Website attributes that increase consumer purchase intention: A conjoint analysis

Ying-Hueih Chen [a], I-Chieh Hsu [b,*], Chia-Chen Lin [a]

[a] *Department of Computer Science and Information Management, Providence University, Taichung, Taiwan*
[b] *Department of Business Administration, National Changhua University of Education, No.1, Jin-De Road, Changhua City, 500 Changhua, Taiwan*

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ABSTRACT

Prior studies investigate factors that affect consumer preferences in online shopping websites. However, prior studies, due to their methodological limitations, do not thoroughly investigate consumer preference structures that reflect the relative importance of attributes and features of shopping websites. By synthesizing prior literature, this research proposes and investigates a comprehensive list of attributes and features of shopping websites that increase consumer purchase intention. This research used IT-based platforms for data collection, and collected data from university students. Data analysis enabled us to categorize consumers that use online shopping websites into three groups based on the attributes they prefer. Consumers with different levels of computer expertise also showed differing preference structures. This research has implications in both research and practice.

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1. Introduction

Since the rise of B2C online shopping websites as major transaction platforms, attracting consumers to online shopping has become a critical issue for both firms and researchers. Scholars have proposed several conceptual models to capture factors that affect consumer preferences for online shopping websites (Liang and Lai, 2002; Schaupp and Belanger, 2005; Zviran et al., 2006). A review of the extant literature suggests wide acceptance of the survey method in the conduct of prior studies. However, wide acceptance does not necessarily signify high reference value in research findings. Survey methodologies face potential problems of validity and transferability.

The validity of quantitative studies depends on respondent knowledge and online experiences. However, finding and targeting experienced respondents may be difficult. Validity has thus become a challenge. Furthermore, as e-commerce becomes commonplace, e-vendors face the challenge of attracting new online customers and keeping existing customers. Research findings from existing customers may not be transferable to potential customers who may lack the requisite knowledge and experience in online shopping. Thus, a more robust methodology is imperative in the investigation of online purchase intention (cf. Schaupp and Belanger, 2005).

In this paper, we synthesize previous research to obtain three major factors that affect online purchase intention: technology, shopping, and product (Ranganathan and Ganapathy, 2002; Schaupp and Belanger, 2005). To investigate how attributes and features of each of these factors affect online purchase intention, we established

four online websites that incorporate and operationalize the relevant attributes and features as test platforms. Prior knowledge and experience in online technologies was not necessary in this research. These online experiments allow this research to effectively classify groups of consumers based on their preferences for the focal attributes and features, a result prior studies have not achieved. This research also seeks to compare preference structures between consumers with and without computer expertise. The findings of this research have implications for both research and practice.

2. Conceptual model

In the context of e-commerce, purchase intention is a major consequence of pre-purchase satisfaction (Bai et al., 2008). Previous e-commerce research has sought to propose generic decision-making criteria and suggested that technology, shopping, and product characteristics are important factors influencing purchase decision (e.g., Bai et al., 2008; Schaupp and Belanger, 2005; Szymanski and Hise, 2000). However, prior studies seldom distinguish between pre-purchase and post-purchase experiences and tend to focus on post-purchase assessment only (Maxham, 2001). This has presented a gap in the literature. Companies building online shopping websites do not just seek to attract consumers with online purchase experiences, they also seek to attract those without. The research approach of previous research has tended to draw information only from consumers with online shopping experiences, losing sight of those without (Schaupp and Belanger, 2005; Szymanski and Hise, 2000). However, the business goal of attracting the largest number of online consumers possible renders consumers without prior online shopping experiences an important area of e-commerce research. Thus, this research

* Corresponding author. Tel.: +886 4 7232105x7316; fax: +886 4 7211292.
E-mail address: fbhsu@cc.ncue.edu.tw (I.-C. Hsu).

extends previous research by investigating whether the above three factors and their corresponding attributes and features are major catalysts in increasing the online purchase intention of consumers, with or without prior online shopping experiences. In doing so, we can establish what factors can affect consumer purchase intention. We also seek to investigate the relative importance of the three factors, i.e., technology, shopping, and product, and their corresponding attributes and features in affecting consumer purchase intention. Fig. 1 depicts the conceptual model.

