

**POLYTECHNIC UNIVERSITY of BUCHAREST
DOCTORAL SCHOOL OF INDUSTRIAL AND ROBOTIC ENGINEERING**

SUMMARY

DOCTORAL THESIS

**INNOVATIVE BUSINESS MODELS IN THE MARKET OF
OPTICAL MEDICAL DEVICES**

Scientific coordinator

Prof.univ.habil.dr.ing.ec.mat. Augustin SEMENESCU

Ph.D. Candidate

Ec. Victor CONON

BUCHAREST

2022

CONTENT

INTRODUCTION	3
CHAPTER I BUSINESS MODEL – CONCEPTUAL FOUNDATIONS, HISTORY OF THE EVOLUTION OF THE CONCEPT, DEFINITION AND IDENTIFIED DIVERGENCES OF OPINIONS	8
CHAPTER II THE MARKETING APPROACH TO THE ANALYSIS OF BUSINESS MODELS	10
CHAPTER III THE RESULTS OF THE PRACTICAL APPLICATION OF THE MARKETING APPROACH FOR THE ANALYSIS OF BUSINESS MODELS ON THE MARKET OF OPTICAL MEDICAL DEVICES IN ROMANIA	12
CHAPTER IV COLLECTION, EVALUATION AND INTERPRETATION OF DATA FOR THE DEVELOPMENT OF AN INNOVATIVE BUSINESS MODEL ON THE MARKET OF OPTICAL MEDICAL DEVICES IN ROMANIA	19
CHAPTER V THE DEVELOPMENT OF SOME INNOVATIVE BUSINESS MODELS ON THE MARKET OF OPTICAL MEDICAL DEVICES IN ROMANIA	24
GENERAL CONCLUSIONS. PERSONAL CONTRIBUTIONS AND FUTURE DIRECTIONS FOR RESEARCH	27
SELECTIVE BIBLIOGRAPHY	33

INTRODUCTION

Relevance of the research topic

Today, business model research is becoming increasingly demanded in both academic and professional communities. The need to research business models is due to the need of the business environment for new sources of growth and strengthening competitiveness in a dynamic market.

The success of companies' development depends increasingly on the business model used. This has been demonstrated by the successful business models of companies such as Amazon (one of the largest bookstores that does not have any traditional bookstores), Skype (one of the largest telecommunications service providers, which has no network of infrastructure) and Uber (one of the revolutionary companies in the field of taxi services). In response to the growing needs of business, companies are beginning to turn to business advisors on issues of improving existing business models and developing new business models. The number of studies in this field in recent years has increased more than 10 times, which indicates an increased attention of the scientific and business community on the issue of research and development of the business model concept. However, the number of successful business models currently remains low, and companies are actively looking for different approaches to create and maintain successful business models.

The study of business models is primarily associated with the concept of creating value for the end user through interactions between participants in the value chain (suppliers, manufacturers, distributors). Today the business model exceeds the limits of a single company and for its analysis must be considered the value chains and networks between companies. In the interaction of the different participants of the business model, the orientation of the value chain must be made to the interest of the final consumer, because he decides to buy or reject the value. Also, the main interest of the companies participating in the value chain is to obtain a profit from their interactions with the end user (customer). Consequently, the key role in business model analysis is played by a marketing component that facilitates the search and delivery of value to the end consumer and thus builds the interaction between value chain participants to get recognition of the value created by them by the end user.

A lot of marketing research confirms the orientation of companies towards the interests of consumers, and cooperation between companies offers them more opportunities to successfully develop the business and obtain better financial results, such as qualitatively increasing the value offered to the end user.

The novelty of the proposed theme

Deepening the research of published business models makes it possible to evaluate them and identify a direction for improvement in a specific area: the market of optical medical devices. The studied field is one of the futures and will interest increased subjects (manufacturer, distributor,

ophthalmologist, and patient) who are interconnected with each other, with the same goal: achieving satisfaction (*financial profit for producer and distributor, loyalty for certain products from the ophthalmologist and self-satisfaction for the patient for choosing the product*).

The general objective of the thesis is the development of the marketing approach for the analysis of business models and the identification of innovative business models to be applied for a specific field, of optical medical products and for a specific economy in Romania.

The operational objectives that contribute to achieving the overall objective are:

1. The objective of this paper is to increase the foundations of understanding the concept of business model by addressing three areas of research: business model definitions, elements of the business model, classifications, and archetypes of business models. The three areas are important for conceptualizing business models.
2. Analyzing and systematizing the key trends of business model research and highlighting the characteristics that are included in the field of marketing.
3. Researching the opinions of schools of thought devoted to the conceptual development of business models and researching successful conceptual business models used in the international business environment.
4. Studying the functioning of the business model on the market of optical medical products, at international level and researching some innovative business models used for the Romanian market.
5. Studying the market of optical medical products in Romania, researching the process of interactions between participants in the value chain (suppliers, manufacturers, distributors, end users), conducting practical research on the possibilities of improving the entire process of interactions and identifying a business model innovative end-user-oriented.

Research methodology and methods

The theoretical basis of the thesis research will be the works of established authors in the fields of strategic management and marketing. Both the results of academic research and practice-oriented papers written by business consultants will be used.

The study of the key trends in the research of business models and the dynamics of publications in this field will be performed in the international educational databases that are endorsed by the Romanian Ministry of Education and Research (electronic platform enformation.ro which includes several international databases: Scopus, Web of Science, Elsevier, Science Direct etc) as well as in the Google Scholar search engine (scholar.google.com).

Methods of comparisons, generalizations, grouping and classification methods will be used to analyze the theoretical basis.

The practical basis of the study will consist of data collected by the author from various sources (opinions of experts, distributors, market research, periodicals, etc.).

Other practical methods for obtaining research-relevant information will be applied: interviews, questionnaire methods, case study research and various methods of statistical analysis.

The theoretical significance of the thesis

The paper contributes to the understanding of key trends in the research of business models and their development over time. A synthesized definition of business models based on the semantic and morphological analysis of the definitions in the most cited works of the authors dedicated to researching the business model concept as well as identifying the marketing component in business model research. The paper also analyzes in detail areas of research of business models and marketing.

The practical significance of the thesis

A step-by-step procedure for analyzing the business model, developed because of the research, will allow the analysis of the value chain, the participants in the interactions within the value chain and the orientation of the value towards the end user.

The analysis of the business model on the market of optical medical devices in Romania will allow: the identification of the dominant actor within the interaction chain and the modalities regarding the coordination of the actions of the other participants; highlighting the differences between the different participants in the value chain, which prevents an increase in the value offered to the consumer; identifying ways to overcome problems by coordinating the dominant link in the interest of other participants in the business model.

Thesis structure

The thesis is structured in six chapters that address step by step, from conceptual theoretical problems to functional and practical aspects, from the general to the specific.

The first chapter analyzes the characteristics, trends, and results of research on business models, existing approaches to the analysis of business models and their shortcomings. It presents the concept of the business model and a brief history of the evolution of research in the field, the studies conducted and the dynamics of publications on business models.

Various approaches of researchers are presented to define and understand the essence of a business model: definitions, analysis of differences of opinion, key elements. There are also some ways to develop a business model.

Given that the business environment is very dynamic and business models evolve through innovation (improving or transforming the existing business model or developing a new one), in the business environment there is often a confusion between the business model and the company's strategy. Although these two concepts are similar, they still differ in many ways.

Certain opinions of researchers in the field are presented: approaches, foundations, and differences (because there are differences of opinion between researchers on the two concepts).

The second chapter presents a marketing approach for analyzing business models to justify directions for improvement. The conceptual and methodological foundations of the approach, the common elements, and the divergences between the two concepts are presented: the business model and marketing. The dynamics of publications on business models in international marketing magazines are analyzed. There is a correlation of the marketing approach with the "schools of scientific thinking" on the business model (School of Activity System; School of Processes; School of Cognitive; School of Technology; School of Strategic Choice; School of Recombination; School of Duality). Business models relevant to the thesis are presented, in a chronological order of their conception.

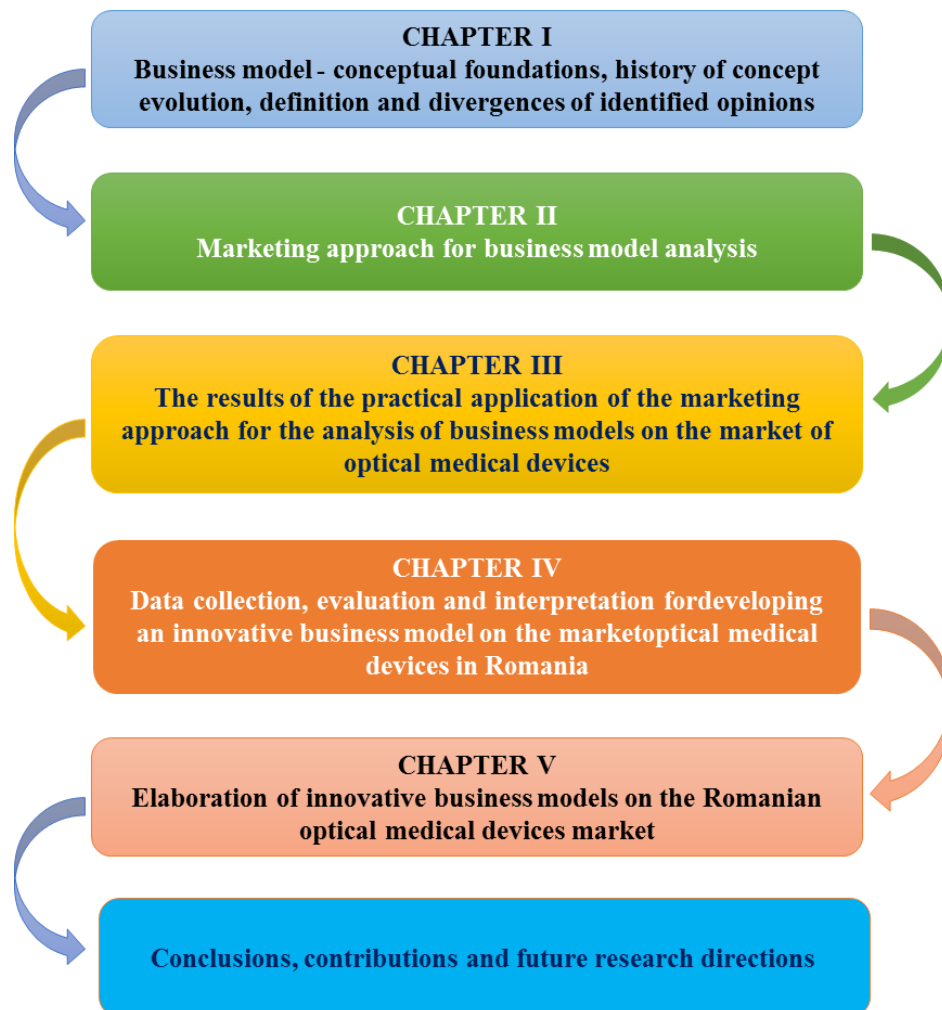


FIG. 1.0 Thesis structure. Approach from general to particular or specific.

