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Design of an E-Commerce Platform for Protective Gear Products from the Consumer Perspective - A Study on User Satisfaction

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Abstract

E-commerce has been around for many years. As people's needs change, many product-based and service-based e-commerce platforms have emerged. However, research on the design of e-commerce platforms related to protective gear products has been relatively unpopular. This study starts from the perspective of consumers and studies what elements need to be considered when designing e-commerce platforms for experience-based products of protective gear, and what their impact on "user satisfaction" is. This study targeted consumers aged 18 to 75 who used the platform in Hsinchu, Taiwan. A total of 300 valid questionnaires were collected, and descriptive statistical analysis, reliability analysis, correlation analysis, and regression analysis were performed using SPSS statistical software. The results of this study showed that the e-commerce platform design of protective gear products affects "user satisfaction", and the results were partially established; the "information richness" dimension, "operation practicality", and "service comfort" of the "e-commerce platform design of protective gear products" had a significant positive impact on "user satisfaction". The "system security" of "e-commerce platform design for protective gear products" has no significant impact on "user satisfaction".

Keywords: Protective gear products, Platform design, User satisfaction.

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1. Introduction

E-commerce has been developed for many years. With the continuous evolution of consumer demands, various types of product-based and service-based e-commerce platforms have emerged (Luo Kaili, 2022). Numerous studies have been conducted on platform design (Guo Yiyu, 2022). However, protective gear products, which belong to the category of experiential goods, are rarely sold online, and research specifically addressing the design of e-commerce platforms for such products is limited.

Although experiential goods are typically sold in offline physical stores (Lin Yujie, 2015), it is not uncommon to find wearable products—such as clothing, hair accessories, and footwear—available on e-commerce platforms. Similarly, protective gear also falls into the category of experiential goods. These products serve not only elderly individuals and workers seeking injury prevention, but also younger consumers engaged in sports activities (Lin Huici, 2013). Notably, most young consumers have shifted from physical store shopping to online purchases. Ding, Y.Q. (2021) highlighted that advancements in internet technology and the proliferation of smartphones have transformed the shopping habits of younger demographics from offline to online channels. Responding to this consumer trend, this study focuses on designing e-commerce platforms specifically for protective gear products.

For consumers, one of the key concerns is whether the design principles of product-oriented e-commerce platforms differ from those of platforms tailored for experiential products such as protective gear. To gain deeper insights into the necessity of specific platform features from the consumer's perspective, this study distributed structured questionnaires to evaluate user demand for different functions in an online protective gear platform. Based on consumer feedback, essential platform features were identified and prioritized.

The main objectives are to:

Investigate the influence of e-commerce platforms for protective gear on user satisfaction.

This study hopes to understand how the design of an e-commerce platform affects "user satisfaction" to help the industry adjust its design. This will help businesses increase the attention and "user satisfaction" of e-commerce platform users and increase users' willingness to buy.

2. Literature Review

This chapter explores the essential functions and design elements of e-commerce platforms for experiential products, specifically protective gear. By reviewing both domestic and international literature, this study identifies key factors that influence consumer perceptions and purchasing behavior when evaluating such platforms.

2.1 Experiential Products - Protective Gear Products

Protective gear falls under the category of experiential products and is classified within the "personal care and protective aids" group, specifically those worn on the body. This category includes head protection, facial and eye protection, hearing protection, arm and elbow guards, hand protection, knee and leg guards, foot and toe protection, full-body protection, and airway protection. Examples include helmets, safety goggles, earmuffs, heat-resistant gloves, and hip-protective pants (Chang Lishan, 2014). These products are worn directly on the body, providing immediate tactile feedback such as tightness or pressure, which can relieve pain in specific areas (Chang Hsin-fang, 2018). When purchasing such products in physical stores, consumers often benefit from in-person explanations and the ability to try on the gear to assess comfort and effectiveness.

Chang Weibin (2011) proposed the concept of experiential marketing from five dimensions: sense, emotion, thought, association, and action. The tactile experience of wearing protective gear and feeling localized pressure can create personalized sensory feedback. During product demonstrations, emotional responses may be triggered, promoting ideas such as “prevention is better than treatment” or encouraging filial piety, especially in protective gear for elders. In social media contexts, consumers may share their protective gear use in everyday life, reinforcing the practical value of such products in sports and labor scenarios.

2.2 The Design of the e-commerce Platform

Protective gear products are experiential products. Should the "functions" and "elements" of e-commerce platform design be different from those of service-oriented e-commerce platforms? Are there different design elements for e-commerce platforms that offer protective gear and experiential products? Whether the innovative e-commerce platform is designed to attract consumers' attention, Wei Liling (2013) believes that even if an online store has a good reputation and good products, it will not be able to retain consumers' attention and purchasing intention without a good website design. How to convert consumers in offline physical stores into online consumers of the website when browsing the web is the main goal of this study on the design of the protective gear e-commerce platform. Therefore, whatever website is designed is suitable, or even more important to users.

