

THE EFFECTS OF GLOBAL ORGANIZATIONS WEB-BASED TECHNOLOGIES ON KNOWLEDGE TRANSFER

Abstract

Knowledge transfer for a global organization can be viewed as learning and understanding quality characteristics of a product or service. We test whether different levels of web-based experience will influence 556 individuals' retention. Our results support the notion that quality variables and experience aid knowledge transfer for retention of a company's products/services. Implications indicate that organizations can retain individuals if they educate and train them to be more knowledgeable about the use of their web-based services.

Key words: knowledge transfer, expertise, knowledge-based assets, web technologies

Global organizations Internet portals represent an extension of knowledge transfer for users. Suppose you are an individual interested in learning more about the products/services of a multinational company. Will the information, service, and perceptions of the quality of the global company's web-based services strongly influence your decision to retain a company's products/services? Quality is defined as a property that brings more clarity to a problem (Bulter and Scherer, 1997). Can a global company successfully transfer its product knowledge to its web pages? Will your web-based services knowledge and experience influence your choice of products and services? Organizational scholars have argued that the structures of organizations are related to the technologies they employ (Barley, 1990; Hargadon and Sutton, 1997). Web-based technologies are entering into our lives at a rapid pace as well as impacting our learning habits. Due to the arrival of powerful information technologies, major challenges to organizations are viewed as the producing and processing of knowledge (Schulz, 2001). To date, there has been insufficient empirical research into the quality perceptions and subjective attributes of individuals with different levels of knowledge for technological uses (Ofir, 2000; Sonnentag, 1998). This paper presents several dimensions of individual learning in examining the dynamics of knowledge acquisition in a global web-based environment (Argote, Beckman and Epple, 1990). The quality perception and experience dimensions of individual learning in this research article are examined in the context of Internet portals used by multinational organizations (Argote and Ingram, 2000; Hinds, Patterson and Pfeffer, 2001; Stein and Zwass, 1995). The results of our survey instrument indicate that individuals are more likely to learn, become more innovative, and increase their problem solving skills when using enhanced web-based technologies. That is, Web-based service is an online medium where individuals seek

answers to their questions about the products and services they own or intend to own. The quality of the information individuals receive, the quality of the service experienced during the interaction, and the quality of the computer system used to access the information enhance the individual's experience when using web-based services. The following example illustrates an interactive problem solving experience enhanced by a global organization employing web-based technologies. Suppose you want to paint your home. What color combination would work best? What supplies do you need? How do you organize your project? For example, you can visit the web-based services of Benjamin Moore at www.benjaminmoore.com to learn about painting, paint products, and more. Start by looking at the many project ideas available on the website. Select your paint using the paint selector that allows you to visualize a variety of color combinations for the wall, trim, and floor. When you finish your selection save your choice in the project plan you created using your member account. Determine the amount of paint you need using the paint calculator; input the height and width of your wall, trim, windows, and doors and let the paint calculator determine the amount of paint needed for your project. Click on the problem solver to learn about the causes and solutions of peeling and by clicking on a few more links you can learn about supplies, cleanup, preparing, priming, and painting. You can even learn about architectural styles and their history from the 19th and 20th centuries. For the safety conscious homeowner, the material safety data sheet (MSDS) is a click away. You can now click on Forums and discuss your options with individuals that have similar interests. Do you still need additional information? Click on the online chat room and discuss your questions with the support staff. These web-based services provide a detailed learning experience. This is not unique to Benjamin Moore's site. Visit Home Depot's website at www.HomeDepot.com and you will find similar services for paint, wallpaper, drywall, tile, etc. Similar web-based services are

available from many organizations from which you buy your products and services. Your learning experience can be enhanced by using the various web-based services tools including Search, Frequently Asked Questions (FAQs), Forums, tutorials, online chat rooms, upgrades, and downloads.

The next section highlights the importance of knowledge viewed as an asset, followed by a discussion of knowledge transfer, and concluding with issues pertaining to the domain knowledge of the individual and modeling their behavior. Finally, the method and results section are included, closing with the discussion and conclusion of our research.

Knowledge Viewed As An Asset

The resource-based view examines an organization in regards to its resources rather than its products and aims to identify strategic options through the exploitation and development of these resources (Wernerfelt, 1995). Knowledge based assets (KBA) can be depicted as resources that represents a nonphysical claim to future benefits and are difficult to determine with certainty or precision (Lev, 2001). KBA include patents, brands, trademarks, and digital content that can be specified, protected, and traded (Contractor, 2001). KBA that cannot be bought or sold include human capital, know-how, and organizational culture. When the claim on KBA is legally secured (protected), as in the case of patents, trademarks, or copyrights, they are often times referred to as intellectual property (Lev, 2001). KBA have been researched quite extensively in the last several years as indicators of productivity and profitability (Zander and Kogut, 1995; Osterloh and Frey, 2000; Schultz and Leidner, 2002). In sum, KBA can generate demand-side economies of scale through the creation of new, deeper knowledge that enhances the quality of the products/services offered by an organization (Ofek and Sarvary, 2001).

