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The use of dietary supplements and vitamin consumption during and after the Covid pandemic in Vietnam: a perspective of user-generated content

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This paper aims to examine the key determinants of User-Generated Content (UGC) affecting consumers' purchase intention toward buying vitamin and dietary supplement products during the coronavirus disease (COVID-19) outbreak through the social networking site, Facebook. Five determinants of UGC have been investigated in this context to highlight the association with the purchase intention of Vietnamese consumers these days, including Quality, Quantity, Trust, Utilitarian Value, and Hedonic Value of generated content by experienced users. This cross-sectional study collected data through an online survey questionnaire among 331 respondents from three different regions throughout the whole of Vietnam. The results show that Quality, Quantity, Trust, and Utilitarian Value of UGC have positive relationships with consumers' intention to buy vitamin and dietary supplement products on Facebook during the COVID-19 pandemic, while the Hedonic Value of UGC is not associated with their behavioral intention of consumption. Lastly, the findings are expected to contribute valuable knowledge about COVID-19 from UGC and its consequences on health and selected supplement products for recent emerging changes. Finally, the results are also a solid premise for future research to enlarge the scale of situational issues and perspectives during the global COVID-19 pandemic.

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Introduction

Since the beginning of 2020, the world has been dramatically confronted by the coronavirus disease (COVID-19) caused by the severe acute respiratory syndrome coronavirus 2 which was publicly affirmed as a global pandemic on 11 March 2020 by the World Health Organization (WHO). Consequently, as stated by the Center of Diseases Control and Prevention, the increasing rates of high human-to-human transmissibility of SARS-CoV-2 have formed the authoritarian mechanism of social isolation as the most effective protective approach for avoiding the spread of COVID-19 (CDC, 2020). The influences occur mostly to numerous perspectives of the human race as changing lifestyles and behaviors, healthcare concerns and systems, national and global economies, and even social issues. After that, social isolation often acknowledges an unpleasant practice and experience to current living situation. This may cause somewhat negative sides on mental health, psychological, and emotional tensions as well as eating habits, and the worsening of chronic health conditions, etc. (De Faria Coelho-Ravagnani et al. 2021). These days, people have become increasingly aware of the substantial role that vitamins and dietary supplements can play in their lives, and this trend has grown strongly. Instead of addressing the concern for healthy supplements, more Vietnamese people are willing to make the decision on more vitamins and dietary supplements in order to enhance their health and immune systems (Nguyen et al. 2012).

Dietary supplements are becoming increasingly popular with Vietnamese consumers. They have also increased their frequency of buying dietary supplement products after the outbreak of the Coronavirus (COVID-19) pandemic to supplement for their health (Hirschmann et al. 2020; Nguyen et al. 2021). In particular, vitamin dietary supplements from foreign brands are purchased more. Besides, along with the large purchase of dietary supplements, trend is an increase in Facebook post engagement rates in Vietnam (Lu and Miller, 2019). Therefore, the subject related to health concerns during the pandemic and the topic associated with consumers' engagement on social networking sites become an interesting topic. Furthermore, Vietnamese people now gain more attention to improve their health, and their common preference is using foreign brands. This is because dietary supplements are largely used for health improvements, and there are also a large number of dietary supplement products as well as brands introduced into the nutraceuticals market in Vietnam. Therefore, this research paper focuses on dietary supplements which becomes the particular perspective of the paper.

Given the impacts of online sharing and knowledge on social media, there are still some concerns in the case of vitamin and dietary supplement consumption in Vietnam. First, Facebook is also considered a platform that enables consumers to update new information quickly and shop (Chetioui et al. 2021), and UGC has become one of the most popular methods for spreading the products in terms of sharing experiences and promoting. However, Vietnamese consumers are curiously worried about their intention to purchase while they have less information and experience about a variety of dietary supplement products as well as brands (Ali, 2020). In other words, they do not know exactly how dietary supplements work in the body, nor do they know if products have positive results or negative consequences They also do not even know whether products are actually as good as the advertisements or not. Second, during outbreaks of infection, people are likely to experience a fear of falling sick or dying themselves, as well as having feelings of helplessness and stigma. This creates an upsurge in anxiety and stress for people who have concerns about their own health (Özdin and Bayrak Özdin, 2020) and the post-pandemic health-centered consequences. Nevertheless, a few studies proposed only the supplementation of Vitamin D for COVID-19 prevention (Carter et al. 2020; Charoenngam et al. 2021), general vitamins and supplementary products (Çimke and Yıldırım Gürkan, 2021), and safety-focused products (Clemens et al. 2020). This scale should then be enlarged into various perspectives of consumer health-centered concerns, especially during recovery from the pandemic. Third, due to the lockdown and social distancing during the COVID-19 pandemic, consumers prefer to spend time shopping and buying online (Chen and Shen, 2015), and the products that consumers care mostly about are supplements that help to improve health (Hamulka et al. 2020). Despite this interest, none of the topics connect those elements together. In particular, only a few researchers have looked into the impact of User-Generated Content (UGC) in the context of purchasing dietary supplements while the health situation is very sensitive due to COVID-19.

To address the aforementioned literature gaps that the existing literature has not examined, this study attempts to explore the key determinants of UGC on Facebook toward examining the purchase intention all over Vietnam. This gives the reader a perspective on dietary supplements during the COVID-19 pandemic within the far-reaching area. Next, the study further investigates the mediating role of consumer trust toward online-generated content from the users' dimensions of psychological values. The main questions underpinning this study are (1) What are the key predictors of the heuristic-systematic model toward intention to use vitamin and dietary supplements during and post-pandemic?; (2) How does health-related information on social media affect individuals' behavioral intention toward supportive products?

