

THESIS OF THE DOCTORAL DISSERTATION

MOHAMMAD MOHAMMAD

KAPOSVÁR

2024

MATE – Hungarian University of Agriculture and Life Sciences  
Doctoral School of Economic and Regional Sciences

Head of Doctoral School  
PROF. DR. ZOLTÁN BUJDOSÓ PhD

Supervisor:  
DR. ORSOLYA SZIGETI  
Associate professor

Analysis of Factors Influencing Consumer Attitudes and Online  
Purchasing in the Hungarian Dairy Functional Food Market

Created  
MOHAMMAD MOHAMMAD

VALUE OF THE SUBMISSION

2024

## TABLE OF CONTENTS

<b>1</b>	<b>RESEARCH BACKGROUNDS AND OBJECTIVE .....</b>	<b>2</b>
<b>2</b>	<b>MATERIAL AND METHODS.....</b>	<b>4</b>
<b>2.1</b>	<b>Theoretical framework and hypotheses .....</b>	<b>4</b>
<b>2.2</b>	<b>Research design .....</b>	<b>13</b>
2.2.1	Systematic literature review .....	13
2.2.2	Main study.....	14
2.2.2.1	Quantitative research and data collection.....	14
2.2.2.2	Demographic Data .....	14
2.2.2.3	Partial least squares PLS-SEM.....	15
2.2.2.4	Evaluation measurement model .....	16
2.2.2.5	Evaluation reflective constructs .....	16
2.2.2.6	Evaluation structural model .....	17
<b>3</b>	<b>RESULTS AND EVALUATION.....</b>	<b>18</b>
<b>3.1</b>	<b>Evaluation of the measurement model.....</b>	<b>18</b>
<b>3.2</b>	<b>Evaluation of the structure model .....</b>	<b>24</b>
<b>4</b>	<b>CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>33</b>
<b>5</b>	<b>NEW SCIENTIFIC RESULTS.....</b>	<b>39</b>
<b>6</b>	<b>SUMMARY.....</b>	<b>39</b>
<b>7</b>	<b>LIST OF AUTHORS' PUBLICATIONS.....</b>	<b>41</b>

# **1 RESEARCH BACKGROUND AND OBJECTIVE**

Over the past few decades, the dairy functional food market has experienced significant growth worldwide, driven by consumers' increasing awareness of the health benefits of functional foods and their desire for products that can improve their overall well-being (Topolska et al., 2021). Dairy functional foods, in particular, have gained considerable attention due to their high nutritional value and the presence of bioactive compounds, such as probiotics, prebiotics, and peptides, which can improve gut health, boost immunity, and reduce the risk of chronic diseases (Hadjimbei et al., 2022). In Hungary, the dairy functional food market has also witnessed steady growth in recent years, as consumers are becoming more health-conscious and seeking out products that can support their immune system and digestive health (Balogh et al., 2020b; Nagy, 2010). However, online purchasing of dairy functional foods has become increasingly popular in Hungary, as it offers consumers the convenience of shopping from home, easy access to a wide range of products, and the ability to compare prices and quality across different vendors (Madarász et al., 2022).

At the same time, media marketing has emerged as a powerful tool for promoting dairy functional foods and creating awareness among consumers about their health benefits (Granato et al., 2020; Martinho, 2020). Media marketing refers to the use of various channels and platforms, such as social media, TV, radio, and print media, to reach out to consumers and persuade them to buy products or services (Qader et al., 2022). In the context of dairy functional foods, media marketing can play a critical role in shaping consumers' attitudes and perceptions of these products and influencing their purchasing behavior (Hoque et al., 2018). However, the impact of media marketing on dairy functional food online purchasing in Hungary has not been fully explored in the literature. Although some studies have examined the role

of various marketing techniques, such as brand loyalty, perceived value, and trust, in influencing consumer behavior in the dairy functional food market (Nagpal et al., 2012; Siró et al., 2008; Temesi et al., 2019), few have specifically focused on the effects of media marketing on online purchasing behavior.

The popularity of online grocery shopping in Hungary has been driven by several factors, including the convenience it offers, the wider variety of products available, and increasing levels of trust in online retailers. Additionally, consumers appreciate the ability to browse products, place orders, and schedule deliveries with just a few clicks, which saves time and effort. Furthermore, online grocery shopping also provides access to niche and specialty products that may not be available in physical stores, giving consumers greater choice and flexibility. As trust in online retailers continues to grow, more consumers in Hungary are comfortable with the idea of purchasing groceries online. Despite the benefits of online grocery shopping, there are still challenges to be addressed, such as the logistics and infrastructure of delivery and the need for a better user experience. However, the rise of online grocery shopping presents significant opportunities for retailers and marketers to better understand consumer behavior and preferences and introduce new and innovative products to the market.

This study aims to analysis of factors influencing consumer attitudes and online purchasing in the hungarian dairy functional food market. The study employs various theoretical models, including the Value-Attitude-Behavior (VAB) model (Homer & Kahle, 1988), the Theory of Planned Behavior (TPB) (Ajzen, 1991), the Technology Acceptance Model (TAM) (Davis, 1989), and the Media Advertising Value (MAV) theory (Cuesta-Valiño et al., 2020).

In order to address these inquiries, the research will employ quantitative data collection and analysis techniques. The quantitative aspect of the study will involve conducting a survey among a sizable group of Hungarian consumers of dairy functional food. This survey aims to delve into their attitudes, values, and perceptions regarding online purchasing, while also examining their exposure to media advertising. The ultimate goal is to test theoretical models and explore the interconnections among various variables.

The results of this study are expected to contribute to a better understanding of the factors that influence dairy functional food online purchasing in Hungary and to provide insights into the role of media marketing in shaping consumer behavior and attitudes. The findings may have practical implications for dairy functional food manufacturers and marketers, as they can use the insights gained from this study to design more effective marketing strategies and communication campaigns that resonate with consumers' values, attitudes, and beliefs.

## **2 MATERIAL AND METHODS**

### **2.1 Theoretical framework and hypotheses**

Online grocery shopping involves purchasing consumables and household items through e-commerce websites or mobile shopping applications (Driediger & Bhatiasevi, 2019). The Technology Acceptance Model (TAM) is widely used to predict customers' acceptance and intention to purchase from online grocery stores (Davis, 1989; Driediger & Bhatiasevi, 2019). TAM has been supported by experimental studies and shares similarities with the Theory of Planned Behavior (TPB) in exploring consumer attitudes and behavior (Cuesta-Valiño et al., 2020; Küster-Boluda & Vidal-Capilla, 2017; Salmani et al., 2020). Perceived ease of use (PEOU) impacts consumers' willingness to use online purchasing, but various factors influence this choice, particularly in

the Hungarian market (Driediger & Bhatiasavi, 2019; Siró et al., 2008; Szakály et al., 2016). Health considerations, sustainability, and limited access to physical stores also influence online grocery shopping behavior (Gasmi et al., 2020; Marty et al., 2021; Sorić et al., 2021).

According to Davis (1989), perceived usefulness (PU) reflects individuals' belief in the ability of a method to enhance their work performance, while perceived ease of use (PEOU) represents the perceived effortlessness of using a system (Perea et al., 2004). In the context of online grocery shopping, PU refers to the belief that buying food online improves the shopping experience, while PEOU refers to the assumption that online food purchasing requires minimal effort. TAM suggests that PU is influenced by PEOU, supported by empirical studies (Gefen et al., 2000; Gefen et al., 2003; Kim, 2012). The ease of using online platforms directly relates to the perceived benefits of online shopping (Bauerová & Klepek, 2018; Perea et al., 2004; Sondakh, 2017). Therefore, we propose the following hypothesis:

*Hypothesis 1. Consumers' PEOU of online DFFs purchasing has a positive influence on PU of online DFFs purchasing.*

Behavioral intention reflects individuals' willingness and effort to engage in a specific action (Kim & Woo, 2016). Within the TAM, perception of technology's utility significantly affects attitude towards adopting new systems (Davis et al., 1989). Numerous studies on online shopping have validated these associations (Chang et al., 2005; Gefen et al., 2003; Perea et al., 2004). Perceived usefulness (PU) in internet shopping is based on consumers' belief that it saves time, minimizes effort, extends store hours, and offers faster checkout (Gentry & Calantone, 2002; Chiu et al., 2014). Customers with higher incomes value time more due to opportunity costs, finding online shopping appealing for time-saving (Punj, 2012). Convenience, product

variety, and time-saving capabilities influence consumers' decisions to buy food online (Ramus & Nielsen, 2005). In emerging markets, the ease of online food purchasing drives adoption (Dang et al., 2018). Research by Chien et al. (2003) demonstrates that PU positively impacts individuals' intentions to shop for food online. Therefore, the following hypotheses were formulated:

*Hypothesis 2. Consumers' PU of online DFFs purchasing has a positive influence on their intentions toward online DFFs purchasing INT.*

Attitude, evaluated by Ajzen (1991), strongly influences purchase intentions and reflects individuals' assessment of the consequences associated with behavior, including buying functional food items (Nystrand & Olsen, 2020; Huang et al., 2019). Health consciousness motivates purchases of healthy food products, with health awareness integrating concerns into daily activities and guiding choices (Huang et al., 2019; Michaelidou & Hassan, 2010; Nguyen et al., 2019b; Jayanti & Burns, 1998). Functional foods are perceived to improve health and reduce the risk of illnesses, significantly influencing consumer choices (Aguiar et al., 2019; Annunziata & Vecchio, 2011). A positive attitude towards functional foods is linked to intentions to purchase groceries online (Quevedo et al., 2016; Chen, 2011; Loketkrawee & Bhatiasavi, 2018). Based on these findings, the following hypotheses were formulated:

