



On gender differences in consumer behavior for online financial transaction of cosmetics

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ABSTRACT

The popularity of the Internet has enabled a wide variety of services. Due to increasing pricing levels and material costs over years, enterprises have intended to lower their financial costs by Internet marketing and online financial transactions, by which renting cost, facility setup cost and manpower cost can be saved, and advertising cost is lowered for increasing the number of potential customers. Hence, Internet marketing and online financial transactions have become a market territory for which each enterprise competes. In the market, male consumers no longer mainly shop for 3C products online, and now are becoming more diverse in their shopping selections. Male cosmetics and skincare products comprise a market with great growth potential that is yet to be developed. The purpose of this study is to explore whether gender differences exist or not in perception, importance and satisfaction for online financial transactions of cosmetics. The online questionnaire survey method was used for this study. A total of 600 surveys were distributed. Once the invalid replies were excluded, a total of 567 effective samples were recovered. The results from this study show significant gender differences in the “amount of money spent per purchase of cosmetics”, “the most recent online purchase of cosmetics”, “the time spent on cosmetics”, “amount of money spent each month on cosmetics”, “amount of money spent per time on cosmetics”, “the time spent on buying cosmetics online” and “the satisfaction with the most recent online purchase of cosmetics”. There were also significant differences in the level of importance assigned to “brand reputation”, “fresh scent”, “natural ingredients”, “reasonable price”, “suitable skin type”, “professionalism of service personnel”, “recommended by advertising” and “ease of use”.

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1. Introduction

As the Internet and wireless network technologies have had a lot of advancement in decades, e.g., see the notable studies in [1,2], their increasing use has resulted in more online commercial activities, in terms of consumers navigating websites and making financial or nonfinancial transactions. The growing online consumer market allows consumers to make financial transactions online anywhere in the world regardless of their locations. The Internet therefore offers enterprises a growing market with limitless opportunities that they can tap into by providing consumers with online shopping services.¹

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¹ The consumer online shopping process can be divided into the following steps: Identification of requirements, product brokering, merchant brokering, price negotiation, purchase & delivery and product services & evaluation.

While enterprises can efficiently and economically conduct their marketing activities through Internet, a challenge in this massive and growing market is to identify potential consumers through appropriate marketing planning and market segmentation [3]. Due to increasing pricing levels and material costs over years, enterprises have intended to lower their financial costs by Internet marketing and online financial transactions, by which renting cost, facility setup cost and manpower cost can be saved, and advertising cost is lowered for increasing the number of potential customers. Hence, Internet marketing and online financial transactions have become a market territory for which each enterprise competes, and the implementation for Internet marketing is to provide online shopping services for customers. Simply speaking, online shopping makes financial transactions over the Internet, in which electronics commerce is derived. It simplifies the process, and further saves logistics and manpower costs. It allows convenient and real-time response to the inquiries from customers, even negotiation of prices, and lowest achieved costs, to be the main line of increasing shopping services. In addition, Internet marketing and financial transactions provide services to customers with low costs, and efficiently raises the sales of the enterprises. Kalakota and Robinson [4] indicated that electronics commerce can solve financial problems, including shortening delivery time, decreasing the procurement cost, decreasing unconfirmed orders (for receiving payment first and then shipping the goods), integrating back-end system effectiveness, increasing the control ability for the supply chain, to electronizing the operations of transactions, transportation, storehouse, and payments to analyze customers' procurement data with precise prediction on the supply to customers, etc.

The Taiwanese Internet population is growing, and the time period spent online is increasing as well. Around 6.27 million people in Taiwan used the Internet frequently in 2000, and had grown to 10.25 million by 2008. The proportion of frequent Internet users in the Internet population grew from 28% in 2000 to 45% in 2008 [5]. People use the Internet for all kinds of activities like shopping through online platforms [6]. As the number of Taiwanese online consumers increases, the integration of virtual and physical channels together with the forming of the community-based word-of-mouth shopping model produces an increase in the proportion of purchases made online as well. The strength of the Taiwanese online shopping market can be seen in how its size grew explosively from NT \$3.89 billion in 2004 to NT \$108 billion in 2007 [6].

The data from the Institute for Information Industry (III) indicated that the majority of Taiwanese online shopping consumers made use of "auction websites" and "shopping websites", which accounted for 56% and 47.3% of all purchases, respectively, and together made up over 90% of the whole online shopping market. The main product categories for male Taiwanese auction buyers included "Computer Software/Hardware and PDAs" as well as "Mobile Phone & Communications" at 55.3% and 43.3%, respectively. For female Taiwanese auction buyers, the main product categories included "Women's Clothing & Accessories" and "Cosmetics and Skincare". In 2006, for example, around 81% of the Taiwanese online shopping market was made up of travel, 3C, cosmetics and fashion products. Cosmetics had the fastest growth rate at 90%.² The top three products purchased by male consumers were: 3C, male boutique goods, as well as books & magazines and cosmetics. It is noteworthy that Taiwanese consumers no longer mainly purchase 3C or books & magazines online and are now expanding their choices. According to the statistics made by the market researcher *Euromonitor International*, the sales of cosmetics-targeting people grew by over 40% between 1998 and 2003. Another market researcher *Datamonitor* estimated that in 2004, people spent around NT \$89 billion on personal cosmetics. As compared to the saturated female skincare product market, it obviously offers an unexploited market with great growth potential [7].

In light of the above, it is discovered that cosmetics are no longer the exclusive province of women and make the causes behind the annual increases in male spending on cosmetics a topic worth examining. Most previous literature focused on the analysis of online shoppers' level of satisfaction or analyze the marketing methods, transaction platform and key factors in online shopping (e.g., see [8,9]). Relatively few looked at the gender differences in online shopping importance, satisfaction, perception and behavior, though there existed some works on the differences of other traits (e.g., [10,11]) and the gender differences in online selling recommendation services (e.g., [12]). The main purpose of this study is to analyze the gender differences between consumers in perception, importance and satisfaction when buying cosmetics online. Although fewer innovative statistical techniques are involved in this study, a basic statistical method is sufficient to realize the gender difference of consumer behavior when buying cosmetics online. The results from the empirical analysis of this study hopefully provide the relevant government departments and online vendors with a useful reference in their decision-making.

This study is divided into five sections. Section 1 gives the introduction to our study. Section 2 gives the review of literature. Section 3 gives the research methodology and survey design. Section 4 gives analysis of survey results. Section 5 consists of the conclusion and suggestions.

2. Literature review

2.1. Definition of e-commerce

Electronic commerce (or e-commerce) carries out traditional commercial activities through the new medium of the Internet. E-commerce can be defined as any commercial transaction conducted in an electronic format. Kalakota and

² In 2008 for example, the growth rates for travel, 3C products and cosmetics were 53 %, 63% and 90%, respectively, with sales of skin-care cosmetic products achieving the highest rate of growth.

Whinston [13] suggested that e-commerce is the use of the Internet for purchasing, selling or trading products and services. The aim is to reduce costs, shorten product lifecycles, speed up customer feedback and improve the quality of service. E-commerce is the process of online transactions between individuals and enterprises. These include Business-to-Business (B2B) transactions, Business-to-Consumer (B2C) retail sales (or e-retail) and Consumer-to-Consumer (C2C) transactions.