To highlight the originality of the literature in this paper, the results are expected to deliver significant correlations among online content attributes and consumer behavioral intention in terms of protective and preventive products for health during the emerging outbreak, and especially health-based consequences in the post-pandemic era. Subsequently, understanding the role of heuristic and systematic sides of content helps to provide insights into behavioral changes and how digital measures support individuals' mental and physical health concerns after the dramatic infection fatality rate. From a theoretical perspective, the theory of reasoned action (TRA) implies that behavioral intentions represent a person's motivation in the sense of a conscious plan, choice, or self-instruction to exert the necessary effort in order to achieve a goal (Conner, 2020; Madden et al. 1992). Next, this is underpinned by the source credibility theory which receives much attention in the communication literature, stating how the persuasiveness of a communication is determined in part by the perceived credibility of the source of the communication (Lowry et al. 2014). In this context, the explicit notion of trust is explained in the absence of tangible legal protection (Lam et al. 2020). Supportively, the Heuristic-systematic model (HSM) is able to contribute to the body of the theoretical base which generally specifies how an individual receives and interprets the information, categorizing two basic approaches: heuristic and systematic processes (Chen and Chaiken, 1999). This study implements the heuristic route known as less cognitive effort to achieve the outcomes/findings, stated on heuristics or non-content cues.

Literature review

User-generated content. Bahtar and Muda (2016) explained UGC with a comprehensive scope as many researchers have conducted examinations in recent studies to provide many contexts of UGC and also to demonstrate the dissimilar aspects of UGC. At the time of writing, UGC is a new term that draws its definition from public usage, thus there has been no clear

definition of UGC published (Christodoulides et al. 2011; Santos, 2022). However, UGC is defined as UGC by satisfying three basic requirements: (i) the content should be published and made available via publicly available transmission media (e.g., the Internet), (ii) the content generated should reflect a level of inventiveness and effort to create it, and iii) for professional routines and practices, the content must be created outside (Luca, 2015). Since the popularity of UGC has become a trend in 2016, many firms started to use its influence for their advertising by letting customers generate content about their products (Assaker, 2020). User-generated brand content is a highly discussed marketing tool that is addressed as being appropriate for the marketing strategy of businesses since it seamlessly integrates with editorial social media material (Mayrhofer et al. 2020). While UGC is created by consumers, firms generate content traditionally through banners, email marketing, and blogs (Yi et al. 2019). Moreover, Chen and Shen (2015) examined that consumers no longer rely on the information provided by firms through their traditional channels; however, they now compare the performance of several products through content posted by experienced consumers. Liu et al. (2019) also revealed that UGC works as "an online seller's free" as it helps consumers classify which product is the best match for their needs. Experienced users can give ratings, likes, or shares of their experience of product usage, while the readers who read content from experienced users can evaluate the alternative in order to inform their purchase intention (Mayrhofer et al. 2020). Furthermore, content on social media has a great impact on the context of green retailing including organic, natural, and healthy perspectives (Lu and Miller, 2019).

The term UGC is perceived to be more credible than content generated by firms (Dabbous and Barakat, 2020; Park et al. 2007). Other studies also confirm that purchasing intention has been largely impacted by UGC on different types of platforms such as the influence of UGC on purchase intention in the background of a YouTube channel (Mathur et al. 2022), or the research of UGC on purchase intention via the "content + transaction" app (Chung et al. 2015). Besides, there are also a lot of empirical studies which research the topic of consumers being affected by UGC in the background of Facebook (Chari et al. 2016; Pahlevan Sharif and Mura, 2019), and the power of brand-related UGC (Kim and Johnson, 2016). In other studies, the role of UGC toward purchase intention has been widely discussed in the literature (Sethna et al. 2017; Utami and Rahyuda, 2019). During the COVID-19 pandemic situation, the significant change in consumers' purchase intention has been recently highlighted in the study by Ellison et al. (2021). Besides, the topic of UGC impacting consumers' purchase intention was also researched in the context of Vietnam (Nguyen et al. 2020).

Heuristic-systematic model. The heuristic-systematic model (HSM) has been extensively employed to observe user behaviors in information processing and decision-making in multiple contexts (Shi et al. 2021). The dual-process theoretical framework serves as a groundwork to explain how users process information, assess the content validity, and then make a decision (Chen and Chaiken, 1999; Eagly and Chaiken, 1993; Frauenstein and Flowerday, 2020). Scholars have argued that HSM is one of the most prevalent models rooted in the dual-process theory and the model anticipates one's social assessment such as self-beliefs, reflections, and attitudes (Chaiken, 1980; Khalifa, 2022). Scholars have also described HSM as being two processes or routes including (1) heuristic processing, in which users study informational cues to create their initial or irrational judgments, and (2) systematic processing, in which they evaluate all relevant aspects of information and establish coherent judgments based on

these comprehensive evaluations (Chen and Chaiken, 1999; Eagly and Chaiken, 1993; Shi et al. 2021). Zhang et al. (2014) also claimed that both routes of HSM (heuristic processing and systematic processing) are likely to occur in parallel, and interact with each other, imitating an individual's process of decision-making.

Extant research on innovative service and product adoption has largely depended on traditional theories of innovation diffusion such as the technology acceptance model (TAM) (Davis et al. 1989; Legris et al. 2003), theory of planned behavior (TPB) (Ajzen, 1991), and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al. 2003), expectation-confirmation model (ECM) (Bhattacherjee, 2001), and theory of innovation diffusion (DIT) (Rogers, 2003), to name a few, to predict user acceptance and continuance intention to use an IT-enabled service (Nguyen and Ha, 2021; Shi et al. 2021). Furthermore, it is worth observing that, in addition to traditional models on adoption (e.g., ECM, UTAUT), the HSM is becoming the most appropriate theoretical framework to study users' behavioral intention and usage of healthcare services and products (Griffin et al. 2002; Son et al. 2020; Zhang et al. 2014; Zhang and Zhu, 2021).

