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Factors Affecting the Purchase Intention of Personal Protection Equipment Products in the COVID-19 Pandemic Era

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Abstract

The objective of this research is to investigate the factors influencing the purchase of PPE products in China during the COVID-19 pandemic. This research is the quantitative research. The quantitative research was conducted by using online survey methodology. The target population are the permanent resident population of the Wuhan, China including doctors, nurses, and patients. The sample size of this research is 350. The data were collected from July to August 2022. The data were analyzed using multiple regression analysis. The finding indicates attitude towards functional attributes, attitude towards social attributes, subjective norms, perceived behavioral control and fear appeal are significant and positively related with purchase intention (significant level of 0.05). These finding can be applied for manufacturers, product developers, policy makers, and retailers. For manufacturers and product developers, the apparel, textile, and fashion industries were certainly to pivot during the COVID-19 pandemic towards innovative means of meeting consumer needs through new products or new points of sale. This applies not only PPE products but also other future inventions, where manufacturers and policy makers should consider working more closely with industry of all sectors to include public health intervention as a regularly considered category of focus for open innovation. For retailers, businesses should be prepared to acknowledge and act on their ability to create norms surrounding behaviors, such as PPE products purchase, that produce widespread social good.

Keywords: Consumer Attitudes, Functional Attributes, Social Attributes, Subjective Norms, Perceived Behavioral Control, Fear Appeal, Purchase Intention and Personal Protective Equipment product.

Introduction

In late 2019, a cluster of pneumonia cases in Wuhan City, Hubei Province, China was identified as with a novel betacoronavirus, first called the 2019 novel coronavirus (2019-nCov) and often referred to as the Wuhan coronavirus. On 9 January 2020, Chinese researchers shared the full genetic sequence of the novel coronavirus, now called SARS-CoV-2. Since the novel coronavirus was recognized, the disease it caused was termed coronavirus disease 2019 (COVID-19) (Rabi et al., 2020). In March 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a global pandemic (Clare, 2023).

During the COVID-19 pandemic, the world has become reliant on personal protective equipment, or PPE. Most of these essential gears, from masks to gowns to goggles, come from China. Therefore, it is very important for companies to understand the impact of the COVID-19 pandemic on consumer behavior. Abe (2020) observed such trends in her report on "Market Trends and D2C Opportunities in COVID-19", for example, people attack the sidewalks of grocery stores to cancel the world's most important events and temporary closure non-essential enterprises to prevent the spread of infection.

A modified approach was chosen to understand consumer attitude for PPE products. The wide variety of observed PPE products, along with the unevenness of availability and marketing information, not to mention some confusion in public health guidelines, means that a richer exploration could be obtained by expanding an examination of the behavioral beliefs. Asian countries' experience following the SARS epidemic suggests that consumers will need to be prepared to make decisions about the purchase of PPE, such as face masks, for the foreseeable future (Kim, E.T. 2022). Previous research has demonstrated the relation between attitude and purchase intention (Das et al., 2019). For example, in a study on Pakistanis' face mask attitudes and purchase intentions, attitudes toward face masks were found to have a positive and significant effect on purchase intention (Shah, 2021). The results of this study demonstrated that this measure of attitude predicted the intention to purchase a face mask. However, this model of attitude does not tell us anything about what consumers believe about face masks or what they value in their face mask purchase. Therefore, the goal of the current research is to examine the attitudes related to the purchase of PPE products. This will allow us to derive implications for manufacturers, product developers, policy makers, and retailers responsible for planning for the next phases of the COVID-19 pandemic and subsequent pandemics. By focusing on a PPE product that consumers have already purchased and used, this research incorporated both the PPE products' search and experience attributes. This illumination is valuable because, while the color, style, or social/communicative value may all play a role in consumers' decisions with respect to their intention to purchase and wear one PPE product over another, solid public health research has demonstrated that PPE products' fit is the essential product feature that should dominate consumer choice (Edirisuriya et al., 2020). The main research problem of this research is to investigate the factors affecting the purchase intention of PPE products in China during the pandemic

from a consumer behavior. The objective of this research is to investigate what factors, attitude towards functional attributes, attitude towards social attributes, subjective norms, perceived behavioral control and fear appeal, influencing the purchase intention of PPE products in China during the COVID-19 pandemic**.** These finding can be applied for manufacturers, product developers, policy makers, and retailers to offer PPE products that appeal to a wide variety of consumer tastes and styles seem to be the best way to increase consumer purchase of PPE products.

