

## **Only If It Is Convenient: Understanding How Convenience Influences Self-Service Technology Evaluation**

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Self-service technologies (SSTs) can help firms reduce labor costs while providing more channel options, but customers must be convinced of their value before foregoing a full service alternative. To understand how customers evaluate an SST, the authors conducted three studies to analyze the importance of convenience in the evaluation process along with exploring what constructs ultimately influence customers' need for human interaction with an SST. Surveying both users' experiences with an SST and also nonusers' perceptions of an SST, a comprehensive analysis was undertaken to assess the perceived benefits of using an SST. In Study 1, the authors found that convenience had a strong positive effect on the perceived accuracy, speed, and exploration intentions of an SST. Building on these results, Studies 2 and 3 reveal that SST users have a lower need for interaction when they are satisfied with an SST, while nonusers' trust perceptions had the greatest influence on the need for human interaction during an SST transaction. The authors discovered that user satisfaction can be enhanced by focusing on the speed and accuracy of an SST, whereas nonusers' perceptions of accuracy and exploration increased the trust placed in an SST.

**Keywords:** self-service technology, convenience, need for interaction, speed, accuracy, exploration

## **Introduction**

Do customers really need employee interaction to have a quality service experience? This is the question many service providers are pondering when deciding if a self-service technology (SST) is right for their business. The idea of having customers take on a partial employee role during a transaction is highly advantageous for service providers. Not only can they reduce labor costs and increase service availability, but they can reclaim valuable floor space for additional sales. The one thing forgotten in this decision is why customers would want to perform a service themselves. What is the ultimate benefit to the customer for taking on this added effort in the service experience? Numerous SSTs have come and gone in the past because of service providers' inability to educate customers on the reason why an SST is a better option than other channel alternatives. Customers are not naturally inclined to change channel options unless motivated to do so.

From the earliest qualitative studies on SSTs, customers have initially indicated that attributes emphasizing convenience influenced SST evaluations (Meuter et al. 2000). Recently, research has supported the importance of convenience as a driver of satisfaction with an SST (Collier and Sherrell 2010; Ding, Hu, and Sheng 2011), and convenience has been shown to affect the usage of an SST (Durkin 2004; Evans and Brown 1988). With a self-service option, the customer often has the ability to dictate the time and location of a transaction overcoming many of the inconveniences of a full service channel. Subsequently, a convenient SST can provide more flexibility in the transaction process along with a reduction in the amount of effort needed to initiate and complete a transaction.

The current research on convenience in a self-service context is quite sparse and lacks a thorough understanding of how this construct influences customers. Hence, the goal of this research is to explore how convenience perceptions influence the potential benefits received

from an SST. Specifically, we explore how convenience impacts three areas: speed of the transaction, accuracy of an order, and ability to explore the technology to find information and options. These three constructs were chosen because they address both the functional and the hedonic benefits of using the technology. Additionally, we examine how these potential SST benefits influence customer satisfaction with and trust of the technology. Finally, we assess the relationship of SST satisfaction and trust to customers' need for human interaction to see if customers are less dependent on employee interaction if they are satisfied with and trust an SST. This seems to be an especially important concern for service providers who are trying to expand their self-service presence.

Drawing from prior research and using resource matching theory, the authors test these proposed relationships in two different self-service settings. Within each setting, both users' experiences with the SST and nonusers' perceptions of the SST were surveyed to thoroughly understand how customers evaluate an SST. The purpose of these studies is to strengthen the managerial understanding of how convenience influences customers in a self-service environment. As well, a further objective is to understand what self-service qualities must be present for customers to require less employee interaction during a service experience.

The organization of this article is as follows. First, we provide a theoretical background of our model and then present our conceptual framework and hypotheses. Subsequently, we present our research methodology and the results from our studies. We conclude with research and managerial insights, a discussion of our research contribution, and suggestions for future research.

## **Theoretical Background**

### **Resource Matching Theory**

Resource matching theory has been widely used to explain branding, advertising, and cognitive evaluations of products. Recently, the theory has also been applied in SST settings. Resource matching theory is built upon the idea that customers have limited resources to process information or accomplish a task (Anand and Sternthal 1990). When customers allocate resources in a manner that matches the required effort to accomplish a task, an efficient outcome is achieved. Conversely, if customers are asked to exceed their available resources to accomplish a task, the effectiveness of the activity is lowered. In a self-service context, the resources allocated by customers often relate to the cognitive load surrounding the technology. Unsafe, poorly lighted, or distracting areas require more resources from customers that could be dedicated to the self-service task. For self-service users, the resources that must be allocated are oftentimes more than just cognitive demands. Customers are frequently asked to exert physical resources in scanning items or lifting packages. Contrary to other types of services, self-service applications can often require numerous types of resources to be allocated to complete a task.

Previous research in SST has used resource matching theory to explain how customers judge the effectiveness of an SST experience. A recent study by Zhu et al. (2007) explored how customer resource allocation in regard to perceived control had a positive impact on interface evaluations. Using resource matching theory as a foundation, we examine how convenience perceptions of an SST influence the allocation of resources for customers. When convenience considerations influence the time and place of a self-service transaction, customers can determine when and where they are willing to use their available resources to accomplish a transaction. Because an SST allows more freedom in accomplishing a task, customers can

allocate their resources in order to “match” a desired level of effort. Additional research has supported this idea with Seiders et al.’s (2005) finding that convenience was a determining factor of resource allocation and was seen as an ongoing barrier that encouraged or discouraged future intentions. With SST, the convenience of a transaction can conserve time and effort and allow customers to allocate the appropriate amount of resources to effectively complete a task at their choosing.

## **Convenience**

In a self-service context, convenience is defined as the perceived time and effort required to find and facilitate the use of an SST (Collier and Sherrell 2010). From a resource matching perspective, convenience directly relates to the amount of time and effort (resources) that must be dedicated to accomplish a task. For instance, if an SST is in a poor location or in a high traffic area, the customer has to account for the surrounding environmental factors thus diverting more resources from the self-service task. This diversion of resources can directly contribute to the inefficiency of a self-service experience. Whereas, if an SST is in a convenient location that reduces the time and effort to not only find but facilitate the self-service transaction, this reduction of necessary resources will create a more effective transaction experience.

