

**EXPLORING CONSUMERS' DECISION-MAKING  
PROCESS ON ONLINE PURCHASING OF HEALTH  
SUPPLEMENTS AND NATURAL PRODUCTS IN  
MALAYSIA**

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PROCESS ON ONLINE PURCHASING OF HEALTH  
SUPPLEMENTS AND NATURAL PRODUCTS IN  
MALAYSIA**

**by**

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## LIST OF ABBREVIATIONS

ADR	Adverse drug reaction
COREQ	Consolidated Criteria for Reporting Qualitative Research
D&M IS	DeLone & McLean Model of Information System
DCA	Drug Control Authority
GT	Grounded theory
HBM	Health Belief Model
IDI	In-depth Interview
IMB	Information Motivation Behavioural skills
MAB	Medicine Advertisement Board
MCMC	Malaysian Communications and Multimedia Commission
NPRA	National Pharmaceutical regulatory Agency
OTC	Over-the-counter
PIS	Participant information sheet
PMT	Protection Motivation Theory
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TST	Temporal Self-regulation Theory
UNCTAD	United Nations Conference on Trade and Development
vs	Versus
WWW	World-Wide Web

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**MENEROKA PROSES MEMBUAT KEPUTUSAN PEMBELIAN  
SUPLEMEN KESIHATAN DAN PRODUK SEMULAJADI DALAM TALIAN  
DI KALANGAN PENGGUNA DI MALAYSIA**

**ABSTRAK**

Suplemen kesihatan dan produk semulajadi digunakan secara meluas oleh orang awam untuk menyokong fungsi fizikal dan mencegah penyakit. Selain itu, dengan kemunculan sistem e-dagang, produk ini semakin mudah diakses oleh orang awam. Walaupun beberapa model teori telah digunakan untuk menerangkan penggunaan suplemen kesihatan dan produk semula jadi, bukti empirikal tentang cara pengguna membuat keputusan untuk membeli product ini dalam talian masih terhad. Dalam kajian kualitatif yang dijalankan dari Januari 2021 hingga Mac 2022 ini, pendekatan ‘Grounded Theory’ telah digunakan untuk membangunkan model teori substantif untuk menerokai proses pengguna membuat keputusan apabila membeli suplemen kesihatan dan produk semula jadi dalam talian. Pengguna dewasa Malaysia yang telah membeli produk ini melalui Internet dipilih melalui persempelan tujuan atau tepretikal. Sebanyak 18 temu bual intensif (IDI) secara maya telah dijalankan, setiap IDI mengambil masa sepanjang 30 hingga 80 min, dengan ‘theoretical saturation’ tercapai selepas kesemua 18 IDIs . Semua IDI telah dirakam secara audio dan ditranskripsikan secara verbatim. Data dikendalikan dengan menggunakan perisian Nvivo 12, dianalisis menggunakan pengekodan terbuka, pengekodan fokus dan pengekodan teori. Pengekodan dilakukan oleh seorang penyelidik dan disemak silang oleh seorang penyelidik kedua, dengan sebarang konflik diselesaikan melalui perbincangan dengan seorang penyelidik ketiga bagi keputusan muktamad pengekodan. Tafsiran analisis dan konsep teori telah direkodkan dalam memo penyelidikan. Hasil kajian dilaporkan dengan berpanduan senari semak COREQ.

Keputusan pengguna untuk membeli suplemen kesihatan atau produk semula jadi melalui Internet adalah berdasarkan satu siri penilaian mengenai tentang faedah dan risiko yang dipersepsikan oleh mereka, sama ada berkaitan dengan produk atau proses yang terlibat dalam aktiviti ini. Dalam pasaran dalam talian, pengguna cuba memilih produk, penjual dalam talian, platform jualan dan/atau mekanisme pembelian dengan persepsi risiko yang lebih rendah, yang akhirnya meningkatkan keyakinan mereka terhadap lima elemen yang berkaitan dengan pembelian: (1) keberkesanan produk, (2) keselamatan produk, (3) kemudahan pembelian, (4) pembelian yang adil dan (5) keselamatan dalam talian. Pengguna mengambil tahap risiko yang boleh diterima untuk membeli produk ini dalam talian, dan tahap yang boleh diterima ini adalah unik bagi setiap individu dan berdasarkan persepsi mereka sama ada mereka mempunyai kawalan ke atas akibat yang mungkin berlaku semasa terjadinya senario terburuk. Kesimpulannya, sebuah model teori substantif telah dibina untuk menunjukkan cara pengguna membuat keputusan semasa membeli suplemen kesihatan dalam talian dan produk semula jadi dengan menerima tahap risiko yang boleh diterima, sama ada berkaitan dengan produk atau proses. Model yang dihasilkan dalam kajian ini memberikan informasi penting untuk memaklumkan kawalan jualan dalam talian produk ini serta program pendidikan pengguna yang lebih disasarkan.