2.1. Online purchase intention

Online purchase intention, an important predictor of actual buying behavior, refers to an outcome of criteria assessment of consumers regarding website quality, information search, and product evaluation (Poddar et al., 2009; Hausman and Siekpe, 2009). Online purchase intention reflects the desire of consumers to make a purchase through the website. Previous research has explored driving forces of online purchase intention. For example, Liang and Lai (2002) found that consumers are more likely to purchase online when the shopping website provides highly desirable functions, including a product catalog, a search engine, intelligent agents for price comparisons, shopping carts, e-payment methods, and tracing mechanisms. Likewise, Vijayasarathy (2004) and Richard (2005) found that website design affects online purchase intention. Jarvenpaa et al. (2000) differentiated online shopping from traditional commerce and suggested that trust is crucial for online transaction. Ranganathan and Ganapathy (2002) concluded that security, privacy, website design, and information content are important for B2C websites. In sum, technology features, shopping conditions, and product factors each plays a critical role in forming the complex response of online purchase intention (Ha and Stoel, 2009; Schiffman and Kanuk, 2000). Understanding the relative importance of each of these factors is important for e-vendors in order to attract and retain consumers.

2.2. Technology factors

Technology factors comprise the quality of the website that facilitates online transactions. This research follows Ranganathan and Ganapathy (2002), Schaupp and Belanger (2005), and Szymanski and Hise (2000), and considers security, privacy, and usability to be key attributes of website quality.

2.2.1. Security

Information security refers to the confidentiality, integrity, authentication, and nonrepudiation of the e-transaction and online data (Turban et al., 2006). Previous literature has proposed mechanisms to safeguard online transactions. Ranganathan and Ganapathy (2002), for example, suggested that a personal account with an ID and password can alleviate customer fears. Schaupp and Belanger (2005) found that websites that display confirmation screens after completion of a transaction can ensure transaction accuracy. To combat the lack of trust in the context of e-commerce, consultants frequently advise e-vendors to provide stated and authenticated policies of security (e.g., encryption and use of seals of approval) (Glass, 1998). After scanning the use of cryptographic techniques on e-commerce, we found that the digital certificate, which is an advanced approach to authenticating online shopping websites and consumers, can relieve the perceived transaction risk of consumers. Considering the latest development in the digital certificate and findings and suggestions of prior literature, this research evaluates security features using four aspects: (1) the website provides information encryption for data transmission (Glass, 1998; Schaupp and Belanger, 2005); (2) the website requires the user to set up an account with an ID and password (Ranganathan and Ganapathy, 2002; Schaupp and Belanger, 2005); (3) the website displays a confirmation screen after completion of a transaction (Schaupp and Belanger, 2005); and, (4) the website offers digital certificates to prove its identity and verify consumer identities.

2.2.2. Privacy

Researchers have regarded privacy as the ability of an individual to control, manage, and selectively reveal personal information (Eastlick et al., 2006). The protection of privacy is imperative for online transactions. Liu et al. (2004) argued that the protection of privacy signifies transaction integrity and thus influences transaction decisions. Belanger et al. (2002) similarly suggested that a privacy statement can enhance the perceived trustworthiness of e-vendors. To eliminate consumer privacy concerns, many online shopping websites have developed privacy policies. This research evaluates three features of privacy: (1) the vendor presenting a privacy statement (Belanger et al., 2002; Schaupp and Belanger, 2005); (2) the request for customer consent to share or distribute private information (Chen, 2006; Ranganathan and Ganapathy, 2002; Schaupp and Belanger, 2005); and, (3) the request for customer consent to the use of cookies (Schaupp and Belanger, 2005).

2.2.3. Usability

Usability refers to overall website design and functionality. Research has suggested that well-developed content and functions of websites tend to increase consumer satisfaction and consequently increase the return rate (Ranganathan and Ganapathy, 2002; Schaupp and Belanger, 2005; Hausman and Siekpe, 2009). Anand (2007) pointed out that customized content is important in enhancing usability. Likewise, Hausman and Siekpe (2009) emphasized the importance of informational content. Search functions, download speed and navigation also improve website usability (Zeithaml et al., 2002). This research summarizes prior literature and evaluates three key features of usability: (1) the website provides a user-friendly interface and is easy to use (Anand, 2007; Gordon and Schoenbachler, 2002; Schaupp and Belanger, 2005); (2) the website possesses fast and accurate search capability (Belanger et al., 2002; Liang and Lai, 2002; Schaupp and Belanger, 2005; Zviran et al., 2006); and, (3) the website provides rich content and interactive mechanisms (Anand, 2007; Richard, 2005; Schaupp and Belanger, 2005; Zeithaml et al., 2002).

2.3. Shopping factors

Shopping factors refer to individual and website attributes that relate to the shopping experience (Schaupp and Belanger, 2005). Schaupp and Belanger (2005) examined the shopping process and proposed that convenience, trust, and delivery are three major attributes that affect the shopping experience. This research synthesizes Schaupp and Belanger (2005) and other relevant studies, adopting these three attributes but modifying the key features of each attribute to better reflect current e-commerce practices.