Contrary to other SST studies, we believe that convenience is a more comprehensive construct than simply examining ease of use perceptions that also addresses the amount of effort in an interaction. Ease of use has been defined as the degree to which a customer expects an interface to be free of effort (Davis 1989). While ease of use focuses on the interactivity of a technology, convenience addresses the time and effort exerted before, during, and after a transaction. The ease of use construct focuses on the interface of the technology

while ignoring the other potential sources of cognitive effort such as the location of the technology, the social environment surrounding the technology, and the accessibility of the technology. Convenience represents a time and effort component related to the whole transaction process instead of just focusing on one specific component.

From the earliest qualitative studies on SST, the concept of convenience has been frequently mentioned by many customers desiring a service to take place “where I want” and “when I want” (Meuter et al. 2000). Unlike a traditional full service encounter, SSTs give customers the convenience to overcome many traditional constraints such as time availability, scheduling, and location. Recently, academic research has further emphasized the importance of convenience with Collier and Sherrell (2010) noting that perceptions of convenience were one of the driving factors in the evaluation of an SST. Similarly, Ding, Hu, and Sheng (2011) noted that one of the criteria for evaluating the service quality of a self-service application was convenience.

With SST, convenience perceptions directly relate to the amount of resources required of the customer to complete a transaction. These resources can include the mental and physical effort required in the transaction. In a self-service context, in which a customer is taking on a coproduction role, the convenience of the transaction can impact the perceived efficiency and effectiveness of a transaction. If customers are able to exert fewer resources to facilitate a transaction, then customers’ perceptions of SST attractiveness will be influenced.

### **Conceptual Framework and Hypotheses**

To further explore the importance of convenience, we examine how this construct influences the perceived benefits of using an SST along with the necessary resources required of customers to use the technology. Specifically, we focus on what concepts are influenced in a

customer's evaluation of a self-service transaction as a result of convenience perceptions. We propose that three concepts are directly influenced by convenience: exploration, speed of transaction, and accuracy. When customers are allowed the ability to dictate the time and location of a transaction, this heightened level of convenience can positively impact both the functional and the hedonic components of a service experience.

From a functional standpoint, when customers have to exert fewer resources in finding and facilitating a transaction, the perceived speed of the transaction should be elevated. The convenience of an SST to enact a transaction when and where a customer wants will allow for an optimal environment for a transaction to take place, thus conserving resources and producing a speedier transaction. Additionally, the ability of customers to conveniently initiate a transaction will allow for greater accuracy perceptions since the customer can direct the transaction and review an order before the transaction is completed. With SSTs, the chance of miscommunication can be minimized compared to a traditional service interaction where an employee might be distracted, handling multiple requests at once, or even speak a different first language. Additionally, the ability of the customer to verify information during the order process can also create a lighter cognitive load than having to verify all the information at the end of a transaction. Finally, the convenience of an SST can allow a user to divert more resources toward assessing the perceived accuracy of an order rather than being concerned about the environment or other customers.

Along with the functional benefits, convenience perceptions of an SST can also influence the enjoyment or hedonic element of a transaction. The convenience to initiate a transaction at the customer's choosing allows for a conducive opportunity for exploration of the options and features of the technology. For example, if an SST is located in an inconvenient place, customers will be more concerned with simply finishing the transaction than exploring the technology. Conversely, if an SST allows customers the ability to initiate a transaction at a time

and location of their choice, the ability and willingness for exploration should be increased. When customers can reduce the time and effort to complete a self-service transaction, this conservation of resources allows for more opportunity to interact with the technology or to explore the alternatives and options of the SST interface.

To fully understand customers' evaluation of a self-service experience, we further consider how the three variables of exploration, accuracy, and speed of transaction influence satisfaction judgments along with the perceived trust customers place in the technology. Due to the unique nature of a self-service experience where customers are engaging in a transaction without employee involvement, understanding the overall satisfaction of the experience along with the perceived trust of the technology is imperative to the successful implementation of an SST. Finally, we consider how satisfaction and trust influence customers' need for human interaction during a transaction. If customers are satisfied with the SST experience, does this directly influence the need for employees to be present during a transaction? In essence, are customers content to perform a service in isolation if they trust the technology and are satisfied with its performance. To clarify these proposed relationships, Figure 1 details our conceptualization along with the hypothesized relationships between the proposed constructs. Next, we discuss the importance of our model constructs and why they were chosen for this study.

## **Exploration**

In a retailing context, the ability of customers to explore and browse through the content of the store has been widely supported as a crucial component in maximizing a customer's experience (Babin, Darden, and Griffin 1994; Chandon, Wansink, and Laurent 2000). With an SST, if customers are not willing to explore the technology to understand all the options

available, there are no employees available to explain additional alternatives. The need for exploration is particularly important with SST because formal directions are rarely given and customers are often expected to find their way through the technology to understand all the potential applications. Many SSTs' success is precipitated on customers exploring the available options, such as movie rental and ticketing kiosks, photo editing and printing SSTs, and greeting card SSTs like Hallmarks "Touch-Screen Greeting." From a self-service perspective, the construct of exploration is defined as the willingness to extend or enhance a self-service interaction in order to browse or obtain consumption relevant knowledge.

Numerous technology adoption studies have examined a similar concept called Trialability. Trialability refers to the degree that a customer can experiment with an innovation (Rogers 1983). Exploration is not the same as trialability in a technology interaction. With customer trial, the interaction with the technology may not proceed any further than the main interface. In contrast, exploration is the ability of the customer to browse a technology system to seek out additional options, applications, or relevant product knowledge. Where trialability is the initial exposure of a customer to a technology, exploration is the willingness of the customer to seek out additional information beyond the initial technology interface.

In regard to how convenience perceptions influence exploration, previous research has found a relationship between customer convenience evaluations and the intentions to explore and browse through a technology (Ahn, Ryu, and Han 2007). Hence, the convenience of an SST can have a significant influence on a customer's willingness to extend a service experience to explore the technology. Conversely, if an SST is located in a poor location that detracts from the service experience, customers will be less likely to prolong a transaction. For example, if an organization wants customers to explore a technology, having the customer stand during the transaction will not promote extended exploration due to the physical inconvenience of the experience. When customers can choose the location of a transaction to take place, this

convenience allows for greater exploration because customers will often choose a location that has a low “environmental load” while using the technology. The convenience of a technology can encourage a pressure free interaction where customers do not feel the added pressure of time constraints or social pressure from others. Thus, the convenience of an SST will lead to greater exploration.