While the HSM is widely applied to observe a user's decision-making process in the context of healthcare, both message characteristics (i.e., validity information) and source characteristics (e.g., status of a person) could influence user decisions. For instance, Zhang and Zhu (2021) discovered that people are more positive about the quality of messages (e.g., messages with images or hyperlinks) than the branding of a journalist (e.g., source characteristics) during a public health crisis of the Covid-19 outbreak. In the case of the e-cigarette, Katz et al. (2018) claimed that the addition of a modified risk statement can reduce user perception of the warning and preserve non-smokers' intentions to use e-cigarettes, and while both the systematic and heuristic routes are illustrative, heuristic processing provides more appropriateness.

Consumer purchase intention. Purchase intention expresses consumers' plan to make a future purchase of goods or services (Ajzen, 1991; Ha et al. 2023; Hsu and Tsou, 2011). Purchase intention is also an antecedence that may be used to forecast real-world buying behavior, thus it has caught the attention of a lot of studies (McClure and Seock, 2020). A great number of papers have examined the elements influencing customer purchase intention through online platforms such as blogs (Lu et al. 2014; van Esch et al. 2018), websites (Erkan and Evans, 2018; Wu et al. 2014), social networking sites (McClure and Seock, 2020; Shang et al. 2017; Sokolova and Kefi, 2020). There are a variety of factors that can affect online purchase intention. Al-Jundi et al. (2019) researched the perceived customer value such as perceived usefulness and perceived sacrifice, while trust is the focused determinant in investigating the purchase intention (Yu et al. 2021). In addition, there are a lot of studies examining the factors from other buyers to potential customers' purchase intention such as electronic word of mouth (eWOM) on social networking sites (Alhidari et al. 2015; Lee et al. 2020) and generated content from prior consumers (Bahtar and Muda, 2016; Nyein, 2019). Next, consumer purchase intention will emerge strongly if the customers rely on the content created by other users on the internet for pre-purchase evaluation of variably priced services (Noone and McGuire, 2013) and even product sales (Tang et al. 2014). Similarly, Bahtar and Muda (2016) indicated the increasing consumption trends of show-rooming and web-rooming arise significantly to look for product information and comments from prior consumers to inform their purchase decision (Kang, 2018;
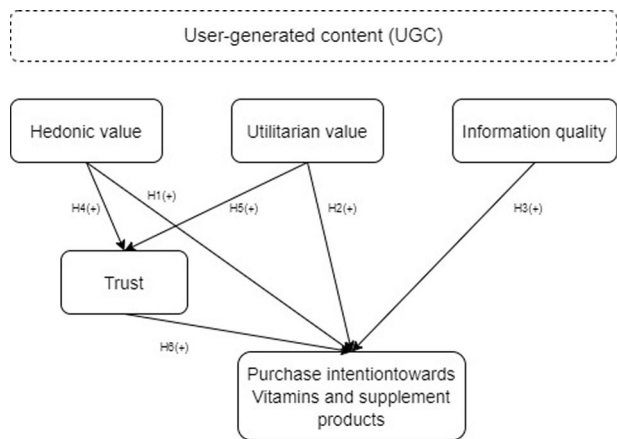
Fig. 1 The proposed research model. The model was constructed on the base of user-generated content features such as Hedonic and Utilitarian values and Information quality; and its relationships to Trust among consumers and finally facilitating consumer purchase intention.

Tsiakali, 2018). Furthermore, the COVID-19 pandemic is an encumbrance all over the world, thus the purchase intention is more or less also partly impacted. Some recent studies analyze how the purchase intention changed during this pandemic in the context of online book shopping (Nguyen et al. 2020) and online medication (e.g., dietary supplements, anti-cough medicine) (Jairoun et al. 2021). The aforementioned studies prove that as the COVID-19 pandemic has been occurring, purchase intention tends to be formed through online shopping (Fig. 1).

Main elements of UGC toward Vitamin and supplement products

Hedonic value of UGC. Hedonic value is correlated to the non-functional advantages; and concentrates more on the emotional benefit (Fang et al. 2017; Hirschman and Holbrook, 1982; Lavuri et al. 2023). In addition, the hedonic aspect represents the enjoyment from UGC (Hazari et al. 2017). Also, Batra and Ahtola (1991) also supported that hedonic value is relevant to content gratification which brings emotional arousals and feelings through subjective and personal evaluation rather than utilitarian (Ham et al. 2019). Given the influence of hedonic use on consumers' intention to do online shopping is still dubious among researchers. Nevertheless, some studies assert that hedonic value just increases the enjoyment for wondering then browsing the information, thus the purchase intention is not largely affected by the hedonic value, which involves cognition more than feeling (Arruda Filho et al. 2020; Okada, 2005). On the other hand, hedonic is examined as a strong effective factor that results in consumers' intention to purchase the product (Soebandhi et al. 2019). From the viewpoints of online-generated content, the relationship between hedonic and purchase intention is figured out in an online environment as content generated by users considered as amazed, interesting, and likely to create consumers' and forming discussion on the information, thus resulting in purchase intention (Karunanayake and Madubashini, 2019). Thus, the hypothesis proposed for this research is below:

H1: Hedonic value of UGC has a positive impact on consumers' purchase intention toward dietary supplement products on Facebook

