Proposed Framework for Investigating Motivating Factors Influencing Dietary Supplement Purchase Intentions: The Mediating Role of Attitude

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DOI: https://dx.doi.org/10.47772/IJRISS.2025.9010193

Received: 12 January 2025; Accepted: 16 January 2025; Published: 11 February 2025

ABSTRACT

The global dietary supplements market is expanding rapidly, driven by consumer interest in health and wellness. Despite this growth, little empirical research has been conducted on consumer purchase behavior within the Malaysian context. This study integrates Self-Determination Theory (SDT), Theory of Planned Behavior (TPB), and Protection Motivation Theory (PMT) to explore intrinsic and extrinsic motivational factors, health motivation, and the mediating effect of attitude on dietary supplement purchase intentions. The study contributes to understanding how these factors interrelate, filling a critical gap in consumer behavior and dietary supplement marketing literature.

Introduction. The dietary supplement market has shown remarkable growth, with Malaysia emerging as a significant player. However, the country still lags behind others in dietary supplement consumption. With increasing public awareness of health issues, it is crucial to understand the motivators behind consumer behavior in this industry. This study examines the determinants influencing dietary supplement purchase intentions, offering insights for marketers and public health campaigns. While prior research has extensively explored socio-demographics and frequency of dietary supplement use, less attention has been paid to motivational constructs. This study focuses on the integration of SDT, TPB, and PMT to provide a holistic understanding of intrinsic and extrinsic motivations, health motivations, and attitudes toward dietary supplements. It also investigates the mediating effect of attitude on purchase intention. The conceptual framework integrates motivational theories, highlighting how intrinsic and extrinsic motivations and health-related behaviors influence attitudes and purchase intentions. The framework hypothesizes that attitude mediates the relationship between motivational factors and purchase intention. This study adopts a theory-driven conceptual modeling methodology, leveraging systematic literature review, theoretical synthesis, and analytical validation.

Keywords: Dietary Supplements, Purchase Intention, Motivation, Self-Determination Theory, Theory of Planned Behavior, Protection Motivation Theory, Conceptual Framework.

INTRODUCTION

The global dietary supplements market size is expected to expand at a compound annual growth rate (CAGR) of 9.0% from 2020 to 2026, reaching USD 306.8 billion (RM 1,270 billion) by 2026 [1]. In research which indicating 75% of individuals in developed countries take one or more dietary supplements, it shown the usage of dietary supplements is promising [2].

Based on Malaysian Adults Nutrition Survey MANS 2014 [3] the prevalence of dietary supplement users in Malaysia has increased tremendously from the earlier survey in 2003 especially in urban population. According to Malaysia Dietary Supplement Association [4], industry's CAGR estimated at 3.0% between 2018 and 2020. The market size of the Malaysian dietary supplements industry was between RM2.1 billion (USD 519 million) to RM2.2 billion (USD 544 million) [5]. According to Herbal and Traditional Products in Malaysia September 2021 Passport, an increasing number of herbal/traditional vitamin and dietary supplements are designed to improve holistic wellbeing. Herbal/traditional vitamins and dietary supplements, used largely to boost immune

health, recorded strong uptick in 2021 due to the ongoing presence of COVID-19 in the country. Most consumers purchase dietary supplements in Malaysia to boost their immune system (18.8%), followed by those who look for a healthier ageing process (16.7%), meal replacement (16%), and support for bones and joints (14.6%) [6].

As reported in UNICEF [7] and Global Nutrition Report [8], Malaysia has shown minimal improvement towards achieving the diet-related non-communicable disease (NCD) targets. Diabetes is estimated to affect 10.7% of adult women and 11.4% of adult men in Malaysia. There are estimated 13.0% of adult men and 17.9% of adult women living with obesity in Malaysia (higher than the regional average of 8.7% for women and 6.0% for men). Malaysia has the highest rate of obesity and overweight among Asian countries with 64% of male and 65% of female population being either obese or overweight [3]. The prevalence of diabetes among adults in Malaysia aged 18 years and above has increased from 11.6% to 17.5% over a period of 9 years from 2006 to 2015. Moreover, the prevalence of hypertension remains high at around 30%. More than 50% of diabetes or hypertension are undiagnosed in Malaysia (World Health Organization) [9].

Consumers in Malaysia are increasingly aware of potential health issues related with eating habits and have become more proactive in searching for health products to prevent certain chronic diseases [10]. However, Malaysia still far behind its Asian counterparts in terms of demand for dietary supplements, as less than 30% of the population consumes dietary supplements compared to countries like South Korea (60-70%), Taiwan (40-50%) and Australia (40-50%), as of 2019 [11]. Hence, a better understanding of what drives consumers to take dietary supplements contribute to improving value creation for both customers and marketer in dietary supplements industry.

Problem Statement

The market is currently witnessing fierce competition between the companies producing and marketing food supplements because of the increase in the number of these companies and the diversity of these products [12]. There is still little empirical evidence on the buying behavior towards dietary supplements in the Malaysian context, despite the accelerating growth of the dietary supplements industry in the country. According to research, it explained that the factors determining consumer attitudes using dietary supplements may be influenced by certain biases present in consumer decision-making [13].

Most of the dietary supplement's studies in Malaysia tend to focus on profiling the socio-demographics of supplements users (adolescents [14], elderly in suburban [15], university students [16][17][18] and government employees [19], frequency of use [19] [20]and the types of supplements consumed such as probiotics nutraceutical products [21] oral health supplements [22]. The proposed research will focus on the motivation constructs toward the purchase intention of dietary supplements in Malaysia context which there has not been sufficient focus on it by other researchers except by Qistina et al [24] and Deci and Ryan [25]. Another stream of research integrated two different theories, or motivating factor to explain health related food and supplements consumption. Health motivation has been identified as an important factor in predicting health behavior [26].

Due to the importance of food supplements products in disease prevention (and health promotion) as well as the growing use of dietary supplements around the globe, research into investigating the factors influencing dietary supplements consumption is warrant [27]. Thus, it is the right timing to investigate the motivating factors influencing purchase intention of dietary supplements with the mediating effect of attitude.

Research Gap

There are several rationales to establish for this research from theoretical perspective. First, while previous studies have examined the link between behavior and purchase intentions, there has not been sufficient focus on the intrinsic and extrinsic motivation toward purchase intention towards dietary supplements. Second, the literatures in the TPB framework offers a narrow perspective of dietary supplement purchase intention, hence this study include the health motivation in the model may provide greater clarity and precision regarding the relationships between the constructs of interest in this study. Thirdly, studies on dietary supplement purchase intention adopting the TPB framework acknowledges that motivating factors may account for improved explanation. It is worth noting that research within these areas of inquiry assume a linear relationship between constructs, but a more complex (nonlinear) structure is worthy of exploration.

This study seeks to investigate the integration of self-determination theory (SDT), Theory of Planned Behavior (TPB), and Protection Motivation Theory (PMT) on intrinsic and extrinsic motivation factors, and health motivation, that accounts for the relationship between mediating effect of attitude and purchase intention in dietary supplement consumption. Specifically, study which constructs motivate their attitude and purchase intention towards dietary supplements. In this context, the present research sheds light on previous studies because it raises how the importance of intrinsic, extrinsic motivation, and health motivation towards the attitude and purchase intention towards dietary supplements. Hence, this study provides a contribution for both consumer behavior knowledge and practice for dietary supplement marketing and fills a gap in the literature on consumption of dietary supplements.

Research Questions

1. What are the determinants (between intrinsic motivation, extrinsic motivation, health motivation & attitude) influencing purchase intention of dietary supplements?
2. What is the strength of the relationship between these determinants with purchase intention of dietary supplement?
3. Does attitude mediate the relationship between intrinsic motivation, extrinsic motivation, health motivation and purchase intention of dietary supplement?

Research Objectives

The research aims to demonstrate the various motivating factors represented by intrinsic motivation, extrinsic motivation and health motivation, with the mediating effect of attitude which affect purchase intention when purchasing dietary supplements.

The Research Objectives are derived:

1. To examine the determinants (intrinsic motivation, extrinsic motivation, health motivation) influencing purchase intention of dietary supplement.
2. To investigate the strength of the relationship between these determinants with purchase intention of dietary supplement.
3. To examine the mediating effect of attitude in the relationship between intrinsic motivation, extrinsic motivation & health motivation with purchase intention of dietary supplement.

Significant of Study

The practical importance is to deliver insights for marketers and manufacturers of the dietary supplements industry to understand the motivating factors influencing the customer's purchase intention and try to apply relevant marketing strategies in favor of the targeted customer to identifying the suitable dietary supplement and make a purchasing decision.

The information can then be used to tailor public health messages and increase the effectiveness of public health campaigns. The study can help researchers evaluate the effectiveness of current supplement use prevention and education programs. The scientific importance is to become a basis to establish new hypotheses for better mapping of mediating effect of attitude between motivating factors and purchase intention specifically in dietary supplements context. The understanding of factors and mediating effect of attitude towards purchase intention can help researchers identify subgroups of the population who may be more or less likely to use supplements.

LITERATURE REVIEW

Dietary Supplement

The Dietary Supplement Health and Education Act DSHEA 1994 defined dietary supplement as a product taken orally which contains "dietary ingredients" intended to supplement the diet. The "dietary ingredients" in dietary supplement may include vitamins, minerals, herbs or other botanicals, amino acids, and substances such as enzymes, organ tissues, glandular, concentrate, metabolite, constituent, or extract [29].Dietary Supplements or

Nutraceutical are not the same as a food, considering the bioactive components have been insulated and mostly sold to consumers in the form of capsules and tablets [30].

The literature on dietary supplement use has expanded significantly in recent years, reflecting a growing interest in understanding the motivations and behaviors associated with this practice. A comprehensive review of studies reveals that various demographic, psychological, and social factors influence dietary supplement consumption. For instance, research [31] found that demographic variables, lifestyle habits, and health status are critical determinants of dietary supplement use among Australian adults, emphasizing the need for further investigation into the social and psychological factors that motivate supplement consumption to minimize potential harm from excessive use [31]. Similarly, Research [32] reported a complex relationship between alcohol consumption and dietary supplement intake among university students, suggesting that lifestyle choices may significantly impact supplement use patterns.

The COVID-19 pandemic has also notably influenced dietary supplement consumption. Study [33] documented an increase in dietary supplement use during the pandemic, although they noted fluctuations in prevalence across different waves, indicating the need for ongoing research in this area [33][34] further highlighted the role of social media in shaping public perceptions and behaviors regarding dietary supplements, with many individuals relying on information from these platforms rather than healthcare professionals [34]. This reliance on lay information sources underscores the importance of enhancing public awareness about evidence-based dietary supplement use.

The Theory of Planned Behavior (TPB) has been frequently employed to understand dietary supplement consumption. McDermott [35] conducted a systematic review and meta-analysis that supports the relevance of TPB in predicting food choices, including dietary supplements [35]. This theoretical framework suggests that attitudes, subjective norms, and perceived behavioral control are significant predictors of dietary supplement use. In line with this, Liu et al. [36] integrated TPB with Protection Motivation Theory to explore how fear, particularly during the COVID-19 pandemic, influenced purchasing behavior regarding dietary supplements [36]. Their findings indicate that consumers' attitudes toward health and safety significantly affect their intentions to purchase supplements during crises.