Literature review and hypothesis development

Attitude toward PPEs

According to Fazio (1995), attitude is an interaction in memory between a given object and a summary evaluation of this object. Attitude is likely to reveal the psychological assessment of a product by the consumer (Bonne et al., 2007; Eagly & Chaiken, 1995; Schiffman & Kanuk, 2007). Previous studies have focused on the relationship between attitudes and intention behavior. Mostafa (2007) found that the positive relationship between attitude and behavioral intention has been established in many cultures.

Attitude illustrates to what extent behavior was deemed as positive or negative (Peters & Templin, 2010). This research specifies attitude as people's perception and tendencies of behavior toward PPE products. If people had a positive attitude toward PPE products purchasing, then they become more aware of the significance of PPE products and were consequently more intent on engaging in buying them. The beliefs that purchasing the preferred PPE products (a behavior) can protect the consumer (an outcome), make him/her feel comfortable (an experience), or allow the consumer to go into public areas (either an outcome or experience) were included. The selection of behavioral beliefs included functional attributes (e.g., comfort, fit, protection/safety), and expressive or social-communicative (e.g., identity/status) (Liang et al., 2022). All two of these dimensions were validated by a content analysis of online review comments purchasers of PPE products left. By using the expectancy-value model that explain attitudes, decision, and volitional behavior as outcomes of dispassionate processing of beliefs associating attitude objects (including decisions and potential actions, and more) with perceived attributes (Babrow & Kwitonda, 2020) of attitude toward PPE product purchase to separate out the attitude's social, and functional aspects, we can pinpoint clearly behavioral beliefs' contribution to the intention to repurchase the PPE products they have already evaluated according to these dimensions. Therefore, Hypotheses 1-2 were proposed:

H1: Attitude towards functional attributes positively influences the intention to purchase PPE products.

H2: Attitude towards social attributes positively influences the intention to purchase PPE products.

Subjective norms

Subjective norms represent perceptions of specific salient others' views about whether one should or should not engage in a behavior (Ajzen & Fishbein, 1980).

The closer their relationship with others is, the greater their tendency to influence the other person. Someone would tend to perform a behavior if he/she felt the pressure from their relatives to do it. In the context of Asian culture, society encourages collectivism rather than individualism. Thus, individuals are easily influenced by leaders and even related organizations. Previous studies have confirmed the positive impact of subjective norms on intention (Al-Swidi et al., 2014). Ajzen and Fishbein defined subjective norm (SN) as an individual's "perception of the social pressures put on him or her to perform or not to perform the behavior" (Ajzen & Fishbein, 1980). It represents the degree to which an individual is aware of a salient referent's opinion (Jin & Ji Hye, 2010). Previous studies have found that subjective norms can influence the intention to purchase and use clothing and accessories significantly (Hwang & Kim, 2020). Purchasing PPE products may be considered essential during a pandemic, as it affects not only the health of consumers themselves, but also that of their significant referents. It is reasonable to predict that consumers will value the protection that a mask can provide for their significant referents, whose opinions may matter to them sufficiently to motivate them to purchase a PPE product. Further, PPE product mandates in certain municipalities or workplaces, create normative pressure to ensure that PPE products are worn, which potentially can determine purchase intention because of these subjective norms. Thus, we test the third hypothesis:

H3: Subjective norms positively influence the intention to purchase PPE products.

