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# **Impact of Marketing Mix on Consumer Choices in Dietary Food Supplement Industry**

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The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam.

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# 1. Introduction

This thesis explores the dietary food supplement industry. More specifically, it focuses on exploring the main elements of the marketing mixes employed by the dietary food supplement (DFS) companies and determining their impacts on consumer choices of the supplements offered by these companies.

## 1.1. Problem Analysis

As time goes on, the world as a whole becomes increasingly more health conscious. As a result, the health industry has been rapidly growing throughout the last decade; new health-related products and services appear on the market nearly daily. Moreover, there are forecasts suggesting that by 2026 the market size of worldwide health industry will become six times as large as in 2019 (Stewart, 2021). On top of that, Covid-19 disease, which broke out in the last quarter of 2019 and has been terrorizing a major part of the world for one and a half years, has had a tremendous contribution to the growth of health industry; Coronavirus has made the subject of health more relevant than ever before (Arizton, 2020).

A big sector of health that has had an especially rapid growth rate, including the years 2020 and 2021, is a market of dietary supplements. A dietary supplement is a product consumed internally, containing minerals, vitamins, herbs, amino acids and other dietary ingredients (U.S. Food & Drug Administration, 2015). Nowadays, there is a large variety of dietary supplement companies, companies that manufacture and sell various dietary supplements; this can be explained by the recent trends in health and a growing demand for vitamins, minerals and other types of supplements around the world. Some sources explain such high demand by the concept of preventive healthcare which keeps gaining its popularity. Preventive healthcare is focused on preventing potential health issues that might arise rather than dealing with health issues as they come (Research and Markets, 2020).

As mentioned before, the forecasted future will bring a tremendous growth of the supplement market, but even today millions of people have a variety of vitamin bottles standing in their cupboards used daily. Based on the 2019 statistics, back then, 86% of the American adults used dietary supplements, which is a major part of the USA population (American Osteopathic Association, 2019). In fact, the US is the biggest dietary supplement market in the world, followed by Europe, China, and the rest of the world.

There is a great variety of distinctive supplement companies in majority of the countries around the world, most of which offer similar products. A tremendous number of people purchase supplements from the companies of their choice, which is made for various possible reasons, some of which are influence of social media and recommendations (Food Standards Agency, 2018). These companies act differently on the markets and attract different customers based on certain criteria. The exact reason for which people choose specific supplement companies, whether or not and why these people stay loyal to them are not thoroughly researched.

Companies' marketing strategies, their marketing mixes more specifically, might play a significant role in consumers' decision processes. Firms tend to act with caution when developing their marketing mixes, which are combinations of decisions concerning pricing strategies, product characteristic, distribution channels, and promotion campaigns. These decisions generally tend to have a significant impact on consumer behavior and brand loyalty (Aloysius, 2004), which gives a presumption that the consumer choices in dietary food supplement industry might also be considerably affected by the marketing mixes of companies active in the market. This brings this thesis to its main research objectives.

## 1.2. Research Objectives

Two objectives of this research can be outlined. First, to explore marketing strategies of dietary supplement companies by looking at the marketing mixes commonly employed by companies of this industry as well as the ones employed by 3 specific dietary supplement companies. Second, to analyze how the elements of the marketing mixes impact choices made by consumers.

## 1.3. Research Central Question

The aforementioned problem analysis and research objectives set the ground for further discussion and raise a question, which will be central to this research: *To what extent and how do the marketing mixes most commonly employed by the dietary food supplement companies impact consumer choices among younger adults aged from 18 to 29?*

As outlined in the central research question, the thesis will focus on younger adults, but more specifically, on university students. This focus will be maintained by using previously conducted studies with samples consisting of mostly students of roughly the same age, and by conducting an empirical research, the data for which will be gathered from university students by convenience and snowball sampling.

Furthermore, answering the central research question will require adopting a case study approach, which will be more clearly addressed by 3<sup>rd</sup> research sub-question discussed in the next sub-section of the introduction (*Research Sub-questions*).

## 1.4. Research Sub-questions

In order to formulate an answer to the central research question, a set of theoretical and empirical sub-questions is required:

Theoretical questions:

1. What is the effect of marketing mix of supplement companies on consumer choice according to previously conducted research?

2. Which aspect of the marketing mix has the most significant impact on consumer choice according to previously conducted research?

Empirical questions:

3. Which 3 supplement companies are mostly chosen as preferred by the respondents?
4. How is the marketing mix realized by the companies identified in sub-question 3?
5. What effect does marketing mix of DFS companies have on consumer choices based on the research results and how do these results differ from previously existing findings?
6. Which of the elements of the marketing mix has the most significant effect on consumer choice based on the research results and how does it differ from the most significant element outlined by previous studies?
7. Does consumer choice of DFS brand depend on the supplement purchased?

The marketing mixes of the dietary supplement companies will be researched from the point of view of the 4 Ps of marketing and how they are realized commonly realized in a supplement industry and by specific companies. The 4 Ps of marketing include: Product (characteristics of a brand and its offered product mix), Place (ways in which the products are distributed), Price (companies' pricing strategies), and Promotion (brand's advertising techniques and publicity). These 4 Ps will be looked at separately, as well as when they are put together, forming a company's marketing mix.

Sub-question 4 will adopt a case study approach: marketing mixes of the 3 most commonly chosen dietary-supplement brands outlined in sub-question 3 will be researched. Marketing strategies of these companies will be elaborated in depth in order to determine whether the self-reported preferences for marketing mixes of the respondents, who chose these companies, coincide with the actual marketing mixes of these companies. On top of that, the case study approach will provide more insight into marketing strategies of firms competing in the dietary supplement industry.

## 1.5. Scientific and Social Relevance of Research

**Scientific Relevance:** the research will discover the reasons behind people's choice of the supplement companies and reasons behind their brand loyalty, which have not been studied in depth.

**Social Relevance:** The results of the study will provide supplement companies with useful information on the customer choices, according to which they can adjust their marketing strategies to attract more consumers and expand market shares. Additionally, the study will raise consumers' awareness of their own choices of supplements and explain the reasons behind their choices from a marketing perspective.

## 1.6. Structure of the Thesis

This thesis consists of 4 chapters besides *Introduction: Literature Review, Research Methodology, Results and Analysis, and Conclusion and Recommendations*.

Chapter 2, *Literature Review*, explores the literature found on the topic of marketing mix and its impacts on consumer choices within the DFS industry in order to answer sub-questions 1 and 2. First, it will cover each of the 4 elements of the marketing mix separately, explaining their general effects on consumer choices. Second, it will present 2 studies which dive deeper into characteristics of the 4 elements, how they impact consumer choices and which of them has a more significant effect.

Chapter 3, *Research Methodology*, describes the set-up of the research that was performed in order to answer sub-questions 3 to 7. It overviews the sampling methods used, the design of the survey distributed and its questions individually, data filtering process, and data analysis techniques used. Moreover, it explains how exactly each of the research sub-questions will be answered.

Chapter 4, *Results and Analysis*, presents overview of the data collected via surveying the sample, results of analysis of this data, as well as the results of research performed in attempt to answer a theoretical sub-question #3. Furthermore, this chapter presents interpretation and discussion of the results.

Finally, chapter 5, *Conclusion and recommendations*, answers all of the sub-questions individually. After that, the answers to the sub-questions are combined, so that the answer to the central research question is formulated and a general conclusion is drawn. At the end, this chapter presents limitations of the performed research, as well as recommendations for further research to explore the topic of this more in depth.

## 2. Literature Review

### 2.1. Overview

This literature section of the thesis will review various academic articles, previously conducted research and studies, publications of conferences, and even books on consumer behavior in order to gather information on the concept of marketing mix, its elements, and its implications for consumer choice. More specifically, this section will attempt to answer the research sub-questions 1 and 2.

### 2.2. Significance of the 4 Elements of the Marketing Mix

#### 2.2.1. Product

Product characteristics most likely play a big role in consumer decision making. Packaging, being one of the product's characteristics, has a distinct role in brands' marketing strategies; moreover, it may have a significant impact on consumer preferences. In their journal article, Roe, Levy, and Derby (1999) reported results of a mall-intercept study of effects of health claims on product packages on consumer information processing and behavior. The study revealed that consumers often gave more weight to the information provided by the claims than to the nutritional value information on the back. The authors also mentioned that effectiveness of a claim on the packages is associated with 2 effects: Halo effect and Magic-bullet effect. People happen to rate the products higher in terms of other health attributes that are not even mentioned by a claim; this behavior can be explained by Halo effect. On top of that, people exhibit Magic-bullet effect, which is associating unrelated health benefits to the product in presence of a claim. Overall, this study suggests that the packaging and health claims positioned on it may play a crucial role in consumers' information processing and hence preferences and behavior.

Furthermore, another study performed using SPSS software, based on data collected from a sample, consisting of 100 customers of three major shopping centers in Singapore, suggests that product characteristics have a significant impact on consumers' impulsive buying behavior (Chavosh et al., 2011). This impact on impulsive buying behavior may be relevant when it comes to consumers purchasing DFSs in the grocery stores. This can be explained by DFSs generally being located in convenient locations of supermarkets, which promotes impulsive behavior.

#### 2.2.2. Price

Pricing strategies also tend to have a strong impact on choices made by consumers. Demand for food nutrients is price elastic, based on a study conducted in India (Bhargava, 2006), which suggests that changes in price levels impacts consumers' demand for nutrients. Such relationship between price and demand for nutrients gives ground to assume a potentially similar relationship between prices and DFSs. Furthermore, two books on consumer behavior written nearly 10 years apart, one by Hawkins, Best, and Coney (2001) and another by



Schiffman and Kanuk (2010), both explain that consumers tend to use prices as signals for product quality, which applies to DFS industry as well. In other words, consumers attempt to find DFSs with the highest quality for the price they are willing to pay, while often using price as a proxy for quality.

### 2.2.3. Place

Place or distribution is an important part of marketing mix as well. Every place of selling or distribution channel will attract a certain segment of customers, some of them are more effective than others. The way products are distributed/place of distribution plays a big role and may impact consumer preferences based on product categories (Heitz-Spahn et al., 2018). This suggests that the most appropriate way of distribution has to be chosen depending on the type of product in question. Furthermore, Heitz-Spahn, Yildiz, and Belaud (2018) also explain that a company's choice of distribution channel may impact consumer preferences because individuals have different preferences for places where to purchase products; some consumers believe shopping on Internet to be risky, for example.

