Thesis of PhD Dissertation

EXPLORING DIETARY SUPPLEMENT CONSUMPTION PATTERNS AND THE SOCIO-COGNITIVE AND PSYCHOSOCIAL FACTORS BEHIND THEM

Holbné Nábrádi Zsófia Ildikó

Supervisor:

Prof. Dr. Szakály Zoltán

Professor

Co-Supervisor:

Prof. Dr. Bánáti Diána

Professor

UNIVERSITY OF DEBRECEN

Károly Ihrig Doctoral School of Management and Business

Debrecen, 2022

1. BACKGROUND, OBJECTIVES AND HYPOTHESES OF THE RESEARCH

Public health indicators in Hungary are significantly below the European average, but at the same time, health-conscious behaviour is becoming more popular among consumers. The development of health depends on several factors, of which nutrition and food consumption are essential. The concept of the health paradox is inescapable when looking at food consumption behaviour. "My 'personal encounter' with this phenomenon dates back to ten years ago, during my Master's degree research in Health Psychology. Five years after my thesis, as a researcher at the Institute of Marketing and Retailing, in 2016, I conducted the same survey again with my supervisor and a faculty member, and it was confirmed that it was not just a passing behaviour (NÁBRÁDI et al., 2017). After another five years, albeit with a completely different research question, sample and theoretical concept, I again found contradictions.

When looking at food consumer behaviour, the health paradox has everyday manifestations that inevitably trap consumers in the 21st century. On the one hand, consumers may be aware of how they can lead healthier lives through a balanced diet, but *for convenience reasons, they do not make an effort to put this into practice*. A further paradox is that *people may consider extra consumption of high levels of vitamins and minerals as part of a healthy lifestyle* while getting the correct quantity and quality of nutrients and therefore do not physiologically need to supplement. This phenomenon is compounded by *the availability of many products and services that we did not think we needed 15-20 years ago and the oversupply, which means that they are uncontrollable*.

Nutritionists emphasise that the primary aim is to maintain a balanced diet, but if this is not possible, other ways are to ensure that micronutrients are replenished. Dietary supplements (from now on, referred to as 'DS') can be an accessible tool for everyone to integrate into their daily diets, in today's fast-paced lives, through convenience or 'over-healthy' eating.

This is why *dietary supplements have never been as popular as they are today*. Western trends in beauty and health, or the mysterious Eastern cures of millennia-old traditions, have taken the form of many dietary supplements - or capsules. In Hungary, thousands of products have been registered and at least as many rejected since E.U. accession.

After all, what is the purpose of dietary supplements? Do we want them to compensate or to balance? Do we use them according to the principle of "more is better"? Or do we see them as an opportunity to build up our immune system as a shield against the harmful effects of the environment? While consumer surveys explore these questions, it is no longer common for them to try to understand the deeper structures behind motivations (antecedents and dispositors). My primary research will be based on these issues. The relevance of my research, in addition to the figures realised in the turnover of the dietary supplement industry, is also confirmed by the fact that there has not yet been any study in Hungary on dietary supplements that interprets the use of products within the complex processes of health behaviour.

1.1. Objectives of the research

The main objective of my dissertation is to identify the socio-cognitive and psychosocial factors that determine dietary supplement consumption, in addition to mapping the dietary supplement consumption patterns and characteristics of the Hungarian population. In this context, I aim to form segments that differentially represent the pre-dispositional, pre-motivational and motivational drivers of dietary supplement consumption among the Hungarian population.

Under the main objective, I have formulated the following objectives:

1. Identifying anomalies, risks and challenges associated with dietary supplements.
2. Exploring demographic and lifestyle factors that influence dietary supplement consumption.
3. Determining the relationship between health behaviour and dietary supplement consumption.
4. Adaptation and application of an integrated health behaviour model to explore the psychological determinants of dietary supplement consumption.

1.2. Hypotheses of the research

Based on the objectives, I have formulated the following hypotheses:

Table 1: Presentation of the hypotheses underlying the objectives of the dissertation

Nomination	Hypotheses	Research method	Confirm / reject objectives
H1	Food supplements' conceptual definition and regulation are globally controversial, raising several consumer protection issues.	*secondary*	O1
H2	Consumers' perception of risks associated with dietary supplements is low.	*secondary and primary*	O1
H3	Increased subjective health awareness has a positive impact on the Purchase and consumption of dietary supplements.	*secondary and primary*	O3
H4	Among the labelling elements on product labels, health claims are highly valued by consumers of dietary supplements [1].	*primary (Q1)*	O3
H5	Health behaviour modelling can reveal the relationship between motivational and attitudinal factors and dietary supplement consumption.	*secondary and primary (Q2)*	O4
H6	Based on motivational and attitudinal factors, the domestic population can be well differentiated into groups regarding the Purchase and consumption of dietary supplement products.	*primary (Q2)*	O4

[1] We consider health claims as an umbrella term; we do not categorically mean health claims

2. DATABASE AND METHODOLOGY

For the preparation of the dissertation, I used the basic marketing research methods and secondary and primary research methods. In the secondary information gathering phase, I reviewed and classified the relevant literature on my research topic. I developed the theoretical background for my primary research based on international models. During primary data collection, I used both qualitative and quantitative methods.

2.1. Secondary data and information collection

I have approached the topic from several angles, each of which is related to the title of the dissertation, its main objective and the objectives assigned to it.

In line with this, I examined *the evolution of the concept of health*. I discussed the *changes in the concept of health*, presented the *Meikirch model*, analysed the *factors determining health status*, explored the main characteristics of the *health status of the Hungarian population* based on literature sources, and discussed *the leading indicators of health, namely healthy nutrition*.

I then presented the *theoretical constructs of health behaviour*. I presented the theoretical background and critique of *health behaviour modelling*, the possible applications of health behaviour models, the standard and specific elements of the models, and a new method: the *Integrated Change Model* (hereafter ICM).

In the following chapters, I dealt with *the past and present of the dietary supplement industry* and *the positive and negative perceptions of the use of dietary supplement* products. I have analysed approaches to *the definition of dietary supplements* and the *regulatory framework for dietary supplements*. I examined the *national and international literature on product labelling requirements*. Here I discussed *consumer perceptions of food and dietary supplement labels*. In a separate sub-section, I have discussed the *types of dietary supplements*. I have also addressed the issues of the *global growth of dietary supplements as an industry, focusing on the risks and challenges associated with dietary supplements*. I analysed the *consumption patterns of dietary supplements globally*, the *demographic and lifestyle characteristics of dietary supplement consumers*, and then I described the *domestic characteristics* of these using literature sources.

At the end of the literature review, I analysed the *relationship between health awareness and dietary supplement consumption* and the studies related to the *analysis of dietary supplement consumption using health behaviour models*. I incorporated more than 300 cited sources into my dissertation in my literature review.

2.2. Primary data collection

Processing and organising the secondary data allowed the design of the primary studies. The logical structure of the primary research is illustrated in Figure 1.

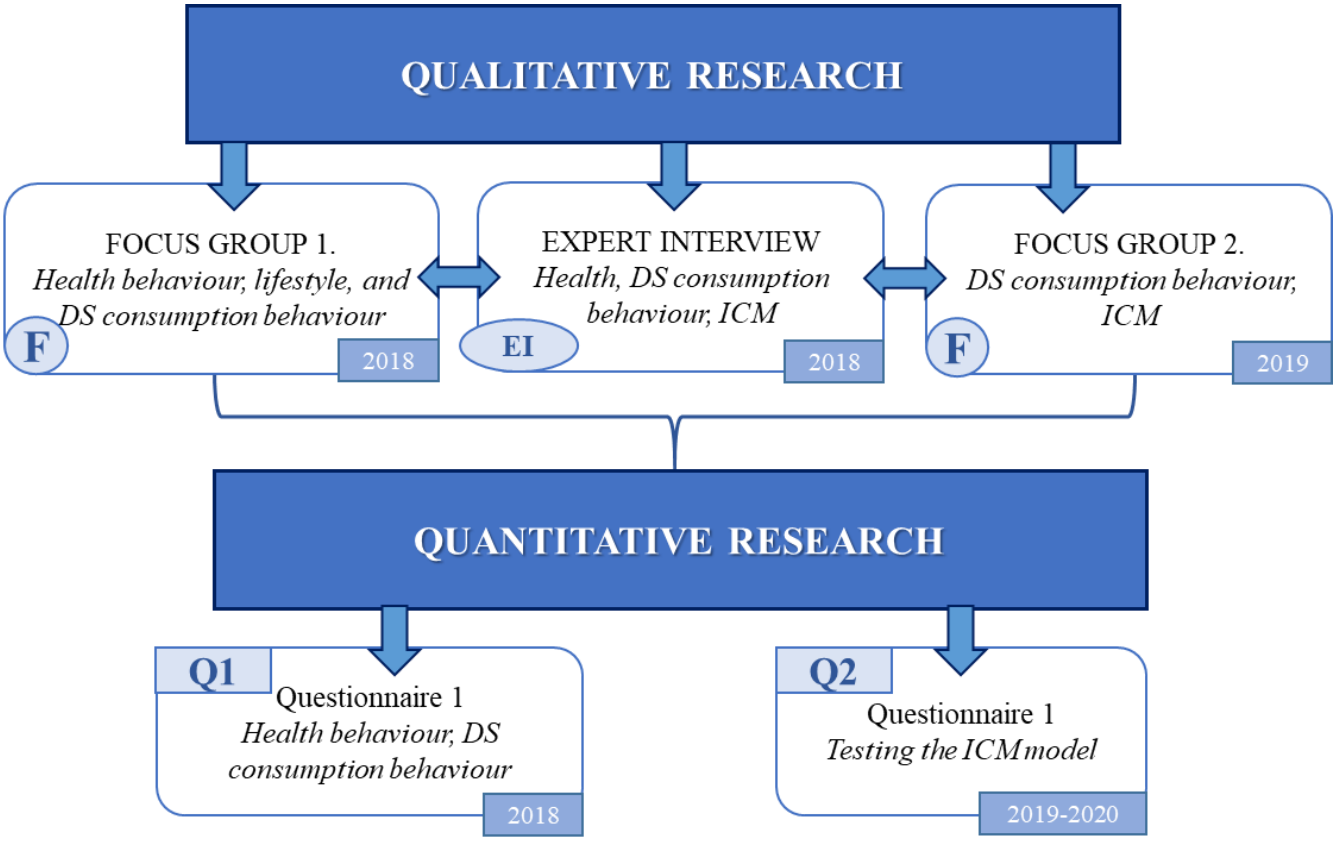

Figure 1: Logical structure of primary research

Source: Own edition (2021)