Web-based services provide learning through tutorials, FAQs, and Search. Individuals can use tutorials to gain deeper knowledge and FAQs provide a quick link to solutions for previously known issues and problems (Kraiger, Ford and Salas, 1993). FAQs are particularly beneficial to novices and they provide a quick entry point to learn about the company's products and services. Search tools on the other hand allow users to ask random questions and receive automatic responses from the knowledge repository. Search engines parse individuals' questions, search for potential matches from the knowledge repository, and provide potential solutions.

Knowledge as used in this paper is defined as a combination of framed experience, values, contextual information, expert insight and grounded intuition that furnishes an environment and framework for evaluating and incorporating new experiences and information (Griffith and Northcraft, 1996). Further, an organization's knowledge is considered as its capacity to apprehend and use relations among critical factors in order to reach its goals (Autio, Sapienza and Almeida, 2000). Knowledge generally consists of general domain, subspecialty, and world knowledge (Chi, Feltovich, and Glaser, 1981). General domain knowledge is acquired by decision makers through instruction and experience in that domain (e.g., search engines). Subspecialty knowledge is acquired through formal instruction and experience (e.g., tutorials), and is specific to decision makers in that subspecialty area. World knowledge is accumulated through individual life experiences and instruction, and it is not likely to be possessed equally by all decision makers at a given experience level (e.g., Forums).

Domain knowledge consists of encounters related to a particular area that allow for the acquisition of knowledge (information stored in memory) about that area (Devine and Kozlowski, 1995; Szulanski, 2000). The ability of individuals to understand and represent web-

based services is structured and/or constrained by their existing domain knowledge (Markman, 2001). The ease with which individuals can transform their existing domain structures to accommodate discrepant information presented by a web-based service will largely determine how a company's products/services are perceived (Sloman, Love, and Ahn, 1998). Knowledge accumulation is important to organizations in that it can be reinforced in all firm activities and, over time, becomes increasingly cemented in organizational practices (Barkema and Vermeulen, 1998).

Researchers view relational systems, such as customer service, as a significant component of KBA contributing to a company's productivity and profitability (Kogut and Zander, 1992; Rulke, Zaheer and Anderson, 2000). With recent growth and globalization and advances in KBA, the ability to leverage the customer base has become increasingly important (Teece, 1998). Ofek and Sarvary's (2001) study indicated that in a competitive setting, when the ability to exploit economies of scale is large enough, firms will focus on building KBA systems aimed at creating higher quality products/services for individuals. We are interested in KBA in order to depict knowledge transfer effects on quality perceptions (information quality, service quality, and system quality), individual satisfaction, and retention. Walsh and Ungson (1991) posited that in order to measure transfer through changes in knowledge, one must capture knowledge changes in organization roles, structures, members, culture, practices and operating procedures. Relational systems (for example web-based customer support systems that have features like FAQs, tutorials etc.) are valuable to an organization in that the knowledge can be used again (McGrath and Argote, 2001).

Knowledge Transfer

Knowledge transfer is generally thought of as embedding knowledge in interactions involving people internally (Argote and Ingram, 2000). We extend the literature by examining individuals external to the firm. We contribute to the notion of knowledge transfer providing firms with a competitive advantage through individuals' domain knowledge about its products/services (von Hippel, 1998). Knowledge transfer is viewed as an event through which an individual or organization learns from the experience of another (Argote, 1999; Darr and Kurtzberg, 2000). For example, in a Forum individuals post their questions through an interactive medium in which other individuals participate and provide solutions. A Forum makes it possible for individuals to get answers to their questions, view and respond to other participant's questions, and learn about the company's products and services. In most cases company representatives moderate Forums. Moderators answer questions, provide additional references, and bundle supplemental components that complement the individual's products and services.

Knowledge gain from Internet portals also can be thought of as contextually dependent and subjectively constructed (Gibson, 1999; Tenkasi and Mohrman, 1999). That is, its potential application arises from collaborative (e.g., on-line chat rooms), contextual approaches to its design (e.g., tutorials) and the interpretation of results (e.g., FAQs). For example, individuals can use web-based services tools like Forums to find immediate answers to their questions, to articulate their questions, and broaden their knowledge about products and services. While individuals can "pull" the desired information from the web-based services, the same tools can be used by the organization to "push" information about its products and services. For example, query responses are displayed in the central pane leaving the margins for displaying additional

company information (e.g., links to similar products/services). The margins provide space that can be used to educate individuals about the company.

Recent studies have demonstrated that properties of quality that can contribute to a product have long been of interest to researchers and practitioners (Weiss, Nicholas, and Daus, 1999). Knowledge acquired from web-based services increases know-how about the company's products and services (Rodgers and Negash, 2002). That is, knowledge transfer influences individuals' depiction of accurate, timely, and updated information. Also, this knowledge increases the understandability of web-based services providing a desirable solution, useful alternative, as well as dependable and trustworthy services. Finally, transfer of knowledge improves system quality by providing quick feedback, a variety of alternatives, predictable screen changes and enhanced customer support.