*Hypothesis 3. Consumers' attitudes towards DFFs ATT will have a positive influence on their intentions towards online food purchasing INT of DFFs.*

The theory of planned behavior (TPB) by Ajzen (1991) is widely used to analyze consumer attitudes and behaviors, including functional food (Cuesta-Valiño et al., 2020; Küster-Boluda & Vidal-Capilla, 2017; Salmani et al., 2020). TPB suggests that behavioral intention directly influences behavior, while attitude, subjective social norms, and perceived behavioral control impact behavioral intention. The value-attitude-behavior (VAB) model,



similar to TPB, considers attitudes and norms as determinants of intention (Chang et al., 2020; Honkanen et al., 2006; Kang et al., 2015). Motivators and barriers, reflecting values, are measured to understand their impact on consumer willingness and intention. Verbeke (2005) found that attitudes, knowledge, and health control influence the acceptance of functional foods. This hypothesis extends the research to include attitudes towards dairy functional foods and their willingness to consume them in the Hungarian market. Thus, there is a positive relationship between attitude towards dairy functional foods and willingness to consume them (Downes, 2008; Urala & Lähteenmäki, 2007). Based on these findings, the following hypotheses were formulated:

*Hypothesis 4. Attitudes towards DFFs influence the willingness to consume DFFs.*

Health is a significant factor in consumer behavior regarding functional foods (Figueroa & Sanchez, 2004). Downes (2008) proposes a model that links a healthy lifestyle to attitudes and consumption of functional foods. Motivators and barriers for health behaviors can be categorized as personal and environmental factors, including motivation, health concerns, time constraints, safety concerns, financial constraints, social support, and stress (Downes, 2008). Personal drivers, such as increased energy levels and weight management, contribute to motivation for physical activity (Jones & Nies, 1996). Verbeke (2005) highlights the importance of health benefits confirmation and personal experiences in adopting functional foods. Based on these findings, the following hypotheses were formulated:

*Hypothesis 5. Motivators positively influence attitudes toward DFFs.*

Barriers to dietary or physical activity practices involve personal and environmental factors (Downes, 2008; Papp-Bata & Szakály, 2020). Personal

barriers include lack of motivation, time constraints, negative emotions, health concerns, and limited desire (Fleury, 1996; Keller, 1993; Eyler et al., 1998; Jones & Nies, 1996). Environmental barriers include limited access to exercise facilities, lack of social support, financial restrictions, and adverse weather conditions (Fleury, 1996; Eyler et al., 1998; Jones & Nies, 1996). Other barriers include lack of knowledge and confidence about transgenic foods, inadequate nutritional information, and limited availability (Miles et al., 2005; Abood et al., 2003; Nguyen et al., 2017; Pham et al., 2018). In conclusion, there is a negative relationship between barriers to functional food consumption and attitudes toward them:

*Hypothesis 6. Barriers negatively influence attitudes toward DFFs.*

In prior research by Deshpande et al. (2009), the influences on eating behaviors were examined. The health belief model (HBM) received less attention despite being a behavioral model. Factors influencing eating habits, such as flavor, time availability, convenience, and cost, were identified by House et al. (2006) and Horacek et al. (1998). These factors were found to act as barriers to healthy eating. Consumer lifestyle and health awareness were shown to impact attitudes towards and consumption of healthy and functional foods (Zandstra et al., 2001; Chen, 2011b; Papp-Bata & Szakály, 2020). Thus, a relationship can be established between motivators and barriers to healthy behaviors and the willingness to consume dairy functional foods:

*Hypothesis 7. Motivators positively influence the willingness to consume DFFs.*

*Hypothesis 8. Barriers negatively influence the willingness to consume DFFs.*

The core concept of the theory of TPB and VAB is that the behavior of consumers was influenced by their attitude. However, attitude plays a mediator

factor between the behavior and the antecedents (Cuesta-Valiño et al., 2020; Küster-Boluda & Vidal-Capilla, 2017; Urala & Lähteenmäki, 2007). In the same vein, Urala & Lähteenmäki (2003) affirmed in their study on functional foods, attitudes modulate how information is processed, adapted, used, or refused. Nevertheless, the attitude has been assessed in this study from this dual viewpoint, where the cognitive and emotional antecedents of attitude to this kind of product are, respectively, the motivators and barriers to using dairy functional foods. Because attitudes affect how people choose their food, they can aid us in comprehending why customers make certain food choices (Sugawara & Nikaido, 2014). That's why we can conclude our hypothesis accordingly:

*Hypothesis 7a. Motivators positively influence the willingness to consume DFFs through attitude as a mediator.*

*Hypothesis 8a. Barriers negatively influence the willingness to consume DFFs through attitude as a mediator.*

Ducoffe's (1996) theory is commonly used to explain user perceptions and attitudes toward internet advertising. It includes informativeness, entertainment, credibility, and irritation as antecedents of advertising value. The Media Advertising Value (MAV) of healthy food incorporates users' interactions and shared content through online/offline advertising (Dao et al., 2015). Previous studies have identified informativeness, entertainment, credibility, and irritation as antecedent variables of MAV (Gangadharbatla & Daugherty, 2013; Bennett et al., 2006; Caus et al., 2009). Informativeness in advertising is the ability to effectively communicate product characteristics and benefits to match consumer needs (Ducoffe, 1996). The use of social networks and viral sharing enhances the informativeness of advertising (Dao

et al., 2015; Saxena & Khanna, 2013). Therefore, the following hypothesis is proposed:

*Hypothesis 9. Informativeness has a positive influence on the MAV of DFFs.*

Entertainment in advertising refers to creating pleasant and enjoyable experiences for consumers (Zhou & Bao, 2002). It is characterized by how interesting social media advertising is to the consumer (Cheng et al., 2009). Given the interactive nature of social networks, users expect entertaining content in advertising (Hamouda, 2018). This emotional connection between the brand and the consumer influences the evaluation of advertising content (Wang & Sun, 2010). The positive relationship between entertainment and media advertising highlights its significance in designing effective campaigns (Dao et al., 2015). The hypothesis is as follows:

*Hypothesis 10. Entertainment has a positive influence on the MAV of DFFs.*

Credibility in advertising refers to the perceived truthfulness and believability of the product information (MacKenzie & Lutz, 1989). It shapes consumers' trust and perception of the advertising message (Lee & Hsieh, 2009). Credibility is distinct from trust in individuals or organizations (Dix et al., 2012; McKnight & Kacmar, 2006). It plays a crucial role in influencing the value and attitude towards advertising (Choi & Rifon, 2013). Creating credible advertising enhances its effectiveness and value (MacKenzie & Lutz, 1989). Customer feedback is an important factor in evaluating the credibility of an advertising message (Okazaki, 2015). The hypothesis is as follows:

*Hypothesis 11. Credibility has a positive influence on the MAV of DFFs.*

Informativeness, entertainment, and credibility positively contribute to media advertising value (MAV), while irritation has a negative impact, decreasing MAV (Dix et al., 2012). Irritation can arise from personal dissatisfaction or ad

