

## EFFECT OF PERSONALIZATION ON THE PERCEIVED USEFULNESS OF ONLINE CUSTOMER SERVICES: A DUAL-CORE THEORY

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### ABSTRACT

E-tailers provide a variety of customer services, many of which are personalized in an attempt to improve customer satisfaction. Several studies indicate that customers perceive these services to be useful, but it is inconclusive whether this effect is created by economic or emotional factors. This paper proposes a dual core theory that takes into account both economic factors (measured by perceived reduction in transaction costs) and emotional factors (referred to as the perceived care) in their effect on the perceived usefulness of providing personalized customer services.

A survey of 387 online bookstore users in Taiwan revealed that different customer services have different perceived usefulness. The study also found that both economic and emotional factors come into play. However, the perceived care has a stronger effect than transaction cost reduction on the perceived usefulness of e-services. This implies that the effect of personalized services is due to both economic and emotional factors, and that e-tailers may use personalized customer services strategically to increase customer care, rather than just focusing on providing economic benefits.

Keywords: Customer Services, Website Personalization, Transaction Cost, Customer Care, Perceived Usefulness of Services

### 1. Introduction

The rapid growth of online businesses has created a large amount of innovative customer services to provide better customer services. These services have been found to be very useful in increasing customer satisfaction and have become a key component in making an online business successful [e.g., Levenburg & Klein 2006; Liang et al. 2006]. Sample services, can be seen at Netflix video rental recommendations and the one-click check out service at Amazon.com.

Online customer services can be standard for all or individually personalized. The importance of personalized services is evidenced by the recent development of service science, management and engineering (SSME) proposed by IBM and other major vendors. A primary goal of service science is to develop solid theories and best practices in order to take advantage of information technology (IT) for improving customer service processes and enhancing service effectiveness. A major feature there is that IT can contribute toward better service by analyzing customer preferences and tailoring the service process and content to the customer's needs. These individually tailored services (e.g., recommending relevant books to a customer) are personalized, as opposed to standard services (e.g., sending discount coupons to all customers), which are non-personalized.

Recent empirical evidence indicates that about 80% of Internet users are interested in personalized services [Kobsa 2007]. According to Freedman [2007, p. 2], 56% of frequent online shoppers were more likely to make a purchase on a website that offered personalization features, than on websites that did not offer them. However, not all personalized services are the same. Previous research indicates that different personalized services tend to have different effects on customer satisfaction [e.g., Alpert et al. 2003], but not much research has been done on which factors contribute to the effect of personalization in customer service and why personalization of certain services are perceived to be more useful than others.

A personalized service is an interactive process in which a vendor provides relevant customized content based on clients' preferences [Miceli et al. 2007]. Probably the most well-known industry sector that uses online customer service features is online retailers (or called e-tailers). Online retailers can choose from about 20 different services (including those for mobile users) and innovative ideas that result in new services. Thus, deciding about an appropriate offering and delivery strategy of services (after assessing their effects) becomes an important managerial activity. Competition forces e-tailers to provide more services, and in many cases vendors are competing on service features rather than on price. This is especially true for many products and services that are offered basically at the same price by different vendors who incline to match the prices of their competitors.

Personalization of online services (also called *e-personalization*) has several patterns. An example would be offering tailored information (e.g., content, messaging, and navigation) to fulfill the needs and desires of customers. Personalized services are not limited to the Web. Every customer-oriented information system that deals with a large amount of data and/or has a heterogeneous group of users (e.g., e-kiosks, e-learning environments) needs to consider personalization.

Previous research has also found that personalized services are powerful in handling information overload [Liang et al. 2006], in making web sites more useful to users and in helping online businesses establish personal relations with their customers (one-to-one marketing and CRM). Vendors are also using personalization to match advertisement and promotions with customers' individual needs and preferences in targeted or behavioral advertisement.

This research focuses on the following research issues:

(1) Whether personalized customer services are perceived to be more useful to customers than non-personalized ones in e-tailing; and

(2) Whether the effect of personalized services is due to rational (economic) or emotional factors?

Answers to these questions can help understand the nature of customer response to personalization and guide e-tailers in designing an appropriate portfolio of customer services. A theoretical framework that includes both economic and emotional segments has been proposed, and an empirical study was conducted to evaluate the theory. Online bookstores were chosen as the research domain due to user familiarity and experience of buying books online. The remainder of the paper is organized as follows: Section 2 reviews theories related to personalized services and their perceived usefulness, and presents our research framework. Section 3 describes the research design. Section 4 reports the results of the empirical study. The conclusion and potential future research directions are reported in Section 5.

## **2 Theoretical Foundation and the Research Framework**

The theoretical foundation and research framework are built on several key concepts. They are briefly introduced in this section.

### **2.1. Personalization in Service Systems**

A service is a time-perishable, intangible experience performed for a customer acting in the role of co-producer. It is an interactive process for the co-creation of value [Fitzsimmons & Fitzsimmons 2008]. The delivery of services requires a service system that is an integration of related components necessary for delivering high quality services. Personalization has been found to have a positive effect on customer satisfaction [e.g., Mittal & Lassar 1996; Liang, et al. 2006; Adolphs & Winkelmann 2010], and it is a major component of many IT-based service systems.

Figure 1 shows a conceptual diagram that illustrates the relationship among major components in a service system. At the top are the customers' needs that can be satisfied by product customization and customer services (personalized and non-personalized). Business process models that integrate organizational and information systems are the kernel to support product and service delivery. The foundation of a sound service system is a service-oriented technology platform that supports both dynamic and on-demand business processes.