2.2. Strengths of online shopping

As the Internet is immediate, interactive, low-cost, available 24 h, and not restricted by space or national boundaries, online shopping has become the most popular shopping method in recent years. Online shopping is an important application of e-commerce through which consumers can use the Internet to conveniently make online transactions with online shops through electronic catalogs and web pages designed by using Internet protocols [14]. The Internet allows the enterprises to provide more product information online at a cost far lower than other conventional forms of popular media. It enables the enterprises to manufacture, market and sell products as well as provide customers services in a more efficient and pervasive manner while strengthening existing channels at the same time [15]. Most experts believe that price [16,17] and convenience [18,19] are the main advantages in online shopping. Also, trust plays an important role on consumer Internet shopping as e-commerce success is determined in part by whether consumers trust sellers [20]. According to the analysis of [21] on the consumer behavior of online shoppers, the main driving forces in the online shopping market included: helping Internet users overcome psychological barriers, defining the pricing strategy, selecting suitable products, providing a variety of options and personalization services, building a comfortable shopping environment and designing an attractive website that matches the Internet users' habits [21].

2.3. Online shopping outside Taiwan

The III estimated that in 2008, the US online shopping market was worth approximately US\$264.7 billion. The US online vendors have gradually accumulated a better understanding of consumers' online shopping preferences and are now able to attract them to use more accurate marketing methods and retain them by providing a wide variety of services. As the Internet becomes more widespread and users gain more experience, an increasing number of Internet users are now experimenting with online shopping. The US online shopping market is therefore expected to grow steadily and surpass US\$300 billion by 2011.

In Europe, extensive networking infrastructure and rapid growth in the population of Internet users mean that an increasing number of Internet users are beginning to experiment with online shopping. In 2006, the European online shopping market was worth 102.6 Euro and will grow to 228.9 billion Euro in 2010. The UK, in particular, has better Internet penetration and infrastructure, in comparison to the European average. With an Internet penetration rate of 67% as early as 2005, online shopping developed earlier in the UK compared to other European countries. In 2006, the British online shopping market was the largest in Europe with 42% of the European market.

The III Market Intelligence & Consulting Institute (MIC) estimated the Taiwanese online shopping market to be worth NT \$243 billion³ in 2008, an increase of \$32.3 on 2007. Online shopping accounted for NT \$136 billion while online auctions accounted for NT \$107 billion. Online shopping sales were also expected to continue growing. The MIC data shows that online shopping's share of the retail industry had increased from 3.3% in 2007 to 4.0% and then 4.7% in 2009, growing despite the economic recession. In 2008, the average amount spent online per person actually increased over 2007. Up to 57% had spent more than NT \$3000 online and Internet users over the age of 50 spent on average nearly NT \$20,000 online [6]. Online transactions have therefore become an important component of modern economic activity. According to the III, the Taiwanese C2C market in 2007 had grown to NT \$110 billion in 2007. The market has grown at an average rate of 56% per year since 2004 with almost a half of all the shoppers coming from the 20- to 29-year-old demographic. As the number of non-adults who used to access the Internet continues growing, the online shopping market has expanded as well, producing drastic changes in shopping habits and structure [6].

The online shopping product categories seeing faster growth were clothing fashion and cosmetics products with a Compound Annual Growth Rate (CAGR) of 88% and 49%, respectively. Growth in 3C and travel products was slowed by the state of the economy so they were 25% and 21%, respectively. According to the data from the III, in 2008 the increasing convenience of the Taiwanese online shopping market, the lower product prices of some products compared to retail channels as well as the increasing variety of online merchandise available meant that an increasing number of consumers are now turning to the Internet instead [6].

³ In Taiwan shopping websites can be divided into three types: Shopping centers, shopping platforms and auction platforms. The first two are similar to physical shopping malls and stores, except their catalogs and transaction information are made available online. Auction platforms, on the other hand, are quite different from their real-world counterpart. On the auction platform, consumers can compare product prices in a very low-cost manner. At the end of April 2009, the largest online auction platform was Yahoo which was established in September, 2001. In 2007, Yahoo's auction revenues were NT \$7.5 billion, and this grew by 30% in 2008. By 2009, revenues totaled NT \$15 billion, surpassing department stores such as the Breeze Centre, Shin Kong Mitsukoshi's Taichung Store and Shin Kong Mitsukoshi's Nanjing W. Rd. Store [22].

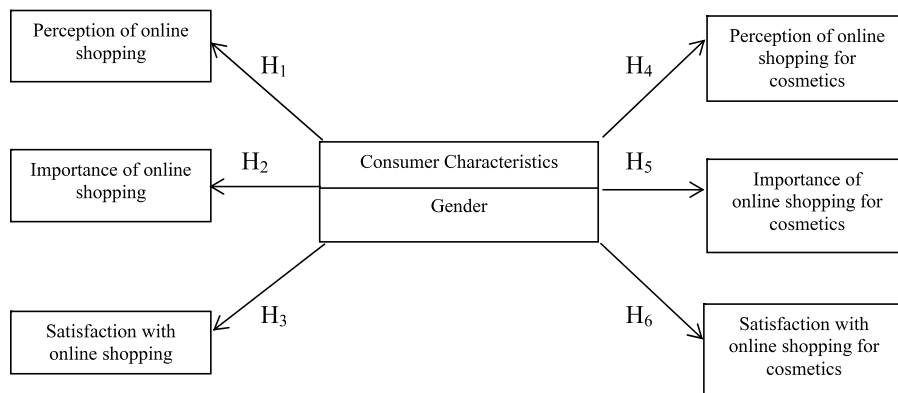


Fig. 1. The research framework of this study.

2.4. Literature on purchasing behavior for cosmetics

Cosmetics can be divided into skin-care, hair-care and facial-care cosmetic products, depending on their purposes. Cosmetics here refer to the cosmetics that can be used to hide facial flaws, highlight the features and make the wearer look more elegant. From previous literature, Wang and Yeh [14] studied consumers' perception of website attributes as well as the pricing and convenience of online shopping. The previous studies on online Taiwanese user groups [21] found that online vendors currently target white collar workers and students, with students accounting for 61.54% because they are the most frequent Internet users [23]. As young people account for the majority of Internet users, the development of the Internet and e-commerce has given rise to a new breed of Internet-savvy users familiar with games, chat rooms and browsing. They are particularly attracted to mail orders and online shopping and so will form the largest potential market for online shopping in the future. Wang and Yeh [14] defined these young Internet users as university students with Internet experience aged between 20 and 30. They then studied the consumer attributes and consumer intent of online shopping from the perspective of these young Internet users. Wang and Ho [3] explored the key factors influencing purchasing amount, product, website and purchasing frequency during the decision-making process for online shopping. Previous literature on cosmetics included: examination of the factors that influence female consumers' selection of cosmetic retail channel [24]; analysis of demographic variables and purchasing behavior for female consumers who purchase cosmetics online [25]; an examination of brand and sales channel's influence on female consumers' purchase of cosmetics from a consumer behavior [12], as the product brand determines the success of E-commerce in part (e.g., see [8]).

The use of cosmetics is no longer exclusive to women. Lai [26] indicated that 80% of men use male cosmetics. Most tend to be under 25 years of age, and facial care products are the main type used. Many brands have also launched male cosmetics as well. Jian [27] analyzed men's use of cosmetics and looked at the differences in products used among men in northern Taiwan with different lifestyles. Lai [26] studied the purchasing motivations and consumer characteristics of male consumers in the northern, central and southern regions of Taiwan when buying cosmetics, respectively. Lai [28] analyzed the factors governing the success of men's skin-care product market and showed that men's skin-care product market as well as men's purchase of cosmetics has become increasingly important issues. An analysis of past literature shows that most research focused mainly on female consumers, but fewer on male consumers. There has also been no literature that compared differences between men and women's online shopping behaviors when buying cosmetics. This study therefore conducted a comparative analysis of gender differences in consumer habits, characteristics, perception, importance and satisfaction in buying cosmetics online. The goal is to gain a better understanding of gender differences in consumer behavior when buying cosmetics online.

3. Methodology and survey design

An online questionnaire survey was used in this study with the primary purpose of investigating gender differences in the consumer behavior when buying cosmetics online. The research framework is shown in Fig. 1.