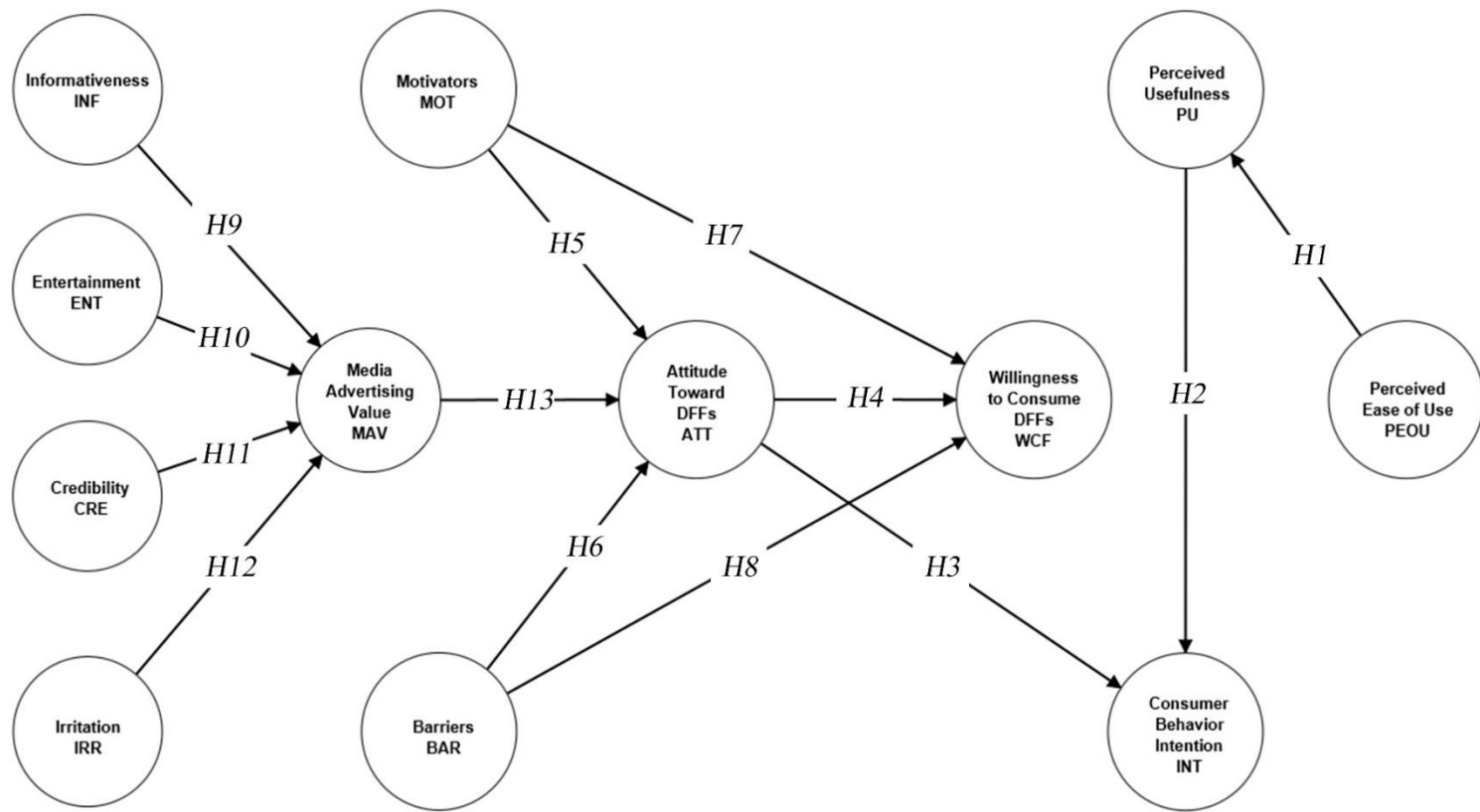
repetition, leading to consumer annoyance, decreased persuasion, and perceived value (Saxena & Khanna, 2013; Cheng et al., 2009; Voss et al., 2003). Criticism and reduced advertising effectiveness can be attributed to consumer irritation (Ducoffe, 1996). Thus, the hypothesis is as follows:

*Hypothesis 12. Irritation has a negative influence on the MAV of DFFs.*

MAV of healthy food refers to the subjective value of potential consumers derived from media advertising, incorporating consumer feedback and personal aspects (Dao et al., 2015). MAV influences attitudes, which are learned predispositions towards specific behaviors and crucial in predicting consumer intentions (Fishbein & Ajzen, 2011). Attitude towards advertising is the inclination to respond favorably or unfavorably (Luna-Nevarez & Torres, 2015). It is influenced by perceived value, and negative attitudes perceive advertising as intrusive and irritating (Ducoffe, 1996; Edwards et al., 2013). Therefore, the following hypothesis is proposed:

*Hypothesis 13. The MAV of DFFs has a positive influence on attitudes toward DFFs.*

Our conceptual model in Figure 1 takes a comprehensive approach by incorporating various well-established theoretical models, such as the Value-Attitude-Behavior (VAB) model, the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM), and the Media Advertising Value (MAV) theory. Additionally, it presents our estimated hypotheses.



**Figure 1** Conceptual model and hypothesis

## **2.2 Research design**

The research topic, which analysis of factors influencing consumer attitudes and online purchasing in the hungarian dairy functional food market, is relatively new and has not been extensively studied. To address this gap, we used a mix-method research process that combined both inductive and deductive approaches. This allowed us to develop new insights into this emerging area, while also evaluating our hypotheses. As part of our research process, we reviewed preliminary studies to gain a broader understanding of the research landscape. However, we want to emphasize that our focus remains on the primary studies, and we have not analyzed the preliminary studies in detail. This is due to the scope of our thesis, which is limited to analysis factors influencing consumer attitudes and online purchasing in the hungarian dairy functional food market.

### **2.2.1 Systematic literature review**

A systematic literature review has two main goals. First, it provides a comprehensive overview of research on a specific topic, including both published and unpublished studies, ensuring rigor and inclusiveness. Second, a systematic literature review was employed to analyze the factors influencing consumer attitudes and online purchasing behavior in the Hungarian dairy functional food market. By selecting and examining relevant studies, this research aims to uncover how various factors, such as marketing strategies and consumer health awareness, impact buying decisions. The objective is to gain a deeper understanding of these dynamics to provide insights that can support both academic discussions and practical marketing strategies, ultimately promoting the consumption of dairy functional foods in Hungary. This approach is designed to highlight key drivers and trends, offering a foundation for future research and marketing efforts in this domain.

## **2.2.2 Main study**

### **2.2.2.1 Quantitative research and data collection**

To gather primary data for testing the research model, an online survey was conducted using Google Forms. The survey questionnaire consisted of 38 items, which were selected based on an extensive review of the literature. The questionnaire was translated into Hungarian to ensure it could be answered by Hungarian individuals. A brief definition and photos of dairy functional foods were provided to avoid any misunderstandings. The online survey allowed for a larger reach and lower effort compared to personal or telephone surveys, ensuring participant anonymity. A five-point Likert response format was used for most constructs, with respondents rating their agreement or willingness on a scale of 1 to 5. The survey was available on various devices, and participants could complete it in an average of 8 minutes. It was shared through social media platforms, and 313 valid questionnaires were collected from the Hungarian population within 40 days.

#### **2.2.2.2 Demographic Data**

The total sample size was 313 individuals which don't consider representative of the Hungarian population. According to gender, 58.8% of the respondents were female, and 41.2% were male. And according to age, 51.1% of the respondents were between the ages of 18 and 25, while 21.7% were between 26 and 30, and 14.1% were between 31 and 40. The percentages decrease for older age groups. However, education level was 53.0% of the respondents had completed college or university, while 38.0% had completed vocational high school or gymnasium. Only 0.6% had a maximum education level of 8 in general. Furthermore, perceived income was 56.9% of the respondents reported that they have enough income to live on and save, while 22.4% reported that they make a very good living and can save. Only 1.0% reported



having regular livelihood problems. However, the location of the respondent was 49.5% of the respondents lived in a city, 29.4% lived in the capital, and 21.1% lived in a village as shown in Table 1.

**Table 1** Socio-demographic characteristics of the sample.

<b>Gender</b>	<b>%</b>	<b>Total 313</b>
Female	58.8	184
Male	41.2	129
<b>Age</b>	<b>%</b>	<b>Total 313</b>
18-25	51.1	160
26-30	21.7	68
31-40	14.1	44
41-50	8.3	26
>51	4.8	15
<b>Education level</b>	<b>%</b>	<b>Total 313</b>
Maximum 8 in general	0.6	2
Vocational school/apprenticeship	1.3	4
Vocational High School/Gymnasium	38.0	119
College/University	53.0	166
PhD degree	7.0	22
<b>How do you perceive your relative income</b>	<b>%</b>	<b>Total 313</b>
We have regular livelihood problems	1.0	3
Sometimes it's not even enough to make a living	1.6	5
Just enough to live on, but we can no longer save	18.2	57
Enough to live, and we save from it	56.9	178
We make a very good living and we can save it	22.4	70
<b>Where do you live?</b>	<b>%</b>	<b>Total 313</b>
Village	21.1	66
City	49.5	155
Capital	29.4	92

### 2.2.2.3 Partial least squares PLS-SEM

SmartPLS version 4, a partial least squares (PLS) and structural equation modeling (SEM) method, was used to investigate the theoretical framework (Ringle et al., 2015). SEM allows for the analysis of both the structural and measurement components of a model, while PLS is useful for non-normal distributions and when dealing with an extension of an existing theory (Hair et al., 2011, 2021). The models considered were the measurement model to evaluate the manifest indicators and the structural model to explain the variance of dependent variables (Hair et al., 2021). Reflective structures were

created based on theoretical principles, as changes in constructs influence the underlying measures without impacting content validity (Hair et al., 2021; Boßow-Thies & Panten, 2009).

#### **2.2.2.4 Evaluation measurement model**

The measurement model uses reflective indicators, where changes in constructs affect all assigned indicators, resulting in expected correlations (Huber et al., 2011). The PLS algorithm involves two steps: estimating construct scores iteratively and determining path coefficients, weights, and loadings using least squares estimations (Hair et al., 2021). Quality assessment of the PLS model consists of evaluating unidimensionality, reliability, and validity of the measurement models. Reflective constructs are assessed for internal consistency reliability, convergence validity, and discriminant validity (Boßow-Thies & Panten, 2009).

#### **2.2.2.5 Evaluation reflective constructs**

##### **Cronbach's Alpha and Composite Reliability (CR)**

To assess internal consistency reliability, two measures were used: Cronbach's alpha and Composite Reliability (CR). Cronbach's alpha measures the proportion of variance in a scale attributed to the common construct, assuming identical loadings for indicators. On the other hand, Composite Reliability allows for distinct loadings, yielding a more precise result (Cronbach, 1951; Jöreskog, 1971). Both measures have comparable thresholds, with a value of 0.7 or above considered acceptable (Burt, 1954). Values exceeding 0.9, especially 0.95, suggest redundant indicators (Hair et al., 2019).