Research has also highlighted the prevalence of dietary supplement use among specific populations, such as children and adolescents. Study [37] reported that dietary supplement use among children and adolescents in the United States is common, with implications for both nutrient adequacy and potential toxicity [37][38] found that health problems often correlate with higher rates of dietary supplement use among children, raising concerns about the risks associated with concomitant use of supplements and medications [38]. This highlights the necessity for healthcare providers to communicate effectively with patients regarding the safe use of dietary supplements. Furthermore, health literacy has emerged as a critical factor influencing dietary supplement consumption. A study conducted in Thailand demonstrated that individuals with higher health literacy levels were more likely to make informed decisions regarding dietary supplements [39].

This finding aligns with the notion that access to reliable health information is essential for consumers to navigate the complexities of dietary supplement use effectively. In summary, the literature indicates that dietary supplement use is influenced by a multitude of factors, including demographic characteristics, lifestyle choices, psychological motivations, and health literacy. The COVID-19 pandemic has further complicated these dynamics, necessitating ongoing research to understand the evolving landscape of dietary supplement consumption. Future studies should continue to explore these relationships to inform public health strategies and consumer education efforts.

Self-Determination Theory (SDT)

Previous research on dietary supplement globally which studied individual motivation emerged as main factor of the consumer’s processing and use of health claims information in ten European countries [40]. From the theories perspective, Self-Determination Theory (SDT) is widely use in health-related studies which investigate the motives in Malaysia. Study [41] explored the motives of physical activities. Reference [42] investigated the socio-ecological determinants and psychological factors of woman participation in sports. Reference [43] studied

the relationship between extrinsic motivation and physical activity level among students. The self-determination theory could explain the intrinsic motivations for health behavior [44]. The proposed research will focus on the motivation constructs toward the purchase intention of dietary supplements in Malaysia context which there has not been sufficient focus on it by other researchers whereby reference [45] explored the online shopping behavior of dietary supplements among females in Malaysia using Self-determination Theory (SDT) specifically focused on the impact of trust, hedonic and utilitarian value (more related to extrinsic motivation refers to the involvement of performance of an activity by a customer to fulfil some separable outcomes) by reference [25]. Reference [46] analyzed intrinsic and extrinsic cue factors affecting buying decision of house brand in Klang Valley.

Self-Determination Theory (SDT) has emerged as a significant framework for understanding consumer behavior, particularly in the context of health-related decisions such as dietary supplement purchases. SDT posits that individuals are motivated by the fulfillment of three basic psychological needs: autonomy, competence, and relatedness. Research indicates that when these needs are satisfied, individuals are more likely to engage in health-promoting behaviors, including the purchase of dietary supplements [47]. For instance, intrinsic motivations, such as personal health goals and the desire for self-improvement, can enhance the likelihood of consumers choosing dietary supplements that align with their health aspirations [48]. Moreover, studies have shown that interventions designed to enhance intrinsic motivation can lead to more sustainable health behaviors. Reference [49] demonstrated that health promotion strategies grounded in SDT effectively increased anemia prevention behaviors among pregnant women, highlighting the importance of autonomy and competence in health-related decision-making. Similarly, Study [50] found that moral and environmental identities significantly influenced pro-environmental behaviors, suggesting that fulfilling psychological needs can lead to more responsible consumer choices.

In the realm of marketing, understanding the psychological motivations behind consumer behavior is crucial. Reference [51] explored how brand engagement can be enhanced by fulfilling consumers' psychological needs, indicating that brands that support autonomy and competence are more likely to foster loyalty and positive purchasing intentions. This aligns with the findings [52] noted that chatbots in retail settings can enhance consumer satisfaction by addressing these psychological needs, ultimately influencing purchase intentions. Furthermore, the interplay between consumer motivations and values is essential in shaping purchasing behaviors. Reference [53] highlighted that intrinsic motivations significantly influence organic food consumption, suggesting that consumers are more likely to purchase products that resonate with their personal values and beliefs. This is particularly relevant in the context of dietary supplements, where consumers may seek products that align with their health philosophies and lifestyle choices. In summary, the literature supports the notion that Self-Determination Theory provides a valuable lens through which to understand dietary supplement purchase intentions. By focusing on the fulfillment of intrinsic psychological needs, marketers and health professionals can better engage consumers and promote healthier purchasing behaviors. Future research should continue to explore the application of SDT in various consumer contexts to further elucidate its impact on health-related decisions.

Theory of Planned Behavior (TPB)

Several past studies have examined the antecedents of dietary supplement purchase intention using the Theory of Planned Behavior (TPB) as theoretical framework. Study [54] applied TPB with additional insight by testing the moderating role of health motivation that accounts for the relationships between social cognitive constructs and behavioral intention in dietary supplements context. There is research analyzed the internal factors that affect consumer buying behavior, which are product knowledge, belief of the health value, and the self-motivation for the buying intention [55]. The study also analyzed the attitude towards the motivating factor (health benefits) and safety in determining the intention to use nutraceuticals. For this research, product knowledge and belief of health value are used for the measurement items of intrinsic motivation factors.

The Theory of Planned Behavior (TPB) is a widely recognized framework for understanding the factors that influence dietary behaviors, including the purchase intentions of dietary supplements. TPB posits that individual behavior is primarily determined by three constructs: attitude toward the behavior, subjective norms, and perceived behavioral control. Research consistently demonstrates that these constructs significantly predict

intentions and subsequent behaviors related to dietary choices [56]. For instance, a systematic review and meta-analysis by reference [35] confirmed that attitudes, subjective norms, and perceived behavioral control are consistently associated with dietary intentions, emphasizing the relevance of TPB in dietary contexts [56]. Moreover, the application of TPB has been shown to be effective across various demographic groups and settings. The researcher conducted a systematic review that highlighted how socioeconomic status influences health-promoting dietary behaviors, suggesting that interventions based on TPB can be tailored to diverse populations [56]. This adaptability is crucial for designing effective health interventions aimed at improving dietary supplement use.

The role of attitudes in shaping dietary supplement purchase intentions is further corroborated by study [57], found that attitudes influenced by risk-benefit analysis, social influences, and health consciousness significantly affect consumers' intentions to use supplements. This aligns with findings from study [58], which indicated that TPB constructs effectively predict dietary behaviors among adolescents, reinforcing the theory's applicability in various contexts [58]. However, some studies have raised concerns about the limitations of TPB in predicting specific dietary behaviors. For example, reference [59] suggested that the constructs of attitude and perceived behavioral control may not fully capture the complexities of dietary sodium intake in patients with heart failure. This indicates a need for further exploration of the contextual factors that may influence the effectiveness of TPB in predicting dietary behaviors.

In conclusion, the Theory of Planned Behavior provides a robust framework for understanding the motivations behind dietary supplement purchase intentions. By focusing on the interplay between attitudes, subjective norms, and perceived behavioral control, researchers and practitioners can develop targeted interventions that enhance consumer engagement with dietary supplements. Future research should continue to explore the nuances of TPB in diverse populations and contexts to further refine its application in health behavior interventions.

Protection Motivation Theory (PMT)

PMT has been widely applied in health behavioral studies [60]. PMT was initially developed for general health problems [61]. The basic assumption of PMT is that when individuals make a pro-environmental decision, they will consider both the current and new behaviors in terms of costs and benefits [62]. Protection Motivation Theory (PMT) is an extension of the health belief model (HBM) that deals with motivation for behavioral change [63] which integrated TPB, Protection Motivation Theory (PMT) and Health Belief Model (HBM) in organic food purchase intention.

Protection Motivation Theory (PMT) has been extensively utilized to understand health-related behaviors, particularly in the context of dietary supplement use. PMT posits that individuals are motivated to protect themselves from perceived threats based on their assessment of the severity of the threat, their vulnerability to it, and their ability to cope with the threat. This framework has been applied in various studies to explore factors influencing health behaviors, including dietary supplement consumption. One significant application of PMT is in the context of preventive health behaviors, such as skin cancer prevention. For instance, a study [64] demonstrated that motivation, as defined by PMT, is a powerful predictor of sun protection behaviors among rural women. This aligns with findings from reference [65] who also reported that increased protection motivation significantly influenced preventive behaviors against skin cancer. These studies underscore the importance of motivation in translating theoretical constructs into actual health behaviors.

Moreover, PMT has been effectively applied to understand dietary supplement use among various populations. The finding is consistent with the notion that higher levels of self-efficacy and perceived effectiveness of dietary supplements can enhance protection motivation, thereby influencing purchase intentions. In addition to knowledge and motivation, socio-demographic factors also play a crucial role in dietary supplement use. Reference [66] noted that the prevalence of dietary supplement use varied significantly among different socio-demographic groups, suggesting that vulnerable populations may benefit more from dietary supplements. This indicates that understanding the socio-economic context is essential for applying PMT effectively in promoting dietary supplement use. Furthermore, PMT has been extended to address contemporary health challenges, such as the COVID-19 pandemic. Study [67] applied PMT to investigate preventive behaviors among healthcare personnel, finding that constructs of PMT significantly predicted adherence to preventive measures. This

highlights the adaptability of PMT in addressing emerging health threats and its relevance in guiding consumer behavior in health-related contexts.

The integration of PMT with other behavioral theories has also been explored. For example, study [68] combined PMT with the Theory of Reasoned Action to examine intentions to reduce meat consumption, demonstrating that protective motivations significantly influenced dietary choices. This suggests that PMT can be effectively integrated with other frameworks to provide a more comprehensive understanding of dietary behaviors. In conclusion, Protection Motivation Theory offers a robust framework for understanding the motivations behind dietary supplement purchase intentions. By focusing on the interplay between perceived threats, coping strategies, and individual motivations, researchers and practitioners can better engage consumers and promote healthier purchasing behaviors. Future research should continue to explore the application of PMT in diverse contexts, particularly in relation to dietary supplements, to further refine its utility in health behavior interventions.

Motivation

It is reasonable to argue that motivation forms the genesis of attitudinal differences to the healthy lifestyle desirability as well as confidence in an individual's ability to perform such preventive health behaviors. Thus, an individual who is motivated to maintain good health might also believe that the target preventive behaviors can be performed [26].

There are health-related studies which related to motivation in Malaysia. Research [69] also studied on motivation in physical activity and [70] on mental health among university students. There are other studies related to other industries in Malaysia which focused on motivation. Reference [72] explored the intrinsic, extrinsic motivation, and perceived risk of senior tourists' participation in Malaysia. Reference [73] focused on the impact of job satisfaction in FMCG industry. Study [74] explored the moderating effects of motivation on fast-food employees.