Perceived behavioral control

Perceived behavioral control describes someone's expectation that the performance of a behavior is under his/her control. The perception is dependent on two things, namely, the necessary resources and opportunities to perform the behavior successfully (Ajzen, 1991). Perceived behavioral control is defined in this research as an integrated measure of internal and external resources that make it easy to act upon the motivation to buy PPE products. As Ajzen (2020) indicated, perceived behavioral control can be modeled as based upon accessible control beliefs, which are "...concerned with the presence of factors that can facilitate or impede performance of the behavior" (Ajzen, 2020, p. 315). Previous research has supported perceived behavioral control's positive influence on the intention to purchase apparel (Jin, & Ji Hye, 2010). Consumers' requisite resources are having time, money, and accessibility to purchase PPE products. If consumers wish to purchase PPE products, if they can access it and control the way they purchase it, their intention to do so will increase. Therefore, this research includes perceived behavioral control together with attitudes and social norms and expects that they have a positive effect on intention of purchasing PPE products.

H4: Perceived behavioral control positively influences the intention to purchase PPE products.

Fear appeal

Fear is a negatively-valance sentiment, along with a high level of provocations, and provoked by a threat that is seemingly significant and personally relevant (Witte,

1992). Recent works point out that purchase decisions and choices are a result of the scrutiny of the pros and cons and affective and sensitive aspects of products (Consoli, 2009). Products that are perceived to overcome a specific risk or dangers, fomenting fear, and more successful in reducing perceptions of danger, attract higher purchases (McDaniel & Zeithaml, 1984).

The theory of fear appeal has dominated marketing research in the past but appears to be neglected in recent times (Witte & Allen, 2000). Fear appeals are persuasive messages designed to communicate facts or to scare individuals by resenting or exaggerating terrible outcomes of neglecting a specific caution (Witte, 1992).

An increase in fear is known to be associated with increases in coaxing and compliant behavior if the causal factor forewarned the receiver to danger. Many studies investigating the effects of fear appeals have reported findings of positive behavioral outcomes (Hammond et al., 2003, p. 391; O"Hegarty et al., 2006, p. 467; Tay, 2002, p. 198). Fear appeals have been employed in advertising of products and services. It dominated areas such as life insurance, road accident campaigns, promoting political causes, drug-prevention commercials, and in the development of social awareness of serious concerns such as the COVID-19 and other public health-related issues.

H5: Fear appeal positively influences the intention to purchase PPE products.

Conceptual framework

Based on the conducted review of relevant literature, the conceptual framework of this research is presented in as following model:

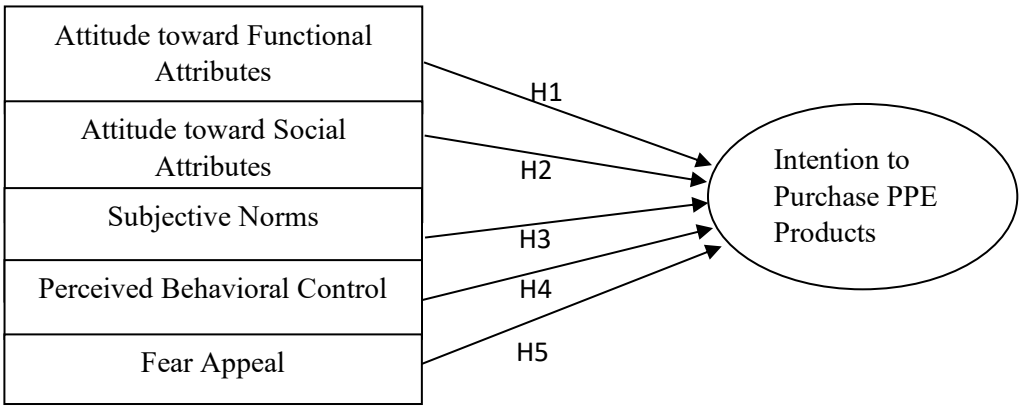

Figure 1 Conceptual Framework

Research methodology

This research is the quantitative research. The quantitative research was conducted by using online survey methodology. The target population are the permanent resident population of the Wuhan city including doctors, nurses, and patients. The sample calculated according to formula by Yamane (1973) is 400. The response rate was appropriate as it was in accord with Grover and Vriens (2006) who suggested that the optimum population probability sample proportion should be a bit over 60.0%. The online sampling process commenced by networking and snowball technique. The questionnaires were collected on WeChat mini program. Finally, a total of 350 valid questionnaires were collected. The overall usable response rate was 87.5%. Therefore, the sample size of this research is 350 deemed suitable for data analysis. The data was collected from July to August 2022.