# **EXPLORING CONSUMERS' DECISION-MAKING PROCESS ON ONLINE PURCHASING OF HEALTH SUPPLEMENTS AND NATURAL PRODUCTS IN MALAYSIA**

## **ABSTRACT**

Health supplements and natural products are widely used by the general public to support physical function and prevent disease. Additionally, with the advent of e-commerce, these products have become easily accessible to the general public. Although several theoretical models have been used to explain the use of health supplements and natural products, empirical evidence on how consumers make decisions to purchase online health supplements and natural products remains limited. In this qualitative study conducted from January 2021 until March 2022, a grounded theory approach was used to develop a substantive theoretical model with the aim of exploring the decision-making process of consumers when purchasing health supplements and natural products online. Malaysian adult consumers who had purchased these products via the Internet were either purposively or theoretically sampled. A total of 18 virtual in-depth interviews (IDIs) were conducted, each lasting between 30 to 80 min, with theoretical saturation achieved after all 18 IDIs. All the IDIs were audio-recorded and transcribed verbatim. The data were managed using NVivo 12 software, analysed using initial coding, focused coding and theoretical coding. Coding was performed by one researcher, and cross-checked by a second researcher, with any conflicts resolved via discussion with a third researcher to finalize the coding decisions. The analytical interpretations and theoretical concepts were recorded in research memos. The study reporting was guided by the COREQ checklist. Consumers' decisions to purchase a health supplement or natural product over the Internet are based on a series of assessments regarding the perceived benefits and risks

of this activity, which may be related to the product or the process. In the online marketplace, consumers attempt to choose products, online sellers, sales platforms and/or purchase mechanisms with lower perceived risk, which ultimately enhances their confidence in five elements related to the purchase: (1) product effectiveness, (2) product safety, (3) purchase convenience, (4) fair purchase and (5) online security. Consumers take an acceptable level of risk to purchase these products online, and this acceptable level is unique to each individual and is based on their perception of having control over the potential consequences if the worst-case scenario occurs. In this study, a substantive theoretical model is developed to demonstrate how consumers decide to purchase online health supplements and natural products by accepting an acceptable level of risk associated with the product or process. The emerging model provides valuable insights to inform regulation of these products' online sales as well as a more targeted consumer education programme.

## **CHAPTER 1 INTRODUCTION**

### **1.1 Introduction**

This chapter serves as an overview of the research project. Section 1.2 outlines the scope of health supplements and natural products, followed by Section 1.3 on regulatory control in Malaysia. Section 1.4 provides an overview of product registration in Malaysia, followed by section 1.5, which offers an overview of e-commerce and its application for online purchases. Subsequently, Section 1.6 briefly describes the background of online purchases in Malaysia. Finally, the problem statement (Section 1.7), research question (Section 1.8), and study objective (Section 1.9) are outlined. This chapter concludes with a thesis outline (Section 1.10).

### **1.2 The scope of health supplements and natural products**

Health supplements and natural products include a wide range of substances, such as vitamins, minerals, nutritional supplements, and herbs. In Malaysia, health supplements refer to ‘any product used to supplement a diet and to maintain, enhance and improve the health function of human body’, which could be presented and to be administered in small unit dosage forms such as capsules, tablets, powder, liquids, excluding sterile preparations (i.e. injectables, eyedrops) (National Pharmaceutical Regulatory Agency, 2024a). Examples of health supplements include products that contain one or more vitamins, minerals, amino acids, fatty acids, enzymes, probiotics or other bioactive substances, including substances derived from natural sources and synthetic sources (National Pharmaceutical Regulatory Agency, 2024a). On the other hand, natural products include traditional medicines, herbal products, homeopathic medicines and natural products with therapeutic claim (National Pharmaceutical Regulatory Agency, 2024b).

Globally, there is no consensus of terminology for this group of products (i.e., health supplements and natural products); other terms commonly used include dietary supplement, health food, complementary medicine, and natural health products. This group of products is also regulated and classified differently in different jurisdictions. For example, some countries or continents classify both groups of product under a single category (e.g. 'natural health products' in Canada, and 'complementary medicine' in Australia) (Thakkar et al., 2020; Therapeutic Goods Administration, 2019), whereas some separated the natural products from the health supplement (e.g., 'dietary supplement' vs 'botanical drugs' in the US, 'dietary supplement' vs 'herbal remedies' in New Zealand, 'dietary supplement' vs 'herbal medicinal products' in the European Union, 'health food' vs 'Traditional Chinese Medicine' in China, 'health supplement' and 'natural product' in Malaysia) (Konik, Jungling, & Bauer, 2011; Thakkar et al., 2020). Additionally, a product may be classified as a 'supplement' in one country but as a 'medicine' in another, resulting in different regulatory requirements for product registration, particularly regarding the extent to which a therapeutic claim could be made for a product (Thakkar et al., 2020).

In Malaysia, a product's classification as a health supplement or natural product is primarily for product registration and regulatory purposes. Furthermore, the manufacturer may choose the product category under which it is registered based on the level of evidence of product efficacy they are willing to provide (Park, Yi, & Kwon, 2022). Furthermore, the consumers are not expected to be fully aware of the product classification (Tengku Mohamad, Islahudin, Jasamai, & Jamal, 2019); and from the consumer's perspective, both health supplements and natural products are commonly regarded as products intended for health purposes, such as supporting body function and disease prevention (Hys, 2020). Their purchasing habits for these two types of products are unlikely to differ. As a result, both health supplements and natural



products are included in the scope of this research, which is viewed as a group of health-related products.

### **1.3 The regulatory control of health supplements and natural products in Malaysia**

In Malaysia, the Pharmacy Services Programme under the Ministry of Health shoulders the responsibility in ensuring the public get access to safe, efficacious and quality pharmaceutical products, including controlled medicines, over-the-counter (OTC) medicines, health supplements and natural products. Particularly, the National Pharmaceutical regulatory Agency (NPRA) was established in 1978 to implement quality control on pharmaceutical products that are locally marketed, serving as the secretariat of the Drug Control Authority (DCA) that was established under the purview of the *Control of Drug and Cosmetic Regulations 1984* (National Pharmaceutical Regulatory Agency, 2023a). The DCA plays its role as the executive body to review matters related to product registration, to make decisions related to regulatory policies, to maintain a register of the registered products, and to impose requirements for the registered products (National Pharmaceutical Regulatory Agency, 2023a). Since its establishment, all pharmaceutical products need to be registered with the DCA before they can be marketed for public. Pharmaceutical products herewith include controlled medicines that contain scheduled poisons, over-the-counter (OTC) medicines that contain non-scheduled poisons, health supplements and natural products. Pharmaceutical products are regulated for their safety, efficacy and quality, while health supplements and natural products are regulated for their safety and quality, and partially for their efficacies (National Pharmaceutical Regulatory Agency, 2023a).