Due to contextually dependent and subjectively constructed aspects of knowledge (Gibson, 1999) we hypothesize that individuals' information, service, and system quality perceptions are influenced by the knowledge transfer from the company's website. This can advance our knowledge on answers and solutions captured into a knowledge base, so other individuals can reuse them in the future. This leads to the following hypothesis:

H1: Transfer of knowledge has a positive trending effect on individuals' perceptions of (a) information quality, (b) service quality, and (c) system quality.

Satisfaction can be a key variable in determining whether organizations are adept at communicating their knowledge (e.g., online chat rooms) about quality to others (Szulanski, 1996). Diener and Larsen (1993) argued that satisfaction is influenced both by cognitive judgments of one's life and by the "preponderance of pleasant rather than unpleasant affect in one's life over time" (p. 406). Further, we concur with Brief (1998) that satisfaction is an

internal state that is expressed affectively or cognitively. Recent literature has focused on understanding the processes that underlie satisfaction (Diener et al., 1999). The global construct of satisfaction captures the importance of subjective views in evaluating Web-based technologies. We claim that knowledge transfer through web-based services affect individuals' satisfaction. That is, individuals are likely to be more satisfied with collaboration and knowledge tools that help to inform their choices. Collaboration is defined as "the coming together of diverse interests and people to achieve a common purpose via interactions, information sharing, and coordination of activities" (Jassawalla and Sashittal, 1998: 239). Collaboration and these knowledge tools provide a collective cognition as a series of transactions in which information is exchanged among individuals helping to bring problem-relevant information to light (Mohrman, Gibson and Mohrman, 2001). Further, this electronic social interaction enables individuals' perceptions, judgments, and opinions to be combined in order to generate solutions. Hence, we advance the research on knowledge transfer by incorporating a satisfaction variable that may shed light on the effectiveness of web-base technologies on individuals. We test the next hypothesis:

H2: Transfer of knowledge has a positive trending effect on individuals' satisfaction.

Given the attributes of quality perception and satisfaction, it is critical that the effects of knowledge transfer lead to product or service selection. Quality variables and customer satisfaction are recognized as increasingly important KBA to organizations for repeat business (El Sawy and Bowles, 1997). This type of knowledge contributes to refinement and modification of reasoning processes in the selection of services (Frensch and Sternberg, 1989). Further, many organizations implement Internet technology to give customers direct access to their customer support KBA (Davenport and Klahr, 1998).

When displaying Search results, the firm can choose to include information on competitive products and services. The firm may provide information on industry, market, or products and services. This may encourage the customer to use the web-services for a wide array of questions, which, in turn, may influence her/his willingness to return for more web-based services. On the other hand, the company has control over the format of the displayed results and can choose to conveniently display its products and services by, for example, placing its products and services ahead of its competitors'. That is, these web-base tools build on Argyis and Schon's notion that learning is assisted by occasions for reflection (Argyris and Schon, 1978). Certain tools (e.g., forums) bring together individual users and the organization to jointly reflect and interpret information. They put together different knowledge structures for collective examination. Like others (e.g., Amabile, Patterson, Mueller, Wojcik, Odomirok, Marsh and Kramer, 2001; Easterby-Smith and Malina, 1999), we argue that individuals reflect upon their experiences/ perceptions and discuss processes (e.g., online chatrooms) to make sense of their own assumptions and motives. We add to the knowledge literature by assuming that answers and solutions are captured into a web-base knowledge base, so individuals can reuse them in the future. Hence, we hypothesize web-based services that transfer knowledge impact retention. This leads to our next hypothesis:

H3: Transfer of knowledge has positive trending effect on product/service retention.

Experience Of The Web-Based Services User

Knowledge that is not well understood is more difficult to transfer (Zander and Kogut, 1995). That is, an important element in structuring a company's quality of information, service, and system is the degree of knowledge or expertise of the problem solver. Further, users may

invoke different forms of knowledge representation affecting decision outcomes (Boland, Singh, Salipante, Aram, Fay and Kanawattanachai, 2001). Previous research has shown that experts are more likely than novices to rely on schemata to guide the problem solving process (Hershey, Walsh, Read, and Chulef, 1998). For example, expertise in a content domain (e.g., web-based services) influences how individuals interpret accurate and timely information, and evaluate decisions regarding future use of its products/services (Goldstein and Weber, 1995; Harinck, Dreu and Vianen, 2000). Expertise contributes to refinement and modification of reasoning processes (Kolodner and Riesbeck, 1986) as it relates to information, service and system quality.

Successful experiences reinforce already known rules or previous hypotheses. Unsuccessful experiences require reanalysis of whatever reasoning and knowledge were used and modification of faulty rules and knowledge. Therefore, experience enhances problem solving knowledge (e.g., in a Forum) and, in the process, turns novices into relatively more expert types. That is, transfer of knowledge is viewed more beneficial to experts when viewed as an empirical phenomenon, residing in action and becoming “organizational” in the acquisition, diffusion, and replication of those actions throughout the organization (Hargadon and Fanelli, 2002). For example, one’s experience of the web-based services can influence the entertainment, enjoyment, and fun use of information. However, Meyer and Goes (1988) found that an innovation was more likely to be assimilated when it was complex (e.g., aided by a tutorial). They also found that observable innovations were assembled more easily than ones that were more difficult to observe.