##### **Convergence validity**

Convergence validity is a measure used to evaluate the correlation between different measurements of the same construct. To assess convergence validity,

the amount of loading and "average variance extracted" (AVE) are used. A factor loading of at least 0.7, which explains at least 50% of the variance of an indicator, is recommended (Birkinshaw et al., 1995). If other quality criteria are met, loadings of 0.4 or more can be acceptable. Additionally, the p-values of the indicators are assessed using bootstrap analysis (Hair et al., 2021). At the construct level, AVE is calculated based on the mean of the squared loadings of all indicators assigned to the construct. A value of 0.5 suggests that, on average, half of the variance of the indicators can be explained by the construct. This method was first proposed by (Fornell & Larcker, 1981).

### **Discriminant validity**

Discriminant validity is assessed through cross-loadings, the Fornell-Lacker criterion, and the heterotrait-monotrait (HTMT) correlation ratio (Birkinshaw et al., 1995; Fornell & Larcker, 1981; Hair et al., 2021; Henseler et al., 2015). Cross-loadings compare indicator charges on the assigned construct with those on other constructs. The Fornell-Larcker criterion compares the construct's square root of average variance extracted (AVE) with its correlation with other constructs. The HTMT ratio compares indicator correlations between constructs with the average correlations within a construct. Thresholds of 0.9 or 0.85 are used for conceptually similar or dissimilar constructs, and bootstrap can confirm significant differences (Hair et al., 2021).

#### **2.2.2.6 Evaluation structural model**

Model fit is assessed using various fit indices, including the Standardized Root Mean Square Residual (SRMR), with an SRMR below 0.08 considered good (Hu & Bentler, 1998). Path coefficients are evaluated, and significance is determined through a bootstrap procedure. Mediation effects can be examined by calculating indirect and total effects (Matthews et al., 2018). The  $R^2$  of endogenous constructs indicates explanatory power, with values of 0.67, 0.33,

and 0.19 considered substantial, moderate, and weak, respectively (Chin, 1998). The corrected coefficient of determination,  $R^2_{adj}$ , is recommended for model comparison (Hair et al., 2021). Effect sizes ( $f^2$ ) of exogenous constructs denote their influence, categorized as small, medium, or large (Chin, 1998). Predictive relevance of reflective endogenous constructs can be assessed using the Stone-Geisser criterion ( $Q^2$ ), with values above 0, 0.25, or 0.5 indicating small, medium, or high relevance, respectively (Geisser, 1974). PLS analyses employ cross-validation (k-fold) to estimate model accuracy, and  $Q^2_{predict}$  values above zero indicate superior performance (Shmueli et al., 2016). RMSE values from PLS analysis should be compared to errors from linear regressions for assessment (Danks & Ray, 2018; Hair et al., 2021).

### **3 RESULTS AND EVALUATION**

#### **3.1 Evaluation of the measurement model**

The study employed a measurement model to assess the items' reflection of hypothetical constructs. It evaluated 12 reflective constructs for internal consistency reliability, convergence validity, and discriminant validity. To ensure stability and account for significance, bootstrapping with 5,000 subsamples was used. The BCa bootstrap method corrected bias and skewness, providing precise intervals. A two-sided significance test at a 0.05 level determined statistical significance (Efron, 1987).

The first step in assessing the quality of reflective constructs is to examine content validity. This is done to guarantee that significant support is provided for the reliability of the reflective measurements. This was based on the level of the loadings of the individual items. The loading needed to be greater than 0.7. Thus, we had to delete items that showed very low loading values which are (Probiotic yogurts and I am unable to afford healthy foods). In addition, we had 3 items that showed values slightly under 0.7 which are (Lactose-free dairy

products, Low-fat dairy products, and I have too many other things to do) with the value of (0.64, 0.68, and 0.67) respectively. However, in order to assess whether the removal of each item resulted in an increase in the reliability of internal consistency and convergent validity, individual testing of the items was performed (Hair et al., 2021). However, no significant improvement was observed in either of the aforementioned criteria. Consequently, all items were retained in the final model.

In accordance with the guidelines provided by Hair et al. (2021), internal consistency reliability was assessed using both Cronbach's  $\alpha$  coefficient ( $>0.7$ ) and the composite reliability (CR) value ( $>0.6$ ). All values surpassed the minimum thresholds, thereby ensuring the internal consistency of the constructs. The values of Cronbach's  $\alpha$  ranged from 0.81 to 0.91, while the values of the composite reliability ranged from 0.80 to 0.95. Furthermore, convergent validity was examined using the average variance extracted (AVE) ( $>0.5$ ). The AVE values, as presented in Table 2, were also satisfactory, ranging from 0.67 to 0.87.

**Table 2** Constructs, items, factor loading, reliability, and validity.

Factor Loadings		Sources of Adoption
Attitude toward DFFs: $\alpha$ : 0.88, AVE: 0.68, CR: 0.88		
ATT1: DFFs help to improve my mood	0.78	(Urala & Lahteenmaki, 2007)
ATT2: My performance improves when I eat DFFs	0.86	
ATT3: I can prevent disease by eating DFFs regularly	0.85	
ATT4: DFFs can repair the damage caused by an unhealthy diet	0.80	
ATT5: DFFs promote my well-being	0.83	
Willingness to consume DFFs: $\alpha$ : 0.86, AVE: 0.65, CR: 0.86		
WCF1: Lactose free dairy products	0.64	(Urala & Lahteenmaki, 2007)
WCF2: Low-fat dairy products	0.68	
WCF3: Probiotic yogurts	*	
WCF4: Milk fortified with calcium	0.90	
WCF5: Enriched Milk with Omega3 EPA & DHA	0.90	
WCF6: Milk fortified with folic acid	0.88	
Motivators: $\alpha$ : 0.83, AVE: 0.67, CR: 0.82		
MOT1: I may live longer	0.80	(Downes, 2008)
MOT2: I want to be healthy	0.87	
MOT3: I want to manage my weight	0.83	
Barriers: $\alpha$ : 0.81, AVE: 0.68, CR: 0.80		
BAR1: I am not motivated	0.97	(Downes, 2008)
BAR2: I do not have someone to encourage or help me	0.80	
BAR3: I have too many other things to do	0.67	
Consumer Purchase Behavior Intention: $\alpha$ : 0.88, AVE: 0.81, CR: 0.93		
INT1: I intend to use DFFs online shop when the service becomes widely available.	0.87	(Davis, 1989)
INT2: I intend to use DFFs online shop when there is free home delivery.	0.91	
INT3: I intend to use DFFs online shop when the price is competitive.	0.92	
Perceived usefulness: $\alpha$ : 0.91, AVE: 0.77, CR: 0.95		
PU1: Using DFFs online shop can save me a lot of time.	0.80	(Davis, 1989)
PU2: Using food online shopping can make my DFFs shopping easier.	0.87	
PU3: Using Online food Shopping is convenient for my DFFs shopping.	0.83	
Perceived ease of use: $\alpha$ : 0.85, AVE: 0.85, CR: 0.91		
PEOU1: Online DFFs Shopping is/might be easy to use.	0.84	(Davis, 1989)
PEOU2: It is/might be easy for me to follow the procedures when ordering DFFs online.	0.93	
PEOU3: My interaction with the processes of online DFFs is/might be clear and understandable.	0.87	
Continued on the next page		

Table 2 Continued from the previous page		
MAV1: Advertisements of dairy functional foods are useful	0.937	(Dao et al., 2015; Ducoffe, 1996)
MAV2: Advertisements of dairy functional foods are important	0.933	
Informativeness: $\alpha$ : 0.83, AVE: 0.75, CR: 0.90		
INF1: Advertising makes product of dairy functional foods information immediately accessible	0.915	(Dao et al., 2015; Ducoffe, 1996)
INF2: Advertising is a convenient source of dairy functional foods product information	0.928	
INF3: Ad informs me of the latest products and information of dairy functional foods available on the market.	0.744	
Entertainment: $\alpha$ : 0.70, AVE: 0.77, CR: 0.87		
ENT1: Advertising usually makes people laugh and has great amusement value	0.882	(Dao et al., 2015)
ENT2: Advertising tells me what people who share my lifestyle will buy and use	0.869	
Credibility: $\alpha$ : 0.81, AVE: 0.84, CR: 0.91		
CRE1: Advertisements of dairy functional foods are credible	0.922	(Dao et al., 2015)
CRE2: Advertising of dairy functional foods is convincing	0.913	
Irritation: $\alpha$ : 0.87, AVE: 0.79, CR: 0.92		
IRR1: Advertising of dairy functional foods is irritating	0.894	(Ducoffe, 1996)
IRR2: Advertising of dairy functional foods is deceptive	0.854	
IRR3: Advertising of dairy functional foods is annoying	0.923	
$\alpha$ : Cronbach's alpha, AVE: Average variance extracted, CR: Composite reliability		

## Discriminant validity

To assess discriminant validity, the cross-loadings, Fornell-Lacker criterion, and HTMT correlation ratio were employed. The cross-loadings indicated that the items were more correlated with their assigned constructs than with other latent constructs. Table 3 shows that the correlations between the latent variables were smaller than the root of the AVE.