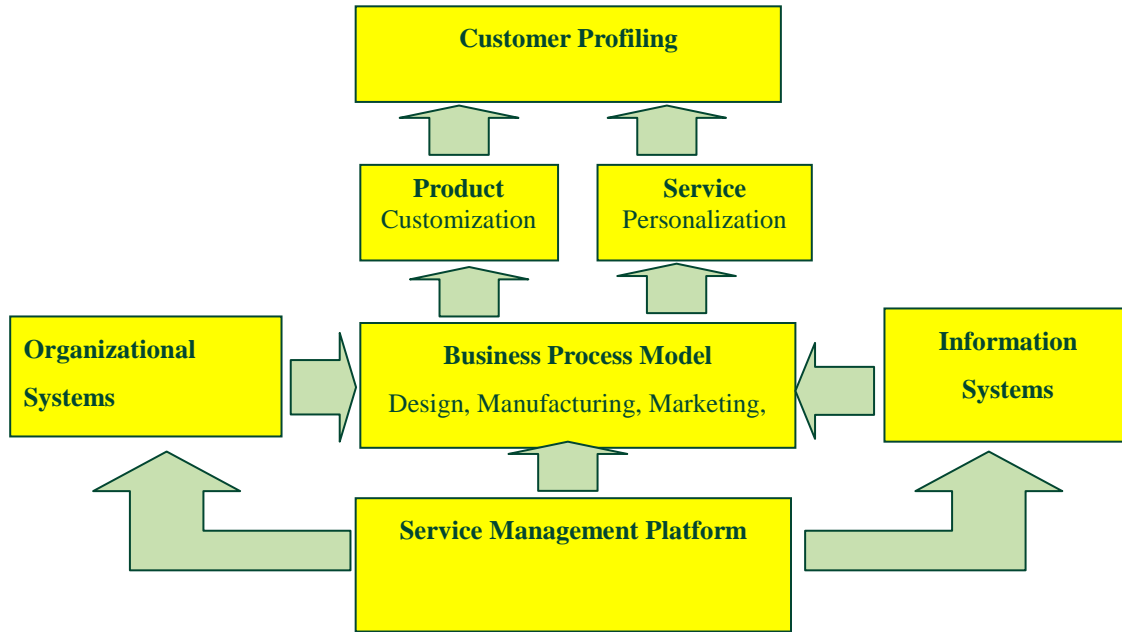


Figure 1: Conceptual Components of a Service System

## 2.2. Perceived Usefulness of Customer Services

Several constructs have been used to measure the effect of adopting information technologies by end users. A popular one is user satisfaction, which is usually suitable as an ex post measurement to understand users' response to using a technology or a product. Information system quality is another ex post measure that is often decomposed into three elements: information quality, system quality, and service quality. A problem with these measures is that the target system for measurement needs to be the same for all respondents. For example, a user who is satisfied with SAP's ERP system may not be satisfied with Oracle's ERP system. Hence, analyzing user satisfaction data from different firms (likely having different designs of information systems) has inherent flaws.

Alternatively, information systems researchers also attempted to study users' intentions to adopt technology without actually knowing whether the user has previously used a particular system. Therefore, perceived usefulness has been developed as an important construct in the technology acceptance model [TAM; Davis 1989], and it has been used in many previous studies as an effective measurement of the value of IT-based services [Davis 1989; Yang & Padmanabhan 2005; Massey et al. 2007; Henderson & Divett 2003]. For example, previous literature has reported that perceived usefulness may increase customers' loyalty, adoption of recommendation provided by intelligent agents [Komiak & Benbasat 2006], and intention to buy [Tam & Ho 2006; Brusilovsky et al. 2007; Smith 2005]. In fact, perceived usefulness has become a key predictor of users' attitudes and intentions to use a technology.

Thus, it is reasonable to use perceived usefulness as a surrogate variable to measure the value of online customer services. The concept of perceived value is a construct that has been extensively investigated in marketing research [e.g., see Chen & Dubinsky 2003]. Measuring the performance of an individual service is similar to assessing its value, which is also different from measuring the performance of e-commerce websites [e.g., Ghandour & Benwell 2011]. A comprehensive survey about perceived usefulness is available at Sanchez-Fernandez & Iniesta\_Bonillo [2007].

## 2.3. Transaction Cost Theory

In order to use online services effectively for better customer services, we need to have sound theories that can explain the effect of personalized services. A major line of thinking here is that personalization can reduce the effort

(e.g., reducing information overload) for customers who receive the service. For example, a book recommendation service can reduce the effort of finding a particular book. In previous research Liang et al. [2006], investigated the use of a personalized content provision in a news website, and found that the increase in user satisfaction from such a service was primarily due to effort reduction. The more accurate the recommendation content, the higher was the user satisfaction. This finding indicates an economic (or rational) view on the effect derived from personalized services.

A more comprehensive theory of effort reduction is the transaction cost theory, which became most widely known through Williamson's Transaction Cost Economics [1985]. According to Williamson, the determinants of transaction costs are transaction frequency, asset specificity, uncertainty, limited rationality, and opportunistic behavior, all of which may be present in online trading. Today, transaction cost economics is used to explain a number of different behaviors, including intention to purchase.

From the rational perspective, it makes sense that the usefulness of customer services is derived from its ability to reduce the effort, time, and costs involved in the transactional process. Transaction costs refer to "a cost incurred in making an economic exchange, during the buying and selling transactions, other than the purchase cost of the product or service" [Dahlman 1979]. Transaction costs can be tangible or intangible, and may be monetary, cognitive, or labor efforts. These costs are paid directly or indirectly by the consumers, and therefore, it is logical to assume that consumers tend to choose an option that exhibits a minimal level of transaction costs [e.g., see Liang & Huang 1998].

Previous research has shown that e-commerce can lower the transaction costs involved in the commercial trading process occurring in the marketplace [Cordella 2006]. For example, by using search and comparison engines, the cost of locating buyers and/or sellers and discovering product information is lower than in the physical marketplace. The relevant administrative costs can also be lower. The information overload resulting from a large amount of clues that supports decision-making and communication online can also be reduced [Liang et al. 2006].

#### 2.4. Perceived Care Theory

In addition to effort reduction, customer services, especially personalized ones, may generate strong emotional links between vendors and customers. These types of factors are associated with consumers' affective feeling of a service (in short, *affect*). Consumer affect is a type of intuitive mental response to stimuli and events. Existing literature has shown that affect induced from a stimuli or event is a major factor that determines consumer purchasing behavior [e.g. see Xia 2002 & Grudney 2006]. For example, Jun et al. [2008] studied affect from marketing and psychology perspectives. Saari et al. [2004] described a framework for a personalization system to systematically induce desired emotion and related attention, and promote information processing in viewers of online advertisement and e-commerce product information. They called this "psychologically targeted persuasive advertisement." Komiak & Benbasat [2006] also reported that both emotional and cognitive trusts have roles in the process of adopting the recommendation of software agents.