Wei Liling (2013) divides shopping website platform design into five major aspects: 1. Web page layout, screen, and other visual designs; 2. Information and support system interface engine optimization, keyword advertising, hyperlinks, etc.; 3. Establishing social networks for real-time problem-solving or information communication; 4. Security and convenience of the network environment; 5. Flexibility of transactions and learning effectiveness, multiple payment methods, sharing of experience of consumer pleasure to stimulate learning effectiveness. The content designed by the above platform applies to any product and service. However, this study believes that in addition to web page design, the platform design of protective gear experience products also needs to add visual and auditory sensory

stimulation of audio and video, which is believed to be more able to stimulate consumers' demand. Therefore, in addition to web page design, the e-commerce platform design of protective gear also adds audio and video content, and the richness of the content should be increased, such as detailed explanations of protective gear product styles and sharing of personal experiences of consumers who have used protective gear.

Cai Yilin (2013) divided website characteristics into web design, website content, website security and privacy, and trust. They believe that the design of a website should be user-friendly, and the content should not only be correct, rich, and timely, but the website's security and privacy protection should also reassure consumers, gain the trust of online consumers, and at the same time increase their willingness to buy. Undoubtedly, when designing the e-commerce platform for protective gear, security and trust considerations must also be considered. The platform design principles of (Huang et al. 2013) are summarized into five categories: 1. Usability: users obtain information. 2. Information quality: The website provides information of better quality and in an easy-to-understand format. 3. System quality: The website has a high level of system quality, whether in terms of the website's appearance, content, functions, navigation, etc. 4. Service quality: after-sales service or immediate feedback. 5. Fun: The website provides entertainment functions, which can not only stimulate consumers to browse and buy but also make consumers feel happy.

2.3. User Satisfaction

Regarding the relevant literature on user satisfaction of e-commerce platforms, Tsai, S. F. (2018) verified that the aesthetic design of web pages has a significant and positive impact on users' internal evaluation. He took mobile shopping APP users as the research objects to explore the relationship between technology introduction and service quality, customer satisfaction, and customer loyalty. He believed that customer satisfaction is the satisfaction or dissatisfaction that consumers feel after using the product, that is, the degree of satisfaction felt by consumers, which is caused by the difference in pre-use experience (Lin Huici, 2013). User satisfaction in this study refers to whether the functions and services provided by the protective gear product e-commerce platform meet the needs of consumers. If the user satisfaction survey results are high, it means that the design of the protective gear product e-commerce platform meets consumers' expectations; if the user satisfaction survey results are low that consumers are dissatisfied with the design of the protective gear product e-commerce platform. Adjustments can be made based on users' dissatisfaction with the platform, and then it can be provided to protective gear product manufacturers as a reference for improving the e-commerce platform (Huang Shengru &Chang Zhixiong, 2010).

Based on the literature on e-commerce platform design mentioned by the scholars mentioned above, this study comprehensively summarizes the design principles of e-commerce platforms (as shown in Table 1).

Table 1: E-commerce platform design principles

Scholar	Design Principles	Content
Huang, Z., & Benyoucef, M.,2013,	Usability	Refers to the efficiency with which users can obtain information or achieve specific goals on a website.
	Information quality	The information or content provided by the website must be easy to understand
	System quality	Focuses on the appearance, content, functionality, navigation, and security of the website.
	Service quality	The attitude and service of the store are reflected when consumers give comments or opinions on the website.
	Fun	Provide entertainment functions to attract consumers to browse.
Ranganathan,C., & Ganapathy, S. (2002)	Information content	Provide complete product information and services, quickly obtain information through search engines, and provide consumers with assistance in decision-making
	Design	Provides easy operation and beautiful design
	Security	Ensure the safety of money transactions
	Privacy	Ensure that personal data is not misused
Wei Liling (2013)	Web design	layout, graphics, and other visual design
	Information and support system	Interface engine optimization, keyword advertising, hyperlinks
	Establish a social network	For crisis management or information communication
	Internet environment	Convenient Internet search, convenience of obtaining products, and transaction security
	Transaction and learning effectiveness	Flexible payment methods, Experience sharing and exchange of consumption pleasure, Stimulate learning effectiveness
Cai Yilin (2013)	Web Design	Layout
	Website Content	Product Content
	Website Security	Privacy and Trust
Chen Hongxin (2010)	Website design	Price, product information, shipping instructions, payment terms, etc., presentation mode
	Website interface	Reading convenience, web browsing, and shopping process fluency and simplicity, such as the design precision of the website interface, web design, etc.

Source: Compiled from this study

Scholars' platform design methods are similar, but there are some differences in the explanation and naming of the general principles of the platform. This study integrates the design principles of e-commerce platforms by scholars and combines the characteristics of protective gear products to design an e-commerce platform for protective gear products. Based on "information richness", "operational practicality", "service comfort", and "system security", this study takes the "information richness", "operational practicality", "service comfort", and "system security" as the research aspects of the e-commerce platform for protective gear products.