In the primary data collection, I conducted both qualitative and quantitative research. The first element of the primary research was an exploratory focus group (F) interview, which I conducted in January 2018. In the second step of the qualitative research, I conducted an expert interview (E.I.) with two senior managers of a dietary supplements company in October 2018. The interview has a semi-structured structure, in which I wanted to explore and identify the characteristics of dietary supplement consumers, anomalies related to the products and motivational factors of ICM from the perspective of the manufacturer. The second focus group interview (F) was recorded in September 2019. A

key objective was to explore the pre-motivation and motivational factors associated with ICM. The expert interview, the second focus group study, and the processed secondary sources formed the basis for the most exciting part of our research, the adaptation of the Integrated Change Model, which, to our knowledge, was the first to be studied in Hungary. In order to test the model, we conducted a nationally representative questionnaire survey of 1,000 people (Q2).

2.2.1. Focus group studies

I selected the groups according to the same criteria based on the research concept. The studies involved 3-3 men and 4-4 women. Both studies were conducted in Debrecen. The group discussions started with a brief introduction of the participants. To set the tone, we discussed the factors that play a role in developing a healthy lifestyle with the group members. The concept of health behaviour was clarified through some aspects of health. The factors that make up the concept were identified first by spontaneous mention, then by ranking, and then the dimensions categorised by the WHO. An essential element of the theme was discussing *what can be easy and what can be difficult in establishing and maintaining a healthy lifestyle.* I have moved on to look at supplements in the context of healthy food, including adequate vitamin and mineral intake. The study participants first created the definition through free association. Then I clarified with them what exactly is meant and what belongs to the group of dietary supplements based on the Hungarian legislation (Decree 37/2004 (26.IV.) of the ECCSM) following the European Union Directive. In this block, I examined *knowledge about the products* and identified the essential consumer *anomalies and misconceptions*. I then asked about consumer habits, where to buy and where to find information about dietary supplements. I assessed the motivations that encourage consumers to buy and use dietary supplements in the groups studied. I then proceeded along with the elements of the ICM model, gradually incorporating pre-motivation and motivational factors. Finally, I identified the positive and negative attitudes towards the products and the determinants of purchase/consumption intention (peer influence, norms).

Participants solved both individual and group tasks on the topics covered. The focus group interviews lasted 60-70 minutes. The interviews were recorded and audio-recorded to

facilitate processing and accurate analysis. The block on the characterisation of the lifestyle has been dissected out of the script, as it is not presented in the thesis.

2.2.2. Expert interview

The expert interview was conducted in pairs. The interview took place in October 2018 with two senior executives from a leading dietary supplement company. The interview framework consisted of four sub-units. The first element explored consumer knowledge about the Purchase of dietary supplements. In the second block, I explored the controversies surrounding dietary supplements and analysed the issue of consumer confidence—the third set of questions focused on innovation and current trends. The fourth block of questions focused on the pre-motivation factors of the ICM model, i.e., I analysed the producer side's view on consumers' prior knowledge, risk perception, awareness and incentives to act.

2.2.3. First national representative questionnaire survey (Q1)

The questionnaire, hereafter referred to as the Q1 questionnaire, was administered by interviewers trained in the subject area to a nationally representative sample of 1,000 respondents between 1 June and 30 June 2018. The survey was part of a larger-scale research project involving several research institutes. At the beginning of our block of questions on 'Purchase and consumption of dietary supplements, we defined the term 'dietary supplements to avoid incorrect response responses. From the other sections of the questionnaire, my work included statements on health behaviour and product labelling in the Q1 analysis. In the Q1 survey, I investigated the total sample and the consumer population buying and using dietary supplements, which is N=374. The questionnaire included eight blocks on dietary supplements, two blocks on the knowledge and importance of product labels, and two blocks on health behaviour and health attitudes.

The dietary supplement purchase and consumption block were started with a screening question asking the respondent to indicate whether they had consumed one or more food supplements in the six months preceding the survey. We then asked the consumers of the products to indicate the three most important reasons why they buy dietary supplement products. In addition to nine factors, an option to abstain (no response) and other response options were provided. In the third set of questions, statements were made about dietary supplements and conventional foods, with which respondents expressed their agreement on

a Likert scale of 1 to 5. Next, we asked whether a doctor had recommended the consumption of any vitamin or mineral supplements in the year preceding the survey. The fourth and fifth questions asked about knowledge and consumption of 33 types of vitamin, mineral, plant-based, animal-derived and other products not listed. The categories were not based on consumption in the course of treatment but only on whether the consumer had used the product in the past. Regular consumption, 3-4 times a week, was assessed in question 6. Next, we asked about the place of Purchase and then about the information sources prior to Purchase. In the second block of Q1, we looked at the mandatory and recommended content on food labels. First, we asked respondents to indicate the factors they look for on product labels. In the second part, they were asked to rank on a Likert scale from 1 to 5 on how important this information was to them. In the third block of Q1, attitudes towards health behaviours were assessed using ordinal Likert-type scales ranging from 1 to 5. This was followed by statements to identify health and risk behaviour patterns, which respondents were asked to indicate as either self-reported or not.

2.2.4. Second national representative questionnaire survey (Q2)

The second questionnaire, referred to as Q2, was administered between November 2019 and December 2019 to a nationally representative sample of 1,000 respondents. Based on focus group interviews and literature research, I identified the elements that influence the implementation of behaviour in the ICM model, in this case, dietary supplement consumption.

In the first set of questions, I measured the frequency of dietary supplement consumption. In the second question, I measured the consumption of dietary supplements in the course of treatment, listing the types of preparation. The grouping of the types of preparations was based on the research of STANOJEVIĆ-RISTIĆ et al. (2017). Subsequently, I formulated statements related to the pre-dispositional, pre-motivation, motivational theorems of the ICM model and to Intention. Except for the statements measuring the Knowledge factor, I used ordinal Likert-type scales ranging from 1 to 5.

The first element of the *Pre-disposing factor group* looked at the dimension of health locus of control. The statements were taken from the original 11-item questionnaire of WALLTSON (1976); four items were related to the external health locus of control and

three items to the internal health locus of control. I used a unidimensional approach in my analysis and did not separately examine the luck factor within external health-control behaviour. This is because dietary supplement consumption is not necessarily a typical risk or health behaviour (such as smoking or regular consumption of fruit and vegetables). The second element of the predisposing factor group is the focus of health promotion, which is divided into preventive and supportive categories based on international research (FERRER et al., 2017). The prevention-focus items typically convey feelings of concern in international studies. My questionnaire's prevention-focused and promotion-focused health regulation contains 2-2 statements. The last item in this block is the statements related to health value. Based on LAU and colleagues (1986) research, I included 2-2 items that represented the value of health as significant and insignificant, respectively.

Pre-motivational factors were then developed. Risk perception was investigated from two directions: disease-related risk perception and risk factors related to dietary supplement products. In the knowledge scale, seven items were examined, which included lexical knowledge on the one hand and informative knowledge about dietary supplement products on the other hand. In the knowledge scale, correct answers and sufficient informative knowledge were scored 1-1, and incorrect and omitted answers were excluded from the analysis. Some scale items were developed based on national and international research (RODLER, 2005; OGYEI, 2016; QIDWAI et al., 2012). The third item of the pre-motivation factor group is the stimuli that induce action. I trained statements based on the HBM model (ROSENSTOCK, 1974; STRETCHER - ROSENSTOCK, 1997) and categorised them following PAJOR et al. (2017). Thus, my study was divided into three units, internal-external- and action stimuli related to the dietary supplement product itself.

In the *motivational factors*, I examined the strength of peer affect and feelings of self-efficacy and positive and negative attitudes towards the preparations. Attitude-related items were developed based on the research of CHUNG et al. (2012) and PAJOR et al. (2017), social affect items were developed based on the research of HIGGS et al. (2019), and self-efficacy items were developed based on the research of CONNER et al. (2001). Concerning the mechanism of action of DS preparations, I formulated five positive and three negative attitudinal theorems based on the cited international studies. In the factors of peer effect, I incorporated 1-1 propositions in the themes of norms, peer support and model provision.