These findings support another theory that the effect of personalized services on customers' perceived usefulness may be due to consumer affect and the positive feeling which is sometimes referred to as *perceived care*. As defined by Bevis [1989], "caring is a feeling of dedication to another, to the extent that it motivates and energizes action to influence life constructively and positively; most other human feelings have potentially negative effects as well as positive ones, but caring by its nature and definition is only and always positive." Consumers will build a positive attitude when they feel the vendor cares for them and pays attention to their personal needs through the provision of customer services.

#### 2.5. A Dual-Core Research Model and Hypotheses

##### 2.5.1. Research Model

As argued by Simon's bounded rationality theory, human decisions are neither totally economically rational nor purely emotional. Instead, they are the result of a mixture of rational and emotional factors. Hence, dual-process theories are popular in social psychology. For instance, the Elaboration Likelihood Model (ELM) is popular in explaining the human persuasion behavior. The model integrates a central route (cognitive and high elaboration) and a peripheral route (intuition and low elaboration).

Dual process models have also been applied to online research before. For instance, Komiak & Benbasat [2006] reported that recommendation agents can give rise to an individual's emotional process. Both emotional and cognitive trusts have roles in the adoption of such recommendation agents. Tam & Ho [2006] applied the ELM to study the persuasion effect of recommendation messages. A typical dual process model includes a rational path that needs systematic reasoning and an emotional path that relies on judgment and intuition. The ELM approach calls them central and peripheral routes, while the heuristic-systematic model by Chaiken [1980] calls them systematic and heuristic processing, respectively.

As described earlier in Sections 2.3 and 2.4, transaction costs and perceived care are two appropriate measures of economic and emotional factors, respectively. Reduced transaction costs and increased perceived care may explain why users value customer and personalized services as useful. Therefore, we propose a research model that includes these two theories as mediators between customer services and their perceived usefulness. Transaction cost theory shows the rational and economic concerns, while perceived care is behavioral and affective oriented. Figure 2 shows the suggested relationships among these two constructs. Provisions of customer services (personalized or not) assume to effect transaction costs and perceived care of customers, which in turn affects the perceived usefulness of the provided services. The figure also shows five specific hypotheses tested in our study. They are presented below.

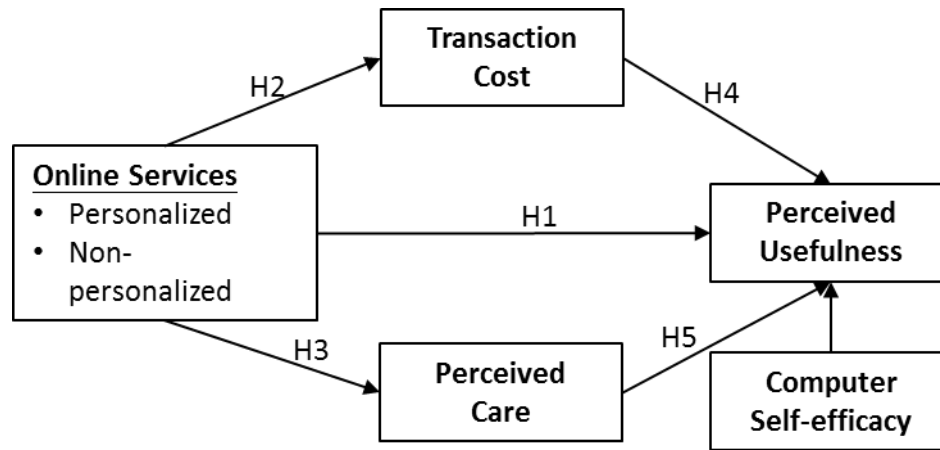


Figure 2: Theoretical Framework of the Research

### 2.5.2. Research Hypotheses

*H1: Perceived usefulness is higher for personalized services than for non-personalized ones.*

This hypothesis is aimed mainly to verify and complement previous research. For example, Alpert et al. [2003] found that people engaged in different types of transactions value the usefulness of various personalized services differently. Huang & Lin [2005] explored why certain personalization services were embraced by customers while others were not. Campbell & Wright [2008] argued that personalized services would induce customer's positive attitudes. Finally, Kobsa [2007] reported that different personalization services provided different potential benefits. We tested this hypothesis in order to check whether our survey on personalized services provides consistent findings in order to ensure the validity of further analysis. We also examined differences among the various services to see which personalized services have higher levels of perceived usefulness.

*H2: Different customer services are perceived to have different effects on transaction cost reduction.*

Previous research has concluded that customer services may reduce transaction costs, but whether the effects differ for different personalized services has not been previously investigated. Fung [2008] argued that perceived costs is one of the dimensions of commitment and that intelligent personalized services (i.e., comprehension-type or association-type services) may induce higher perceived costs than unintelligent personalized services (i.e., remembering-type). This hypothesis examines which personalized services have stronger effects, and whether rational reasons exist that make personalized services perceived more useful by customers. A sub-hypothesis here is that the transaction cost reduction effect of personalized services is stronger than that of the non-personalized ones.

*H3: Different customer services are perceived to have different effects on perceived customer care.*

The purpose of this hypothesis is to test the emotional effect of various customer services. For example, Alpert et al. [2003] indicated that levels of perceived personal care may differ for different personalized services. This hypothesis attempts to check whether the observation of Alpert et al. is duplicable, and which kind of the personalized services have the highest effects. We also examined the sub-hypothesis that the effect of personalized services is stronger in increasing perceived customer care than that of non-personalized ones.

*H4: Transaction costs reduction has a significant effect on perceived usefulness of a customer service.*

As described in Section 2.2, transaction cost reduction is logically attractive to customers, e.g., reduced search efforts and reducing risks by conducting price comparisons [e.g. Rindfleisch & Heide 1997]. This hypothesis intends to examine whether positive effects exist between the reduction in transaction costs and perceived usefulness of

different types of customer services, and whether the effect is stronger for personalized services than for non-personalized ones.