The innovation literature can be depicted as encompassing the generation, development, and implementation of new ideas or behaviors (Damanpour, 1991). From the innovation viewpoint, transfer of knowledge provides the organization with the potential for novel action,

and the process of constructing novel actions often entails finding new uses or new combinations of previously different ideas (Hargadon and Sutton, 1997; Schumpeter, 1934; Weick, 1979).

Although, no literature to our knowledge exists that examines whether experienced individuals will benefit more from the use of innovative web-based services, we believe that prior knowledge helps to enhance innovation. That is, prior learning through the adoption and replication of existing actions (e.g., FAQs, Forums, search engines) aid in the feasibility for future novel actions (Hargadon and Fanelli, 2002). Therefore, use frequency of web-base services will enhance individuals' learning (Argote, 1999) of an organization's products/services. Our contribution to the knowledge transfer literature is that an organization's technology employment leading to repeat business may be more effective by expertise web-based use. This leads to the next set of hypotheses:

H4a: Experienced users of web-based services are more likely to retain a company's products/services than less experienced users.

H4b: Experienced users of web-based services are more likely to be satisfied by a company's products/services than less experienced users.

Knowledge transfer model

A model is proposed here to provide a broad conceptual framework for examining interrelated processes that impact on decisions effecting organizations. It incorporates the constructs of perceptual processing (information, system and service quality), judgmental processing (analysis of satisfaction experiences), and decision choice (retention of services) as it applies to individuals/organizations (see Culbertson and Rodgers, 1997 for a in-depth discussion of the model). The central insight of the knowledge process model is that knowledge inputs are necessarily embedded in a context representing cognitive, behavioral, individual and social that

constrains their discovery, their transfer from one set of actors to another, and their usefulness in different problems (Postrel, 2002). This insight we depict as “perception” in our model (Figure 1). The model further incorporate knowledge transfers not as acts, but as processes (Szulanski, 2000).

Insert Figure 1 here

In the knowledge process model, information quality, system quality, and service quality affects judgment. Finally, before an individual can make a retention decision, that individual encodes the information and develops a knowledge representation for the problem. Hence, we propose the following hypotheses:

H5a: Knowledge transfer of information quality will be positively related to stakeholders’ judgments.

H5b: Knowledge transfer of system quality will be positively related to stakeholders’ judgments.

H5c: Knowledge transfer of service quality will be positively related to stakeholders’ judgments.

In the knowledge process model, information quality, system quality, service quality, and judgment affect the decision of retention. In sum, this model depicts knowledge transfer as a process in which a stakeholder recreates and maintains a complex, causally set or routines (Szulanski, 2000). This leads to the last set of hypotheses:

H6a: Knowledge transfer of information quality will be positively related to retention of company’s services/products.

H6b: Knowledge transfer of system quality will be positively related to retention of company's services/products.

H6c: Knowledge transfer of service quality will be positively related to retention of company's services/products.

H6d: Knowledge transfer of judgment will be positively related to retention of company's services/products.

Method

Participants

We went to the websites of US universities and randomly selected 54 professors assigned to teach Information Systems courses. E-mails were sent to the professors inquiring about their willingness to participate in our study. Seventeen professors responded that they are not teaching during the study period and an additional six declined to offer extra credit as an incentive for participating students. Thirty-one professors, from twenty-two US universities, agreed to have their students participate in the study.

We found 556 usable responses out of 726 completed surveys. The gender ratio was 46% female and 54% male with majority of the students (75%) under 25 years of age, as might be expected from a college population. We had 8% graduate and 92% undergraduate students. Frequency of use (i.e. the number of times respondents used the Web-based services tools) for 68% of the respondents was several times a month and 32% of the respondents used it on a monthly basis. For eCommerce experience 86% had more than one month experience and 14% had less than one month experience. About half the universities were from the western US region

and the other half from the mid-west and east region. Student majors included 45% information systems, 26% business, 15% accounting, and 14% other disciplines.

Participating professors indicated that their course assignments require students to engage in web-based services tools like Forums, tutorials, FAQs, Search, downloads, upgrades, and online chat rooms. The course assignment typically asked students to download software, to learn from the tutorials, upgrade computers, engage in Forum discussions, purchase goods, inquire additional support, return goods, etc.

We operationalized knowledge transfer based on individuals' "use" and "learning" of a company's web-based services. This follows Singley and Anderson's (1989, p. 1) definition of transfer at the individual level as "how knowledge acquired in one situation applies (or fails to apply) to another."