The final, theoretically most influential factor on behaviour in ICM is Intention. I classified three items into this factor based on the work of KHOURY (2019) et al. and NISHIJIMA et al. (2019). I divided Intention into health maintenance, performance enhancement and peer trust. The framework of the ICM model used and the number of statements for each dimension is illustrated in Figure 2.

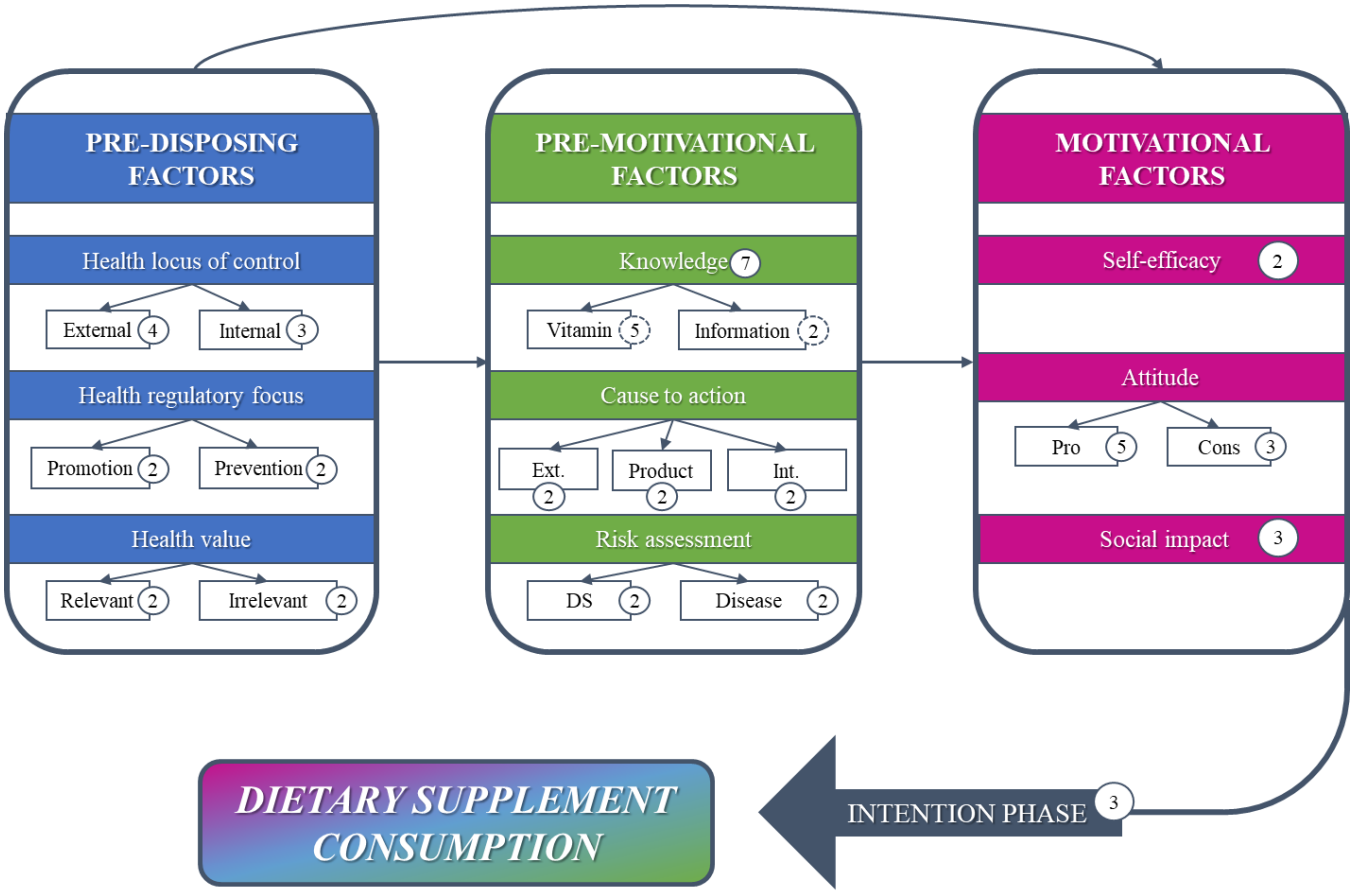

Figure 2: Structure of the adapted ICM

Source: Own construction, 2021

2.3. Method of measurement for quantitative research

The quantitative research was conducted in two parts, using the same sampling procedure. Both were carried out in the form of a nationally representative survey of 1,000 respondents with the involvement of the Szocio-Gráf Market Research Institute Ltd. In the sampling, representativeness was ensured according to the quota established by the KSH (quota sampling) for each type of municipality and region. Simple random sampling was used in the regions to select settlements based on a random draw. In the selected municipalities, the principle of random walking was followed, which ensures complete randomness in selecting

respondents. According to this principle, starting from the address defined in the sampling design, the interview was conducted in every third house by the designated interviewer, proceeding in ascending order of house numbers. The inhabitants of the households visited were selected for interview using the birthday key method. The method ensures complete randomisation in two steps. The interviewer first asked how many people of adult age (18 years and over) lived in the household and then selected the consumer whose birthday fell closest to the time of the survey—the random error of the sample ± 1.9%-3.2%. The sample was adjusted for gender and age using multivariate weighting so that both surveys reflect the composition of the population based on four factors (region, municipality, gender and age).

2.4. Data analysis

This chapter describes the methodology for data analysis in quantitative research. For each procedure, I will indicate specifically which research is involved:

- A first nationally representative survey of 1000 respondents (Q1)

- Second national representative questionnaire survey of 1000 respondents (Q2)

In processing the results, my analysis was based on the methodology of applied statistics (SAJTOS - MITEV, 2007) and marketing research (LEHOTA, 2001; MALHOTRA, 2008; MALHOTRA - SIMON, 2009).

In processing the results, I presented the distributions by sample population. In the analysis, I used distribution ratios; arithmetic means, standard deviation, mode, median (Q1 and Q2) and skewness test (Q2) (SAJTOS and MITEV, 2007).

Most of the variables in both questionnaires were nominal and ordinal, and the background variables included age (Q1 and Q2) and BMI (Q2) metric ratio scale level. The measurement levels determined the method of analysis.

For questions with nominal scales, a Chi2 test was used to examine the relationship between two categorical variables in the cross-tabulation analyses. I used the Kolomogorov-Smirnov test for normality for ordinal scale questions, but as the sample sizes indicated, I did not obtain normal distributions. For this reason, I analysed the factors of interest using non-parametric procedures. I used Mann-Whitney tests for two dependent variables, while

for three or more categorical dependent variables, I used Kruskal-Wallis analysis. In marketing research methodology, the use of arithmetic averages is accepted, but for a more accurate measurement, I also used rank averaging in the analysis of the questionnaire for the descriptive studies of the Q1 questionnaire. Following the descriptive statistical procedures and cross-tabulation analyses, I conducted an *exploratory cluster analysis* using the Two-Step Cluster procedure for the Q1 survey. I chose this method because it optimises the possibility of clustering. In this case, my aim was to identify differences that could be identified by extracting only one behavioural element - regularity seeking (*Cluster1: Regularity seeking; Cluster2: Disorderly*).

I tested the ICM model when examining Q2. First, I compared the leading indicators of each item using descriptive statistical procedures and drew general conclusions about the sample from the skewness of the distribution. Next, I constructed scales from the variables and tested their reliability using Cronbach's alpha. In preparing the model, I carried out a correlation test between the scales' items and looked at the correlations between the scales. In none of the cases did I find any factor that would raise the problem of multicollinearity. Next came a detailed examination of the model. In order to achieve my goal, I performed *binary logistic regression analyses* using a Forward Stepwise (Conditional) procedure. The elements of the factor groups (factors) were first analysed separately and then block by block with the predicted behaviour, with the use of the dietary supplements. The effect of a single element can be informative, but the behaviour is a complex system that depends on the interaction of many factors. I performed stepwise addition of blocks, checking the percentage of correct predictions in each case by cross-tabulation analysis. Finally, I used a Homer-Lemeshow test to evaluate the fit of the resulting model.

After identifying the determinants of dietary supplement consumption, a *control factor analysis* was carried out with the ICM-DS model statements. After excluding unrelated factors from the analysis, each factor was defined in a new structure. After running several procedures, I used Principal Component Analysis to develop the factor structures. I rotated the factor weight matrix using the Varimax method, which resulted in factor weights with excellent values. Bartlett's test and Kaiser-Meyer-Olkin (KMO) values were calculated for the variables. The optimal KMO values and the significant Bartlett test confirmed that the variables are suitable for factor analysis.

I also used a variance ratio method to determine the factor counts, the 60% criterion for which was fully met. I then checked the distribution of the factors on a graph (scree plot). After the final design of the factors, I calculated Cronbach's alpha values, which confirmed the internal consistency of the designed dimensions. Factor analysis was used to identify well-differentiable attitude structures based on socio-cognitive and psychosocial factors that determine the consumption of dietary supplement (*F1: Norm-driven intrinsic attitude; F2: Supportive attitude; F3: Health-promoting attitude; F4: Information-seeking attitude; F5: External-control attitude; F6: Inclusive, price-sensitive attitude*). I have provided a more nuanced analysis of the factors with socio-demographic characteristics of the factors.