Source: author of the thesis

In the third chapter, the proposed approach is verified for the optical medical products market in Romania. The approach is performed on three levels of analysis. At the first level, an analysis is made of the structure of the business model, the participants and the interactions that take place between them. The dominant factor and the key role played by the ophthalmologist in the interaction between the manufacturer or distributor of optical medical devices and the end user (patient) are presented. It starts from the hypothesis of a study conducted in 2019 on the doctor's loyalty to certain types of optical medical devices, which is manifested based on the medical prescription prepared to the patient. This aspect is medically important but at the same time it is commercially important. If the patient is satisfied with a certain optical medical device, he will pay for it and the manufacturer recovers a significant part of the value created, will increase production and at the same time, based on information received from patients through the ophthalmologist the manufacturer could innovate the business model.

Based on this last hypothesis, a strategy of practical research of the Romanian optical medical devices market is drawn up, establishing all the stages, including the way of collecting the data necessary for the elaboration of an innovative business model oriented to the needs of the end user.

In the fourth chapter we move on to the second and third level of analysis of the business model on the market of optical medical devices in Romania. The mechanism of interaction between the participants in a business model on the whole chain is analyzed: manufacturer, distributor, intermediate user (doctor) and end user (patient) based on the results of data and information collected according to the research strategy presented in the previous chapter.

A practical study of the marketing approach is performed for the analysis of business models on the optical medical devices market in Romania. A quantitative study is analyzed on a sample of 35 companies in the field of optical medical devices from 19 cities in Romania. The process of interactions within the value chain is analyzed, the dominant actor and the needs of the end user are identified. After obtaining practical results after conducting interviews with experts, ophthalmologists, representatives of the leadership in the production-distribution of ophthalmic products, the loyalty of the doctor for a certain brand, the interest of the end user of optical medical devices and the dominant participant in the model are analyzed. business of companies in the field of optical medical devices in Romania.

Chapter V is dedicated to the qualitative analysis of the data obtained from the practical study and from the results of the quantitative analysis. Subsequently, based on the results obtained, innovative business models are developed for large companies / company networks, respectively for medium and small companies on the optical medical devices market in Romania.

The last chapter is dedicated to the synthesis of the essential elements of the issue addressed in the thesis by the elaboration by the author of the final conclusions, personal contributions and future research directions.

CHAPTER I

BUSINESS MODEL - CONCEPTUAL FUNDAMENTALS, HISTORY OF CONCEPT EVOLUTION, DEFINITION AND DIFFERENCES OF IDENTIFIED OPINIONS

Today, the research of business models is becoming more demanded both in the academic and in the professional communities. The need to research business models is due to the need of the business environment for new sources of growth and consolidation of competitiveness in a dynamic market.

In response to the growing business needs, companies are beginning to turn to business advisors on issues of improving existing business models and developing new business models. The number of studies in this field in recent years has increased more than ten times, which indicates an increased attention of the scientific and business community on the issue of research and development of the business model concept. However, the number of successful business models currently remains low, and companies are actively looking for different approaches to create and maintain successful business models.

The study of business models is primarily associated with the concept of creating value for the end user through interactions between participants in the value chain (suppliers, manufacturers, distributors). [1] Today, the business model exceeds the limits of a single company and for its analysis must be considered the value chains and networks between companies. [2] In the interaction of the different participants of the business model, the orientation of the value chain must be made to the interest of the final consumer, because he decides to buy or reject the value. [3]

Business models give us a sense of confidence in business, which stems from the fact that we know where we are and where we can go. Just as we need a map for a mountain trip, so we need a business model to start a business. [4]

For the business model, innovation and sustainability are like oxygen for people. Without the power of innovative ideas and long-term and stable visions, it is difficult to live and develop. Innovations are successful offers, recently launched on the market. Innovations were initially related to products and services and can now refer to processes, organizational structures, or business models.

Also, the main interest of companies participating in the value chain is to make a profit from their interactions with the end user (customer). [5] Consequently, the key role in analyzing the business model is played by a marketing component that facilitates the search and delivery of value to the end consumer and thus builds the interaction between value chain participants to get recognition of the value created by them by the end user.

A lot of marketing research confirms the orientation of companies towards the interests of consumers, and cooperation between companies offers them more opportunities to successfully

develop the business and obtain better financial results, such as qualitatively increasing the value offered to the end user.

This chapter represents in general the interest of the academic and research environment in the economic field for the study of the business model for 30 years and in particular the interest shown by the research environment in the field of marketing for the business model.

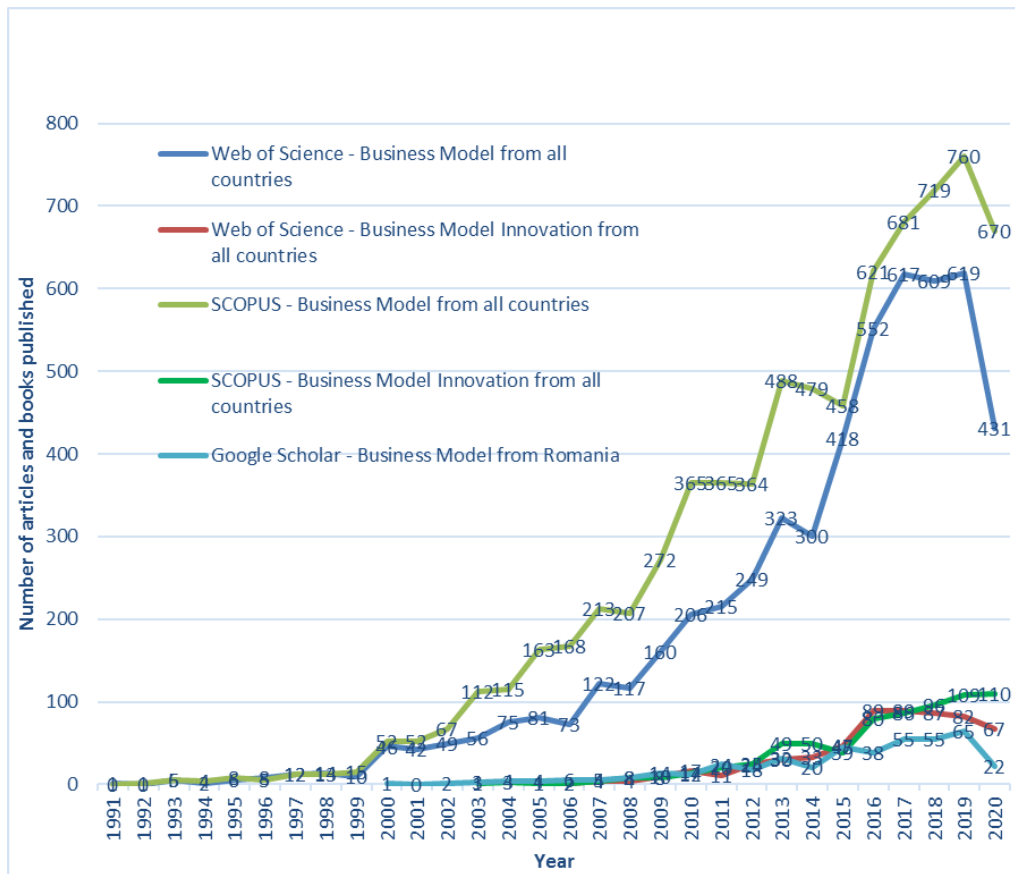


FIG. 1.1 Dynamics of publications on the issue of business models in magazines and books from abroad and from Romania. Source: author of the thesis [6]

The research of the dynamics of publications on the two fields (business models and business model innovation) published after the 1990s is summarized in Fig. 1.1.

METHODOLOGY

From the point of view of the research methodology used, the following paragraphs present all the criteria used in selecting the relevant articles for this subject. The number of criteria used is 7 and their relevance for this study of the literature is detailed below.

1. Database: Search the international academic databases Web of Science and SCOPUS, which are chosen because they offer a wider selection of articles and multiple possibilities to access data.
2. Year of publication: For this study, the research on the dynamics of publications on the two fields (business models and business model innovation) was performed for the reference period 01.01.1991 - 18.10.2020.
3. Type of publications: To obtain the most relevant results, only works published in books and magazines specialized in the field were selected.
4. Keywords used: The search was performed by concrete queries: "business model*", respectively "business model innovation*".
5. Selected topics: Variants of selected topics: Business, Management, Marketing.
6. Availability of publications: All publications available in the two databases were selected for this study.
7. Language: The language in which the selected articles were written is English.

STUDY RESULTS

The obtained results, which were at the elaboration of the graph presented in Fig. 1.1 were the following: in the Web of Science database there were 5419 publications from abroad for business models and 597 publications from abroad for business model innovation and in the SCOPUS database there were 7455 publications from abroad for business models and 705 publications from abroad for business model innovation.

In Romania there are few materials (articles / books) developed by Romanian researchers in academia on the issue of business models. Following the concrete searches on the Google Scholar platform (scholar.google.ro), resulted a number of 433 publications (articles in specialized magazines and books), elaborated by Romanian authors (in Romanian and English) in the period 2000-2020 for business models and 3 publications dedicated to business model innovation.

CHAPTER II MARKETING APPROACH FOR BUSINESS MODEL ANALYSIS

The concept of business model has increased the attention of researchers in a variety of academic disciplines and fields of professional practice. However, until 2011, business models received very little attention from marketers, only eight articles on business models were published in marketing magazines between 1970 and 2011.

In order to see how the level of interest of Marketing researchers in the study of the business model evolved, after 2011, a research was carried out on the number of papers published in marketing journals.

METHODOLOGY

From the point of view of the methodology used, the following paragraphs present all the criteria used in selecting the relevant articles for this study. The number of criteria used is 7 and their relevance for this study of the literature are detailed below.