Fandy Tjiptono, a researcher in Monash University Malaysia has written numerous articles and has done many studies in a field of marketing, consumer behavior and brand management. In one of his studies (2000), Tjiptono explains that location of product's distribution may change shopping patterns significantly. He states that when the location is right, many consumers will be attracted, which is likely to increase company's sales.

### 2.2.4. Promotion

Promotion has a special role among the 4 elements of marketing mix, because it is the companies' main way of informing buyers about their products, as well as their features, characteristics, and advantages. In other words, promotion can be seen as a firm's way to convey other aspects of its marketing mix to the customers. Potential market transactions require buyers to have access to the information about the products, its prices, and physical or electronic locations of distribution, which is given to them by the companies' promotion campaigns. According to Shi, Ka-Man and Gerald (2005), promotion via price and quantity discounts has shown to be highly effective at increasing sales. Furthermore, according to Grunert, Wills and Celemin (2010), informing consumers about the prices via various types of advertising has shown to be essential for consumer choice, based on a number of studies. This suggests that promotion techniques related to adjustments of prices and quantities are effective means of affecting behavior of consumers by attracting them and convincing to make a purchase. In addition, another empirical study's results suggest that exposure to television and print advertising has a positive impact on demand for supplements and their use (Eisenberg et al., 2017). This suggests that promotion via TV and printed means such as magazines and newspaper also impacts consumer decisions in favor of supplements.

## 2.3. Empirical Study of Impact of Marketing Mix on Consumer Choices in India

### 2.3.1. Research Set-Up

So far the literature providing more general information about the marketing mix has been covered. The aforementioned sources have mostly gone over the overall significance of product characteristics, pricing strategies, distribution channels, and promotion campaigns of the companies, as well as their general effects on consumer behavior in the DFS industry. However, there is also some literature that dives more in depth when exploring the effects of the 4 P's of the marketing mix of DFS companies on consumer choice. The overall set up and main findings of such research will be discussed in the following few paragraphs.

This research was done by Chauhan and Bhatia, 2 assistant professors of Shri Chimanbhai Patel Institute of Management and Research in Ahmedabad, India, with the help of a post graduate student of the same institute, Hirpara (2017). In this study, they explored consumer preferences for DFSs and the factors they are influenced by; more specifically they researched how consumers perceive different prices of DFSs, their quality and the forms in which they come. In order to do this, the researchers took a sample of 108 individuals from an Indian target population consisting of consumers of dietary supplements, each of whom was asked to fill out a survey. The majority of the sample, fell in roughly the same age cohort as the one studied in this Thesis: 51.9% of the sample were consumers aged between 21 and 30, the rest were older, but did not exceed an age of 50. In order to find answers to their questions, the authors provided respondents with a list of statements concerning their preferences for DFS brands and for price levels, contents of the supplements, quality, form, and source of information of the preferred supplements. The respondents had to evaluate the given statements using a 5-point Likert scale, where 5 was "strongly agree" and 1 was "strongly disagree".

### 2.3.2. Main Findings

One of their findings was about the price preferences of Indian consumers: it turned out that on average the respondents were willing to pay for between 500 and 1000 Rs for their supplements, which is low-to-average price level, based on the average prices of supplements on the Indian online marketplaces such as Flipkart. Based on their results, the DFS companies setting higher prices would still attract consumers, but the higher price a company sets, the lower number of consumers will purchase its supplements.

Furthermore, the study draws up some conclusions about the promotion effectiveness. In order to get results, the 108 people were presented with 6 six statements concerning the source of knowledge about the supplements of their preference; the listed sources in these statements were friends, family, doctor, internet, newspaper/TV ads, and salesperson. Among these 6, the statements in which the sources of information were family, doctor, and friends scored 3.05, 3.20, 3.29 on average, respectively; meanwhile, salesperson scored 2.95, internet – 2.71, and newspaper/TV ads – 2.70. The 3 sources of information about the DFSs of people's liking with the highest scores can be characterized as a word-of-mouth or recommendation type of promotion. Even though these results do not provide evidence for word-of-mouth being the most effective way of promoting dietary food supplements, they still suggest that it might

create a more positive impact on consumer preferences than promotion by TV ads, newspaper, Internet, and salesperson.

Finally, there were some findings related to product characteristics that impact consumer preferences of DFSs. It appeared that, on average, the respondents cared whether or not the food supplements they purchase contain 100% natural ingredients, which suggests that quality is a relevant product characteristic which most likely impacts consumer choice to a certain extent. Moreover, based on 4 statements concerning the form of supplements, the researchers concluded that supplements in tablet and capsule form are, on average, more appealing to the respondents than powder form or soft gels. This indicates that the form of supplements is another product characteristic that consumers consider when making choices.

### 2.3.3. Conclusion

In conclusion, in their research, the authors find a few important insights on how different elements of the marketing mix of DFS brands impacts consumer preferences and choices. Firstly, consumers seem to be more attracted to supplements which are priced just below average, and the higher the price rises, the less people purchase these supplements. Secondly, word-of-mouth is an effective promotion technique, which shows to possibly be better than advertisements on Internet, promotion by salesperson, TV and print advertising. Lastly, quality and form are product characteristics that may alter consumer preferences: having 100% natural supplements and supplying them in the form of tablets and capsules may attract more customers.

## 2.4. Empirical Study of an Impact of Marketing Mix on Consumer Choices in Malaysia

### 2.4.1. Research Set-Up

Another empirical study investigating specifics of an impact of the elements of marketing mixes of companies on consumer choice was carried out in Malaysia. This research was conducted by 6 professors of 4 Malaysian universities. As opposed to the previously described study conducted in India, which explored how the elements of the marketing mix impact consumer behavior, this quantitative research focused on evaluating the size of an impact of each of the elements of marketing mix on consumer preferences and assessing which of the 4 P's has the biggest affect.

In order to carry out this research, the professors randomly sampled 397 students of University Utara Malaysia, which has a total of 27945 students. The minimum number of individuals for a representative sample with 95 confidence interval and 5% margin of error for a population of 27945 is 379, according to Qualtrics. This suggests that the random sample of 397 students should theoretically be representative of the university population if all requirements of random sampling were fulfilled. The participants were given 30 minutes to fill out a survey with questions related to the 4 Ps of the marketing mix: product, price, place, and promotion. Unfortunately, the questions' specifics are not discussed within the study. Even though the

sample is taken from a university in Malaysia and not Europe, the population's age mostly likely varies between 18 and 29 years old, which is usually the age range of university students. Having the sample taken from the university population of age range between 18 and 29 makes this research highly relevant for answering the central research question of this Thesis.

#### 2.4.2. Main Findings

After the data was collected, it was used to run a Pearson correlation analysis for the following variables: Product, Price, Place, Promotion, and Consumer Preferences. The details of the analysis are displayed in the table 1 below, where the correlation coefficients of all the variables between each other are present.

Table 1: Result of Pearson Correlation Analysis.

	Product	Price	Place	Promotion	Consumer Preferences
Product	1				
Price	0.553***	1			
Place	0.559***	0.613***	1		
Promotion	0.497***	0.483***	0.541***	1	
Consumer Preferences	0.545***	0.381***	0.494***	0.445***	1

Notes: this table shows the correlation coefficients of variables Product, Price, Place, Promotion, and Consumer Preferences between each other. Stars for p-values: \* < 0.10; \*\* < 0.05; \*\*\* < 0.01.

According to the results of the correlation analysis, correlation coefficient of Consumer Preferences is the highest with Product (0.545), followed by Place (0.494), Promotion (0.445), and Price (0.381) in descending order. Based on these results, the professors made a logical conclusion that product characteristics have the highest positive relationship with consumer preferences, while price has the lowest positive relationship with them. In other words, a fact of consumers preferring a certain product is most correlated with consumers being satisfied with the product characteristics and least correlated with price satisfaction.

After the correlation analysis was performed and the consequent conclusions were made, the data was used to run a multiple regression analysis. Using an unidentified software for statistical analysis, Consumer Preferences were regressed on Product, Price, Place, and Promotion. The results of this regression analysis are portrayed in table 2 below.

Table 2. Multiple Regression Analysis.

	B	Sig
(Constant)	10.277***	0.000
Product	0.250***	0.000

Price	0.031	0.547
Place	0.154***	0.000
Promotion	0.113***	0.002

*Notes:* this table shows regression model with Consumer Preferences as an independent variable and Product, Price, Place, and Promotion as dependent variables; Adjusted  $R^2 = 0.359$ . Stars for p-values: \* < 0.10; \*\* < 0.05; \*\*\* < 0.01.

According to the regression analysis conducted by the researchers, marketing mix overall (product, price, place, and promotion together) explain 35.9% ( $R^2 = 0.359$ ) of consumer preferences, which can be seen in the *Notes* section under the table 2. This implies that consumer preferences for DFSs might be significantly dependent on the marketing mixes of the companies. Assuming that consumer preferences can be used as a proxy for consumer choices, then the choices made by consumers might also be highly dependent on the elements of companies' marketing strategies. As it can be seen on the table 2, the coefficients of all variables except Price are significant, which means that only the regression coefficient of Price cannot be interpreted. Moreover, according to the model, product has the most positive association with consumer preferences of 0.250, while place and promotion have coefficients of 0.154 and 0.113, respectively. Even though the research does not provide enough evidence to establish these coefficients to be causal effects, they can still serve as indicators of which element of marketing mix consumer preferences respond to more.

Unfortunately, the article does not provide conceptualization and operationalization of the variables; in other words, the paper does not give any information on what exactly the variables stand for in this specific research, how they were measured and in which units. Therefore, it remains unclear how exactly to interpret the coefficients provided by the model.

### 2.4.3. Conclusion

In conclusion, this results of this study suggest that marketing mix of dietary food supplement companies explains 35.9% of consumer preferences in this industry, which might suggest that consumer choices are under significant dependence on the marketing mixes of companies. Moreover, even though the coefficients cannot be interpreted, they, together with the correlations, give an idea that Product out of the 4 Ps of the marketing mix might be more important for consumer preferences, and possibly choices.