This study developed the six questions below based on the above.

- H1: Do significant gender differences exist in consumers' perception for online shopping?
- H2: Do significant gender differences exist in consumers' importance for online shopping?
- H3: Do significant gender differences exist in consumers' satisfaction for online shopping?
- H4: Do significant gender differences exist in consumers' perception of online shopping for cosmetics?
- H5: Do significant gender differences exist in consumers' importance when purchasing cosmetics online?
- H6: Do significant gender differences exist in consumers' satisfaction when purchasing cosmetics online?

3.1. Research subject and scope

Since the previous studies on consumer behavior of online shopping were conducted by questionnaire surveys in general, this study continues applying the questionnaire survey to conduct our analysis. This study consisted of an online survey that did not specifically require the consumers with online shopping experience, and also had no gender restrictions, in order to increase the depth and breadth of the analysis. As there are many potential consumers among Internet users, the level of acceptance for online shopping among those without online shopping experience can also serve as a reference during decision-making. Consumers with no experience in shopping for cosmetics online can also be used for differential analysis of their socio-economic backgrounds. To avoid repeating respondents and to make the best use of limited resources and time, the convenience sampling method was used to conduct an online survey of consumers in the hopes of acquiring sufficient samples. Note that convenience sampling is a type of non-random sampling method and based purely on convenience.

3.2. Number of surveys distributed

Since the population for the online questionnaire survey conducted in this study is “the consumers who had experience of online shopping”, this study applies the My3q system (which is one of the most convincing online questionnaire platforms in Taiwan) to conduct our online questionnaire survey. On distributing the online questionnaire survey, the beginning of the questionnaire reminds the respondents that “only the consumer who had the experience of online shopping is able to respond to this questionnaire”, and hence, there is no response from those who did not have any experience of online shopping, assuming that each respondent can be trusted. Since the size of the population for this study cannot be known, the sample size is calculated as follows:

$$n = \frac{Z_{\alpha/2}^2 \cdot p(1-p)}{d^2}$$

where n is the number of effective samples when the population is unknown, $Z_{\alpha/2}$ is the standard normal distribution (1.96 with a confidence interval of 95%), d is the allowable sampling error of 0.05, and p is the representative probability (generally 0.5). Assuming a confidence interval of 95% with a sampling error of 5%, we require at least 384 effective samples by using the above formula. A recovery rate of 95% was assumed for this study, so 384 surveys should be distributed. To reduce the error, 600 surveys were distributed for this study to reach the standard for validity.

3.3. Survey design

This survey was divided into four parts. The detailed survey design is shown in Table 1. Part 1 consists of the respondents' basic details, part 2 checks whether the respondents had any online shopping experiences, part 3 looks at the respondents' perception, importance and satisfaction with online shopping, while part 4 looks at the respondents' perception, importance and satisfaction with online shopping for cosmetics. The design of this study's survey was based on the relevant literatures and research framework. A Likert 5-point scale was used, with 1 meaning “strongly disagree, very unimportant, very dissatisfied”, 2 meaning “disagree, unimportant, dissatisfied”, 3 meaning “average”, 4 meaning “agree, important, satisfied” and 5 meaning “strongly agree, very important, very satisfied”. The survey consisted of four dimensions, including previous online shopping experiences, personal characteristics, seller services and external incentives.

4. Survey results

4.1. Reliability analysis

The results from the reliability analysis of the survey were shown in Table 2. The analysis shows that the reliability of the results was high. The reliability for agreement with online shopping was 0.874, that for importance in online shopping was 0.955, and that for satisfaction with online shopping was 0.920. As for the respondents with no online shopping experience, reliability was 0.807. Finally, the reliability for experience with online shopping for cosmetics was 0.919, so the survey designed and distributed for this study possessed a certain level of reliability.

4.2. Descriptive analysis of survey sample

Since we require at least 384 effective samples as mentioned above, a greater number of surveys should be distributed to increase the response rate of effective samples. Hence, in our study, a total of 600 surveys were distributed for this study. A total of 567 effective samples were recovered after the invalid responses were eliminated. Provided below is a description of the sample data on gender, age, occupation, education, place of residence, place of birth, marital status and monthly family income. As shown in Table 3, in gender “female” was the majority with 340 responses (60%) while “male” had 227 responses (40%). For age, the “21–25” bracket was the largest age group with 255 responses (45%), followed by “under 20” with 132 responses (23.3%). Occupation-wise, “student” was the majority with 300 responses (52.9%) followed by the

Table 1

The dimensions of this study's survey design.

Dimension	Category	Question
Online shopping experience	Have online shopping experiences	Have purchased products online (of any type)
		Level of satisfaction with most recently purchased product (of any type)
		Still willing to purchase products online (of any type)
		Have purchased cosmetics online
		Level of satisfaction with mostly recently purchased cosmetics
	No online shopping experiences	Still willing to purchase cosmetics online
		Not as fun as window shopping
		Cannot see the actual product
		Website contents are provided for reference only
		Product delivery speed
		Worried about product guarantee
		Questions about the seller's quality of service
		Concerns about security of payment method
		Risk of not receiving products
		Worried about of personal details being compromised
Personal characteristics	Demographic variables	No guarantee on after-sales service
		Brand reputation
		Obvious effect
		Attractive packaging
		Fresh scent
		Natural ingredients
		Reasonable price
		Spokesperson
		Suitable skin type
		Come with gifts
		Professionalism of service personnel
		Recommended by advertising
		Recommended by experts
		Product's source country
		Ease of use
Seller service	Frequency of Internet use	Gender
		Age
		Occupation
		Education
		Place of residence
		Place of birth
		Marital status
		Monthly family income
		Hours spent online each day
		Number of shopping site views each day
		Number of hours spent on shopping sites each day
		Convenient return or replacement process
		Diversification of payment methods
		Can pay online by credit card
		Can pay in installments with zero interest rate
External incentives	Ordering	Diversification of delivery methods
		Fast delivery
		Reasonable delivery costs
	Payment method	Transparent seller record
		Security of online transactions
		Diversification of seller websites
	Delivery	Elegant website design
		Easy to search for products
		Fast response to questions
	Guarantee	Easy to communicate with seller
		More product specials or promotions
		More products with free shipping
	Website design	Price cheaper than physical stores
		Easily attracted by webpage advertising
		Provide special product bundles
Service	Diversification of products	
	Easy to buy	
	Product not easy to buy on the market	
Price	Product only available online	
	Detailed product specifications and features	
Promotion		
Product attributes		

Table 1 (continued)

Dimension	Category	Question
	Quality	Better product quality
	Brand	Product is purchased according to the notability of brands
	Source of opinion	Easy to find users' reviews
		Wide diversification of advertising

Table 2
Reliability analysis of the survey.

Category	α value
Agreement with online shopping	0.874
Importance in online shopping	0.955
Satisfaction with online shopping	0.920
Without online shopping experiences for cosmetics	0.807
With online shopping experiences for cosmetics	0.919

“service industry” with 91 responses (16.0%).⁴ In education, the largest group was “university” with 388 responses (68.4%). In place of residence, the largest group was “North” with 330 responses (58.2%) followed by the “South” with 172 responses (30.3%).⁵ For marital status, the overwhelming majority were “unmarried” with 478 responses (84.3%). “Married” had just 89 responses (15.7%). For monthly family income, the largest group was “\$50,000–70,000” with 161 responses (28.4%).⁶

4.3. Gender differences in experiences for Internet use and online shopping

The *t*-test of mean difference was carried out to determine if the respondents' experiences varied due to gender. Gender shows that statistically significant differences exist in “average amount of money spent on online shopping” and “amount of money spent on recent online purchase of cosmetics”. The mean value for “average amount of money spent on online shopping” was NT \$710.661 for male respondents and NT \$1,338.841 for female respondents. Table 4 shows that statistically significant difference exists. The mean value for “amount of money spent on recent online purchase of cosmetics” was 3.28 for male respondents and 3.53 for female respondents with a *P* value of 0.007, so the difference was statistically significant. There was no statistically significant difference between the genders for “the number of hours spent online each day”, “the frequency of browsing the shopping site every day” and “the number of hours spent on shopping sites each day”.