1. Database: The search was performed in the international academic database SCOPUS.
2. Year of publication: For this study, the dynamics research on business models published in marketing journals was performed for the reference period 01.01.2012 - 23.10.2020.
3. Type of publications: In order to obtain the most relevant results, only works published in books and magazines specialized in the field of marketing were selected.
4. Keywords used: The search was performed by concrete queries: "business model*", respectively "business model innovation*".
5. Selected topics: Variants of selected topics: Marketing.
6. Availability of publications: All available publications from the SCOPUS database were selected for this study.
7. Language: The language in which the selected articles were written is English.

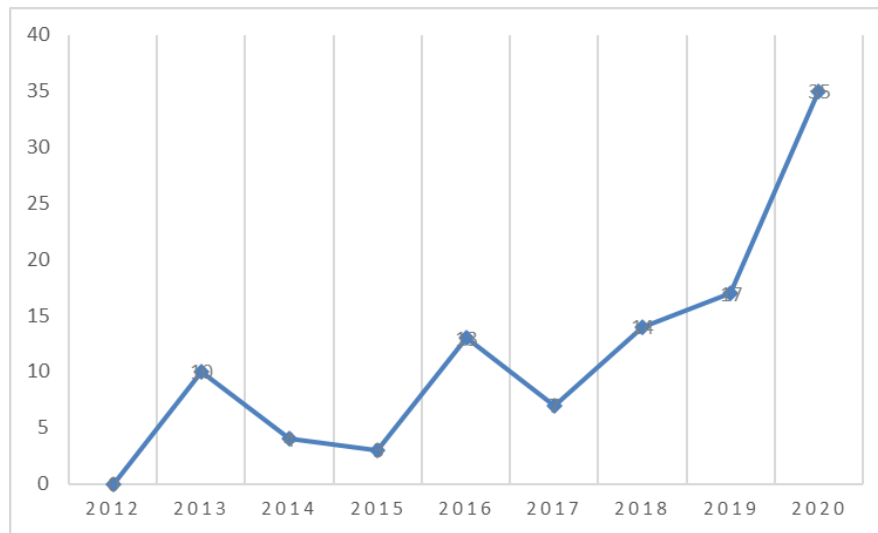


FIG. 2.1 Dynamics of business model article publications in marketing magazines, in the period 2012 – 2020. Source: author of the thesis [6]

STUDY RESULTS

The results were as follows: a total of 103 articles published. It is noted that 28 of the 103 published articles address the issue of business model innovation. In Figs. 2.1 is presented a graph of the dynamics of publications of articles on business models in marketing magazines, as follows: 2013 (10 articles), 2014 (4), 2015 (3), 2016 (13), 2017 (7), 2018 (14), 2019 (17), 2020 (35). There is a greater concern of research and from a temporal point of view, increasing from 3-4 articles (in 2014-2015) to 35 (in 2020).

As can be seen from the above, a significant increase in interest from marketers in the study of business models began after 2013. And in 2020, marketers began to give more importance to the field business models which leads to the conclusion that there are many more compatibilities between the two concepts (business model and marketing) than divergences, and the marketing approach in the analysis of business models will be one of the futures, both for academia and entrepreneurship. [7]

CHAPTER III

RESULTS OF THE PRACTICAL APPLICATION OF THE MARKETING APPROACH FOR THE ANALYSIS OF BUSINESS MODELS ON THE MARKET OF OPTICAL MEDICAL DEVICES IN ROMANIA

The Romanian market is an emerging market in which changes can occur more easily and quickly than other markets, for example in Western European countries.

One of the important factors in choosing this market is that the Romanian market for optical medical devices includes groups of specific participants significantly affecting the functioning mechanism and the results of interactions within a business model. [8]

One of the links in the value chain of a business model on the Romanian optical medical devices market is the ophthalmic medical office has a significant impact on the value creation process for ophthalmic patients because in most cases patients depend on the prescription prepared by the ophthalmologist for choosing optical medical device. This interaction between the ophthalmologist and the patient must be analyzed not only from a medical point of view but also from a commercial point of view because in most cases the patient in Romania pays for the prescribed optical medical device. [9]

The Romanian market for optical medical devices is developing with a very large segment of end users. This market segment has been very little approached from an academic point of view by researchers in the field in Romania.

According to a study, conducted in 2019 by OECD Health, published in the journal *Healthcare & Life Sciences Review*, Romania is at the bottom of the ranking of European (EU) countries in terms of expenditures allocated to public health. In 2019, Romania allocated a budget of 1000 Euro per person (2.5% of GDP). The EU average was approx. 3000 Euro per person and in the top of European countries is Norway, which has allocated approx. 4400 Euro per person. [10]

According to the latest social research study conducted at the level of European countries published in 2020 by the European Council of Optometry and Optics in *ECOO-Blue Book-2020*, 50% of the Romanian population wears eyeglasses and 2% wears contact lenses. [11]

The state policy regarding the free provision of health care services for the population in Romania is made from the funds allocated by the state, through the Health Insurance Houses

(CNAS, OPSNAJ). According to the provisions of the National Health Insurance House (CNAS) in Romania for the insured persons according to Law no. 95/2006 on the health care reform, the medical services that are not reimbursed from the Single National Health Insurance Fund are : “the equivalent value of some materials necessary for the correction of sight and hearing”. [12]

According to the publication ECOO-Blue Book-2020 elaborated annually by the European Council of Optometry and Optics, in Romania for the majority of the young, adult and elderly population, the medical services for obtaining optical medical devices are paid from their own sources. Also, people who have low incomes or are unemployed are not exempt from payment. Exceptions are people who have disabilities, in this case they benefit from the general insurance granted by the state for disability and the medical service for the optical device is covered by this insurance.

Therefore, the market of optical medical devices in Romania is represented by the retail segment that differentiates it from the markets in other countries, where the financing by the state is more consistent. The market of optical medical devices in Romania is estimated at approximately 200 million euros and is constantly growing. Compared to other European countries, the profile market in Romania is only at 20% of the potential level it can reach.

The interactions between the participants of the business model on the optical medical devices market in Romania

The first contact of the end user (patient) with the product or service offered by the company occurs through the value proposition. The role of the end user in the business models of manufacturers of optical medical devices has a special implication because distribution chains are becoming more diversified and decentralized to allow more customization in the production of these goods. Consequently, the end user imposes the need to decentralize and diversify the organization of the distribution chain of the manufacturing company precisely because it pays for the value created and participates in the process of capturing value by the company.

Given the fact that the end users of optical medical devices in Romania are financed in most cases from their own sources, the relevant participants of a business model on this (retail) market of optical medical devices in Romania are material suppliers, manufacturing company, distribution companies, marketing companies, ophthalmic medical practices, and patients (see Fig. 3.1). The functioning of this market is also influenced by government regulatory bodies, but their influence is more present for the market segment financed by the state, through the National Health Insurance House.

To highlight the interactions between the participants of the business model on the optical medical devices market in Romania, it is important to describe the roles they each have.

The company producing optical medical devices is responsible for shaping market demand and controls the distribution of manufactured products. There are many foreign companies working in Romania in the field of optical medical devices, but they do not have a production location in

Romania. Therefore, the activity of these companies is focused on activities to promote products on the Romanian market through interaction with Romanian health professionals.

The key role of suppliers is to deliver to the company producing the raw material or semi-finished materials needed for the manufacturing process of optical medical devices.

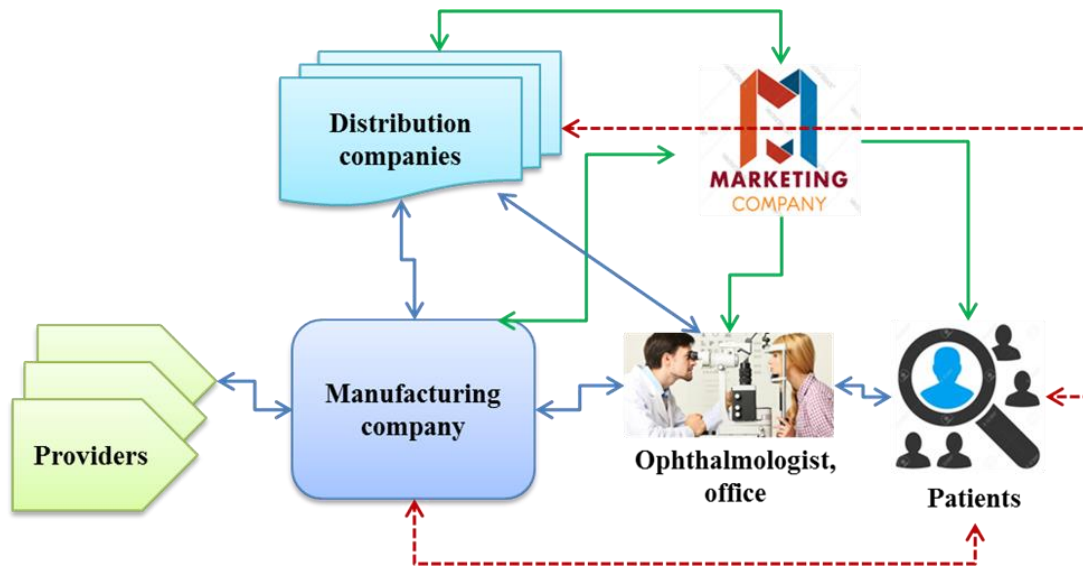


FIG. 3.1 Value chain participants and the interactions between them within a business model on the retail market of optical medical devices in Romania. *Source : author of the thesis [13]*

The role of distribution companies on the optical medical devices market in Romania is to ensure the continuity of the presence of stocks of optical medical devices of the manufacturing company for ophthalmic offices or specialized stores (own or other partner companies) in the field of glasses and contact lenses.

Patients are the end users of optical medical devices. They provide the manufacturing companies with information about the personal satisfaction of the purchased product, which allows the quality of the manufactured products to be adjusted.

Considering the fact that in Romania optical medical devices are distributed on the basis of a medical prescription following an ophthalmological consultation, the role of the ophthalmologist is very important, as it has the power to greatly influence the patient in choosing a particular optical medical device.

Marketing companies also play an important role in the value chain, because they deal with the development of the promotional message of an optical medical device and develop a strategy for transmitting this message to the target market segment (both end users and physicians ophthalmologists).

Marketing companies can be partners with the manufacturing company but also with the distribution company to offer its services to promote an optical medical device on the market.