Intrinsic Motivation

According to research [75], the more the individual is highly intrinsic-motivated, the more it has a positive influence on the purchase intention. A desire for a healthy lifestyle is confirmed to be a motivator that shapes the intention, attitude and willingness to consume functional foods [76]. Desired outcomes [77] as personal motivation factor is a motivator to healthy lifestyle, whereby wish to be healthy, wish to live longer, want to feel more energetic, desire for a healthy lifestyle are the measurement items.

Intrinsic motivation plays a crucial role in influencing dietary supplement purchase intentions, as it reflects an individual's internal drive to engage in behaviors that are personally rewarding and aligned with their values and interests. This concept is grounded in Self-Determination Theory (SDT), which posits that individuals are more likely to engage in behaviors when they feel autonomous, competent, and connected to others [78]. Research has shown that intrinsic motivation is a significant predictor of health-related behaviors, including dietary supplement use. For instance, a study [79] highlighted the importance of intrinsic motivation in promoting healthy eating and physical activity among adolescents. The findings indicated that intrinsic motivation serves as a key determinant of long-term health-enhancing behaviors, emphasizing the need to foster such motivation in interventions aimed at improving dietary habits. This is particularly relevant in the context of dietary supplements, where consumers who are intrinsically motivated may be more likely to seek out and use supplements that align with their health goals.

Moreover, the role of intrinsic motivation in dietary behaviors has been supported by various studies examining the impact of external factors. For example, reference [80] found that participants who received modest financial incentives reported higher levels of both intrinsic and extrinsic motivation for weight management, suggesting that external rewards can enhance intrinsic motivation when aligned with personal health goals. This interplay between intrinsic and extrinsic motivation is critical for understanding consumer behavior in the dietary supplement market. In the context of dietary supplement use among athletes, reference [81] explored the

prevalence and patterns of supplement consumption, noting that athletes often rely on intrinsic motivation to guide their choices regarding supplementation. The study emphasized the need for athletes to be informed about the quality and safety of supplements, as intrinsic motivation can drive them to make informed decisions that support their performance and health.

Additionally, the influence of leadership styles on intrinsic motivation has been examined in various settings. Su et al. (2020) demonstrated that servant leadership positively influences employees' intrinsic motivation, which in turn enhances their innovative behaviors [82]. This finding suggests that supportive leadership can foster an environment that encourages intrinsic motivation, which may also apply to health professionals promoting dietary supplements. Furthermore, the relationship between intrinsic motivation and organizational behavior has been explored by study [83] found that intrinsic motivation significantly impacts organizational citizenship behavior. This indicates that when individuals are intrinsically motivated, they are more likely to engage in positive behaviors that benefit their environment, including making healthier dietary choices.

In summary, intrinsic motivation is a vital factor influencing dietary supplement purchase intentions. By understanding the underlying motivations that drive consumers to seek out dietary supplements, marketers and health professionals can develop targeted interventions that align with consumers' intrinsic values and goals. Future research should continue to explore the role of intrinsic motivation in dietary behaviors, particularly in the context of dietary supplements, to enhance consumer engagement and promote healthier choices.

H1: Intrinsic motivation influences the purchase intention of dietary supplements.

H5: Intrinsic motivation influences the attitude towards dietary supplements.

Extrinsic Motivation

The extrinsic motivation obviously has influences on changing the attitude of consumers towards dietary supplements but having a positive attitude does not necessarily lead to the purchasing them. External reinforcement which can either be tangible or psychological rewards such as having the better physical appearance or having a healthy lifestyle from the sources of information or influence can exert more powerful influence on individuals [75]. Reference [84] found body image perception led to influence metabolic syndrome patients lifestyle changes. Some patients reported a tendency towards anti-aging products and food supplements to counter excess weight gain. Female patients were more concerned about body image specifically on skin and physical beauty. Therefore, body image is a measurement item of extrinsic motivation construct. Other than body image, reference [84] and [55] discovered peer and family support is another measurement item for extrinsic motivation construct to adopt healthy nutrition and lifestyle behaviors. The recommendation and feedbacks of use from their family and friends were more trustable and have better effect in motivating them to try.

According to the reference [55], product testimonial and advice from healthcare professionals are motivating factors influencing consumer's use of nutraceuticals or supplements. The respondents wanted to try supplements after knowing good reviews from people who have consumed the products in certain duration required to see the health effects of nutraceuticals. The trust towards healthcare professionals comments would somehow influenced the decision to take supplements. Extrinsic motivation refers to the drive to engage in a behavior due to external rewards or pressures rather than for the inherent satisfaction of the activity itself. In the context of dietary supplement purchase intentions, extrinsic motivation can significantly influence consumer behavior, particularly through factors such as social norms, financial incentives, and marketing strategies. Understanding how extrinsic motivation interacts with consumer attitudes can provide valuable insights for promoting dietary supplements effectively. Research has shown that extrinsic factors, such as celebrity endorsements and advertising, can enhance consumer attitudes and subsequently influence purchase intentions. For example, reference [85] found that celebrity credibility positively affects brand attitude and purchase intention, suggesting that external endorsements can heighten consumer motivation to purchase dietary supplements. This aligns with findings from study [86], who emphasized the role of price-saving orientations and promotional strategies in shaping consumer attitudes toward online food delivery, indicating that similar principles may apply to dietary supplements.

The role of extrinsic motivation is also evident in the context of consumer behavior toward Islamic banking, where demonstrated that subjective norms and religiosity significantly influence purchase intentions through the

mediation of consumer attitudes. This indicates that external social factors can shape consumer motivations and attitudes, which may also be relevant in the dietary supplement context [87]. It also investigated the impact of brand attitude as a mediator in the relationship between advertising and purchase behavior, emphasizing the importance of external influences in shaping consumer attitudes toward products. This underscores the potential for marketing strategies that focus on enhancing brand attitudes through extrinsic motivators to influence dietary supplement purchase intentions. Study [88] examined the influence of Xeno centrism on purchase intentions, finding that product attitudes mediated this relationship. This suggests that consumer perceptions shaped by external factors can significantly impact purchasing behavior, reinforcing the idea that extrinsic motivations play a crucial role in dietary supplement consumption. Furthermore, reference [89] explored how perceptions of uniqueness can affect attitude-intention relations, indicating that external factors can influence consumer attitudes and their willingness to act on those attitudes. This finding is particularly relevant for dietary supplements, where unique product offerings may enhance consumer motivation to purchase.

In conclusion, extrinsic motivation is a significant factor influencing dietary supplement purchase intentions. By understanding the interplay between external motivators, consumer attitudes, and purchasing behavior, marketers can develop targeted strategies to enhance consumer engagement with dietary supplements. Future research should continue to explore the role of extrinsic motivation in dietary behaviors to refine marketing approaches and promote healthier choices.

H2: Extrinsic motivation influences the purchase intention of dietary supplements.

H6: Extrinsic motivation influences the attitude towards dietary supplement.

Health Motivation

Health motivation is regarded to have facilitative effect on an individual's cognitive effort toward health information processing. an individual's motivation level is regarded as an important precondition for attitudinal change. Health motivation was used to assess the degree to which people say they are concerned about health hazards and their level of interest or willingness to engage in health behaviours that leads to preventive health care behaviours. Individuals who possess higher health motivation level are more likely to seek health information and engage in health preventive behaviour [90]. Health motivation activates individuals and drives them to pursue health-promoting behavior which are seen as important goals or values [91]. Health motivation is a pivotal factor influencing dietary supplement purchase intentions, as it encompasses the internal and external drivers that encourage individuals to engage in health-promoting behaviors. This motivation can stem from various sources, including personal health goals, social influences, and the perceived benefits of dietary supplements. Understanding health motivation is essential for developing effective marketing strategies and interventions aimed at promoting dietary supplements.

In the case of the influence of healthy behavior, the cues to action construct are subsumed by antecedent variables of health motivation [75] [26].Health motivation also moderates the impact of health ability on health behavior. A motivated person may use his health ability to improve his health behavior [92]. Study [54] show that the strength of the relationships between consumer attitude and their intention to consume dietary supplements are strongly influenced by health motivation.

The current research aimed to provide additional insight by testing the health motivation as independent variables which accounts for the relationship between attitude and purchase intention towards dietary supplements. The use of measurement items under the health motivation construct [26] in this current research are disease prevention action taken, and concern about common health hazards.

Moreover, health literacy plays a significant role in dietary supplement consumption. A study conducted in Thailand found that individuals with higher health literacy levels were more likely to use dietary supplements effectively [31]. This suggests that health motivation, coupled with adequate knowledge about dietary supplements, can enhance consumers' ability to make informed choices regarding their health. Study [93] identified that healthy individuals are more likely to use dietary supplements, indicating that health motivation is a crucial determinant of supplement consumption [32]. The study emphasized that individuals motivated by health concerns are more likely to adopt dietary supplements as part of their overall health regimen. In a study

focusing on colorectal cancer survivors, Reference [94] identified psychological drivers that influence dietary changes and supplement use, emphasizing the importance of health motivation in decision-making processes related to health behaviors[33]. The findings indicated that survivors perceived dietary changes and supplement use as crucial strategies for improving their health and preventing disease recurrence, further underscoring the role of health motivation in dietary supplement consumption.

Additionally, reference [105] explored the adherence of adults with type 2 diabetes to dietary programs, finding that social support and health motivation significantly impacted compliance with dietary recommendations [34]. This highlights the interplay between external motivators, such as social support, and intrinsic health motivation in shaping dietary behaviors. Furthermore, the relationship between health motivation and dietary supplement use among children has been explored. Reference [96] found that family income and food security levels significantly influenced dietary supplement use among U.S. children, indicating that health motivation can be affected by socio-economic factors [36]. This highlights the need for targeted interventions that consider the socio-economic context of dietary supplement consumption.

In conclusion, health motivation is a vital factor influencing dietary supplement purchase intentions. By understanding the various dimensions of health motivation, including intrinsic and extrinsic influences, marketers and health professionals can develop targeted strategies to enhance consumer engagement with dietary supplements. Future research should continue to explore the complexities of health motivation in dietary behaviors to refine marketing approaches and promote healthier choices.

H3: Health motivation influences the purchase intention of dietary supplements.

H7: Health motivation influences the attitude towards dietary supplement.

Attitude & Purchase Intention

Since attitude is widely recognized as a strong predictor of behavior [106] it is logical to posit attitude as a mediator that represent the generative mechanism through which social influence and perceived behavioral control can influence behavior to consume dietary supplements [71]. Consumer attitude emerged to be the most salient factor in influencing the subjects' purchase intention to consume dietary supplements [54]. There is a strong relationship between consumer attitude and purchase intention as supported by previous studied [97][98][99][100]. Likewise, the relationship between attitude and purchase intention was also confirmed (Padgett et al., 2013).

There are many factors that can influence a consumer's decision to purchase a dietary supplement. If a person does not believe that a diet will be effective, they are unlikely to purchase it. Additionally, personal beliefs and values may also influence a person's decision to purchase dietary supplement [12]. Consumers who form positive attitudes toward dietary supplements think that the consumption of dietary supplements can improve their health and may therefore have a greater intention to consume dietary supplements. The findings revealed that consumer attitude has positive effects on behavioral intention. A person with more favorable attitude toward the behavior would perform certain behavior due to higher intention level [102]. Reference [103] argued that attitude is the antecedents of purchase intention. This study will adopt research [55] on explored the domain of attitude (perceived health benefits, safety, side effects and etc).