## 2.5. Conceptual Framework

This subsection presents the main findings from the literature reviewed in order to provide answers to the first two sub-questions of this thesis. Figure 1 below presents the 4 elements of the marketing mix outlined in the literature review, as well as the main findings related to each of these 4 elements in terms of their impacts on consumer preferences and choices within the DFS industry.

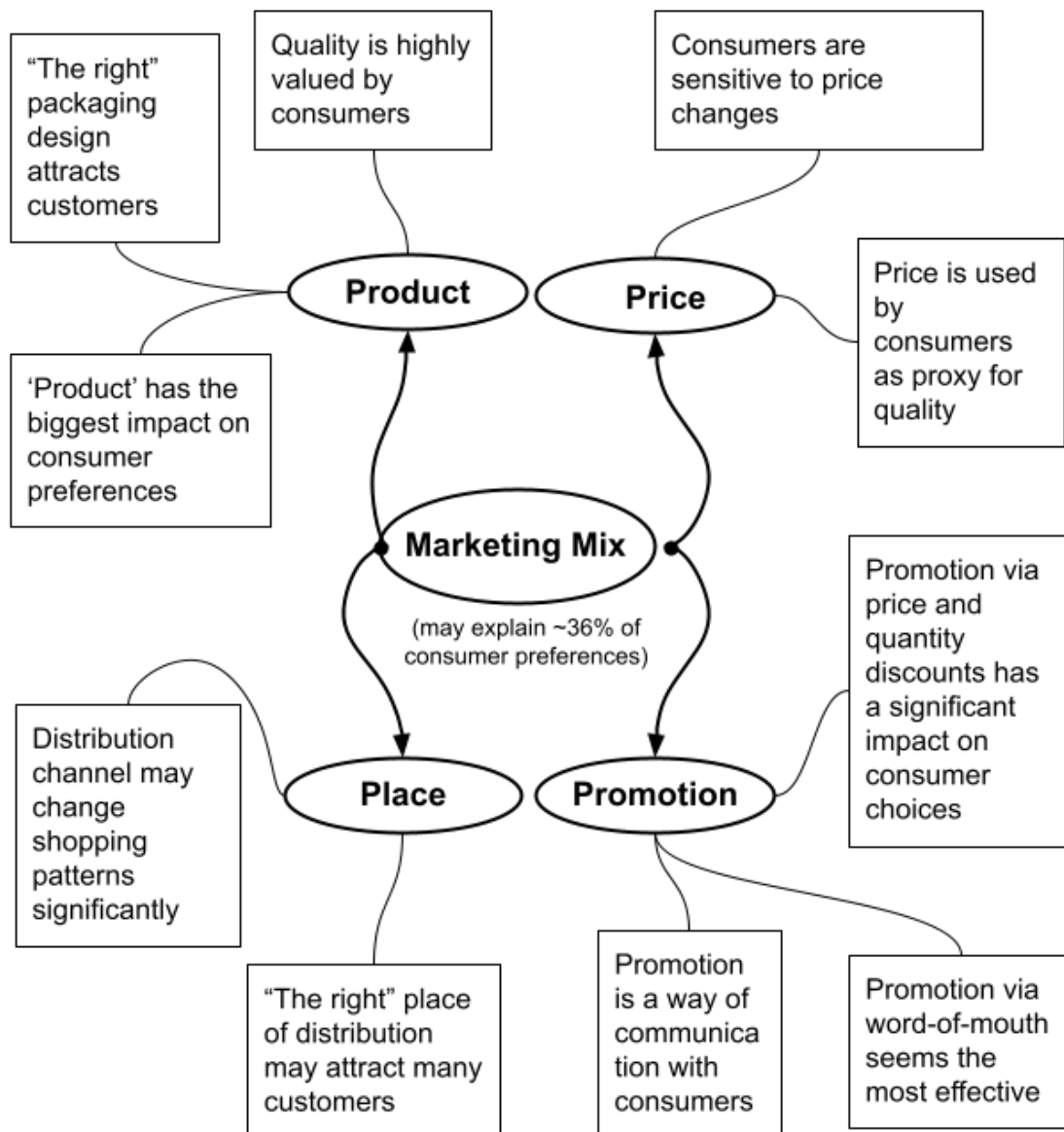


Figure 1. Conceptual Framework of the Literature Review.

## 3. Research Methodology

### 3.1. Research Design

This section will cover the methodologies applied in order to answer the research sub-questions 3 to 7. All of them will require slightly different approaches, but the main research methods used will be quantitative and qualitative. Questions 3, 5, 6, and 7 were answered by analyzing quantitative data collected from a sample of people for this research, while question 3 required gathering more qualitative information from available academic and non-academic sources on top of previously conducted literature review.

First of all, the survey used for data collection served to answer the 3<sup>rd</sup> research sub-question: *which 3 supplement companies are mostly chosen as preferred by the respondents?* After finding which DFS companies the consumers are mostly attracted to, a case study approach was adopted in order to explore the marketing strategies of these most preferred dietary supplement companies in the sample. Their product mixes, pricing strategies, and ways of promotion and distribution were studied in order to get an overall picture of the companies that appeal to the sample the most. This served as a starting indicator of what supplement companies' and their products' characteristics are more appreciated on the market.

After sub-questions 3 and 4 were answered, the data was used to provide answers to questions 5 and 6: *What effect do elements of marketing mix of DFS companies have on consumer choices and which element is the most significant based on the research results.* In order to answer these questions, the survey included questions on the 4 elements of marketing mix: product, price, place, and promotion. Consequently, the findings obtained through this survey were compared with the findings of literature review. Finally, sub-question 7 was addressed by analyzing the data provided by the respondents as well. All the findings obtained through covering all the sub-questions separately were pulled together in order to find an answer to the central question of this thesis: *To what extent and how do the marketing mixes most commonly employed by the dietary supplement companies impact consumer choices among younger adults aged from 18 to 29?* Further, an outline of the survey, the specifics of its questions, and the data collection process will be discussed in the next section of methodology.

### 3.2. Data Collection and Sampling

#### 3.2.1. Sampling Methods and Procedure

The target population from which the sample was drawn consisted of DFS consumers who purchase their supplement themselves and who are university students of ages between 18 and 29 years old, . In order to ensure that the data was gathered from the target population, as well as to make the data collection process less complicated, convenience and snowball sampling methods were employed. Convenient sampling method is characterized by gathering data from conveniently available individuals (QuestionPro, 2021), which were mostly university

students of Erasmus University Rotterdam, Amsterdam University, a few universities in Great Britain, Serbia, Russia and in a few other countries. On top of that, to ensure having more demographic diversity in the data, the research made use of snowball sampling: when the research participants recruit other people of certain characteristics to join the research as well (QuestionPro, 2018). Snowball sampling aided the research by making sure to gather data from the individuals belonging a segment of DFS consumers of the correct age cohort.

The sample was drawn by sending a survey link to the target population segment via various means of social media such as WhatsApp, Instagram, Telegram, and so on. Once people got access to the link, they filled out the survey and then passed on the link on to the people they knew that fell within the right category. In the end, this procedure yielded a sample of 53 DFS consumers of ages between 18 and 29 years old.

### 3.2.2. Survey Overview

The survey for this research was created using an advanced tool for survey design from Qualtrics software, which is an operating system with a variety of tools generally employed by businesses to evaluate their goods, services or systems and improve the experience of their offerings. This sub-section will explain an outline of the survey, as well as cover the questions used to gather information necessary for answering the research sub-questions. It will explain, in details, which questions specifically attempt to find information on sub-questions 3, 5, 6, and 7. An overall list of survey questions and their purposes can be observed in the Table 3 below.

These survey questions were in part based on the findings of the literature review. Figure 1 (p. 14) presented the 4 elements of the marketing mix outlined in the review of available literature: product, price, place, and promotion. These elements served as a foundation of this research, as many of the questions presented in Table 3 are designed to extract information on respondents' preferences within each of these 4 elements.

Table 3. Survey Questions.

<b>No</b>	<b>Survey Question</b>	<b>Purpose</b>
1	Do you or have you ever used dietary supplements?	To ensure that the respondent is a DFS consumer
2	How old are you?	To ensure that the respondent's age is between 18 and 29 (including both)
3	What is your gender?	To ensure that all genders are equally represented in the sample
4	What is your main country of residence over the last year?	To ensure that the results are not biased due to most consumers being from one country
5	Do you have a preferred dietary supplement brand/company (or a company that you buy supplements more often from)?	To get the respondents to start thinking of their answer to the next question (increasing the chance of getting an answer to the next question)



6	Which supplement brand/company do you prefer? OR what company do you more often buy supplements from?	To answer sub-question 3 (determine which 3 DFS brands are most preferred)
7	What characteristic of the supplement/product mix of the company is most important to you?	To answer sub-question 5 (determine consumers' preferences for product)
8	How expensive are the supplements that you prefer (buy) compared to the market on average?	To answer sub-question 5 (determine consumers' preferences for price)
9	How/where do you prefer to purchase your supplements?	To answer sub-question 5 (determine consumers' preferences for place)
10	How/where did you find out about the brand/company you named as preferred/most often used?	To answer sub-question 5 (determine which promotion technique is more effective for the consumer)
11	Please rank the 4 P's in descending order of impact they have/had on your choice of the company? (1st - most important when making a choice, 4th - least important)	To answer sub-question 6 (determine which of the elements of marketing mix of DFS companies has more impact on consumer choices)
12	Does your choice of a brand/company depend on the supplement purchased?	To answer sub-question 7

As it can be seen in the table 3 above, the first 4 questions of the survey were aimed at ensuring that the respondents fall into the chosen category, population segment, as well as to track how representative the acquired sample is. Furthermore, survey questions 5 and 6 serve to determine the DFS brands preferred by the respondents and pinpoint the top 3 most common throughout the sample.

Questions 7 through 10 share the same purpose: gather insight on consumer preferences for the common elements of the marketing mixes of DFS companies. Each of these questions offered respondents a list of options to choose from, which were given based on the element categories outlined by the *Literature Review* (chapter 2) and a sub-section 4.2, which will be presented later. The possible options for these questions can be seen in the table 4 below.

Table 4. Answer Options of the Multiple-Choice Survey Questions.