This article addresses the retail market of optical medical devices, which is relevant in the current specific conditions of the optical medical devices market in Romania. The following flows take place within the interaction between the manufacturing company and suppliers : material, financial and informational (see Fig. 3.2). In this interaction, the flow of materials usually goes from suppliers to the manufacturing company and the financial flow usually goes from the manufacturing company to suppliers. The financial flow is characterized by a compensation to be paid by the manufacturing company for the raw materials and subassemblies received from suppliers. Sometimes in this interaction reverse flows (recycling flows) can take place between the manufacturing company and suppliers. In this case the flow of materials goes from the manufacturing company to suppliers, in the form of defective optical medical devices intended to be recycled by suppliers and the financial flow goes from suppliers to the manufacturing company in the form of financial compensation for recycled optical medical devices. Within this interaction there is also a mutual information flow that starts with the forecast of the demand for raw materials and materials up to customs and tax formalities that suppliers need (from abroad for example).

Exchanges of information on contracts, confirmations and notifications of changes take place so that the materials are in the necessary order and at the right time in the next phase of the supply chain.

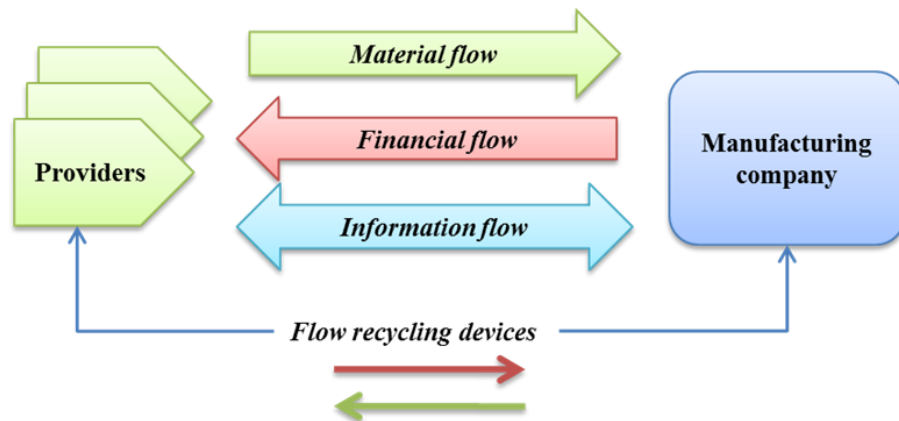


FIG. 3.2 Interactions between material suppliers and the manufacturing company of optical medical devices in Romania. *Source : author of the thesis [13]*

Over-production or a lack of optical medical devices on the market may occur during the interaction between the manufacturer and suppliers. In order to prevent such situations, the representatives of the management of the manufacturing company must carry out joint activities (formal coordination meetings regularly) with the representatives of the management of the

supplying company to establish, adjust and correct the demand plan for raw materials and subassemblies of optical medical devices.

The interactions between the manufacturing company and the distribution company of optical medical devices are carried out in order to forecast the demand for these devices and to plan the necessary quantities of stocks in the distributor's warehouses. Within this interaction the following flows take place : supply, financial and information (see Fig. 3.3). The material supply flow represents the supply of distribution companies with optical medical devices produced by the manufacturing company. The material flow can sometimes be the other way around, from distributors to the manufacturer, in case of return of defective or unsold optical medical devices due to "moral" wear (they are technologically and qualitatively outdated by other better performing devices from other manufacturers). The financial flow from the manufacturer to the distributors is characterized by a payment (may be a percentage of the volume of supply of goods) to the service of distribution or sale of optical medical devices. And the reverse financial flow is characterized by the supply of the bank account of the manufacturer by distributors for capitalized optical medical devices (redistributed or sold).

Sometimes within this mutual financial flow, mutual financial compensations are included in case of risks of different types (appeared in the supply chain, appeared from the external environment - disturbances of the stock exchange, financial and foreign exchange market, crises of different types, natural calamities, etc.).

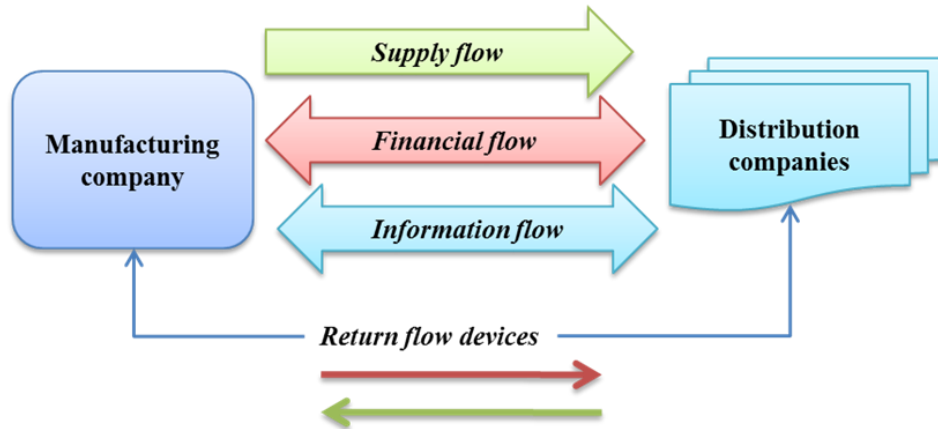


FIG. 3.3 Interactions between the manufacturing company and the distribution companies of optical medical devices in Romania. *Source : author of the thesis [13]*

The reciprocal information flow (in both directions) refers to exchanges of information on the performance of contracts, confirmations, and notifications of change so that the supply chain to replenish stocks of optical medical devices is viable. At the same time, there are exchanges of information on the evolution of the market (trends, needs of certain specific devices, the situation of competition). The manufacturing company as part of the collaboration with distributors tries first to ensure the availability of optical medical devices in the specialized stores of the

distribution company to increase the number of end users loyal to the company's "brand". The collaboration relationship between the production company and the distribution company is usually a formal one made on a contractual basis with very well-established clauses. To ensure its success on the market, the distribution company has the interest to sell as many of the stocks of optical medical devices provided by the manufacturing company.

To achieve this goal, the distribution company hires, on a contractual basis, a marketing company to promote the optical medical devices of the manufacturing company in a target market. This market comprises end users (wearers of glasses or contact lenses) and ophthalmologists who are interested in new, innovative, excellent quality, medically effective and affordable products. The manufacturing company also hires on a contractual basis a marketing company to promote the optical medical devices it produces to the same target market as an alternative channel for transmitting valuable communication to end users.

In Figs. 3.4 are represented the flows that take place between the marketing company and the manufacturing company, the distribution companies, the ophthalmologists, and the patients. The information flows between the manufacturing company or the distribution companies and the marketing company are reciprocal and include various formal arrangements (contracts, agreements), coordination meetings from the manufacturing company or distribution companies, respectively information (reports, presentations) by the marketing company. on the evolution of the target market (of optical medical devices in Romania) and the results of the market survey on promoted optical medical devices. The financial flows between the manufacturing company or the distribution companies and the marketing company are unidirectional and are characterized by the payment to the marketing company for the promotional services provided.

The information flows between the marketing company and the ophthalmologists or patients are unidirectional and are characterized by the communication of value transmitted to them. Value communication is translated into providing useful information in various forms (online, printed brochures, catalogs, demonstration videos) on optical medical devices (quality, technological performance, attractive price, related bonuses) as well as providing samples of medical devices optical instruments that are used to demonstrate technological quality and performance. The purpose of the value communication is to draw the attention of ophthalmologists and patients to the optical medical devices of the manufacturing company, to persuade them to opt (ophthalmologist to prescribe and the patient to accept the prescription and pay) for these devices. Both the manufacturing company and the distribution company have their own stores specializing in optical medical devices.

At this level there is a direct interaction between the manufacturing company and the distribution company and the end users. Thus, the manufacturing or distribution company can provide directly without intermediary's certain useful information for end users (especially those who are already wearing glasses or contact lenses and know certain technical aspects about what they need).

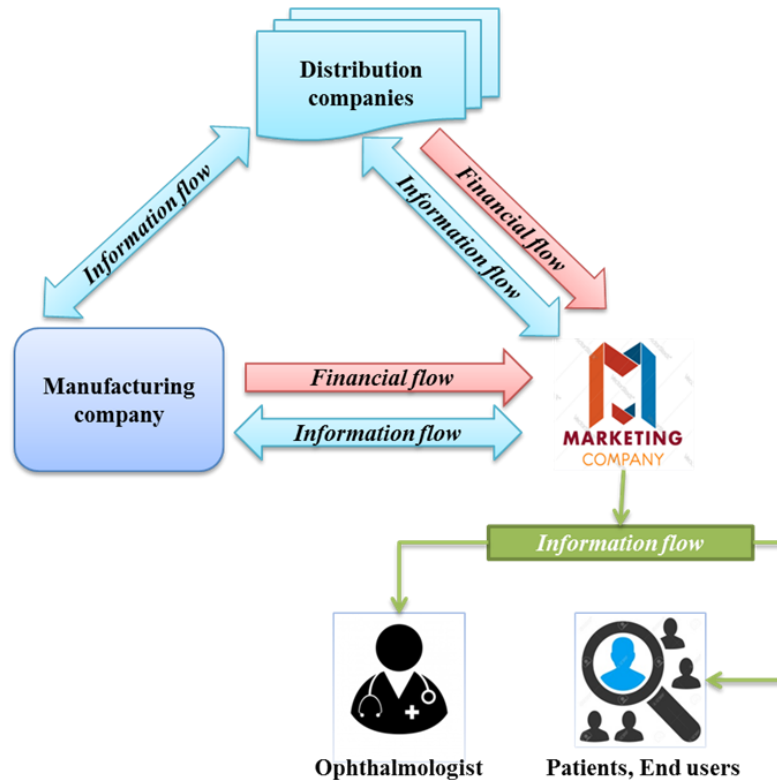


FIG. 3.4 Interactions between the marketing company and the manufacturing company or companies' distribution, respectively ophthalmologists and patients.

Source : author of the thesis [13]

In the interaction of the manufacturing company with ophthalmologists, the manufacturing companies aim primarily to organize many educational activities to allow them to exchange views on issues arising from professional practice. In addition to the presence of an educational component, these events have a positive effect on the image of the manufacturing company. Many educational events (congresses, symposia, conferences) include lectures by famous professionals in the field who have achieved certain notable performances that can be distributed in the form of "lessons learned" from practice.

The interactions between the manufacturing company and the medical optics offices with the sale of optical medical devices are manifested in the form of coordination of patient flows directed by ophthalmologists for the purchase of optical medical devices of the manufacturing company.

The sales representative of the manufacturing company provides information to the ophthalmologists about the locations where the company sells the products and about the types of optical medical devices available.