2.3.1. Convenience

Convenience refers to the services and practices of online shopping websites that reduce consumer time and effort in the transaction
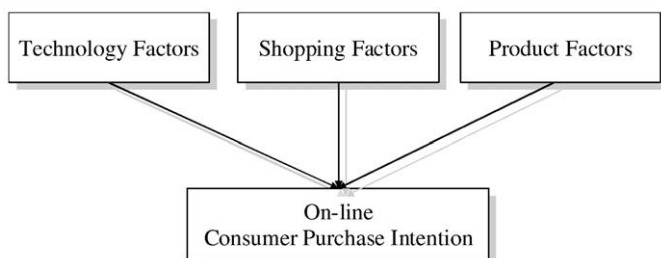

Fig. 1. Conceptual model.

process. Services, such as product search (Richard, 2005) and payment options (Liang and Lai, 2002) can reduce the effort consumers expend and increase online purchase intention. In observing product uncertainty as a major issue of online shopping (Liang and Huang, 1998), and the consumer's desire for information sharing (Armstrong and Hagel, 1996), this research proposes including product return/exchange services and online forums in online shopping websites. The former can reduce consumers' perceived product uncertainty while the latter facilitates information sharing. This research extends the scope of convenience to incorporate five major features: (1) vendors categorize products for the ease of shopping (Ranganathan and Ganapathy, 2002; Schaupp and Belanger, 2005; Szymanski and Hise, 2000); (2) vendors provide a variety of payment methods (for example, credit card, wire transfer, and online money transfer) (Chen, 2006; Liang and Lai, 2002; Ranganathan and Ganapathy, 2002; Zeithaml et al., 2002); (3) consumers can look up detailed product information and compare prices (Liang and Lai, 2002; Ranganathan and Ganapathy, 2002; Schaupp and Belanger, 2005); (4) vendors provide product exchange and return services; and, (5) vendors provide online forums enabling consumers to share information. Previous studies have not evaluated the latter two features, but this research considers them to be important in reflecting the scope of convenience.

2.3.2. Trust

Trust is important in developing long-term online B2C relationships (Eastlick et al., 2006). Prior research investigated the impact of trust. Yoon (2002), for example, claimed that trust influences online purchase intention. Turban et al. (2006) argued that a secure IT infrastructure is important in decreasing perceived risk and increasing consumer trust in the context of e-commerce. Prior literature has also proposed ways to improve consumer trust. Belanger et al. (2002) suggested that the ability to handle online transactions and conduct e-commerce professionally may enhance consumer belief in e-vendor ability. This research argues that advances in information technology have enabled online shopping websites to provide instantaneous explanations and online assistance, which can improve consumer trust. Further, McKnight et al. (2002) argued that "structural assurance" can help develop consumer trust. Structure assurance refers to proactive legal or technological structures that ensure the safety and security of online transactions. McKnight et al. (2002) has led us to argue that a practical conduct of structural assurance is to provide a detailed transaction contract that specifies the rights and responsibilities of the trading entities. Synthesizing previous literature and our arguments, this research evaluates the following features of trust: (1) the vendor uses a certified transaction platform (Belanger et al., 2002; Pavlou and Gefen, 2004); (2) when a consumer encounters transaction problems, the vendor provides an instantaneous explanation and online assistance; and, (3) the vendor provides detailed transaction contracts that specify the rights and responsibilities of trading entities.

2.3.3. Delivery

Delivery refers to the total time spent in shipping and handling. Schaupp and Belanger (2005) pointed out that reliable and timely product delivery is essential to consumer satisfaction. They further argued that online shopping websites should not only minimize delivery time but also provide parcel tracking mechanisms to reduce consumer anxiety. While these arguments capture major delivery practices that the western literature has reported, they do not fully reflect the common delivery services of e-vendors in Taiwan, the context of this research. Because Taiwan is a small and densely populated island with a high density of convenience stores, Taiwanese e-vendors often allow consumers to pick up products at a local convenience store. In addition, tracking number services are not applicable in Taiwan, where one-day delivery is a common practice.

This research synthesizes our observations in Taiwan and prior literature to evaluate four features of delivery: (1) overall minimization of delivery time (Anand, 2007; Schaupp and Belanger, 2005); (2) vendor notification of any potential delays in shipping (Schaupp and Belanger, 2005); (3) vendor notification of a delay in shipping (Schaupp and Belanger, 2005); and, (4) consumer ease of product pick-up at a local convenience store.