I performed a *cluster analysis* to segment the respondents based on the factors. I performed clustering in several ways. First, I used a Two-Step clustering procedure to investigate the possibility of optimal cluster numbers. Subsequently, I used Ward's procedure among the hierarchical clustering methods. This method was used to guide the number of segments. Because of many sample elements, I next ran a K-means cluster analysis procedure. For segmentation, I tested the quality of the clusters using Silhouette statistics. Finally, the clusters formed by the K-means method showed the best results, where I separated homogeneous groups (*C1: Interested Deniers; C2: Knowledgeable Explorers; C3: Price-sensitive Unbelievers; C4: Self-didactic Unstable*) by considering the F-values. To examine the differences between segments (both for Q1 and Q2), I identified characteristics in the groups by analysing the differences between category means. To detect significant differences, I performed cross-tabulation analyses with Chi2 tests, analysis of variance tests, and Mann-Whitney and Kruskal-Wallis tests for rank averages.

3. FURTHER FINDINGS OF THE INTERPRETATION

This chapter presents the conclusions related to the secondary and primary research objectives and the associated hypotheses. In many cases, the conclusions are followed by recommendations, which provide either scientific or practical context.

The main objective of the dissertation is to *identify the socio-cognitive and psychosocial factors that determine dietary supplement consumption, in addition to mapping the dietary supplement consumption patterns and characteristics of the Hungarian population—related to this, to form segments that differentially represent the motivational, pre-motivational and pre-dispositional drivers of dietary supplement consumption among the Hungarian population.*

Based on our first representative survey, I analysed the characteristics of the Hungarian population as dietary supplement consumers in detail. I developed the ICM-DS model using the second survey, which includes the eight most important socio-cognitive and psychosocial factors determining dietary supplement consumption. I carried out a cluster analysis along the 8 factors, resulting in well-differentiated segments. I identified which motivational and predisposing factors influence dietary supplement consumption by analysing the segments. **My main objective was achieved.**

In the following, I will present an analysis of the hypotheses associated with each objective.

Objective O1: To identify anomalies, risks and challenges associated with dietary supplements.

Research hypothesis	Confirmed / rejected	New / novel scientific result	Detailed result
H1: The conceptual definition and regulation of dietary supplements is globally controversial, raising a number of consumer protection issues.	Confirmed	R1	*Chapter 2.4.* *Chapter 2.5.* *Chapter 2.8.*
H2: Consumers have a low risk perception of dietary supplements.	Confirmed	R1	*Chapter 2.3.1.* *Chapter 4.1.2.* *Chapter 4.1.4.* *Chapter 4.3.1.*

The details of the analysis of the **H1 hypothesis** can be found in chapters 2.4, 2.5 and 2.8 of this thesis. The literature on this topic in our country is relatively scarce, with only a few domestic studies discussing this problem. However, *the prevalence of consumption of dietary supplements has never been higher than in the last two decades.* It is estimated that *more than 80% of the world's population uses dietary supplements and herbal medicines* (THAKKAR et al., 2020). A variety of products are taken by 50% of the adult population and nearly a third of children in economically developed countries (BINNS et al., 2018).

There is no global consensus in professional terminology on defining dietary supplements. *The context in which dietary supplements are used varies widely from country to country*; in some countries, they are limited to general health and well-being, while others allow their use for medicinal purposes. In many cases, their *regulatory framework is lax and often aimed at supporting trade rather than protecting public health* (BINNS, 2018). Regulations for dietary supplements are much less stringent than those for food or medicines, even though *adverse reactions to dietary supplements and interactions between supplements and medicines are common* (KNAPIK et al., 2016; LEVY et al., 2016) and potentially serious (GELLER et al., 2015). In the EU and Hungary, manufacturers are only subject to notification requirements to place dietary supplements on the market. Mandatory labelling applicable to dietary supplement products varies across significant jurisdictions. Product labelling is considered crucial for informing consumers, *but product labels lack a consistent structure*, hindering cross-platform communication and confusing information interpretation. Based on my secondary and primary research, *the most significant risks associated with dietary supplements are classical food safety risks, nutritional risks, low-quality or illegal products, and the inappropriate use of dietary supplements*. Increased market demand and the rapid rise in the number of products present enormous challenges for the industry. ***In light of the above findings, I consider hypothesis H1 justified.***

Hypothesis H2 has been tested through secondary and primary research. International publications have confirmed that *the advertising keywords "natural" and "healthy" in the advertising of dietary supplements create a positive association in consumers that dietary supplement products are safe*. A significant proportion of US consumers believe in the quality and efficacy of the products and that the industry is entirely trustworthy. My research shows that consumers are most averse to products made in China, but they buy them out of

curiosity, especially those of plant origin. *Few have heard of the concept of GMP*. They believe that the products are manufactured under appropriate conditions and are subject to *regulatory control when sold in pharmacies*. *They have a poor perception of the quality of the products, and in fact, the risks associated with medicinal products are higher than those associated with dietary supplement*. Media exposure is a significant factor for consumers, who believe that *"the product advertised on TV is safe"*. *Consumers have a poor understanding of the definition of dietary supplement products and the references to their use. They do not inform themselves about dietary supplement products before buying them*, or if they do, they ask a family member, friend or pharmacist for information. They have a negative perception of the concept of medicine, with associations of 'illness' and 'side effects. In contrast, "health" and "vitality" are associated with dietary supplement preparations. *The manufacturers believe consumers are exposed to some risks when using dietary supplement products*. In their view, the world is moving towards *'self-medication'*, which can sometimes be a source of serious problems, although less costly. Our representative survey of 1,000 people has shown that *risk perception in the Hungarian population is disease-focused, with no risk being attributed to dietary supplements*. We can distinguish between low and medium risk perception concerning the dosage. *For vitamins, the risk of high doses is perceived as very low*, "as it is eliminated from the body through urine". Higher risk perceptions characterise consumers who do not use the products, but most of them also express their views on the question of origin. All this means that the ***H2 hypothesis is confirmed.***

Objective O2: *Explore demographic and lifestyle factors influencing dietary supplement consumption*

I did not assign a specific hypothesis to this objective, as I wanted to explore, in general, the demographic and lifestyle characteristics that would allow a scientific comparison between data from the Hungarian population and international studies. Secondary and primary studies mapped demographic and lifestyle characteristics of consumers using dietary supplements. *Our first survey of 1000 people confirms similar trends to those found in the international literature. Typically, female shoppers with higher incomes and higher education levels define the market*. 44.7% of the respondents believe that food does not contain sufficient nutrients and needs to be replaced. There is a widespread belief that the

use of dietary supplement products can help maintain good health and consumers believe that the use of dietary supplement products can help them recover more quickly from an illness.

Men are more likely to consume dietary supplement to improve their sports performance (22.5%) and to reduce stress (17.2%). Women are more likely to buy dietary supplements because they believe they can help them maintain good health (37.2%) and recover from illness (9.9%). Women are also more likely to think that they can achieve nutritional supplementation through the consumption of dietaery supplement (17.5%) and compensate for the adverse effects of harmful environmental factors (6.7%).

Differences can be observed between vitamin awareness, consumption, and studied background variables. The importance of the brand is related to income perception: the lower the personal income level of consumers, the more importance they attach to the brand of the products. Concerning subjective income perception, it is also found that both the importance of taking dietary supplements and the quality of the nutrients consumed are rated more positively within higher income categories. *The more health-conscious consumers consider themselves to be, the more they show positive attitudes towards dietary supplement products and feel the need to use them.* Consumers of dietary supplements are more likely to engage in regular health-promoting behaviours, which are reflected in their diet and active leisure time.

Content heard in online and offline media has a significant impact on the subjective perception of dietary supplement consumers. The stories of people with serious illnesses are more likely to touch consumers who use supplements than those who do not, and the content encourages them to lead healthier lifestyles. Information read on internet forums, blogs, and social networking sites has a stronger impact on adults' health behaviour who take dietary supplements. Content received through online media is more likely to encourage them to try to live healthier than those who do not take dietary supplements. Healthy lifestyle events and campaigns have a more significant impact on consumers of dietary supplements. Typically, after such an event, they are more likely to try to lead a healthier lifestyle than adults who do not consume these products.

Objective O3*: Determine the relationship between health behaviour and dietary supplement consumption*

Research hypothesis	Confirmed / rejected	New / novel scientific result	Detailed result
H3: Increased subjective health awareness has a positive impact on the purchase and consumption of dietary supplements	Confirmed	R3	*Chapter 2.10. Chapter 4.2.1.*
H4: Among the labelling elements on product labels, health claims are highly valued by consumers of dietary supplements	Partially confirmed	R3	*Chapter 4.2.2.*

This thesis presents a detailed analysis of **hypothesis H3** in subsections 2.10 and 4.2.1. The international literature demonstrates that health consciousness determines dietary supplement consumption. This issue has not yet been studied in detail in our country. Scrolling through the chapters of my quantitative studies, it is apparent in *each sub-analysis that health consciousness is a marked - if not the most marked - determinant of the purchase and consumption of dietary supplements*. My qualitative research has highlighted that *consumers identify the most significant difficulty in developing a healthy lifestyle as being a regularity*. In our first representative survey analysis, I conducted an exploratory cluster analysis to confirm this fact. Awareness of vitamin and mineral supplements is equal in the two clusters, but "Regularity seekers" all have a higher consumption of dietary supplements. It is important to emphasise that there is no difference between the groups regarding whether a doctor has advised them to take the products. 17.9% of the Regulars and 14.2% of the "Non-Regulars" group bought a dietary supplement product only on the advice of a specialist. *It can be concluded that a more significant proportion of the Hungarian population can be classified as the "Regular" segment, which tries to practice health-promoting behaviours as a matter of discipline - and this seems to include the consumption of dietary supplements.* Globally and in our country, the megatrend of health is highly dominant. I suspect that the growth of the dietary supplement industry is shifting towards 'immune preparations'. Because of the preceding factors, I consider hypothesis ***H3 to be confirmed***.