CHAPTER IV

COLLECTION, EVALUATION, AND INTERPRETATION OF DATA FOR THE DEVELOPMENT OF AN INNOVATIVE BUSINESS MODEL ON THE MARKET OF OPTICAL MEDICAL DEVICES IN ROMANIA

For this study, the author chose the method of collecting data through a structured interview that “is a combination of an interview and a survey. The interview is structured and based on predetermined questions. The answers to these questions are determined, and the respondent chooses one of them that he considers most relevant.

The novelty of this study is that in the digital age, however, the human factor remains an important link in a business model. One of these factors is the ophthalmologist who has a key role in the value chain of the business model. The ophthalmologist's place is between the company that produces optical medical devices and the end users who pay for these devices. The key role of the ophthalmologist is represented by his loyalty for certain optical medical devices, for a certain brand of the company, this loyalty being materialized by prescribing to the patient certain optical medical devices.

To obtain a perspective to evaluate the field of activity of the ophthalmologist and the evolution of the optical medical devices market, in this interview, the author introduced the last two questions such as "open questions", where the researcher asks the respondent unstructured questions, allowing the interview to be more of a discussion. Respondents may be asked to express their own opinion. The interview was conducted in person, face to face, by telephone and via the Internet.

The telephone and Internet interview was considered due to the geographical distance from the interviewee and the limited time. Also, the Covid-19 pandemic context was another argument that the author had to consider during the practical study (October 2021-April 2022).

The research methodology in this practical study that refers to the market of optical medical devices in Romania and to the interactions that take place between the manufacturing company, the ophthalmologist and the end user will be carried out according to the following algorithm: sample selection; primary data collection; evaluation of indicators resulting from the collection of primary data; validation and interpretation of results following the evaluation of indicators.

IBM SPSS (Statistical Package for the Social Sciences) Statistics for Windows, Version 26.0 was used to statistically process the data obtained from the study. IBM SPSS is one of the most well-known international programs on quantitative-qualitative analysis in the field of social research.

For the study, a sample of 35 companies in the field of optical medical devices, 35 private ophthalmic clinics and 35 specialized stores from 19 cities (large and medium, as population) from all representative regions of Romania were established: Transylvania, Moldova, Dobrogea, Muntenia and Oltenia.

To answer the questions of the interview with the ophthalmologists, the respondents had to choose a Likert scale from 1 to 4, where 1 means No, 2 means rather No, 3 means rather Yes, and 4 means Yes.

After collecting the data obtained from the interview applied for the 35 respondents, the author analyzed the 5 dependent variables related to the loyalty of the ophthalmologist based on the medical prescription prepared for the patient.

Following the evaluation of the results of the study, the situation is as follows:

- 74.3% of the ophthalmologists interviewed mentioned that they have a good and particularly good relationship with the sales representative of the company specialized in the field of optical medical products.
- 60% of the ophthalmologists interviewed mentioned that the opinion leaders in the medical field recommend them to prescribe the optical medical devices of a certain company producing optical medical devices.
- regarding the tangible reward, 40% of the respondents rated positively, 45.7% neutrally appreciated the influence of the tangible reward on the prescription decision and a share of 14.3% of the respondents rated that the tangible reward does not influence their decision regarding the optical medical device they prescribe to patients. Analyzing the percentage of undecided respondents (45.7%), it is observed that 17.1% answered below the average grade (6.20) and 28.6% answered above average. According to the cumulative percentages, it results that 31.4% of the total respondents opted for the negative option. In conclusion, 68.6% of respondents opt for the positive variant (above the average of 6.20), which means that the tangible reward has a positive effect on the ophthalmologist's decision for a certain type of optical medical device.
- regarding the reputation of the company producing or distributing optical medical devices, 5.8% of the respondents have a negative opinion on the reputation, 77.1% of those interviewed have a neutral opinion, while 17.1% have a positive opinion on the company's reputation. Analyzing the percentage of undecided respondents (77.1%), it is observed that 28.6% answered below the average grade (8.20) and 48.6% answered above average. According to the cumulative percentages, it results that 34.3% of the total respondents opted for the negative option. In conclusion, 65.7% of respondents opt for the positive option, which means that the reputation of the manufacturing company counts in the decision of the ophthalmologist for a certain type of optical medical device.
- 91.4% of the ophthalmologists interviewed answered that they appreciate the quality of optical medical devices. In conclusion, the investment of the manufacturing company in a particularly good quality product produces a greater effect on ophthalmologists than the low price (promotional) or the prestige of the product brand.

In Figs. 4.1 is graphically presented the influence of the 5 variables on the ophthalmologist in terms of expressing loyalty for prescribing a particular optical medical device for the patient.

We can conclude that each of these variables has an influence on the decision of the ophthalmologist for prescribing a certain type of optical medical device.

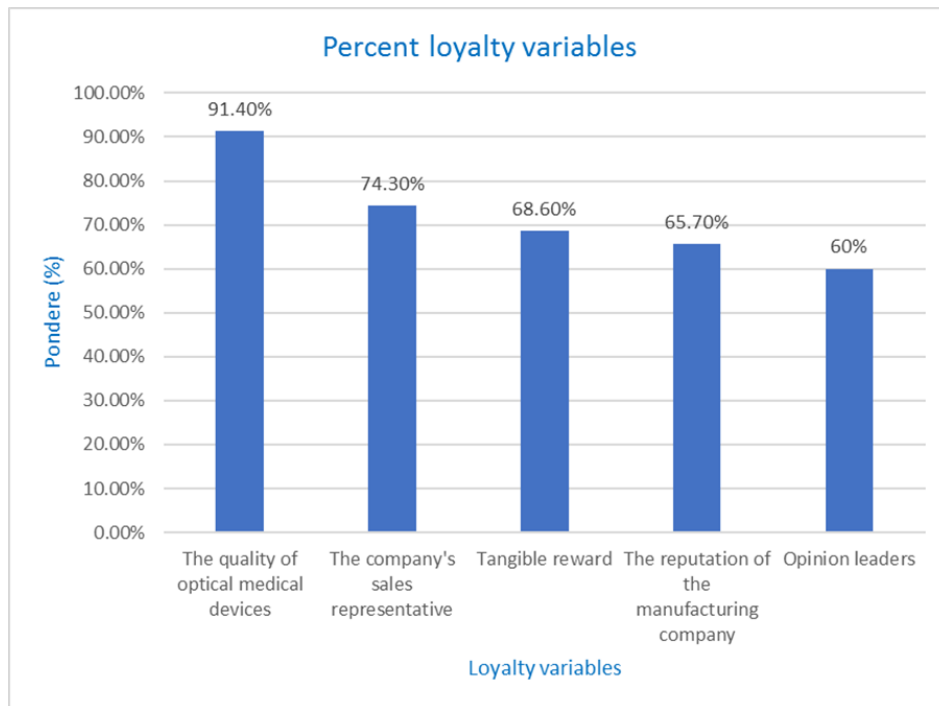


FIG. 4.1 Graphical representation of the influence of the 5 variables on the doctor Ophthalmologist in terms of expressing loyalty. *Source : author of the thesis [14]*

From the 5 variables for three of them (the sales representative of the manufacturing company, opinion leaders, the quality of optical medical devices) it was very clear that they certainly matter and influence the decision.

Two other variables (tangible reward, reputation of the manufacturing company) can often influence the loyalty of the ophthalmologist, but there are many doctors who are undecided. This indecision of doctors can be influenced by marketing policies promoted, over a period, by companies producing optical medical devices.

The manufacturing company as a link that coordinates the interests of other participants in the value chain is interested in the factors that influence the loyalty of the ophthalmologist to certain types of optical medical devices. With this information, the company has the opportunity to influence in a timely manner and eliminate the differences between the interests of ophthalmologists and the interests of the end user.

In order to reach the end user of optical medical devices on the Romanian market, the company producing optical medical devices must work with the ophthalmologist.

The expression of the ophthalmologist's loyalty for the optical medical devices of the manufacturing company is transposed in effect by recommending optical medical devices, based on the medical prescription to end users and they express agreement for the recommended devices, order them and pay for them. The financial value of the optical medical device is paid by the customer and reaches the value captured at the manufacturer.

According to the National Institute of Statistics of Romania, the population by domicile on July 1, 2021 reached 22,047,000 people, 0.4% lower than on July 1, 2020. The urban and female population are majority (56, 3%, respectively 51.2%).

According to the latest social research study conducted at the level of European states, published in 2020 by the European Council of Optometry and Optics in ECOO-Blue Book-2020, 50% of the Romanian population wears glasses and 2% wears contact lenses.

Performing a calculation, we will reach the following result : 11,464,440 peoples are visually impaired in Romania.

In Romania, visually impaired people pay for services and devices in the optical medical field, except for people with disabilities.

According to the National Authority for the Rights of Persons with Disabilities, Children and Adoptions of the Romanian Ministry of Labor and Social Protection, as of December 31, 2021, the total number of persons with disabilities was 865,573 persons (3.92% of the total Romanian population). Of these, 98.09% (848,966 peoples) are in the care of families and / or live independently (non-institutionalized) and 1.91% (16,607 peoples) are in public residential social assistance institutions for adults (institutionalized).

The aspects shown above have been transposed into a scheme in Figs. 4.2 below.