The relationship between attitude and purchase intention is a critical area of investigation in understanding consumer behavior, particularly in the context of dietary supplements. Attitudes, defined as an individual's positive or negative evaluation of a behavior, significantly influence their intentions to engage in that behavior. In the realm of dietary supplements, various studies have explored how attitudes shape consumer decisions and the factors that contribute to these attitudes. Research indicates that positive attitudes toward dietary supplements are associated with higher purchase intentions. Health literacy also plays a significant role in shaping attitudes toward dietary supplements. A study conducted in Thailand revealed that individuals with higher health literacy levels were more likely to have positive attitudes toward dietary supplements, which subsequently influenced their consumption patterns [31]. This highlights the importance of educating consumers about the benefits and appropriate use of dietary supplements to foster positive attitudes and enhance purchase intentions.

Furthermore, reference [93] identified that healthy individuals are more likely to use dietary supplements, indicating that a positive attitude towards health and wellness directly correlates with the intention to purchase

supplements [32]. This finding underscores the need for health promotion strategies that cultivate positive attitudes toward dietary supplements as part of a broader health-conscious lifestyle. In examining specific populations, Reference [94] explored the dietary habits of colorectal cancer survivors and found that positive attitudes toward dietary changes and supplement use were critical for improving health outcomes [33]. The study emphasized that survivors who perceived dietary supplements as beneficial were more likely to incorporate them into their health regimens, demonstrating the impact of attitude on behavior. The role of social influences in shaping attitudes toward dietary supplements cannot be overlooked. A qualitative study [105] highlighted that social support and health motivation significantly impacted adherence to dietary programs among adults with type 2 diabetes [34]. This suggests that positive attitudes fostered by social networks can enhance individuals' intentions to purchase dietary supplements that align with their health goals. Moreover, the attitudes of specific demographic groups, such as college students, have been investigated. Study found that female college students in Saudi Arabia exhibited positive attitudes toward dietary supplements, which were associated with higher usage rates [35]. This indicates that targeted marketing strategies that resonate with the values and attitudes of specific consumer segments may enhance purchase intentions.

In addition to individual factors, the influence of parental attitudes on children's dietary supplement use has been explored. Study found that parents' positive perceptions of dietary supplements significantly influenced their decisions to provide these products to their children [36]. This highlights the importance of understanding the familial context in shaping attitudes and subsequent purchasing behaviors. In conclusion, the interplay between attitude and purchase intention is a critical factor in understanding dietary supplement consumption. Positive attitudes, shaped by health literacy, social influences, and demographic factors, significantly enhance consumers' intentions to purchase dietary supplements. Future research should continue to explore the complexities of this relationship to inform effective marketing strategies and health promotion interventions.

H4: Attitude influences the purchase intention of dietary supplement.

H8: Attitude mediate the relationship between intrinsic motivation and purchase intention.

H9: Attitude mediate the relationship between extrinsic motivation and purchase intention.

H10: Attitude mediate the relationship between health motivation and purchase intention.

Proposed Conceptual Framework & Hypotheses

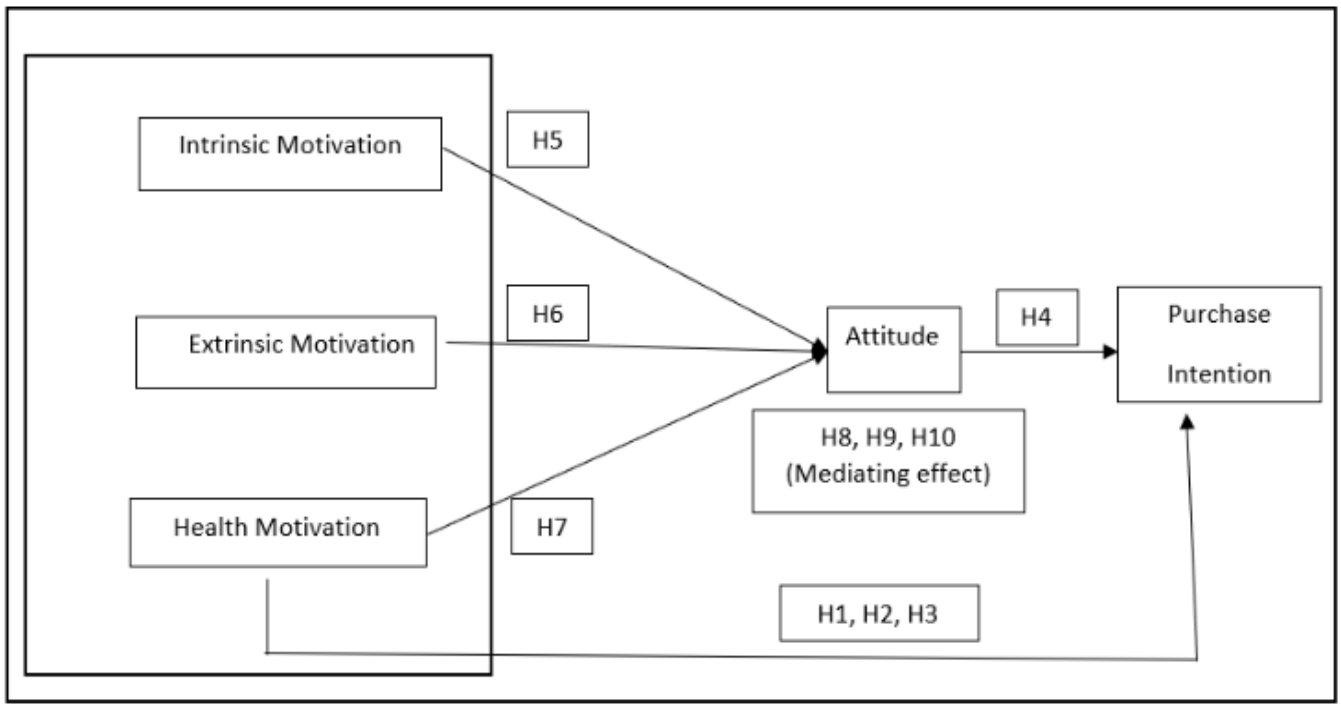


Fig. 1 Proposed Conceptual Framework

The following main hypothesis is proposed according to the importance, problems, and objectives of the study.

H1: Intrinsic motivation influences the purchase intention of dietary supplements.

H2: Extrinsic motivation influences the purchase intention of dietary supplements.

H3: Health motivation influences the purchase intention of dietary supplements.

H4: Attitude influences the purchase intention of dietary supplement.

H5: Intrinsic motivation influences the attitude towards dietary supplement.

H6: Extrinsic motivation influences the attitude towards dietary supplement.

H7: Health motivation influences the attitude towards dietary supplement.

H8: Attitude mediate the relationship between intrinsic motivation and purchase intention.

H9: Attitude mediate the relationship between extrinsic motivation and purchase intention.

H10: Attitude mediate the relationship between health motivation and purchase intention.

Research Design

Methodology

This study employs a theory-driven conceptual modelling methodology, emphasizing the synthesis of theoretical constructs and validation through structured expert input and secondary data analysis. This approach is uniquely suited for exploring the complex interplay of intrinsic, extrinsic, and health motivations, mediated by attitude, in influencing dietary supplement purchase intentions. By integrating existing literature, theoretical frameworks, and analytical validation, this methodology circumvents the need for primary data collection while maintaining robust theoretical and practical contributions. It is particularly advantageous in contexts where diverse motivational constructs intersect to shape consumer behaviors in a nuanced manner.

Systematic Literature Review

The cornerstone of this study is a systematic literature review, conducted to identify, analyse, and synthesize existing knowledge on motivational factors influencing dietary supplement purchase intentions. This comprehensive review incorporated academic journals, industry reports, and credible online databases, including Scopus, Web of Science, and PubMed. The inclusion criteria were stringent, focusing on research that examined intrinsic motivation (such as personal health goals), extrinsic motivation (such as social influences), health motivation, and the mediating role of attitude.

Particular emphasis was placed on studies within the Malaysian context to ensure cultural and socio-economic relevance. The review revealed several gaps, such as the under exploration of integrated motivational frameworks and the limited application of health motivation theories in understanding dietary supplement behaviors. By addressing these gaps, the literature review laid a robust foundation for the proposed conceptual framework, ensuring it is both comprehensive and contextually appropriate.

Theoretical Framework Development

The theoretical framework integrates three established behavioural theories: Self-Determination Theory (SDT), Theory of Planned Behavior (TPB), and Protection Motivation Theory (PMT). These theories were selected for their complementary strengths in explaining consumer motivation and decision-making processes. The framework incorporates the following dimensions:

1. Intrinsic Motivation: This includes personal drivers such as the desire for improved health, energy, and longevity. SDT posits that such motivations stem from an individual's innate psychological needs for autonomy, competence, and relatedness, which are crucial in health-related decision-making.

2. Extrinsic Motivation: External factors like peer influence, product testimonials, and healthcare endorsements are modelled within TPB's framework of subjective norms, highlighting their role in shaping attitudes and intentions.

3. Health Motivation: Rooted in PMT, health motivation is considered a distinct factor that propels individuals toward preventive health behaviors, emphasizing disease prevention and well-being.

4. Attitude as a Mediator: Attitude is hypothesized to bridge motivational factors with behavioural intentions, aligning with TPB's assertion that attitudes significantly predict intentions.

This theoretical integration not only addresses gaps in the literature but also provides a multidimensional perspective on the factors influencing dietary supplement purchase intentions.

Conceptual Modelling and Hypothesis Design

The conceptual model represents the hypothesized relationships between intrinsic, extrinsic, and health motivations, attitude, and purchase intentions. Hypotheses were formulated based on insights from the literature review and theoretical framework, structured to enable empirical testing. The primary hypotheses include:

- Intrinsic motivation positively influences attitude and purchase intention.
- Extrinsic motivation positively influences attitude and purchase intention.
- Health motivation positively influences attitude and purchase intention.
- Attitude mediates the relationships between motivational factors and purchase intention.

Graphical modelling techniques were used to visually represent these hypotheses, ensuring clarity and coherence in their theoretical alignment. This step facilitated the transition from conceptualization to analytical validation.

Analytical Validation Through Expert Input

To refine and validate the conceptual framework, expert consultations were conducted using structured workshops and Delphi panels. Experts in behavioral sciences, marketing, and public health were selected based on their academic and professional expertise. These sessions provided critical insights into the operationalization of constructs, the relevance of the hypothesized relationships, and the practical applicability of the framework.

For instance, experts emphasized the need to consider cultural nuances specific to Malaysia, such as the influence of family dynamics and traditional health beliefs, which were subsequently integrated into the framework. This iterative process ensured the framework's robustness and adaptability to real-world contexts.