Currently, health supplements and natural products are available without a prescription and commonly self-selected by the consumers. This also allows health

supplements and natural products to be sold online together with other items such as household goods, clothing, and utilities. Nonetheless, while the sale of health supplements and natural products is not as strictly regulated as pharmaceutical products, advertisements for these products must be approved by the Medicine Advertisement Board (MAB) before publication (Pharmacy Enforcement Division, 2022). Product advertisements that have been approved by MAB will be assigned an approval number (Wong, 2015). Any unregistered product advertisement with medical claims, whether printed or online, is considered to be in violation of the *Medicine (Advertisement and Sale) Act of 1956*.

Furthermore, the pharmaceutical products being sold in the market are under regular scrutiny by the Pharmacy Enforcement Division, a division under the Pharmacy Services Programme. With the rise of online marketplaces, health supplements and natural products have become more widely available to the general public via the Internet (Binns, Lee, & Lee, 2018). Control and regulation of this category of products has thus been extended from physical shops to online marketplaces. Indeed, such regulation does not only limit to health supplements and natural products, but also other pharmaceuticals (e.g., controlled medicines, OTC medicines) and non-pharmaceutical products (e.g., cosmetics). Regular online screening is conducted by the Pharmacy Enforcement Division to ensure all product advertisements complies to the advertising guidelines. Aside from that, the division has been cooperating with other local agencies such as the Malaysian Communications and Multimedia Commission (MCMC) and the Royal Malaysian Customs Department (Abdullah, 2014, 2016) to ensure the quality of pharmaceutical products sold online. Actions taken include blocking illegal websites as well as investigating and confiscating illegal pharmaceutical products. International cooperation has also been established through participation in international operational networks such as Interpol

in the fight against illegal online pharmaceutical product sales through Operation Pangea (Abdullah, 2014). Besides, the Pharmacy Services Programme established the Digital Forensic Unit in 2014 to strengthen the investigation of illegal online pharmaceutical product sales (Abdul Rahman@Othman, 2015). All these efforts are aimed at protecting public health by preventing the sale of counterfeit and illegal pharmaceutical products by irresponsible online sellers. The increase of health conscious along with disposable income has been attributed to such increasing trend in the use of health supplements and natural products.

#### **1.4 Product registration in Malaysia**

In Malaysia, the registration of pharmaceutical products is facilitated by the NPRA, which serves as the secretariat of the DCA. The responsibility of submitting registration applications lies with the Product Registration Holder (PRH), also referred to as the product owner. The PRH must be a locally incorporated company registered with the Companies Commission of Malaysia (National Pharmaceutical Regulatory Agency, 2024c).

Products to be registered fall into various categories, such as new drug products, biologics, generics, health supplements, natural products, or veterinary products (Table 1.1). Each category is subject to different regulatory requirements. For the purpose of this thesis, we will focus specifically on the registration of health supplements and natural products.

Table 1.1 Classification of product type registered with NPRA

Product classification	Definition
New drug product	Any pharmaceutical products that have not been previously registered in accordance with the provisions of the Control of Drugs and Cosmetics Regulations (CDCR) 1984 (e.g., an active moiety or radiopharmaceutical substance)
Biologics	A product whose active substance is made by or derived from a living organism (plant, human, animal or microorganism) (e.g., vaccines, blood products, monoclonal antibodies, recombinant proteins - insulin, hormones)
Generics	A product that is essentially similar to a currently registered product in Malaysia (may include schedule poison, non-scheduled poison, medicinal gas)
Health supplement (HS)	any product used to supplement a diet and to maintain, enhance and improve the health function of human body. It is presented in small unit dosage forms (to be administered) such as capsules, tablets, powder, liquids and shall not include any sterile preparations (i.e. injectable, eye drops) (e.g., vitamins, minerals, enzymes, substances derived from natural sources)
Natural products	Natural products include traditional medicines, herbal products, homeopathic medicines and natural products with therapeutic claim.
Veterinary products	Any drug which includes any substance, product or article, intended to be used, or capable or purported or claimed to be capable of being used on humans or any animals, whether internally or externally, for a medicinal purpose.
*Definition adopted from (National Pharmaceutical Regulatory Agency, 2024c)	

Health supplements comprise substances derived from natural sources, including animal, mineral, and botanical materials. These substances may bear similarities to food items and can sometimes blur the distinction between food products and health supplements or natural products. Food-Drug Interphase (FDI) products, which combine food ingredients (e.g., fruits, vegetables, milk) with active ingredients (e.g., vitamins, minerals, herbs) for oral consumption, fall within this

category (National Pharmaceutical Regulatory Agency, 2024d). FDI products containing herbs in their crude form, without medicinal or health claims, are regulated by the Food Safety and Quality Division (FSQD), Ministry of Health. However, if an FDI product includes specific listed ingredients (e.g., St. John's Wort, red yeast rice), is intended for medicinal purposes (e.g., curing/preventing disease, maintaining health), or is formulated in pharmaceutical dosage form (e.g., capsules, tablets), it must undergo registration with the NPRA (National Pharmaceutical Regulatory Agency, 2023d, 2024d).