2.4. Product factors

Schaupp and Belanger (2005) considered product factors to be the perceived quality of the product or service for sale. They argued that merchandising, quality of products, and product customization are major determinants of the customer purchase decision. Arguably, product customization in the context of e-commerce may increase the possibility of perceived differences between consumer expectation about the purchased product and the actual, delivered product, and thus increase consumer perceived uncertainty in an online transaction (Moon et al., 2008). As a result, evaluation of the impact of product customization on online purchase intention is difficult. This research evaluates product factors only in terms of product value and merchandising.

2.4.1. Product value

Product value denotes perceived product and service quality of consumers. Boyer and Hult (2006) argued that a match between the requested and the delivered product is a key element in online purchase decisions. Brucks et al. (2000) emphasized that product value should comprise ease of use, functionality, high performance, durability, customer service, and good reputation. Turban et al. (2006) considered reasonable price and high quality equally important to product value. This research synthesizes prior literature and evaluates the following features of product value: (1) product features matching customer expectation (Boyer and Hult, 2006; Brucks et al., 2000); (2) product ease of use (Brucks et al., 2000); (3) product pricing reasonably reflects product brand (Turban et al., 2006); and, (4) vendors offer continuous customer services (Anand, 2007; Brucks et al., 2000).

2.4.2. Merchandising

Merchandising refers to features of product offerings per se (Szymanski and Hise, 2000). Schaupp and Belanger (2005) suggested that e-commerce should provide a great breadth and depth of product offers to impress the consumer. This research synthesizes prior literature and evaluates the following features of merchandising: (1) vendors offer extensive product assortment and variety (Anand, 2007; Schaupp and Belanger, 2005; Szymanski and Hise, 2000); (2) vendors offer exclusive products (Anand, 2007; Schaupp and Belanger, 2005); and, (3) vendors offer seasonal products and sales (Schaupp and Belanger, 2005).

3. Research method

3.1. Sample and procedures

Taiwan is one of the most heavily computerized societies in the world. For example, the digital access index report in 2003 ranked Taiwan ninth in the world and third in Asia in terms of the overall ability of individuals to access and use ICTs. The 2007 annual report of online shopping behavior, a publication of the Institute for Information Industry (Taiwan), indicates that in Taiwan the largest online segment is between 20 and 29 years old, with undergraduate students accounting for roughly 50% of this population. Thus, undergraduate students are good candidates for the investigation of online purchase intention due to their online experiences.

This research uses samples from a university in Taiwan with a population of 20,000 undergraduate students with an average age of 22 years of age. To ensure that these samples effectively represented the overall research population, we employed a stratified random sampling method based on class and college to identify 76 classes totalling 4144 students participating in the research. The research involved conducting two stages of data collection, which together produced a total of 1567 effective responses.

In the first stage, the participants participated in an online survey. In the sequel, we analyzed the collected data to identify influential attributes and their features leading to online purchase intentions. The initial feedback suggested elimination of merchandising and its associated features because of low attribute scores.

The second stage of data collection involved investigating the major attributes influencing the online purchase intention of consumers. We developed four test platforms using PHP to simulate four online shopping websites. The products displayed on each of the four shopping websites were identical: 3C (computer, communication, and consumer-electronics), cosmetics and furniture, books and DVD, luxury items, and travel related services such as airline tickets. The 2007 annual report on online shopping behavior, a publication of the Institute for Information Industry (Taiwan), guided the selection of products. The four websites differed in their features of security and privacy (refer to Table 1). The built-in features seek to keep up with the latest developments in IT technology that aim at enhancing security and privacy in the online shopping context. The online shopping simulation enabled all respondents to obtain first-hand experience of how each feature, such as digital certificates or privacy statements, functions in e-commerce.

Before filling in the online questionnaire, we asked each respondent to go through each of the four websites, each encompassing the following transaction procedures: product search and display, product ordering, payment simulation, and choice of delivery features. The respondent had to finish his/her transaction in the current website before jumping to the next. Before changing screens within each website, a pop-up screen appeared that oriented the respondents to the next screen they would see. For example, in the first shopping website, after the respondents ordered the product(s) and before the website directed them to the payment screen, a privacy statement popped up, stating that the website would keep all the personal and transaction information confidential and would not disclose it to any third party. Because the title of this pop-up screen was "privacy statement", the respondents knew the feature they were experiencing. We embedded checkpoints in each website to make sure that each respondent went through every transaction procedure the individual website requested.

After completing four transactions in the four websites, the respondents filled in the online questionnaire, containing all seven attributes and their corresponding features with detailed explanations. The questionnaire went through three rounds of pre-test and modification to eliminate ambiguities and confusion. The questionnaire instructed respondents to rank each attribute's corresponding features according to their preferences. No two features or more within an attribute should receive the same rank. The second stage of data collection resulted in a total of 513 effective responses. We used these questionnaires for the conjoint analysis described below.