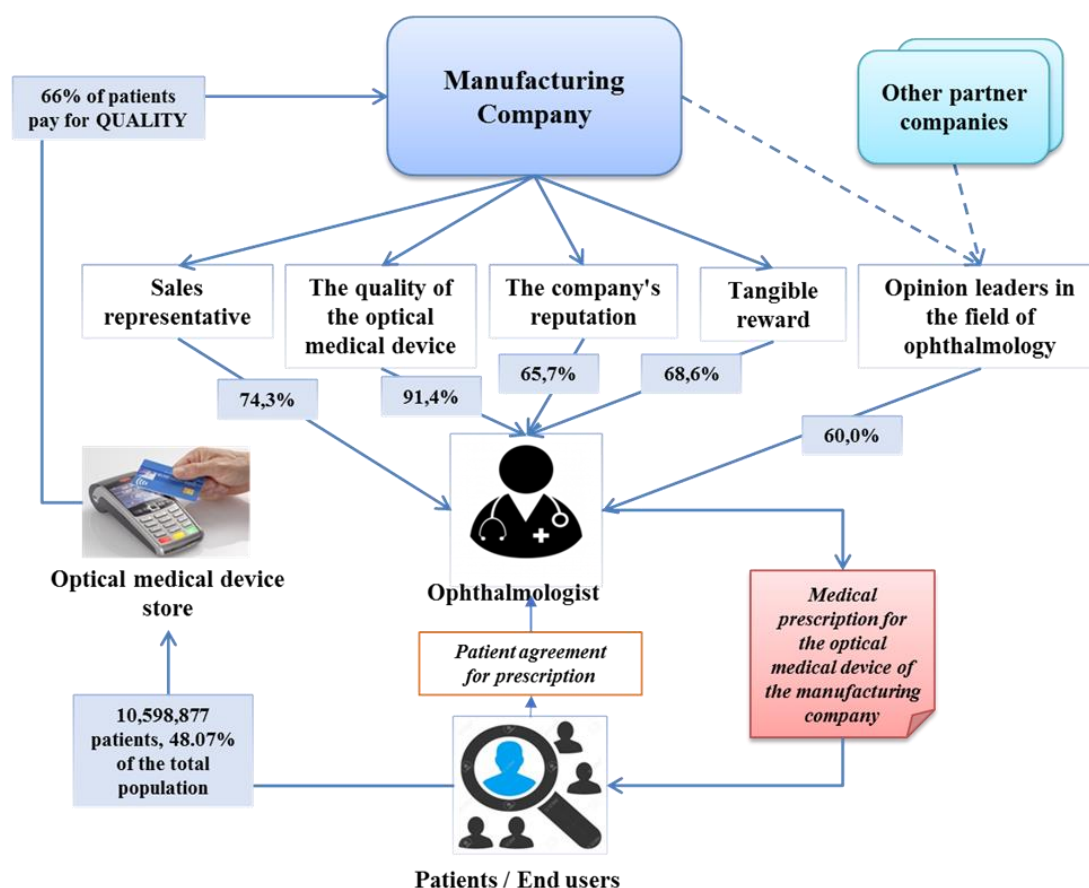


FIG. 4.2 Flows between the manufacturing company - ophthalmic office - end users. *Source : author of the thesis* [14]

Therefore, the total number of end users in Romania who pay for services and devices in the field of medical optics is 10,598,877 people, ie 48.07% of the total population of Romania.

According to the results obtained by the author, following the practical study, two thirds of the study participants (66%) consider that the dominant factor that convinces the client to buy the optical medical device is its quality.

Qualitative analysis of the client (end user of optical medical devices) in Romania.

This analysis aims to highlight the most relevant needs / requirements of the end user of optical medical devices in Romania.

Following the analysis of the above questions, the following results were obtained, presented in Fig. 4.3:

- current customers (end users) of medical optics stores in Romania mainly buy eyeglasses and less contact lenses;
- the dominant factor that convinces the client to buy the optical medical device is its quality;
- The facility that is most frequently offered in medical optics stores is the free medical consultation.

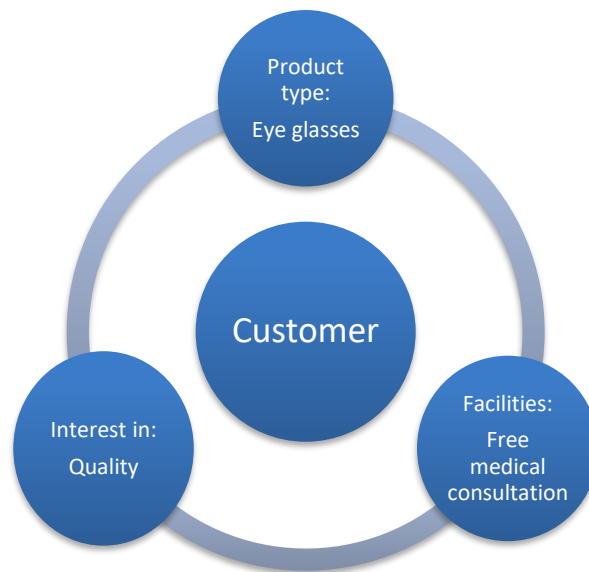


FIG. 4.3 Customer needs (end user of optical medical devices)
From Romania, Year 2022. *Source : author of the thesis* [15]

In addition to these useful answers in the analysis of a company's business model in the field of optical medical devices, data were also obtained that validated certain known aspects such as:

- all optical shops included in the study offer free optical medical devices for people with disabilities.
- none of the optical shops included in the research sells to customers eyeglasses or contact lenses without a prescription from the ophthalmologist. These data indicate that in Romania the provisions of the normative acts in force regarding the visually impaired are observed and have been previously validated by the publication ECOO-Blue Book-2020, elaborated by the European Council of Optometry and Optics.

An interesting aspect also emerged: although an overwhelming percentage of customers (94.3%) prefer to buy eyeglasses instead of contact lenses, three-quarters of respondents (77.1%) say they recommend customers wearing glasses to try contact lenses. This indicates that the visually impaired population is not sufficiently well informed and educated in the

spirit of innovation brought about by contact lenses. This is also confirmed by the publication ECOO-Blue Book-2020, in which our country is presented with a percentage of only 2% contact lens wearers, one of the lowest percentages in the EU.

Turning to the business model we can see that companies in the field of optical medical devices in Romania have noticed this divergence (glasses vs. contact lenses) in our country and have taken measures to educate customers through specialized sellers the percentage of 77.1 % confirms this finding. At least, after these answers we can hope that there is a future for contact lenses in Romania but not immediately but probably in the medium and long term.

CHAPTER V

ELABORATION OF INNOVATIVE BUSINESS MODELS ON THE MARKET OF OPTICAL MEDICAL DEVICES IN ROMANIA

The research methodology in this practical study refers to the optical medical devices market in Romania and to the interactions that take place between the manufacturing company, distribution companies, raw material suppliers, marketing company, development research center in the field of optical medical devices, ophthalmologist, and end user.

The study was performed according to the following algorithm: sample selection; primary data collection; evaluation of indicators resulting from the collection of primary data; validation and interpretation of results following the evaluation of indicators. Also, the information that was obtained by documenting the specialized publications was considered in the calculation of the qualitative analysis. This information complemented the results of the study and contributed to the development of an innovative business model on the market of optical medical devices in Romania.

IBM SPSS Statistics for Windows software, Version 26.0, was used for statistical processing of the study data.

The analysis of the association between the categorical variables was done using the cross-table and the χ^2 (chi-square) test. If the results of the chi-square test were altered enough that they could not be considered, Fisher's exact test was used.

A value of the statistical significance coefficient $p < 0.05$ was considered significant.

The data collection was performed by applying interviews to the management of companies (managers, directors, presidents) specialized in the production and distribution of optical medical devices. The interviews were conducted through direct discussions, by telephone and by videophone.

For the study, a sample of 35 private companies specialized in the production and distribution of optical medical devices from 19 cities (large and medium, in terms of population) from all representative regions of Romania was established: Transylvania, Moldova, Dobrogea, Muntenia and Oltenia. The data collection period for this study was October 2021-April 2022.

The author of the article sought to obtain answers regarding the dominant participant in the business model of the company represented by the person on its management board. Depending on the answers obtained, a quantitative analysis was performed, benefiting from the possibilities offered by the IBM SPSS information program for elaborating complex diagrams, through the crosstabulation method.

A crosstab is a frequency distribution of responses across two or more sets of variables. To make a cross-tabulation, we count the answers for each of the groups and compare them. Chi square analysis (χ^2) allows us to evaluate whether the frequencies of two nominally scaled variables are related.

For the application of the crosstabulation method, the author used the chi-square test, for the calculation of which he started from the following hypotheses:

- Hypothesis H0 = There is no statistically significant association between two variables (if $p > 0.05$, p values deviation for a χ^2).
- Hypothesis H1 = There is a statistically significant association between two variables (if $p < 0.05$).

Following the application of the crosstabulation method for different associations, the following results relevant to the practical study were obtained:

- ❖ There is an association between the main object of activity and the dominant participant in the company's business model that influences the company's turnover.

Since $p < 0.001$, the hypothesis H1 is accepted, namely there is a statistically significant association between the two variables. The bivariate Chi square test (χ^2) indicated the presence of a significant association between the two variables ($\chi^2 = 27.78$; $df = 3$, $p < 0.001$).

- ❖ There is a significant association between the dominant participant that influences the company's turnover and the target market segment that the company accesses.

Since $p < 0.001$, the hypothesis H1 is accepted, namely there is a statistically significant association between the two variables ($\chi^2 = 31.37$; $df = 6$, $p < 0.001$).

- ❖ There is a significant association between the dominant participant in the business model that influences the company's turnover and the type of business model used by the company.

Since $p < 0.001$, the hypothesis H1 is accepted, namely there is a statistically significant association between the two variables ($\chi^2 = 21.25$; $df = 3$, $p < 0.001$).

- ❖ There is a significant association between the dominant participant in the business model that influences the company's turnover and the participants in the business model used by the company in the field of optical medical devices.

Since $p < 0.001$, hypothesis H1 is accepted, namely there is a statistically significant association between the two variables ($\chi^2 = 49.65$; $df = 6$, $p < 0.001$).

- ❖ There is a significant association between the dominant participant in the business model that influences the company's turnover and the form of interaction with the participants of the business model.

Since $p < 0.001$, the hypothesis H1 is accepted, namely there is a statistically significant association between the two variables ($\chi^2 = 21.25$; $df = 3$, $p < 0.001$).

- ❖ There is a significant association between the dominant participant in the business model that influences the company's turnover and divergences between various factors within the business model.

Since $p < 0.009$, the hypothesis H1 is accepted, ie there is a statistically significant association between the two variables ($\chi^2 = 31.06$; $df = 15$, $p < 0.009$).

- ❖ There is a significant association between the dominant participant in the business model that influences the company's turnover and the dominant factor that influences the company's position in the market.

Since $p < 0.127$ (ie $p > 0.050$, exceeding the limit for hypothesis H1), **hypothesis H0 is accepted**, namely **there is no statistically significant association** between the two variables ($\chi^2 = 13.85$; $df = 9$, $p < 0.127$).

- ❖ There is a significant association between the dominant participant in the business model that influences the company's turnover and how companies manage to transmit feedback from the end user to other participants.

Since $p < 0.009$, the hypothesis H1 is accepted, ie there is a statistically significant association between the two variables ($\chi^2 = 22.31$; $df = 9$, $p < 0.009$).

- ❖ There is a link between the dominant participant in the business model and the use of the method in setting the price of the optical medical device by the company.

Since $p < 0.009$, the hypothesis H1 is accepted, namely there is a statistically significant association between the two variables ($\chi^2 = 22.65$; $df = 6$, $p < 0.001$).

To develop the innovative business model, it is necessary to represent the way in which the demand chain works from the supplier, producer, distributor to the end user. This chain is managed by a dominant factor, the manufacturing company.