I have tested **hypothesis H4** in chapter 4.2.2 of this thesis. *Among the product label information, the most critical factor among the factors investigated is the time to quality retention factor for consumers in the North East, in line with domestic research.* This is

followed by the price of food and dietary supplements and then the products' ingredients. The least - but slightly more critical than average - elements of food and food supplement labels are the manufacturer, brand name and recommended daily intake. Health claims are read on product labels by more than half of women and 47% of men who consume food supplements. *Consumers' subjective health awareness shows a strong linear relationship with the importance they attach to this information.* However, *dietary supplement consumers do not attach much importance to health claims* contrary to expectations. The slightly higher than the average value of 3.61 suggests that this labelling element is of secondary importance to them, e.g. in addition to ingredients or nutrition facts. ***I partially accept hypothesis H4***.

Objective O4: *To adapt and apply an integrated health behaviour model to explore the psychological determinants of dietary supplement consumption.*

Research hypothesis	Confirmed / rejected	New / novel scientific result	Detailed result
H5: Health behaviour modelling can reveal the relationship of motivational and attitudinal factors with dietary supplement consumption	Confirmed	R4	*Chapter 4.3.3.*
H6: Based on motivational and attitudinal factors, the domestic population can be well differentiated into groups in terms of the purchase and consumption of dietary supplement products	Confirmed	R5	*Chapter 4.3.4.* *Chapter 4.3.5.*

Hypothesis H5 is tested in chapter 4.3.3 and its subsections in this thesis. In line with my main objective, I adapted and applied an integrative health behaviour model to a nationally representative sample of 1000 people. I developed validated scales for each dimension of the ICM adapted to dietary supplements. In addition to the pre-dispositional, pre-motivation and motivational factors, the model included the intention factor with 17 scales. The dependent variable was dietary intake, so I constructed a version of the ICM concerning dietary supplement consumption based on the specific realisation of the behaviour. I used binary logistic regression analyses to construct the *ICM-DS* model by examining the factors separately and then jointly.

After examining the factors separately, it is found that a *one-unit increase in the factor External Health Loocus Control changes the probability of use by a factor of 0.893, or 11%.*

A one-unit increase in the factor Promotion-Focused Health Regulatory Control increases the probability of use by 40%. A unit increase in the value of the Cause to action – External decreases the probability of use by 13%. In comparison, a unit change in the value of the Internal-determined action stimulus increases the probability of use by 23%, and a unit change in the value of the Product-related stimulus increases the probability of use by 28%. The Social impact increases the probability of use by 7%, the Self-efficacy by 20%, the Positive attitude by 13%, while the Negative attitude decreases the probability of use by 12% for a unit increase.

In constructing the model of dietary supplement use, I took the Pre-dispositional, Pre-motivational, Motivational, and Intentional factors and analysed the combined effect of the variables in each factor. When combining the elements of each, I found that the model does not improve further in the language of probabilities when examining Intention, i.e. the *Intention and Motivation factors determine the consumption of dietary supplement at the same level*.

My results suggest that eight determinants influence dietary supplement consumption. *Theoretical testing of the ICM-DS model showed that 63.4% of consumers estimated as non-users do not use DS products, while 75.5% of consumers estimated as users use DS products.* The strength of the estimation accuracy is also indicated by the Lambda indicator, which has a value of 0.215. The Homer-Lemeshow test was used to assess the fit of the resulting model. The results show that we cannot reject the test's null hypothesis (p-value 0.305) at the usual significance levels, so the model fit is acceptable. Because of the above findings, **I consider hypothesis H5 to be confirmed**.

Hypothesis H6 is tested in subsections 4.3.4 and 4.3.5 of this thesis. Based on the socio-cognitive and psychosocial factors determining dietary supplement consumption, I first differentiated segments using factor analysis and cluster analysis. When running the factor analysis, all criteria were met, and I did not need to exclude any factor. Based on 26 statements, I separated six dimensions (*F1: Norm-driven intrinsic attitude; F2: Supportive attitude; F3: Health promotion attitude; F4: Information-seeking attitude; F5: External control attitude; F5: Inclusive, price-sensitive attitude)*. After analysing the factors with background variables, I performed a differential cluster analysis based on ICM-DS. I examined the segmentation of Hungarian consumers concerning the use of DS using both

Hierarchical (Ward) and Non-Hierarchical procedures. The quality of the clusters was tested with Silhouette statistics, based on which the final clustering was performed using K-means clustering. Significant differences between clusters were demonstrated using a six-factor analysis of variance (One-Way ANOVA). I created four distinct segments based on the motivational, pre-motivational and dispositional factors (*C1: Interested Deniers; C2: Knowledgeable Explorers; C3: Price-sensitive Disbelievers; C4: Autodidactically Unstable*), which are illustrated in Figure 3.

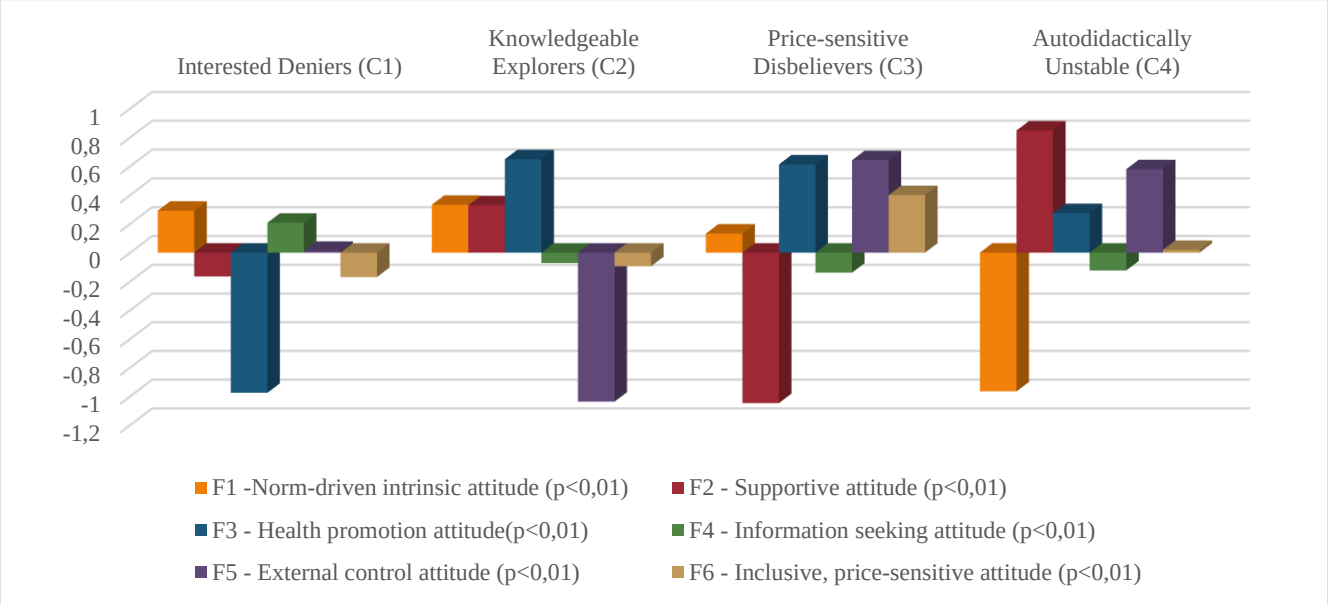

Figure 3: ICM-DS clusters based on the factors developed; N=664

Source: Own construction, 2021

Although vitamin and mineral products are consistently the most popular products among the groups, there are differences in the proportion of each type of product purchased, and there are also marked differences in the proportion of dietary supplements consumed (Figure 4)

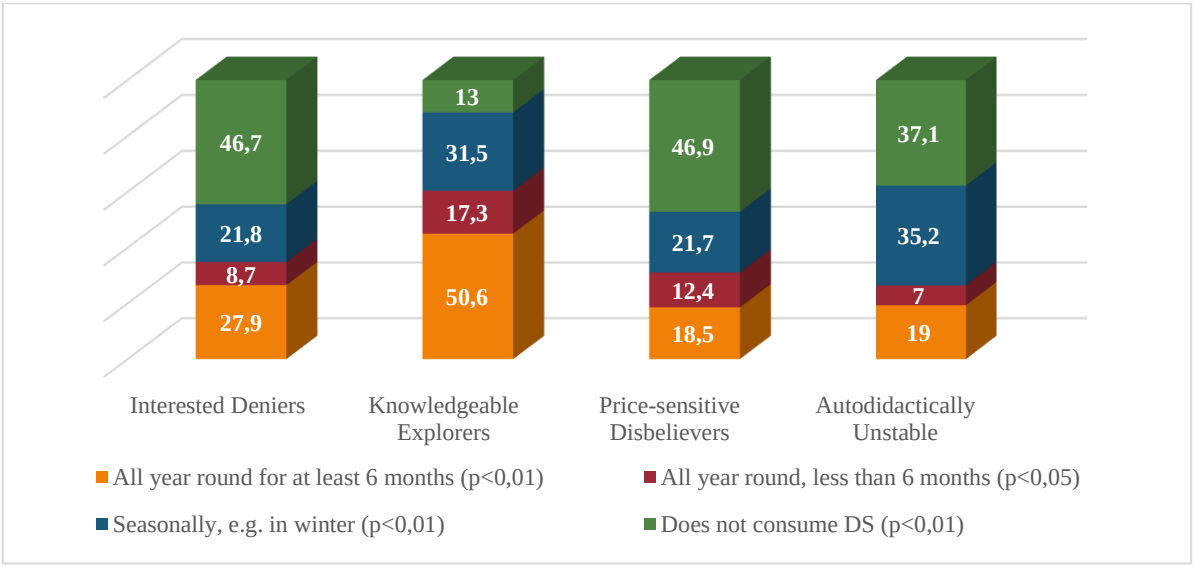

Figure 4: DS consumption frequency in the study clusters (%); N=664

Source: Own construction, 2021

On this basis, it can be said that hypothesis ***H6 is confirmed***.