4.4. Gender differences in cosmetics shopping experiences

Table 5 shows statistically significant differences between genders on “time spent on cosmetics”, “amount of money spent on cosmetics each month” and “amount of money spent on purchasing cosmetics each time”. The mean value for “time spent on cosmetics” was 4.90 for male respondents and 6.54 for female respondents. The *P* value was 0.000, so the difference was statistically significant. The mean value for “amount of money spent on cosmetics each month” was 612.34 for male respondents and 1132.94 for female respondents. The *P* value was 0.000, so the difference was also statistically significant. The mean value for “amount of money spent on cosmetics each time” was 742.81 for male respondents and 958.98 for female respondents. The *P* value was 0.000, so the difference was statistically significant.

4.5. Gender differences in cosmetics online shopping experiences

Table 6 shows that statistically significant differences between genders for both “time spent purchasing cosmetics online” and “level of satisfaction with the most recent online purchase of cosmetics”. The mean level of satisfaction with “time spent purchasing cosmetics online” was 1.64 for male respondents and 2.01 for female respondents. The *P* value was 0.003, so the difference was statistically significant. The mean level of satisfaction for “the most recent online purchase of cosmetics” was 3.28 for male respondents and 3.73 for female respondents. The *P* value was 0.000, so the difference was also statistically significant. There was no significant gender difference for “amount of money spent on cosmetics online each month”.

⁴ In Taiwan, it is reasonable that the university students account for a higher ratio of online shopping and Internet using. Hence, the result conducted by this study is consistent with our expectation.

⁵ In general the residence places of Taiwan are divided into five regions: north, central, south, east, and offshore. In terms of population, the people in the north region of Taiwan are the most (accounting for 1/3 of Taiwan). Therefore, the result of this study in which those in the north region of Taiwan have the most experience of online shopping is consistent with our expectation.

⁶ According to the “Survey on Internet Users in Taiwan” conducted by the Institute for Information Industry in 2011, it was shown that over 30% of the Internet users are students (referring to <http://distance.shu.edu.tw/98dmcix/d01.htm>). Although the student samples account for a higher ratio of the total samples (close to 50%), it still falls into a reasonable range. In addition, since most of the samples are no more than 35 years old, the unmarried samples accounting for a higher ratio of the total samples are consistent with our expectation.

Table 3
Analysis of respondents' background.

Variables	Frequency (person)	Percentage (%)
Gender		
Male	227	40.0
Female	340	60.0
Age		
Under 20	132	23.3
21–25	255	45.0
26–30	103	18.2
31–35	31	5.5
36–40	15	2.6
Over 41	31	5.5
Occupation		
Unemployed	20	3.5
Retired	9	1.6
Service industry	91	16.0
Casual	57	10.1
Manufacturing industry	19	3.4
Primary industry	2	0.4
Public service	15	2.6
Healthcare	18	3.2
Finance	10	1.8
Student	300	52.9
Homemaker	8	1.4
Other	18	3.2
Education		
Below junior high school	33	5.8
Senior high school/vocational	114	20.1
Undergraduate	388	68.4
Postgraduate	32	5.6
Place of residences		
South	172	30.3
Central	46	8.1
North	330	58.2
East	5	0.9
Offshore	14	2.5
Marital status		
Married	89	15.7
Unmarried	478	84.3
Monthly family income		
Less than NT \$10,000	84	14.8
NT \$10,000–30,000	76	13.4
NT \$30,001–50,000	132	23.3
NT \$50,001–70,000	161	28.4
NT \$70,001–90,000	75	13.2
More than NT \$90,001	39	6.9

Table 4
Gender differences in online experience and online shopping experiences.

Dimension	Gender	Frequency	Mean	Standard deviation	T value	Significance
The number of hours spent online each day	Male	227	3.90	1.457	1.007	0.315
	Female	340	3.78	1.474		
The number of shopping site views each day	Male	227	3.12	2.611	−1.732	0.084
	Female	340	3.52	2.687		
The number of shopping site views each day	Male	227	2.37	0.828	−1.468	0.143
	Female	340	2.49	0.970		
Amount of money spent on online shopping each month (NT \$)	Male	227	710.661	561.23	−3.491	0.001***
	Female	340	1338.841	899.41		
Level of satisfaction with the most recent online purchase (Likert 5 points)	Male	157	3.28	0.919	−2.708	0.007**
	Female	254	3.53	0.888		

* $P < 0.05$.** $P < 0.01$.*** $P < 0.001$.

Table 5
Gender differences in cosmetics shopping experiences.

Dimension	Gender	Frequency	Mean	Standard deviation	T value	Significance
Time spent on cosmetics (hours/each time)	Male	227	4.90	3.202	−5.927	0.000***
	Female	340	6.54	3.254		
Amount of money spent on cosmetics each month (NT \$)	Male	227	612.34	898.825	−5.222	0.000***
	Female	340	1132.94	1310.100		
Amount of money spent on cosmetics each time (NT \$)	Male	227	742.81	329.147	−6.933	0.000***
	Female	340	958.98	385.129		

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

Table 6
Gender differences in cosmetics online shopping experiences.

Dimension	Gender	Frequency	Mean	Standard deviation	T value	Significance
Time spent purchasing cosmetics online (hours/each time)	Male	227	1.64	1.223	−3.012	0.003**
	Female	340	2.01	1.531		
Amount of money spent on cosmetics online each month (NT \$)	Male	227	397.37	971.799	−1.249	0.212
	Female	340	493.53	845.433		
Level of satisfaction with the most recent online purchase of cosmetics (Likert 5 points)	Male	106	3.28	0.740	−4.614	0.000***
	Female	188	3.73	0.825		

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

4.6. Gender differences in agreement with online shopping

The t -test was conducted to determine if there were gender differences between respondents' level of agreement with online shopping. Table 7 shows statistically significant differences between genders for both "fun of shopping online" and "diversification of payment methods". Note that we apply a Likert scale of 1–5 in Table 7. The mean level for "fun of shopping online" was 3.53 for male respondents and 3.70 for female respondents. The P value was 0.025, so the difference was statistically significant. The mean level for "diversification of payment methods" was 3.85 for male respondents and 3.97 for female respondents. The P value was also 0.025, so the difference was statistically significant as well. Statistically significant differences existed between genders on agreement with "fast delivery" and "reasonable delivery costs" for online shopping. The mean level for "fast delivery" was 3.39 for male respondents and 3.62 for female respondents. The P value was 0.004, so the difference was statistically significant. The mean level for "reasonable delivery costs" was 3.40 for male respondents and 3.69 for female respondents. The P value was 0.000, so the difference was statistically significant as well. Significant differences were found in agreement with the five items on online shopping's "security of online transactions", "easy to buy" and "better product quality". The mean level for "security of online transactions" was 3.32 for male respondents and 3.54 for female respondents. The P value was 0.012, so the difference was statistically significant. The mean level for "easy to buy" transactions was 3.77 for male respondents and 4.28 for female respondents. The P value was 0.048, so the difference was statistically significant. The mean level for "easy to find user reviews" was 3.57 for male respondents and 3.74 for female respondents. The P value was 0.015, so the difference was statistically significant. The mean level for "better product quality" was 3.02 for male respondents and 3.29 for female respondents. The P value was 0.002, so the difference was statistically significant.