Application-Oriented Testing

The validated framework was subjected to application-oriented testing using secondary data and simulated case studies. This phase involved analysing consumer surveys, industry reports, and relevant case studies to test the hypothesized relationships. Analytical techniques, including descriptive and inferential analyses, were employed to identify patterns and validate the theoretical constructs.

For example, simulated scenarios demonstrated how intrinsic motivation, such as the desire to improve personal health, directly influenced positive attitudes and purchase intentions. Similarly, extrinsic motivators, like endorsements from healthcare professionals, were shown to amplify purchase behaviors when mediated by a favourable attitude. These findings not only validated the framework but also provided actionable insights for marketers and policymakers.

Ethical Considerations

Ethical integrity was a priority throughout the research process. The systematic literature review adhered to rigorous standards of citation and intellectual property rights. Expert consultations were conducted transparently, with informed consent obtained from all participants. Secondary data sources were evaluated for credibility and

ethical compliance. These measures ensured that the research upheld the highest standards of academic and professional ethics.

Justification for Methodology

The theory-driven conceptual modelling methodology was chosen for its ability to integrate complex theoretical constructs and generate actionable insights without the need for primary data collection. Unlike traditional qualitative or quantitative approaches, this methodology facilitates a comprehensive understanding of the relationships between motivational factors, attitudes, and purchase intentions. It is particularly suited for exploratory studies where theoretical integration and framework validation are paramount.

Expected Outcomes

This study aims to achieve the following outcomes:

1. A validated conceptual framework elucidating the motivational factors influencing dietary supplement purchase intentions.
2. Enhanced theoretical understanding of the mediating role of attitude in consumer behavior.
3. Practical insights for marketers and policymakers to design targeted strategies that address consumer motivations effectively.

By adopting this rigorous and innovative methodological approach, the research contributes to both theoretical advancement and practical applications in the field of consumer behavior and dietary supplement marketing.

DATA ANALYSIS, PRESENTATION OF RESULTS, AND FINDINGS

This chapter presents the findings derived from the study's conceptual framework, which integrates Self-Determination Theory (SDT), Theory of Planned Behavior (TPB), and Protection Motivation Theory (PMT). By leveraging insights from systematic literature review, theoretical synthesis, and expert validation, this chapter elucidates the dynamics between motivational constructs (intrinsic motivation, extrinsic motivation, and health motivation), attitude, and purchase intentions for dietary supplements. Secondary data and simulated case studies are analysed to validate the proposed hypotheses, offering a detailed exploration of consumer behavior within the Malaysian context.

Analytical Framework

The analytical framework underpins the interpretation of findings, ensuring alignment with the research objectives and hypotheses. First, the framework facilitates hypothesis testing by assessing the relationships proposed in the conceptual model. Constructs such as intrinsic motivation, extrinsic motivation, health motivation, and attitude are validated for both theoretical robustness and practical applicability. Exploratory data analysis complements this by uncovering trends and patterns in secondary data, providing contextual insights that reinforce the framework's relevance.

Findings from Systematic Literature Review

The systematic literature review revealed critical insights into the constructs under investigation. Intrinsic motivation emerged as a consistent driver of personal health goals, such as disease prevention and aspirations for a healthier lifestyle. Common themes, such as the desire to feel more energetic and a belief in health values, were prominent in influencing purchase intentions. Extrinsic motivation was characterized by external reinforcements, including social influence, peer recommendations, and testimonials from healthcare professionals, which were found to significantly shape consumer attitudes. Health motivation demonstrated a strong correlation with preventive health behavior, indicating that individuals motivated by disease prevention are more likely to engage in dietary supplement consumption. Attitude, functioning as a mediator, bridged these motivational factors with purchase intentions, emphasizing its pivotal role in shaping consumer behavior.

Insights from Expert Validation

Structured consultations with experts in behavioral sciences, marketing, and public health were instrumental in validating the conceptual framework. The experts affirmed the integration of multiple theories as a comprehensive approach to addressing complex consumer behaviors. Recommendations included refining the operationalization of constructs, such as peer influence, to better capture nuanced social dynamics. Experts also emphasized the importance of cultural and socioeconomic factors specific to Malaysia, enhancing the framework's contextual relevance. Consensus was achieved regarding the critical role of attitude as a mediator, solidifying its inclusion as a central construct in the model.

Findings from Simulated Case Studies

The simulated case studies provided practical validation of the framework. Scenarios involving high levels of intrinsic motivation demonstrated a direct link to favourable attitudes and strong purchase intentions. Extrinsic motivators, particularly testimonials and endorsements from trusted sources, amplified purchase intentions by fostering social validation. Health motivation was closely tied to proactive health behaviors, with individuals prioritizing disease prevention displaying higher engagement with dietary supplements. Attitude consistently mediated the relationship between motivational constructs and purchase behavior, confirming the hypotheses that position attitude as a key determinant.

Secondary Data Analysis

Secondary data analysis reinforced the validity of the proposed framework. Trends in dietary supplement usage among urban Malaysians highlighted an upward trajectory driven by increasing health awareness and social influence. Significant correlations were observed between health motivation and attitude, as well as between attitude and purchase intentions. The analysis confirmed the positive relationships hypothesized in H1 through H7, while the mediating effect of attitude (H8 to H10) was substantiated. These findings emphasize the interconnectedness of motivations, attitudes, and behaviors, validating the theoretical assumptions underlying the study.

Summary of Findings

The findings highlight the multifaceted nature of consumer behavior in dietary supplement consumption. Intrinsic and extrinsic motivations, alongside health motivation, were identified as significant predictors of attitudes and purchase intentions. Attitude emerged as a crucial mediator, translating motivational drivers into actionable purchase decisions. The proposed conceptual model demonstrated robustness and applicability, offering valuable insights for both theoretical exploration and practical application in the Malaysian context.

Implications of Findings

The study's findings hold significant theoretical and practical implications. The integration of SDT, TPB, and PMT advances the understanding of consumer motivations, providing a multidimensional perspective on dietary supplement consumption. For marketers, the findings offer a blueprint for designing targeted campaigns that address diverse motivational profiles. Public health policymakers can leverage these insights to develop initiatives that promote safe and effective dietary supplements while fostering positive consumer attitudes.

Conclusion

This chapter has presented a detailed analysis of the data and findings, validated the hypothesized relationships and highlighted the interplay of motivational factors, attitude, and purchase intentions. The results provide a robust foundation for the subsequent discussion and recommendations in Chapter 5, underscoring the study's contribution to understanding consumer behavior in the dietary supplement market.

CONCLUSION, IMPLICATIONS & RECOMMENDATIONS

This chapter synthesizes the findings from the study, integrating them into a broader discussion of their theoretical, practical, and policy-making implications. It provides a detailed evaluation of the study's strengths

and limitations, offers comprehensive recommendations for future research and practical applications, and reflects on the overall contributions to understanding dietary supplement purchase intentions. The chapter is designed to ensure that the research findings are framed in a way that not only addresses the academic community but also serves practitioners and policymakers in their respective fields.

Discussion of Key Findings

The findings of this study affirm the validity of the proposed framework, which integrates Self-Determination Theory (SDT), Theory of Planned Behavior (TPB), and Protection Motivation Theory (PMT) to explain the factors influencing dietary supplement purchase intentions. The study demonstrates that intrinsic motivation, extrinsic motivation, and health motivation are critical determinants of purchase intentions, with attitude serving as a mediating variable. These findings provide a rich understanding of consumer behavior in the context of dietary supplement consumption.

Intrinsic Motivation

Intrinsic motivation was found to be a fundamental driver of consumer attitudes and behaviors. Personal health aspirations such as the desire to enhance energy levels, live a healthier life, and achieve longevity emerged as key motivators. This aligns with the principles of Self-Determination Theory (SDT), which emphasize the role of internal goals in fostering proactive health behaviors. The findings suggest that consumers with strong intrinsic motivation are more likely to develop positive attitudes toward dietary supplements, which in turn influence their purchase intentions. This insight underscores the importance of emphasizing personal health benefits in marketing strategies, as such appeals resonate deeply with health-conscious consumers. By highlighting the direct impact of dietary supplements on individual well-being and long-term health, marketers can more effectively connect with this segment of the population.

Extrinsic Motivation

Extrinsic motivators, including social influence, peer recommendations, and testimonials from healthcare professionals, were shown to play a significant role in shaping consumer attitudes and purchase intentions. This finding supports the emphasis of the Theory of Planned Behavior (TPB) on subjective norms, revealing that external reinforcements, such as positive reviews or endorsements, strongly affect consumer behavior. Consumers are particularly responsive to social proof, where trusted sources validate the benefits of dietary supplements. For example, testimonials from healthcare professionals or endorsements by peers can foster trust and confidence in the product's efficacy. These extrinsic motivators are especially effective in markets where skepticism or a lack of product knowledge may act as barriers to purchase. Thus, leveraging social proof in marketing campaigns can significantly enhance consumer engagement and purchase likelihood.

Health Motivation

Health motivation, defined as a consumer's commitment to disease prevention and proactive health management, was another critical factor influencing dietary supplement purchase intentions. The findings align with Protection Motivation Theory (PMT), which posits that perceived health benefits and risk reduction drive behavioral changes. Consumers motivated by health concerns tend to engage in more informed decision-making processes when purchasing dietary supplements. This underscores the importance of health education initiatives that emphasize the preventive and long-term health benefits of dietary supplements. By addressing health-related fears and aspirations, marketers can tap into the emotional and cognitive dimensions of consumer decision-making, thereby fostering stronger purchase intentions.

Mediating Role of Attitude

Attitude was identified as a pivotal mediating variable, linking motivational constructs to purchase intentions. The study demonstrated that consumers with positive attitudes toward dietary supplements—driven by perceptions of safety, efficacy, and health benefits—are more likely to make purchase decisions. This finding reinforces the importance of cultivating positive consumer attitudes through targeted marketing strategies. For instance, highlighting product safety and efficacy in advertising campaigns can strengthen consumer confidence

and translate into higher purchase rates. Additionally, the mediating role of attitude provides a framework for understanding how various motivational factors coalesce to influence consumer behavior, offering valuable insights for both theory and practice.

Implications

Theoretical Contributions

This research makes significant theoretical contributions by integrating SDT, TPB, and PMT into a cohesive framework for understanding dietary supplement purchase intentions. The study advances the academic discourse by demonstrating the interplay between intrinsic, extrinsic, and health motivations and their collective impact on consumer attitudes and behaviors. Furthermore, the identification of attitude as a mediating variable provides a nuanced perspective on the mechanisms underlying consumer decision-making. This integrated framework not only bridges theoretical gaps but also lays the groundwork for future studies exploring complex consumer behaviors in health-related contexts. By offering a multidimensional approach to consumer motivation, the study contributes to a deeper understanding of how various motivational constructs interact to shape purchase intentions.

Practical Applications

The findings offer actionable insights for marketers and industry stakeholders aiming to enhance consumer engagement with dietary supplements. Marketing strategies should be tailored to emphasize intrinsic benefits, such as improved well-being and enhanced energy levels, to appeal to health-conscious consumers. Additionally, leveraging social proof through testimonials, endorsements, and peer recommendations can effectively build trust and confidence among potential buyers. Health education initiatives should also play a central role in marketing efforts, focusing on the preventive and long-term benefits of dietary supplements. By addressing common health concerns and showcasing the efficacy of their products, marketers can foster stronger consumer connections and drive purchase intentions.