3.1. Current research limitations and future directions

In this short subsection, I summarise the limitations of the research and identify the main directions that can be taken as a continuation of the dissertation.

In examining the types of dietary supplements, I have typically focused my quantitative research on vitamin and mineral supplements due to scope limitations. Extending the same studies to specific product groups, such as plant-based supplements, would be worthwhile. Following the trends, it can be concluded that plant-based products are gaining more and more market share. Just consider that 'natural' food supplements accounted for 21% of the organic food industry in 2020. Moreover, the anomalies and risk factors identified in my secondary research affect consumers more significantly than in the case of vitamin and mineral products that are considered safe - but still risky.

It is also important to note that my analyses are based on the adult Hungarian population, but international data show that one-third of children consume dietary supplements. Children are typically a well-defined segment of the 'immune market', and in their case, the motivational network can be mapped through parents.

In addition to identifying the motivational and attitudinal structure, exploring platforms that point towards digital health behaviour would be an exciting direction. With the help of a multidisciplinary team of professionals, I would test different apps that could help to deliver credible and reliable information, thereby increasing knowledge and informing about dietary supplements.

4. NEW OR NOVEL RISULTS OF THE THESIS

The main new and novel scientific findings of my thesis are summarised below.

R1: Through secondary and primary research, I have explored the anomalies, risks and challenges associated with dietary supplements, looking at both the producer and consumer sides.

R2: I used statistical analyses to demonstrate the demographic and lifestyle characteristics that significantly affect the consumption of dietary supplements by the adult Hungarian population.

R3: With our first nationally representative survey of 1000 people, I have revealed more nuanced relationships between health behaviour, subjective health awareness and dietary supplement consumption. I have characterised dietary supplement users based on several health behaviours and used cluster analysis to identify differences in the typical health behaviours of the Hungarian population.

R4: By adapting and applying a new model (ICM-DS), I explored the associations between socio-cognitive and psychosocial factors determining dietary supplement consumption in our second nationally representative survey of 1000 people.

R5: I used the factors from the model developed in the logistic regression analyses to create well-differentiated groups using factor and then cluster analysis.

5. PRACTICAL USE OF THE RESULTS

Recommendation 1 (based on H1): Consumers have little credible information on rigorous scientific sources to help them choose the type and dosage of dietary supplements. Therefore, health and nutrition professionals must become better informed about the types of dietary supplements to help consumers in their purchasing decisions.

Recommendation 2 (based on H2): The Safe Dietary Supplement Programme is of particular relevance to the problem of legislation in our country. Making the trademark as widely known as possible can guarantee excellent safety for consumers. The solution could be to develop educational programmes that can be implemented in a user-friendly online environment to protect consumers. These could take the form of presentations and training courses using a Community initiative. These programmes should be coordinated by voluntary regulatory bodies and involve major manufacturers seeking credibility or even opinion leaders known from the media. In addition to credibility, I would attach particular importance to the involvement of well-known people whose messages can reach a wider audience.

Suggestion 3 (based on H3): It is no coincidence that an increasing number of product types appear on the market alongside the traditional capsule form, which is expanding the range of vitamin and mineral preparations. Mapping the "immune market" with a more robust segmentation and differentiation of immune products could be the future for manufacturers.

Recommendation 4 (based on H5): A unit increase in promotion-focused health promotion has been associated with a 40% increase in use as a stand-alone element. The development of promotion-focused messages (positive content of an affective nature, future-oriented approach) can significantly contribute to the organisation of health-related campaigns and interventions among those who consume dietary supplements.

Bibliography

1. Binns, C.W. – Lee, M.K. – Lee, A. (2018): Problems and Prospects: *Public Health Regulation of Dietary Supplements. Annu. Rev. Public Health*, 39, 403–420
2. Chung, J. E. – Stoel, L. – Xu, Y. – Ren, J. (2012): Predicting Chinese consumers' purchase intentions for imported soy-based dietary supplements. *British Food Journal*, **114** (1), 143-161.
3. Conner, M. – Kirk, S. F. – Cade, J. E. – Barrett, J. H. (2001): Why do women use dietary supplements? The use of the theory of planned behaviour to explore beliefs about their use. *Social Science & Medicine*, **52** (4), 621-633.
4. Ferrer, R. A. – Lipkus, I. M. – Cerully, J. L. – McBride, C. M. – Shepperd, J. A. – Klein, W. M. P. (2017): Developing a scale to assess health regulatory focus. *Social Science & Medicine*, **195,** 50–60.
5. Geller, A.I. – Shehab, N. – Weidle, N.J. – Lovegrove, M.C. – Wolpert, B.J. – Timbo, B.B. – Mozersky, R.P. – Budnitz, D.S. (2015): Emergency Department Visits for Adverse Events Related to Dietary Supplements. *N Engl J Med*. **373**(16) 1531-40.
6. Higgs, S. – Liu, J. –Collins, E. I. M. – Thomas, J. M. (2019): *Using social norms to encourage healthier eating. Nutrition Bulletin, 44(1), 43–52.*
7. Khoury – D., Dwyer – J. J. M., Fein – L., Brauer – P., Brennan, S. – Alfaro, I. (2019). Understanding the Use of Dietary Supplements among Athlete and Non-Athlete University Students: Development and Validation of a Questionnaire. *Sports*, **7** (7), 166. doi:10.3390/sports7070166
8. Knapik, J.J. – Trone, D.W. – Austin, K.G. – Steelman, R.A. – Farina, E.K. – Lieberman, H.R. (2016): "Prevalence, Adverse Events, and Factors Associated with Dietary Supplement and Nutritional Supplement Use by U.S. Navy and Marine Corps Personnel," (in eng), *J Acad Nutr Diet* **116 (**9) 1423–1442.
9. Lau, R. R. – Hartman, K. A. – Ware, Jr. J. E. (1986): Health as a value: methodological and theoretical considerations *Health Psychology* **5** (1) 25-43.
10. Lehota J. (2001): Marketingkutatás az agrárgazdaságban. Mezőgazda Kiadó, Budapest, 27-64.
11. Levy, I. – Attias, S. – Ben-Arye, E. – Goldstein, L. – Schiff, E. (2016): *Adverse events associated with interactions with dietary and herbal supplements among inpatients. British Journal of Clinical Pharmacology,* **83** (4), 836–845.
12. Malhotra N. K. – Simon s. (2009): Marketingkutatás, Akadémiai Kiadó, Budapest
13. Malhotra, N. K. (2008): Marketingkutatás, Akadémiai Kiadó, Budapest
14. Nábrádi, Zs ; Kovács, S ; Szakály, Z. (2017): Húsfogyasztási szokások összefüggése az evési attitűdökkel a fiatal felnőtt korosztályban. MARKETING ÉS MENEDZSMENT 51 : klsz pp. 75-84. , 10 p. Stanojević-
15. Nishijima, C. – Sato, Y. – Chiba, T. – Umegaki, K. (2018): Nationwide Online Survey to Complement the Current Voluntary Reporting System for Adverse Events Associated with Dietary

Supplements: Application to the Case of Skin Manifestations. *Journal of Nutritional Science and Vitaminology,* **64** (4) 277–283.