It must be borne in mind that the core of the marketing concept is the end user. For this, the innovative business model must be oriented towards the end user. The way in which the orientation to the end user is made is through a relevant participant in the business model in the field of optical medical devices. This relevant participant is the ophthalmological medical office that has an ophthalmologist or optometrist. Due to the specificity of the Romanian optical medical devices market and in accordance with national and European regulations, the Romanian ophthalmologist has a defining role in influencing the delivery of value to the end user and the capture of value by the manufacturing company.

Within the innovative business model, it is important to delimit the types of flows that overlap the field of business models and the field of marketing. The field of marketing helps to understand the market and market positioning of the manufacturing company, and the customer (in this case the end user of optical medical devices) is the beneficiary of the value provided by the manufacturing company but at the same time is the one who pays for this value. In value captured by the manufacturing company. This closes the cycle of proposing, creating, delivering, and capturing value.

In Figs. 1 presents an innovative business model for the company producing on the market of optical medical devices in Romania. This business model is a mixed type consisting of two types of business models: B2B Model - *Business-to-Business* model (by performing contractual interactions between legal entities, only between companies) and B2C Model - *Business-to-Consumer* model (by performing contractual interactions between legal entities and physical entities, or end users).

Within the innovative business model, 4 blocks of marketing relationships have been delimited that build the balance between the flows of optical medical devices.

Block I includes relationships with end users. It builds modern mechanisms for receiving market signals (feedback) and directing the value (supply) to the end user (which represents the market) through the ophthalmologist.

Block II is the space where the interactive relations between the manufacturing company and the distribution companies and the interactions of the two companies with the marketing company are built.

Block III is the space where the coordination of activities is organized within the production company taken separately or in the form of a network of production companies. This also resolves the divergences that appear at the level of the manufacturing company, this being also the dominant participant of the business model.

Block IV is the space where the market signals are analyzed and the strategy of transmitting the requirements to the material suppliers and the requirements for the development and innovation of optical medical devices is conceived, through a contractual relationship of the manufacturer with the research and development centers in medical optics. .

These four blocks (spaces) of marketing responsibility recommend the development of specific tools for managing relationships and coordinating actions in the value creation and distribution chain.

The innovation of the business model occurs in block I by innovating the methods of accessing the market. In this block, the ophthalmologist has an important role because he has the power to influence the decision of the end user to opt for the product of a certain company. But the company's role is to attract the ophthalmologist's loyalty to it. The company can do it directly through several levers: through the representative of the manufacturing company who frequently interacts with the ophthalmologist; by offering a tangible reward to the ophthalmologist. But this is not enough, it is necessary to gain the loyalty of the doctor through other types of leverage: product quality (it is a tool that the company can use but this tool requires a complex process that must be validated in the medium term) or the company's reputation (a tool which can be used after medium and long-term validation).

It is also necessary to lobby the ophthalmologist from some personalities in the field of optical medicine (this tool is the most difficult to manage by the company because it requires a good experience in the field of optical medical devices. On this space (block I) can innovate through various changes and adaptations of the business model, improving the levers through which the company can succeed, in a percentage as high as possible to obtain the loyalty of the ophthalmologist for the optical medical devices produced by it.

Another level where you can innovate is block III. It is the inner area of the internal flows within the manufacturing company. Here it is necessary to identify and remedy / adapt in a positive way various divergences, which were presented (identified during the practical study, from the previous chapter of the thesis). By applying certain internal structural transformations, the company can generate positive changes in flows to the external environment (relationship with other companies and end users). This type of innovation is an innovation through structural changes of the business model.

The innovation of the business model also occurs in block IV, by introducing innovative products (optical medical devices) in the value chain. Innovative products can be obtained for a fee (payment of the product license) on a contractual basis from the Centers for Research and Development in the field of optical medical devices. Innovation can also be achieved by qualitatively changing the raw material used. This can be achieved through good coordination with material suppliers both on the information cycle, by sending feedback from end users and on the financial flow by allocating additional financial resources to provide high quality raw materials.

If a business model supports at least two innovative changes then it becomes an innovative business model.

GENERAL CONCLUSIONS.

PERSONAL CONTRIBUTIONS AND FUTURE RESEARCH DIRECTIONS

The research within this doctoral thesis were conducted at a time when in Romania there were few materials (articles or books) developed by Romanian researchers in academia on the issue of business models. And the expectations of the economic environment from the academic environment and the needs of the entrepreneurial environment have increased and become more nuanced.

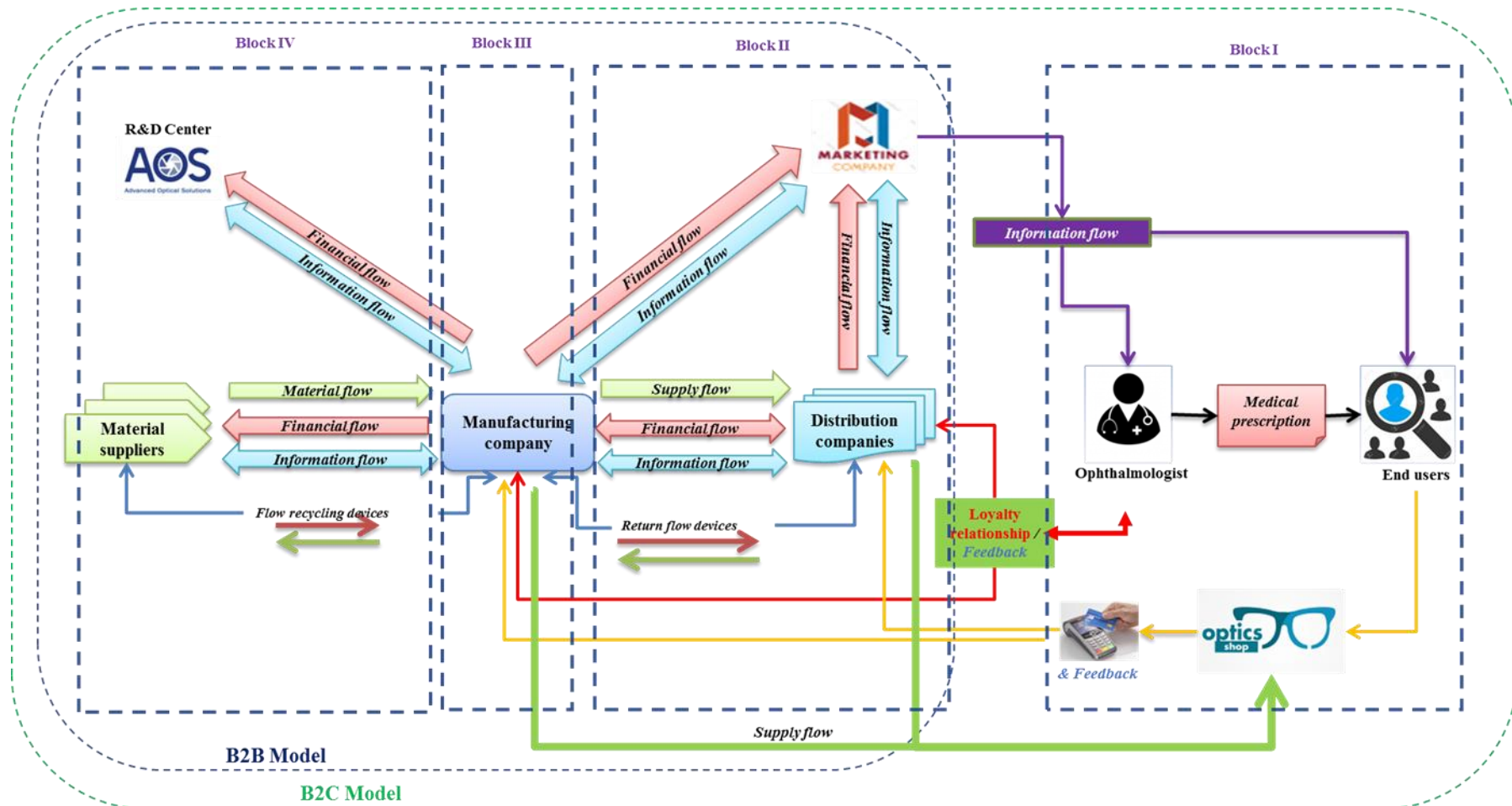


FIG.5.1 Innovative business model for the manufacturer / network of companies on the optical medical devices market in Romania

Source : author of the thesis [15]

In the first chapter of the doctoral thesis entitled "Business model - conceptual foundations, history of concept evolution, definition and divergences of identified opinions" were presented general issues and related to the characteristics, trends, and results of research on business model, existing approaches for the analysis of business models and their shortcomings. Various approaches of researchers were analyzed to define and understand the essence of a business model: definitions, analysis of differences of opinion, key elements. Some opinions of researchers in the field were presented - approaches, foundations, and differences regarding the concepts of the business model and the company's strategy. There were also some ways to develop a business model.

In the second chapter entitled "Marketing approach for business model analysis" a marketing approach for business model analysis was presented to justify directions for improvement. Given that the core of the marketing concept is the end user, and one of the main objectives of the scientific approach is to meet the satisfaction of the end user of optical medical devices. The purpose of scientific research was to develop innovative business models, oriented to the end user, because he is the core, which underlies the success of a company's business. Before starting the practical study, relevant business models were presented in a chronological order of their design to be able to use the "lessons learned" from previous research in future business model research.

In the third chapter, entitled "Results of the practical application of the marketing approach for the analysis of business models on the Romanian optical medical devices market" the proposed marketing approach for the analysis of the proposed business model was verified for the Romanian optical medical products market. First, a strategy for pyramid analysis of the three-tier business model was developed. At the first level, an analysis was made of the structure of the business model, the participants and the interactions that take place between them, after the situation of the optical medical devices market in Romania was presented. The dominant factor and the key role that the ophthalmologist can represent in the interaction between the manufacturer or distributor of optical medical devices and the end user (patient) were presented. The benchmarks regarding the research design, the operational objectives of the practical study, the variables, and the hypotheses in the research of the optical medical devices market in Romania were established. A representative sample of the research was chosen, the methods and tools for data collection, processing and analysis were established.

At the end of the chapter, great attention was paid to the conclusions resulting from the conclusion of the theoretical study of scientific research.

The fourth chapter is an extremely important one in the architecture and conception of this scientific research. It is entitled "Collection, evaluation and interpretation of data for the development of an innovative business model on the market of optical medical devices in Romania."