Question No	Variable Name	Number of options	Answer Options
7	Product	5	1) Quantity 2) Physical form 3) Packaging 4) Quantity/size 5) Taste/smell
8	Price	3	1) Premium 2) Average 3) Low-cost

9	Place	5	<ol style="list-style-type: none"> <li>1) Online marketplaces</li> <li>2) Official website of the preferred supplement brand</li> <li>3) Pharmacies</li> <li>4) Sport/health stores</li> <li>5) Supermarkets/hypermarkets</li> </ol>
10	Promotion	6	<ol style="list-style-type: none"> <li>1) TV ads</li> <li>2) Social media ads</li> <li>3) Marketplace promotions</li> <li>4) Word-of-mouth</li> <li>5) Promotion by salesperson</li> <li>6) Multilevel marketing (MLM)</li> </ol>

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Furthermore, question 11 helps to determine the element that has the greatest positive impact on consumer choices, which provide an answer to research sub-question 6. Finally, the 12<sup>th</sup> survey question tackles sub-question 7 of the thesis.

### 3.2.3. Data Filtering

After receiving a considerable portion of responses, it became clear that all of the questions that required answers were not made mandatory when designing the survey. As a result, some responses did not contain the answers necessary for the research. Therefore, this issue had to be solved by forcing responses to all the questions and the updated survey was distributed, which collected new responses on top of the initial ones, some of which had missing data. Eventually, 109 survey responses in total were collected; however, many of them had to be filtered out for various reasons. In order to make the overviewing and filtering process more convenient, the data was downloaded in XML format to further work with it in Microsoft Excel Spreadsheet Software.

The first fraction of responses that had to be dropped were the ones in which the respondents replied “No” to the first question of survey, of whether or not they have used/use dietary supplements. They needed to be deleted because these respondents did not belong to the population segment of interest for this research. These participants were directed to the end of the survey automatically, as their responses would not be informative for the research, since they have not used supplements, while most questions in the survey implied the respondent to be a DFS consumer.

In addition to these, more responses had to be deleted for other reasons. Some responses were incomplete and missed answers for some relevant survey questions; these responses did not provide valuable information vital for this research. Furthermore, 1 response was removed because it did not fit the age category researched, which is from 18 to 29 years, while the respondent was 31 years old. When the filtering process was complete, there were only 53 responses remaining out of the initial 109.

### 3.2.4. Data Analysis Techniques

This sub-section of methodology will lay down all the data analysis techniques used in this research in order to answer the posed sub-questions. The analysis used of this research was based on the data collected by the survey explained in detail above.

Firstly, the data was analyzed using STATA 16, a software for statistics and data science. In order to this, the brands preferred by the respondents were listed and ranked in descending order of frequency, where the firm that came up the most got a rank of 1 and so on. Then, the data was filtered by the brand name: only the observations containing a few top ranked brands by the respondents were left. The ranks of the top firms, which will be discussed in the *Results and Analysis* section, were determined, and further used as a regressand.

After that, the respondents' answers to questions from 7 to 10 were transformed into independent categorical variables: *Product*, *Price*, *Place*, and *Promotion*, whose categories are displayed in table 4 of *Survey Overview* subsection of methodology above. These string categorical variables were transformed into numeric variables: *nProduct*, *nPrice*, *nPlace*, and *nPromotion*. Finally, the ranks of the top companies were regressed on these new numeric variables using a Multinomial Logistic regression model, which allows for a categorical outcome variable. The STATA command used for this regression is displayed below.

*mlogit Rank i.nProduct i.nPrice i.nPlace i.nPromotion*

In order to back up the STATA analysis, the data was also looked at using Microsoft Excel. Using the graphs, consumer preferences for certain categories of the 4 P's of the marketing mixes will be looked at. Information about consumer preferences may suggest what marketing strategies employed by the DFS companies influence consumer choices most.

## 4. Results and Analysis

This section of the thesis will present the results of the data analysis process previously explained in the *Methodology* section. Firstly, it will give a brief description the data collected and consequently filtered; its potential representativeness will be assessed based the demographic variables. Secondly, this section will overview the 3 top firms chosen by the participants, their marketing strategies will be described and analyzed. Lastly, the data collected will be analyzed with respect to the elements of the marketing mix and their effects on choices consumers make; the results of the analysis will be presented and elaborated on.

### 4.1. Overview of the Data

The data collected for this research via surveying consists of the responses provided by 53 dietary food supplement consumers, the majority of whom are university students from different countries aged between 18 and 29. The data overall looks moderately diverse from the point of view of countries where the respondents lived in the last year, the choices of categories of product characteristics, pricing strategies, distribution channels, and promotion techniques, as well as their significance rankings.

The respondents' distribution by gender is displayed below in Figure 2, which shows that 51% of the sample are females and the rest are males. This is fairly representative of the DFS consumers population, from which the sample was drawn and where the proportion of women seems to be slightly higher than that of men based on some countries' supplement market statistics. For example, 54% of the American DFS consumers are female, while 46% are male, similar tendencies are found in European countries with slight differences in proportions between each other (Statista, 2021).

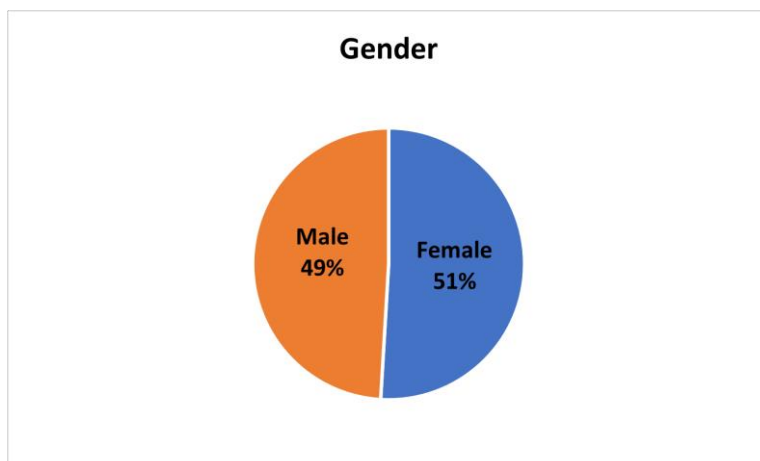


Figure 2. Gender Proportions of the Respondents.

Furthermore, considering that a sample is fairly small and consist of only 53 respondents, their distribution by country is moderately wide; the respondents in the sample have lived in 13 different countries over the last year. However, some countries had a higher number of respondents coming from them than others, which is presented in Figure 3 below. In

comparison to other countries, 3 of them had significantly more respondents: The Netherlands with 16 respondents and Serbia with Russia both having 9. This suggests that the data may be biased towards these countries: more companies from these 3 countries are listed as preferred and some of the companies from these countries appear more often than others. Overall, the respondents from the Netherlands, Russia, and Serbia, as well as their preferences are overrepresented in the sample, which should be taken into consideration when drawing conclusions based on data analysis.

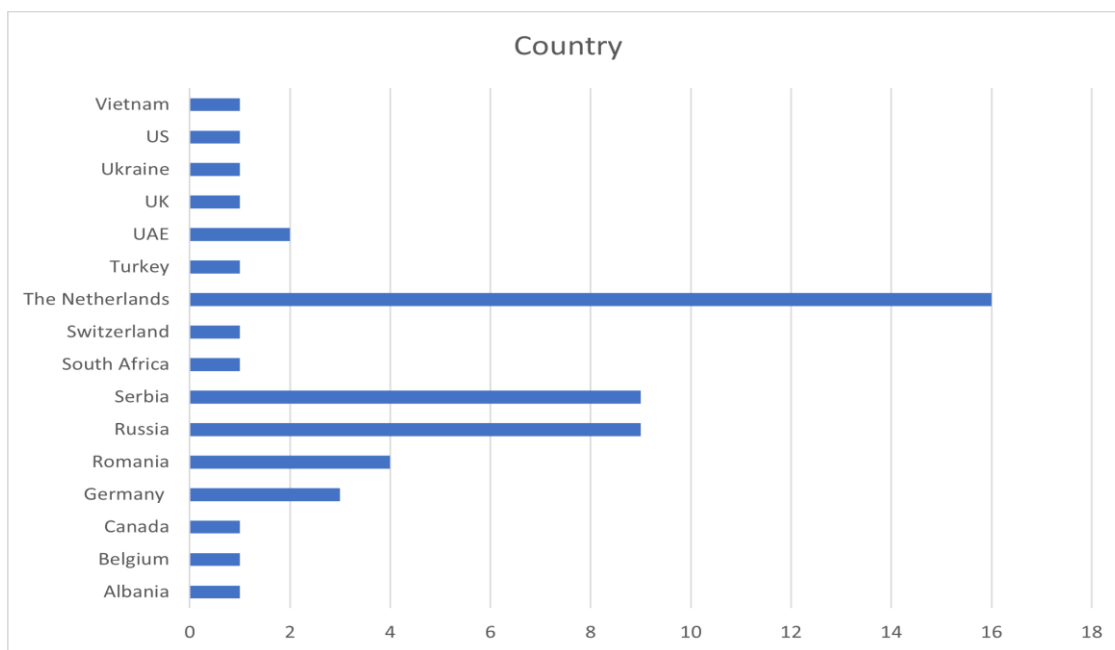


Figure 3. Sample Distribution by Country.

Overall, 26 different dietary food supplements companies from various countries are represented in the sample drawn for this research. Most of them are preferred only by one of the respondents in the sample; however, 4 firms were chosen as preferred by more than one participant. These companies were assigned ranks based on the number of times they appeared in the data; these 4 companies, how many times they appeared in the data and their corresponding ranks are displayed in table 5 below.

Table 5. Top Ranked 4 DFS Companies, Sample-Based.

Company	Number of Appearances	Rank
Coral Club International	5	1
Ultimate Nutrition	4	2
Kruidvat	3	3
Optimum Nutrition	2	4

This table shows that the top 1 firm based on the data is Coral Club International with 5 respondents picking it as preferred, top 2 is Ultimate Nutrition according to 4 respondents, and finally, top 3 is Kruidvat, which was chosen by 3 participants. These are the 3 supplement companies most commonly chosen by the respondents, and they, their marketing strategies more specifically, will be the main focus of the next section

## 4.2. Sample's Top Ranked DFS Companies Overview

This section of the thesis will shine light on the top ranked dietary food supplement companies based in the sample data. It will provide an overview of their marketing strategies, more specifically, it will keep focus on the elements of their marketing mixes and how they are utilized.