*Hypothesis 1:* The perceived convenience of an SST will have a positive relationship with exploration intentions.

### **Speed of Transaction**

Speed of transaction has been frequently mentioned since the earliest qualitative studies on SST as an important consideration to customers. Studies such as Langeard et al. (1981) and Bateson (1985) argued that time savings was a primary concern to users of SST. Lovelock and Young (1979) noted that some customers prefer a self-service experience simply because of the reduced time in the service delivery. Additionally, numerous qualitative studies of SST have listed speed as an important factor (Meuter et al. 2000; Pujari 2004). Speed of transaction in a self-service experience is defined as the time it takes to actively complete a transaction via an SST (Dabholkar 1996).

The perceived convenience of a self-service transaction can have a strong influence on the perceived speed. When customers can initiate a transaction when and where they want, the concept of waiting for a service to begin is eradicated. With SSTs that are located off-site, the service starts and ends at the customer’s discretion. Unlike traditional service encounters where the capacity and flexibility of employees determine the speed of the transactions, the convenience of an SST allows for a perceived speedier transaction by allowing the customer to always be first in line. Farquhar and Rowley (2009) further emphasized this point by noting that convenience in services had a relationship to a concept called Execution: the process of how

long it took to accomplish a task. When customers have to exert less effort to accomplish the same task, the perception of speed should be increased. As customers acknowledge the convenience of a self-service transaction, speed of transaction perceptions will increase.

*Hypothesis 2:* The perceived convenience of an SST will have a positive relationship with speed of transaction perceptions.

### **Accuracy**

Accuracy or the ability to process a transaction to the exact specification of the customer is an important evaluating factor to the quality of a service experience (Bienstock, Mentzer, and Bird 1997; Mentzer, Flint, and Hult 2001). The convenience of an SST can also allow customers the ability to verify orders and avoid the perceived time pressure from other customers. For instance, with an online ordering application for a restaurant, customers can take their time placing their order and verify all the information is correct before finalizing the transaction. Conversely, if customers feel rushed when placing an order directly with an employee, they may experience lower order accuracy perceptions. From an online perspective, Wolfinbarger and Gilly's (2001) qualitative study also showed that when customers have the convenience to start and stop a transaction it leads to greater information accuracy perceptions compared to offline interactions with employees. Hence, when an organization allows customers the convenience of initiating a transaction on their time frame and pace, the accuracy of the transaction will increase due to the customer coproducing the exact order as requested.

*Hypothesis 3:* The convenience of an SST will have a positive relationship with accuracy perceptions.

## Trust

In order to fully understand the benefits of a self-service experience, the authors examined how the constructs of speed of transaction, exploration, and accuracy influence the trust customers place in the technology. Trust in a self-service context refers to the subjective belief that a technology will perform a particular transaction according to customer expectations, in an environment characterized by uncertainty (Ba and Pavlou 2002). Since the customer and service provider are separated during a self-service transaction, trust must be present to lower the financial, social, and technical risk of that service experience. Ha and Stoel (2009) purported that trust played a pivotal role in the intent to use a technology again in the future. Additionally, Johnson, Bardhi, and Dunn (2008) found that trust was a key mediating construct in customers overall evaluation of an SST.

When customers feel comfortable enough to explore all the options of a technology and can customize a service experience, the trust placed in an SST will be elevated. Previous online research has noted that customers willingness to explore a website fostered a social presence that emulates face-to-face interaction which directly influenced trust perceptions (Hess, Fuller, and Campbell 2009). Additionally, Harris and Goode's (2010) study of online servicescapes found that promoting greater interactivity, exploration, and customization lead to stronger trust perceptions. For many customers, trust is initially built on the exploration of the technology, though this exploration may be limited at the beginning. As customers start to explore more of the functions of a self-service application, this extended interaction can increase the trust placed in the technology.

*Hypothesis 4:* The exploration of an SST will have a positive relationship with trust perceptions.

Similarly, a speedier transaction should also impact trust evaluations. When customers can reduce the amount of time to complete a transaction, the expedited service process can lead to greater faith and trust in the technology. Bart et al.'s (2005) research found that speed played an influential role in establishing consumer trust by allowing customers to accomplish their goals with a minimum number of clicks. Zhou, Lu, and Wang (2009)'s study found that speed in which customer inquiries were addressed directly influenced trust perceptions. Finally, Vance, Elie-Dit-Cosaque, and Straub (2008) stated that system quality attributes such as speed of navigation can influence customers' evaluations of trust. By increasing the speed of a transaction, the SST provider can signal to the customer the quality of the service experience, thus increasing trust perceptions.

*Hypothesis 5:* The perceived speed of a self-service transaction will have a positive relationship with trust perceptions.

If an SST can provide a more accurate account of a transaction, this added functionality may create a higher degree of trust with customers. Previous research has supported this idea with Cassab and MacLachlan (2009) finding that record accuracy had a direct influence on customers online trust. Additionally, Ho, Kuo, and Lin's (2010) study found that information accuracy, completeness, and relevance had a direct influence on trust placed with a technology. Hence, customers who are willing to take on a coproduction role in a service experience to enhance the accuracy of a transaction should exhibit an increased level of trust.

*Hypothesis 6:* The accuracy of a self-service transaction will have a positive relationship with trust perceptions.

## **Satisfaction**

To further explore the influence of accuracy, speed of transaction, and exploration, the concept of satisfaction was also included in our conceptual model. Numerous studies have shown the importance of satisfaction in a self-service experience as a determinant for future use (Ding, Hu, and Sheng 2011; Makarem, Mudambi, and Podoshen 2009). If a customer can achieve a faster and more accurate transaction with an SST, then the overall satisfaction with the service experience will be improved. Initial SST studies have noted that one of the influential factors leading to customer satisfaction with this medium was the perceived speed of the transaction (Meuter et al. 2000; Pujari 2004). As for accuracy, Collier and Bienstock (2006) showed that information accuracy influenced the overall satisfaction of a website experience. Similarly, Ding, Hu, and Sheng's (2011) recent study on self-service quality found a relationship with order accuracy and customer satisfaction. In regard to exploration, some of the earliest research on customer willingness to explore a technology or to interact in a spontaneous manner with an application showed a direct and strong influence on the overall satisfaction with the technology (Webster and Martocchio 1992). More recently, Demangeot and Broderick's (2010) qualitative study of exploration behaviors found that in an online context, customer tendency to explore led to greater satisfaction with their decision making and overall online experience. Subsequently, if customers feel comfortable exploring an SST to fully understand all its applications and options, then satisfaction with the self-service experience will be increased.