Utilitarian value of UGC. Utilitarian value refers to "functional and instrumental benefits" such as convenience and cost-reduction (Gan and Wang, 2017; Hirschman and Holbrook, 1982; Lu et al. 2022). Utilitarian is distinguished among the terms

of value as individuals involving processes such as information usefulness for necessity rather than getting information for reaction. Thus, the utilitarian value of UGC refers to how beneficial and useful information is on social media (Chiu et al. 2014). Nowadays, people spend more time searching UGC to obtain more useful information which refers to utilitarian value to fulfill their goals (Kim and Park, 2013). Some earlier studies examine the positive relationship between utilitarian value and purchase intention (Gan and Wang, 2017; Ozkara et al. 2017). From online contents, the side of utilitarian values contributes massively in the decision of whether or not to buy something based on user reviews, especially in mobile services (Zhani et al. 2022). These findings are consistent with a previous study (Hazari et al. 2017) as it indicated that utilitarian use of UGC is relevant to practical benefits of UGC as consumers can obtain more useful information and/or practical. Furthermore, the researchers also state that the comprehensibility of utilitarian value of UGC is essential for consumers and potential customers in their purchasing intention (Hazari et al. 2017). To clarify the relationship, it can be hypothesized that:

H2: Utilitarian value of UGC has a positive impact on consumers' purchase intention toward dietary supplement products on Facebook

Information quality of UGC. Quality of contents encompasses various characteristics such as objectivity and logical reasons, which is also deliverable information that is understandable, abundant, and applicable to related products (Chen et al. 2011; Tyrväinen et al. 2023). Additionally, online consumer reviews come in a variety of formats ranging from subjective emotional information to attribute-specific factual descriptions (Lukyanenko et al. 2014). In 1984, information quality is distinguished as both understandable and objective aspects that are more effective and strongly influential than emotional and subjective information (Petty and Cacioppo, 1984). An online review is perceived quality under the terms of understandability, relevance and sufficiency. The degree of congruence between information in the consumer review and the information consumers desire to evaluate a product is measured by relevance (Chua and Banerjee, 2016). The degree of ease with which the information may be understood is referred to as understandability; and sufficiency represents the level of detail (Petty and Cacioppo, 1984). When uncertainty emerges in consumer perception, the purchase intention also partially fluctuates (Shiu et al. 2011). Another research study also elucidates that if the information is clear, it will help consumers to evaluate the product which then can create the purchase intention (Bataineh, 2015). Therefore, it is a prediction that the purchase intention of consumers becomes stronger as the reviews generated by users are quality, and the following hypothesis is proposed:

H3: Information quality of UGC has a positive impact on consumers' purchase intention toward vitamin and dietary supplement products on Facebook.

Trust in UGC. Trust is defined as the willingness of a party to depend on an exchange relationship with partners and a specific state of mind with positive expectations of individuals (Rousseau et al. 1998; Zafari et al. 2020). The importance of trust enriches the higher level of information acceptance and the increasing purchase intention among individuals (Basha et al. 2015). Continuously, consumers who are involved in processing individual reviews systematically will likely enhance purchase intention and have a predilection for favorable product reviews, which then influences consumer information processing by eliciting a confirmation bias (Yu et al. 2021). As a fact, consumers likely use information that they trust toward particular products/services;

Table 1 Respondents' profile.

	Criteria	Frequency	Percentage
Age	Less than 19	15	4.5
	20–29	241	72.8
	30–39	63	19
	Greater than 40	12	3.7
Gender	Male	113	34.1
	Female	218	65.9
Income	Below 5 million VND	36	10.9
	5–10 million VND	148	44.7
	Above 10–15 million VND	96	29
	Above 15 million VND	51	15.4
Living area	Southern Vietnam	203	61.3
	Northern Vietnam	95	28.7
	Central Vietnam	33	10

Authors' calculation.

and they make decisions whether or not to react to such information obtained (Cheng et al. 2017; Mayer et al. 1995). In the context of UGC, trust is indicated by the information that users provide through their activities (Al Qundus et al. 2019). More recently, people have become increasingly likely to trust other consumers with similar characteristics and/or experiences than they are to believe the government authorities, business experts, and the media (Mainardes and Cardoso, 2019). Given the previous studies regarding online contents, the findings revealed the impact of UGC on health-related attitudes and intentions (Hu and Shyam Sundar, 2010; Jin et al. 2015; Plasek and Temesi, 2019). Consumers are sidestepping the conventional methods of information transmission, such as doctors and healthcare advisors, and instead of that, they are depending more on online from different sources (Willis, 2018). Moreover, online-generated contents might be perceived in the type of recommendations provided by relatives, friends, or "like-minded souls" (Zeng and Gerritsen, 2014). These users usually generate contents that help other consumers to reduce the risks in their decision-making and thus reduce the uncertainty in their intention to purchase (Lăzăroiu et al. 2020). Generally, consumers normally trust reviews from users who have purchased the product, and trust of UGC is an essential factor that influences other potential consumers (Hazari et al. 2017). Thus, it can be concluded that trust in UGC has a significant impact on consumers' purchase intention (Table 1).

H4: Hedonic value of UGC has a positive impact on consumer trust toward vitamin and dietary supplement products on Facebook.

H5: Utilitarian value of UGC has a positive impact on consumer trust toward vitamin and dietary supplement products on Facebook.

H6: Trust of UGC has a positive impact on consumers' purchase intention toward vitamin and dietary supplement products on Facebook.

Methods
Data collection and sampling. The questionnaire for this study was administered personally by convenient sampling. The structure of the question was then created through a professional online-based survey tool, which has already been adopted in tourism research with satisfactory results (Ali et al. 2018; Ayeh et al. 2013). Also, the online questionnaire is developed as an effective tool to maximize the validity and reliability of survey, and further improve both response rates and data quality (Ha, 2022). The target group of population is selected on the attributes as those people who have a stable standard of living, a healthy

lifestyle (e.g., using dietary supplements for improving their health), a habit of reading content (e.g., reviews, posts, videos) generated by other users, or even a habit of using Facebook to refer to more information before purchasing something. Besides, they are investigated in terms of both using Facebook and at least experiencing content generated by other users to assist their purchase intention. All measurement constructs and items were adapted from previous studies for validity and reliability, and were operationalized using a 5-point Likert-type scale ranging from 1 for strongly disagree to 5 for strongly agree. There were five items of hedonic value retrieved from Gan and Wang (2017) and Sethna et al. (2017), five items of utilitarian value retrieved from Hazari et al. (2017) and Sethna et al. (2017), and five items of information quality retrieved from Hazari et al. (2017) and Kim et al. (2012). For trust, five items were taken from Chari et al. (2016) and Hazari et al. (2017), and five items for purchase intention were modified from Hazari et al. (2017) and Sethna et al. (2017). The detailed measurement items are shown in Table 2.