Natural products encompass traditional medicines, herbal products, homeopathic medicines, and those with therapeutic claims. However, it is crucial to ensure that these products do not contain botanicals known to contain scheduled poisons listed under the *Poison Act 1952* (e.g., *Cabola albarrane* containing glycoside), substances associated with reported adverse events (e.g., *Aristolochic acid*, known to cause kidney toxicity), or other hazardous ingredients (e.g., *Papacer sp.* that potentially subject to abused) (M. Pauzi, S. Cheema, Ismail, Rohi Ghazali, & Abdullah, 2021; National Pharmaceutical Regulatory Agency, 2024b). It is noteworthy that while products originating from natural sources are generally considered traditional, those containing highly potent active ingredients are categorized as pharmaceutical product instead (e.g., products containing senna > 0.5g crude drug per daily dose) (National Pharmaceutical Regulatory Agency, 2024b).

Health supplements are permitted to make different level of health claims. For instance, an iron supplement can make general or nutritional claims (e.g., helps in maintenance of good health), functional claims (e.g., helps in the formation of red blood cells), or disease risk reduction claims (e.g., helps to prevent anaemia due to iron deficiency) (National Pharmaceutical Regulatory Agency, 2024a). Specifically, health supplements intending to make general/nutritional and functional claims

undergo an abridged evaluation process, which includes assessing product particulars, formulation, packaging and labelling, quality control, and manufacturer standards. On the other hand, those making disease risk reduction claims require a full evaluation, necessitating additional data on pharmacology, pharmacokinetics, and efficacy (National Pharmaceutical Regulatory Agency, 2024a, 2024e). It is worth noting that natural products, especially traditional and homeopathic medicines, are restricted to low-level claims indicated on product labels. Since 2020, the NPRA has authorized the registration of natural products with therapeutic claims that were not documented in established pharmacopoeias or monographs (National Pharmaceutical Regulatory Agency, 2024f). Such therapeutic claims must be adequately supported by scientific data derived from intervention human studies, additionally supported by non-clinical studies and international recognized monographs and pharmacopoeias (M. Pauzi et al., 2021).

As a quality control measure, all health supplements and natural products must be manufactured by Good Manufacturing Practice (GMP) certified manufacturers. Additionally, the raw materials used in manufacturing must be authenticated, and the finished product must undergo screening for heavy metals (including lead, arsenic, mercury and cadmium) as well as microbial contamination (e.g., total aerobic microbial count, total yeast and mould counts) to ensure user safety (National Pharmaceutical Regulatory Agency, 2024a, 2024b). Furthermore, health supplements and natural products in capsule or tablet forms are required to undergo additional tests for weight uniformity and disintegration. Previously, these laboratory testing were conducted by NPRA laboratory on the sample product submitted by the PRH. Since 2020, they can be performed by NPRA-recognized local panel laboratories and local manufacturer laboratories (National Pharmaceutical Regulatory Agency, 2020).

A successful registration grants products a registration number, also known as the ‘MAL number’, which ends with a specific alphabet indicating the product category (‘A’ refers to controlled medicines, ‘X’ for Over-the-counter medicine (OTC), ‘T’ for natural products/traditional medicines, ‘N’ for health supplements) (Pharmaceutical Services Programme, 2023). This registration number is unique to the product registered and contains details such as its name, identity, composition, characteristics, origin (manufacturer), and PRH. It is not permissible to use this number for any other product. Every product registration remains effective for a period of 5 years, unless it undergoes suspension or cancellation by the authority (National Pharmaceutical Regulatory Agency, 2023b). The NPRA conducts continuous post-marketing surveillance to ensure the safety and quality of health supplements and natural products available in the market. If a product fails to meet the required standards of quality, safety and efficacy, NPRA reserves the right to cancel or remove it from the market (National Pharmaceutical Regulatory Agency, 2023c). Additionally, any complaints regarding product quality, efficacy, adverse events, labelling, or packaging will be taken into consideration by NPRA during the renewal process of the product registration (M. Pauzi et al., 2021).

### **1.5 An overview of e-commerce and the use of online purchases by consumers**

With the advancement of information technology, particularly the development of the Internet and its sub-network, the World-Wide Web (WWW), business activities have been expanded from the physical shops to the electronic platforms (Cockburn & Wilson, 1996). Business activities involving the electronic medium is termed as ‘e-commerce’, occasionally used interchangeably with ‘e-business’ (S. C. Lim, Baharudin, & Low, 2017). Indeed, the term ‘e-commerce’ refers

to more than just ‘business transactions’ (buying and selling products or services), but also ‘business information sharing’ and ‘business relationship maintenance’ through telecommunications networks (Khoshnampour & Nosrati, 2011; Zwass, 2003). The initial form of e-commerce began with electronic fund transfer and business document exchange through private communication networks between corporations (Nanehkaran, 2013). Following that, e-commerce evolved with the role of telecommunication networks accommodating broader scope of business activities, such as receiving product or service orders, sending information, and distributing product or service distribution, and eventually direct communication between seller and consumer via telecommunication network (Santos, Sabino, Morais, & Goncalves, 2017). Currently, the types of e-commerce models can range from transactions between companies (business-to-business, B2B) to those between companies and consumers (business-to-consumer, B2C) and even between consumers (consumer-to-consumer, C2C) (Zwass, 2003). Consumers can purchase online products or services from a shared e-commerce platform (such as Amazon, Taobao, eBay, Shopee, or Lazada) or from an individual e-commerce platform owned and managed by a specific company. Notably, consumers can also become sellers on many of the shared e-commerce platforms or social media, typical representation of the C2C transaction (Leonard & Jones, 2019). In particular, social media such as Twitter, Facebook, Youtube and Instagram, are increasingly popular avenues for e-commerce, facilitating the formation of online communities centred around specific companies or sellers (Soegoto & Eliana, 2018).