*Hypothesis 7:* The exploration of an SST will have a positive relationship with satisfaction perceptions.

*Hypothesis 8:* The speed of a self-service transaction will have a positive relationship with satisfaction perceptions.

*Hypothesis 9:* The accuracy of a self-service transaction will have a positive relationship with satisfaction perceptions.

## **Need for Human Interaction**

One construct that is inherently tied to the evaluation of a self-service experience is the degree of human interaction desired during the transaction. Need for human interaction is a construct defined as the desire for human contact by the customer during a service experience (Dabholkar 1996). Early research profiling self-service users initially did not find support for the influence of customer need for human interaction (Langeard et al. 1981), but recently, qualitative studies have listed customer need for human interaction as one of the main reasons for not adopting an SST (Dabholkar, Bobbitt, and Lee 2003; Meuter et al. 2000; Meuter et al. 2003). In addition, Dabholkar and Bagozzi (2002) found that the need for human interaction positively influenced a customer's overall attitude toward an SST.

When customers have greater trust and overall satisfaction with an SST, need for human interaction should be diminished. As customers begin to become more satisfied with the technology along with trusting that a reliable and safe experience can be achieved, customers will not have a strong need to have an employee present. Unlike other constructs in the model, an inverse relationship will exist with need for human interaction in a self-service context. Trust and satisfaction will have a negative influence on need for human interaction highlighting the strength of intended future use as the desire for employee involvement decreases.

*Hypothesis 10:* The trust perceptions of an SST will have a negative relationship with need for human interaction.

*Hypothesis 11:* Satisfaction perceptions of an SST will have a negative relationship with need for human interaction.

## **Research Methodology**

### **Study 1**

To test our conceptual model, a survey was created to capture customers' evaluations of an SST. We initially wanted to establish the importance of convenience before examining a larger structural equation model. A survey consisting of 15 items was developed to measure the impact of convenience on evaluations of speed of transaction, accuracy, and exploration. The measures for these four constructs were adapted from existing self-service research and were only altered to fit the setting of the study (Baumgartner and Steenkamp 1996; Collier and Sherrell 2010; Dabholkar 1996; Parasuraman, Zeithaml, and Berry 1988; Seiders et al. 2007). Our selection of items from these constructs was based on the ability to apply them to the context of this study with as little alteration as possible. The survey items were based on a 5-point scale from strongly agree to strongly disagree.

The specific SST used for this study was an online reservation system for restaurants. This SST allows customers to choose a restaurant and then place a reservation for a date, time, and number of patrons in lieu of directly contacting the restaurant for a reservation. Popular examples of this SST include OpenTable (United States), TopTable (United Kingdom), and ReservIt (Singapore). We used a U.S.-based national panel database and obtained responses from 260 current users of online reservation systems. To get a complete picture of the importance of convenience, nonusers of the SST were also surveyed. These respondents acknowledged their familiarity with the SST but had not placed a reservation through the technology. The wording of the questions for the nonusers was changed slightly to reflect the fact that they had not yet used the SST. The nonuser survey focused on customer perceptions of the SST and beliefs about using the technology. A total of 214 respondents who were familiar with the SST but had not tried the technology responded to the survey. The user sample was 53% female and the largest age group was 25–34 (28.5% of the sample) followed by the age

group of 50–64 (25%). The nonuser sample was 49% female and the largest age group was 50–64 (32%) followed by the over 65 category (25%). Due to the differences in age across samples, we included this variable as a covariate in our analysis.

The reliability of the items was then tested to assess the appropriateness of the scales. All constructs exhibited an acceptable level of reliability ( $\alpha \geq .70$ , Nunnally and Bernstein 1994). Following Fornell and Larcker's (1981) recommendation to assess validity, we calculated the average variance extracted (AVE) for each construct along with the shared variance between constructs. The AVE for each construct exceeded .50 and no shared variance exceeded the average variance for each construct, thus exhibiting the convergent and discriminant validity of our scales. Next, each constructs' items were summated to form an overall index of the construct.

After assessing the validity of the scale items, a  $2 \times 3$  multivariate analysis of variance was run to investigate if high- and low- convenience perceptions influenced the self-service evaluations of speed, accuracy, and exploration. High- and low- convenience perceptions were determined by a median split of the data. To assure that respondents who had higher convenience perceptions were not simply predisposed in their attitudes toward the technology, the authors captured a measure of technology readiness from respondents. The results of this analysis found that users with high- and low- convenience perceptions were equally ready to use the technology and did not find a significant difference. We also tested the nonusers and found a nonsignificant difference on technology readiness between the nonusers who had high- and low- convenience perceptions. Table 1 provides the details of the analysis for both the users and the nonusers of the technology. From the analysis, both users and nonusers' convenience perceptions had a strong influence on the evaluations of speed, accuracy, and exploration. The users who rated the SST as being more convenient had significantly higher speed, accuracy, and exploration perceptions compared to users who had low convenience

perceptions of the technology. Similarly, nonusers followed the same pattern. When convenience perceptions were high, nonusers noted that the SST would provide a quicker transaction, higher accuracy, and greater ability for exploration. Overall, this first study provides initial support for the importance of convenience in a self-service setting. When customers can see that an SST requires less effort to find and facilitate a transaction, this subsequently influences both the perceived function (speed and accuracy) and the perceived hedonic benefits (exploration) of using the technology. To further extend these findings, we tested the importance of convenience again but also included the constructs of satisfaction, trust, and need for human interaction to capture the overall evaluation of a self-service experience.

## **Study 2**

After initially establishing the influence of convenience in a self-service setting, we performed a second study in order to have a comprehensive understanding of all the proposed relationships of the conceptual model in Figure 1. A survey was created to capture all the constructs of the study. Scale items for convenience, speed of transaction, accuracy, and exploration were the same items as used in Study 1. The constructs of trust, satisfaction, and need for human interaction were adapted from existing SST research (Collier and Sherrell 2010; Meuter et al. 2005; Oliver and Swan 1989). Our selection of items from these constructs was based on the ability to apply them to the context of this study with as little alteration as possible. A total of 23 items captured all the constructs of interest. The setting for this study was an SST that allowed customers to place an online or mobile order for restaurant meals for takeout or delivery instead of talking to an employee. A national panel database was used for this study as well with 228 users of the technology responding to the survey. In the sample, 45% were male with the largest age group falling between 25 and 34 years old (29%).