3. Research Methods

3.1 Research object and structure

This study analyzes the design of e-commerce platforms for protective gear products from the consumers' perspective. An electronic questionnaire survey was conducted on e-commerce platform users aged 18 to 75 in Taiwan. This study mainly explores the key factors that should be paid attention to when building e-commerce platforms for experiential protective gear products and designing e-commerce platforms for protective gear products based on consumers' experience of using protective gear products and e-commerce platforms. Therefore, based on the literature review in the previous chapter and consumers' experience of using protective gear or their impression of experiential products, the framework of the design of the e-commerce platform for protective gear products in this study is divided into four dimensions, with the content of the design of the protective gear e-commerce platform, namely, "information richness", "operational practicality", "service comfort" and "system security" as independent variables, "user satisfaction" as the dependent variable, as shown in Figure 1.

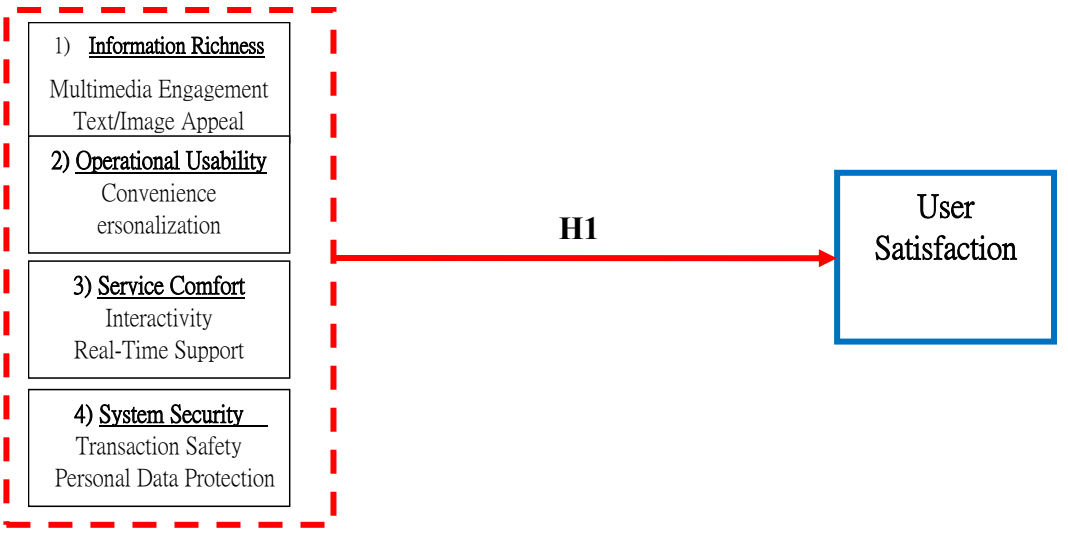

Figure 1: Protective Gear E-Commerce Platform Design

Source: Compiled by the authors

3.2 Research Hypotheses

This study is based on the relevant literature on e-commerce platforms and summarizes the key factors that affect consumer satisfaction when using e-commerce platforms. It also incorporates the factors that consumers pay attention to regarding protective gear products into the platform design, and thus organizes the following research hypotheses:

H: The phrase "Protective gear product e-commerce platform design" has a significant positive impact on "user satisfaction."

H-1: The "information richness" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction."

H-2: The "operational practicality" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction."

H-3: The "service comfort" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction."

H-4: The "service comfort" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction."

3.3 Operational definition of research variables

This study assumes that "protective gear product e-commerce platform design" is the independent variable, and" user satisfaction " is the dependent variable. This study adopts the operational definitions and measurement items of Ranganathan, C., & Ganapathy, S. (2002) and Huang, Z., & Benyoucef, M.,2013, Chen Hongxin (2010), Wei Liling (2013) and Cai Yilin (2013) to organize and summarize them into the principles of protective gear product e-commerce platform design and add the experience characteristics of protective gear products. Then, it conducts an in-

depth analysis based on the dimensions of "information richness", "operational practicality", "service comfort", and "system security". The characteristics covered include "audio-visual richness", "picture and text attractiveness", "convenience", "personalization", "interactivity", "immediacy", "transaction security" and "personal information protection", etc., as the measurement characteristics of the protective gear product e-commerce platform design in this study, a total of 18 Each question is answered using a 5-point Likert scale. The options are divided into "strongly disagree", "disagree", "average", "agree", "agree", and "strongly agree", and are scored from 1 to 5 points as the measurement standard. "Strongly agree" is the highest level of agreement with this item and is given 5 points. "Strongly disagree" is the lowest level of agreement with this item and is given 1 point. The higher the subject's score, the higher the user's degree of recognition of the design variables of the protective gear product e-commerce platform (as shown in Table 2).