The emergence of e-commerce has fundamentally transformed consumer purchasing habits. Products once exclusive to physical stores are now accessible through online shopping platforms. According to the United Nations Conference on Trade and Development (UNCTAD), online shopping has seen substantial growth



globally, with one out of every four people worldwide engaging in online purchases in 2017 (UNCTAD Communications and Information Unit, 2019). This trend has only intensified, with recent data indicating that 60% of Internet users participated in online shopping between 2020 to 2021 (UNCTAD, 2022b), particularly following the onset of the COVID-19 pandemic. Notably, developing countries have experienced a significant surge in online shopping activity, with countries like United Arab Emirates recorded a threefold increase, while Thailand witnessed a doubling of the proportion of Internet users who shopped online post-pandemic (UNCTAD, 2022b). Conversely, developed countries like the UK and Switzerland experienced a more modest increase, attributed to their established online shopping culture predating the pandemic (UNCTAD, 2022b).

Before the COVID-19 pandemic, global B2C e-commerce sales reached an estimated \$ 4.4 trillion in 2018, with China, the US and the UK leading in B2C e-commerce sales (UNCTAD, 2020). The B2C e-commerce companies generated the most Gross Merchandise Value were predominantly based in China (e.g., Alibaba, JD.com, Meituan Dianping) and the USA (e.g., Amazon, Expedia, eBay, Booking Holdings, Uber), with notable players also in Canada (e.g., Shopify) and Japan (e.g., Rakuten) (UNCTAD, 2022a). Despite a slight decrease in global B2C e-commerce during the pandemic, there was a notable increase in the share of online B2C e-commerce. Selected economies worldwide (including Australia, Canada, China, Korea, Singapore, the UK and the USA) saw a 3% increase in the online share of total retail sales between 2019 and 2020, compared to a 2% increase between 2018 and 2019 (UNCTAD, 2022a), highlighting the resilience and growth of e-commerce despite economic challenges.

The adoption of online shopping has become more common among the consumers as well. In European countries, as of 2021, the majority of the population

has Internet access (>90%), with a significant portion engaging in online shopping (ranging from 48% to 87%) (Lone & Weltevreden, 2022; Lone, Weltevreden, & Luharuwala, 2023). Notably, the highest concentration of Internet users who shop online is observed in the UK (95%), Netherlands (92%), and Norway (92%) (Lone et al., 2023). Among online shoppers, a substantial percentage purchase items such as ‘clothes, shoes or accessories’ (68%) (Lone & Weltevreden, 2022; Lone et al., 2023). The lack of necessary skills does not pose a significant obstacle to consumers adopting online shopping within this region. Instead, barriers commonly arise from personal preferences (54%), including a preference for physical shopping, the desire to see physical product, a sense of loyalty to conventional shops, or personal habits (Lone & Weltevreden, 2022).

In the Asia-Pacific region, the COVID-19 pandemic has accelerated the process of digital transition and consumers’ adaptation of this shift (Asian Development Bank, 2023). In 2020, this region emerged as the dominant player in the B2C e-commerce market, accounting for over 50% of global B2C e-commerce, surpassing North America (20%) and Europe (16%) (Asian Development Bank, 2023). Many consumers in this region have transitioned to online shopping, with notable increases seen in countries such as China, where 92% of consumers now make online purchases, exceeding rates in the USA (64%), and the UK (56%) (Asian Development Bank, 2023). Singapore, in particular, has demonstrated its potential in B2C e-commerce, with market share tripling following the pandemic, a more substantial increase compared to some developed countries like Canada and Australia (UNCTAD, 2022b). Within this region, Singapore and China scored the highest B2C e-commerce readiness score in 2020 (with Malaysia ranked 30<sup>th</sup> globally and 5<sup>th</sup> in Asia) (Asian Development Bank, 2023). In 2022, Singapore and Indonesia both topped the global fastest-growing retail e-commerce list, with Malaysia and Thailand ranked 7<sup>th</sup> and 8<sup>th</sup>

respectively (Asian Development Bank, 2023). In terms of product category, fashion (e.g., apparel, footwear, bags, and accessories) dominates B2C e-commerce in this region; this is followed by ‘toys, hobbies, DIY’, ‘food and personal care’, ‘electronics and media’ and ‘furniture and appliance’ (Asian Development Bank, 2023). Consumers in the Asia and Pacific region predominantly conduct online transactions via digital or mobile wallets, accounting for 58.4% of transaction volume, significantly higher than in North America (23.7%), and Europe, Middle East and Africa (24.6%) (Asian Development Bank, 2023). In comparison, other regions tend to rely more on credit cards (Asian Development Bank, 2023). Furthermore, consumers from the Southeast Asia region prioritize value for money, health and welfare, and at-home consumption during their online shopping, compared to consumers from the US and North America (Asian Development Bank, 2023).