Procedure

To test our hypotheses we designed the survey questionnaire with an ordinal scale using items that were validated in prior studies, minor modification in the wording is made to reflect web-based support (See Appendix A for details). The items used in the survey were validated in prior studies. That is, information quality, service quality, system quality, satisfaction and retention questions were taken from the studies of Delone and Mclean (1992) and Pitt, Watson and Kavan (1995). The reliability factors were quite high and the interrater agreement for "which measures fit in which category" was over 90%. Finally, pilot studies were used to further validate the instrument for our audience.

The dependent and predictor variables come from the same survey and survey respondents. This could lead to common methods variance (CMV) problem. To check for CMV we performed a factor analysis test and the items loaded into six distinct factors. We also

analyzed the range for each item using descriptive statistics and found responses ranging from one-to-five for all items further indicating the existence of variance in the responses.

Six items including questions on information accuracy and timeliness operationalize *information quality*. Customers want timely, accurate, and up-to-date information. For example, is the information individuals get from the tutorials up-to-date? Does the Search provide timely information? Is the input from the online Forums accurate? Some websites use cartoon characters. Others provide online chat rooms and visual depiction on how to assemble a product. Individuals learn from these web-based services tools and may find it enjoyable, fun, and entertaining. Customers that find these tools enjoyable may visit the web-based services frequently. These questions address informative and entertaining aspects of information quality perceptions in a web-based customer service (Ducoffe, 1996).

Seven items asking participants if the service is dependable, prompt, and safe capture *service quality*. The items are operationalized as follows: When using Search is the service responsive? Do I get the right results for my requests? When Search results are not adequate are there other alternatives like Forums and FAQs for the individual to pursue her/his questions? Are the responses from the Searches prompt? When using web-based services, for example Forums, can the individual feel safe about the transaction? Can he/she trust the online medium? These questions are used to evaluate individuals' service quality perceptions (Parasuraman, Zeithaml, and Berry, 1985).

Five items that inquired about system feedback and ease of system access depict *system quality*. When individuals interact with an information system their attitude toward the system affects their experience (Kraut, Dumais, and Koch, 1989). Individuals' experience about the accessibility and interactivity of the web-based services affect their perception of system quality.

The operationalization of this concept is as follows: Does the web-based service provide quick feedback? Can I access the web-based services at any time of the day? Are the web-based services easy to access? Does the system make it easy when I want to reach the customer support manager? Some organizations, for example IOMEGA, provide online chat room capability for direct access to customer support personnel. When individuals need to contact a person they can click on the online chat room link and learn from a live question and answer session with a customer support representative. These questions are used to understand individual perception about system quality of web-based services (Steuer, 1992).

Three items are used to operationalize satisfaction. Users were asked to respond about their overall satisfaction and their satisfaction with the quality of the web-based services. Retention is operationalized with three items that ask participants about their willingness to return and use the company's products and services.

Results

The reliability test result for the constructs was above the desired 0.7 level (Nunnally, 1978, 1994). Table 1 depicts the respective results for Cronbach Alpha.

Insert Table 1 here

Factor analysis (varimax rotation) for the items is shown in Table 2. The item for "provides quick feedback" in the system quality construct is low. However, reliability results for this construct drops when the "provides quick feedback" item is dropped. Hence we kept this item with the group as theorized. The information quality loaded on two factors reflecting the two dimensions: informative and entertaining.

Insert Table 2 here

F statistic is used to analyze the effect of knowledge transfer on information quality, service quality, systems quality, satisfaction, and retention. Our data supports that frequency of system use significantly affects information quality and system quality, supporting H1a and H1c. As predicted, frequency of system use (for example, FAQs, Forums, tutorials, Search, online chat rooms, upgrades, and downloads) has significant effect on information quality, $F(2, 553)=8.525$, $p \approx 0$. Similarly, frequency of system use has a significant effect on system quality, $F(2, 553)=4.525$, $p<.011$. Against expectations, frequency of system use does not have a significant effect on service quality and satisfaction, thereby rejecting H1b and H2. Further, our data supports that retention is affected by frequency of system use, $F(2, 553)=18.455$, $p \approx 0$, supporting H3.

ANOVA test was conducted to test the effect of electronic commerce (eCommerce) experience on individuals' satisfaction and retention. Individuals accessing information, buying and selling over the Internet represent eCommerce experience. For eCommerce experience the respondents are segmented in two groups. Prior studies have found significant difference based on prior computer experience (Ford, Ledbetter, and Roberts, 1994). The propensity to learn is also found to be affected by prior experience (Ketler and Moncada, 1992). Ford et al. (1994) used prior experience level of up to 5 weeks and above 5 weeks. Following Ford et al. (1994) we placed individuals with over one month eCommerce experience in one group and those with less than one month in the second group.

The ANOVA of individuals' length of eCommerce experience showed a significant main effect for the retention factor, $F(2, 553) = 3.883$, $p<.021$, supporting H4a. To analyze the difference in experience level we used Bonferroni procedure for multiple comparisons. The

results show a significant mean difference in retention between individuals with over one month experience and those with less than one month experience. This indicates that individuals with more experience have higher retention rate than users with less experience as shown in Figure 2a. The mean difference is significant at the .05 level.