*H5: Perceived care has a significant effect on perceived usefulness of a customer service.*

As predicted by the perceived care theory, the perceived usefulness of a customer service is affected by customer's perceived care of the service. We also examine whether the effect is stronger for personalized services than for non-personalized ones.

### 3 Research Design and Execution

In order to test the above hypotheses, an empirical survey was conducted. Online bookstores were chosen as the target for our study. This was because online bookstores, such as Amazon.com, pioneered personalized services and today they offer many customer services (personalized and not personalized). Anke & Sundaram [2006] offered details of such services. Furthermore, many people have experiences in purchasing books online. This made it easier to find subjects for our survey.

#### 3.1. Selection of Customer Services to be Investigated

Many different types of customer services are available in online bookstores. A panel of three experts was invited to survey six popular online bookstores to identify the online customer services available at these stores. They were www.Amazon.com, www.books.com.tw, www.B&N.com, www.Kingstone.com.tw, www.bookzone.com.tw, and www.ylib.com.tw. The following services were found to be most common:

*Book recommendation:* Providing relevant book recommendations to customers based on their previous shopping history or on their current search. This function is also referred to as "recommendation agents" in some previous studies, see Xiao & Benbasat [2007] and Komiak & Benbasat [2006]. Two types of recommendation functions exist: *book matcher* and *mood matcher*. Book matcher makes book recommendation based on purchasing behavior of other customers such as collaborative filtering [e.g., Chandrashekar & Bhasker 2011], while mood matcher makes recommendation based on the preference set by the customer him/herself.

*Book reviews:* Most bookstores provide review comments on books from other readers (e.g., Amazon allows customers to review and rank books they purchased). For a study on the effect of consumer reviews on consumer purchasing intention, see Park et al. [2007].

*Orders processing, reporting and tracking:* This function allows customers to know the order status in the entire process of processing and delivery.

*One-to-one after-sale services:* Tailoring services provided after the customer has purchased a product (e.g., providing troubleshooting advice or allowing for product return or repair)

*Simplified payment (1-Click):* Allowing customers to order books repeatedly without re-entering payment and delivery information.

*E-coupons:* Providing discounts on certain items, on any one item, or on all items.

*E-news:* Providing information about new book releases and other book-related events to all customers.

*Sending reminders* for not visiting the store over a certain time period.

*Greeting visitors* by name when they enter the online store.

*Selective content:* Providing contents only in areas in which the customer had shown interest.

*Experience sharing:* Providing customers with experiences and opinions of other customers regarding the topics of interest to them.

*Tool kits:* Providing calculators, scenario-specific information and other specialized purchasing aiding tools.

*Customized website features:* Allowing customers to change website appearance, such as background color or functional layouts.

There are other customer services, such as personalized search tools where results are shown based on users' previous shopping history, price comparisons, and book marking. They are available from Google and other websites.

Among the many available services, we had to decide which ones to choose for the study and whether they are personalized or not. To determine if a customer service is personalized or not personalized, we used the three criteria proposed by Gaitonde [2008]:

- (1) Whether or not the service needs to collect the user's personal information;
- (2) Whether or not the service delivery requires using the user's preferences (e.g., analyzing their previous shopping history);
- (3) Whether or not the content is tailored to individual customers?

If two or more answers to the three questions regarding a specific customer service were "yes," we considered the service as personalized. Otherwise it was classified as non-personalized.

Two experts in electronic commerce (each with 20 years of experience) were invited to jointly select seven most representative services from the list. The experts also decided which of the 7 are personalized, based on the above three criteria. The results are shown in Table 1.

### 3.2. The Constructs and Their Operationalization

In addition to the differentiation between personalized and non-personalized services, we needed to collect data for the three constructs in our research framework. Their operationalization in the questionnaire is as follows:

Table 1: Determination of Personalization

Customer Services	Collect Personal Information	Use Personal Preference	Provide Tailored Information	Personalized Services
Order Processing/Reporting	Y	N	Y	Y
One to One After-sales Service	Y	Y	Y	Y
Book Review	N	N	N	N
e-Coupon	N	N	N	N
Recommendation Service	Y	Y	Y	Y
e-News	N	N	N	N
1-Click Service	Y	N	N	N

(1) *Transaction costs*: As transaction costs involve both tangible money and intangible cognitive effort, they can be measured from three aspects: time saving, money saving, and user autonomy. Three questions were designed to evaluate the perceived level of transaction costs, as shown in Appendix A.

(2) *Perceived care*: It is the feeling that the customer's needs are fulfilled and it was measured by two questions: whether the customers feel (a) they are treated as valuable, and (b) their needs are cared for. Two questions were included in the questionnaire.

(3) *Perceived usefulness*: The value of customer services was measured by its perceived usefulness. Three questions derived from Davis et al. [1989] were developed to assess whether the customer feels the services can help find useful information, reduce the uncertainty and increase pleasure in the process. Hence, three questions were included in the questionnaire.

Based on the above operationalization, we designed 8 questions for each service to test our hypotheses. A total of 56 questions for 7 services were included in the survey questionnaire. The questionnaire was pre-tested in a pilot study (see Section 3.3) and then distributed to all subjects. Sample questions for the service of "book matcher" and "mood finder" are shown in Appendix A.

(4) *Computer self-efficacy*: As the computer skill of a customer may affect the perceived usefulness of an online service, computer self-efficacy was treated as a control variable of the study.

### 3.3. Research Instrument and Subjects

The questionnaire included three parts: the first part was designed to keep record of the online purchasing experiences of the respondents in order to exclude inexperienced participants. The second part was designed to collect opinions about customer service (the 56 questions), and the last part was designed to collect personal background data. A five-point Likert-scale was used for collecting user responses. As the questionnaire covers 7 customer services, the sequence of presenting the selected services to the subjects was randomized to prevent potential bias due to the presenting order of one service at a time.