The reliability of the items were checked and each construct had an acceptable level of reliability ( $\alpha \geq .70$ , Nunnally and Bernstein 1994). After establishing the consistency of the items, a confirmatory factor analysis was conducted using AMOS 17. The results of the confirmatory factor analysis indicate that each item loaded on its respective underlying concept and all loadings were significant. To view the complete list of items and loadings, see Table 2. The fit indices also suggest that the measurement model was a good fit to the data,  $\chi^2 = 420.09$ ,  $df = 208$ ,  $p < .001$ , Incremental Fit Index (IFI) = .94, Tucker–Lewis Index (TLI) = .93, Comparative Fit Index (CFI) = .94, root mean square error of approximation (RMSEA) = .06. Consistent with Study 1, we assessed the convergent and discriminant validity of the measures by following Fornell and Larcker's (1981) recommendation of calculating the AVE and compared it to the shared variance between constructs. Each construct had an AVE over .50, providing evidence of convergent validity. No shared variance between constructs exceeded the AVE per construct, which supports the discriminant validity of the construct items.

The sample covariance matrix was then used in AMOS 17.0 to test the structural model displayed in Figure 1. The individual indicators for each construct resulting from the CFA were summated to form a Composite Index for use in estimating the structural model. The results of the analysis show that the model did fit the data relatively well,  $\chi^2 = 27.90$ ,  $df = 7$ ,  $p < .001$ , Normed Fit Index (NFI) = .97, CFI = .97, IFI = .97, RMSEA = .11. After assessing the model fit, the individual relationships between constructs were analyzed. To account for potential differences, age of the respondent was included in the analysis as a control variable. Table 3 shows the standardized path estimates and t values for each of the hypothesize model relationships. Like Study 1, convenience had a strong positive relationship with exploration, speed, and accuracy supporting Hypotheses 1–3. The strength of the structural path coefficients for these three constructs were roughly equivalent with accuracy having the largest standardized regression coefficient ( $\gamma_{31} = .69$ ,  $t = 14.72$ ,  $p \leq .001$ ).

In regard to the dependent variable of trust, all three intervening variables had a significant relationship to trust supporting Hypotheses 4 - 6. The strongest relative influence on trust came from accuracy perceptions ( $\beta_{13} = .37, t = 4.64, p \leq .001$ ). Exploration had a weaker relationship to trust than accuracy or speed though it still had a significant relationship. The construct of satisfaction was also significantly influenced by speed, accuracy, and exploration (Hypotheses 7-9). Unlike trust, the strongest relative influence on satisfaction evaluations was from the speed of the transaction ( $\beta_{22} = .43, t = 7.33, p \leq .001$ ). These results emphasize that trust is built on the perceived accuracy of the technology but speed is what creates a satisfying self-service experience.

As for the last construct of need for human interaction, trust had no significant relationship with need for human interaction (Hypothesis 10), but satisfaction did have a significant negative relationship (Hypothesis 11). From this analysis, we can state that simple trust of an SST does not lead to a lower need for employees present during a self-service experience. Conversely, if users are satisfied with the final performance of the technology, this directly influences the likelihood of needing employee involvement in a transaction. For service providers, this underscores the importance of the overall performance of an SST if efforts to reduce the dependency on employee contact during a transaction are going to be achieved.

### **Study 3**

To fully assess how customers view SST, we replicated Study 2 by surveying nonusers of the online ordering SST. Nonusers were asked their perceptions of the technology using the same items as in Study 2, but the wording of the questions was changed slightly to reflect the fact that they had not yet used the SST. See Appendix A for examples of users/nonusers items. A total of 242 customers were surveyed who were familiar with the technology but had never

placed an order through the SST. The nonuser sample was 52% male with the largest age group being between 50 and 64 years old (40%).

A confirmatory factor analysis was run with the nonuser group using AMOS 17. Like the user group, all items loaded significantly on their respective construct and the overall measurement model fit the data ( $\chi^2 = 415.63$ ,  $df = 208$ ,  $p < .001$ ,  $IFI = .94$ ,  $TLI = .93$ ,  $CFI = .94$ ,  $RMSEA = .06$ ). The reliability of the items were still consistently above the recommended level ( $\alpha \geq .70$ , Nunnally and Bernstein 1994) and the AVE for each construct exceeded .50 and no shared construct value exceeded the average variance for each construct further establishing the validity of the scales.

The structural relationships for the nonusers were then analyzed using AMOS 17. The analysis showed that the structural model had an acceptable fit to the data ( $\chi^2 = 33.14$ ,  $df = 7$ ,  $p < .001$ ,  $NFI = .97$ ,  $CFI = .97$ ,  $IFI = .97$ ,  $RMSEA = .12$ ). Similar to Study 2, we included age as a control variable in the analysis. The individual hypothesized relationships were then analyzed (see Table 3) to assess the importance of each construct to nonusers. Resembling the user sample, nonuser convenience perceptions had a significant relationship with speed, exploration, and accuracy (Hypotheses 1 – 3). Convenience had a slightly stronger influence on accuracy ( $\gamma_{31} = .70$ ,  $t = 15.30$ ,  $p \leq .001$ ) compared to speed and exploration.

The evaluation of trust for the nonuser sample was quite different than the users. With nonusers, speed of transaction did not have a significant relationship with trust perceptions (Hypothesis 5). The constructs of accuracy (Hypothesis 6) and exploration (Hypothesis 4) were both found to significantly influence customers' perceptions of trust with accuracy having the strongest regression coefficient ( $\beta_{43} = .45$ ,  $t = 7.01$ ,  $p \leq .001$ ). Customer satisfaction also varied with nonusers compared to users. Exploration intentions did not have a significant relationship to satisfaction (Hypothesis 7), but speed of transaction and accuracy had a

significant influence on the potential satisfaction of an SST experience (Hypotheses 8 and 9). For nonusers, the thought of more options and having to explore the technology was not a strong driver of satisfaction.