Insert Figure 2 here

The ANOVA of individuals' length of eCommerce experience showed a significant main effect for the satisfaction factor, $F(2, 553)=3.575$, $p < .029$, supporting H4b. We conducted Bonferroni procedure for multiple comparisons and the results show a significant mean difference in satisfaction between individuals with over one month experience and those with less than one month experience. This indicates that individuals with more experience are more satisfied compared to those with less experience as shown in Figure 2b. The mean difference is significant at the .05 level.

Insert Table 3 here

Finally, we regressed satisfaction, information quality, service quality, and system quality on retention for the full, more experienced, and less experienced models. Supporting our previous analysis, we found that the experienced users were more satisfied than less experienced users as depicted by the satisfaction variable significance at the $p < .05$ level (See Table 3). Apparently, the more experienced users were better able to derive higher benefits from knowledge transfer.

Structural model

Structural equation modeling analysis using a variance based tool, EQS Version 5.5, was conducted. The chi-square statistic tests the hypothesis that the model generated by the data

supports the theoretically proposed model, with smaller χ^2 values indicating a better fit (Bentler and Wu, 1995; Anderson and Gerbing, 1988). A statistically non-significant χ^2 suggests that the hypothesized model is sufficiently close to the observed data and that the remaining differences are due to sampling fluctuations (Chau and Hu, 2001). We observed a $\chi^2(284)=611$ with a 2.15 ratio of χ^2 to degree of freedom, a ratio under the recommended threshold of 5 (Jiang, Klein, and Crampton, 2000).

The normed fit index (NFI) statistic based on the maximum likelihood function and independent variables has values in a range from 0 to 1, the model result, NFI = 0.888, was close to the desired value of .9. The disadvantage of NFI is that it is affected by sample size (Bentler, 1995). To resolve this difficulty the modified non-normed fit index (NNFI) is used. The non-normed fit index (NNFI) is adjusted for the degrees of freedom.

We observed NNFI of 0.927, which exceeds the desired 0.9 value (Anderson and Gerbing, 1988). According to Bentler, “the comparative fit index has the advantage of the NNFI in reflecting fit relatively well at all sample sizes, especially, in avoiding the underestimation of fit sometimes found in true models with NFI” (1995: 93). The CFI result from our model was 0.937, which is above the desired cut-off value of 0.9 (Anderson and Gerbing, 1988).

In addition we calculated the goodness of fit index (GFI) and the adjusted goodness of fit index (AGFI). The data displayed a GFI value of .886, which is close to the desired value of 0.9 (Segars, and Grover, 1993; Fornell and Larcker, 1981). When the sample was adjusted for the degrees of freedom, as is the case in AGFI, the result was within the desired range. The AGFI result was 0.859, exceeding the desired value of .8 (Segars, and Grover, 1993; Fornell and Larcker, 1981). We also observed .047 for the root mean square residual (RMR), indicating that the unexplained variance is small; this is below the desired 0.050 value (Fornell and Larcker,

1981; Segars, and Grover, 1993). From the goodness-of-fit tests and the analysis of the residuals, we conclude that the structural model satisfactorily fits the data. The hypothesized relationship between the quality dimensions and judgment and retention is modeled as shown in Figure 3.

Insert Figure 3 here

As hypothesized information quality has a significant impact on judgment and retention, supporting hypotheses H5a and H6a. Hypothesis H5a, impact of information quality on judgment, is supported at the 0.10 level and hypothesis H6a, impact of

Information quality on retention is supported at the 0.01 level. We also found significant relationship between system quality and satisfaction, supporting H5b at the 0.05 level. The details of the hypotheses results are shown in Table 1. Support for H5c, H6b, H6c, and H6d was not found. The variance explained, R^2 , by the dependent variables for judgment and retention is 0.52 and 0.30, respectively.

Insert Table 4 here

Discussion and Conclusion

Modeling domain knowledge is used in this study to learn about and develop a better command and insight of global organization web-based services. The knowledge transfer paradigm provides a strong theoretical basis for describing how domain knowledge influences individuals' adoption processes by learning and innovating. By transferring existing knowledge from a web-based domain to a target such as retention, individuals can learn about a multinational company's products/services. Individuals can also use web-base technologies to effectively innovate a global company's products/services for their use. We advanced research on

knowledge transfer by identifying tools that are more likely to transfer knowledge. Knowledge transfer is linked with relational KBA (e.g., tutorials, online chat rooms, FAQs, etc.) providing an organization with a unique asset. This study presents the importance of knowledge transfer as it relates to quality variables and retention of customers' business. Our results were partially mixed in that knowledge transfer was significant for information quality and system quality, and not for service quality. Argote and Ingram (2000) argued that people across contexts make knowledge transfer problematic. Apparently, individuals are better able to understand the benefits of knowledge transfer for web-based information and system enhancements as it applies to retaining company services. Future research should examine why transfer of knowledge for service quality is not as effective.

Knowledge transfer as it relates to individual satisfaction indicated a non-significant relationship. This result may have been driven by the complexity of the satisfaction construct. That is, individuals may have a difficult time in transferring knowledge to a factor that relates to several significant indicators. Future research may indicate whether more instructive services by a global organization can assist individuals in transferring knowledge to satisfaction.

