H., Fingar, P. *Business Process Management—the third wave*, Meghan-Kiffer Press, 2007.
- Shani, D. and S. Chalasani, "Exploiting niches using relationship marketing", *The Journal of Consumer Marketing*, Vol. 9, No. 3: 33-42, 1992.
- Spieker, C.J., V. B. Hinsz, "Repeated success and failure influences on self-efficacy and future goals," *Social Behavior and Personality*, Vol. 32, No. 2: 191-197, 2004.
- Standard and Poor's *The Standard & Poor's 500 Guide*, McGraw-Hill Professional. p. 437, 2006.
- Sun, H. "Transferring Attributes of E-commerce Systems into Business Benefits: A Relationship Quality Perspective." *Journal of Electronic Commerce Research*, Vol. 11, No. 2: 92-109, 2010.
- Titah, R., & Barki, H. Nonlinearities between Attitude and Subjective Norms in Information Technology Acceptance: A Negative Synergy? *MIS Quarterly*, 33(4): 827-844., 2009.
- Tiwana, A. *The Essential Guide to Knowledge Management: E-Business and CRM Applications*, NJ, Prentice Hall PTR, 2001.
- Venkatesh, V, "Determinants of perceived ease of use: integrating control, intrinsic motivation, and emotion into the technology acceptance model", *Information Systems Research*, Vol. 11, No. 4: 342-365, 2002.
- Walker, R.H., M. Craig-Lees, R. Hecker, and H. Francis, "Technology-enabled service delivery: an investigation of reasons affecting customer adoption and rejection," *International Journal of Service Industry Management*, Vol. 13, No. 1: 91-106, 2002.
- Wei, Y., D. W. Straub, and A. Poddar, "The Power Of Many: An Assessment Of Managing Internet Group Purchasing," *Journal of Electronic Commerce Research*, Vol. 12, No. 1: pp.19-43, 2011.
- Wood, R. E. and A. Bandura, "Impact of Conceptions of Ability On Self-Regulatory Mechanisms and Complex Decision Making," *Journal of Perceived Social Psychology*, Vol. 56, No. 3: 407-415, 1989.
- Yang, Y., and B. Padmanabhan, "Evaluation of Online Personalization System: A Survey Of Evaluation Schemes and A Knowledge-Based Approach," *Journal of Electronic Commerce Research*, Vol. 6, No. 2: 112-122, 2005.
- Zeithaml, V. A. "Consumer perception of Price Quality, Quality, and Value: A Mean-End Model and Synthesis of Evidence," *Journal of Marketing*, Vol. 52, No. 3: 2-22, 1988.

Zhu, Z., C. N. Sivakumar, K. Sivakumar and D. Grewal, "Self-service technology effectiveness: the role of design features and individual traits," *Journal of the Academic Marketing Science*, Vol. 35: 492–506, 2007.



**Appendix A**

1. If you would purchase a computer, which brand will you choose? Please identify your first choice, second choice, third choice and the fourth choice. (You may click through those links to identify which brand to your like.)

ABS	Apple	Dell	Fujitsu	eMachines	Gateway	Hewlett Packard	IBM	MPC	Sony	Toshiba
-----	-------	------	---------	-----------	---------	-----------------	-----	-----	------	---------

- [1] 1<sup>st</sup> choice
- [2] 2<sup>nd</sup> choice
- [3] 3<sup>rd</sup> choice
- [4] 4<sup>th</sup> choice

2. In the following list, how did you distribute the following attributes -- price, reliability, customization, service/warranty, and technical support in decisions involving the purchase of computer. Please allocate percentage points to each attribute such that it reflects the importance of that attribute for you relative to the other listed attributes. In other words, all the percentages you provide for the five attributes must total 100%.

Price:

- [1] Reliability: %
- [2] Customization: %
- [3] Service/warranty: %
- [4] Technical support: %
- [5] Total: %

3. Please think about the last time you had a computer problem. Which of the following best describes that problem? (Please check that all apply.)