### 4.2.1. Coral Club International

This company started in 1998, when Leonid Lapp brought some relict coral, which grows in certain areas of Pacific Ocean, to Toronto, where he had it tested by the scientists for its properties. They discovered that this specific type of coral has a property of infusing water with minerals necessary for a healthy body functioning. Consequently, Leonid decided to start a company which would sell relict coral in a form of sachet filled with ground coral, so he named the company Coral Club International. In order to make sure that he has a competitive advantage, Mr. Lapp patented this product, which makes the company stand out in the DFS market even nowadays (Coral Club - About Company, 2020). In addition to Coral-Mine, which is how he called this product, the company offers a big variety of different vitamins, minerals, antioxidants, and amino acids as a part of their product mix. Moreover, the company differentiates by having other brands such as Privelege, which offers premium cosmetics, Pure&Natural – an average-priced cosmetics brand, Alive – a brand of detergents, and Daily Delicious – a brand of healthy foods (Coral Club - official website).

Coral Club International puts emphasis on the quality of their products and backs it up with different research publications. This is the main reason why their supplements are within the average-to-premium price segment. This company not only presents their products to be high quality, but also claims that the minerals and vitamins it sells are bound with the elements that promote better absorption. When it comes to the packaging Coral Club takes a minimalistic approach, keeping their designs simple.

It sells its supplements in a variety of different physical forms. Most of the supplements come in a form of tablets or capsules, but they also sell some of them in a powder form. In addition they sell many of their supplements in capsules filled with powder; these capsules are designed to be easily opened up in case the customers want to dilute the content in water. The company doesn't use big bottle sizes as most of the bottles are meant to be consumed within a month. On the one hand it is convenient because consumers can plan their consumption and purchases more easily. On the other hand it doesn't satisfy the customers who prefer to buy big packages and use them for extended periods of time.

Coral Club uses direct distribution, as it does not use intermediaries in their distribution channels. The company's customers mostly get its products through delivery. Coral Club's supplements can be purchased on the company's official website, and then sent to customers by various means of delivery to 189 countries. For instance, the products can be delivered to customer's door or they can be sent to a post office, from where the supplements can be picked up by the consumer himself. In addition, Coral Club International has 350 of its official physical stores located in 42 countries, where people can get an advise from the salespersons on the matter of which products to buy depending on the customer's needs (Serjaga, 2021).

One of Coral's main promotion techniques is multilevel marketing (MLM), which is based on a network of independent distributors/consumers, who attract new consumers and distributors. The company uses MLM along with a loyalty program, which gives members a 20% discount on the products and even cash backs after their cumulative purchases exceed a certain monetary amount (Coral Club - About Company, 2020). This promotion campaign is mostly based on the word-of-mouth, which helps Coral Clubs attract consumers by some members inviting other people to join the program to become consumers or distributors or both. In addition, Coral Club promotes its products by holding presentations across the World, during which the employees explain health effects of Coral's products and how they were developed.

Overall, Coral Club International developed a very effective promotion campaign, which attracts many new consumers, while its distribution strategy and product characteristics keep these new consumers loyal to the brand.

#### 4.2.2. Ultimate Nutrition

Ultimate Nutrition is one of the first sports nutrition companies established by a power lifter Victor H. Rubino in 1979. Even though this company is mostly focused on and well-known for selling products containing amino acids such as BCAA and Whey Protein, it offers a big list of minerals and vitamins. In contrast to many DFS brands, Ultimate Nutrition is focused on sports nutrition, which makes it operate in a slightly different market, as opposed to Coral Club, for example.

Similarly to Coral Club International, Ultimate Nutrition keeps its focus on the quality of its products and claims it to be supported by scientific research. As opposed to most DFS companies nowadays, Ultimate Nutrition does not use minimalistic design for its products; on the contrary, the design of its supplements bottles is futuristic. In addition, the color of nearly all its products is dark blue/purple, which makes it stand out on the shelves and helps consumers recognize it. Furthermore, Ultimate Nutrition has a big variety of physical forms in which its products are sold: capsules, tablets, powder, soft gels, and even chewables. Concerning the bottle sizes of Ultimate Nutrition's products, it depends on the product: vitamins and minerals are sold in fairly small packages, the contents of most of which are meant for about a month, while amino acids are sold in big bottles, which is quite common for the supplement industry (Ultimate Nutrition Inc.).

The prices of Ultimate Nutrition supplements offered on their official website are higher than the average prices of similar supplements sold on online marketplaces such as Amazon and iHerb, which are included in the company's distribution channels. This is what makes Ultimate

Nutrition different from Coral Club and Kruidvat, which will be described in the next section; it does not use direct distribution only. The official website is indeed one of the ways its products are distributed, but they are also sold on worldwide and national online marketplaces. In addition, Ultimate's supplements are sold in physical retail stores in many countries around the world. All of this makes ways distribution of products offered by Ultimate Nutrition fairly diversified, as consumers have many options of how to purchase the company's products.

One of the company's main promotion techniques is celebrity endorsements: it uses fitness conscious famous figures to promote the brand. For example, Ultimate Nutrition signed on John Abraham, an Indian Bollywood actor to advertise the company and appeal to the Indian market (Adgully Bureau, 2011). In addition, their products are most likely promoted by salespersons in physical stores. Overall, the company's promotion campaigns are mostly based on appealing to sportive consumers by associating its products with sport activities and good health. This is done through creating pictures, videos and posts in Ultimate Nutrition's official social media accounts on Instagram, Facebook, and Twitter.

Overall, Ultimate Nutrition uses its marketing strategies to attract fitness conscious consumers by positioning its products as high quality and associating them with a sportive and healthy lifestyle. Moreover, the company makes purchasing process very convenient for the customers by giving them many different options of where to acquire their products, which most likely promotes loyalty to the brand to a certain extent.

#### 4.2.3. Kruidvat

Kruidvat, which is now a subsidiary of the Hong Kong-based company A.S. Watson, was initially founded in 1975 by Dick Siebrand in the Netherlands. Years after that, Kruidvat became one of the most widespread and common pharmaceutical store in the Netherlands, which also operates in Belgium (Wikimedia Foundation, 2021). In addition to selling dietary food supplements and drugs, Kruidvat is also a retailer for many household goods, household chemicals products, hygiene products, and stationery.

The DFSs offered by Kruidvat are of low prices, which is in line with the overall company's strategy: being cheap and convenient. Even though supplements are far from the only product line Kruidvat is focused on, it has an extended variety of them; however, its list of offerings is smaller than those of the companies specialized in dietary supplements. Furthermore, some of the product characteristics of Kruidvat supplements are similar to the ones of Coral Club. For example, the packages are also designed to be minimalistic, and the sizes are very similar to Coral's. As opposed to many other DFS brands, Kruidvat does not do much differentiation with the physical forms of its supplements: most of them are in a form of pills (Kruidvat).

When it comes to distribution channels, Kruidvat operates as a retailer for many lines of products of other brands, as previously mentioned, making the company the last step of many distribution channels. Therefore, it comes with no surprise that Kruidvat sells its own branded dietary food supplements itself without using any further retailers; in this sense, Kruidvat and Coral Club International are somewhat alike. DFSs offered by Kruidvat may be purchased on their website, in which case they are delivered to the customers' homes or post offices;



alternatively, they may be acquired in 967 Kruidvat physical stores in the Netherlands and over 270 stores in Belgium (Statista, 2021).

Kruidvat's promotion is based on its strategy of offering value-for-money products affordable by nearly everyone, which is portrayed in one of their slogans: "Always surprising, always affordable!" (Kruidvat). Therefore, many of their promotion techniques are based on price and quantity discounts. One commonality between all Kruidvat physical stores are posters positioned on the outside, which display some kind of deals for certain products such as percentage and '1+1' discounts. Furthermore, similarly to Coral Club, Kruidvat has a loyalty program, which is based on a discount card which allows customers to get 1 loyalty point for every euro they spend. Consequently, these loyalty points can be used to make purchases in both Kruidvat's physical and online stores.

Overall, Kruidvat has an effective promotion based on value-for-money, which attracts many price conscious consumers, who see a chance to purchase cheap dietary food supplements.

### 4.3. Results of Data Analysis

This section will display and describe the results of data analysis performed in STATA and Excel using figures. First, it will cover the results of the multinomial logit regression analysis from STATA, then the results of analysis of respondents' tendencies within the data from Excel will be presented. However, it will not draw any conclusions, as this will be done in the next section: *Interpretation and Discussion*.

#### 4.3.1. Results of Regression Analysis in STATA

In order to perform a multinomial logistic regression in STATA, the data was filtered, so that only the top 3 companies out of 26 remained, which resulted in only 12 data points. In order to explore the relationship between companies' marketing mixes and consumer choices, the 3 brands' ranks were regressed on the categories of each of the elements of the marketing mix: product, price, place, and promotion.

Unfortunately, even though STATA returned the coefficients for the categories of all 4 variables, it also displayed the following notes "Convergence not achieved" and "Standard errors questionable". The model turned out not to achieve convergence most likely due to questionable standard errors. In other words, in this specific case, the model most likely did not have enough data points available, which resulted in big standard errors, which is the reason the model did not yield a significant result. Even though STATA returned the coefficients for the categories of all 4 variables, it also displayed a note "Convergence not achieved". In addition, not only did the model not converge, but STATA did not display the z-scores, confidence intervals, nor the significance levels of most of the coefficients, with some exceptions. All of this can be observed in Figure 4 below, which displays STATA output for the multinomial logistic regression model.

Rank		Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
1		(base outcome)					
2	nProduct						
	quantity/size	-1.56e-32	.	.	.	.	.
	taste/smell	50.625	.	.	.	.	.
	nPlace						
	Online marketplaces	91.125	.	.	.	.	.
	Pharmacies	40.5	.	.	.	.	.
	Sport/health stores	40.5	.	.	.	.	.
	nPrice						
	Low-cost	0 (omitted)					
	Premium	91.125	.	.	.	.	.
	nPromotion						
	Multilevel Marketing	-1.20e-13	7.79e+08	-0.00	1.000	-1.53e+09	1.53e+09
	Word of mouth	0 (omitted)					
	_cons	-40.72314	6.96e+08	-0.00	1.000	-1.37e+09	1.37e+09
3	nProduct						
	quantity/size	-4.16e-32	.	.	.	.	.
	taste/smell	-67.5	.	.	.	.	.
	nPlace						
	Online marketplaces	40.5	.	.	.	.	.
	Pharmacies	108	.	.	.	.	.
	Sport/health stores	108	.	.	.	.	.
	nPrice						
	Low-cost	0 (omitted)					
	Premium	40.5	.	.	.	.	.
	nPromotion						
	Multilevel Marketing	-4.50e-14	8.99e+08	-0.00	1.000	-1.76e+09	1.76e+09
	Word of mouth	0 (omitted)					
	_cons	-41.01083	8.04e+08	-0.00	1.000	-1.58e+09	1.58e+09

Note: 12 observations completely determined. Standard errors questionable.  
convergence not achieved  
(\*\*\*)

Figure 4. STATA Multinomial Logistic Model Output.