The rise of e-commerce has transformed consumer access to a diverse range of products and services online, spanning from tangible products (e.g., clothes, health supplements) to intangible products (e.g., music, film series) as well as various services (e.g., ride hailing, delivery services) (Eurostat, 2021). The COVID-19 pandemic has further accelerated this shift towards online shopping, with notable increases in sales of health-related and pharmaceutical products (UNCTAD, 2021c), amidst declines in other sectors such as travel and ride hailing (UNCTAD, 2021d). For instance, between 2020 and 2021, a considerable portion of online shoppers purchased health products (e.g., medicine, health supplements), especially those from China (28%), followed by Europe (19%), the USA (18%), Germany (13%) and the UK (11%) (Asian Development Bank, 2023; Lone & Weltevreden, 2022). In light of the growth of e-commerce and the increasing adoption of online shopping by the general public, consumer behaviour in online purchases has become a critical topic that attracts increased attention from policymakers and researchers.

## **1.6 Background of online purchases in Malaysia**

In Malaysia, Internet services was first provided by JARING and subsequently TMNET in the 1990s (Chua, Khatibi, & Ismail, 2006; Stevens, 2021). Since then, the number of Internet user has been rising. There were only 30 Internet users when this service was first introduced in 1992 (Stevens, 2021), and now more than 80% of Malaysians are connected to the Internet in 2020 (Malaysian Communications and Multimedia Commission, 2020). The introduction of various e-commerce platforms (e.g., Shopee, Lazada, Taobao) and e-wallet services to Malaysian consumers has made online purchasing more convenient and contributed to the growth of this activity (Malaysian Communications and Multimedia Commission, 2020). In 2018, more than half of Malaysian Internet users (approximately 16.6 million) were involved in online purchases (Malaysian Communications and Multimedia Commission, 2018). During the COVID-19 pandemic in 2020, Internet users who performed online purchasing activity increased even more to 64.2% (Malaysian Communications and Multimedia Commission, 2020). Malaysian adults who shop online are younger (in their 20s and 30s) and have a higher monthly income of RM3000 or more (Malaysian Communications and Multimedia Commission, 2018). The majority of them (93.6%) purchased products or services from local sellers, while approximately half (52.2%) purchased from sellers from other countries, such as China and the US (Malaysian Communications and Multimedia Commission, 2018). Product categories that were most commonly purchased by online shoppers were clothing and accessories (68.7% online shoppers), followed by gadgets, sports and household items (56.1%) and online food ordering, groceries and medicines (43.7%) (Malaysian Communications and Multimedia Commission, 2018).

In general, Malaysians were motivated to adopt online purchase due to convenience, better product price, easy payment methods, greater product variety,

availability of peer customer review and rating, as well as flexible delivery options (Chua et al., 2006; Malaysian Communications and Multimedia Commission, 2018). However, they were also concerned about security of personal information as well as consumer protection by law when performing online purchases (Chua et al., 2006; Malaysian Communications and Multimedia Commission, 2018).

## **1.7 Problem statement**

The rise of e-commerce has significantly increased the accessibility of health supplements and natural products to consumers, raising concerns about potential risks associated with their purchase and use. Previous discussions have highlighted issues such as self-administration, non-disclosure of product use, and the sale of unregistered products (Abd Wahab et al., 2021; James, Kaikai, Bah, Steel, & Wardle, 2019; Lee et al., 2020; Masumoto, Sato, Maeno, Ichinohe, & Maeno, 2018; Ong, Vasan Thakumar, Ooi, Shafie, & Ahmad Hassali, 2020). While global and national regulatory efforts have been noted to mitigate these risks (Interpol, 2022; Teoh, 2022), the specific behaviour of consumers in purchasing these products online is currently limited.

Despite the increasing popularity of e-commerce, there is a lack of empirical evidence regarding how consumers make decisions in this context. The vast amount of information available on online platforms, coupled with the lack of professional guidance, makes it challenging to ascertain how consumers interact with virtual communities and navigate the purchasing process. While some factors influencing online purchases have been identified (Allom, Mullan, Clifford, & Rebar, 2018; Tzeng & Ho, 2022), there remains a need to explore the interaction between these factors and the key determinants of consumer behaviour. This gap in knowledge is crucial for informing policy-making and consumer education efforts, especially considering the role of the Ministry of Health in safeguarding the country's health and protecting

consumers from potential risk. Therefore, further research is necessary to better understand consumer behaviour in this area, particularly their decision-making process, which can, in turn support targeted consumer education programs and regulatory measures aimed at protecting consumers and promoting informed decision-making.

### **1.8 Research question**

This study was designed to answer the following research question,

- i. ‘How do individuals come to their decision of purchasing health supplements and natural products online?’ What are the factors influencing consumers’ decisions of purchasing health supplements and natural products online?
- ii. What is the key factor that influences consumers’ decisions to purchase health supplements and natural products?
- iii. How do these factors interact with each other in influencing consumers’ decisions of purchasing health supplements and natural products online?

### **1.9 Study objective**

Based on the research question, the general objective of this study was to explore the decision-making process of individuals when purchasing health supplements and natural products online. Specifically, this study was conducted to:

- i. To identify the factors influencing consumers’ decisions to purchase online health supplements and natural products.
- ii. To determine the key factor that influences consumers’ decisions to purchase health supplements and natural products.
- iii. To develop a substantive theoretical model which explores the interaction between factors that influence consumers’ decisions to purchase online health supplements and natural products.