Table 2: Measurement items of e-commerce platform design of protective gear products

Study variables	Dimension	Questionnaire items
Information Richness	Multimedia Engagement	1. I think the protective gear product e-commerce platform can stimulate vision and hearing through live broadcasts and other audio-visual methods. 2. I agree that audio and video content on protective gear e-commerce platforms can trigger consumer demand. 3. I agree that e-commerce platforms for protective gear products can use live broadcasts or videos to help consumers understand how to use them.
	Text/Image Appeal	4. I think the protective gear product e-commerce platform, using vivid pictures, will attract consumers' attention. 5. I think the e-commerce platform for protective gear products should have detailed text explanations of product classifications, product functions, and usage methods for protective gear.
Operational Usability	Convenience	1. I think the convenience of operating the functions of the e-commerce platform for protective gear products is very important. 2. I think the operation and navigation of the e-commerce platform for protective gear products are very important. 3. I think it is important for e-commerce platforms that sell protective gear products to provide keyword functions.
	Personalization	4. I think it is very important for e-commerce platforms that sell protective gear products to provide personalized product information (e.g., size, specifications, type, quantity, color, etc.). 5. I think it is very important for the e-commerce platform for protective gear products to provide product order information (e.g., shopping cart, order inquiry).

Service Comfort	Interactivity	1. I think the live commentary function of the protective gear product e-commerce platform is very important. 2. I think the e-commerce platform for protective gear products should have 24-hour audio and video commentary. 3. I think the e-commerce platform for protective gear products should provide a message area for consumers to leave their questions.
	Real-Time Support	4. I think the e-commerce platform for protective gear products should provide immediate after-sales service. 5. I think the e-commerce platform for protective gear products should provide immediate professional consultation.
System Security	Transaction Safety	1. I believe that the e-commerce platform for protective gear products provides a third-party authentication mechanism to ensure transaction security.
	Data Protection	2. I believe that the less information consumers provide when trading protective gear products on e-commerce platforms, the safer it is. 3. I think the privacy protection measures of the protective gear product e-commerce platform are very important.

Source: Compiled from this study

This study refers to Tsai, S. F(2018)'s study on satisfaction with the platform design of e-commerce platforms for protective gear products. A total of five questions were used to measure the "user satisfaction" variable, as shown in Table 3.

Table 3: Measurement items of user satisfaction

Dimension	Questionnaire items
User satisfaction	1. I am satisfied with the overall design of the protective gear product e-commerce platform. 2. I am satisfied with the information, audio, and graphic design of the protective gear product e-commerce platform. 3. I am satisfied with the convenience and personalized design of the protective gear product e-commerce platform. 4. I am satisfied with the interactive and real-time service design of the protective gear product e-commerce platform. 5. I am satisfied with the system transaction and personal information security design of the protective gear product e-commerce platform.

Source: Modified from reference Tsai, S. F(2018), and this study

3.4 Research Methods

This study adopted the questionnaire survey method and distributed questionnaires in the Hsinchu area through convenience sampling. Purposive sampling was used to confirm the sample data. After deleting invalid questionnaires from the collected questionnaire data, the valid questionnaires were coded and analyzed. Appropriate

statistical analysis methods were then used to analyze the data and verify various inference hypotheses. This study uses SPSS as a statistical tool for data input, organization and operation. The data analysis projects and methods include: 1. narrative analysis, 2. reliability analysis, 3. Pearson correlation analysis, 4. regression analysis, etc., as follows:

3.4.1 Narrative Statistical Analysis

a. Sample structure analysis

Sample structure analysis is to summarize and integrate the characteristics of sample data. The basic data of the sample: gender, age, occupation, marital status, education level and monthly income are statistically analyzed and presented in the form of frequency distribution, percentage and cumulative percentage to clearly understand the sample structure distribution of this study and to examine whether the sample data presents a concentrated or discrete phenomenon.

b. Descriptive statistical analysis of variables

This chapter implements narrative statistics for each variable of this study. This study divides the questionnaire data into four parts: "information richness" dimension, "operational practicality" dimension, "service comfort" dimension, and "system security" dimension of the e-commerce platform design of protective gear products, and performs statistical summary and descriptive analysis. The meaning, standard deviation, and total mean of each item are calculated and analyzed to understand the questionnaire response status and the scores of the tested samples under each research variable.

3.4.2 Reliability analysis

The purpose of reliability analysis is to verify the consistency and stability of a scale, which can be said to be a necessary condition for the usability of a scale. This study adopted Cronbach's α value, which has been used since the 1950s and is considered by most scholars to be the most suitable reliability value for measuring Likert scales. If the measurement error is smaller, the reliability is higher; if the error is larger, the reliability is lower. Nunnally (1978) believed that a scale reliability α value higher than 0.7 indicates high internal consistency. If it does not reach 0.7, at least the α value of each dimension must be above 0.5 to meet certain reliability requirements. This study uses Cronbach's coefficient to test the internal consistency reliability of major variables and their facets, such as "information richness", "operational practicality", "service comfort", "system security", and "user satisfaction". It is the correctness or accuracy of measurement. The reliability of a test indicates whether the questions within the test are consistent with each other and whether the scores of retests are consistent. The Cronbach's α coefficient of the variables in this study and the constructs they contain was used to test the internal consistency reliability. If Cronbach's $\alpha > 0.7$, it is high reliability, $0.7 >$ Cronbach's $\alpha > 0.5$, it is acceptable, and Cronbach's $\alpha < 0.5$, it is low reliability. The reliability coefficient is between 0 and 1, and the reliability of an excellent test is at least 0.8. When the error ratio is low and the true score is high, the reliability is higher.