A pilot test of the questionnaire was conducted using 20 subjects who had extensive experiences in ordering from online bookstores, and three professors who had experiences in the B2C field and had done research on related topics. The formal survey was based on convenience sampling. The modified questionnaire was posted on [www.ectimes.org.tw](http://www.ectimes.org.tw), a popular electronic commerce website in Taiwan with more than 20,000 subscribers. Description of each individual service was provided along with the questionnaire. Messages were also posted at several Taiwanese online social communities to invite volunteers to participate in the survey. In order to attract more subjects to participate in the survey, participants were given bookstore discount coupons, and were offered a chance to win monetary rewards through a lottery pick. The data collection activity lasted for 20 days.

A total of 389 responses were received, and 387 of them were complete for further analysis (224 males and 163 females). About 30% of the respondents were below 24 years of age, 30% were between 25 and 30, and 40% of the respondents were older than 30. This age distribution indicates that many participants were non-students (most

full-time college students in Taiwan are younger than 23). Most of the respondents visited online bookstores regularly. Sixty-six percent of the respondents reported that they visited e-bookstores at least 1 to 2 times a month.

**4 Data Analysis and Research Results**

**4.1. Data Reliability**

The reliability of the collected data was examined by the Cronbach’s  $\alpha$  values. Except for the category of transaction cost being 0.7, all categories were above 0.7, up to 0.9336. As recommended by Cuieford [1965], a data set is considered reliable when its Cronbach’s  $\alpha$  value is greater than 0.7. This indicates that the data collected in this study are reliable and can be used for further statistical analysis.

**4.2. Effect of Customer Services on Perceived Usefulness**

The first issue we examined was whether personalized customer services result in higher perceived usefulness (H1). Since customer services were categorical variable, structural equation modeling (SEM) was not applicable. One-way ANOVA was used to compare the mean perceived usefulness reported by the participants. As shown in Table 2, the customer service of order processing/reporting (a personalized service) scored the highest (3.96 on the scale of 5), while the 1-Click service (non-personalized) scored the lowest (3.56). These results were found to be statistically significant ( $F= 18,740, p<.001$ ). We also confirmed previous research findings that different customer services have significantly different levels of Perceived usefulness. A t-test on the means of the different services revealed that personalized services, as a group, scored significantly higher than non-personalized services ( $t=4.61, p<.001$ ). Thus, hypothesis H1 is supported.

The result from the Scheffe’s pairwise multiple comparisons (post hoc test) is shown in Table 3. The test indicates that the means for order processing (3.96) and for one-to-one after sale service (3.88) (both personalized services) are significantly larger than the means for e-coupons (3.67), recommendation service (3.62), and 1-click (3.56), two of them are non-personalized. Although the range of mean values is not very large, the statistical test does show significant differences pointing to a need for further examination of our research model.

Table 2: Statistics of the Perceived Usefulness of Various Customer Services

Customer Services	Type*	Mean	Standard Deviation	F Value	P Value
Order Processing/Reporting	P	3.96	.670	18.740	.000***
One to One After-sales Service	P	3.88	.709		
Book Review	NP	3.80	.681		
e-Coupon	NP	3.67	.738		
Recommendation Service	P	3.62	.683		
e-News	NP	3.59	.738		
1-Click Service	NP	3.56	.732		

\*\*\* $P<0.001$

\*P=personalized; NP=not personalized

Table 3: Perceived Usefulness of Various Customer Services in Scheffe’s Multiple Comparisons

Difference in Means	One to One After-sales Service	Book Review	e-Coupon	Recommendation	e-News	1-Click Service
Order Processing /Reporting	.08	.16	.29***	.34***	.37***	.40***
One to One After-sales service		.07	.21*	.26***	.28***	.32***
Book Review			.13	.18*	.21**	.24**
e-Coupon				.05	.08	.11
Recommendation					.03	.06
e-News						.03

\*\*\* $P<0.001, **P<0.01, *P<0.05$



#### 4.3. Effect of Customer Services on Transaction Costs

The second issue examined was the possible impact of different customer services on the perceived transaction cost. As shown in Table 4, the one-way ANOVA shows that the differences of perceived transaction cost reduction levels due to different customer services are statistically significant ( $F=7.777$ ,  $p<0.001$ ). That is, hypothesis H2 is supported. This indicates that different customer services effected transaction costs differently. Services that supports order processing and reporting (a personalized service) resulted in the highest reduction in transaction costs (mean=3.93), while providing e-news (a non-personalized service) generated the least reduction in transaction costs (mean= 3.64).

A t-test revealed that personalized services as a group scored significantly higher than non-personalized services ( $t=3.37$ ,  $p<0.01$ ). Thus, hypothesis H2 is supported. By further looking into Scheffe's multiple comparisons, as shown in Table 5, the impact on transaction cost reduction can be seen in two extremes: order processing and one-to-one after-sales services (both personalized) are significantly higher than the rest.

Table 4: Transaction Cost Reduction Derived from Different Customer Services

Customer Service	Mean of Transaction Cost Redirection	Type*	Standard Deviation	F Value	P Value
Order Processing/Reporting	3.93	P	.691	7.777	.000***
One to One After-sales Service	3.87	P	.760		
Book Review	3.78	NP	.712		
1-Click	3.72	NP	.792		
e-Coupon	3.72	NP	.681		
Recommendation Service	3.70	P	.691		
e-News	3.64	NP	.806		

\* P=Personalized, NP= Not personalized

Table 5: Scheffe's Multiple Comparisons of Transaction Costs Difference

Customer Service	One to one after-sales service	Book review	e-Coupon	1-Click service	Recommendation service	e-News
Order processing/reporting	.06	.15	.21*	.21*	.24**	.30***
One to one after-sales service		.09	.15	.15	.18	.24**
Book review			.06	.06	.09	.15
e-Coupon				.00	.03	.09
1-Click service					.03	.09
Recommendation						.06

\*\*\* $P<0.001$ , \*\* $P<0.01$ , \* $P<0.05$

#### 4.4. Effect of Customer Services on Perceived Care

A similar analysis was conducted regarding the perceived care. As shown in Table 6, the users reported different levels of perceived care from receiving different customer services. The one-way ANOVA results on different levels of perceived care are statistically significant ( $F=13.092$ ,  $p<0.001$ ), which indicates that different customer services affect the perceived care level differently. A t-test result revealed that the personalized services as a group scored significantly higher than the non-personalized ones ( $t=4.95$ ,  $p<0.001$ ). Thus, hypothesis H3 is supported.