**Table 3** Fornell-Larcker criterion

	ATT	BAR	CRE	ENT	INF	INT	IRR	MAV	MOT	PEOU	PU	WCF
ATT	0.824											
BAR	-0.172	0.825										
CRE	0.505	0.022	0.918									
ENT	0.238	0.154	0.434	0.875								
INF	0.455	0.031	0.625	0.391	0.866							
INT	0.519	-0.064	0.420	0.266	0.415	0.899						
IRR	-0.375	0.187	-0.518	-0.208	-0.313	-0.212	0.891					
MAV	0.628	-0.070	0.658	0.263	0.535	0.514	-0.513	0.935				
MOT	0.500	-0.107	0.351	0.125	0.300	0.385	-0.182	0.464	0.849			
PEOU	0.322	-0.212	0.279	0.077	0.255	0.302	-0.227	0.297	0.300	0.878		
PU	0.460	-0.083	0.252	0.118	0.315	0.608	-0.131	0.388	0.307	0.524	0.925	
WCF	0.531	-0.111	0.302	0.147	0.293	0.391	-0.208	0.340	0.260	0.255	0.372	0.807



As can be seen in Table 4, the HTMT thresholds did not exceed 0.85 due to the conceptually different constructs. Thus, all the constructs met the requirements of discriminant validity (Hair et al., 2021).

**Table 4** Heterotrait-monotrait ratio

	ATT	BAR	CRE	ENT	INF	INT	IRR	MAV	MOT	PEOU	PU	WCF
ATT												
BAR	0.159											
CRE	0.597	0.060										
ENT	0.309	0.228	0.578									
INF	0.519	0.049	0.754	0.499								
INT	0.588	0.068	0.498	0.341	0.476							
IRR	0.429	0.211	0.615	0.265	0.356	0.243						
MAV	0.721	0.083	0.788	0.340	0.614	0.593	0.594					
MOT	0.585	0.169	0.434	0.177	0.366	0.455	0.211	0.553				
PEOU	0.366	0.231	0.337	0.110	0.309	0.345	0.262	0.344	0.357			
PU	0.509	0.115	0.292	0.146	0.368	0.674	0.150	0.437	0.354	0.586		
WCF	0.610	0.093	0.362	0.189	0.332	0.448	0.246	0.394	0.303	0.294	0.421	

Thus, all the reflective constructs met the quality criteria and were sufficiently valid and reliable.

### 3.2 Evaluation of the structure model

In scientific research, path coefficients are used to quantify the relationship between two variables in a statistical model. The bootstrapping procedure is a method used to estimate the accuracy of a statistical measure by resampling data from the original sample. A significance test is performed to determine whether the relationship between two variables is statistically significant or not. A significance level of 5% is commonly used, indicating that the probability of the results occurring by chance is less than 5% (Sellin & Keeves, 1994). The researchers found that certain path coefficients were not significant, while others were significant but had a low influence. The path coefficients of BAR -> WCF, ENT -> MAV, and MOT -> WCF were not significant, with values of -0.020, -0.055, and -0.008, respectively. However, the path coefficient of BAR -> ATT, with a value of -0.110, was significant, although its influence was very low, less than 0.1. The results can be found in Table 5.

**Table 5** Path coefficients and significances

	Path coefficients	Standard deviation	T statistics	P values
ATT -> INT	0.303	0.048	6.271	0.000
ATT -> WCF	0.532	0.055	9.700	0.000
BAR -> ATT	-0.110	0.048	2.293	0.022
BAR -> WCF	-0.020	0.056	0.356	0.722
CRE -> MAV	0.422	0.060	7.025	0.000
ENT -> MAV	-0.055	0.040	1.367	0.172
INF -> MAV	0.219	0.056	3.894	0.000
IRR -> MAV	-0.237	0.051	4.694	0.000
MAV -> ATT	0.501	0.049	10.290	0.000
MOT -> ATT	0.256	0.053	4.859	0.000
MOT -> WCF	-0.008	0.060	0.141	0.888
PEOU -> PU	0.524	0.047	11.206	0.000
PU -> INT	0.468	0.054	8.613	0.000

In social science research, it is not uncommon for exogenous constructs to affect endogenous constructs via more than one mediator variable. As such, a multiple mediation analysis of the structural model was carried out to account

for these indirect paths. This approach was recommended by Hair et al. (2021) and aimed to evaluate both the indirect and total effects of the exogenous constructs on the endogenous constructs. By identifying and quantifying these effects, the study gained a more comprehensive understanding of the relationships between the variables in the model. This information can inform theoretical frameworks and contribute to the development of practical interventions that target the specific mediator variables through which exogenous constructs influence endogenous constructs. Table 6 shows the results of the path analysis conducted in this study. Among the various paths examined, the paths from ENT → MAV → ATT → INT, ENT → MAV → ATT, and ENT → MAV → ATT → WCF were found to be non-significant. However, the other paths demonstrated significant path coefficients with varying degrees of influence. Specifically, the path coefficients of CRE → MAV → ATT, MAV → ATT → WCF, and PEOU → PU → INT were above 0.2, indicating that MAV, ATT, and INT act as mediators in their respective relationships. These findings suggest that these variables play an important role in influencing users' intentions to adopt the technology in question. The table presenting path coefficients reveals that the relationship between BAR and WCF, as well as between MOT and WCF, did not exhibit statistical significance. However, the analysis of the indirect effects, specifically the paths BAR → ATT → WCF and MOT → ATT → WCF, displayed significant path coefficients with minimal influences of -0.058 and 0.136, respectively. Therefore, the findings suggest that there is evidence of purely indirect mediation, aligning with previous research (Matthews et al., 2018). The results of the path coefficients table reveal significant path coefficients for all the other factors of direct relationships, while the table of indirect effects displays significant path coefficients of the indirect relationships. Therefore, partial mediation by indirect relations was observed for all the factors. Therefore, path

coefficients for each factor were less than 0.1, indicating a low level of mediation.

**Table 6** Specific indirect effects

	Path coefficient	Sample mean	Standard deviation	T statistics	P values
ENT -> MAV -> ATT -> INT	-0.008	-0.008	0.006	1.299	0.194
IRR -> MAV -> ATT -> INT	-0.036	-0.036	0.011	3.322	0.001
CRE -> MAV -> ATT	0.212	0.210	0.037	5.672	0.000
BAR -> ATT -> INT	-0.033	-0.034	0.015	2.191	0.029
INF -> MAV -> ATT	0.110	0.110	0.029	3.749	0.000
INF -> MAV -> ATT -> WCF	0.058	0.059	0.017	3.421	0.001
MAV -> ATT -> WCF	0.267	0.265	0.040	6.670	0.000
MAV -> ATT -> INT	0.152	0.153	0.030	5.003	0.000
PEOU -> PU -> INT	0.245	0.245	0.035	6.962	0.000
INF -> MAV -> ATT -> INT	0.033	0.033	0.010	3.297	0.001
BAR -> ATT -> WCF	-0.058	-0.059	0.026	2.270	0.023
CRE -> MAV -> ATT -> INT	0.064	0.064	0.017	3.777	0.000
CRE -> MAV -> ATT -> WCF	0.113	0.111	0.023	4.816	0.000
ENT -> MAV -> ATT	-0.027	-0.027	0.020	1.368	0.171
MOT -> ATT -> WCF	0.136	0.136	0.031	4.340	0.000
ENT -> MAV -> ATT -> WCF	-0.015	-0.014	0.011	1.324	0.185
IRR -> MAV -> ATT -> WCF	-0.063	-0.063	0.018	3.600	0.000
IRR -> MAV -> ATT	-0.119	-0.119	0.029	4.138	0.000
MOT -> ATT -> INT	0.078	0.078	0.021	3.733	0.000

Once the relationships within the structural model were assessed, the explanatory power of the model was examined through the assessment of the coefficient of determination  $R^2$  of the endogenous constructs. This was done by referring to Table 7. The results indicated that WCF and PU had weak  $R^2$  values of 0.282 and 0.274, respectively. On the other hand, ATT, INT, and MAV had moderate  $R^2$  values of 0.462, 0.442, and 0.502, respectively. The  $R^2_{adj}$  value further supported these findings. These results demonstrate that the model provides an adequate explanation of the variance in the endogenous constructs, albeit with varying degrees of accuracy.

**Table 7** Coefficient of determination ( $R^2$ )

	<b>R-square</b>	<b>R-square adjusted</b>
ATT	0.462	0.456
INT	0.442	0.439
MAV	0.502	0.495
PU	0.274	0.272
WCF	0.282	0.275

Furthermore, the impact of exogenous constructs on endogenous constructs was evaluated by computing the effect sizes ( $f^2$ ) and the results are presented in Table 8. BAR->WCF, ENT->MAV, and MOT->WCF, were found to have no relevant effect. However, BAR->ATT, INF->MAV, IRR->MAV, ATT->INT, and MOT->ATT had a small effect. Moreover, CRE->MAV, ATT->WCF, and PU->INT showed a moderate effect. Conversely, MAV->ATT and PEOU->PU had a large effect.

**Table 8** Effect size ( $f^2$ )

	<b>ATT</b>	<b>INT</b>	<b>MAV</b>	<b>PU</b>	<b>WCF</b>
ATT		0.130			0.289
BAR	0.022				0.001
CRE			0.166		
ENT			0.005		
INF			0.057		
INT					
IRR			0.083		
MAV	0.366				
MOT	0.095				0.000
PEOU				0.378	
PU		0.310			

To further evaluate the predictive performance of their model, the researchers calculated the predictive relevance  $Q^2$  for each endogenous construct.  $Q^2$  values provide information about the predictive power of each variable in the model, with higher values indicating better predictive performance. As shown in Table 9, the results indicated that all of the endogenous constructs had a predictive relevance. The size of the predictive relevance was evaluated as small to medium, indicating that the constructs had some level of predictive

power but may benefit from further refinement. The  $Q^2$  values are a crucial measure in structural equation modeling and indicate the proportion of the variation in the endogenous variable that is accounted for by the model. Therefore, the results of this analysis suggest that the model had some degree of predictive power for each endogenous construct.