The questionnaire design is related to the target conceptual framework and is divided into 7 parts. The first part is screen questions. The second part is personal information. The third part is PPE products' purchase behavior. The first, second, and third parts are multiple-choice questions. The fourth part is attitudes towards purchasing personal protective equipment. The fifth part is subjective norms. The sixth part is perceived behavioral control. The last part is fear appeal. The fourth, fifth, sixth and seventh parts are scaling questions were measured with a 5-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly agree). The questionnaire was first developed in English, and then translated into Chinese, so that the participants could easily understand the content of the survey. The questionnaire was conducted to pretest on 30 samples.

The data was analyzed through descriptive statistics and inferential statistics. Descriptive statistics (Percentage, Mean, and Standard Deviation) used for analysis the personal information, PPE products' purchase behavior and six constructs, attitude toward functional attributes, attitude toward social attributes, subjective norms, perceived behavioral control, fear appeal, and purchase intention. This research used inferential statistic (Multiple Regression) to examine the hypothesis.

Analysis and result

Descriptive statistical analysis

From the pretest, the Cronbach's alpha value ranges from 0 to 1, and 0.7 or better is the reliable and acceptable (Nunnally, 1978). The Cronbach's alpha scores of all dimensions are greater than 0.7 and the total scale is 0.780. This result indicates a satisfactory level of confidence in the questionnaire's reliability.

Personal information of the respondents was summarized in the Table 1 as follow:

Table 1 Frequency and Percent of Personal information

Personal Information	Frequency	Percent
Gender		
Male	155	44.3
Female	195	55.7
Age		
<18	50	14.4
19-25	104	29.8
26-35	66	18.8
36-45	97	27.6
Over 45	33	9.4
Education level		
Under bachelor	66	18.7
Bachelor	197	56.4
Master	83	23.6
Doctorate	4	1.2
Working status		
Student	73	20.9
Working	234	66.9
Quit/be laid off	35	10.0
Other	8	2.2
Income/per month (RMB)		
Under 2,000	42	12.0
2,001-5,000	189	54.0
5,001-10,000	89	25.4
10,001 and above	30	8.6

The respondents were 155 males (44.3%) and 195 females (55.7%). The age of respondents mainly is 19-25 year (29.8%). The education level of the respondents, bachelor's degree was the largest at 197 (56.4%). Working status 234 (66.9%) of the respondents were employed. There were 189 (54.0%) of the respondents who was the biggest group getting the income among 2,001-5,000 (RMB).

PPE products' purchase behavior of the respondents was summarized in the Table 2 as following:

Table 2 Frequency and Percent of PPE products' purchase behavior

PPE products' purchase behavior	Frequency	Percent
Spend on PPE products per month (RMB)		
Under 30	91	26.0
31-60	110	31.4
61-100	84	24.0
101-200	30	8.6
201-500	20	5.7
Over 501	15	4.3
Purchase channel		
A online purchase	169	48.3
B offline purchase	181	51.7

There were 110 (31.4%) of respondents that was the biggest group spending 31-60 yuan on PPE products per month. There were 181 (51.7%) of the respondents willing to purchase from online channel and 169 (48.3%) of the respondents willing to purchase from offline channel.