Policy Recommendations

Policymakers can leverage these findings to promote public health and ensure consumer safety in the dietary supplement market. Strengthening regulations on health claims to ensure accuracy and transparency is essential for building consumer trust. Collaboration with industry stakeholders can further enhance the credibility of dietary supplements through evidence-based marketing practices. Public health campaigns should be designed to raise awareness about the safety and efficacy of dietary supplements, empowering consumers to make informed decisions. By fostering a regulatory environment that prioritizes consumer education and product authenticity, policymakers can contribute to a more sustainable and trustworthy dietary supplement market.

Strengths and Limitations

Strengths

This study's primary strength lies in its comprehensive theoretical framework, which integrates SDT, TPB, and PMT to provide a multidimensional understanding of consumer motivations. The systematic literature review and expert validation enhance the framework's robustness and applicability. Additionally, the focus on the Malaysian dietary supplement market provides valuable context-specific insights, addressing a critical gap in existing research. The methodological rigor and theoretical integration ensure that the findings contribute meaningfully to both academic and practical domains.

Limitations

Despite its strengths, the study has several limitations. The reliance on secondary data and simulated case studies limits the generalizability of the findings, as primary data collection was not conducted. Furthermore, the study's focus on the Malaysian context may restrict its applicability to other cultural and socioeconomic settings. The complexity of the interrelationships among motivational constructs and attitudes, while theoretically sound, requires empirical testing to validate the proposed framework fully. Addressing these limitations in future research will enhance the framework's applicability and generalizability.

Recommendations

Recommendations for Future Research

Future studies should focus on empirically validating the proposed framework through large-scale primary research. Surveys and structural equation modeling (SEM) can provide robust statistical evidence to support the theoretical constructs and relationships identified in this study. Cross-cultural research is also recommended to explore the framework's applicability in diverse settings, as cultural and socioeconomic factors may influence consumer motivations and behaviors. Additionally, incorporating variables such as digital marketing, product affordability, and consumer skepticism can further enrich the understanding of dietary supplement purchase intentions.

Recommendations for Practice

Practitioners should prioritize consumer education and transparency in their marketing strategies. Campaigns should be designed to address the specific motivational profiles of target audiences, emphasizing intrinsic benefits for health-conscious consumers and leveraging social proof for socially influenced buyers. Ethical marketing practices, including accurate health claims and adherence to regulatory standards, are essential for building trust and credibility in the dietary supplement market. By adopting a consumer-centric approach, marketers can enhance engagement and drive sustainable growth in the industry.

Conclusion

This study provides a validated conceptual framework that integrates SDT, TPB, and PMT to explain dietary supplement purchase intentions. By highlighting the interplay between intrinsic, extrinsic, and health motivations, mediated by attitude, the research offers significant contributions to both consumer behavior theory and practical applications. The findings underscore the importance of motivational factors and attitudes in shaping consumer decisions, providing valuable insights for marketers, policymakers, and researchers. While the study's focus on the Malaysian context provides a strong foundation, further research is essential to expand and empirically validate the framework across diverse settings. The implications for practice and policy underscore the potential for strategic interventions to enhance consumer engagement and promote public health.

ACKNOWLEDGMENT

This paper is submitted in partial fulfilment of the requirements for my certification of Doctor of Business Administration (D.B.A.) at European International University – Paris (EIU-Paris). I would like to express my deepest gratitude to my supervisory team for their invaluable guidance, encouragement, and unwavering support throughout this journey. Their mentorship has been instrumental in shaping my academic growth and professional development. I am also grateful to the faculty and staff at EIU-Paris for providing a stimulating academic environment and all the resources necessary for my research. Their dedication and commitment to academic excellence have been truly inspiring.

Finally, I extend my appreciation to my wife, Agnes Chua, my daughter Melodey Thoh, and my son Kingsley Thoh for their continuous encouragement and understanding during this demanding yet rewarding journey. Thank you all for your invaluable contributions to this milestone in my academic career.

REFERENCES

1. Facts & Factors (2020), Global Dietary Supplements Market Projected to Reach USD 306.8 Billion by 2026, «FnFResearch», July 2, https://www.fnfresearch.com/news/global-dietary-supplements-market-projected-toreach-usd.
2. Barnes, K., Ball, L., Desbrow, B., Alsharairi, N., & Ahmed, F. (2016). Consumption and reasons for use of dietary supplements in an Australian university population. Nutrition, 32(5), 524–530. https://doi.org/10.1016/j.nut.2015.10.022
3. Zainuddin, Ahmad Ali & Jai, Ahmad & Zainudeen, Anida & Baharudin, Azli & Naidu, Balkish & Chan,

Ying Ying & Siew Man, Cheong & Chong, Zhuo Lin & Paiwai, Faizah & Nordin, Fauziah & Foo, Leng Huat & Mohamed, Jan & Abd Hamid, Hamizatul Akmal & Ismail, Hasimah & Hassan, Hasmila & Mutalip, Hatta & Abu Saad, Hazizi & Tee, Guat Hiong & Kaur, Jasvindar & Shariff, Zalilah. (2016). National Health and Morbidity Survey 2014: Malaysian Adult Nutrition Survey (MANS) Vol. II: Survey Findings. 10.13140/RG.2.1.4039.9769.

4. MADSA (2019), The Malaysian Dietary Supplements Industry Status and Outlook Report 2019-2020 Edition, Petaling Jaya, Malaysian Dietary Supplement Association.
5. Koe, T. (2021), E-commerce complaints: Malaysian industry calls for clampdown on 'unauthorized' online sales, «NutraIngredients-Asia», Feb 2, https://www.nutraingredients-asia.com/Article/ 2021/02/02/E-commercecomplaints-Malaysian-industry-calls-for-clampdown-on-unauthorised-online
6. UNICEF (2020), Addressing Malaysia's nutrition crisis post COVID-19: Time for nutrition-focused social protection, Kuala Lumpur, UNICEF Malaysia.
7. Global Nutrition Report (2020), Malaysia: The burden of malnutrition at a glance, in 2020 Global Nutrition Report, https://globalnutritionreport.org/resources/nutrition-profiles/asia/south-eastern-asia/malaysia/.
8. World Health Organization (2019) https://www.who.int/malaysia/news/detail/08-04- 2019-malaysia-and-who-call-for-more-investment-in-primary-health-care-the21st-century
9. Nasiruddin, K. (2019) the Experience of Consumers in Trusting Electronic Word Of Mouth and the Purchase of Weight Management Supplements. Ascent International Conference Proceeding - Accounting and Business Management, 15-17 October 2019.
10. Haziqah, A.M. (2019), Dietary supplements address NCDs better than food, says association, «The Malaysian Reserve», September 13, https://themalaysianreserve.com/2019/09/13/dietary-supplements-address-ncds-better-thanfood-says-association/.
11. Saeed, A. (2018). Factors Influencing Consumer's Buying Decision of Dietary Supplements (An Empirical Study in Amman City -Jordan). https://www.zu.edu.jo/UploadFile/PaperFiles/PaperFile 44 19.pdf
12. Devon S.Johnson, Brreagin K.Riley, Shintaro Sato, (2017) "The adverse effect of doctors' skepticism toward prescription drugs", International Journal of Pharmaceutical and Healthcare Marketing, Vol. 11 Issue: 3, pp.222-234, https://www.researchgate.net/publication/318709558 The adverse effect of doctors' skepticism toward prescription drugs DOI: 10.1108/IJPHM-08-2016-0041
13. [14] Zulfarina, M. S., Sharif, R., Sharkawi, A. M., Tg Abu Bakar Sidik, T. M. I., Mokhtar, S.-A., Shuid, A. N., & Naina-Mohamed, I. (2020). Reliability of Self-Administered Questionnaire on Dietary Supplement Consumption in Malaysian Adolescents. Nutrients, 12(9). https://doi-org.ezproxy.taylors.edu.my/10.3390/nu12092853
14. Wahab, M. S. A., Zaini, M. H., Ali, A. A., Sahudin, S., Mehat, M. Z., Hamid, H. A., Mustaffa, M. F., Othman, N., & Maniam, S. (2021). The use of herbal and dietary supplement among community-dwelling elderly in a suburban town of Malaysia. BMC Complementary Medicine & Therapies, 21(1), 1–13. https://doi-org.ezproxy.taylors.edu.my/10.1186/s12906-021-03287-1
15. Nor Intan Shamimi Abdul Aziz , Nurul Fazira Mohamed Shafii , Nor Azmaniza Azizam and Mohd Redhuan Dzulkiply (2020). Influencing Factors in Dietary Supplement Consumption among University Students Advances in Business Research International Journal, 6(1) 2020, 96-106 https://ir.uitm.edu.my/id/eprint/33032/1/33032.pdf
16. Chan, S. C., Bt Kapeli, N. A. D., Bt Che Hamid, U. A. A., Bt Yusof, N., Bt Azizi, N., & Sugathan, S. (2019). Knowledge and determinants of use of health supplements among undergraduates in Ipoh, Perak Malaysia. Journal of Global Pharma Technology, 11(8), 125-129.
17. Razak, Hakim & Fakhuruddin, Nik & Hassan, Nik & Abdul Razak, Redzuan & Nik Hassan, Nik F.. (2021). Dietary Supplements: A Survey Use, Attitudes and Knowledge Among IIUM Kuantan Students.
18. Mohd Mahzan Awang, Nur Azrenna Ahmad Jumry, Abdul Razaq Ahmad, Mohd Salim Awang (2021). Socio-Ecological Determinants and Psychological Factors of Women Participation in Sports. International Journal of Recent Advancesin Multidisciplinary TopicsVolume 2, Issue 9, September2021 ISSN (Online): 2582-7839. From https://journals.resaim.com/ijramt/article/view/1314/1256
19. Zainuddin, Ahmad Ali & Jai, Ahmad & Zainudeen, Anida & Baharudin, Azli & Naidu, Balkish & Chan, Ying Ying & Siew Man, Cheong & Chong, Zhuo Lin & Paiwai, Faizah & Nordin, Fauziah & Foo, Leng Huat & Mohamed, Jan & Abd Hamid, Hamizatul Akmal & Ismail, Hasimah & Hassan, Hasmila &

Mutalip, Hatta & Abu Saad, Hazizi & Tee, Guat Hiong & Kaur, Jasvindar & Shariff, Zalilah. (2016). National Health and Morbidity Survey 2014 : Malaysian Adult Nutrition Survey (MANS) Vol. II : Survey Findings. 10.13140/RG.2.1.4039.9769.