The pilot study is used to test the content in order to make the research more cohesive and understandable. A questionnaire pilot study was conducted to assess the measuring scales' content validity (Wang and Yang, 2010). A panel of experts examined content validity by determining whether the test accurately represents all of the contents of a given concept (Ha et al. 2023; Judd et al. 1991). After evaluation by an advisor in this field, some items were altered based on the feedback. Next, the questionnaire would be administered to 20 Facebook users who have created content to given products which was primarily designed with closed questions that were measured using a 5-points Likert scale. They would be required to answer, review, and appraise the questionnaire. All of the questionnaires would be considered carefully, then revised and finalized from the points of feedback and comments before being distributed digitally through a Google Form. Thus, this enables the questionnaire to reach respondents who come from three different areas in Vietnam, especially on electronic platforms for convenience. The result of screening questions expectedly stated that (1) the confirmation of spending on product reviews on Facebook and (2) the intention of being aware of vitamins and dietary supplement products during the coronavirus pandemic.

Among the 331 Vietnamese respondents who took part in the survey on Google Forms, there are 323 respondents engaged in online contents for review on Facebook, and eight who are not associated with product reviews on a networking site such as Facebook. Among the 323 abovementioned respondents who frequently exposed on Facebook with sources of online review, there is one respondent confirmed with no plan of being aware of related products for health and other supports from a networking site. It can be initially concluded that a large number of Vietnamese buyers engage in product reviews on Facebook to facilitate their purchase intention through shared information from prior experiences with similar or related products.

Data analysis. The data was analyzed through Structural Equation Modeling (SEM) which is known as a viable measurement technique over simple regression tools, since it enables researchers to test a series of dependence relationships simultaneously (Hair et al. 2018). This paper undertook a two-step approach using the measurement model and the structural model to examine the associations between latent constructs including perceived values of hedonic and utilitarian, information quality and trust, and further intention to use vitamin and supplement products during and post-pandemic. Furthermore, the research for this study considered all the necessary aspects involved in

Table 2 Factor analysis of all measurement items.

Constructs	Code	Item	Source	Factor loading	CR	α	AVE
Hedonic Value (HV)	HV1	Searching UGC on FB is interesting rather than tedious	Gan and Wang (2017) and Sethna et al. (2017)	0.807	0.912	0.911	0.674
	HV2	Searching for UGC of a product on FB is a good way to spend time		0.832			
	HV3	Searching UGC on FB for a product is not obligatory but enjoyable		0.807			
	HV4	I feel excited when choosing products offered by users on FB.		0.895			
	HV5	Using FB for reading UGC would give me pleasure.		0.764			
Utilitarian Value (UV)	UV1	I tend to only read UGC on FB when there is a product that I want to buy.	Hazari et al. (2017) and Sethna et al. (2017)	0.802	0.858	0.854	0.549
	UV2	Reading UGC on FB can be useful in comparison with other sites.		0.676			
	UV3	It is convenient to gather UGC's information on products on FB.		0.885			
	UV4	Gathering UGC by browsing FB saves time.		0.670			
	UV5	Reading UGC is a worthwhile use of my time.		0.644			
Information Quality (QL)	QL1	UGC about any particular product gives detailed information.	(Kim et al. 2012) and Hazari et al. (2017)	0.785	0.872	0.868	0.580
	QL2	UGC about the product of a particular brand on FB is clear.		0.544			
	QL3	UGC about a particular product is relevant to my search.		0.784			
	QL4	UGC about a product is understandable.		0.726			
	QL5	When buying a product, the availability of high-quality product reviews provided by users is very important to me.		0.858			
Trust (TR)	TR1	I trust user reviews from people who have purchased the product.	Chari, Christodoulides, Presi, Wenhold and Casaletto (2016) and Hazari et al. (2017)	0.861	0.891	0.886	0.627
	TR2	I believe that user reviews of a product are more beneficial than manufacturer-provided information.		0.794			
	TR3	I trust user reviews of a product to be reasonably accurate representations of a product.		0.608			
	TR4	I trust reviews from friends or people I follow on FB.		0.610			
	TR5	I would trust a product review posted by an average user more than a product review posted by an expert.		0.956			
Purchase Intention (PI)	PI1	I feel good purchasing a product that has a positive UGC.	Hazari et al. (2017) and Sethna et al. (2017)	0.824	0.897	0.890	0.638
	PI2	If I read that the majority of UGCs are positive, I would purchase that product.		0.676			
	PI3	It is important for me to make a purchase decision based on UGC.		0.630			
	PI4	UGC has in the past influenced my purchase decision.		0.726			
	PI5	UGC is likely to influence my future purchase decisions.		0.913			

Authors' calculation.

SEM analysis to ensure the reliability and validity of the findings (Kline, 2015; Nunkoo and Ramkissoon, 2012).