3.4.3 Pearson Correlation Coefficient Analysis

Correlation Analysis is used to explore the degree of linear association between two variables, and the correlation coefficient is the most important basis for interpretation. It has two characteristics: size and direction (Qiu Haozheng and Lin Bifang, 2014):

a. Magnitude

Indicates the strength of the correlation between two variables. The larger the correlation coefficient, the stronger the correlation; conversely, the smaller the correlation coefficient, the weaker the correlation; if the correlation coefficient is 0, it means zero correlation.

b. Direction

Indicates whether there is a positive or negative correlation between two variables. A positive correlation coefficient means that when one of the two variables increases, the other variable will also increase, and vice versa. A negative correlation coefficient means that as long as one of the variables increases, the other variable will decrease, and vice versa.

This study will conduct a correlation analysis and examine the correlation coefficient of "information richness", "operational practicality", "service comfort", "system security", "user satisfaction" of the e-commerce platform design of protective gear products to confirm whether the two variables have a linear relationship (Linear Relationship). Non-linearity cannot be estimated, and this value is between ±1. +1 means perfect positive correlation, -1 means perfect negative correlation, and 0 means zero correlation. A correlation coefficient value ≧of 0.7 indicates that there may be a problem of linear overlap (Chang Weihao and Cheng Shiyi, 2012).

3.4.4 Regression Analysis

Regression analysis was used to examine the relationship between the independent variable "e-commerce platform for protective gear products" and its dimensions of "information richness", "operational practicality", "service comfort", and "system security", and the dependent variable "user satisfaction". Regression analysis is often used in two aspects: explanation and prediction. Regarding explanation, we can calculate the regression equation from the samples obtained and then use the regression equation to determine the influence of each independent variable on the dependent variable and interpret the statistical and management implications.

4. Statistical Analysis

Using convenience sampling and purposive selection, this study distributed 320 questionnaires to consumers. A total of 300 valid responses were collected, yielding an effective response rate of 87%. In the following chapter, these responses form the basis for statistical analysis and hypothesis testing.

This study used convenience sampling and purposive sampling to select consumers as the sample for the questionnaire. A total of 320 questionnaires were distributed, and 300 valid questionnaires were collected, with a valid questionnaire rate of 87%. This study will use this valid questionnaire for statistics, analysis, and verification.

4.1 Narrative Statistical Analysis

4.1.1 Sample Structure Analysis

Statistics of the 300 sample participants (1). In terms of gender, the majority are female, totaling 154, accounting for 51.3%; there are 146 males, accounting for 48. %; this shows that the number of female participants in this survey is higher than that of male participants. (2) In terms of age group, the majority were between 51 and 60 years old, totaling 122 people, accounting for 44.7%. (3) Occupation: Most respondents were in business, with 97 respondents accounting for 32.3%. (4) In terms of marital status, most respondents were married, with a total of 255 respondents, accounting for 85%; (5) In terms of educational level, the majority of respondents had a college degree or above, with a total of 104 respondents, accounting for 34.7%. (6) Monthly income: Most respondents had an income between NT$30,001 and NT$40,000, accounting for 86 people and 28.7%.

4.1.2 Statistical Analysis of Each Variable

(1) Narrative Statistical Analysis of “Information Richness”

There are 5 questions in this dimension of "Information Richness", and the average values range from 4.13 to 4.37, with the highest total average of 4.37, as shown in Table 4, indicating that the respondents have a high degree of recognition of this question, and the data of the respondents are also relatively concentrated. The research data shows that the respondents' overall "Information Richness" dimension is the highest in the dimension of "Video Richness" in Item 5, "I think the e-commerce platform for protective gear products should have detailed text explanations of the product classification, product functions, and usage methods of protective gear." The second highest score is in Item 3 of the dimension "Graphic Attractiveness", "I think the e-commerce platform for protective gear products should have detailed text explanations of the product classification, product functions, and usage methods of protective gear."

Table 4: Mean values of descriptive statistics of "Information Richness"

	N	MIN	MAX	MEAN	SD
I5	300	1	5	4.37	.732
I3	300	1	5	4.26	.837
I4	300	1	5	4.20	.873
I1	300	1	5	4.15	.856
I2	300	1	5	4.13	.776
(listwise)	300				

Source: This study compiled

(2) Narrative Statistical Analysis of "Operational Usefulness"

The average values of the five items in the variable "operational practicality" ranged from 4.20 to 4.32. As shown in Table 5, the subjects scored the highest for item 1 of "operational practicality" "1. I think the convenience of the operating functions of the protective gear product e-commerce platform is very important.", while the subjects scored the lowest for item 3 "I think it is very important for the protective gear product e-commerce platform to provide a keyword function." However, the average values of all the items were above 4, indicating that the degree of recognition of all the items was quite high.