4.7. Gender differences for importance in online shopping

The t -test was conducted to determine if there were gender differences between respondents' level of importance in online shopping. From Table 8, there was a statistically significant difference between genders on the level of importance of "fun of shopping online". The mean level for "fun of shopping online" was 3.53 for male respondents and 3.70 for female respondents. The P value was 0.171, so the difference was statistically significant. There were no statistically significant differences between genders on the level of importance of "not limited by time", "convenience of shopping from home", "diversification of payment methods", "can pay online by credit card", "can pay in installments with zero interest rate", "wide diversification of advertising", "easy to search for products", "diversification of products", "easy to buy", "product not easy to buy on the market", "product only available online", "diversification of shopping websites", "more product diversification", "fast response to questions", "ease of contacting seller", "transparent seller record", "easy to find user reviews", "more products on special", "more products with free shipping", "price cheaper than physical stores", "provide special product bundles", "detailed product specifications and features", "better product quality" and "product purchased according to the notability of brands".

Table 7
Gender differences in agreement with online shopping.

Dimension	Gender	Frequency	Mean	Standard deviation	T value	Significance
Not limited by time	Male	227	4.09	0.717	0.342	0.733
	Female	340	4.06	0.849		
Convenience of shopping at home	Male	227	4.00	0.787	0.084	0.933
	Female	340	3.99	0.831		
Fun for shopping online	Male	227	3.53	0.894	−2.240	0.025 [*]
	Female	340	3.70	0.891		
Diversification of payment methods	Male	227	3.85	0.763	−1.961	0.050 [*]
	Female	340	3.97	0.758		
Can pay online by credit card	Male	225	3.80	0.811	0.022	0.983
	Female	340	3.80	0.798		
Can pay in installments with zero interest rate	Male	225	3.84	0.739	1.546	0.123
	Female	340	3.74	0.747		
Convenient return or replacement process	Male	227	3.07	0.916	−0.752	0.453
	Female	340	3.14	1.025		
Diversification of delivery methods	Male	227	3.76	0.740	−1.734	0.084
	Female	340	3.87	0.805		
Fast delivery	Male	227	3.39	0.888	−2.900	0.004 ^{**}
	Female	340	3.62	0.959		
Reasonable delivery costs	Male	227	3.40	0.788	−4.177	0.000 ^{***}
	Female	340	3.69	0.819		
Security of online transactions	Male	227	3.32	0.958	−2.527	0.012 [*]
	Female	340	3.54	1.005		
Elegant website design	Male	227	3.62	0.802	−1.380	0.168
	Female	340	3.72	0.825		
Attracted by webpage advertising	Male	225	3.60	0.931	0.215	0.830
	Female	340	3.58	0.973		
Wide diversification of advertising	Male	225	3.80	0.744	−0.483	0.629
	Female	340	3.83	0.801		
Easy to search for products	Male	225	3.75	0.892	−1.384	0.167
	Female	340	3.85	0.832		
Diversification of products	Male	225	4.00	0.698	−0.954	0.341
	Female	340	4.11	1.785		
Easy to buy	Male	225	3.77	0.865	−2.033	0.043 [*]
	Female	340	4.28	3.666		
Product not easy to buy on the market	Male	225	3.87	0.766	0.638	0.524
	Female	340	3.83	0.757		
Product online available online	Male	225	3.83	0.797	0.776	0.438
	Female	340	3.77	0.797		
Diversification of seller websites	Male	225	3.83	0.751	−1.805	0.072
	Female	340	3.95	0.793		
More product diversification	Male	225	3.89	0.757	0.362	0.717
	Female	340	3.86	0.790		
Fast response to questions	Male	225	3.40	0.866	−1.985	0.048 [*]
	Female	340	3.55	0.859		
Ease of contacting seller	Male	225	3.42	0.853	−0.566	0.572
	Female	340	3.46	0.887		
Transparent seller record	Male	225	3.67	0.896	−1.852	0.065
	Female	340	3.81	0.876		
Easy to find user reviews	Male	225	3.57	0.822	−2.438	0.015 [*]
	Female	340	3.74	0.846		
More products on special	Male	225	3.77	0.694	0.626	0.532
	Female	340	3.73	0.759		
More products with free shipping	Male	225	3.47	0.911	−0.147	0.883
	Female	340	3.48	0.871		
Price cheaper than physical stores	Male	225	3.90	0.722	−0.035	0.972
	Female	340	3.90	0.746		
Provide special product bundles	Male	225	3.61	0.794	−0.556	0.579
	Female	339	3.68	1.805		
Detailed product specifications and features	Male	225	3.39	0.900	−1.893	0.059
	Female	340	3.54	0.966		
Better product quality	Male	225	3.02	0.911	−3.181	0.002 ^{**}
	Female	340	3.29	1.021		
Product is by well-known brand	Male	225	3.56	0.838	−0.988	0.324
	Female	340	3.72	2.387		

* $P < 0.05$.** $P < 0.01$.*** $P < 0.001$.

Table 8
Gender differences for importance in online shopping.

Dimension	Gender	Frequency	Mean	Standard deviation	T value	Significance
Not limited by time	Male	225	4.09	1.017	−0.239	0.812
	Female	340	4.06	0.925		
Convenience of shopping from home	Male	225	4.00	0.913	1.317	0.188
	Female	340	3.99	0.978		
Fun of shopping online	Male	225	3.53	0.927	−1.372	0.171
	Female	340	3.70	1.885		
Diversification of payment methods	Male	225	3.85	0.963	−0.235	0.814
	Female	340	3.97	0.964		
Can pay online by credit card	Male	224	3.80	1.046	−0.871	0.384
	Female	340	3.80	1.136		
Can pay in installments with zero interest rate	Male	224	3.84	1.011	−1.861	0.063
	Female	340	3.74	1.143		
Convenient return or replacement process	Male	225	3.07	0.937	−1.789	0.074
	Female	340	3.14	0.970		
Diversification of delivery methods	Male	225	3.76	1.004	0.287	0.774
	Female	340	3.87	0.917		
Fast delivery	Male	225	3.39	1.015	−1.065	0.288
	Female	340	3.62	0.945		
Reasonable delivery costs	Male	225	3.40	0.992	−1.063	0.288
	Female	340	3.69	0.921		
Security of online transactions	Male	225	3.32	0.982	−2.792	0.005*
	Female	340	3.54	0.934		
Elegant website design	Male	225	3.62	0.909	−1.194	0.233
	Female	340	3.72	0.991		
Easily attracted by webpage advertising	Male	225	3.60	0.985	−0.138	0.890
	Female	340	3.58	1.894		
Wide diversification of advertising	Male	225	3.80	0.945	−0.277	0.782
	Female	340	3.83	0.970		
Easy to search for products	Male	225	3.75	0.920	−0.693	0.488
	Female	340	3.85	0.858		
Diversification of products	Male	225	4.00	0.888	−0.845	0.399
	Female	340	4.11	0.892		
Easy to buy	Male	225	3.77	0.978	−0.935	0.350
	Female	340	4.28	0.925		
Product not easy to buy on the market	Male	225	3.87	0.959	0.988	0.324
	Female	340	3.83	0.919		
Product online available online	Male	224	3.83	0.894	1.248	0.213
	Female	339	3.77	0.833		
Diversification of seller websites	Male	225	3.83	0.839	0.469	0.640
	Female	340	3.95	0.914		
More product diversification	Male	224	3.89	0.861	−0.713	0.476
	Female	340	3.86	0.958		
Fast response to questions	Male	225	3.40	0.926	−0.545	0.586
	Female	340	3.55	0.930		
Ease of contacting seller	Male	225	3.42	0.939	−1.451	0.147
	Female	340	3.46	0.923		
Transparent seller record	Male	225	3.67	0.916	−0.0504	0.615
	Female	340	3.81	1.011		
Easy to find user reviews	Male	225	3.57	0.904	1.007	0.315
	Female	340	3.74	0.981		
More products on special	Male	225	3.77	0.886	0.579	0.563
	Female	340	3.73	0.933		
More products with free shipping	Male	225	3.47	0.941	−0.658	0.511
	Female	340	3.48	0.952		
Price cheaper than physical stores	Male	225	3.90	0.888	−1.031	0.303
	Female	340	3.90	0.942		
Provide special product bundles	Male	225	3.61	0.937	0.946	0.345
	Female	340	3.68	0.926		
Detailed product specifications and features	Male	225	3.39	0.930	−0.247	0.805
	Female	340	3.54	0.951		
Better product quality	Male	225	3.02	0.953	−0.304	0.761
	Female	340	3.29	0.904		
Product is by well-known brand	Male	225	3.56	1.045	−0.157	0.875
	Female	340	3.72	0.949		