By further examining the effects of individual services on personal care using the Scheffe's method of multiple comparisons, it is noted, as shown in Table 7, that one-to-one after-sales service and order processing/reporting (both personalized services) had significantly higher effects on the perceived care than the rest. That is, consumers felt that they were treated as valuable customers and well taken care of by the vendor when these two services were provided. The remaining five services do not have significant differences in this aspect.

Table 6: Perceived Care Induced from Different Customer Services

Customer Service	Mean	Type*	Standard Deviation	F Value	P Value
One to One After-sales Service	3.88	P	.693	13.092	.000***
Order Processing/Reporting	3.85	P	.694		
Book Review	3.60	NP	.748		
Recommendation Service	3.60	P	.730		
1-Click	3.60	NP	.750		
e-Coupon	3.59	NP	.776		
e-News	3.55	NP	.760		

\*\*\*P<0.001

\* P=Personalized, NP= Not personalized

Table 7: Scheffe’s Multiple Comparisons of Difference in Perceived Care

Difference in Means	Order Processing	Book review	Recommendation service	1-Click	e-Coupon	e-News
One to One After-sales Service	.03	.28***	.28***	.28***	.29***	.33***
Order Processing/Reporting		.25**	.25**	.26***	.26***	.30***
Book Review			.00	.00	.01	.05
Recommendation				.00	.01	.05
1-Click Service					.01	.04
e-coupon						.04

\*\*\*P<0.001, \*\*P<0.01, \*P<0.05

4.5. Relative Effect of Transaction Costs and Perceived Care

The final analysis deals with the relative effect of the perceived transaction cost and the perceived care on the perceived usefulness of the customer services. Since the customer services were divided into two categories (personalized vs. non-customized), we could not run a structural equation model on a mixture of categorical and numerical variables. Therefore, a stepwise regression analysis was adopted to compare the effect of these two factors. The result is shown in Table 8.

We can see that the perceived care was the most influencing and significant factor because its standardized regression coefficient  $\beta$  was 0.572 and its  $R^2$  contribution was 0.766 ( $t=14.528$ ). The effect of transaction costs ( $\beta=0.368$ ,  $R^2 = 0.042$ ,  $t=9.356$ ) was also significant but its effect size was less than that of the perceived care. Thus, the analysis shows that hypotheses H4 and H5 are supported. Computer self-efficacy, as a control variable, did not show significant effect on the perceived usefulness of consumer services. Although its p-value was close to the significant level of .05, but the effective size of .045 was too small to have a meaningful influence and hence can be ignored.

Table 8: Stepwise Regression of Transaction Cost, Perceived Care, and Computer Self-Efficacy Impact on Perceived Usefulness of Customer Services

Factor	Standardized Regression Coefficient $\beta$	$R^2$	t Value	p Value
Perceived Care	.572	.766	14.528	.000***
Transaction Cost	.368	.809	9.356	.000***
Excluded Variables				
	Standardized Regression Coefficient $\beta$	T Value	P-Value	
Computer Self-efficacy	.045	1.95	.052	

\*\*\*P<0.001

Therefore, the result supports the dual-core theory that argues the effect of personalized customer services is due to both economic and emotional factors, but the emotional factor of perceived care has a more powerful influence.

## **5 Discussion and Conclusions**

### **5.1. Summary of the Findings**

In summary, our research has indicated the following observations. First, personalized customer services can generate higher perceived usefulness as compared to non-personalized ones. The services perceived to be the most useful by customers were those that allowed customers to trace the ordering and delivery process and providing post-sales services, while the least useful one was the one-click service.

Second, personalized services resulted in the higher effect on both perceived economic benefits, as measured by the reduction of perceived transaction costs, and positive emotional feelings, as measured by the perceived care. This implies that e-tailers can expect stronger positive attitudes of their customers if their customer services are personalized.

Third, book recommendation services did not perform as well as many would anticipate. It ranked 6<sup>th</sup> and 4<sup>th</sup> in transaction cost reduction and perceived care increase, respectively. Although this finding does not deny the value of recommendation services, it may indicate the limitation of recommendation agents, which may be due to low recommendation accuracy. Positive correlation between recommendation accuracy and user satisfaction was reported in Liang, et al. [2006]. A practical implication is that e-tailers must pay more attention to their recommendation algorithms when the product recommendation service is deployed.

Finally, the perceived care had the highest impact on the perceived usefulness of customer services. This finding indicates that in online services, emotion may be more important than economic incentives. This observation will influence the choice of customer services for e-tailers. The finding also indicates that the dual-core model is better than a single factor model, such as the information overload reduction, in explaining the effect of personalized services.

### **5.2. Contributions and Limitations of the Study**

The major contribution of this research is two-fold. Theoretically, we have developed a dual-core research model that combines economic (transaction costs) and emotional (perceived care) factors to explain the perceived usefulness of customer services at online bookstores. Our empirical findings have shown that the dual-core model is better than the economic or emotional factors alone in interpreting the variance of perceived usefulness.

In addition, the perceived care has been found to be a useful measure of customer emotion for predicting perceived usefulness. We have also discovered that the effect of perceived care on the perceived usefulness is stronger than that of transaction costs.

In practice, our findings can be used to guide e-tailers on how to design, select and prioritize online customer services. Specifically, e-tailers need to pay more attention to personalized services and to those services that result in higher perceived care of customers. These findings also provide insights into the notion that customer services can increase customers' perceived usefulness, which, based on the technology acceptance model, can in turn lead to a positive attitude toward the vendor.

Notwithstanding the interesting findings and contributions of the research, we do recognize the following limitations:

First, the data were collected from a single country without much culture diversity. In addition, the subjects were volunteers that knew that they were participating in an experiment; which may cause some biases. The reasonably large sample size and background diversity of the respondents may partially compensate for this limitation.