Results

Sample profile. This part summarizes the characteristics of 331 respondents in this survey. The age of samples largely accounted for a range of 20–29 with 72.8% and 30–39 with 19%; and the division of gender is 34.1% of male, versus 65.9% of female. In terms of monthly income, the proportion is divided approximately among 44.7% of "5–10 million VND" and 29% of "above 10–15 million VND"; whereas equivalently 15.4% of "above 15 million VND" and 10.9% of "below 5 million VND". The majority of respondent accounts for office staff/employment with 72.8%; and currently live in three main areas of Vietnam the south of 61.3%, the north of 28.7%, and the central of 10%. Due to the large scale of ages taken, there are equivalent proportions among marital status as dating, single, and married with 36.3, 29.6, and 29.3% respectively. For frequency, there are 53.2% of "less 2 times/week", 34.1% "2–5 times/week" and 12.7% "above 5 times/week" respondents spend on Facebook posts for DS products or information related to health.

The measurement evaluation. *Exploratory factor analysis* (EFA) was first used to identify the multidimensionality of the constructs. The Bartlett test was significant at $\rho = 0.000$ and the KMO (Kaiser-Meyer-Olkin) score was 0.855, which is greater than the threshold of 0.6, indicating the adequacy of the sample size as well as the existence of the latent factors. The EFA indicated a total of four variables with eigenvalues of 1 or more, and the total variance of the four derived factors was appropriately 69.2%.

Next, a Confirmatory factor analysis (CFA) was performed. Table 2 shows the results of the tests of both convergent and discriminant validity outcomes. *Convergent validity* was assessed using Cronbach's alpha (α), Composite Reliability (CR), and average variance extracted (AVE). The factor loadings for all the constructs used in this study were greater than the recommended cutoff at 0.5, with the highest value of TR5 (Trust) at 0.956 and the lowest value of QL2 (Information quality) at 0.544. Reliability was assessed for each construct by Cronbach's alpha, which ranged from 0.854 (Utilitarian Value) to 0.911 (Hedonic Value), which indicates a very good level used to check the reliability of factor analysis, where values of more than 0.7 are acceptable (Hair et al. 2018). This research for this study also examined AVE and CR to confirm the convergent validity and internal consistency. As the AVE values were higher than 0.5 and the CR values were higher than 0.7, the internal consistency and convergent validity of the measurement variables were valid (Fornell and Larcker, 1981). The corresponding results were that the AVE values ranged from 0.549 (Utilitarian Value) to 0.674 (Hedonic Value), and the CR values ranged from 0.858 (Utilitarian Value) to 0.912 (Hedonic Value). Therefore, the convergent validity and internal consistency of the measurement variables are accepted.

Discriminant validity was verified through the AVE value, which is larger than the maximum shared variance (MSV) and the square root of AVE is larger than all inter-construct correlations between the potential variables, indicating that there were no issues with discriminant validity (Fornell and Larcker, 1981). Table 3 shows that these requirements have been confirmed for all factor values.

The structural evaluation. The overall model fit was measured using the relative/normed chi-square (χ^2/df), yielding a value of $\chi^2/df = 2.847$, which is below the recommended threshold of 3 (Kline, 2015), the chi-squared value was 746.113 and all factor

Table 3 Discriminant validity.

	HV	TR	QL	UV	PI
HV	**0.821**				
TR	0.129	**0.792**			
QL	0.136	0.372	**0.761**		
UV	0.007	0.311	0.126	**0.741**	
PI	0.149	0.524	0.574	0.406	**0.799**

Authors' calculation.

loadings were statistically significant ($\rho = 0.000$). The goodness-of-fit index (GFI) was 0.855, and the comparative fit index (CFI) was 0.907; RMSEA was 0.075, all of which are indicated as moderate fit indices (Browne et al. 1993; Hair et al. 2018). Overall, the structural equation model shows a good fit.

The structural evaluation illustrated above in Fig. 2 shows the relationships among the variables. An estimation of regression weights determined in Table 4 indicates that the first dimensions of trust, such as Utilitarian value and Hedonic value, have significant associations with consumer trust toward vitamin and dietary supplement products through Facebook information sharing with the values of 0.331 and 0.142, respectively. Next, the consumer purchase intention of vitamin and dietary supplement products is significantly impacted by Information quality, Utilitarian value, and Trust and their respective range of values are 0.418, 0.250, and 0.266 respectively. Meanwhile, Hedonic value is not significant to the consumer purchase intention (0.052 and $\rho = 0.245$).

Mediation analysis. The cause-effect relationships among Hedonic value, Utilitarian value, Trust, and Purchase intention are expected to be validated by conducting mediation analysis with the bootstrapping approach (Hayes, 2009). The analysis process is taken with the bootstrapping of 2000 samples and integrates a 95% level of bias-corrected confidence interval. In the results, Table 5 indicates that the Hedonic value and the Utilitarian value both have significant relationships on Trust; further, Information quality, Trust, and Utilitarian value are all associated with Purchase intention toward vitamin and dietary supplements. Excitingly, Hedonic value is not significantly related to Purchase intention during and post-pandemic for supportive products. Furthermore, the association between Hedonic value, Utilitarian value, and Purchase intention are fully mediated and partially mediated by trust, respectively. Therefore, all hypotheses are supported as proposed, except H1.

Discussion

The research findings represent that the majority of hypotheses are supported by statistically significant paths of this model. First, Hedonic value and Utilitarian value are significantly related to Trust. These findings are consistently confirmed by Albayrak et al. (2020) stating hedonic value of website content is positively associated with consumer trust. In a related context, Utilitarian shopping experience/value is examined as a significant relationship to consumer trust at the airport (Han et al. 2018). Continuously, Information quality is significantly related to Purchase intention. This finding is consistently confirmed by Kim and Johnson (2016) stating that perceived information quality as a cognitive response significantly influences behavioral intention through online content on Facebook.