**Table 9** Prediction relevance ( $Q^2$ )

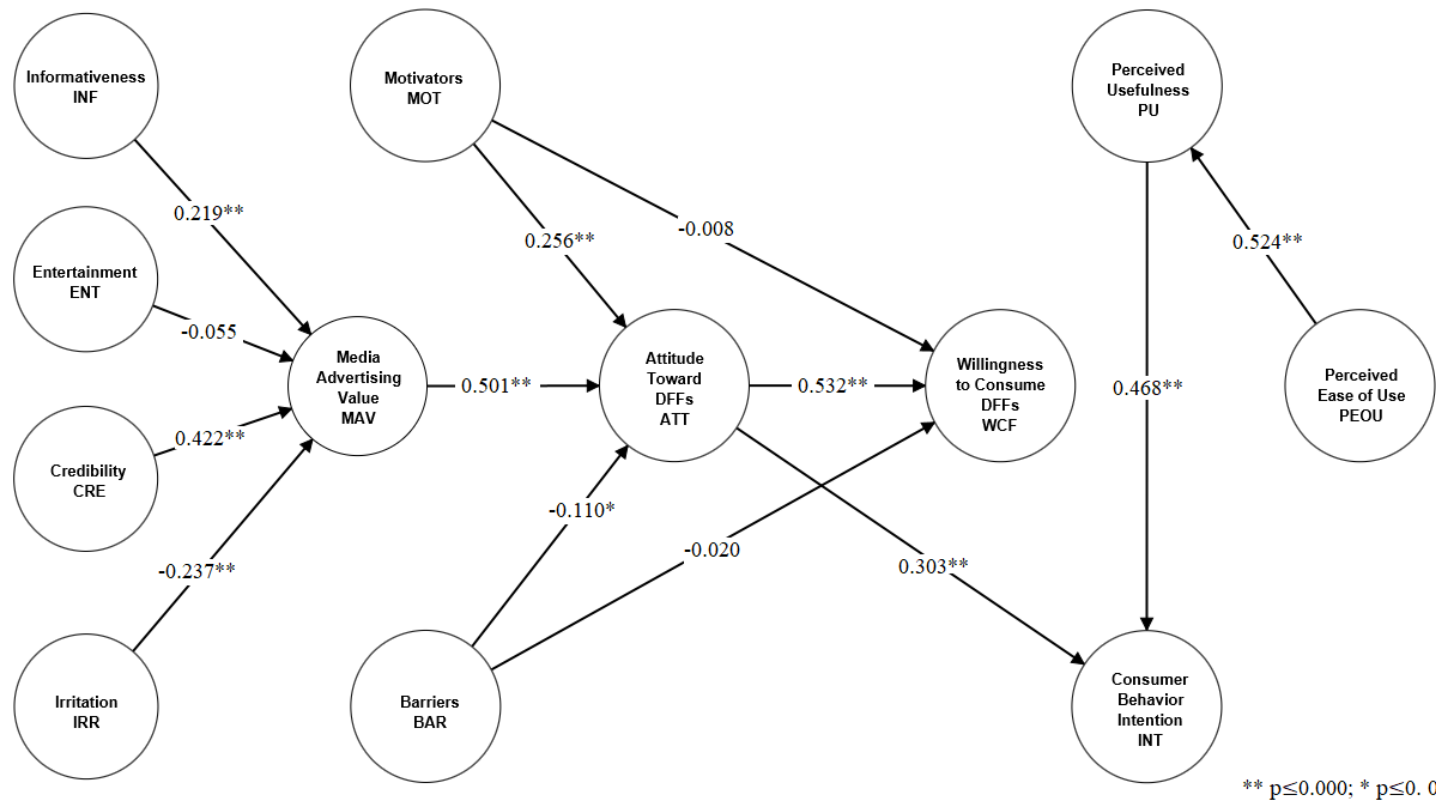
	SSO	SSE	$Q^2 (=1-SSE/SSO)$
ATT	1565.000	1084.144	0.307
INT	939.000	606.390	0.354
MAV	626.000	355.194	0.433
PU	939.000	726.134	0.227
WCF	1565.000	1284.615	0.179

The researchers assessed the predictive performance of their model using the PLSpredict procedure. Cross-validation was conducted with three subgroups repeated 10 times, and  $Q^2$  predict values were analyzed. All values were greater than zero, indicating superior predictive performance compared to a naive benchmark. Table 10 presents the detailed breakdown of  $Q^2$  predict values for each variable. RMSE values from the PLS-SEM were compared to those from the LM, with the majority of PLS-SEM values being lower. This suggests an intermediate level of predictive power for the model. Overall, the PLS-SEM model demonstrated good predictive performance, accurately predicting outcomes for new data points. While further refinement is beneficial, it provides a strong foundation for future research in this area (Hair et al., 2021).

**Table 10** Out-of-sample predictive power

	<b>Q<sup>2</sup> predict</b>	<b>PLS- SEM_RMSE</b>	<b>LM_RMSE</b>
ATT	0.391		
ATT1	0.195	1.129	1.183
ATT2	0.231	1.107	1.165
ATT3	0.318	1.090	1.119
ATT4	0.298	1.079	1.110
ATT5	0.286	1.084	1.094
INT	0.181		
INT1	0.172	1.334	1.325
INT2	0.134	1.401	1.407
INT3	0.132	1.360	1.361
MAV	0.488		
MAV1	0.460	0.800	0.814
MAV2	0.390	0.906	0.885
PU	0.266		
PU1	0.271	1.105	1.059
PU3	0.220	1.106	1.105
PUS2	0.189	1.121	1.113
WCF	0.111		
WCF1	0.037	1.508	1.564
WCF2	0.070	1.284	1.310
WCF4	0.093	1.351	1.385
WCF5	0.075	1.388	1.421
WCF6	0.078	1.372	1.401

A test of the theoretical framework's goodness of fit revealed the following findings, which are within acceptable bounds. The discrepancy between the measured and the expected correlation is known as the standardized root mean square residual (SRMR). In PLS-SEM analysis, the SRMR has been employed to evaluate the model fit (Henseler, 2018). It is thought that a score less than 0.10 (or 0.08 in a more conservative form) indicates a satisfactory match for the data (Hu & Bentler, 1998). The SRMR for this model is 0.053, which indicates that a well-fit model.



**Figure 2** Results of the structural model, path coefficients, and significances of the model



According to the results of Figure 2, we found that informativeness has a direct influence on media advertising value of  $\beta = 0.219$ ,  $p \leq 0.000$ ,  $f^2 = 0.057$ . These results support our H9 hypothesis. However, informativeness showed an indirect influence on attitude toward DFFs of  $\beta = 0.110$  and  $p \leq 0.000$ , and on willingness to consume DFFs of  $\beta = 0.058$  and  $p \leq 0.001$ , and on consumer behavior intention with  $\beta = 0.033$  and  $p \leq 0.001$ . However, entertainment didn't show any influence on media advertising value of ( $\beta = -0.055$ ,  $p \leq 0.172$ ,  $f^2 = 0.005$ ). That's why we had to reject the H10 hypothesis. Furthermore, entertainment didn't show any indirect influence on any other constructs. In addition, the result of credibility showed different results. It showed that credibility has an influence on media advertising value of  $\beta = 0.422$ ,  $p \leq 0.000$ ,  $f^2 = 0.166$ . That's why the H11 hypothesis is accepted. Furthermore, the credibility showed an indirect influence on the attitude toward DFFs of  $\beta = 0.212$  and  $p \leq 0.000$  due to the interference of media advertising value as a mediator. And also, credibility showed an indirect influence on the willingness to consume DFFs and consumer behavior intention due to the interference of media advertising value and attitude toward DFFs as mediators of  $\beta = 0.113$ ,  $p \leq 0.000$  and  $\beta = 0.064$  and  $p \leq 0.000$  respectively. Besides that, irritation had a different influence than other constructs. Irritation had a negative influence on media advertising value of  $\beta = -0.237$  and  $p \leq 0.000$ ,  $f^2 = 0.083$ . that's why our H12 hypothesis is accepted. Furthermore, Irritation showed a negative indirect effect also on attitude toward DFFs of  $\beta = -0.119$  and  $p \leq 0.000$  due to the mediator effect of media advertising value. Additionally, irritation also showed an indirect negative effect on willingness to consume DFFs and consumer behavior intention of  $\beta = -0.063$  and  $p \leq 0.000$  and  $\beta = -0.036$  and  $p \leq 0.001$  respectively. However, the construct of media advertising value showed a higher influence on attitude toward DFFs of  $\beta = 0.501$ ,  $p \leq 0.000$ ,  $f^2 = 0.366$ . Therefore, the H13 hypothesis is accepted. In the same vein, media

advertising value showed an indirect influence on the willingness to consume DFFs and consumer behavior intuition or  $\beta = 0.267$  and  $p \leq 0.000$  and  $\beta = 0.152$  and  $p \leq 0.000$  respectively.