A second possible limitation is that we chose only seven customer services among the many offered online today. There may be useful customer services that were not included and the findings may not be applicable to those services not included in the study. In addition, some services may not be offered in all bookstores. We are not sure whether the findings from studying bookstores can be generalizable to other types of online stores either.

The third limitation is that due to lack of generally accepted questionnaires for measuring perceived care or transaction costs, we had to develop our own; and even though we pre-tested the questions, the instrument may not have been perfect. Developing generally usable measurement instruments is a task that needs future research.

Despite these limitations, we believe that the findings are important enough and that they provide us with a solid base for generating practical guides for managers and for conducting further research. Below are a few additional suggestions:

- 1) The effects found in this study could be investigated in different contexts, such as distinguishing between online buyers and online information seekers based on what is important for them [Cai & Jun 2003],

distinguishing between the types of transactions conducted (buying books, travel services, computers, etc.), and exploring behavior in a different platforms such as the mobile environment or auctions.

- 2) Conduct similar studies that include more customer services and differentiate customer services based on different levels of personalization, instead of dividing them into two distinct groups: personalized and non-personalized.
- 3) Identifying success factors for customer and personalization services and finding the best practices that have been only partially explored by others [e.g., Huang & Lin 2005; Brusilovsky, Kobsa & Nedji 2007]. Identifying such factors in different configurations could be very beneficial.
- 4) A further investigation into different varieties of each service and into possible additional variables such as the transaction quantity, frequency and quality, as they are related to usefulness [e.g. see Park et al. 2007] could also be useful.
- 5) More studies are needed to examine the generalization of the dual-core model to other constructs and problem domains. Several dual processes models for information processing have been developed, but the combination of economic and emotional factors is a new one that needs more empirical replications for confirmation of its value.

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### REFERENCES

- Adolphs, C. and A. Winkelmann, "Personalization Research in E-Commerce—A State of the Art Review (2000-2008)," *Journal of Electronic Commerce Research*, Vol. 11, No. 4:326-341, 2010.
- Alpert, S.R., J. Karat, C.M. Brodie Karat., and Vergo J.C., "User attitudes regarding a user - adaptive eCommerce web site." *User Modeling and User Adapted Interaction*, Vol. 13, No. 4: 373-396, 2003.
- Anke, J. and D. Sundaram, "Personalization Techniques and their Application," in Khosrow-Pour, M.(ed.), *Encyclopedia of E-Commerce, E-government and Mobile Commerce*, Hershey, PA: Idea Group Reference, 2006.
- Brusilovsky, P., A. Kobsa, and W. Nedji, Eds. *The Adaptive Web: Methods and Strategies of Web Personalization*. Berlin: Springer Verlag, 2007.
- Cai, S. and M. Jun, "Internet users' perceptions of online service quality: a comparison of online buyers and information searchers." *Managing Service Quarterly*, Vol. 13, No. 1: 504-519, 2003.
- Campbell, Damon E. and Ryan T. Wright, "Shut-UP I Don't Care: Understanding the Role of Relevance and Interactivity on Customer Attitudes Toward Repetitive online Advertising," *Journal of Electronic Commerce Research*, Vol. 9, No. 1: 62-76, 2008.
- Cater, B. and T. Cater, "Emotional and Rational Motivations for Customer Loyalty in Business to Business Professional Services," *Service Industries Journal*, Vol. 29, No. 8: 1151-1169, 2009
- Chaiken, S. "Heuristics versus systematic information processing and the use of source versus message cues in persuasion," *Journal of Personality and Social Psychology*, Vol. 39: 752-766, 1980.
- Chandrashekhhar, H. and Bhasker, B., "Personalized Recommendation Systems: Entropy Based Collaborative Filtering Recommender Techniques," *Journal of Electronic Commerce Research*, Vol. 12, No. 3, 2011, pp. 214-237.
- Chen, Z. and A. J. Dubinsky "A conceptual model of perceived customer value in e-commerce: a preliminary investigation." *Psychology & Marketing*, Vol. 20, No. 4 : 323-347, 2003.
- Cordella, A. "Transaction cost and information technology: does IT add up?" *Journal of Information Technology*, Vol. 21, No. 1: 195-2022006
- Cuieford, J.P. *Fundamental Statistics in Psychology and Education*. 4<sup>th</sup> ed, New York: McGraw-Hill, 1965.
- Davis, F.D. "Perceived usefulness, perceived ease of use, and user acceptance of information technology." *MIS Quarterly*, Vol. 13, No. 3: 318-340, 1989.
- Davis, F.D., R.P. Bagozzi, and P.R. Warshaw, "User acceptance of computer technology: a comparison of two theoretical models." *Management Science*, Vol. 35, No. 8:982-1003, Aug 1989.
- Fitzsimmons, J.A. and M.J. Fitzsimmons , "Service Management: Operations, Strategy, and Information Technology, 6<sup>th</sup> Edition, New York: McGraw-Hill Publishing, 2008.