Finally, perceived trust had a strong negative relationship with need for human interaction (Hypothesis 10), but satisfaction had a negative but nonsignificant relationship with need for human interaction. With nonusers, perceptions of trust play a crucial role in the evaluation of an SST. Nonusers must trust the technology will provide a reliable performance that protects sensitive information. Conversely, the potential satisfaction with the technology had relatively little influence on customers' need for human interaction during a transaction.

Across Studies 2 and 3, numerous similarities and differences were uncovered in self-service evaluations of users and nonusers. Both groups emphasized the importance of convenience in a self-service context. As well, both groups noted that accuracy of the technology was an essential component with an SST. Differing across the groups, speed of transaction had a much heavier influence for users than nonusers. Nonusers did not see speed of transaction as a driver of trust though it did contribute to the potential satisfaction received from an SST. Exploration also had a stronger impact on users than nonusers where intentions to explore the technology enhanced levels of trust and satisfaction. Finally, customers need for human interaction during a service transaction had very different influences across the studies. With users, satisfaction with an SST experience was the only influence to customers' need for human interaction. Contrary to this finding, nonusers need for human interaction was only influenced by perceptions of trust. For managers trying to implement an SST, these results stress the differing areas for growth in implementing an SST.

## **Discussion**

## **Research Contribution**

Focusing initially on users' evaluation of SST, convenience had a heavy influence on the perceived speed, accuracy, and willingness to explore the technology. The consistency of its influence across two different SST contexts further emphasizes the importance of this construct in the minds of customers. Along with convenience, the perceived speed of the transaction also significantly influenced the evaluative criteria for a self-service transaction. For current SST users, speed of transaction had the strongest relative influence on the overall satisfaction from using an SST. Speed also had a positive and significant influence on customers' trust perceptions, though substantially weaker than the relationship to satisfaction.

Users' accuracy perceptions and willingness to explore the SST also had a significant influence on the satisfaction and trust derived from an SST experience. The construct of accuracy had a strong and roughly equivalent influence on both satisfaction and trust. For users of the SST, accuracy was paramount in a favorable evaluation of the technology. Customers' willingness to explore an SST had a relatively weaker influence on satisfaction and trust than the constructs of speed or accuracy, but still had a significant influence.

What makes customers need less interaction? We found that satisfaction judgments were the only influence on need for human interaction for users. Conversely, trust perceptions had very little influence on customers need for human interaction. The satisfaction derived from the technology interaction and completion of a transaction was the primary influence on a customers' need for employee interaction during a self-service experience.

Many SST studies solely focus on users of the technology, while failing to capture the perspective of customers who are not currently using the technology. In our studies, we wanted to explore nonusers' perceptions of SSTs to see if these potential future SST users differed in their opinions about what is important in a self-service experience. By surveying this group of

customers, we can observe if there are differences of importance with users and potential users of the technology.

Across Studies 1 and 3, nonusers' convenience perceptions influenced evaluations of accuracy, willingness to explore the technology, and perceived speed of transaction. Consistent with the users, convenience perceptions had the strongest relative influence in the conceptual model. Where nonusers started to deviate from users in the evaluation of an SST was in the constructs of trust, satisfaction, and need for human interaction. The strongest influence on trust and satisfaction for nonusers was accuracy perceptions. Surprisingly, speed of transaction had a weak but significant relationship to satisfaction and no influence to trust. While previous SST research has found that speed of transaction impacts consumer trust (Zhou, Lu, and Wang 2009), our study showed that this relationship only applied to current users of the technology. Finally, exploration intentions had a strong influence on trust perceptions but no influence on nonusers' potential satisfaction with the SST experience.

As for nonusers' desire for human interaction during a self-service experience, trust perceptions were the only significant influence. The potential satisfaction with the SST had no influence on customers need for interaction. This finding is directly opposite of the users, where satisfaction was the key influence and trust was nonsignificant. Hence, nonusers' must trust the technology before they are willing to reduce the human interaction during a service experience while users are more concerned with the ultimate satisfaction from the SST transaction as relates to their need for human interaction.

For users and nonusers, the evaluation of an SST was similar in the importance placed on convenience but also uniquely different in other constructs such as need for human interaction. We found that for users, satisfaction with the SST led to a lower need for interaction, but for nonusers, perceived trust in the SST is what drove the need for less interaction. Satisfaction for users is primarily based on the perceived speed and accuracy of the SST. For

nonusers, trust is primarily influenced by the potential accuracy of the SST and the ability to explore the SST.

### **Practical Implications**

From a managerial perspective, convenience perceptions had a heavy influence on both users and nonusers about the attractiveness of a self-service option. Service providers looking to transition customers to an SST need to highlight the added convenience of an SST transaction. For this to be effectively accomplished, a promotional campaign needs to be implemented so that customers are aware of the benefits. As stated earlier, some customers have no desire to switch channel options unless the advantage for doing so is obvious. Simply creating awareness of a new SST is not enough; customers need to understand how this technology requires less time and effort or provides additional benefits in the service process.

In regard to current users, our results emphasize the prominent role speed of transaction plays with the overall satisfaction of an SST experience. To enhance the perceived speed of a transaction, firms would be well advised to create clear usage guidelines to aid in the navigation for both existing and new customers. Other ways of enhancing transaction speed include allowing customers (or perhaps members of a firm's loyalty program) to create profiles that save favorite options and prevent customers from having to input repetitive information. Another way to increase perceived speed is to give the SST users preferential treatment. For example, Chipotle, a U.S.-based casual restaurant chain, offers a dedicated pickup line for SST orders. This not only speeds the transaction for SST users but may also attract other customers who may not have been aware of the SST. Finally, service providers must be aware of the potential environmental factors surrounding an SST. A distracting or ill-suited location of an SST can slow down transaction speed because of the added effort to account for situational influences.

While SST users value the speed of the transaction, nonusers' perceptions of the SST were heavily influenced by the potential trust placed in the technology. Two constructs played an influential role in that trust: exploration and accuracy. In regard to exploration, customer ability to explore and browse an SST in a low-stress environment may be the key to building this trust. For example, Home Depot recently tried to implement a self-service kiosk in the plumbing department to allow customers to browse the 15,000 different plumbing fixtures. This particular application failed because customers are not going to undertake extensive exploration when they are standing and in the presence of other customers. Other retailers, such as RedBox, a U.S. operator of remote video kiosks, have encouraged exploration by allowing customers to browse and select movies from home and then use the kiosk solely for the functional task of picking up the movie. Not only does this speed the movie rental process, but it also allows customers to explore movie titles without the added pressure of other customers waiting to use the kiosk. By having multichannel alternatives, customers can search and explore the options of an SST in an environment of their choice that matches their comfort level with the technology.