- [1] Problem with existing application
- [2] System locking up
- [3] Downloading software/drivers
- [4] Connecting to Internet
- [5] Problems installing software
- [6] Upgrades/replacement
- [7] Reinstalling OS
- [8] Help with setup/installation

4. In each of the following attribute-specific lists, please rank four brands in terms of their appeal on that attribute.

- [1] Please rank your four choices based on the PRICE attribute:
- [2] Please rank your four choices based on the RELIABILITY attribute:
- [3] Please rank your four choices based on the CUSTOMIZATION attribute:
- [4] Please rank your four choices based on the SERVICE & WARRANTY attribute:
- [5] Please rank your four choices based on the TECHNICAL SUPPORT attribute:

5. Please think about the last time you had a computer problem. Which of the following best describes that problem? (Please check that all apply.)

- [1] Problem with existing application
- [2] System locking up
- [3] Downloading software/drivers
- [4] Connecting to Internet
- [5] Problems installing software
- [6] Upgrades/replacement
- [7] Reinstalling OS
- [8] Help with setup/installation

6. Based on your computer experience, which of the following means of interacting with technical support do you prefer? (Please check that all apply.)

- [1] Telephone
- [2] e-mail
- [3] In person
- [4] Web
- [5] Chat
- [6] Remote control
- [7] Tech on site
- [8] Other

7. While attempting to solve your problem, how often did you seek the knowledge-base at the website of the computer brand you purchased from?

- [1] Never
- [2] Very Rarely
- [3] Rarely
- [4] Occasionally
- [5] Sometimes
- [6] Often
- [7] Very Often

8. Please indicate how important of the following features are to you while using the online knowledge base website for the computer you purchased. (Please check all that apply.) You may click through any Website to help you refresh your memory. From each item, please choose one of the seven points from 1 extremely unimportant to 7 extremely important.

ABS	Apple	Dell	Fujitsu	eMachines	Gateway	Hewlett Packard	IBM	MPC	Sony	Toshiba
-----	-------	------	---------	-----------	---------	-----------------	-----	-----	------	---------

- F1 Ease of navigation of the knowledge base (easily to locate the knowledge base, account set-up)
- F2 Quality of information about problem solution (knowledge based documents, knowledge based database)
- F3 Interactive help offered (bulletin board discussion, community discussion board, voice of technical support)
- F4 Clear search functions (e.g., search function is facilitated by natural language, fuzzy logic)
- F5 Advanced techniques help narrow down the search results (e.g., use percentage, importance/relevance of search results, search of the search results)
- F6 Others (users-friendly features, i.e., print version, discussion board, feedback text box)

9. When using a knowledge base that can be accessed online, please indicate how often the following features are applied to your situation. (Please check all that apply.) From each item, please choose one of the seven points from 1 never to 7 very often.

- G1 Solve your problem in a timely fashion
- G2 Navigate easily
- G3 Find if the solution offered actually worked
- G4 Find the bulletin board discussion (related to the knowledge base) is helpful
- G5 Think the tech support on the Website offers immediate responses
- G6 Believe that the knowledge base is helpful
- G7 Find the search results include unnecessary information
- G8 Solve your problem to your satisfaction
- G9 Save time as a result of interacting with the online knowledge base
- G10 Find that online knowledge base is better than other forms of technical support
- G11 Fix your PC/laptop problem promptly
- G12 Find it inconvenient
- G13 Fix your PC/laptop on the first try
- G14 *Consider buying this brand again because of its online knowledge base*
- G15 Find the knowledge base had adequate depth
- G16 Find the knowledge base had adequate breadth

- G17 Find the knowledge base was user-friendly
- G18 Think the knowledge base was cumbersome to use
- G19 Find the results of any information search to be exhaustive
- G20 Feel happy with the search results
- G21 Find the search results were too general
- G22 Rather prefer relying on a person to solve your problem
- G23 Find it difficult to use the knowledge base
- G24 Find it hard to locate the knowledge base
- G25 Like to fix your computer yourself
- G26 Consider recommending the knowledge base you used to others you know