Table 5: Mean values of descriptive statistics for the dimension "operational usefulness"

	N	MIN	MAX	MEAN	SD
O1	300	1	5	4.32	.752
O5	300	1	5	4.28	.751
O4	300	1	5	4.27	.765
O2	300	1	5	4.20	.705
O3	300	1	5	4.20	.727
(listwise)	300				

Source: This study compiled

(3) **Narrative Statistical Analysis of "Service Comfort"**

The average values of the five questions in the dimension "Service Comfort" ranged from 3.94 to 4.29, as shown in Table 6, indicating that the respondents had a high degree of recognition of this question. Research data showed that the respondents had the highest score for the dimension "Service Comfort" of "Protective Gear Product E-commerce Platform Design" for the question "3. I think the protective gear product e-commerce platform should provide a message area for consumers to leave their questions." and the lowest score for the question "2. I think the protective gear product e-commerce platform should have 24-hour audio and video commentary."

Table 6: The average value of descriptive statistics of the "Service Comfort" dimension

	N	MIN	MAX	MEAN	SD
C3	300	1	5	4.29	.675
C1	300	1	5	4.29	.762
C4	300	1	5	4.24	.779
C5	300	1	5	4.23	.714
C2	300	1	5	3.94	.865
(listwise)	300				

Source: This study compiled

(4) Narrative Statistical Analysis of "System Safety"

The average values of the three questions in this dimension "System Security" range from 4.0 to 4.45, with a total average of up to 4.45, as shown in Table 7, indicates that the subjects have a high degree of recognition of this question, and the data of the subjects are also relatively concentrated. The research data shows that consumers have the highest score for the item "3. I think the privacy protection measures of the protective gear product e-commerce platform are very important" in the "system security" dimension of the "protective gear product e-commerce platform design", indicating that consumers are very concerned about the design of their own privacy protection measures when shopping online; the research data shows that the consumers have a relatively low score for the item "2. I think the less information consumers provide when trading on the protective gear product e-commerce platform, the safer it is.", but the average score is 4.00, and the recognition degree is still high.

Table 7: Mean values of descriptive statistics for the "System Security" dimension

	N	Min	Max	Mean	SD
S3	300	1	5	4.45	.764
S1	300	1	5	4.41	.728
S2	300	1	5	4.00	.973
(listwise)	300				

Source: This study compiled

4.2 Reliability Analysis

In the questionnaire on the “information richness” dimension of the variable “protective gear product e-commerce platform design” in this study, the Cronbach’s α value of the total scale of “information richness” was 0.885, which met the standard of reliability Cronbach’s α value greater than 0.7, indicating that the “information richness” dimension achieved internal consistency. In the "Operational Practicality" facet questionnaire, Cronbach’s value of the total scale of "Operational Practicality" was 0.911, which met the reliability standard of Cronbach's α value greater than 0.7, indicating that the facet achieved internal

consistency. In the questionnaire on the dimension "Service Comfort", the Cronbach's α value of the total scale of "Service Comfort" was 0.859, indicating that the dimension achieved internal consistency and met the reliability standard of Cronbach's α value greater than 0.7. In the questionnaire on the dimension "system safety", the Cronbach's α value of the total scale of "system safety" was 0.763. Further examination of the overall Cronbach's α values of the four dimensions of the variables in this study, namely "information richness", "operational practicality", "service comfort", and "system security", were 0.885, 0.911, 0.859, and 0.763, respectively, as shown in Table 8. The analysis results also show that the results of the summary of the variables are consistent and meet the reliability test standards. Therefore, through the reliability test results of the constructs and variables, this study was able to further perform statistical analysis and verification based on the reliability of the scale used, supporting the correctness of the analysis results of the various hypotheses verified in this study.

Table 8: Cronbach's α value of the design of the e-commerce platform for protective gear products

Study variables	Dimension	Questionnaire items	Cronbach's α value
Information Richness (0.885)	Multimedia Engagement	1. I think the protective gear product e-commerce platform can stimulate vision and hearing through live broadcasts and other audio-visual methods. 2. I agree that audio and video content on protective gear e-commerce platforms can trigger consumer demand. 3. I agree that e-commerce platforms for protective gear products can use live broadcasts or videos to let consumers understand how to use them.	0.857
	Text/Image Appeal	4. I think the protective gear product e-commerce platform using vivid pictures will attract consumers' attention. 5. I think the e-commerce platform for protective gear products should have detailed text explanations of the product classification, product functions, and usage methods of protective gear.	0.744
Operational Usability (0.911)	Convenience	1. I think the convenience of operating functions of the e-commerce platform for protective gear products is very important. 2. I think the operation and navigation of the e-commerce platform for protective gear products is very important. 3. I think it is important for e-commerce platforms for protective gear products to provide keyword functions.	0.879