## **1.10 Outline of thesis**

This thesis is structured as follows:

- i. Chapter 1 provided a brief overview of the online purchase of health supplements and natural products. The regulatory control of these products in Malaysia was broadly described, followed by consumer reports on their use. An overview of online shopping in Malaysia was also provided. The study rationale, research question, and study objectives were eventually outlined.
- ii. Chapter 2 described several existing theoretical models relating to behaviour in the use of health supplements and natural products, as well as those relating to online purchasing behaviour. This chapter concluded with a discussion of the existing studies' knowledge gaps, which justify the need for this study in developing a substantive theoretical model that investigates how consumers decide to purchase online health supplements and natural products.
- iii. Chapter 3 described the methods used in this study. An overview of the study design was provided, followed by detailed procedures for participant sampling, data collection, and data analysis. This study's ethical considerations were also discussed.
- iv. Chapter 4 presented the findings of empirical data generated via grounded theory approach. To provide the reader with context, the meaning of health supplements and natural products, as well as online purchases, were summarised from the participants' perspectives. Following that, the emerging substantive theoretical model was presented by describing the 'core category' and other categories that

demonstrate how consumers decide on purchasing online health supplements and natural products, supported by participants' excerpts.

- v. Chapter 5 discussed the study's main findings, which included the emerging substantive theoretical model, the core category, and other categories. Several significant findings from this study were also discussed, followed by the study's strengths and limitations.
- vi. Based on the study findings, Chapter 6 concluded this thesis with implications and recommendations. Several unanswered questions for future research were also raised.



## **CHAPTER 2 LITERATURE REVIEW**

### **2.1 Introduction**

This chapter provides a brief summary on the literatures. Section 2.2 summarized the prevalence of health supplements and natural products use, whereas Section 2.3 describes the types of products commonly used. The prevalence of consumer purchasing online health supplements and natural products are summarized in Section 2.4. Under Section 2.5, online purchases are compared with in-shop purchases, followed by a brief overview of the regulatory landscape for online purchasing in Section 2.6. Section 2.7 covers the potential risk associated with the online purchase of health supplements and natural products, focussing on risk associated with the use of online information (Section 2.7.1), unregistered product (Section 2.7.2) and unwanted adverse event associated with these products (Section 2.7.3). Subsequently, several factors that were found influencing consumer behaviour in this activity are outlined under Section 2.8, based on the existing theoretical models. Factors influencing both the use of health supplements and natural products (Section 2.8.1) and the use of online purchases (Section 2.8.2) are discussed. Knowledge gap identified from the studies reviews are provided in Section 2.9 and a summary is provided under Section 2.10.

### **2.2 The use of health supplements and natural products among consumers**

The use of health supplement and natural health products is gaining popularity among the general public. The estimated size of the global market for this product category in 2022 is USD 155.2 billion, and by 2027, it is anticipated to reach USD 220.8 billion (Research and Markets, 2022). The prevalence of health supplements and natural products use varies across regions. More than half of American adults and nearly half of Australian adults used some types of health supplements (Moore,

McClain, & Hong, 2020; O'Brien, Malacova, Sherriff, & Black, 2017; Steel et al., 2018). In the European region, the prevalence of health supplements and natural products use ranged from 3.6% to 10.7% in Greece, Spain and Italy, 24% to 35% in Germany, the Netherlands and Sweden, 41% to 56.7% in the UK and Denmark (Skeie et al., 2009). Around the Asian region, 1.5% of Chinese adults (Gong et al., 2018), 25% of Iranian adults (Mahdavi-Roshan et al., 2021), 32.3% Korean adults (Jang, Park, Ryu, & Choi, 2020). In general, women, the elderly, those with a higher level of health consciousness, those leading a healthier lifestyle, and those with a higher education level are more likely to use health supplements and natural products (Kofoed, Christensen, Dragsted, Tjønneland, & Roswall, 2015; Mahdavi-Roshan et al., 2021; Mishra, Stierman, Gahche, & Potischman, 2021; O'Brien et al., 2017; Rontogianni et al., 2021). Besides, consumers with chronic diseases are occasionally reported more likely to use health supplements and natural products than those who are healthy (Mahdavi-Roshan et al., 2021).

Specifically in Malaysia, two national surveys reported that 21.5% to 31.8% of the Malaysian general public were taking some types of health supplements and 7.9% to 34.0% of them were taking some types of natural products, including processed and non-processed herbal product (Mohamad Azmi et al., 2016; Mohd Zaki et al., 2018). Malaysians' out-of-pocket expenditure on this group of products has also been steadily rising over the years (Malaysia National Health Accounts (MNHA) Section, 2021). The most commonly taken health supplements was vitamins and minerals, followed by various types of natural products (e.g., herbal products, fish oil, royal jelly) (Mohamad Azmi et al., 2016; Mohd Zaki et al., 2018). Similar to consumers from other regions, Malaysian consumers use health supplements and natural products for their health and general well-being (Mohamad Azmi et al., 2016; Mohd Zaki et al., 2018). Additionally, some of them use these products for beauty purposes (Mohd Zaki

et al., 2018). On the other hand, it has been reported that 35% to 80% of Malaysians with type 2 diabetes mellitus use natural products to complement their disease management as well as for general well-being (Baharom, Shamsul Azhar, & Rotina, 2016; Ching, Zakaria, Paimin, & Jalalian, 2013). Meanwhile, 15% to 20% of cancer patients were also found using health supplements and natural products on top of their conventional therapies (Farooqui et al., 2016). Furthermore, approximately half of the elderly (45.8%) (Abd Wahab et al., 2021) and adolescents (54.1%) (Sien, Sahril, Abdul Mutalip, Mohd Zaki, & Abdul Ghaffar, 2014) have also been reported to use this category of products.