Table 1
Security and privacy features for the four test platforms.

Four test platforms	Features of security	Features of privacy
Shop1	Information encryption	Privacy statement
Shop2	Accounts with ID and password	Policy on information distribution
Shop3	Confirmation screen	Use of cookies
Shop4	Digital certificate	None

In the second stage of data collection, respondents included 71.73% females and 28.27% males. Among the respondents, 62.38% had not taken e-commerce related courses before, 58.48% had more than seven years of computer experience, and 80.31% had online shopping experience.

Because of the separation of data collection into two stages in our research, it is necessary to examine whether respondents in the two stages had different compositions in terms of colleges and grades. The Chi-square test (χ^2) did not suggest significant differences between the first and second sets of data.

3.2. Analytical strategy

To understand what factors influence consumer purchase intention and the relative importance among these factors, this research employed conjoint analysis to study the relative preferences for each attribute and its corresponding features. Conjoint analysis is a decompositional approach that uses an overall evaluation of a set of profile descriptions to determine the consumer's preference structure (Hair et al., 2006). The basic conjoint model used in this research is (Hair et al., 2006):

$$Y = X_1 + X_2 + X_3 + \ldots + X_n,$$

where Y represents the total utility of the respondent's preferences for the shopping website (a metric or non-metric variable), and X_i represents part-worth for the features (metric variable). We derived the relative importance of an attribute by dividing each attribute's range of part-worth (highest part-worth value − lowest part-worth value) by the sum of all range values across attributes.

This research adopts two segmentation approaches: componential segmentation and prior segmentation. The componential segmentation classified respondents on the basis of a preference structure that comprises attributes and features. In prior segmentation, we classified respondents into two groups: respondents from a college of Computer and Informatics, representing a high level of computer expertise, and respondents from other colleges, representing a low level of computer expertise. Descriptive statistics analysis indicated significant differences between the two groups in academic training in e-commerce and perceived importance in website security under seven categories of amount of transactions. In other words, computer expertise may affect a respondent's perceived importance in information security and transaction decision. Thus, it is necessary to further compare and contrast the preference structures of both groups of high and low levels of computer expertise. Table 2 presents the descriptive statistics.

4. Results

4.1. Componential segmentation

We identified three individual groups using K-means analysis. The Chi-square tests indicated significant differences among the three groups in the number of times of online shopping, and perceived importance in website security under seven categories of amount of transactions. We discuss the preference structure of each group in detail below.

4.1.1. Group 1

This group considered usability, delivery and security the three most important attributes (in the descending order of the range of part-worth value). This research labels this group usability/delivery-oriented according to the top two preferred attributes. Within the attribute of usability, this group considered a user-friendly interface the most important feature. Within the delivery attribute, this group preferred the pick-up service of convenience stores. Within the security attribute, this group considered a personal account with an ID

Table 2
Descriptive statistics of the two groups of respondents.

		Prior segmentation	
		Non-informatics group	Informatics group
Academic training on e-commerce			
Took e-commerce course before	Count	121	72
	Frequency (%)	28.95	75.79
Have not taken e-commerce course before	Count	297	23
	Frequency (%)	71.05	24.21
Number of respondents perceiving website security as importance under differing categories of amount of transactions (in New Taiwan dollars)			
Website security is not important at all	Count	98	18
	Frequency (%)	23.44	18.95
0–$500	Count	63	16
	Frequency (%)	15.07	16.84
$501–1000	Count	83	10
	Frequency (%)	19.86	10.53
$1001–2000	Count	94	38
	Frequency (%)	22.49	40
$2001–3000	Count	43	6
	Frequency (%)	10.29	6.32
$3001–5000	Count	17	5
	Frequency (%)	4.07	5.26
More than $5000	Count	14	0
	Frequency (%)	3.35	0

Note: One US dollar is approximately thirty-four New Taiwan dollars.

and password to be the most important. These findings suggest that a website should provide a user-friendly interface and a user account with an ID and password and should allow consumers to pick up products at local convenience stores in order to improve this group's purchase intention.

4.1.2. Group 2

This group considered security, trust, and convenience the three most important attributes (in the descending order of the range of part-worth value). This research labels this group security/trust-oriented according to the top two preferred attributes. Within the security attribute, this group considered information encryption the most important feature, and confirmation screens the second most important. Within the trust attribute, this group considered a detailed transaction contract that specifies the rights and responsibilities of the trading parties the most important feature. This finding may indicate that consumers are beginning to consider protecting their rights and preventing potential disputes with online vendors. This group considered product return and exchange services the most important feature of convenience. These findings suggest that a website should provide information encryption, a detailed transaction contract and product return and exchange services in order to improve this group's purchase intention.