Also, experience was deemed as an important factor for retention of company services. Experienced individuals, more than those with less experience, appear to produce better abstract representation of an organization's information quality and system quality (e.g., by concepts or a "deep structure"). These extensive problem structures of high knowledge individuals may have permitted broader solution strategies, whereby low knowledge individuals proceeded through a list of constraints that limits them to take action (Voss, Greene, Post and Penner, 1983). Experienced individuals may have been able to better cluster (meaningful groupings) the web-based information, as well as display greater inferential capability.

The linkage between experience and knowledge has consequences not only through the direct effect on individual retention but also via the information processing context in which customers operate. Organizations may be able to capitalize on educating their customers in the use of its web pages, thereby increasing its competitive advantage. Individuals may find new ways of learning regarding world, general and specialty knowledge.

Some of the limitations of this study include controlling for technology impediments such as bandwidth for Internet connection. For example, someone with a dial-up connection may not be able to use an online chat room and may view support as slow, whereas a better system (e.g., DSL connection) may have different results. Also we viewed a subset of buyers that is students. Though students are active participants in the use of web-based services, they may not be representative for all groups. Future studies may consider including control variables such as completion time thereby enabling a better insight on the efficiency of using web-based services. Although feedback from professors administering our experiment indicated that students' learning is affected by many web-based services tools (e.g., Forums, FAQs, Search, tutorial, online chat rooms, downloads, and upgrades), future studies may consider only one tool for better experimental control.

Transfer of knowledge is of critical importance to companies that invest hundreds of thousands of dollars on web-based services. A sizable amount of research has examined the generalization maintenance of trained skills over time (see Baldwin and Ford, 1988, for a review). Our premise is that expectations about an individual's quality assessments are influenced not only by the subjective correlation among these attributes, but also individuals' domain knowledge regarding web-based services. Hence, decisions are often influenced by domain knowledge and expectations created by the correlations among cues (Ordóñez, 1998).

The paper helps further research in that it examines and models quality dimensions of retention of customer services. These dimensions (information quality and system quality) imply that knowledge generation and transfer is an essential source of organizations' sustainable competitive advantage. Global organizations may further benefit by acquiring and storing this knowledge in the organizations' memory and by making comparisons between current design (i.e., information, service, and system) problems and the past solutions they have seen, retrieving that knowledge to generate new solutions to improve customer retention. This new knowledge can be created in specialized web-based knowledge centers assisting individual relations. This creation of new knowledge can be converted into new and improved products, services and processes.

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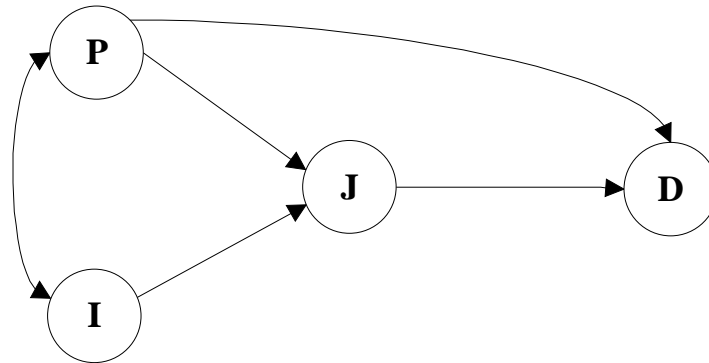
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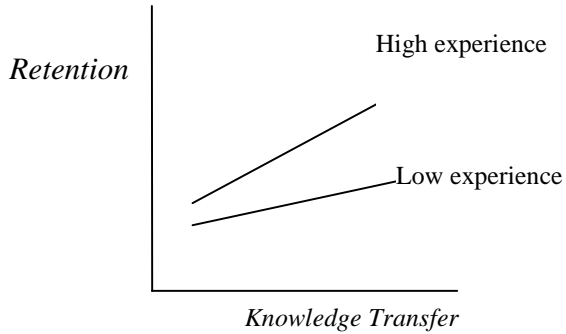
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FIGURE 1 KNOWLEDGE TRANSFER MODEL

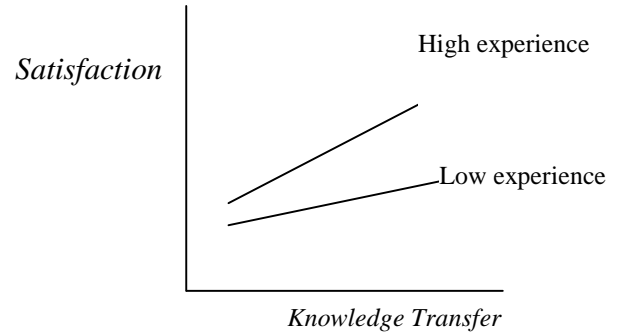


where P = perception (quality), I = information, J = judgment (satisfaction), and D = decision choice (retention).