Next, Utilitarian values and Trust are significantly related to Purchase intention. These findings are consistently confirmed by Jeon et al. (2017) and Wu et al. (2017), both stating that utilitarian values and trust are positively associated with repurchase
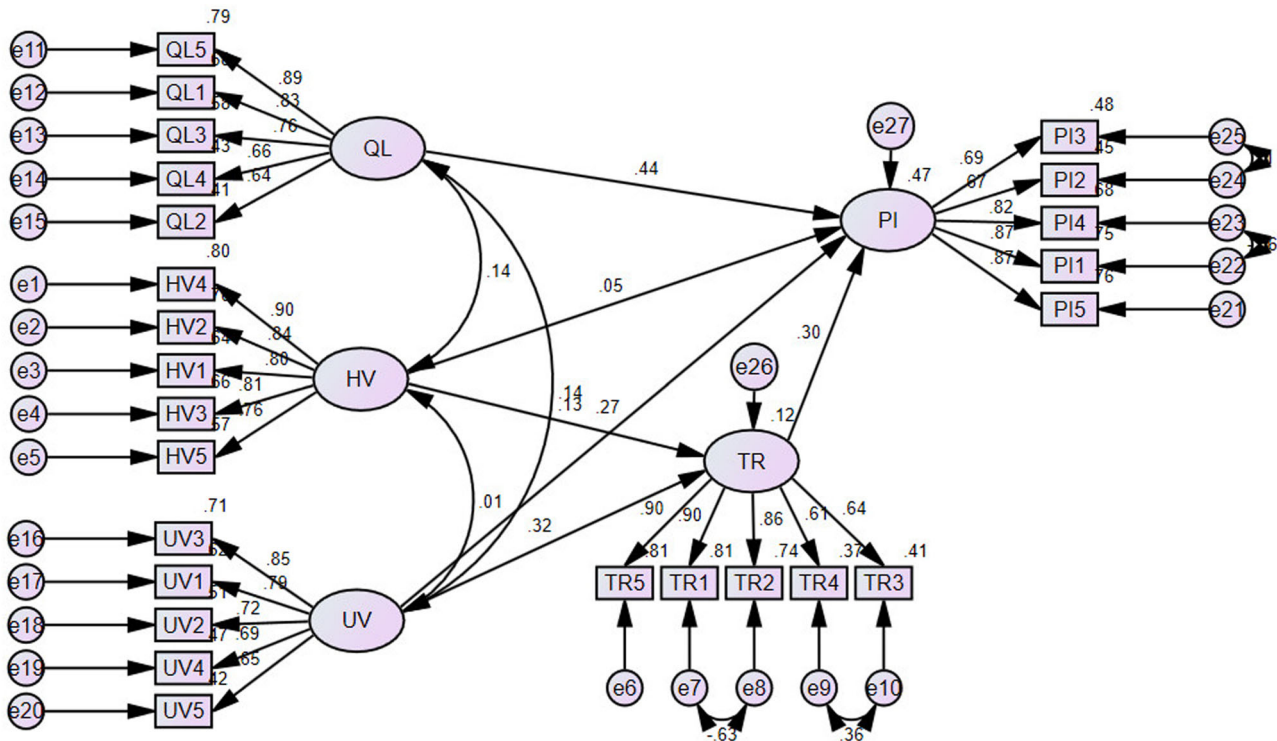
Fig. 2 Structural model assessment results. Source: AMOS calculation results.

Table 4 Structural model estimation.

Path	Hypothesized relationship	Estimate	S.E.	C.R.	ρ	Supported
H6	Trust - Purchase intention	0.266	0.043	6.120	***	Yes
H5	Utilitarian value -Trust	0.331	0.062	5.341	***	Yes
H4	Hedonic value -Trust	0.142	0.061	2.330	0.020	Yes
H3	Information quality -Purchase intention	0.418	0.048	8.729	***	Yes
H2	Utilitarian value - Purchase intention	0.250	0.048	5.235	***	Yes
H1	Hedonic value - Purchase intention	0.052	0.044	1.163	0.245	No

***ρ values = 0.000.
Authors' calculation.

Table 5 Products of mediation analysis.

Relationships	Paths of mediation	Estimate	ρ	Conclusion
Hedonic value – Trust – Purchase Intention		0.039*	0.025	Full mediation
Utilitarian value – Trust – Purchase Intention		0.095***	0.001	Partial mediation

(ns) non-significant at $\rho < 0.10$, ***$\rho < 0.001$, *$\rho < 0.050$.
Authors' calculation.

intention toward online community; or utilitarian value dimensions are also positively associated with Chinese travelers' behavioral intention. Further, trust is also positively associated with the online purchase of products and services through consumers' perceived value (Bonson Ponte et al. 2015)

Interestingly, the research for this study found that hypothesis H1 was rejected. This finding infers that the hedonic value of online sharing information on social media is insignificant to consumer purchase intention toward vitamin and dietary supplement products during the height of the pandemic. This result is contradictory to the findings of Biondi and Camanzi (2020) stating hedonic features/values significantly facilitate consumer perception and purchase intention toward novel nutritious food products with multiple attributes. These dimensions of the hedonic perspective are of pleasant taste; color of product; product tastier; and easier to use than what is used to measure the estimation in this given context. Similarly, the opposing results reveal a higher emphasis of hedonic attributes/cues explicitly to advance the perceived value of consumers and promote consumers' continuous purchase intention (Lin et al. 2021; Mohammed, 2021). As a fascinating novelty, this study uncovers the new side of human perception that is considerably adapted in certain circumstances of public health crisis and even negative cases in life. Consumers are more likely to give emphasis less on the subject experience of amusement and playfulness, pleasure and excitement within product function and display. Actually, the undesirable consequences on health and survival are driving consumers to attempt to acquire knowledge and comprehension to be able to make the correct decision among product alternatives from various retailers and forms of market.