	Personalization	4. I think it is very important for e-commerce platforms of protective gear products to provide personalized product information (e.g., size, specification, type, quantity, color, etc.). 5. I think it is very important for the e-commerce platform of protective gear products to provide product order information (e.g., shopping cart, order inquiry).	0.897
Service Comfort (0.859)	Interactivity	1. I think the live commentary function of the protective gear product e-commerce platform is very important. 2. I think the e-commerce platform for protective gear products should have 24-hour audio and video commentary. 3. I think the e-commerce platform for protective gear products should provide a message area for consumers to leave their questions.	0.804
	Real-Time Support	4. I think the e-commerce platform for protective gear products should provide immediate after-sales service. 5. I think the e-commerce platform for protective gear products should provide immediate professional consultation.	0.857
System Security (0.763)	Transaction Safety	1. I believe that the e-commerce platform for protective gear products provides a third-party authentication mechanism to ensure transaction security. 2. I believe that the less information consumers provide when trading protective gear products on e-commerce platforms, the safer it is. 3. I think the privacy protection measures of the protective gear product e-commerce platform are very important.	0.763

Source: This study compiled

4.3 Pearson Correlation Analysis of Each Dimension

The results of the Pearson correlation analysis of each dimension of this study are shown in Table 9. The "information richness" dimension of the variable "e-commerce platform design for protective gear products" is significantly moderately positively correlated with "operational practicality", "service comfort", "system security", "user satisfaction", ($r=0.617$, 0.639, 0.472, 0.628, 0.009, $P<0.01$). It showed a significant moderate positive linear correlation with the "user satisfaction" dimension ($r=0.628$, $P<0.01$).

The variable "e-commerce platform design for protective gear products" and the "operational practicality" dimension showed a significant moderate positive linear

correlation with "information richness", "service comfort", and "system security" (r=0.617, 0.557, 0.658, 0.600, 0.055, P<0.01). It showed a significant moderate positive linear correlation with the dimension "user satisfaction" (r=0.600, P<0.01). The variable "e-commerce platform design for protective gear products" and the "service comfort" dimension showed a significant moderate positive linear correlation with "information richness", "operational practicality", and "system security" (r=0.639, 0.557, 0.692, P<0.01). It showed a significant moderate positive linear correlation with the "user satisfaction" dimension (r=0.652, P<0.01).
The dimension "system security" of the variable "e-commerce platform design for protective gear products" showed a significant moderate positive linear correlation with "information richness", "operational practicality", and "service comfort" (r=0.572, 0.658, 0.692, P<0.01). It showed a significant moderate positive linear correlation with the "user satisfaction" dimension (r=0.541, P<0.01).
The variable "user satisfaction" and the variable "e-commerce platform design for protective gear products" in terms of "information richness", "operational practicality", "service comfort", and "system security" showed a significant moderate positive linear correlation (r=0.628, 0.600, 0.652, 0.541, P<0.01).

Table 9: Pearson correlation analysis of each dimension

Information richness	Information richness	Operational Practicality	Service comfort	System security	User Satisfaction
Operational Practicality	0.617**	1			
Service comfort	0.639**	0.557**	1		
System security	0.572**	0.658**	0.692**	1	
User Satisfaction	0.628**	0.600**	0.652**	0.541**	

Source: This study compiled

4.4 Regression analysis

This section uses linear regression analysis to continue the results of correlation analysis to analyze whether the four variables of the e-commerce platform design of protective gear products, "information richness", "operational practicality", "service comfort" and "system security", have a significant positive impact on the variables such as "user satisfaction". And verify whether the assumptions H (H-1, H-2, H-3, H-4), etc., are valid.

4.4.1 Verification of H: The phrase "Protective gear product e-commerce platform design" has a significant positive impact on "user satisfaction."

Anova analysis Table 10 shows that F=100.386, P=0.000<0.01), so this pattern is significant, indicating that at least one coefficient is not 0. This means that the overall impact of "e-commerce platform design for protective gear products" on "user satisfaction" is significant.

Table 10: ANOVA analysis of "protective gear product e-commerce platform design" and "user satisfaction"

Model	Sum of Squares	df	Mean Square	F	Significance
Regression	104.890	4	26.223	100.386	.000[b]
Residuals	77.059	295	.261		
Totals	181.950	299			

Response number: User satisfaction b. Prediction value: (constant), system security, information richness, service comfort, operational practicality.

(a) Verification of H-1: The "information richness" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction." This study conducted a regression analysis on "user satisfaction" based on the four variables designed by the e-commerce platform for protective gear products. According to the regression analysis in Table 11, F=100.386 (P=0.000<0.05), so it is known that this model is significant; the standardized coefficient of "information richness" is 0.412 (P=0.000<0.05), which has a significant positive impact on "user satisfaction"; the empirical results finally determined that "information richness" has a significant positive impact on "user satisfaction", that is, H-1 is supported.

(b) Verification of H-2: The "operational practicality" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction."