In any transaction where the customer is interacting with a technology, the idea of accuracy is imperative to a successful transaction. In our study of online ordering, one of the attractive options for this SST is the ability of the customer to verify the accuracy of the order. To emphasize the accuracy of a transaction, an SST must provide a salient account of a transaction. For example, Amazon.com displays a shopping cart that contains the items that customers have ordered along with their selling prices. Customers can review the order for accuracy before placing their order. Once the order is placed, customers receive a confirmation e-mail that the order has been received and can modify the order if desired. In addition, the customer is notified when the order has been shipped and, depending upon the shipment method, is also provided with a tracking number that allows them to monitor the progress of their order. In multiple stages, a customer can verify the accuracy and promptness of an order.

Additional ways that a service provider can signal the accuracy of an order is to emphasize the security of the transaction during processing. This can be done by highlighting payment card industry standards compliance, by providing a graphic that indicates that credit cards are safe (e.g., Verisign), and by stating that customer information will not be shared with outside companies.

SSTs can offer significant labor savings to service providers and it behooves providers to encourage as many customers as possible to use an SST. Given that customers with a positive perception of an SST are more likely to try an SST, our research shows that to encourage repeat usage, firms should highlight the speed and accuracy of their SST. To encourage nonusers to try the SST, service providers should concentrate on building customer trust by emphasizing the accuracy of the SST and by giving customers the opportunity to explore the SST without having to initiate a transaction.

### **Limitations and Future Research**

With this research, there are some limitations to consider which highlight several worthy avenues for future research. First, we collected the data for our studies from the restaurant industry; future research should look to expand on these results by pursuing other contexts to generalize these results. Second, due to time and financial constraints, the data were collected at single point in time. Undertaking a longitudinal study might examine how convenience perceptions change over the length of using an SST. Third, this study was conducted in one country, and it would be interesting to determine if the same relationships hold true in an international context. Finally, the conceptual model presented in Figure 1, though representing a good fit to the data, should be a starting point to determine if other constructs might need to be included to provide a more complete understanding of SST user behavior.

Other fruitful areas of research include understanding how managers think customers view a self-service offering. Our study specifically examined customers' perspective, but it would be interesting to investigate what managers of a self-service application think are important. By having a dyadic approach, differences could be uncovered about the quality of a self-service experience. As well, future research could explore how the type of functions in an SST (utilitarian or hedonic) influences customer expectations of the technology. Additionally, from a convenience perspective, how does the social presence of other customers during a transaction influence SST behaviors. Another potential research area could look at the role of employees during an SST failure. Convenience perceptions might draw customers to the technology but if a failure occurs, are customers content to give up the "self" in a service experience and let an employee finish a transaction in the recovery process.

In summary, our research over multiple contexts provides evidence that convenience is a driving influence for many customers in self-service experience. These convenience perceptions subsequently influenced evaluations of the technology's benefits such as speed and accuracy. As well, we found that perceived trust of an SST had a strong impact on nonusers need for employee interaction. For users, need for human interaction was influenced more from the overall satisfaction of the SST experience. With service providers looking to expand the range of application of self-service applications, managers need to be aware that customers ultimately need to clearly see the time and effort benefits of switching channel options. Failing to educate customers on these benefits will result in a lukewarm reception and ultimately, frustration on the part of management because of the lack of return on investment.

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**Table 1.** MANOVA Results for Users and Nonusers of Online Reservation System.

Variable	High Convenience, <i>M</i> ( <i>SD</i> )	Low Convenience, <i>M</i> ( <i>SD</i> )	<i>F</i> Values	<i>p</i> Level
Users of the Self-service Technology <sup>a</sup>				
Accuracy	16.26 (2.14)	12.82 (2.26)	145.97	<.001
Speed of transaction	12.50 (1.93)	9.80 (1.14)	137.47	<.001
Exploration	16.41 (2.57)	13.29 (2.73)	82.76	<.001
Nonusers of the Self-service Technology <sup>b</sup>				
Accuracy	14.93 (2.85)	11.76 (2.76)	61.87	<.001
Speed of transaction	11.68 (2.07)	8.62 (2.13)	103.62	<.001
Exploration	14.32 (3.30)	10.80 (3.42)	52.23	<.001

Note. MANOVA = multivariate analysis of variance.

<sup>a</sup> Total *n* = 260: High Convenience *n* = 167: Low Convenience *n* = 93.

<sup>b</sup> Total *n* = 214: High Convenience *n* = 88: Low Convenience *n* = 126.

Exploration and accuracy each had 4 items summated.

Speed of transaction had 3 items summated. To see a list of the individual items, see Table 2.

**Table 2.** Confirmatory Factor Analysis for Users of Online Ordering SST.

	Standardized Factor Loading	t Values
Convenience: ( $\alpha = .85$ , AVE = .59)		
Online ordering allows me to initiate a transaction whenever I choose	.82	12.59
Online ordering allows me to initiate a transaction at a convenient time	.79	12.21
I value the ability to initiate a transaction from the comfort of home	.69	10.53
I like the ability to order food without leaving home	.76	**
Exploration: ( $\alpha = .91$ , AVE = .73)		
I like browsing online ordering sites to get new ideas of food to order	.86	16.65
I like browsing online ordering sites to see what new food items are available	.91	18.31
I enjoy browsing through the food offers provided on online order sites	.78	14.23
I enjoy browsing the Internet to see what online restaurant ordering options are available	.85	**
Speed of transaction: ( $\alpha = .85$ , AVE = .66)		
I am able to place my order online without spending too much time	.81	14.19
Online ordering saves me time	.81	14.30
Online ordering lets me complete my order quickly	.82	**
Accuracy: ( $\alpha = .87$ , AVE = .64)		
My order will be accurate	.88	**
I am given good information about the menu items	.70	12.33
I am confident that everything will be correct with my order	.77	14.57
The information on my order will be correct	.84	16.63
Trust: ( $\alpha = .84$ , AVE = .72)		
I trust that this site will not misuse my personal information	.87	**
I feel safe ordering food online	.92	12.64
I feel safe giving them my credit card	.72	10.51
Satisfaction: ( $\alpha = .87$ , AVE = .78)		
I am happy with the service of online ordering	.88	**
I am happy with the quality of the service of online ordering	.88	18.77
Need for Human Interaction ( $\alpha = .76$ , AVE = .56)		
Personal contact with a restaurant employee makes ordering food more enjoyable to me	.89	**
Personal attention by a restaurant employee is important to me	.74	9.05
It bothers me to use a computer when I could talk to a live person instead	.57	7.70

Note. AVE = average variance extracted; CFI = Comparative Fit Index; IFI = Incremental Fit Index; RMSEA = root mean square error of approximation; SST = self-service technologies; TLI = Tucker-Lewis Index.