Theoretical implication. This study presents theoretical implications based on the findings of empirical analyses. The theoretical implications are as follows: first, numerous studies approve that customer purchase intention was caused by marketing efforts such as social media branding (McClure and Seock, 2020), celebrity endorsement (Osei-Frimpong et al. 2019), social media advertising, and eWOM engagement (Chetioui et al. 2021). However, this study is among the first to attempt to show that customer buying intention can occur without the involvement of marketing efforts and activities. The findings reveal that consumers have their own perception and perceptual selectivity for any source of information they obtain from social media, and their concerns of benefit and value are from given health-related products and information quality highly appropriated (Guan et al. 2022; Jiménez-Castillo and Sánchez-Fernández, 2019). Second, the empirical findings in this study provide a new understanding to how attributes of heuristic routes of online content are explicitly identified as non-content bases, such as consumer-perceived values by hedonic and utilitarian, information quality and trust, affect psychological dimensions of consumers (Hazari et al. 2017). These essentially contribute to the basis of behavioral responses that customers psychologically perceive and believe to be vital in special circumstances or specific contexts such as a health-related outbreak. Third, the study findings have provided a deeper insight into the relationships between the UGC's factors and purchase intention by explaining generated content from previous users fostering customer behavior on adoption, intention, and usage of health-related products during and after the COVID-19 pandemic. Before this study, there has been little attention on how consumer-generated content fosters purchase intention and use of vitamin and dietary supplement products during health crisis settings. Although many recent studies have concentrated on purchase intentions for certain goods and services on online platforms, they have only

highlighted how dimensions of benefits and sacrifice have positively affected online purchase intention by concentrating on consumer-perceived values (Konuk, 2018). Further, studies on consumer intention have been restricted to consumer perception of risk from online platforms, such as financial, time, security, product, and psychological risks significantly affecting online purchase intention (Kamalul Ariffin et al. 2018). Surprisingly, in the context of the COVID-19 crisis, little evidence of consumer purchase intentions toward necessary health-related products is found, except for several factors, including uncertain and unsafe (Naeem, 2021). The findings of this investigation complement those of earlier studies.

Practical implication. The practical implications are detailed in this section. These days, as technological advancement as well as a large number of social sharing platforms such as TikTok, Instagram, Twitter, and many blogging sites have arisen to allow customers to engage and/or generate their own content for reviewing a product or a particular brand to potential customers. Particularly during the lockdown and social distancing of COVID-19, the UGC has become more and more favorable and popular. With a large number of dietary supplement concerns increasing during the epidemic, as well as a variety of emerging product reviews, the quality of content is also important for managers to be concerned about them. From the company's perspective, they should take a further outlook beyond Facebook to develop their status in video-sharing sites such as TikTok and/ or Instagram IGTV to maximize the quality of content. These sites can deliver popularity, while Facebook enlarges the momentum of customers to contribute high-quality content. For marketers, such as freelancers or Key-Opinion Leaders (KOLs), to generate content, they can enhance the quality such as objectivity or logical content to make it understandable and sufficient about the topic of health protection to influence potential buyers' intentions to purchase dietary supplement products.

Further, managers can add reviews and ratings to their sites, and display the number of reviews and ratings by customers on the product pages. Thus, the purchase intention of customers might increase as the more content that is generated by other users, the more popular the brand will be. Besides, one way that marketers can generate more UGC is by running campaigns related to health protection during the lockdown or quarantine, or even generating giveaways as gifts for audiences when they create, share, or tag brands in content featuring their dietary supplement products. This action is referred to as gamification to increase the engagement from customers.

Moreover, managers can share UGC on social media accounts, websites, and other marketing channels to enhance the trust from new customers. In particular, to enhance trust from users, managers should create relationships with their customers on social networking sites. Once a relationship is built, customers then easily turn to loyal customers and generate more content for brands. Thereby, the utilitarian value of UGC is also enhanced as the trust can reduce the time of consideration about the quality and quantity of UGC bringing the notion of usefulness in time.

Limitations and future research. Although this study highlights several empirical contributions, it still has some limitations that can be addressed for future research and managerial fields. Firstly, this study has emphasized consumer purchase intention in Vietnam toward a specific product category known as dietary supplement products although functional food is also preferable and widely used among customers of all ages and genders worldwide. In other words, there is a limitation in terms of types of products that cannot reflect the specific products in dietary

supplements, so future studies in the area of UGC can examine the functional products in terms of healthy products. Secondly, this study has only taken the purchase intention of consumers in Vietnam. Therefore, the limitation in the region that results in the sample size is still small and cannot be evaluated for the whole population in Asia or in the world. Finally, there are also many factors of UGC affecting purchase intention, and this study only addresses some of these factors. Therefore, future studies can extend and discover more factors to increase the richness of the topic "User-Generated Content" such as health-related dimensions, cultural, and personality dimensions that vary by state and country. The addition of this literature should also be enlarged by investigating the different aspects of psychological perceived risk and perceived knowledge of health as well as concerns of livestreaming shoppable sites at a better integration in the implications of research and practical.

Data availability

All data generated or analyzed during this study are included in this published article and its supplementary file.

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Conceptualization: G-DN, M-TH; methodology: M-TH, G-DN, H-TTN, B-DTN; analysis and investigation: M-TH, G-DN, H-TTN, B-DTN; Writing—original draft preparation: H-TTN, B-DTN, G-DN; Writing—review and editing: M-TH, G-DN, H-TTN, B-DTN; validation: M-TH, G-DN; resources: H-TTN, G-DN; supervision: M-TH.

Competing interests

The authors declare no competing interests.

Ethical approval

Ethical approval for this type of study is not required by our institute as this study does not include any sensitive or private information. Therefore, no ethical approval was provided.

Informed consent

The participants were informed during the recruitment and survey process that their participation was voluntary and that all information was treated with confidentiality. Additionally, the participants were informed that they had the right to withdraw from the survey and were asked to tick the consent box before completing the survey.

Additional information