4.1.3. Group 3

This group considered convenience, trust, and usability the three most important attributes (in the descending order of the range of part-worth value). This research labels this group convenience/trust-oriented according to the top two preferred attributes. Like the security/trust-oriented group, this group focused on product return and exchange services and a detailed transaction contract. This group also considered the website usability an important attribute, as did group 1. However, group 3 preferred a fast and accurate search capability over a user-friendly interface. These findings suggest that a website should provide product return and exchange services, a detailed transaction contract, and search capabilities to enhance this group's online shopping intention.

Fig. 2 compares the preference characteristics of the three groups. The usability/delivery-oriented group (group 1) considered usability the most important attribute. The security/trust-oriented group
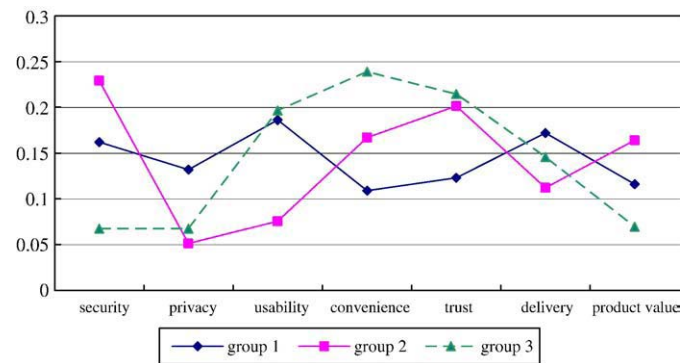
Fig. 2. Relative importance of each attribute: preferences comparison among the three groups.

(group 2) showed a significant preference for security compared with the other groups and considered trust to be as important as the convenience/trust-oriented group (group 3). Only group 3 considered convenience the most important attribute. Apparently, none of the groups considered privacy important. This finding may reflect widespread acceptance of business practices in Taiwan that traditionally do not pay attention to customer privacy.

4.2. Prior segmentation

To understand the impact of computer expertise on consumer preferences, this research compares the preference structure of students from a College of Computing and Informatics (the informatics group) with that of students from other colleges (the non-informatics group).

4.2.1. Non-informatics group

This group considered trust, security, and convenience the three most important attributes. Within the trust attribute, this group considered a detailed transaction contract that specifies the rights and responsibilities of the trading entities the most important feature. Within the security attribute, this group considered information encryption the most important feature. Within the convenience attribute, this group considered product return and exchange services the most important feature.

4.2.2. Informatics group

This group considered convenience, trust, and product value the three most important attributes. Similar to the non-informatics group, this group considered product return and exchange services the most important feature of convenience. In addition, this group considered a detailed transaction contract the most important feature of trust. However, this group considered product value more important than security, and considered continuous customer services the most important feature of product value. While the informatics group did not consider security as important as its non-informatics counterpart, this group considered both information encryption and digital certificates the two most important features of security. Table 3 summarizes the preference structures of all groups.

5. Discussion

5.1. Research implications

The first major contribution of this research comes from the identification of three groups of respondents that previous studies have not identified. These groups were usability/delivery-oriented, security/trust-oriented, and convenience/trust-oriented based on the two attributes each group valued most. Synthesizing the first two

Table 3
Part-worth of key attributes: componential and prior segmentation groups.