The standardized coefficient of "operational practicality" is 0.212 (P=0.005<0.05), which has a significant positive impact on "user satisfaction". The empirical results finally determine that "operational practicality" has a significant positive impact on "user satisfaction", that is, H-2 is supported.

(c) Verification of H-3: The "service comfort" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction."

The standardized coefficient of "service comfort" is 0.139 (P=0.037<0.05), which has a significant positive impact on "user satisfaction". The empirical results finally determine that "service comfort" has a significant positive impact on "user satisfaction", that is, H-3 is supported.

(d) Verification of H-4: The "system security" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction."

The standardized coefficient of "system safety" is 0.070 (P=0.202>0.05), which has a non-significant impact on "user satisfaction". The empirical results finally determined that "system safety" has a non-significant positive impact on "user satisfaction", that is, H-4 is not supported.

Table 11: Regression analysis of "protective gear product e-commerce platform design" and "user satisfaction"

Variable	User satisfaction			
Protective gear product e-commerce platform design	Estimated value of β	SD	t-value	P-value
Information richness	0.412	0.081	5.934	0.000
Operational Practicality	0.212	0.084	2.855	0.005
Service comfort	0.139	0.084	2.093	0.037
System security	0.070	0.066	1.278	0.202
Adjusted R^2	0.571			
F-Value	100.386			

Source: This study compiled

5. Conclusion and Recommendations

This study conducted a literature search on the research topic and based on relevant theories and research by scholars, gradually constructed a conceptual research framework that conforms to the concept of this study, gave operational definitions to each variable, and cited and adjusted to establish an appropriate scale. Based on the collected valid questionnaires, reliability and regression analysis were performed using SPSS software. Based on the verification results, the verification results of each hypothesis of the overall research framework of this study are explained respectively.

5.1 Research Conclusions

Through statistical analysis and results of data, this study explores the relationship between "e-commerce platform design of protective gear products" and "user satisfaction" from the perspective of consumers, and summarizes the hypotheses raised in the process as shown in Table 12.

Table 12: Verification results of research hypotheses

Research Hypothesis	Results
H: The phrase "Protective gear product e-commerce platform design" has a significant positive impact on "user satisfaction.”	Partially not established
H-1: The "information richness" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction."	established
H-2: The "operational practicality" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction."	established
H-3: The "service comfort" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction."	established
H-4: The "system security" of the protective gear product e-commerce platform design has a significant positive impact on "user satisfaction."	Not established

Source: This study compiled

5.1.1 The impact of “e-commerce platform design for protective gear products” on “user satisfaction”

Through Table 12, this study looks at the overall e-commerce platform design of protective gear products to understand that the e-commerce platform design of protective gear products affects "user satisfaction". The result is partially true. The "information richness", "operational practicality", and "service comfort" of the "e-commerce platform design of protective gear products" have a significant positive impact on "user satisfaction". The "system security" of "e-commerce platform design for protective gear products" has no significant impact on "user satisfaction". This study uses regression analysis to verify the influence of the four elements of "information richness", "operational practicality", "operational practicality", "service comfort", and "system security" on "user satisfaction". According to the estimated value of β, the order of influence of the elements is as follows: "information richness" is the first, with a β value of 0.412 ($P=0.037<0.00$), "operational practicality" is the second, with a β value of 0.212 ($P=0.005<0.05$), and "service comfort" is the third, with a β value of 0.139 ($P=0.037<0.05$). The last one is "system security", with a β value of 0.070 ($P=0.202>0.05$), which is not significant.

From the above research results, we know that the first factor that makes users satisfied with the "protective gear product e-commerce platform design" is "information richness" (video and audio excitement, picture and text attractiveness), which means that in the e-commerce platform of protective gear products, the video excitement and the platform design with rich pictures and texts are more attractive

to users. The second factor that attracts users' attention is the "operational practicality" of the platform (convenience, personalization), that is, the protective gear product e-commerce platform provides personalized information about the products, such as: size, specification, type, quantity, color, and order inquiry of the protective gear. The third factor that satisfies users is "service comfort" (interactivity, immediacy), that is, the after-sales service provided by the protective gear product e-commerce platform (for example: the platform's live commentary function and 24-hour audio and video commentary and provide a message area, provide instant after-sales service, instant professional consultation, etc. As for the factor that was not significantly verified in the regression analysis of this study, it is "system security" (transaction security), which means that the protective gear product e-commerce platform provides a third-party authentication mechanism to ensure transaction security.

5.2 Research recommendations and suggestions for related industries

It is recommended that follow-up research collect samples from various regions across the country to further explore the differences in the various classifications of sample structure. In addition to gaining a comprehensive understanding of other related research on the use of protective gear products and e-commerce platforms in Taiwan, it can also explore the differences and special features of protective gear product e-commerce platforms and customer satisfaction in different industries under the classification of the sample structure. And with sufficient samples, reasonable inferences can be made about the parent population, making the samples more representative and improving the value and meaning of the research results.

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