FIGURE 2: HYPOTHESIZED RELATIONSHIP FOR ECOMMERCE EXPERIENCE



(a) eCommerce experience impact on retention



(b) eCommerce experience impact on satisfaction

FIGURE 3: HYPOTHESIZED MODEL

Solid lines represent significant paths and dotted lines represent non-significant paths

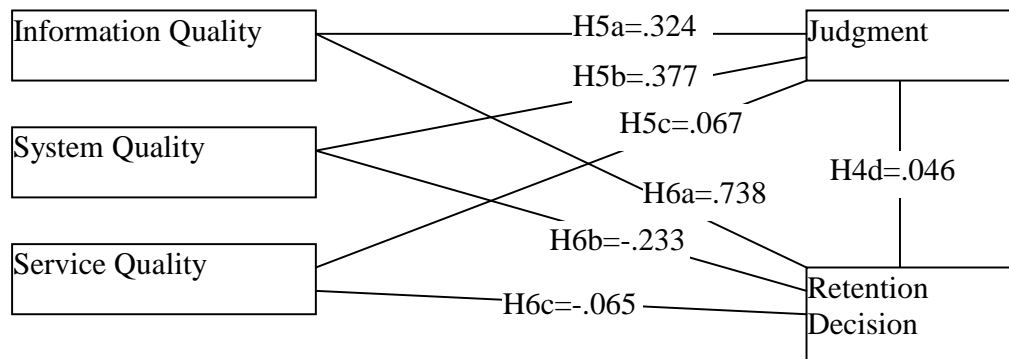


Table 1: Reliability		
Measure	Number of Items	Cronbach's α
Information quality	6	.8471
Service quality	7	.8390
System quality	5	.7761
Satisfaction	3	.8166
Retention	3	.9256

Table 2: Factor Analysis: Rotated Component Matrix ^a

Constructs	Items	Components					
		1	2	3	4	5	6
Information Quality	Accurate source				.632		
	Timely				.796		
	Up-to-date				.715		
	Entertaining			.859			
	Enjoyable			.868			
	Fun			.841			
Service Quality	Provides the right solution	.647					
	Presents useful alternative	.601					
	Dependable	.688					
	Tells when service is performed	.513					
	Prompt	.520					
	I trust it	.740					
	I feel safe	.663					
System Quality	Provides quick feedback						.383
	Gives variety of alternatives						.580
	Has predictable screen change						.406
	Easy to contact support						.808
	Easy to get information						.813
Satisfaction	Better overall					.782	
	Worse than I thought					.720	
	Better than I thought					.760	
Retention	Will use in 3 months		.870				
	Will use in 6 months		.922				
	Will use in 12 months		.879				

Rotation Method: Varimax with Kaiser Normalization.

^a Rotation converged in 6 iterations.

Table 3: Regression Results			
Variables	Full Model (N=556)	More Experience (N=476)	Less Experience (N=80)
Intercept	1.51	1.741	0.01
Information Quality	0.324 ***	0.295 ***	0.756 ***
Service Quality	0.171 ***	0.118 *	0.406 ***
System Quality	0.06	0.08	0.009
Satisfaction	0.09 *	0.111 **	-0.192
Adjusted R ²	0.209	0.187	0.347

* p < .10; ** p < .05; *** p < .01

Table 4: Hypotheses results				
	t test	Standard Error	Significance level (α)	Hypothesis supported?
H5a	1.715	.143	.10	Yes
H5b	2.430	.118	.05	Yes
H5c	.559	.091	-	No
H6a	2.746	.192	.01	Yes
H6b	-1.167	.143	-	No
H6c	-.442	.105	-	No
H6d	.448	.097	-	No

Appendix: Survey Questionnaire

Information quality:

1. The Web-based support I use is an accurate source of information.
2. The Web-based support I use provides timely information.
3. The Web-based support I use has up-to-date information.
4. The Web-based support I use is entertaining.
5. The Web-based support I use is enjoyable.
6. The Web-based support I use is fun to use.

Service quality:

1. The Web-based support I use provides the right solution to my request.
2. The Web-based support I use presents a useful alternative to solve my problem.
3. The Web-based support I use is dependable.
4. The Web-based support I use tells me exactly when support will be performed.
5. The Web-based support I use gives me prompt service.
6. I trust the Web-based support I use.
7. I feel safe when making transaction on the Web-based support I use.

System quality:

1. The Web-based support I use provides quick feedback.
2. The Web-based support I use gives me a variety of alternatives for solving my problem.
3. The Web-based support I use has a natural and predictable screen changes.
4. The Web-based support I use makes it easy to contact the customer support manager.
5. The Web-based support I use makes it easy to get to customer support information.

Satisfaction:

1. My overall satisfaction level with regard to the Web-based support I use is better than what I expected.
2. The Web-based support I use is WORSE than I thought it would be.
3. The overall quality of the Web-based support I use was better than I thought it would be.

Retention:

1. I will continue to use Web-based support in the next 3-months.
2. I will continue to use Web-based support in the next 6-months.
3. I will continue to use Web-based support in the next 12-months.