Furthermore, in order to expand the number of data points used for the regression, the 4<sup>th</sup> top ranked company was included in the regression. None of the independent variables used in the regression changed, only the outcome variable obtain a new, 4<sup>th</sup> numerical category. Unfortunately, this increased the number of observations only by 2, resulting in 14 data points in total. As a result, adjusting the data and running the regression model again, but with 4 ranks, yielded very similar results: the data did not converge and none of the statistical information except the coefficients were displayed. The results of this regression can be seen on Figure 10 and Figure 11 in the Appendix.

#### 4.3.2. Results of Analysis of Tendencies within the Data in Excel

As previously suspected, STATA regression analysis did not yield significant results, which is why analysis in Microsoft Excel were initially planned. Each of the variables was looked at and analyzed in Excel using figures in order to determine tendencies in consumer preferences within each of the elements of the marketing mix. However, this time, the number of data

points used for analysis was 53 instead of 12 or 14 because rank was no longer used as a dependent variable.

In order to explore the frequencies of categories of product characteristics, price levels, channels of distribution, and ways of promotion pie-charts were used, as they seemed to be the most informative way of presenting the consumer preferences on the figures for further interpretation. The following 4 figures display consumer preferences: Figure 5 – preferences for product characteristic, Figure 6 – preferences for pricing strategies, , Figure 7 – preferences for distribution/placement, and Figure 8 – preferences (effectiveness) for (of) promotion.

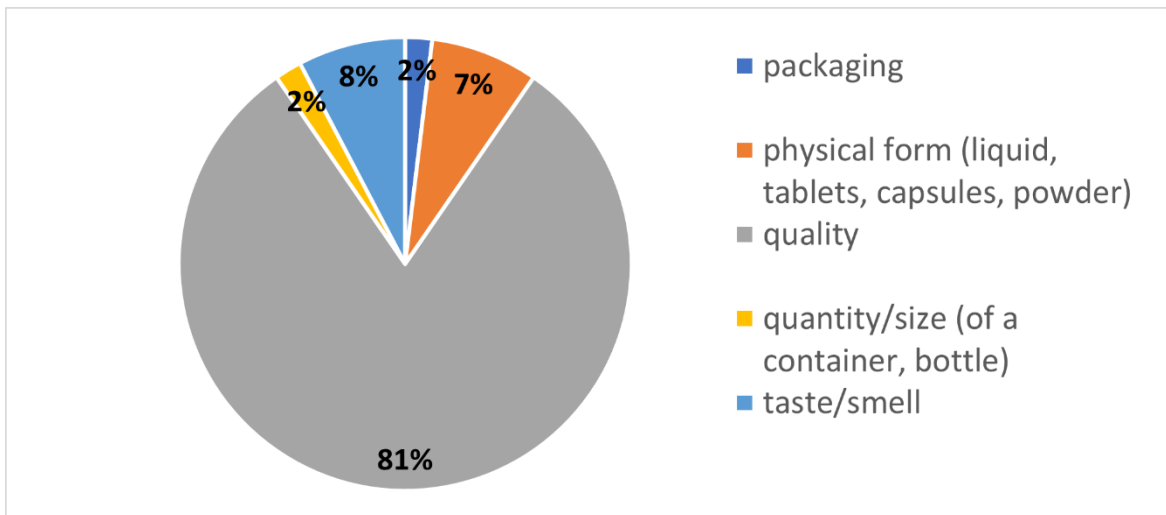


Figure 5. Preferences for Product Characteristics.

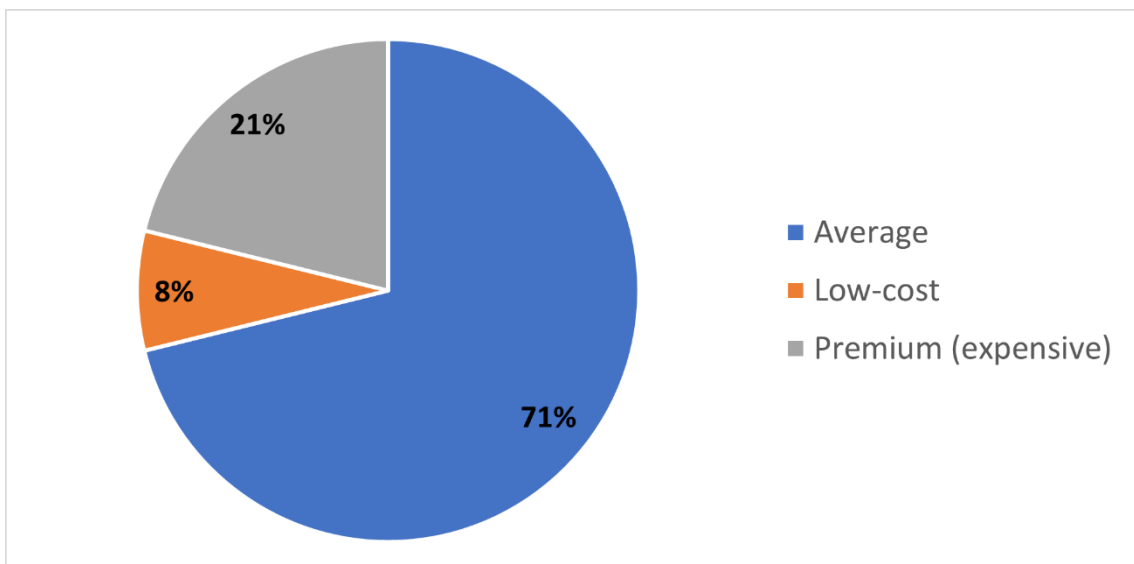


Figure 6. Preferences for Pricing Strategies.

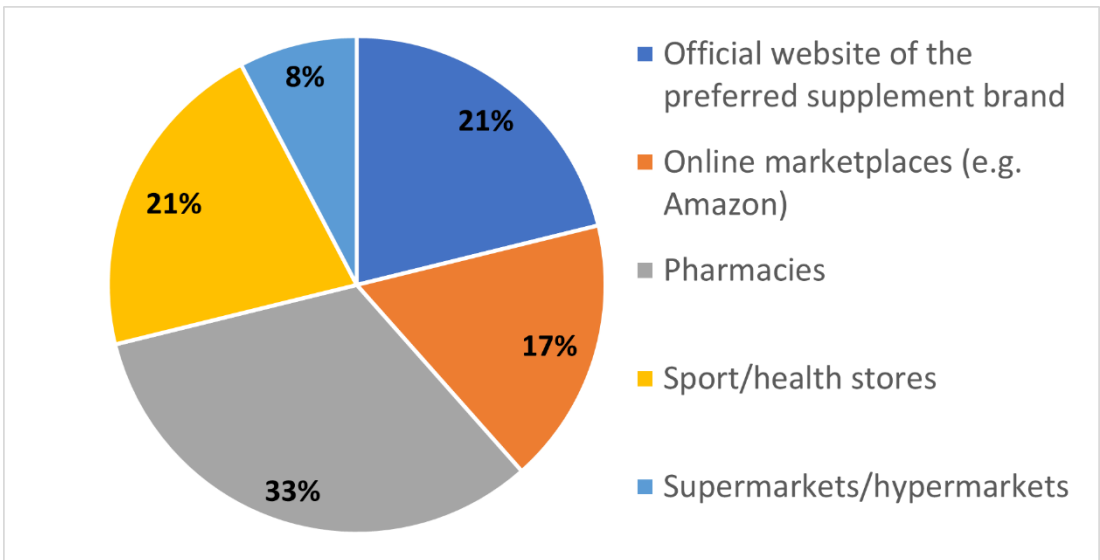


Figure 7. Preferences for Distribution/Placement.

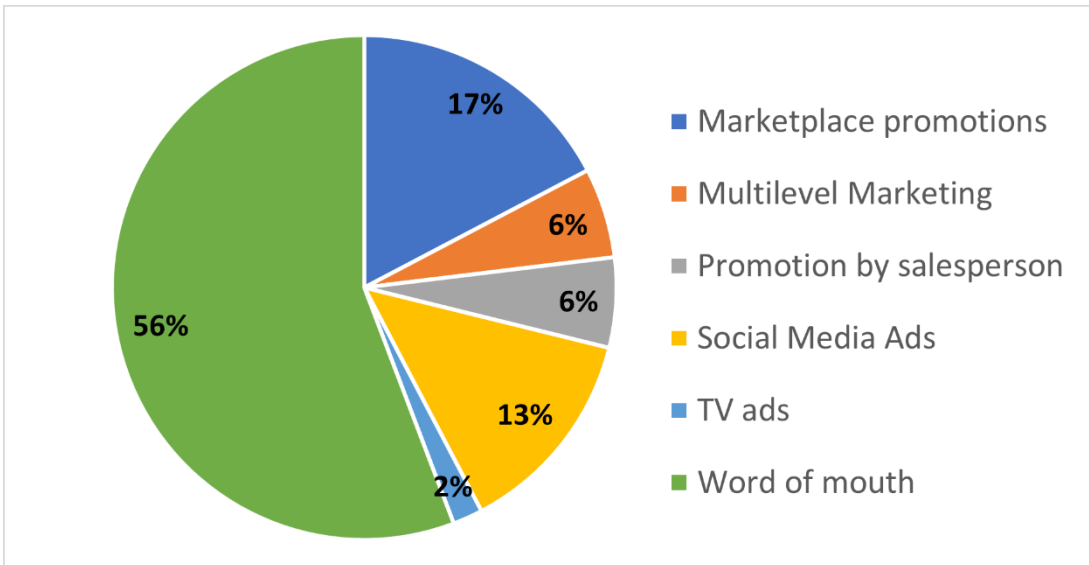


Figure 8. Preferences (Effectiveness) for (of) Promotion.