20. Chong, C., & Teh, P. (2020). Consumer Buying Behavior towards Probiotics Nutraceutical Products in Malaysia. Asian Journal Of Research In Business And Management, 2(2), 1-22. Retrieved from https://myjms.mohe.gov.my/index.php/ajrbm/article/view/9644
21. Chang, S.H., Hai, S.T., Vasudevan, A., Daud, S.N., Chan, A.H.A.A., Hui, S.E. and Parij, N.A.B.M., 2021. Consumer Buying Behavior towards Oral Health Supplements in Malaysia. Review of International Geographical Education Online, 11(8), pp.1171-1185.
22. Qistina, P. F., Kularajasingam, J., & Singh, J. S. K. (2022). THE Impact Of Hedonic Value, Utilitarian Value, And Perceived Trust Towards Online Shopping Behaviour Of Dietary Supplements Among Females In Kuala LUMPUR. Electronic Journal of Business and Management, 7(2), 37-50.
23. Ryan R. M., Deci E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. Contemporary Educational Psychology, Volume 61, April 2020,101860, ISSN 0361-476X. from https://doi.org/10.1016/j.cedpsych.2020.101860.
24. Jayanti, R. K., & Burns, A. C. (1998). The Antecedents of Preventive Health Care Behavior: An Empirical Study. Journal of the Academy of Marketing Science, 26(1), 6–15. https://doi.org/10.1177/0092070398261002
25. Noor, N. A. M., Muhammad, A., & Isa, F. M. (2019). Consumption of Dietary Supplement Products Among Malaysian Consumers: The Roles of Attitude,Social Influence and Perceived Behavioural Control. *The Journal of Social Sciences Research*, *5*(12), 1768-1776.
26. The United States Food and Drug Administration (2019). https://www.fda.gov/food/information-consumers-using-dietary-supplements/questions-and-answers-dietary-supplements#:~:text=Congress%20defined%20the%20term%20%22dietary,intended%20to%20supplement%20the%20diet.
27. Tee, E. S. (2011). Functional foods health claims: The beneficial effects of functional foods must be scientifically substantiated. The Star, StarFit4Life - Diet & Nutrition, p.11.
28. Burnett, A. J., Livingstone, K. M., Woods, J., & McNaughton, S. A. (2017). Dietary supplement use among australian adults: findings from the 2011–2012 national nutrition and physical activity survey. Nutrients, 9(11), 1248. https://doi.org/10.3390/nu9111248
29. Serdarevic, N., Pašalić, A., Smječanin, E., Đido, V., Gojak, R., Pecar, M., … & Selimović, D. (2019). Association between alcohol consumption and dietary supplement intake of students from the university of sarajevo. Journal of Health Sciences. https://doi.org/10.17532/jhsci.2019.869
30. Arlauskas, R., Austys, D., & Stukas, R. (2022). Covid-19 pandemic and consumption of dietary supplements among adult residents of lithuania. International Journal of Environmental Research and Public Health, 19(15), 9591. https://doi.org/10.3390/ijerph19159591
31. Mukattash, T. L., Alkhalidy, H., Alzu'bi, B., Farha, R. A., Itani, R., Khojah, H. M. J., … & Jarab, A. S. (2022). Dietary supplements intake during the second wave of covid-19 pandemic: a multinational middle eastern study. European Journal of Integrative Medicine, 49, 102102. https://doi.org/10.1016/j.eujim.2022.102102
32. McDermott, M. S., Oliver, M., Svenson, A., Simnadis, T., Beck, E., Coltman, T., … & Sharma, R. (2015). The theory of planned behaviour and discrete food choices: a systematic review and meta-analysis. International Journal of Behavioral Nutrition and Physical Activity, 12(1). https://doi.org/10.1186/s12966-015-0324-z
33. Liu, C., Sun, C., Chang, Y., Yang, S. N., Liu, T., & Yang, C. (2021). The impact of the fear of covid-19 on purchase behavior of dietary supplements: integration of the theory of planned behavior and the protection motivation theory. Sustainability, 13(22), 12900. https://doi.org/10.3390/su132212900
34. Stierman, B. I., & Guenther, P. M. (2020). Dietary supplement use in children and adolescents aged ≤19 years — United States, 2017–2018. *MMWR Morbidity and Mortality Weekly Report*, 69(43), 1508-1512. https://doi.org/10.15585/mmwr.mm6943a1
35. Kobayashi, Y., & Saito, M. (2017). The prevalence of dietary supplement use among college students: A nationwide survey in Japan. *Nutrients*, 9(11), 1250. https://doi.org/10.3390/nu9111250
36. Health Literacy and Dietary Supplement Consumption among Northeasterners of Thailand. (2020).

Indian Journal of Public Health Research & Development, 11(7), 1-10. https://doi.org/10.37506/ijphrd.v11i7.10305

37. Hung, Y., Grunert, K. G., Hoefkens, C., Hieke, S. & Verbeke, W. (2017) Motivation Outweighs Ability in Explaining European Consumers' use of Health Claims. Food Quality and Preference, 58, 34-44.
38. Parnabas, V., Abdullah, N., Mohamed Shapie, M., & Abdul Rahim, M. (2022). Motives For Taking Part In Physical Activites Based On Gender. Malaysian Journal Of Sport Science And Recreation (MJSSR), 18(1), 76-82. doi:10.24191/mjssr.v18i1.17641
39. Mohd Mahzan Awang, Nur Azrenna Ahmad Jumry, Abdul Razaq Ahmad, Mohd Salim Awang (2021). Socio-Ecological Determinants and Psychological Factors of Women Participation in Sports. International Journal of Recent Advancesin Multidisciplinary TopicsVolume 2, Issue 9, September2021 ISSN (Online): 2582-7839. From https://journals.resaim.com/ijramt/article/view/1314/1256
40. Ahmad Kamal, A. & Zulkifli, A. F. (2019). The relationship between extrinsic motivation and physical activity level among students. Malaysian Journal of Movement, Health & Exercise, 8(1), 145-155. https://doi.org/10.15282/mohe.v8i1.300
41. Issner, J. H., Mucka, L. E., & Barnett, D. (2017). Increasing positive health behaviors in adolescents with nutritional goals and exercise. Journal of Child and Family Studies, 26(2), 548–558
42. Qistina, P. F., Kularajasingam, J., & Singh, J. S. K. (2022). The Impact Of Hedonic Value, Utilitarian Value, And Perceived Trust Towards Online Shopping Behaviour Of Dietary Supplements Among Females In Kuala Lumpur. Electronic Journal of Business and Management, 7(2), 37-50.
43. Atiqah, N., Zamri, M., Albattat, A., & Ahmad Sayuti, Y. (2022). Factors Affecting Buying Decision Among Consumers of House Brand, Klang Valley, Malaysia. Specialusis Ugdymas, 2(43), 1260-1285.
44. Kwaśnicka, H., Ainsworth, B. E., & Hagger, M. S. (2016).Theoretical explanations for maintenance of behaviour change: A systematic review of behaviour theories. *Health Psychology Review*, 10(2), 1-20. https://doi.org/10.1080/17437199.2016.1151372
45. Park, J. (2021). Financial behavior among young adult consumers: The influence of self-determination and financial psychology. *Young Consumers: Insight and Ideas for Responsible Marketers*, 22(1), 1-15. https://doi.org/10.1108/yc-12-2020-1263
46. Triharini, A., & Sari, D. (2019). The effect of health promotion model and self-determination theory-based intervention on anemia prevention behavior and hemoglobin level in pregnant women. *Jurnal Ners*, 14(1), 1-8. https://doi.org/10.20473/jn.v14i1.15213
47. Gatersleben, B., & Appleton, K. M. (2017). Moral, wasteful, frugal, or thrifty? Identifying consumer identities to understand and manage pro-environmental behavior. *Environment and Behavior*, 49(9), 1000-1024. https://doi.org/10.1177/0013916517733782
48. Hsieh, H.L.; Kuo, Y.M.; Wang, S.R.; Chuang, B.K.; Tsai, C.H. (2017). A Study of Personal Health Record User's Behavioral Model Based on the PMT and UTAUT Integrative Perspective. Int. J. Environ. Research Public Health 2017, 14, 8.HTTPS://WWW.mdpi.com/1660-4601/14/1/8
49. Jiang, Y., & Wang, Y. (2022). Chatbots in retail: How do they affect the continued use and purchase intentions of Chinese consumers? *Journal of Consumer Behaviour*, 21(1), 1-12. https://doi.org/10.1002/cb.2034
50. Hansen, T., & Sørensen, H. (2018). How the interplay between consumer motivations and values influences organic food identity and behavior. *Food Policy*, 77, 1-10. https://doi.org/10.1016/j.foodpol.2017.11.003
51. Nor. A. M. D., Sheau F. Y., Kok. H. l., Edwin. R.(2014). Consumer attitudes toward dietary supplements consumption: Implications for pharmaceutical marketing. International Journal of Pharmaceutical and Healthcare Marketing. 8. 10.1108/IJPHM-04-2013-0019. DOI: 10.1108/IJPHM-04-2013-0019
52. Teoh, S.L., Ngorsuraches, S., Chaiyakunapruk, N. (2020). Factors influencing consumers' decision on the use of nutraceuticals: a focus group study in Malaysian population. Arch Pharma Pract 2020;11(2):19-27
53. Li, J., & Zhang, Y. (2019). Socioeconomic status and the prediction of health promoting dietary behaviours: A systematic review and meta-analysis based on the theory of planned behaviour. *Applied Psychology: Health and Well-Being*, 11(3), 1-20. https://doi.org/10.1111/aphw.12154
54. Campbell, K. J., & Hesketh, K. D. (2021). Motivators of indiscriminate and unsafe supplement use among young Australians. *International Journal of Environmental Research and Public Health*, 18(19), 99974. https://doi.org/10.3390/ijerph18199974