The responses towards the six constructs are summarized in the Table 3 as follows:

Table 3 Mean, Standard Deviation, and Level of Agreement of six constructs

Six constructs	Mean	S. D	Level of Agreement
Attitude towards functional attributes	3.522	0.735	Agree
Attitude towards social attributes	3.463	0.685	Agree
Subjective norms	3.496	0.732	Agree
Perceived behavioral control	3.459	0.725	Agree
Fear appeal	3.495	0.713	Agree
Purchase intension	3.398	0.739	Neutral

The 5-point Likert-type scale was used in this research. The means were interpreted as follows: Strongly disagree in the point range of 1.00 – 1.80, Disagree 1.81 – 2.60, Neutral 2.61 – 3.40, Agree 3.41 – 4.20, and Strongly agree 4.21 – 5.00 (Pimentel, 2010). The sample mean value interval 3.398 to 3.522 was showed in Table 3. All the independent variables were considered as agree level, and the dependent variable was described as neutral level.

Multiple regression and hypothesis testing

The multiple regression analysis of the relationship between independent variables and purchase intention is presented in Table 4. Attitude towards functional attributes, attitude towards social attributes, subjective norms, perceived behavioral control, and fear appeal are significant at the p=0.001, p=0.018, p=0.007, p=0.005 and p=0.004 level and are positively related with purchase intention. Moreover, purchase behavior control (0.228) is the most influence of purchase intention.

Table 4 Multiple Regression of Independent variable and Purchase intention

Independent Variable	Coefficients		t Value	p Value
	Unstandardized	Standardized		
Attitude towards functional attributes	0.193	0.252	3.722	0.001
Attitude towards social attributes	0.212	0.204	3.234	0.018
Subjective norms	0.154	0.159	2.377	0.007
Perceived behavioral control	0.228	0.164	2.926	0.005
Fear appeal	0.189	0.195	2.380	0.004
Purchase intention	0.212	0.224	2.816	
R2(Adjusted R2) =0.224(0.212)				

The result of hypothesis testing is showed that attitude towards functional attributes, attitude towards social attributes, subjective norms, perceived behavioral control, and fear appeal positively influenced intention to purchase PPE products. Therefore, H1, H2, H3, H4, and H5 are supported.

Discussion and conclusion

This part will discuss the result from the hypothesis test with literature review or theories to expand our understanding of consumers' purchase intention of PPE products.

Attitudes toward functional attributes

From the analysis result, the attitudes related to the PPE's functional attributes did play a significant role in the intention to repurchase a preferred PPE product. From a public health perspective, consumers' belief that a face mask fits sufficiently well to filter air, provides protection, and is comfortable, should be the basis of a decision to purchase a PPE product, and these results provided more evidence of the basis of consumer choice than studies that included model attitudes toward PPE product using simpler items, such as "I think it is important to buy masks" (Shah et al., 2021).

Attitudes toward social attributes

Attitude toward social attributes also influence purchase intention significantly. Producing PPE products that appeal to a wide variety of consumer tastes and styles appears to be the best way to increase consumers' purchase and use of PPE products, it is important for product developers to consider that consumers may not want their PPE products to express their identity. In considering their next purchase, these results indicate that they are focusing on PPE product' comfort and safety aspects (Liang et al., 2022).

Subjective norms

Subjective norms represent perceptions of specific salient others' views about whether one should or should not engage in a behavior (Ajzen & Fishbein, 1980). Previous studies have confirmed the positive impact of subjective norms on intention (Al-Swidi et al., 2014).

Purchasing PPE products may be considered essential during a pandemic, as it affects not only the health of consumers themselves, but also that of their significant referents. Furthermore, the result presented that subjective norms did influence consumers' intention to purchase apparel products, more recent research on consumers' mask-wearing behavior has indicated that important referents' perceived opinions did play a significant role in predicting consumers' intention to wear PPE products.