The next step of analysis was to determine which of the elements has the most impact on consumer choices. In order to do that, the results of question 11 of the survey (see Table 3) were used to calculate average ranks of each of the 4 P's of marketing mix. The rankings of each of the P's were listed in an excel table and further the average rank of each element of marketing mix was calculated. These calculated average ranks can be seen on the Figure 9 below.

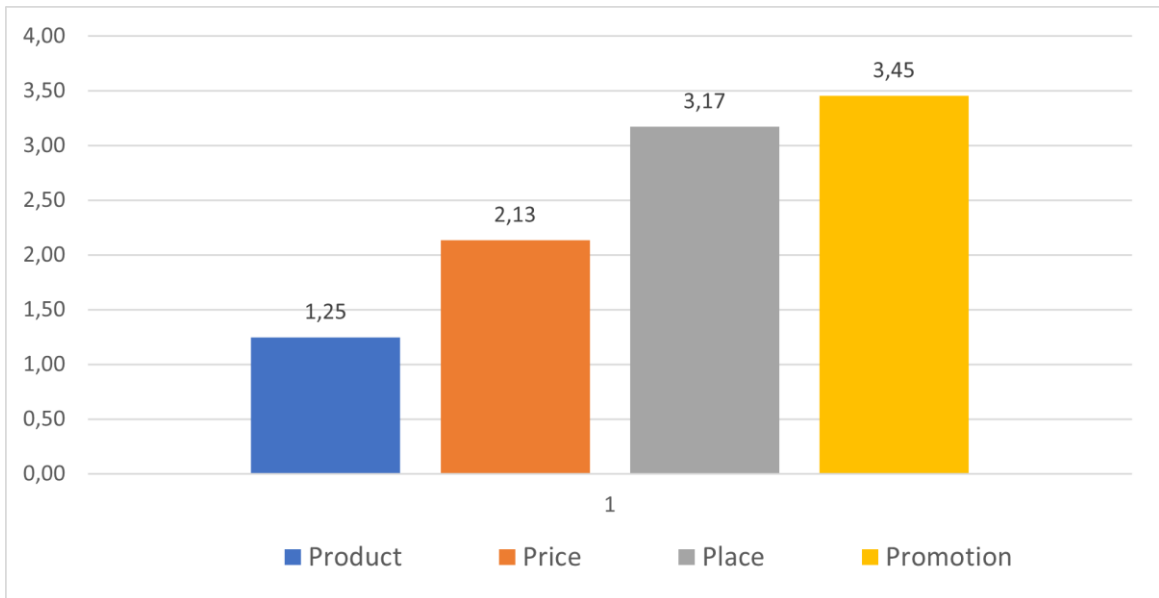


Figure 9. Average Ranks of the 4 Elements of Marketing Mix.

Finally, besides finding the relationship between the marketing mix and consumer choice, the research performed for this thesis attempted to see whether consumer choice of DFS brand and of DFSs themselves are separate from each or interdependent. In order to do that, the respondents were asked about it through the survey (see question 12 in Table 3). An overview of responses can be seen on the Figure 10 below.

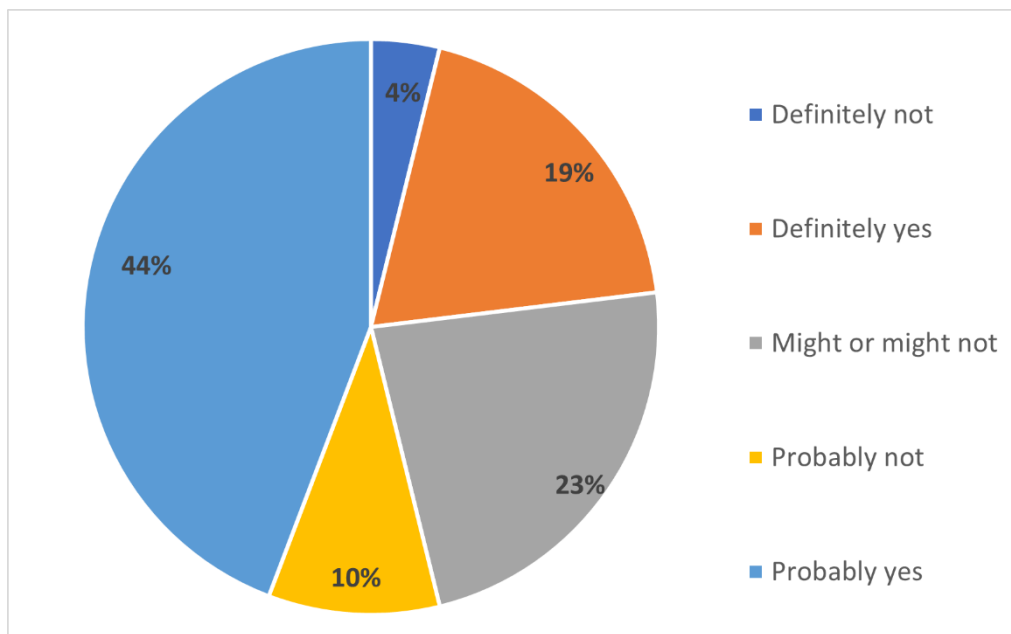


Figure 10. Does Choice of DFS Brand Depend on DFS purchased?

## 4.4. Interpretation and Discussion

### 4.4.1. Multinomial Logistic Regression

As outlined earlier and displayed in Figure 4, the data in STATA did not converge and the standard errors appeared to be questionable. This most likely happened because of a small size of the data set used for the multinomial logistic regression model. Considering that only 12 and then 14 observations were used for the analysis, if the convergence of the data actually did occur, the results of the model would most likely be insignificant. That is because with such a small number of observations it is impossible to determine unbiased coefficients, especially to establish a causal effect. As a result of a small sample which yielded a small number of people choosing the same companies, the results of the model turned out to be insignificant. Therefore, the coefficients returned by STATA cannot be interpreted, which suggests that the results of STATA analysis are inconclusive and do not provide any insight on the impact of the marketing mix of DFS companies on consumer choice, which could be used to answer the research sub-questions of this thesis.

### 4.4.2. Data Analysis in Excel

Even though the numeric extent to which different product characteristics, price levels, distribution channels, and promotion techniques impact consumer choices could not be determined, Microsoft Excel analysis provided some information based on which certain possible conclusions can be made about the impact of consumer preferences for certain elements of marketing mix of DFS companies on what kind of DFS companies and supplements produced by them consumers might be more attracted to.

Based on the Figure 5, most of the respondents (81%) value quality the most among the dietary supplement characteristics. The second most valued characteristic appears to be taste or smell of the supplements (8%), which implies that many respondents prefer the process of intaking DFSs to be more pleasant. Physical form, which usually liquid, tablets, capsules, and powder is the most important characteristic according to 7% of the respondents. The reasons behind preferences for a certain form of supplements can be different, but they usually are convenience and different forms having different percentages of absorption. Finally, the least preferred supplement characteristics both chosen by 2% of the participants are quantity/size and packaging. This implies that probably only some people care about the sizes of bottles in which DFSs are their packaging designs.

Furthermore, 71% of the respondents choose supplements that are averagely priced relative to the market (see Figure 6). This together with quality being the most commonly chosen product characteristics most likely implies that when faced against a trade-off of quality to price, the majority of people try to find a golden middle: get good quality, without paying too much for it. However, this does not apply for everyone: 21% of the respondents prefer premium dietary food supplements, while 8% prefer low-cost ones. This is probably where the income/allowance level of the respondents comes into play: respondents with higher monetary

power are more inclined to purchase more expansive vitamins, minerals, antioxidants, or amino acids.

When it comes to places of purchase (see Figure 7), the respondents differ a lot in their preferences: 33% of respondents prefer pharmacies, 21% - sport/health stores, another 21% - official websites of preferred supplement brands, 17% - online marketplaces, and the last 8% like to purchase supplements in super- or hypermarkets. It appears that supermarkets are the least preferred places for DFSs purchases, while the most common ones are pharmacies, sport/health stores, and brands' official websites. Furthermore, almost all of the respondents who prefer purchasing DFSs from the brands' official websites reported certain preferred DFS brand, while a much bigger number of participants who did not have a preference for brand were among those who purchased supplements in other places. It turned out that big shares of the respondents who purchase supplements in supermarkets/hypermarkets and pharmacies have no brand preference.

Most of the respondents reported that the way they found out about their preferred/most commonly purchased dietary supplement brands was word of mouth (56%), which suggests that this promotion technique used by DFSs companies might be the most effective (see Figure 8). Marketplace promotions and social media ads also appear to have a considerable impact on consumer decisions, as they were chosen as the source of their preferences by 17% and 13% respectively. The last 14% are shared between promotion by salesperson, multilevel marketing, and TV ads, which suggests that they are less effective ways of promoting use of dietary food supplements by consumers.

When analyzing the impact of these elements of the marketing mix on consumer choices in the DFS industry, product, price, place, and promotion were all assigned average ranks based on the respondents' rankings. It turned out that on average product is the most important factor that influences consumer choices of dietary supplements, as its average rank is 1.25 (see Figure 9). The second most influential factor appeared to be price level, the third – place of distribution, and the fourth – promotion techniques used by the companies. This suggests that when choosing DFSs, people mostly pay attention to their characteristics, such as quality, most likely assessed based on composition, and their prices. Place of distribution and promotion do not seem to have such an effect as product and price.

Finally, the results of the survey analysis revealed that most of the respondents are inclined towards choice of DFSs brand being dependent on the DFS purchased (see Figure 10). 44% of the participants believe that their choice of brand probably depends on the supplement they are buying, 19% stated that it definitely depends on the product of purchase, 23% stated that it might depend and might not, while only for 14% in total the choice of brand did not depend on the supplement they buy. This suggests that only few people tend to be loyal to the DFS brand to the point, where they buy all of their supplements from it.

## 5. Conclusion and Recommendations

### 5.1. Review of Research Objectives

The main objectives of this research were to explore the elements of the marketing mixes employed by companies of the dietary food supplement industry and to determine their effects on consumer choices of supplements and their brands.

### 5.2. Review of Research Questions

This sub-section of the thesis will go over the research sub-questions and the central question, as well as provide answers based on the literature review and empirical research conducted based on the data collected by the survey among a sample of DFSs consumers.