Attributes	Features	Usability/delivery orientated group		Security/trust orientated group		Convenience/trust orientated group		Non-informatics group		Informatics group	
		Part-worth value	Range of part-worth value (relative importance)	Part-worth value	Range of part-worth value (relative importance)	Part-worth value	Range of part-worth value (relative importance)	Part-worth value	Range of part-worth value (relative importance)	Part-worth value	Range of part-worth value (relative importance)
Security	Information encryption	0.179	0.275 (16.20%)	0.313	0.313 (22.91%)	−0.014	0.097 (6.74%)	0.181	0.181 (18.78%)	0	0.311 (17.82%
	Accounts with ID and password	0.275		0.139		0.002		0.144		−0.032	
	Confirmation screens	0.184		0.185		−0.095		0.165		−0.311	
	Digital certificates	0		0		0		0		0	
Privacy	Privacy statements	0.182	0.224 (13.19%)	−0.038	0.07 (5.12%)	0.097	0.097 (6.74%)	0.075	0.102 (10.58%)	−0.073	0.073 (4.18%)
	Policies on information distribution	0.224		0.032		0.053		0.102		−0.043	
	Policies on use of cookies	0		0		0		0		0	
Usability	User-friendly interfaces	0.170	0.316 (18.61%)	0.075	0.103 (7.54%)	0.171	0.283 (19.65%)	0.131	0.131 (13.59%)	0.172	0.172 (9.86%)
	Fast and accurate search capability	−0.146		−0.028		0.283		0.041		0.107	
	Interactive features	0		0		0		0		0	
Convenience	Product categorization	−0.185	0.185 (10.90%)	0.023	0.228 (16.69%)	0.095	0.344 (23.89%)	0.013	0.163 (16.91%)	−0.097	0.523 (29.97%)
	Varied payment methods	−0.047		−0.075		0.163		0.090		−0.316	
	Price/product comparison	−0.061		0.017		0.027		0.041		−0.159	
	Product return and exchange services	−0.046		0.153		0.344		0.163		0.207	
	Online forums for information sharing	0		0		0		0		0	
Trust	The transaction platform certified	−0.023	0.209 (12.31%)	−0.275	0.275 (20.13%)	−0.147	0.309 (21.46%)	−0.185	0.188 (19.50%)	−0.124	0.451 (25.84%)
	Instantaneous explanation and online assistance	−0.209		−0.190		−0.309		−0.188		−0.451	
	Detailed transaction contracts	0		0		0		0		0	
Delivery	Minimization of delivery time	−0.199	0.292 (17.20%)	0.009	0.153 (11.20%)	−0.051	0.21 (14.58%)	−0.123	0.123 (12.76%)	0.151	0.179 (10.26%)
	Notification of potential delay	−0.292		−0.144		0.159		−0.095		−0.028	
	Notification of a delay in shipping	−0.222		−0.014		−0.056		−0.087		0.066	
	Product pick-up at a local convenience store	0		0		0		0		0	
Product value	Product features matching customer expectations.	−0.179	0.197 (11.6%)	−0.052	0.224 (16.40%)	−0.060	0.10 (6.94%)	−0.074	0.076 (7.88%)	−0.064	0.36 (20.63%)
	Product ease of use	0.003		−0.224		−0.100		−0.072		−0.360	
	Pricing reasonable	0.018		−0.183		−0.029		−0.076		−0.020	
	Continuous customer services	0		0		0		0		0	
F-value		2.877		2.479		2.567		4.715		2.567	
p-value		0.001		0.001		0.001		0.001		0.01	
Adjusted R^2		0.076		0.034		0.040		0.043		0.053	

attributes each of the three groups valued most, we obtain the following attributes that companies building online shopping websites should focus on: usability, delivery, security, trust, and convenience. Prior literature has emphasized usability and security (e.g., Ranganathan and Ganapathy, 2002; Schaupp and Belanger, 2005; Szymanski and Hise, 2000). Schaupp and Belanger (2005) also emphasized delivery, trust, and convenience. This research presents a synthesis of attributes that signify factors of success for e-tailers. Future theory building efforts should also consider these attributes in the research model. Further, according to our analyses, the three groups differed significantly in their preference structures. Thus, as a practical implication, companies should design their online shopping websites to incorporate the features and the five attributes the three groups valued, thus enabling websites to attract the largest possible number of online shoppers. Alternatively, companies can design websites that cater to specific groups of online shoppers.

Moreover, this research offers interesting insights into trust, security, usability, delivery, and convenience, respectively. First, for the issue of trust, all three groups considered a detailed transaction contract to be the most important feature. To the best of our knowledge, online shopping websites have not used transaction contracts that specify the rights and obligations of trading parties. This research has demonstrated the importance of online contracting in the context of e-commerce. Our findings echo the argument of previous literature regarding the need for online consumers to predict and control the transaction process (Gefen and Straub, 2004; McKnight et al., 2002). Our findings also reflect trust as a context-dependent concept. e-vendors can enhance online purchase intention of consumers by improving their trust by articulating and providing rules and regulations for online transactions (Gefen and Straub, 2004; Liu et al., 2004; Eastlick et al., 2006).

Second, our findings are consistent with Belanger et al. (2002), which found that consumers value security when purchasing goods and services online. Both the security/trust-oriented group, which preferred information encryption, and the informatics group, which preferred both information encryption and digital certificates, support this finding. The implication is that consumers are willing to go through a complex procedure to protect their online transactions even at the expense of convenience. Our research contributes to prior literature that argued for the importance of security solely through identification of the features of security that online consumers valued most.