4.8. Gender differences in satisfaction with online shopping

The *t*-test was conducted to determine if there were gender differences between respondents' level of satisfaction with online shopping. Table 9 shows that statistically significant differences existed between genders on level of satisfaction with six items: "convenience of shopping from home", "fun of shopping online", "can pay in installments with zero interest rate", "convenient return or replacement process", "reasonable delivery costs" and "more products on special". The mean level for "convenience of shopping from home" was 3.84 for male respondents and 4.04 for female respondents. The *P* value was 0.018, so the difference was statistically significant. The mean level for "fun of online shopping" was 3.62 for male respondents and 3.83 for female respondents. The *P* value was 0.010, so the difference was statistically significant. The mean level for "can pay in installments with zero interest rate" was 3.34 for male respondents and 3.56 for female respondents. The *P* value was 0.002, so the difference was statistically significant. The mean level for "convenient return or replacement process" was 3.30 for male respondents and 3.58 for female respondents. The *P* value was 0.043, so the difference was statistically significant. The mean level for "reasonable delivery costs" was 3.36 for male respondents and 3.54 for female respondents. The *P* value was 0.043, so the difference was statistically significant. The mean level for "more products on special" was 3.43 for male respondents and 3.69 for female respondents. The *P* value was 0.001, so the difference was statistically significant.

4.9. Gender differences in perceived importance without online shopping experiences

The *t*-test was conducted to determine if gender differences existed in perceived importance without online shopping experiences. There were statistically significant differences between genders on four items: "the website contents are provided for reference only", "product delivery speed", "worried about product guarantee" and "questions about seller's quality of service". The mean level for "the website contents are provided for reference only" was 4.17 for male respondents and 3.80 for female respondents. From Table 10, it can be seen that the *P* value was 0.002, so the difference was statistically significant. The mean level for "product delivery speed" was 3.76 for male respondents and 3.51 for female respondents. The *P* value was 0.036, so the difference was statistically significant. The mean level for "worried about product guarantee" was 4.39 for male respondents and 3.99 for female respondents. The *P* value was 0.002, so the difference was statistically significant. The mean level for "questions about seller's quality of service" was 4.41 for male respondents and 3.95 for female respondents. The *P* value was 0.000, so the difference was statistically significant. There were no significant gender differences on importance of "online shopping not as fun as window shopping", "cannot see the actual product", "concerns about security of payment method", "risk of not receiving product", "worried about personal details being compromised" and "no guarantee on after-sales service".

4.10. Gender differences in importance when purchasing cosmetics online

The *t*-test was conducted to determine if there were gender differences between respondents on the level of importance when purchasing cosmetics online. There were significant gender differences in the importance of four items: "brand reputation", "fresh scent", "natural ingredients" and "reasonable prices". In Table 11, the mean level for "brand reputation" was 3.92 for male respondents and 3.57 for female respondents. The *P* value was 0.001, so the difference was statistically significant. The mean level for "fresh scent" was 3.57 for male respondents and 3.78 for female respondents. The *P* value was 0.048, so the difference was statistically significant. The mean level for "natural ingredients" was 3.67 for male respondents and 4.05 for female respondents. The *P* value was 0.001, so the difference was statistically significant. The mean level for "reasonable price" was 3.91 for male respondents and 4.17 for female respondents. The *P* value was 0.030, so the difference was statistically significant. There were also statistically significant differences between the genders for the following four items: "suitable skin type", "professionalism of service personnel", "recommended by advertising" and "ease of use". The mean level for "suitable skin type" was 3.75 for male respondents and 4.18 for female respondents. The *P* value was 0.001, so the difference was statistically significant. The mean level for "professionalism of service personnel" was 3.66 for male respondents and 3.91 for female respondents. The *P* value shown in Table 11 was 0.010, so the difference was statistically significant. The mean level for "recommended by advertising" was 3.42 for male respondents and 3.72 for female respondents. The *P* value was 0.012, so the difference was statistically significant. The mean level for "ease of use" was 3.75 for male respondents and 4.02 for female respondents. The *P* value was 0.019, so the difference was statistically significant.

4.11. Gender differences in satisfaction with cosmetics purchased online

The *t*-test was conducted to determine if there were gender differences between respondents on the level of satisfaction with cosmetics purchased online. Statistically significant gender differences were found in the level of satisfaction with "reasonable prices", "product's source country" and "ease of use". The mean level for "reasonable prices" was 3.45 for male respondents and 3.75 for female respondents. Table 12 shows that the *P* value was 0.015, so the difference was statistically significant. The mean level for "product's source country" was 3.60 for male respondents and 3.88 for female

Table 9
Gender differences in satisfaction with online shopping.

Dimension	Gender	Frequency	Mean	Standard deviation	T value	Significance
Not limited by time	Male	157	3.91	0.796	−1.518	0.130
	Female	254	4.04	0.817		
Convenience of shopping from home	Male	157	3.84	0.755	−2.370	0.018 [*]
	Female	254	4.04	0.840		
Online shopping is fun	Male	157	3.62	0.797	−2.587	0.010 ^{**}
	Female	254	3.83	0.819		
Diversification of payment methods	Male	157	3.73	0.683	−1.020	0.308
	Female	254	3.81	0.743		
Can pay online by credit card	Male	157	3.39	0.799	−1.169	0.243
	Female	254	3.50	0.884		
Can pay in installments with zero interest rate	Male	157	3.34	0.626	−3.066	0.002 ^{**}
	Female	254	3.56	0.740		
Convenient return or replacement process	Male	157	3.30	0.780	−3.357	0.001 ^{***}
	Female	254	3.58	0.861		
Diversification of delivery methods	Male	157	3.68	0.818	0.377	0.706
	Female	254	3.65	0.739		
Fast delivery	Male	157	3.48	0.837	0.144	0.885
	Female	254	3.47	0.768		
Reasonable delivery costs	Male	157	3.36	0.848	−2.030	0.043 [*]
	Female	254	3.54	0.860		
Security of online transactions	Male	157	3.52	0.997	−1.109	0.268
	Female	254	3.63	0.965		
Elegant website design	Male	157	3.74	0.681	0.140	0.889
	Female	254	3.73	0.776		
Easily attracted by webpage advertising	Male	157	3.64	0.769	−0.109	0.914
	Female	254	3.65	0.805		
Wide diversification of advertising	Male	157	3.62	0.694	−1.454	0.147
	Female	254	3.73	0.781		
Easy to search for products	Male	157	3.84	0.738	−0.214	0.831
	Female	254	3.86	0.846		
Diversification of products	Male	157	3.82	0.715	0.159	0.873
	Female	254	3.80	0.770		
Easy to buy	Male	157	3.87	0.885	−0.469	0.639
	Female	254	3.91	0.785		
Product not easy to buy on the market	Male	157	3.80	0.814	−0.832	0.406
	Female	254	3.87	0.837		
Product online available online	Male	157	3.71	0.793	1.047	0.296
	Female	254	3.63	0.719		
Diversification of seller websites	Male	157	3.79	0.707	−1.316	0.189
	Female	254	3.89	0.772		
More product diversification	Male	157	3.81	0.744	−1.242	0.215
	Female	254	3.91	0.780		
Fast response to questions	Male	157	3.48	0.837	−1.122	0.262
	Female	254	3.57	0.806		
Ease of contacting seller	Male	157	3.50	0.798	−0.507	0.612
	Female	254	3.54	0.767		
Transparent seller record	Male	157	3.64	0.899	0.740	0.460
	Female	254	3.57	1.002		
Easy to find user reviews	Male	157	3.61	0.897	0.376	0.707
	Female	254	3.57	0.898		
More products on special	Male	157	3.43	0.811	−3.408	0.001 ^{***}
	Female	254	3.69	0.711		
More products with free shipping	Male	157	3.31	0.953	−1.057	0.291
	Female	254	3.42	0.998		
Price cheaper than physical stores	Male	157	3.74	0.752	1.167	0.244
	Female	254	3.65	0.754		
Provide special product bundles	Male	157	3.61	0.758	−1.436	0.152
	Female	254	3.72	0.769		
Detailed product specifications and features	Male	157	3.57	0.900	0.940	0.348
	Female	254	3.48	0.952		
Better product quality	Male	157	3.25	0.933	−1.534	0.126
	Female	254	3.41	1.028		
Product is by well-known brand	Male	157	3.61	0.766	−0.160	0.873
	Female	254	3.62	0.820		