#### 5.2.1. Sub-question #1 and #2

The first 2 sub-questions posed in order to lead the way to answer the central research questions were explored by reviewing previously existing literature on the matter of the 4 elements of the marketing mix of DFS companies, and their impacts on consumer preferences. The sub-questions #1 and #2 were the following: *What is the effect of marketing mix of supplement companies on consumer choice according to previously conducted research?* and *Which aspect of the marketing mix has the most significant impact on consumer choice according to previously conducted research?*

According to the literature, each of the elements of the marketing mix has its own role in the DFS companies' marketing strategies. Certain product characteristics make the product seem more appealing to the customers. For example, quality is viewed as a very important characteristic when shopping for supplements, many consumers are looking for DFSs made of 100% natural ingredients. In addition, 'the right' design and claims used on the packages play a role of attracting consumers by making them think more highly of certain supplements. Furthermore, although prices are used by companies to derive revenues, they also play a role of being a proxy for quality for the customers, who care about it to a high extent. In addition, literature suggests that the demand for supplements is elastic, which means that setting prices too high may result in small number of customers (p.9). Place of distribution also plays an important role, because 'the right' choice of it may attract a big number of customers, depending on their preferences. Promotion serves to communicate information about the companies' DFS to the consumers (p.10). Additionally, it turns out that word-of-mouth tackles this task the best (p.10&12). Overall, according to a study conducted in Malaysia, marketing mixes of the DFS companies explain 35.9% of consumer preferences, which highly impact their choices (p.13). However, product characteristics seem to have the most significant impact on consumer choice among the 4 P's of the marketing mixes of DFS companies.



### 5.2.2. Sub-question #3 and #4

Sub-questions 3 and 4 were about the 3 most commonly chosen DFS brands: which are they and how their marketing mixes are realized? Question 3 was based on the data collected via the survey, while question 4 required extra literature review.

The top 3 DFS brands according to the data were the following: 1<sup>st</sup> – Coral Club International. 2<sup>nd</sup> – Ultimate Nutrition, and 3<sup>rd</sup> – Kruidvat (p.21). Having a closer look at their marketing mixes should give an idea of what elements of marketing strategies the consumers might be attracted to. Coral Club International and Ultimate Nutrition both provide priced supplements of high quality, which is supported by research (p.22-24), which again suggests that quality is a product characteristic valued by DFS consumers. However, Kruidvat operates differently, as its strategy is to sell value-for-money supplements affordable by everyone (p.24-25), which might suggest that the consumers are price sensitive. The distribution and promotion are realized very differently by the 3 companies, so it is difficult to draw any conclusions about potential preferences of DFS consumers.

### 5.2.3. Sub-question #5

The sub-questions #5 was: *What effect does marketing mix of DFS companies have on consumer choices based on the research results and how do these results differ from previously existing findings?* Unfortunately due to an unsuccessful attempt to analyze the data in STATA, it wasn't possible to determine how the elements of the marketing mixes of the DFS companies impact consumer choices. However, overall tendencies of consumer preferences within each of the elements of the marketing mix were determined. Even though consumer preferences are not a perfect proxy of consumer choices, they may indicate how the companies' offerings may potentially impact choices made by consumers.

First, it was found that supplements having high quality may significantly increase the chance of purchase by consumer, since 81% of the respondents chose it to be the most important product characteristic (Figure 5 - p.27, p.30). Furthermore, DFS companies, whose products are averagely priced might be able to attract more customers than the companies with premium or cheap supplements (Figure 6 – p. 27, p.30-31). In other words, supplements having average prices most likely increases the chance of consumers buying them. When it comes to distribution channels, placing DFSs in pharmacies, sport/health stores, brands' official websites, and online marketplaces may make consumers more likely to purchase them. However, using supermarkets and hypermarkets as distribution channels by a DFS brand most likely does not affect consumer choice towards the supplements of this brand positively (Figure 7 – p.28, p.31). Finally, word-of-mouth, aka recommendation, as a promotion technique is very likely to attract many customers, according to the performed data analysis (Figure 8 – p.28, p.31).

Both the data analysis and literature review suggest quality to have a significant impact on consumer choice; however, as opposed to literature review, the data did not capture the importance of packaging and its design for consumer choice. Both literature and data analysis suggest that when the supplements are priced too high, consumers tend not to purchase these supplements. Furthermore, distribution does seem important based on both information

sources for this research. Finally, word-of-mouth seems to attract customers the most according to both literature review and data analysis.

#### 5.2.4. Sub-question #6

As previously explained, the participants provided their rankings of the importance of the 4 elements of the marketing mixes of DFS companies for the consumer choice. These rankings were used for analysis to find an answer to sub-question 6: *Which of the elements of the marketing mix has the most significant effect on consumer choice based on the research results and how does it differ from the most significant element outlined by previous studies?*

According to the data collected, product characteristics seem to have the most significant impact on consumer choice (Figure 9 – p.29, p.31), which is in line with the findings of the literature review.

#### 5.2.5. Sub-question #7

In order to understand whether the marketing mix influences consumer choice of brand only or of supplements themselves as well, it was necessary to answer sub-question #7: *Does consumer choice of DFS brand depend on the supplement purchased?*

According to the data, a major part of the respondents lean towards an opinion that their choice of brand likely depends on the supplement they are purchasing (Figure 10 – p.29). This suggests that on average, the respondents care more about the supplement itself and its quality than the supplement brand (p.31). Therefore, it can be concluded that after being impacted by the elements of the marketing mixes of the DFS brands, consumers do not simply make a choice between brands, but often times their choice of supplement is irrelevant of the brand. In other words, the 4 P's of the marketing mix impacts consumer choice of supplements, often irrelevant of the brand.

#### 5.2.6. Central Research Question

All 7 of the sub-questions answered above were designed to research the topic more thoroughly and give a more complete answer to the central research question of this thesis: *To what extent and how do the marketing mixes most commonly employed by the dietary food supplement companies impact consumer choices among younger adults aged from 18 to 29?*

According to the literature review, a case study of the most commonly chosen companies within the sample, and the data analysis performed, separate elements of the marketing mixes of the DFS companies seem to be highly important for consumer choice. According to all 3 sources of information just listed, quality – product characteristic, and price have a great impact on both consumer preferences and choices of supplements of young individuals between 18 and 29. In addition, it has been found that using the right places for distribution and more effective ways of promotion, namely word-of-mouth tends to attract many customers, which implies an impact on their choices. Moreover, the Malaysian study covered in the literature review found that the marketing mix explains 35.9% of consumer preferences,

which can act as a proxy for consumer choices under many circumstances. Based on all these findings, it can be concluded that the marketing mixes commonly employed by the dietary food supplements have a significant impact on consumer choices of supplements, often irrespective of the brand, among younger adults aged from 18 to 29.

### 5.3. General Conclusion

All of the various types of research conducted for this thesis shines light on how DFS companies tend to realize their marketing mixes and use various strategies to impact the choices made by consumers. Marketing mixes seem to navigate consumers through a tremendous number of different supplements offered on the market and make their choices easier by appealing to their preferences. The marketing mixes are definitely not the only factor impacting consumer choices of the DFSs, which has to be researched for a better understanding of the industry, but it seems to be one of the major ones.

### 5.4. Limitations of the Research and Recommendations

Although, the research and analysis conducted in this thesis do answer the central research question, they are not exhaustive, which is why their limitations and recommendations for further research need to be discussed.

#### 5.4.1. Limitations

Firstly, the literature review conducted considers a somewhat limited list of sources, which do not cover all the findings about the impact of the marketing mixes on consumer choices. Secondly, the sample might not be representative due to its small size of only 53 individuals, which is negligible in comparison to the entire population of DFS consumers. In addition, some countries are represented in the sample more than others in shares not corresponding to the relative population sizes of these countries, which also questions the sample's representativeness. Thirdly, the most commonly chosen DFS companies within the sample are likely not to be the most chosen companies in the world, especially because Coral Club was chosen only by Russian respondents, while Kruidvat – by Dutch, the nationalities overrepresented in the sample, which implies bias. Lastly, the analysis of the data performed was done only in Excel, while STATA regression analysis could have provided some important insights in the matter, which suggests that the analysis done are not exhaustive, but a bigger sample is required.

#### 5.4.2. Recommendations for Further Research

One of the suggestions to get a different perspective on how the marketing mixes impact consumer choices is to consider finding and analyzing other potential literature, not covered by this research. Concerning empirical research, a much bigger sample is required to perform

more thorough analysis, especially using the research design used for STATA multinomial logistic regression analysis adopted in this thesis. Furthermore, other qualitative or quantitative types of research not used in this study can be conducted in order to deepen the understanding of what drives consumer choices in the dietary food supplement industry and to determine with more confidence whether marketing mix is the most important factor that impact these choices.

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3							
	nProduct						
	quantity/size	4.58e-13	.	.	.	.	.
	taste/smell	47.25	.	.	.	.	.
	nPrice						
	Low-cost	126	.	.	.	.	.
	Premium	47.25	.	.	.	.	.
	nPlace						
	Online marketplaces	47.25	.	.	.	.	.
	Pharmacies	126	.	.	.	.	.
	Sport/health stores	6.17e-14	.	.	.	.	.
	nPromotion						
	Multilevel Marketing	1.69e-12	.	.	.	.	.
	Word of mouth	1.04e-12	.	.	.	.	.
	Social Media Ads	0 (omitted)					
	_cons	-47.76083	.	.	.	.	.
4							
	nProduct						
	quantity/size	-118.125	.	.	.	.	.
	taste/smell	-70.875	.	.	.	.	.
	nPrice						
	Low-cost	-70.875	.	.	.	.	.
	Premium	47.25	.	.	.	.	.
	nPlace						
	Online marketplaces	47.25	.	.	.	.	.
	Pharmacies	-70.875	.	.	.	.	.
	Sport/health stores	118.125	.	.	.	.	.
	nPromotion						
	Multilevel Marketing	-118.125	.	.	.	.	.
	Word of mouth	-118.125	.	.	.	.	.
	Social Media Ads	0 (omitted)					
	_cons	69.95871	.	.	.	.	.

Note: 14 observations completely determined. Standard errors questionable.  
convergence not achieved

Figure 11. Multinomial Logistic Regression for 4 Ranks, Part 2.