- Freedman, L., "Merchant Views of personalization and lasting customer relationships." Special report, ATO, October 2007.
- Fung, Timothy K. F. "Banking with a Personalized Touch: Examining the Impact of Website Customization on Commitment," *Journal of Electronic Commerce Research*, Vol. 9, No. 4:296-309, 2008.
- Gaitonde, R., "The Three Degrees of personalization."  
(<http://www.rahulgaitonde.org/2008/01/10/the-three-degrees-of-personalization/>) accessed 2008-12-02.
- Ghandour, A., Benwell, G. and Deans, K.R., "Measuring the Performance of eCommerce Websites – An Owner's Perspective," *Pacific Asia Journal of the Association for Information Systems*, Vol. 3, No. 1, pp.1-27, 2011.
- Grundey, D. "Delineating values, emotions and motives in consumer behavior: an interdisciplinary approach." *Transformations in Business & Economics*, Vol. 5, No. 2 (10) :21-46, 2006.
- Han, H., K.J. Back, and B. Barrett, "A Consumption Emotion Measurement Development: A Full-service Restaurant Setting," *The Service Industries Journal*, Vol. 30, No. 2:299-320 .
- Henderson, R. and M.J. Divett, "Perceived usefulness, ease of use and electronic supermarket use." *International Journal of Human-Computer Studies*, Vol. 59, No. 3: 383-395, 2003.
- Huang, E. Y., and C-Y. Lin, "Customer-oriented financial service personalization." *Industrial Management and Data Systems* Vol. 105, No. 1:26-44, 2005..
- Jun, J., C. Cho, and H. Kwon, "The role of affect and cognition in consumer evaluations of corporate visual identity: perspectives from the United States and Korea." *Journal of Brand Management*, Vol. 15, No. 6: 382-398, 2008.
- Kobsa A. "Privacy-enhanced personalization." *Communication of the ACM*, Vol. 30, No. 8:24-33, August, 2007.
- Komiak, S.Y., and I. Benbasat, "The effects of personalization and familiarity on trust and adoption of recommendation agents," *MIS Quarterly*, Vol. 30, No. 4:941-60, 2006.
- Levenburg, N.M., and H. A. Klein, "Delivering customer services online: identifying best practices of medium-sized enterprises," *Info Systems J*, Vol. 16:135-155, 2006.
- Liang, T.P. and J.S. Huang, "An empirical study on consumer acceptance of products in electronic markets: a transaction cost model," *Decision Support Systems*, Vol. 24:29-43, 1998.
- Liang, T.P. and H.J. Lai, "Effect of store design on consumer purchase: an empirical study of online bookstores," *Information and Management*, Vol. 39, No. 6 :431-444, 2002.
- Liang, T.P., H.J. Lai, , and Y.C. Ku, "Personalized content recommendation and user satisfaction: theoretical synthesis and empirical findings," *Journal of Management Information Systems*, Vol. 23, No. 3:45-70, 2006.
- Massey A. P., V. Khatri, and M. M. Montoya-Weiss, "Usability of online services: The role of technology readiness and context," *Decision Sciences* Vol. 38, No. 2:277-308, 2007.
- Miceli, G., F. Ricotta, and M. Costabile, "Customizing customization: a conceptual framework for interactive personalization," *Journal of Interactive Marketing*, Vol. 21, No. 2:6-25, 2007.
- Mittal, B. and W.M. Lassar, "The Role of Personalization in Service Encounters," *Journal of Retailing*, Vol. 72, No. 1:95-109, 1996.
- Papazoglou, M., and P. Ribbers, *E-Business: Organisational and Technical Foundations*. England: John Wiley, 2006 (section 7.3 Transaction cost economics).
- Rindfleisch, A. and J.B. Heide, "Transaction cost analysis: past, present, and future applications," *Journal of Marketing* Vol. 61, No. 4:30-54, 1997.
- Sanchez-Fernandez, R., and A. Iniesta-Bonillo, "The Concept of perceived value: a systematic review of the research," *Marketing Theory*, Vol. 7, No. 4:427-451, 2007.
- Smith, A. D. "Exploring Service Marketing Aspects of e-personalization and its impact on online consumer behavior," *Services Marketing Quarterly*, Vol. 27, No. 2: 89-102, 2005.
- Su, B. C. "Consumer E-tailer choice strategies at online shopping comparison sites," *International Journal of Electronic Commerce*, Vol. 11, No. 3:137-162, 2007.
- Tam, K.Y. and S.Y. Ho, "Understanding the impact of web personalization on user information processing and decision outcomes," *MIS Quarterly*, Vol. 30, No. 4: 865-890, 2006.
- Vesanen, J. and M. Raulas, "Building bridges for personalization: a process model for marketing," *Journal of Interactive Marketing*, Vol. 20, No. 1:1-16, 2006.
- Williamson, O.E. *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*, New York: The Free Press, 1985.
- Xia, L. "Affect as information: the role of affect in consumer online behaviors," *Advances in Consumer Research*, Vol. 29, No. 1: 93-99, 2002.
- Xiao, B. and I. Benbasat, "E-commerce product recommendation agents: use, characteristics, and impacts," *MIS Quarterly*, Vol. 31, No. 1:137-209, 2007.

Yang, Y. and B. Padmanabhan, "Evaluation of online personalization systems: a survey of evaluation schemes and a knowledge-based approach," *Journal of Electronic Commerce Research*, Vol. 6, No. 2:112-122, 2005.

## APPENDIX A: Sample Questions

Sample questions used for collecting transaction costs, perceived care, and perceived usefulness data of the book matcher and mood finder recommendation services are provided below. Questions for other personalized services are similar, except that book matcher and mood finder were replaced by that service in the questions. A total of 56 questions for seven services (eight for each) was included in the questionnaire.

Recommendation services such as Book Matcher and Mood matcher offered by online bookstores analyze your previous browsing and purchasing experiences or your indicated preferences and recommend books that may meet your interests accordingly. Please answer the following questions to indicate your opinion about this service.

Where: 1- strong disagree; 2- disagree, 3- neutral, 4-agree, 5- strongly agree

### Transaction Costs: (3 questions)

1. I feel that the recommendation service of Book Matcher and Mood Matcher save my time in searching book information.
2. I feel that the recommendation service of Book Matcher and Mood Matcher save me money in searching books.
3. I feel that the recommendation service of Book Matcher and Mood Matcher give me more autonomy in the book ordering process.

### Perceived Care: (2 questions)

4. I feel that the online bookstore treat me as a valuable customer because I receive information from the recommendation service of Book Matcher and Mood Matcher
5. I feel that the online bookstore care of my needs because I receive information from the recommendation service of Book Matcher and Mood Matcher

### Perceived Usefulness: (3 questions)

6. Book Matcher and Mood Matcher provide me with useful information that allows me to find the books I need.
7. Book Matcher and Mood Matcher provide me with convincing information that reduces the uncertainty for me to buy the book.
8. Book Matcher and Mood Matcher make my book purchasing process a pleasant one.

Recommendation services such as Book Matcher and Mood matcher offered by online bookstores analyze your previous browsing and purchasing experiences or your indicated preferences and recommend books that may meet your interests accordingly. Please answer the following questions to indicate your opinion about this service.