^{*} $P < 0.05$.

^{**} $P < 0.01$.

^{***} $P < 0.001$.

Table 10
Gender differences in perceived importance without online shopping experiences.

Dimension	Gender	Frequency	Mean	Standard deviation	T value	Significance
Online shopping not as fun as window shopping	Male	70	2.94	0.832	-1.201	0.232
	Female	86	3.10	0.841		
Cannot see the actual product	Male	70	4.34	0.587	1.170	0.244
	Female	86	4.22	0.693		
Website contents are provided for reference only	Male	70	4.17	0.722	3.230	0.002**
	Female	86	3.80	0.700		
Product delivery speed	Male	70	3.76	0.690	2.111	0.036 [†]
	Female	86	3.51	0.747		
Worried about product guarantee	Male	70	4.39	0.708	3.101	0.002**
	Female	86	3.99	0.861		
Questions about the seller's quality of service	Male	70	4.41	0.771	3.728	0.000***
	Female	86	3.95	0.766		
Concerns about security of payment method	Male	70	4.00	0.978	-0.577	0.565
	Female	86	4.08	0.785		
Risk of not receiving product	Male	70	4.16	0.773	-0.216	0.829
	Female	86	4.19	0.875		
Worried about of personal details being compromised	Male	70	4.00	0.834	1.026	0.307
	Female	86	3.85	0.976		
No guarantee on after-sales service	Male	70	4.00	0.868	1.096	0.275
	Female	86	3.85	0.847		

* $P < 0.05$.** $P < 0.01$.*** $P < 0.001$.**Table 11**
Gender differences in importance when purchasing cosmetics online.

Dimension	Gender	Frequency	Mean	Standard deviation	T value	Significance
Brand reputation	Male	106	3.92	0.825	3.300	0.001***
	Female	188	3.57	0.919		
Obvious effect	Male	106	4.17	0.798	-1.960	0.051
	Female	188	4.35	0.703		
Attractive packaging	Male	106	3.57	0.926	-0.289	0.773
	Female	188	3.60	0.799		
Fresh scent	Male	106	3.57	1.087	-1.985	0.048 [†]
	Female	188	3.78	0.767		
Natural ingredients	Male	106	3.67	1.030	-3.311	0.001***
	Female	188	4.05	0.885		
Reasonable price	Male	106	3.91	1.167	-2.180	0.030 [†]
	Female	188	4.17	0.891		
Spokesperson	Male	106	3.02	0.995	1.339	0.182
	Female	188	2.87	0.843		
Suitable skin type	Male	106	3.75	1.155	-3.481	0.001***
	Female	188	4.18	0.953		
Comes with giveaway	Male	106	3.32	0.890	-0.090	0.929
	Female	188	3.33	0.793		
Professionalism of service personnel	Male	106	3.66	0.791	-2.581	0.010**
	Female	188	3.91	0.823		
Recommended by advertising	Male	106	3.42	1.068	-2.539	0.012 [†]
	Female	188	3.72	0.931		
Recommended by expert	Male	106	3.76	0.991	-0.251	0.802
	Female	188	3.79	0.898		
Product's source country	Male	106	3.94	0.815	-1.337	0.182
	Female	188	4.09	0.903		
Ease of use	Male	106	3.75	0.964	-2.365	0.019**
	Female	188	4.02	0.907		

* $P < 0.05$.** $P < 0.01$.*** $P < 0.001$.

respondents. The P value was 0.015 so the gender difference was statistically significant. The mean level for "ease of use" was 3.72 for male respondents and 3.92 for female respondents. The P value was 0.032, so the difference was statistically significant. As for level of satisfaction with "brand reputation", "obvious effect", "attractive packaging", "fresh scent", "natural ingredients", "spokesperson", "suitable skin type", "includes giveaway", "professionalism of service personnel", "recommended by advertising" and "recommended by expert", there were no statistically significant gender differences.

Table 12

Gender differences in satisfaction with cosmetics purchased online.

Dimension	Gender	Frequency	Mean	Standard deviation	T value	Significance
Brand reputation	Male	106	3.66	0.755	−0.051	0.959
	Female	188	3.66	0.709		
Obvious make-up effect	Male	106	3.80	0.833	0.690	0.491
	Female	188	3.73	0.797		
Attractive packaging	Male	106	3.59	0.826	1.471	0.142
	Female	188	3.46	0.681		
Fresh scent	Male	106	3.70	0.679	0.016	0.988
	Female	188	3.70	0.693		
Natural ingredients	Male	106	3.79	0.686	1.000	0.318
	Female	188	3.70	0.839		
Reasonable price	Male	106	3.45	1.088	−2.457	0.015*
	Female	188	3.75	0.940		
Spokesperson	Male	106	3.45	0.917	0.112	0.911
	Female	188	3.44	0.789		
Suitable skin type	Male	106	3.76	0.698	−0.842	0.400
	Female	188	3.84	0.771		
Comes with giveaway	Male	106	3.21	0.913	−1.736	0.084
	Female	188	3.40	0.905		
Professionalism of service personnel	Male	106	3.58	0.660	−1.747	0.082
	Female	188	3.74	0.800		
Recommended by advertising	Male	106	3.64	0.733	−0.023	0.981
	Female	188	3.64	0.743		
Recommended by expert	Male	106	3.47	1.044	−1.132	0.259
	Female	188	3.59	0.744		
Product's source country	Male	106	3.60	0.764	−2.890	0.004**
	Female	188	3.88	0.812		
Ease of use	Male	106	3.72	0.714	−2.159	0.032*
	Female	188	3.92	0.807		