Third, our findings also suggest critical features associated with usability and delivery. The usability/delivery-oriented group considered a user-friendly interface the most important feature of usability and being able to pick up their goods at local convenience stores the most important feature of delivery. Our finding regarding a user-friendly interface is consistent with prior literature (e.g., Anand, 2007; Gordon and Schoenbachler, 2002; Schaupp and Belanger, 2005). Further, although prior literature has emphasized minimizing delivery time (Anand, 2007; Schaupp and Belanger, 2005), this research reveals a unique contribution: the use of physical channels such as convenience stores enhances the delivery attribute. Our research presents an e-commerce model that combines online shopping websites and physical stores. Such a combination may increase consumer willingness to shop online as most consumers still prefer physical outlets (Lee and Tan, 2003; Keen et al., 2004).

Fourth, this research reveals that product return and exchange services are the most important feature of convenience (see the convenience/trust-oriented group and the security/trust-oriented group). Prior literature has not paid much attention to this feature. However, this research has demonstrated its importance. We encourage future research in our line of enquiry to examine the importance of this feature.

Our major contributions also come from conjoint analysis of data we collected from the two groups of respondents with differing levels of computer expertise. The informatics group preferred convenience, trust, and product value, while the non-informatics group emphasized trust, security, and convenience. Some findings of this research are readily explainable. For example, trust has gained attention in prior literature (Belanger et al., 2002; Liu et al., 2004; Schaupp and Belanger, 2005). However, security is not one of the most important attributes for consumers with computer expertise.

Our explanation is that when consumers have sufficient e-commerce experience and computer skills, they are able to judge whether an online shopping website is secure enough based on the kind of encryption or authentication mechanisms the website adopts. Other attributes such as convenience and product value take precedence over security. When consumers do not have relevant knowledge, security becomes critical. Thus, unlike prior literature that emphasizes security (Belanger et al., 2002; Schaupp and Belanger, 2005), this research proposes a contingency view: security is not always important. We encourage future research to examine whether security is an attribute contingent upon the computer expertise of consumers.

We caution that the two groups agreed that a detailed transaction contract that specifies the rights and responsibilities of the trading parties is the first priority in terms of trust. In security, the two groups ranked information encryption as the most important. Moreover, the informatics group also regarded digital certificates as important as information encryption, but the non-informatics counterpart did not. Our explanation for this discrepancy lies in the superior technological prowess of the informatics group, which understands the importance of digital certificates in authenticating a user's identity. In contrast, with only a faint notion of what digital certificates can do, the non-informatics group switched their focus to features they thought they had better understanding of, such as accounts with an ID and password and confirmation screens.

In sum, this research has categorized and identified groups of consumers by their preference structures. The findings address the need to segment online shopping consumers according to the attributes they prefer. The findings have reference value for companies that seek to attract new online shopping consumers who, due to their lack of computer expertise, may lack online shopping experience. As we pointed out earlier, the preference structures of these groups of consumers have received limited attention. However, by revealing the preference structures of consumers with computer expertise, the findings can help e-vendors develop the loyalty of this group of consumers. This research would not have achieved its contributions without the use of IT-based experimental websites and relevant statistical analysis techniques.

5.2. Limitations

This research has four major research limitations. First, it uses undergraduate students as participants. This type of sample represents a group of consumers with a limited range of ages and educational backgrounds. Consumers of different ages and educational levels could differ in their preferences for attributes and features of online shopping websites. Therefore, we encourage future research, using samples exhibiting diversity in age and educational backgrounds, to fully investigate the preferences of online shoppers. Second, the low adjusted R^2 in our results suggests that online purchase intention is a complex issue that involves a number of psychological and technological factors (e.g., Richard and Chandra, 2005). This research did not include all of these factors. We encourage future research to explore more factors, attributes and features that can potentially influence consumer purchase intention.

Third, this research adopts an orthogonal array to identify preference structures. While an orthogonal array reduces the testing factors, it reveals principal effects without exploring the effects of interactions among factors and attributes. We encourage future

research to investigate the interaction effects of the proposed factors and their relevant attributes. Fourth, readers should interpret our findings with caution as some of them may reflect the specificity of Taiwan as the context of this study. For example, the high density of population and convenience stores in Taiwan facilitate the use of convenience stores for the pick-up of products. Further, consumers in Taiwan may exhibit a lower concern for privacy than their western counterparts. Thus, we encourage future research to establish the transferability of our findings. Future research should include cross-country comparisons of the key factors influencing online purchase intention.

6. Conclusions

This research investigates three categories of attributes of online shopping websites: technology, shopping, and product, by collecting and analyzing data from undergraduate respondents at a university in Taiwan. Data analysis resulted in three groups of online consumers who differ in their preferences for the three categories of attributes and their corresponding features. In addition, computer expertise affects consumer preferences for the attributes and features of online shopping websites. This research contributes to prior studies by providing detailed findings. Firms that seek to reach their customers through online shopping websites need a clear and elaborate strategy to differentiate customers.

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