16. OGYÉI (2016): OTÁP 2014, A 2016. június 2-án megrendezett szakmai konferencián elhangzott előadások https://ogyei.gov.hu/otap_2014 (Letöltés dátuma: 2018. 11. 30.)
17. Pajor, E. M. – Eggers, S. M. – Curfs, K. C. J. – Oenema, A. – de Vries, H. (2017): Why do Dutch people use dietary supplements? Exploring the role of socio-cognitive and psychosocial determinants. *Appetite,* **114,** 161–168
18. Qidwai W., Samani Z. A., Azam I., Lalani S. (2012): Knowledge, Attitude and Practice of Vitamin Supplementation among Patients visiting Out-Patient Physicians in a Teaching Hospital in Karachi, Oman Medical Journal Vol. 27, No. 2: 116-120 DOI 10. 5001/omj.2012.24
19. Ristić, Z. – Stević, S. – Rašić, J. –Valjarević, D. – Dejanović, M. – Valjarević, A. (2017): Influence of pharmacological education on perceptions, attitudes and use of dietary supplements by medical students. *BMC Complementary and Alternative Medicine* **17** (1).
20. Rodler I. (2005): Új tápanyagtáblázat, Medicina Könyvkiadó Zrt., Budapest
21. Rosenstock, I. M. (1974): Historical Origins of the Health Belief Model. *Health Education Monographs*, **2** (4) 328–335.
22. Sajtos L. – Mitev A. (2007): SPSS kutatási és adatelemzési kézikönyv. Alinea Kiadó, Budapest
23. Strecher, V. J. – Rosenstock, I. M. (1997): The health belief model. In Glanz, K., Lewis, F. M. and Rimer, B. K. (eds), *Health Behavior and Health Education: Theory, Research and Practice*, 2nd edn. Jossey-Bass, San Francisco, CA, pp. 41–59.
24. Thakkar, S. – Anklam, E. – Xu, A. – Ulberth, F. – Li, J. – Li, B. – Hugas, M. – Sarma, N. – Crerar, S. – Swift, S. – Hakamatsuka, T. – Curtui, V. – Yan, W. – Geng, X. – Slikker, W. – Tong, W. (2020): Regulatory landscape of dietary supplements and herbal medicines from a global perspective, *Regulatory Toxicology and Pharmacology*, **114**, 104647
25. Wallston, B. S. – Wallston, K. A. – Kaplan, G. D. – Maides, S. A. (1976): Development and Validation of the Health Locus of Control [HLC] Scale. *Journal of Consulting and Clinical Psychology*. **44** (4) 580–585

6. LIST OF OWN PUBLICATION

Foreign language scientific journal

1. **Nábrádi, Zs.** (2017): Demographic and lifestyle attributes with a fundamental role in food supplement consumption (exploratory research) *Apstract - Applied Studies In Agribusiness And Commerce* 11 (3-4) pp. 181-188. 8 p.
2. **Nábrádi, Zs.**, Bánáti D., Szakály Z. (2020): A study on consumer habit in dietary supplement market *Apstract - Applied Studies In Agribusiness And Commerce* 14 (3-4) pp. 5-12, 8 p.
3. **Nábrádi, Zs**., Szakály, Z. (2021): Attitudes towards health foods in terms of diet and physical activity *Elelmiszervizsgalati Kozlemenyek* 67 (3) 3525-3541

Hungarian language scientific journal with foreign language abstract

4. **Nábrádi, Zs.** (2022): Genetikai alapú személyre szabott táplálkozás és az étrend-kiegészítő fogyasztás kapcsolata a magyar lakosság körében *Táplálkozásmarketing* IX. (2) *(megjelenés alatt)*
5. **Nábrádi, Zs.** (2021): Étrend-kiegészítő fogyasztói szokások a fiatal felnőtt korosztály körében *Debreceni szemle* 29 (2), 229-238
6. **Nábrádi, Zs.**, Szakály, Z. (2021): Egészségvédő élelmiszerek iránti attitűdök a táplálkozás és a fizikai aktivitás vonatkozásában *Élelmiszervizsgálati közlemények* 67 (3) 3507-3524
7. **Nábrádi, Zs**. (2020): Egészségvédő élelmiszervásárlás- és fogyasztás kapcsolata a fizikai aktivitással *Gazdálkodástudományi Közlemények* 8 : 1 pp. 51-58., 8 p.
8. **Nábrádi, Zs.** – Szakály, Z. (2020): Az egészségmagatartás és az étrendkiegészítő-fogyasztás kapcsolata *Marketing És Menedzsment* 54 : 2. klsz pp. 39-51., 13 p.
9. **Nábrádi, Zs.** – Szakály, Z. (2019): Életstílus alapú fogyasztói szegmensek étrend-kiegészítők vásárlásában megjelenő sajátosságai In: Fehér, András; Szakály, Zoltán (szerk.) *Egészségpiaci kutatások* Debrecen, Magyarország: Debreceni Egyetem Gazdaságtudományi Kar, (2019) pp. 57-65., 9 p.
10. Kiss, V. – Csapóné, R., T. – **Nábrádi, Zs.** (2019): A sharing economy fogalma és a vele kapcsolatos attitűdök vizsgálata magyarországon *Taylor: gazdálkodás- és szervezéstudományi folyóirat: a virtuális intézet közép-európa kutatására közleményei* 11 : 3 pp. 25-33., 9p
11. **Nábrádi, Zs.** – Polereczki, Zs. (2017): Sportmotiváció és attitűdök vizsgálata aktív sportfogyasztó felnőttek körében In: Bányai, Edit; Lányi, Beatrix; Törőcsik, Mária (szerk.) *Tükröződés, társtudományok, trendek, fogyasztás: Egyesület a Marketing Oktatásért és kutatásért (EMOK) XXIII. országos konferencia: Tanulmánykötet* Pécs, Magyarország: Pécsi Tudományegyetem Közgazdaságtudományi Kar (PTE KTK), (2017) pp. 107-114., 8 p.

12. **Nábrádi, Zs.** – Kovács, S. – Szakály, Z. (2017): Húsfogyasztási szokások összefüggése az evési attitűdökkel a fiatal felnőtt korosztályban. *Marketing És Menedzsment* 51 klsz pp. 75-84, 10 p.

13. Herpainé, Lakó J. – Simon, I. Á. – **Nábrádi, Zs.** – Müller, A. (2017): Családok sportolási szokásainak szocioökonómiai hátterére *Képzés És Gyakorlat: Training And Practice* 15 (4) pp. 37-52, 16 p.

Scientific book/textbook in Hungarian

14. Megjelenés alatt: Szakály, Z. – Kovács, B. – **Nábrádi, Zs.** – Polereczki, Zs.: A hús és hústermékek marketingje: fogyasztói szokások, evési attitűdök és vállalati piacorientáció in Kukovics S. (szerk.): *A hús szerepe a humán táplálkozásban* ISBN 978-615-81508-2-8 pp. 603-626, 24 p.

15. Megjelenés alatt: Szakály, Z. – **Nábrádi Zs.**: Az egészségtudatosság és a fogyasztók ismeretei in Kukovics S. (szerk.): *A hús szerepe a humán táplálkozásban* ISBN 978-615-81508-2-8 pp. 371-394, 24 p.

16. **Nábrádi, Zs.** (2016): A sport és testedzés pszichológiája In: Balogh, László (szerk.) *Bevezetés a sportdiagnosztikába* Debrecen, Campus Kiadó pp. 206-249., 44 p.

17. **Nábrádi, Zs.** (2016): A sportpszichológiában alkalmazott diagnosztikai, mérési eljárások In: Balogh, László (szerk.) *Bevezetés a sportdiagnosztikába* Debrecen, Campus Kiadó pp. 164-206., 43 p.

Conference proceedings:

18. **Nábrádi, Zs.** (2019): Fizikai aktivitás motivációi és az étrend-kiegészítő fogyasztás vizsgálata sporttevékenységet végző felnőttek körében. In: *Fiatal Sporttudósok VII. Országos Konferenciája: Program és előadás-kivonatok*, Magyar Sporttudományi Társaság, Budapest, S-59, 1 p.

19. **Nábrádi, Zs.** – Szakály Z. (2019): Életstílus alapú fogyasztói szegmensek étrend-kiegészítők vásárlásában megjelenő sajátosságainak feltárása In: *Magyar Táplálkozástudományi Társaság XlIV. Vándorgyűlése Programja és az Előadások Összefoglalói*, Székesfehérvár, 38 1 p. ISBN 978-615-5606-09-0

20. **Nábrádi, Zs.** (2019): A fizikai aktivitás és a táplálkozás kapcsolata a savanyított tejtermékek piacán. In: *Tavaszi Szél Konferencia 2019: Nemzetközi Multidiszciplináris Konferencia: Absztraktkötet.* Szerk.: Németh Katalin, Doktoranduszok Országos Szövetsége, Budapest, 651, 1 p. ISBN: 9786155586422

21. **Nábrádi, Zs.** (2019): Motivation for physical activity and dietary supplement usage among Hungarian adults who engaged in sports. In: *1st Partium International Conference on Management : Trends in 21stC entury : Book of Abstracts*. Ed.: András Nábrádi, Katalin Gál, Partium Publishing House, Nagyvárad, 35-36, 2 p. ISBN: 9786068156941

22. **Nábrádi, Zs.** (2018): Az étrend-kiegészítők fogyasztását meghatározó demográfiai és életstílus jellemzők. In: *Táplálkozástudományi kutatások VIII. PhD konferencia program és előadás összefoglalók*. Szerk.: Gelencsér Éva, Lugasi Andrea, Magyar Táplálkozástudományi Társaság, Budapest, 19, 1 p. ISBN: 9786155606052

Other publication:

23. **Nábrádi, Zs.** (2019): Fogyasztói szokások vizsgálata az étrend-kiegészítők piacán. *Táplálkozástudományi Morzsák Hírlevél.* 2 (2), 7-10, 4 p.