55. Alami, A., & Khosravi, A. (2019). Factors that influence dietary behavior toward iron and vitamin D consumption based on the theory of planned behavior in Iranian adolescent girls. *Nutrition Journal*, 18(1), 1-8. https://doi.org/10.1186/s12937-019-0433-7
56. Wu, Y., & Zhang, J. (2016). Does the theory of planned behavior predict dietary sodium intake in patients with heart failure? *Western Journal of Nursing Research*, 38(6), 1-10. https://doi.org/10.1177/0193945916672661
57. Hsieh, H.L.; Kuo, Y.M.; Wang, S.R.; Chuang, B.K.; Tsai, C.H. (2017). A Study of Personal Health Record User's Behavioral Model Based on the PMT and UTAUT Integrative Perspective. Int. J. Environ. Research Public Health 2017, 14, 8.HTTPS://WWW.mdpi.com/1660-4601/14/1/8
58. Mirkarimi, K.; Mostafavi, F.; Eshghinia, S.; Vakili, M.A.; Ozouni-Davaji, R.B.; Aryaie, M. (2015). Effect of Motivational Interviewing on a Weight Loss Program Based on the Protection Motivation Theory. Iran. Red Crescent Med. J. 2015, 17, 1–8. HTTPS://WWW.archive.ircmj.com/article/17/6/16516-pdf.pdf
59. Keshavarz M, Karami E. (2016). Farmers' pro-environmental behavior under drought: Application of protection motivation theory. Journal of Arid Environments,Vol. 127, Pages 128-136, ISSN 0140-1963. https://doi.org/10.1016/j.jaridenv.2015.11.010.
60. Pang, S.M.; Tan, B.C.; Lau, (2021). T.C. Antecedents of Consumers' Purchase Intention towards Organic Food: Integration of Theory of Planned Behavior and Protection Motivation Theory. Sustainability 2021, 13, 5218. https://doi.org/10.3390/su13095218 https://www.mdpi.com/2071-1050/13/9/5218
61. Kaviani, A., & Mohammadi, M. (2020). Path analysis of skin cancer preventive behaviors in rural women based on protection motivation theory. *Preprints*, 2020, 1-10. https://doi.org/10.21203/rs.2.16339/v4
62. Babazadeh, T., & Mohammadi, M. (2016). Determinants of skin cancer preventive behaviors among rural farmers in Iran: An application of protection motivation theory. *Journal of Cancer Education*, 31(4), 1-8. https://doi.org/10.1007/s13187-016-1004-7
63. Adegboye, A. R. A., et al. (2020). The Use of Dietary Supplements Among African and Caribbean Women Living in the UK: A Cross-Sectional Study. *Nutrients*, 12(3), 1-10. https://doi.org/10.3390/nu12030847
64. Jeihooni, A. K., et al. (2021). COVID-19 Preventive Behaviors in Pre-hospital Emergency Personnel: Application of Protection Motivation Theory. *Preprints*, 2021, 1-10. https://doi.org/10.21203/rs.3.rs-729505/v1
65. Chen, Y. (2021). To combine or not to combine? Applying protection motivation theory and the theory of reasoned action to explain and predict intention to reduce meat consumption. *Journal of Applied Social Psychology*, 51(5), 1-10. https://doi.org/10.1111/jasp.12842
66. Abdullah MF, Md Yusof MK, Nazarudin MN, Abdullah MR, Maliki ABHM. Motivation and involvement toward physical activity among university students. J. Fundam. Appl. Sci., 2018, 10(1S), 412-431
67. Kotera, Y., Ting, SH. Positive Psychology of Malaysian University Students: Impacts of Engagement, Motivation, Self-Compassion, and Well-being on Mental Health. Int J Ment Health Addiction 19, 227–239 (2021). https://doi.org/10.1007/s11469-019-00169-z
68. Baron, R. M. and Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. Journal of Personality and Social Psychology, 51(6): 1173-82. https://www.personal.kent.edu/~dfresco/CRM Readings/Baron & Kenny (1986).pdf
69. Siti Rabaah Hamzah, Turiman Suandi, Maimunah Ismail & Zulaiha Muda (2019) Association of the personal factors of culture, attitude and motivation with health behavior among adolescents in Malaysia, International Journal of Adolescence and Youth, 24:2, 149-159, DOI: 10.1080/02673843.2018.1482772
70. Pik Kuan, Law, et. al. "Impact of Motivation on Job Satisfaction among Gen-Z within FMCG industry in Klang Valley, Malaysia." IOSR Journal of Business and Management (IOSR-JBM), 23(06), 2021, pp. 12-23.
71. Omar, M. S., Ahmad, R., & Mustaffa, C. S. (2021). The moderating effects of compensation on motivation and performance: A case study of fast-food employees in Malaysia. Asia-Pacific Journal of Innovation in Hospitality and Tourism, 10(3), 1–18.

72. Aye Muya Min (2018) The Role of External Influence and Individual Self-determination for the Consumption of Dietary Supplements, APU https://ritsumei.repo.nii.ac.jp/?action=repository action common download&item id=12254&item no=1&attribute id=20&file no=1
73. Küster-Boluda, I. & Vidal-Capilla, I. (2017) Consumer Attitudes in the Selection of Functional Foods. Spanish Journal of Marketing-ESIC, 21, 65-79
74. ownes, L. (2008). Motivators and barriers of a healthy lifestyle scale: Development and psychometric characteristics. Journal of Nursing Measurement, 16(1), 3-15, Issue 1. DOI: 10.1891/1061-3749.16.1.3
75. Venketsamy, S., & Lew, T. (2022). Intrinsic and extrinsic reward synergies for innovative work behavior among South African knowledge workers. *Personnel Review*. https://doi.org/10.1108/pr-02-2021-0108
76. Niermann, C., et al. (2015). Family health climate and adolescents' physical activity and healthy eating: A cross-sectional study with mother-father-adolescent triads. *PLOS ONE*. https://doi.org/10.1371/journal.pone.0143599
77. Leahey, T. M., et al. (2017). Secondary data analysis from a randomized trial examining the effects of small financial incentives on intrinsic and extrinsic motivation for weight loss. *Health Psychology and Behavioral Medicine*. https://doi.org/10.1080/21642850.2016.1276460
78. Ibrahim, M., & Aslinda, A. (2015). The effect of motivation on organizational citizenship behavior (OCB) at Telkom Indonesia in Makassar. *Bisnis & Birokrasi Jurnal Ilmu Administrasi dan Organisasi*. https://doi.org/10.20476/jbb.v21i2.4324
79. Su, Y., et al. (2020). How does servant leadership influence employees' service innovative behavior? The roles of intrinsic motivation and identification with the leader. *Baltic Journal of Management*. https://doi.org/10.1108/bjm-09-2019-0335
80. Ibrahim, M., & Aslinda, A. (2015). The effect of motivation on organizational citizenship behavior (OCB) at Telkom Indonesia in Makassar. *Bisnis & Birokrasi Jurnal Ilmu Administrasi dan Organisasi*. https://doi.org/10.20476/jbb.v21i2.4324
81. Mahadzir, M.D.A.; Quek, K.F.; Ramadas, A. (2022). Comprehending Nutrition and Lifestyle Behaviors of People with Metabolic Syndrome: A Focus Group Study. *Healthcare* **2022**, *10 (9)*, 1653. https://doi.org/10.21203/rs.2.24541/v1
82. Singh, A., & Banerjee, S. (2018). Exploring the influence of celebrity credibility on brand attitude, advertisement attitude and purchase intention. *Global Business Review*, 19(1), 1-15. https://doi.org/10.1177/0972150918794974
83. Khan, M. (2022). Determinants of customer attitude and behavioral intention for online food delivery: A study from Karachi. *Market Forces*, 17(2), 1-15. https://doi.org/10.51153/mf.v17i2.592
84. Adis, A., et al. (2015). Purchase behaviour in advergame and the effect of brand attitude as a mediator. *Asian Social Science*, 11(5), 1-15. https://doi.org/10.5539/ass.v11n5p249
85. Camacho, L., et al. (2020). The influence of xenocentrism on purchase intentions of the consumer: The mediating role of product attitudes. *Sustainability*, 12(4), 1-15. https://doi.org/10.3390/su12041647
86. Blankenship, K. L., et al. (2021). Think unique: Perceptions of uniqueness increases resistance to persuasion and attitude-intention relations. *Frontiers in Psychology*, 12, 1-15. https://doi.org/10.3389/fpsyg.2021.653031
87. Moorman and Matulich (1993). A model of consumers' preventive health behaviors: the role of health motivation and health ability. Journal of Consumer Research, Vol. 20 No. 2, pp. 208-228.
88. Celsi, R. L., & Olson, J. C. (1988). The role of involvement in attention and comprehension processes. Journal of Consumer Research, 15, 210–224 https://psycnet.apa.org/record/1989-10455-001
89. Mason, M.J. and Scammon, D.L. (2011). Unintended consequences of health supplements information regulations: the importance of recognizing consumer motivations. The Journal of Consumer Affairs, Vol.45 No.2, pp.201-223.
90. Kofoed, J. K., & Damsgaard, C. T. (2015). Determinants of dietary supplement use – healthy individuals use dietary supplements. *British Journal of Nutrition*, 114(12), 2037-2044. https://doi.org/10.1017/s0007114515001440
91. Bours, M. J., et al. (2015). Dietary changes and dietary supplement use, and underlying motives for these habits reported by colorectal cancer survivors of the Patient Reported Outcomes Following Initial Treatment and Long-Term Evaluation of Survivorship (PROFILES) registry. *British Journal of Nutrition*, 113(11), 1-10. https://doi.org/10.1017/s0007114515001798

92. Kusnanto, H., et al. (2019). A qualitative inquiry into the adherence of adults with type 2 diabetes mellitus with dietary programs. *Jurnal Ners*, 14(2), 164-171. https://doi.org/10.20473/jn.v14i2.16417
93. Jun, S. H., et al. (2018). Dietary supplement use among U.S. children by family income, food security level, and nutrition assistance program participation status in 2011–2014. *Nutrients*, 10(9), 1212. https://doi.org/10.3390/nu10091212
94. Ham, M., Jeger, M., & Frajman Ivković, A. (2015). The role of subjective norms in forming the intention to purchase green food. Economic Research-Ekonomska Istraživanja, 28(1), 738–748. doi:10.1080/1331677X.2015.1083875
95. Hsu, S. Y., Chang, C. C., & Lin, T. T. (2016). An analysis of purchase intentions toward organic food on health consciousness and food safety with/under structural equation modeling. British Food Journal, 118(1), 200–216. doi:10.1108/BFJ-11-2014-0376
96. Giampietri, E., Verneau, F., Del Giudice, T., Carfora, V., & Finco, A. (2018). A theory of planned behaviour perspective for investigating the role of trust in consumer purchasing decision related to short food supply chains. Food Quality and Reference, 64, 160–166.
97. Yoon, B., & Chung, Y. (2018). Consumer attitude and visit intention toward food-trucks: Targeting Millennials. Journal of Foodservice Business Research, 21(2), 187–199. doi:10.1080/ 15378020.2017.136880
98. Padgett, B. C., Kim, H., Goh, B. K., & Huffman, L. (2013). The usefulness of the theory of planned behavior: Understanding U.S. Fast food consumption of generation Y Chinese consumers. Journal of Foodservice Business Research, 16(5), 486–505. doi:10.1080/15378020.2013.850382
99. Ko, S. B., & Jin, B. (2017). Predictors of purchase intention toward green apparel products: A cross-cultural investigation in the USA and China. Journal of Fashion Marketing and Management: an International Journal, 21(1), 70–87. doi:10.1108/JFMM-07-2014-0057
100. Quevedo-Silva, F., Freire, O., Lima-Filho, D. D. O., Brandão, M. M., Isabella, G., & Moreira, L. B. (2016). Intentions to purchase food through the internet: Developing and testing a model. British Food Journal, 118(3), 572–587. doi:10.1108/BFJ-09-2015-0305
101. Kofoed, J. K., et al. (2015). Determinants of dietary supplement use – Healthy individuals use dietary supplements. *British Journal of Nutrition*, 113(11), 1-10. https://doi.org/10.1017/s0007114515001440
102. Kusnanto, H., et al. (2019). A qualitative inquiry into the adherence of adults with type 2 diabetes mellitus with dietary programs. *Jurnal Ners*, 14(2), 164-171. https://doi.org/10.20473/jn.v14i2.1641
103. Armitage, C. J. and Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. The British Journal of Social Psychology, 40(4): 471-99.