Perceived behavioral control

Perceived behavioral control describes someone's expectation that the performance of a behavior is under his/her control. Perceived behavioral control fails to predict intention in quite many cases (Eagly & Chaiken, 1993; McMillan & Conner, 2003). The research results demonstrated that perceived behavioral control significantly influenced consumers' intention to purchase a PPE product. Consumers will invest effort to obtain the desired product despite factors, such as availability, that make it difficult. The implication for retailers is that communicating that PPE products are in stock, without waiting, in store that are familiar to consumers influences their intention to purchase these PPE products positively. Placing PPE products near checkout counters, featuring them in circulars or email advertisements, and emphasizing their continued ubiquity for the duration of the crisis, are actions that retailers can take to increase consumers' perception of behavioral control.

Fear appeal

Fear is a negatively-valance sentiment, along with a high level of provocations, and provoked by a threat that is seemingly significant and personally relevant (Witte, 1992). Products that are perceived to overcome a specific risk or dangers, fomenting fear, and more successful in reducing perceptions of danger, attract higher purchases (Mcdaniel & Zeithaml, 1984). Fear appeals have been employed in advertising of products and services. It dominated areas such as life insurance, road accident campaigns, promoting political causes, drug-prevention commercials, and in the development of social awareness of serious concerns (LaTour & Zahra, 1988), such as the COVID-19 and other public health-related issues. Moreover, the result presented that PPE products provide protection and protect their health for many respondents. It is also found that when people use PPE products, they think they are very safe and avoid risks just like buying insurance.

In conclusion, the current study found that attitude towards functional attributes, attitude towards social attributes, subjective norms, perceived behavioral control, and fear appeal influence purchase intention of PPE positively. Attitude towards functional attributes had the strongest influence followed by attitude towards social attributes, fear appeal, perceived behavioral control, and subjective norms respectively.

Management implications

Based on the analysis results of this research, the researcher put forward the following recommendations for manufacturers, product developers, policy makers, and retailers:

For manufacturers and product developers, the apparel, textile, and fashion industries were certainly to pivot during the COVID-19 pandemic towards innovative means of meeting consumer needs through new products or new points of sale. The rapid product and adoption of PPE products by consumers during the COVID-19 pandemic has provided a real-world application of open innovation in a market space without a dominate brand-only basic product specification that includes rapid prototyping and omni-channel sales. While open, integrated supply chains are the bedrock of the modern innovation economy, the COVID-19 pandemic severely tested supply chain relationships, requiring even more innovation to meet the demand for PPE products.

The item related to social expressiveness that loaded into the model were related to PPE wearing in public, rather than those items measuring the expression of self-identity. While producing PPE products that appeal to a wide variety of consumer tastes and styles seem to be the best way to increase consumer purchase of PPE products, it is important to consider that consumers may not want to enjoy wearing their PPE products.

The fact that family, friends, and neighbors were not included among the groups whose opinions were driving the formation of purchase intention provides implications for those who would seek to increase public health behavior. This applies not only PPE products but also other future interventions, where manufacturers and policy makers should consider working more closely with industry of all sectors to include public health intervention as a regularly considered category of focus for open innovation.

For retailers, the facilitating conditions included in the influence that perceived behavioral control had on purchase intention demonstrates that improving facilitation through steps, such as communicating to consumers that PPE products are in stock, without waiting, at familiar stores will influence their intention to purchase the PPE products. During public health emergencies, businesses should be prepared to acknowledge and act on their ability to create norms surrounding behaviors, such as PPE products purchase, that produce widespread social good.

Limitation and future research

Limitation

There are limitations to the ability to generalize this research's results. General hopefulness might have served to dampen the intention to purchase PPE products for a pandemic that many people hope will end quickly; however, this limitation means the results would be more applicable in a situation of greater emergency, which will doubtless recur. In that case, the open innovation and development of entirely new products that have an apparel aspect to meet unforeseen demand should find these results useful. The data of this research was conducted in July-August 2022, the pandemic subsided, so attitude could be weaker or different compared to during the peak of the pandemic.

Future research

Future research could explore the

differences in response towards the investigated constructs among different groups of people of varied backgrounds and demographics and connect open-source product innovation for public health management. Moreover, future research could do a similar study in other countries to understand how much of globalization or localization is needed for the PPE products.

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