UNIVERSITY AND NATIONAL LIBRARY
UNIVERSITY OF DEBRECEN
H-4002 Egyetem tér 1, Debrecen
Phone: +3652/410-443, email: publikaciok@lib.unideb.hu

Registry number: DEENK/273/2022.PL
Subject: PhD Publication List

Candidate: Zsófia Ildikó Holbné Nábrádi
Doctoral School: Károly Ihrig Doctoral School of Management and Business
MTMT ID: 10062570

List of publications related to the dissertation

Articles, studies (11)

1. Szakály, Z., **Nábrádi, Z.**: Az egészségtudatosság és a fogyasztók ismeretei. In: A hús szerepe a humán táplálkozásban. Szerk.: Kukovics Sándor, Magyar Juh- és Kecsketejgazdasági Közhasznú Egyesület, Herceghalom, [közlésre elfogadva], 371-395, 2022. ISBN: 9786158150828
2. **Nábrádi, Z.**: Genetikai alapú személyre szabott táplálkozás és az étrend-kiegészítő fogyasztás kapcsolata a magyar lakosság körében. *Táplálkozásmarketing. [közlésre elfogadva]*, 1-11, 2022. EISSN: 2064-8839.
3. **Nábrádi, Z.**, Szakály, Z.: Attitudes towards health foods in terms of diet and physical activity. Utánközlés nyelvi változat, *Élelmiszervizsgálati Közlemények. 67* (3), 3525-3541, 2021. ISSN: 2676-8704. DOI: http://dx.doi.org/10.52091/EVIK-2021/3-1-ENG
4. **Nábrádi, Z.**, Szakály, Z.: Egészségvédő élelmiszerek iránti attitűdök a táplálkozás és a fizikai aktivitás vonatkozásában. *Élelmiszervizsgálati Közlemények. 67* (3), 3507-3524, 2021. ISSN: 2676-8704. DOI: https://doi.org/10.52091/EVIK-2021/3-1-HUN
5. **Nábrádi, Z.**: Étrend-kiegészítő fogyasztói szokások a fiatal felnőtt korosztály körében. *Debreceni szemle. 29* (2), 229-238, 2021. ISSN: 1218-022X.
6. **Nábrádi, Z.**, Bánáti, D., Szakály, Z.: A study on consumer habits in the dietary supplements market. *Apstract. 14* (3-4), 5-12, 2020. ISSN: 1789-221X. DOI: http://dx.doi.org/10.19041/APSTRACT/2020/3-4/1
7. **Nábrádi, Z.**, Szakály, Z.: Az egészségmagatartás és az étrendkiegészítő-fogyasztás kapcsolata. *Marketing & Menedzsment. 54* (Spec.), 39-51, 2020. ISSN: 1219-0349. DOI: http://dx.doi.org/10.15170/MM.2020.54.KSZ.II.04
8. **Nábrádi, Z.**: Egészségvédő élelmiszervásárlás és -fogyasztás kapcsolata a fizikai aktivitással. *Gazdálkodástudományi közlemények. 8* (1), 51-58, 2020. ISSN: 2061-2443.

9. **Nábrádi, Z.**, Szakály, Z.: Életstílus alapú fogyasztói szegmensek étrend-kiegészítők vásárlásában megjelenő sajátosságai.
In: Egészségpiaci kutatások. Szerk.: Fehér András, Szakály Zoltán, Debreceni Egyetem Gazdaságtudományi Kar, Debrecen, 57-65, 2019. ISBN: 9789634901327

10. **Nábrádi, Z.**: Fogyasztói szokások vizsgálata az étrend-kiegészítők piacán.
Táplálkozástudományi Morzsák Hírlevél. 2 (2), 7-10, 2019. ISSN: 2630-8975.

11. **Nábrádi, Z.**: Demographic and lifestyle attributes with a fundamental role in food supplement consumption (exploratory research).
Apstract. 11 (3-4), 181-188, 2017. ISSN: 1789-221X.
DOI: http://dx.doi.org/10.19041/APSTRACT/2017/3-4/24

Conference presentations (4)

12. **Nábrádi, Z.**, Szakály, Z.: Életstílus alapú fogyasztói szegmensek étrend-kiegészítők vásárlásában megjelenő sajátosságainak feltárása.
In: Magyar Táplálkozástudományi Társaság XLIV. Vándorgyűlése programja és az előadások összefoglalói. Szerk.: Antal Emese, Biró Lajos, Gelencsér Éva, Lugasi Andrea, Rurik Imre, Magyar Táplálkozástudományi Társaság, Budapest, 38, 2019. ISBN: 9786155606090

13. **Nábrádi, Z.**: Fizikai aktivitás motivációi és az étrend-kiegészítő fogyasztás vizsgálata sporttevékenységet végző felnőttek körében.
In: Fiatal Sporttudósok VII. Országos Konferenciája : Program és előadás-kivonatok, Magyar Sporttudományi Társaság, Budapest, S-59, 2019.

14. **Nábrádi, Z.**: Motivation for physical activity and dietary supplement usage among Hungarian adults who engaged in sports.
In: 1st Partium International Conference on Management : Trends in 21stC entury : Book of Abstracts. Ed.: András Nábrádi, Katalin Gál, Partium Publishing House, Nagyvárad, 35-36, 2019. ISBN: 9786068156941

15. **Nábrádi, Z.**: Az étrend-kiegészítők fogyasztását meghatározó demográfiai és életstílus jellemzők.
In: Táplálkozástudományi kutatások VIII. PhD konferencia program és előadás összefoglalók. Szerk.: Gelencsér Éva, Lugasi Andrea, Magyar Táplálkozástudományi Társaság, Budapest, 19, 2018. ISBN: 9786155606052

UNIVERSITY of DEBRECEN

UNIVERSITY AND NATIONAL LIBRARY
UNIVERSITY OF DEBRECEN
H-4002 Egyetem tér 1, Debrecen
Phone: +3652/410-443, email: publikaciok@lib.unideb.hu

List of other publications

Books (1)

16. Balogh, L., Molnár, A., Jenei, Z., **Nábrádi, Z.**, Ráthonyi, G., Szilágyi, R., Balogh, P.: Bevezetés a sportdiagnosztikába. Campus Kiadó, Debrecen, 371 p., 2015. ISBN: 9789639822436

Articles, studies (4)

17. Szakály, Z., Kovács, B., **Nábrádi, Z.**, Polereczki, Z.: A hús és hústermékek marketingje: fogyasztói szokások, evési attitűdök és vállalati piacorientáció.
In: A hús szerepe a humán táplálkozásban. Szerk.: Kukovics Sándor, Magyar Juh- és Kecsketejgazdasági Közhasznú Egyesület, Herceghalom, [közlésre elfogadva], 603-626, 2022. ISBN: 9786158150828

18. Kiss, V. Á., Csapóné Riskó, T., **Nábrádi, Z.**: A sharing economy fogalma és a vele kapcsolatos attitűdök vizsgálata Magyarországon.
Taylor. 11 (3), 25-33, 2019. ISSN: 2064-4361.

19. **Nábrádi, Z.**, Kovács, S., Szakály, Z.: A húsfogyasztási szokások összefüggése az evési attitűdökkel a fiatal felnőtt korosztályban.
Management and Marketing. EMOK klsz., 75-84, 2017. ISSN: 1842-0206.

20. Herpainé Lakó, J., Simon, I. Á., **Nábrádi, Z.**, Müller, A. É.: Családok sportolási szokásainak szocioökonómiai hátterére.
Képzés és gyakorlat 15 (4), 37-52, 2017. ISSN: 1589-519X.
DOI: http://dx.doi.org/10.17165/TP.2017.4.4

Conference presentations (3)

21. **Nábrádi, Z.**: A fizikai aktivitás és a táplálkozás kapcsolata a savanyított tejtermékek piacán.
In: Tavaszi Szél Konferencia 2019: Nemzetközi Multidiszciplináris Konferencia: Absztraktkötet. Szerk.: Németh Katalin, Doktoranduszok Országos Szövetsége, Budapest, 651, 2019. ISBN: 9786155586422

22. Herpainé Lakó, J., Simon, I. Á., **Nábrádi, Z.**, Müller, A. É.: Családok szabadidő - eltöltési szokásai, különös tekintettel a sporttevékenységek szocioökonómiai hátterére.
In: Diverzitás a hazai és nemzetközi neveléstudományi kutatásokban és a pedagógiai gyakorlatban: X. Képzés és Gyakorlat Nemzetközi Neveléstudományi Konferencia Absztraktkötet = Diversity in National and International Researches in Educational Sciences and Pedagogical Practice" 10th Training and Practice International Conference on Educational Sciences Abstracts. Szerk.: Kissné Zsámboki Réka, Horváth Csaba, Soproni Egyetem Kiadó, Sopron, 152, 2017. ISBN: 9789633590720

UNIVERSITY AND NATIONAL LIBRARY
UNIVERSITY OF DEBRECEN
H-4002 Egyetem tér 1, Debrecen
Phone: +3652/410-443, email: publikaciok@lib.unideb.hu

23. **Nábrádi, Z.**, Szakály, Z., Kovács, S.: A húsfogyasztási szokások összefüggése az evési attitűdökkel és az önértékeléssel.
In: Az Egyesület a Marketing Oktatásért és Kutatásért XXII. Országos Konferenciája : Hitelesség és értékorientáció a marketingben : Tanulmánykötet. Szerk.: Fehér András, Kiss Virág Ágnes, Soós Mihály, Szakály Zoltán, Debreceni Egyetem Gazdaságtudományi Kar, Debrecen, 407-416, 2016. ISBN: 9789634728504

The Candidate's publication data submitted to the iDEa Tudóstér have been validated by DEENK on the basis of Web of Science, Scopus and Journal Citation Report (Impact Factor) databases.

27 May, 2022

DEBRECENI EGYETEM Egyetemi és Nemzeti Könyvtár

Address: 1 Egyetem tér, Debrecen 4032, Hungary Postal address: Pf. 39. Debrecen 4010, Hungary
Tel.: +36 52 410 443 Fax: +36 52 512 900/63847 E-mail: publikaciok@lib.unideb.hu, ¤ Web: www.lib.unideb.hu