The construct of motivators showed influence on attitude toward DFFs of  $\beta = 0.256$ ,  $p \leq 0.000$ ,  $f^2 = 0.095$ . That's why the H5 hypothesis was accepted. However, motivators didn't show a direct influence on the willingness to consume DFFs of  $\beta = -0.008$ ,  $p \leq 0.888$ , and  $f^2 = 0.000$ . Therefore, we had to reject the H7 hypothesis. In another hand, motivators showed an indirect influence on willingness to consume DFFs throughout the interference of the attitude towards DFFs of  $\beta = 0.136$  and  $p \leq 0.000$ . Furthermore, motivators also showed influence on consumer behavior intention due to the mediator factor of attitude towards DFFs of  $\beta = 0.078$  and  $p \leq 0.000$ . However, barriers showed a negative influence on attitude towards DFFs of  $\beta = -0.237$  and  $p \leq 0.000$ ,  $f^2 = 0.083$ . That's why the H6 hypothesis was accepted. In another hand, Barriers didn't show direct influence on the willingness to consume DFFs. Thus, the H8 hypothesis is rejected. In contradictory, barriers showed a negative indirect influence on the willingness to consume DFFs and on the consumer behavior intention of  $\beta = -0.058$  and  $p \leq 0.023$  and  $\beta = -0.033$  and  $p \leq 0.029$  respectively, due to the role of attitude towards DFFs as mediator. However, attitude towards DFFs had the main player in the model and showed the highest path coefficient influence on the willingness to consume DFFs of  $\beta = 0.532$ ,  $p \leq 0.000$ ,  $f^2 = 0.289$ . That's why, we had to accept the H4 hypothesis. Furthermore, attitude towards DFFs also showed influence on the consumer behavior intention of  $\beta = 0.303$ ,  $p \leq 0.000$ ,  $f^2 = 0.130$ . In the same manner, we had to accept the H3 hypothesis.

Perceived ease of use showed the second highest path coefficient influence in the mode on the perceived usefulness of  $\beta = 0.524$  and  $p \leq 0.000$ ,  $f^2 = 0.378$ . Thus, we had to accept the H1 hypothesis. Furthermore, perceived ease of use

showed an indirect influence on consumer behavior intuition of  $\beta = 0.248$  and  $p \leq 0.000$  due to the mediation role of perceived usefulness. Lastly, the results showed that perceived usefulness had an influence on consumer behavior intention of  $\beta = 0.468$  and  $p \leq 0.000$ ,  $f^2 = 0.310$ . That's why we had to accept the H2 hypothesis.

To further evaluate the predictive performance of their model, the researchers calculated the  $Q^2$  values for each endogenous construct. These values indicate the proportion of the variation in the endogenous variable that can be explained by the model, with higher values indicating better predictive power. The results of this analysis, as presented in the text, showed that all of the endogenous constructs had  $Q^2$  values greater than zero. This indicates that the model had some level of predictive power for each construct. The  $Q^2$  values for the constructs of attitude towards DFFs, consumer behavior intention, media advertising value, perceived usefulness, and willingness to consume DFFs were 0.307, 0.354, 0.433, 0.227, and 0.179 respectively. These values indicate a small to medium level of predictive power for each construct. Overall, these findings suggest that the model was able to capture some of the variations in the endogenous constructs and had some degree of predictive power. However, it is worth noting that the predictive power of the model may still benefit from further refinement or additional data. Nonetheless, these results provide a valuable starting point for future research and highlight the potential of the model to make accurate predictions about consumer behavior towards DFFs.

#### **4 CONCLUSIONS AND RECOMMENDATIONS**

Our research aims to explore the factors influencing consumer attitudes and online purchasing in the Hungarian dairy functional food market. Findings align with previous studies on media advertising, indicating that credibility significantly influences the advertising value, followed by informativeness

(Bennett et al., 2006; Cuesta-Valiño et al., 2020). Credibility shows the strongest effect on advertising value, while both credibility and informativeness indirectly affect attitudes toward DFFs, willingness to consume DFFs, and TAM constructs. Additionally, entertainment did not influence the Media Advertising Value (MAV) in this study, while irritation had a negative effect on MAV and the overall model. The nature of the healthy products examined may explain this finding, as consumers prioritize credibility and informativeness over entertainment value when considering their health. Rational factors, such as the amount of information and credibility, play a significant role in the influence of advertisements promoting healthy products. Highlighting the benefits of these foods and comparing them to other options further strengthens their perceived value (Saxena & Khanna, 2013).

The results of the study show that media advertising value has the strongest rank compared with other constructs in the model ( $R^2$  value = 0.502) which concedes moderate (Chin, 1998). Furthermore, MAV has a strong relationship with attitude toward DFFs, with a high coefficient. This suggests that the perceived value of advertising ultimately plays a greater role in the formation of attitudes to advertising in media. Furthermore, the study found that perceived levels of informativeness and credibility, which are antecedents to MAV, can predict, to some extent, the consumer's attitude toward DFFs. Consumers who perceive DFF advertising to be informative and credible are more likely to have a positive attitude toward such advertising. These findings highlight the importance of creating advertising that is perceived as informative and credible by consumers. Advertisers who can effectively communicate the benefits and features of their products in a transparent and honest way are more likely to gain consumers' trust and influence their attitudes toward DFF advertising. Moreover, the results of the study suggest that MAV can be an effective tool for measuring the effectiveness of DFF

advertising. By assessing the perceived value of advertising, advertisers can gauge the effectiveness of their campaigns and identify areas for improvement.

Furthermore, the attitude toward DFFs was influenced by 2 direct constructs of healthy behavior which are considered subjective norms and perceived control namely motivators and barriers to consuming dairy functional foods. Former studies included in their findings the role of motivators and barriers to the use of functional food on attitude and health purchasing behavior (Downes, 2008; Küster-Boluda & Vidal-Capilla, 2017; Papp-Bata & Szakály, 2020). But they couldn't identify the direct and indirect effects of motivators and barriers on attitude and willingness to consume functional food. Our findings revealed that, motivators showed a higher positive impact on attitude toward DFFs with a coefficient of 0.256 compared to barriers which showed a negative impact on attitude toward DFFs with a coefficient of -0.110. The explanation for that, the personal factors as motivators which are identified from an individual perspective such as seeking to live longer, controlling body weight, maintaining a healthy lifestyle, and the fear of sickness because of unhealthy behavior showed a higher impact on attitude rather than the barriers such as not being motivated, not finding the engorging to use healthy food and also because of not having enough time to care about their healthy food which showed a significant negative impact on attitude. This might be because the primary motivating factor for the consumption of functional foods is their potential to promote health, and consumers increasingly preferred natural products and prefer to have a healthy style. This is in line with the finding of Rozin et al. (2004) pointing out that, preference for natural products is often strongly correlated with the perceived health benefits of these products. This suggests that consumers may be more likely to choose natural products when they believe that they will have positive effects on their health and well-being (Chen, 2011b; Papp-Bata & Szakály, 2020).

Willingness to consume DFFs was influenced directly by the attitude with the highest coefficient of 0.532, and this corresponds with the theory of value-attitude-behavior (VAB) and the theory of planned behavior (TPB). However, the  $R^2$  of willingness to consume DFFs showed a weak value ( $R^2 = 0.289$ ). This result indicates that the constructs associated with the independent variables in the models only account for a small fraction of the variation in the dependent variables. This suggests that there may be other factors that play a role in determining the willingness of consumers to purchase DFFs, beyond those included in the current models. Future research efforts could focus on identifying these additional factors, which may include individual differences, socio-cultural influences, and external factors such as marketing strategies and availability of alternative options.

Multiple authors in various countries have previously examined the relationship between willingness to consume functional food and attitude in their studies (Küster-Boluda & Vidal-Capilla, 2017; Urala & Lähteenmäki, 2004; Urala & Lähteenmäki, 2007). Furthermore, our results found that motivators and barriers didn't impact the willingness to consume dairy functional foods directly, but with an intervention of attitude. That might be due to the fact that the majority of Hungarians are not interested in making changes to their diet or living a healthier lifestyle (Szakály et al., 2014). In addition, 86% of Hungarian customers said they never or rarely sacrifice the enjoyable flavor of food in exchange for it being healthier (Papp-Bata & Szakály, 2020). Furthermore, it is possible that European consumers place a higher value on the product's potential for enjoyment (taste orientation) than they do on their potential for health (healthiness orientation), in comparison to Asian consumers, who place a higher value on the products' potential nutritional benefits (Szakály, 2008).

The model of TAM was investigated in many previous studies, and it confirmed the implication of online food purchasing also (Davis, 1989; Nguyen et al., 2019a; Yeo et al., 2017). Attitude toward DFFs showed high impact on consumer behavioral intention besides perceived usefulness and perceived ease of use with a coefficient of 0.303. According to the findings, having a health-conscious attitude has a significant and beneficial effect on a consumer's intention to buy dairy products that have functional benefits. This finding is consistent with previous research that found that health consciousness or concerns play a key role in influencing consumer perception and attitude toward the purchase and consumption of healthy and functional foods in developed countries such as Germany and Sweden. For example, this research found that consumers in those countries were more likely to purchase and consume healthy and functional foods if they were concerned about their health (Goetzke et al., 2014; Landström et al., 2007). This demonstrates that consumers who are concerned about their health are more likely to participate in a variety of health-related activities (Newsom et al., 2005).