### **2.3 The types of health supplements and natural products used**

Various types of health supplements and natural products are commonly used by the general public. In the US and European countries, adult commonly use vitamin and mineral supplements, followed by herbs and other products (Mishra et al., 2021; Moore et al., 2020). They use health supplements and natural products to improve or maintain their health and wellbeing, as well as to supplement their diet (Bailey, Gahche, Miller, Thomas, & Dwyer, 2013; Dickinson, Blatman, El-Dash, & Franco, 2014; Moore et al., 2020). Similar trend is observed among Malaysian adult (Mohd Zaki et al., 2018). On top of that, children also use health supplements and natural products to strengthen their immune system and bone health (Bailey, Gahche, Thomas, & Dwyer, 2013). Notably, in addition of vitamins and minerals, the products commonly consumed by athletes and fitness centre users include protein and amino acids (Baltazar Martins et al., 2019; Knapik et al., 2016; Ruano & Teixeira, 2020). Indeed, the physically active population intend to improve their physical performance, increase muscle mass, as well as exercise recovery via the use of health supplements and natural products (Maughan et al., 2018; Ruano & Teixeira, 2020). Given the diverse intentions

and types of health supplements and natural products among various consumer groups, this study focuses on adult general public behaviour in online purchases of these products, which are generally intended for health and wellbeing.

## **2.4 The prevalence of purchasing online health supplements and natural products among consumers**

Internet has opened up a new platform for online business of various products, ranging from household goods to even health-related products such as health supplements and natural products. According to recent studies conducted in the European region, 7.5% to 8.1% of the general public purchased online health supplements and natural products (Bowman, Family, Agius-Muscat, Cordina, & Sutton, 2020; Tsartsou et al., 2021), while 15.7% of those in the United Arab Emirates (Jairoun et al., 2021) and 17.1% of those in the United States (Nathan, Kudadjie-Gyamfi, Halberstam, & Wright, 2019) did so. Besides, such activity has also been reported among the younger population, with approximately 4% of Japanese students purchasing health supplements and natural products from the Internet (Kobayashi, Sato, Umegaki, & Chiba, 2017; Nishijima, Kobayashi, Sato, & Chiba, 2019). Studies conducted among patients also reported such practices at the prevalence between 1.1% to 2.9% (Açıkgöz et al., 2014; Adam, Agnieszka, Kamila, & Katarzyna, 2017; Almuhareb et al., 2019; Bellikci-Koyu, Şarer-Yürekli, Seçkiner, Özdemir, & Buyuktuncer, 2020; Soner, Sahin, & Sahin, 2013). In 2010, a comprehensive consumer survey across the ASEAN region provided insights into the diverse online purchasing behaviours prevalent among consumers. Notably, Thailand recorded the highest percentage of online shoppers (50%) who bought health supplements or medicine online (which also included cosmetic). This was followed by Indonesia (34%),

Malaysia (28%), Myanmar (25%), Brunei (25%), Singapore (22%), Vietnam (22%) and Cambodia (21%) (ASEAN TELSOM, 2010).

In Malaysia, statistics provided by the local authorities revealed that approximately 4.4% of Internet user who shopped online purchased health and beauty products via the Internet in 2016 (Malaysian Communications and Multimedia Commission, 2016). Another study on the use of natural products found that the Internet was the second most common source of natural products for Malay women, after traditional practitioners (Tengku Mohamad et al., 2019). Generally, online purchase of health supplements and natural products varies by regions, but such activity has grown in popularity over the years.

## **2.5 Comparing online purchases with in-shop purchases**

When comparing online purchases with in-shop purchases (Table 2.1), online purchases are distinguished by their flexible and convenient process, as a product order can be placed anytime and anywhere, regardless of the physical shop's location and operating hours (Santos et al., 2017). Furthermore, consumers have access to a wider range of products because sellers from all over the world can be reached through e-commerce platforms without having to travel far. However, unlike in-shop purchases, consumers do not have the opportunity to physically examine online products; instead, the product is presented to them through video or pictures (Chargebacks911, 2023). Meanwhile, the online purchasing environment provided relatively extensive information, facilitating price and product comparison prior to purchase. Indeed, online information is not limited by the size of physical product packaging or leaflets, nor by the capacity of shop personnel in providing relevant product information (Gupta, Kushwaha, Badhera, Chatterjee, & Santibanez Gonzale, 2023). Nevertheless, the information-rich online purchase environment poses the risk of information overload,

which may cause decision difficulty in online consumers (Hu & Krishen, 2019). Furthermore, when compared to in-shop purchases, personal contact between consumers and online sellers is very limited, and face-to-face contact is not possible which is found to be impeding consumers' satisfaction in online purchase (Abd Aziz & Abd Wahid, 2018; Aw, 2020). With the rapid advancement of information technology, interaction with people in e-commerce platforms has been made possible through the inclusion of live chat and message board functions, as well as the development of artificial virtual agents that represent sellers in communicating with online consumers (Nicolescu & Tudorache, 2022).

Table 2.1 Comparing characteristics of online purchase to in-shop purchase

	<b>Online purchase*</b>	<b>In-shop purchase*</b>
<b>Time and place of purchase</b>	Anytime, anywhere, except website downtime	Restricted to opening hours and locality of physical shop
<b>Product choices</b>	More options, more sellers available	Limited to stock availability in physical shop
<b>Product presentation</b>	Intangible, presented by video or pictures	Tangible, physical examination is possible
<b>Product delivery</b>	Delayed	Instant
<b>Product return</b>	Repackaging and shipping back to seller	Direct in-store return
<b>Product review</b>	Availability of product reviews by peer customers	Lack of product reviews by peer customers
<b>Human interaction</b>	Lack of face-to-face interaction	Human assistance is available
<b>Documentation</b>	Electronic proof	Tangible paper receipt
*Characteristics adapted from Chargebacks911 (2023) .		