In this chapter we went to the second and third level of pyramidal analysis of the business model on the market of optical medical devices in Romania. The mechanisms of interaction between the participants in a business model throughout the chain were analyzed: supplier - manufacturer - distributor - intermediate user (doctor) - end user (patient) based on the results of data and information collected according to the research strategy customized in the previous chapter.

The process of interactions within the value chain was analyzed, the dominant actor and the needs of the end user were identified. The loyalty of the ophthalmologist for a certain brand of optical medical devices, the interest of the end user of optical medical devices and the dominant participant in the business model of companies in the field of optical medical devices in Romania were analyzed.

Chapter five, which concludes the practical research study, is entitled "Development of innovative business models on the market of optical medical devices in Romania." In the first part of this chapter were presented the methodological aspects for the elaboration of an innovative business model and the evaluation of the indicators regarding the situation of the participants of the business model on the optical medical devices market in Romania. Then, a qualitative analysis of the influence of the dominant factor on the flows within the business model on the Romanian optical medical devices market was performed. After analyzing the relevant indicators from the practical study, we proceeded to develop innovative business models for companies on the market of optical medical devices in Romania.

At the end of the chapter, great attention was paid to the conclusions resulting from the conclusion of the practical study of scientific research.

The limits of the study carried out in this doctoral thesis

The innovative business model developed, in chapter five, both for large companies or company networks and for medium and small companies on the optical medical devices market in Romania is a new and unique model compared to other models used in specialized studies previously conducted in our country and abroad.

The conceptually developed business model presented in Chapter Three and published in a journal article was of particular interest to the editors of international journals who asked the author by e-mail to publish other articles on the business model in their magazine or invited him to join the magazine's "reviewer" team.

However, as in any scientific endeavor, it is impossible to eliminate the subjectivity of the approach from which it comes and its methodological limitations. Unlike most previous research, which relies only on the data available in the specialized reports on the business model, the scientific research in this doctoral thesis has addressed several fields (business model, marketing, medical engineering in the optical field) to extract common elements and identify the divergences that exist between them.

The practical study resulted in interesting aspects about the market of optical medical devices in Romania, a market in transformation being marked by the pandemic crisis.

The results of the research would have been more comprehensive if there had been a similar scientific research study in Romania and a comparative analysis could be performed. But until other scientific research studies are developed in the field of business model innovation on the Romanian medical optical devices market, the current doctoral thesis may be a reliable source of inspiration for future PhD students, which will be based on some interesting conclusions for further research.

PERSONAL CONTRIBUTIONS OF THE AUTHOR

Starting from the operational objectives of the doctoral thesis, the most important own contributions can be considered the following:

1. Synthesizing from the specialized literature the concept of business model by approaching three research areas: definitions of the business model; elements of the business model; classifications and archetypes of business models.

The author of the thesis researched the dynamics of publications on the two fields (business models and business model innovation) published after the 1990s.

The author of the thesis selected 28 definitions from the most relevant of established authors in the field of business model research during 1998-2016.

Analyzing the 28 definitions of business models, the author of the thesis identified differences of opinion.

2. Analyzing and systematizing the key trends of business model research and highlighting the characteristics that are included in the field of marketing.

The author analyzed the dynamics of publications on business models in international marketing magazines between 2013 and 2020.

3. Studying the functioning of the business model on the market of optical medical devices, at international level and researching some innovative business models used for the Romanian market.

The author performed an analysis of business models on the Romanian medical optical devices market according to an analysis plan, structured on three levels, in the symbolic form of "Maslow's pyramid" because it describes the type of approach to the topic in this thesis: the analysis was performed by bottom up, from general to specific, from base to top.

The author analyzed the interactions between the participants of the business model on the Romanian optical medical devices market and described the roles that each of the participants have and the flows (material, financial, informational) between them.

The author developed the methodology, the operational objectives of the practical research (O1-O6) and the data collection methods.

The author developed three interview sheets for collecting data from three categories of people: managers (deputies) of companies in the field of optical medical devices; ophthalmologists / optometrists; vendors specializing in optical medical devices.

4. Research the process of interactions between value chain participants (suppliers, manufacturers, distributors, end users), conduct practical research on the possibilities to improve the whole process of interactions and identify an innovative business model oriented to the end user.

The author identified the dominant participant and his connections with the other participants in the business model of the Romanian optical medical device company, using the crosstabulation method and Chi square analysis (χ^2).

5. Conducting a qualitative analysis to elaborate innovative business models on the Romanian optical medical devices market.

The author of the thesis evaluated the indicators regarding the situation of the business model participants on the Romanian optical medical devices market and based on the loyalty variables of the ophthalmologist he developed an interaction scheme between the manufacturing company - ophthalmologist - end user.

The author performed a qualitative analysis of the influence of the dominant factor on the flows within the business model on the Romanian optical medical devices market and grouped the relevant indicators for the scientific approach in a table (see Table 5.1) and removed other relevant indicators. low to achieve the goal of developing an innovative business model adapted to the specific moment and market of optical medical devices in Romania.

6. The author drafted the "CONCLUSIONS" section at the end of each chapter, expressing his personal views on the topic addressed in each chapter.

DIRECTIONS FOR CONTINUING THE RESEARCH

To achieve short-and medium-term objectives, future research directions will consider the following:

1. The manufacturing company must permanently pursue the optimization of information, material, and financial flows, according to the scheme in Fig.5.1 and be receptive to divergences that occur within the company. If it meets these requirements, the innovative business model will certainly bring short-term stability and gradual medium-term prosperity.
2. In a constantly evolving business environment, especially now that the health pandemic has changed the way we perceive the world, understanding the major drivers of change can help companies better prepare for success. Trends such as high digitalization and the growth of a contactless economy play a major role in how the business landscape will look in the coming years.
3. Conducting a new practical study on the process of digitization of companies in the field of optical medical devices and analysis of the process of innovation of the business model through digitization.
4. Develop an innovative digital business model for optical medical device companies. It involves the analysis of indicators resulting from a practical study of data collection from companies on the state of digitalization of companies and the prospects of the management of these companies to invest in digitalization.
5. Integrating digital marketing tools into the innovative digital business model. This can be done by using the data presented in Chapter Three of this thesis and integrating them into the process of qualitative analysis of indicators for the development of an innovative digital business model.
6. Conducting an in-depth study of the contact lens market in Europe and customized in Romania. Using the data presented in this thesis about optical medical devices in general as "lessons learned" and focusing on a specific area, the field of contact lenses. Contact lenses will be worn in the future (medium term, 5-10 years) in a percentage of over 10% of the population (compared to 2%, currently).

SELECTIVE BIBLIOGRAPHY

- [1] Fielt, Erwin. 2013. “Conceptualising business models: Definitions, frameworks and classifications.” *Journal of Business Models* 1 (1): 85–105.
- [2] Zott, Christoph, and Raphael Amit. 2008. “The Fit between Product Market Strategy and Business Model: Implications for Firm Performance.” *Strategic Management Journal* 29 (1): 1–26.
- [3] Tapscott, D. 2001. “Rethinking strategy in a networked world: Or why Michael Porter is wrong about the Internet.” *Strategy and Business*, 24: 1-8.
- [4] Morris, Michael, Minet Schindehutte, and Jeffrey Allen. 2005. “The Entrepreneur’s Business Model: Toward a Unified Perspective.” *Journal of Business Research* 58 (6): 726–735.
- [5] Baden-Fuller, Charles, and Mary S. Morgan. 2010. “Business Models as Models.” *Long Range Planning* 43 (2–3): 156–171.
- [6] **Conon, Victor**, and Semenescu, Augustin: Why the marketing approach is necessary in the research of the business model, *Review of Management and Economic Engineering* Vol. 20, Nr. 3(81), September 2021, p. 171 - 179, ISSN (print): 1583-624X, ISSN (online): 2360-2155 Copyright © Association of Managers and Economic Engineers from Romania
- [7] **Conon, Victor**, and Semenescu, Augustin: Digital marketing and traditional marketing on the optical medical devices market in Romania, pp.365-374, The 10th International Conference of Management and Industrial Engineering, *ICMIE 2021*, November 11th – 12th, 2021, Bucharest, Romania, Editura NICULESCU, 2021, ISSN 2344-0937, ISSN-L 2344-0937.
- [8] **Conon, Victor**, and Semenescu, Augustin: The key elements of a business model on the optical medical devices market in Romania, *Review of Management and Economic Engineering* Vol. 21, No. 2(84), June 2022, Vol. 20, p. 166-175, ISSN (print): 1583-624X, ISSN (online): 2360-2155 Copyright © Association of Managers and Economic Engineers from Romania.
- [9] **Conon, Victor**, and Semenescu, Augustin: The key role of the ophthalmologist in an innovative business model in the optical medical devices market in Romania, pp.353-364, The 10th International Conference of Management and Industrial Engineering, *ICMIE 2021*, November 11th – 12th, 2021, Bucharest, Romania, Editura NICULESCU, 2021, ISSN 2344-0937, ISSN-L 2344-0937.
- [10] Healthcare & Life Sciences Review: Europe Data by Country, June 2020, 1-95 pages, produced by *PharmaBoardroom*, https://pharmaboardroom.com/country-reports/europe-pharma-data-by-country-report-june-2020/accesul_este_posibil_doar_pentru_membrii_abonati.
- [11] *ECOO-Blue Book-2020*. “Trends in optics and optometry - comparative data” 45 pages. European Council of Optometry and Optics (ECOO), <https://www.ecoo.info/2020/10/ecoo-blue-book-2020/>, accessed on 03.02.2021.
- [12] <http://www.cnas.ro/page/servicii-medicale-care-nu-sunt-decontate-din-fnuass.html>, accessed on 01.02.2021.
- [13] **Conon, Victor**, and Semenescu, Augustin: Interactions between the participants of a business model in the retail market of optical medical devices in Romania, *Review of Management and Economic Engineering*, Vol. 20, No. 3(81), September 2021, p. 238 - 250, ISSN (print): 1583-

624X, ISSN (online): 2360-2155 Copyright © Association of Managers and Economic Engineers from Romania

- [14] **Conon, Victor**, and Semenescu, Augustin: Study on the role of the ophthalmologist in the value chain of the innovative business model on the optical medical devices market in Romania, The 9th International Conference “Biomaterials, Tissue Engineering & Medical Devices” BIOMMEDD’2022, July 20-22th, 2022, Bucharest, Romania.
- [15] **Conon, Victor**, and Semenescu, Augustin: Study for the elaboration of an innovative business model on the optical medical devices market in Romania, The 9th International Conference “Biomaterials, Tissue Engineering & Medical Devices” BIOMMEDD’2022, July 20-22th, 2022, Bucharest, Romania.