The direct influence of purchasing ease of use on purchasing usefulness was significant, with a coefficient of 0.524 ( $f^2 = 0.378$ ), supported by previous research (Davis et al., 1989; Nguyen et al., 2019a). However, the R-square value for perceived usefulness was weak at 0.289 (Chen et al., 2019). These findings suggest that perceived ease of use explains only a small portion of the variation in perceived usefulness. Future research should explore additional factors, such as social influence, which can shape individuals' perceptions and attitudes towards technology or products, including their usefulness. The opinions and recommendations of friends and family members may play a significant role in influencing perceived usefulness.

Perceived usefulness showed an influence on customer behavior intention with a coefficient of 0.468. This result is similar to the findings of Chien et al. (2003)

who indicated that the PU of online grocery buyers had a direct effect on their intentions. And contrary to online food shopping conducted by Nguyen et al. (2019c). This finding provides empirical support for the TAM (Davis et al., 1989; Marangunić & Granić, 2014) and also echoes the earlier finding of Chien et al. (2003). It is recommended that if is improved in a way that minimizes the amount of mental and physical effort required by customers, then those consumers' perceptions of the utility and efficiency of online food shopping would be improved.

Perceived ease of use indirectly influences consumer behavior intention through perceived usefulness (coefficient = 0.245), consistent with prior studies (Ming et al., 2020; Nguyen et al., 2019c). Ease of use acts as a barrier to widespread adoption of online food purchasing platforms (Hansen, 2005; Sreeram et al., 2017; Yeo et al., 2017). Convenience-oriented online shoppers seek uncomplicated and rapid purchases (Handa & Gupta, 2014). To reduce customer effort, online food businesses should prioritize user-friendly websites that require minimal customer work. Hungarian customers prioritize long-lasting food, discounts, and local convenience shops, particularly among the active population, middle-aged individuals, and young people (Garai-Fodor et al., 2022). Hungarian food e-retailers should implement communication programs highlighting the effectiveness, ease, time-saving benefits, and enhanced shopping experience of online food ordering. Collaboration with online grocery merchants and relevant organizations like the Association of Hungarian Retailers is crucial for these initiatives.

To address the challenges consumers face when evaluating food products online, the MAV model provides valuable insights for retailers of dairy functional foods (DFFs). By providing detailed product information, including ingredients, nutritional content, origin, and manufacturer, retailers can enhance the credibility and informativeness of their products. Incorporating consumer



feedback, especially comments highlighting product quality and website experience, further strengthens trust and loyalty. Leveraging the MAV model, retailers can improve website user experience and effectively communicate product information. This promotes healthier and sustainable food choices, while enhancing customer satisfaction and trust in the food retail industry.

## **5 NEW SCIENTIFIC RESULTS**

In the analysis of the Hungarian dairy functional food market, my study unveils key insights by integrating the Technology Acceptance Model (TAM), Value-Attitude-Behavior (VAB) framework, Theory of Planned Behavior (TPB), and Media Advertising Value (MAV) theory:

- By applying the Technology Acceptance Model (TAM), I observed that perceived usefulness and ease of use significantly predict consumer behavior intentions and technology acceptance.
- Utilizing the Value-Attitude-Behavior (VAB) model, my research underscored the critical role of consumer attitudes toward DFFs in their willingness to incorporate these foods into their diets, highlighting the pivotal influence of attitudes on consumption behavior.
- Through the Theory of Planned Behavior (TPB), my study found that attitudes and healthy subjective norms, acting as motivators and barriers, can predict behavioral intentions. Motivators positively affect consumers' willingness to consume DFFs, while barriers have a negative impact, with attitudes serving as a mediator.
- Media advertising can influence the perceived value of a product, which in turn can impact the consumer's attitude and willingness to purchase. In terms of media advertising, my study highlighted the positive influence of informativeness and credibility on the media

advertising value of DFFs. However, advertising irritants negatively impact these perceptions.

## **6 SUMMARY**

Our thesis explores the factors influencing consumer attitudes and online purchasing in the Hungarian dairy functional food market. We investigate the relationships between media marketing, consumer behavior, and purchasing intentions. We utilize prominent theoretical models such as VAB, TPB, TAM, and MAV to provide a comprehensive framework for analysis. Primary data was collected through an online Google survey, consisting of 38 constructs. We received 313 valid questionnaires from the Hungarian population, forming the dataset for analysis. SmartPLS version 4, a statistical software for SEM, was used to analyze the relationships among variables using a PLS approach within the SEM framework. These findings contribute to understanding the complex dynamics between media marketing, consumer attitudes, intentions, and the willingness to consume dairy functional foods.

The study revealed important relationships between variables. Perceived ease of use (PEOU) positively influenced perceived usefulness (PU) and intentions (INT) for online dairy functional foods (DFFs) purchasing. Attitudes toward DFFs positively influenced intentions and the willingness to consume DFFs. Motivators influenced attitudes positively, while barriers had a negative impact. Motivators and barriers influenced the willingness to consume DFFs indirectly through attitude as a mediator. Media advertising value (MAV) influenced consumer attitudes toward DFFs, with informativeness and credibility positively impacting MAV. Irritation had a negative influence, while entertainment did not affect MAV. MAV positively influenced attitudes, emphasizing the importance of effective media marketing in shaping consumer perceptions.

The study reveals that Hungarian consumers prioritize cost, quality, healthfulness, and Hungarian provenance when buying food. There has been a shift towards local stores and markets due to a preference for a personal touch and trust in local goods. To enhance the online shopping experience, food retailers should develop user-friendly websites that require minimal effort. Communication programs should emphasize the effectiveness, ease, and time-saving benefits of online food ordering. Collaboration with online grocery merchants and organizations like the Association of Hungarian Retailers is recommended for successful implementation. Effective advertising that is perceived as informative and credible influences consumer attitudes toward dairy functional food. Transparency and detailed product information build trust and empower consumers to make informed choices. The Media Advertising Value (MAV) model measures perceived value and its impact on behavior. Retailers should leverage MAV insights to enhance website user experience and promote healthier choices in the food retail industry.

## **7 LIST OF AUTHORS' PUBLICATIONS**

### **Scientific papers**

Mohammad, M., & Szigeti, O. (2023). RELATIONSHIP BETWEEN ATTITUDE AND ONLINE PURCHASE INTENTION OF DAIRY FUNCTIONAL FOODS IN HUNGARY: AN EXTENDED TAM APPROACH. *European Research Studies Journal*, 26(1), 545-559.

Mohammad, M. (2022). THE IMPACT OF SOCIO-DEMOGRAPHIC PROFILE AND PRODUCT IDENTITY ON FUNCTIONAL FOOD ACCEPTANCE: A REVIEW. *International Journal of Applied Research in Business and Management*, 3(2), 48–65. <https://doi.org/10.51137/ijarbm.2022.3.2.4>

Mohammad, M. (2021). HEALTH AWARENESS TOWARD DAIRY FUNCTIONAL FOODS IN HUNGARY. *Regional and Business Studies*, 13(2), 1–10. <https://doi.org/10.33568/rbs.2912>

### **Papers in proceedings**

Mohammad, M.: CUSTOMER BEHAVIOUR AND MOTIVATION TOWARDS DAIRY FUNCTIONAL FOOD IN HUNGARY. In: Muhammad, Safdar Bhatti; P, Sivasakthivelan; Babayeva-Shukurova, Farahila Fazil; Tuba, Firat (eds.) *4th International "Başkent" Congress On Physical, Social And Health Sciences Full-Text Book*, Istanbul, Turkey: BZT Academy Publishing House (2022) 882 p. pp. 654-661., 8 p.

Mohammad, M.: DAIRY FUNCTIONAL FOOD PROCESSING AND SUSTAINABILITY IN THE HUNGARIAN MARKET. In: Muhammad, Safdar Bhatti; P, Sivasakthivelan; Babayeva-Shukurova, Farahila Fazil; Tuba, Firat (eds.) *4th International "Başkent" Congress On Physical, Social And Health Sciences Full-Text Book*, Istanbul, Turkey: BZT Academy Publishing House (2022) 882 p. pp. 662-669., 8 p.

Mohammad, M., & Szigeti, O.: MARKET ORIENTATION AND DAIRY FUNCTIONAL FOOD IN SMALL AND MEDIUM ENTERPRISES PERFORMANCE IN HUNGARY. In: Teuta, Iljazi; Tuba, Firat (eds) *7th Istanbul Scientific Research Congress Proceedings Book*, Istanbul, Turkey: BZT Academy Publishing House (2021) 609 p. pp. 500-508., 9 p.

Mohammad, M., & Szigeti, O.: THE IMPORTANCE OF SUSTAINABLE DAIRY FUNCTIONAL FOOD PROCESSING. In: Bayoumi, Hamuda Hosam (ed.) *12th ICEEE–2021 International Conference “Global Environmental Development & Sustainability: Research, Engineering & Management” Full Text Book*, Budapest, Magyarország : Óbudai Egyetem (2021) pp. 312-322., 11 p.

### **Abstract in proceedings**

Mohammad, M.: THE IMPACT OF MEDIA MARKETING VALUE ON DAIRY FUNCTIONAL FOOD WILLINGNESS TO CONSUME IN HUNGARY. In: Neslihan, Doğan-Sağlamtimur; Elnur, Albizad; Tuba, Firat (eds.) *9th International Istanbul Scientific Research Congress Abstract Book*, Istanbul, Turkey: BZT Academy Publishing House (2022) 397 p. pp. 323-323., 1 p.