*** $P < 0.001$.** $P < 0.01$.* $P < 0.05$.

5. Conclusion

Due to increasing pricing levels and material costs over years, enterprises have intended to lower their financial costs by Internet marketing, by which renting cost, facility setup cost, and manpower cost can be saved, and advertising cost is lowered for increasing more potential customers. From the aspect of marketing, low advertising cost creates more potential customers. From the aspect of logistics, electronics commerce shortens the delivery, decreases the procurement cost, decreases unconfirmed orders, increases the control ability for the supply chain, electronizes the operations of transaction, transportation, storehouse, and payments to analyze customers' procurement data with precise prediction on the supply to customers, etc. Hence, Internet marketing has become a market territory for which each enterprise competes. The results from this study show significant gender differences among consumers when purchasing cosmetics in terms of perception, importance and satisfaction. They also show that significant gender differences exist in "average amount of money spent on online shopping", "the most recent online purchase of cosmetics", "time spent on cosmetics", "amount of money spent each month on cosmetics", "amount of money spent per time on cosmetics", "the time spent buying cosmetics online", and "satisfaction with the most recent online purchase of cosmetics". There were also significant differences in the level of importance assigned to "brand reputation", "fresh scent", "natural ingredients", "reasonable price", "suitable skin type", "professionalism of service personnel", "recommended by advertising" and "ease of use". Marital status made a statistically significant difference to the level of satisfaction with online shopping characteristics such as "not limited by time", "reasonable delivery costs", "elegant website design", "easily attracted by webpage advertising", "easy to search for products", "diversification of products", "easy to buy" and "price cheaper than physical stores". As for the level of satisfaction with purchasing cosmetics online, the difference was statistically significant for "attractive packaging", "natural ingredients", "spokesperson" and suitable skin type".

Additionally, in comparison to male respondents, as female respondents attached a higher level of importance to "security of online transactions", online vendors should therefore offer more secure transaction methods for female consumers. Online payment validation should also be used to provide consumers with a more secure payment method. For the "Price" dimension, as compared to male respondents, female respondents exhibited a higher level of satisfaction, which implied relatively higher prices for male cosmetic products. This study, therefore, suggests that online vendors offer better prices on male cosmetic products or offer different discount methods to make male consumers more likely to shop online.

As for "the website content is provided for reference only", "product delivery speed", "worried about product guarantee" and "questions about the seller's quality of service", male respondents scored higher than female respondents, so online vendors should consider providing more detailed explanations for female consumers and also providing faster and more convenient services for female products. Finally, more comprehensive after-sales support and quality guarantees should

be offered to make female consumers more likely to shop online. As for perceived importance of “brand reputation”, the score was higher among male consumers. This suggests that male consumers pay more attention to the brand reputation of cosmetics when shopping online. Online vendors should, therefore, seek to build a good product reputation for male consumers in order to increase their chances of buying cosmetics online. Here the product’s “fresh scent”, “natural ingredients”, “reasonable prices”, “suitable skin type”, “professionalism of service personnel”, “recommended by advertising” and “ease of use” show a higher level of perceived importance among female consumers. Online vendors should, therefore, target female consumers by providing products that have a fresher scent, more natural ingredients, more reasonable pricing, and are more suited to female consumers’ skin types. Services, advertising and the method of use need to be better tailored to female consumers as well to increase their chances of purchasing cosmetics online.

References

- [1] H.C. Chu, D.J. Deng, J.H. Park, Live data mining concerning social networking forensics based on a Facebook session through aggregation of social data, *IEEE J. Sel. Areas Commun.* 29 (7) (2011) 1368–1376.
- [2] D.J. Deng, R.S. Cheng, H.J. Chang, H.T. Lin, R.S. Chang, A cross-layer congestion and contention window control scheme for TCP performance improvement in wireless LANs, *Telecommunication Systems* 42 (1–2) (2009) 17–27.
- [3] H.W. Wang, C.L. Ho, Key dimensions of consumer behavior on B2C web sites, *Operating Management Reviews* 2 (1) (2006) 1–28.
- [4] R. Kalakota, M. Robinson, *E-Business: Roadmap for Success*, second ed., Addison-Wesley, 2001.
- [5] Institute for Information Industry, *Study of Online Consumer Behavior and Business Models*, Market Intelligence and Consulting Institute, Taipei, 2008.
- [6] W.C. Chou, *Business Opportunity of Taiwan IT Services Industry under the Worldwide RFID Growing Trend*, Market Intelligence and Consulting Institute, Taipei, 2007.
- [7] C.Y. Lin, Cosmetics brands go forward to males’ market, *Business Weekly* 911 (2005) 240–242.
- [8] T. Ahn, S. Ryu, I. Han, The impact of the online and offline features on the user acceptance of Internet shopping malls, *Electronic Commerce Research and Applications* 3 (4) (2004) 405–420.
- [9] E.K. Clemons, G. Gao, Consumer informedness and diverse consumer purchasing behaviors: traditional mass-market, trading down, and trading out into the long tail, *Electronic Commerce Research and Applications* 7 (1) (2008) 3–17.
- [10] C.M. Angst, R. Agarwal, J. Kuruzovich, Bid or buy? individual shopping traits as predictors of strategic exit on on-line auctions, *International Journal of Electronic Commerce* 13 (1) (2008) 59–84.
- [11] J. Usunier, N. Roulin, B.S. Ivens, Cultural, national, and industry-level differences in B2B web site design and content, *International Journal of Electronic Commerce* 14 (2) (2009–10) 41–87.
- [12] H. Doong, H. Wang, Do males and females differ in how they perceive and elaborate on agent-based recommendations in Internet-based selling? *Electronic Commerce Research and Applications* 10 (5) (2010) 595–604.
- [13] R. Kalakota, A.B. Whinston, *Electronic Commerce – A Manager’s Guide*, Addison Wesley, Massachusetts, 1997.
- [14] M.H. Wang, K.C. Yeh, The relationships between web-characteristics perceptions of young web users and Internet purchase intention, *Journal of Information Management-Concepts, Systems, and Applications* 5 (1) (2003) 19–44.
- [15] K.E.H. Lee, G. Ward, *Long-term Time Series Behavior of Salinity in a Texas Estuary*, tenth ed., Prentice-Hall, New York, 1997.
- [16] J. Covalleski, Panel: Internet marketing may reduce prices, *Best’s Review P/C* 97 (12) (1997) 71–72.
- [17] C. Koçaş, A model of Internet pricing under price-comparison shopping, *International Journal of Electronic Commerce* 10 (1) (2005) 111–134.
- [18] R.R. Burke, Do you see what I see? the future of virtual shopping, *Journal of the Academy of Marketing Science* 25 (4) (1997) 352–360.
- [19] S.L. Jarvenpaa, P.A. Todd, Consumer reactions to electronic shopping on the world wide web, *International Journal of Electronic Commerce* 1 (2) (1997) 59–88.
- [20] M.K.O. Lee, E. Turban, A trust model for consumer internet shopping, *International Journal of Electronic Commerce* 6 (1) (2001) 75–91.
- [21] S.Y. Lin, *Internet Situation and Future*, Market Intelligence and Consulting Institute, Taipei, 1997.
- [22] K.P. Chen, An introduction of internet auction, *Academia Sinica Weekly Publication* 1196 (2008) 1–3.
- [23] C.J. Wang, Internet survey: group analysis that office workers lead internet in Taiwan, *CommonWealth Magazine* 198 (1997) 124.
- [24] P.H. Chi, A study on the choice of females cosmetics retail channel, Master Thesis, National Taiwan University, 1995.
- [25] S.F. Lin, Female consumers’ buying behavior of cosmetic product – a case of Tainan female consumers, Master Thesis, National Cheng Kung University, 2005.
- [26] K.H. Lai, A study on the purchasing behaviors of male skin care products, Master Thesis, Southern Taiwan University, 2005.
- [27] R.J. Jian, A research on consumption of the skincare products for men in Taipei, Master Thesis, National Chengchi University, 1985.
- [28] H.J. Lai, A study of key success factors of adult skin care for man market, Master Thesis, Tamkang University, 2005.