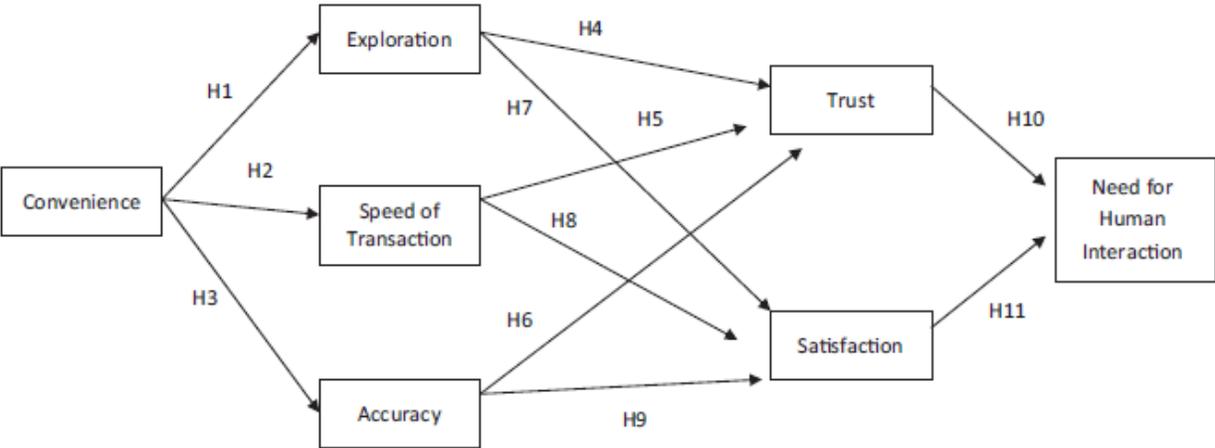
Model Fit Statistics:  $\chi^2 = 420.09$ ,  $df = 208$ ,  $p < .001$ , IFI = .94, TLI = .93, CFI = .94, RMSEA = .06.

**Table 3.** Structural Model Test Results.

Hypothesized Relationship	Users			Nonusers		
	Standardized Estimate	T Value	Hypothesis Supported	Standardized Estimate	t Value	Hypothesis Supported
<i>Hypothesis 1:</i> Convenience → Exploration	.58	11.13	Yes	.62	12.50	Yes
<i>Hypothesis 2:</i> Convenience → Speed of Transaction	.68	14.09	Yes	.63	12.98	Yes
<i>Hypothesis 3:</i> Convenience → Accuracy	.69	14.72	Yes	.70	15.30	Yes
<i>Hypothesis 4:</i> Exploration → Trust	.16	2.88	Yes	.27	4.43	Yes
<i>Hypothesis 5:</i> Speed of Transaction → Trust	.24	3.05	Yes	.08	1.14	No
<i>Hypothesis 6:</i> Accuracy → Trust	.37	4.64	Yes	.45	7.01	Yes
<i>Hypothesis 7:</i> Exploration → Satisfaction	.19	4.40	Yes	.07	1.29	No
<i>Hypothesis 8:</i> Speed of Transaction → Satisfaction	.43	7.33	Yes	.23	3.88	Yes
<i>Hypothesis 9:</i> Accuracy → Satisfaction	.32	5.35	Yes	.56	10.06	Yes
<i>Hypothesis 10:</i> Trust → Need for Human Interaction	.03	0.42	No	-.25	-3.10	Yes
<i>Hypothesis 11:</i> Satisfaction → Need for Human Interaction	-.33	-3.91	Yes	-.05	-0.63	No
Model fit statistics	$\chi^2 = 27.90, df = 7, p < .001$ NFI = .97, CFI = .97, IFI = .97 RMSEA = .11			$\chi^2 = 33.14, df = 7, p < .001$ NFI = .97, CFI = .97, IFI = .97 RMSEA = .12		
Control variable: Age	Age had a significant relationship with accuracy and exploration. All other relationships were nonsignificant Exploration ( $\gamma_{12} = -.20, t = -3.93, p \leq .001$ ) Accuracy ( $\gamma_{32} = -.14, t = -2.98, p \leq .05$ )			Age did not have a significant relationship with any dependent variable		

Note. CFI = Comparative Fit Index; IFI = Incremental Fit Index; NFI = Normed Fit Index; RMSEA = root mean square error of approximation.

**Figure 1.** Conceptual framework for evaluation of a self-service technologies (SST) experience.



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**Appendix A. Examples of Measures for Users and Nonusers.**

**Appendix A. Examples of Measures for Users and Nonusers.**

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Trust

Example User Question: I feel safe ordering food online  
*(from this SST)*

Example Nonuser Question: I would feel safe ordering food  
online *(from this SST)*

Convenience

Example User Question: I like the ability to order food  
without leaving home

Example Nonuser Question: I would like the ability to order  
food without leaving home

Speed of transaction

Example User Question: Online ordering saves me time

Example Nonuser Question: Online ordering would save me time

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*(continued)*

## Appendix A con't

### Appendix A (continued)

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#### Exploration

- Example User Question: I like browsing online ordering sites to see what new food items are available
- Example Nonuser Question: I would like browsing online ordering sites to see what new food items are available.

#### Accuracy

- Example User Question: The information on my order will be correct
- Example Nonuser Question: I believe the information on my order would be correct

#### Satisfaction

- Example User Question: I am happy with the quality of the service of online ordering
- Example Nonuser Question: *(based on my knowledge)* I believe I would be happy with the quality of the service of online ordering

#### Need for human interaction

- Example used for both user and nonuser: Personal contact with a restaurant employee makes ordering food more enjoyable to me
-