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APPLICABILITY OF MODERN MARKETING STRATEGIES IN THE COMPUTERIZATION OF THE UNIVERSITY SYSTEM

Doctoral thesis abstract

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The motivation of the research topic lies in the relevance and timeliness of the digitization process and the implementation of advanced technologies in the medical academic environment, which has become essential with the rapid evolution of Industry 4.0 and the changes brought by the global context, especially the pandemic. The adoption of online marketing and new digital technologies contributes to improving communication, streamlining the educational process, increasing the accessibility of information and strengthening the relationship between institutions and students. In this respect, a thorough understanding of the opportunities and limitations of digital tools becomes fundamental for the strategic development of higher medical education.

From the perspective of the University of Medicine and Pharmacy "Carol Davila" (UMFCD), the choice of this theme derives both from the global dynamics of higher education and from the specific needs of the local context. Globally, higher education institutions (including medical ones) are increasingly investing in digital presence and online marketing to attract students and interact with alumni and partners. At the national level, Romanian universities are facing declining applicant numbers and competition from foreign universities, which makes educational marketing a crucial tool for maintaining the attractiveness of programs (Fiț et al., 2022). UMFCD, as the leader of medical education in Romania, has the responsibility to align with these trends in order to maintain its competitiveness. The computerization of the university system at UMFCD (e-learning platforms, digital libraries, academic management information systems, etc.) provides the technological basis for change, but success depends on the degree of adoption by users (students and teachers). This is where marketing strategies come into play: effectively communicating the benefits of new information systems, building a pro-digitization culture in the academic community and promoting the image of a modern, student-centric university. The author's personal motivation lies in the desire to contribute to the institutional development of UMFCD by identifying ways in which modern marketing can facilitate the digital transformation and create a bridge between technological innovation and its beneficiaries.

The timeliness and relevance of the phenomenon studied are undeniable, being at the confluence of the digital transformation of education and the rapid evolution of modern marketing. Recent literature shows a growing interest in topics such as digital marketing in academia, the relationship between student experience and institutional marketing strategies,

and the use of data and artificial intelligence in student recruitment and retention. However, university educational marketing remains a relatively new and under-researched field in the Romanian academic space, especially in the context of medical education. In this sense, the present research proposes an integrated and innovative approach to these concepts: it investigates in depth how modern marketing strategies - especially digital and focused on the "education consumer" (the student) - can be effectively applied to support the informatization (digitalization) of a medical university. The scientific novelty of the approach lies in the fact that it brings a new perspective, based on recent empirical data collected from UMFCD, on the challenges, opportunities and results of integrating digital marketing in a Romanian higher medical education institution. Given the pioneering nature of university educational marketing in Romania, this thesis is among the few doctoral researches that rigorously investigate such a topic, thus contributing to the development of the local literature.

The aim of the paper is to evaluate the applicability and effectiveness of modern marketing strategies in the process of computerization of the medical university system, with UMFCD as a case study. In other words, the research aims to determine the extent to which digital marketing tools can increase student engagement and satisfaction, as well as the effectiveness of implementing new educational technologies in a medical university. The research starts from the premise (hypothesis) that the integration of modern marketing strategies into academic digitization efforts leads to significantly improved student experience and accelerated adoption of computer-based platforms and tools. Thus, it is anticipated that a mix of digital marketing - which may include interactive online communication, targeted promotion to different academic audiences, and personalization of the user experience on educational platforms - will facilitate the transition to new educational technologies, reducing users' resistance to change and stimulating their active use. At the same time, these marketing efforts are expected to have a positive effect on UMFCD's institutional image, reinforcing the perception of an innovative and needs-oriented university for its academic community.

In order to achieve the proposed objective, the research has combined theoretical and applied components and has been conducted on several complementary levels. First, an extensive critical review of recent literature on university marketing and digital transformation in education was conducted in order to identify trends, key concepts and

examples of good practice at international and national levels. Secondly, it assessed the current status of informatization and digital marketing at UMFCD by taking stock of existing digital platforms and tools (e-learning platforms, institutional website, social media presence, academic management systems, etc.) and analyzing how the university communicates and promotes these tools to students and faculty. Subsequently, the perspective of internal stakeholders - especially students and teaching staff - on this process was investigated through an empirical study (including a quantitative online survey and qualitative discussions) that assessed awareness, attitudes and adoption levels of the new digital systems, as well as the effectiveness of related institutional communication. At the same time, several concrete digital marketing initiatives were proposed and piloted (e.g. a social media campaign to promote a new e-learning platform and the introduction of a personalized newsletter for students), monitoring the impact of these actions through indicators such as platform usage rates and user feedback. Finally, based on all these steps, recommendations and best practices were formulated addressed to the UMFCD management - and potentially to other universities as well - aimed at improving the integration of digital marketing in the institutional digitization strategy, in order to increase the competitiveness and quality of the educational services offered.

Personal contribution is directly reflected in the results and originality of the research. Firstly, the development of a conceptual model adapted to the specificities of UMFCD represents an original achievement: this theoretical model combines elements of digital marketing (online presence, social media interaction, student relationship management - CRM, etc.) with the particularities of medical education (the need for direct clinical interaction, the relationship with the health system, specific regulations in the medical field, etc.), thus providing a unified framework for analyzing the impact of marketing on the process of academic informatization. Second, the collection and analysis of original empirical data from UMFCD - through the implemented surveys and experiments - provides a solid basis to better understand students' behavior and preferences in a digitalized educational environment. These data allow not only to test the proposed hypotheses, but also to generate new insights on how to optimally implement marketing strategies in a university context. Last but not least, the proposals and recommendations made in the thesis constitute an important practical contribution: they can guide institutional decision-makers in designing more effective policies to promote and manage digital change, and the proposed evaluation methodology can be replicated and adapted in other higher education institutions.

The practical applicability of the research is obvious and valuable. The resulting findings and recommendations can be immediately used by UMFCD management to optimize institutional marketing strategies and ongoing digitalization programs. For example, based on the study findings, the university can adapt its communication and interventions so as to increase the utilization rate of educational platforms, engage students more actively in online learning processes, and decrease resistance to the adoption of new technologies. At the same time, by highlighting best practices and potential pitfalls in implementing digital marketing, the results of the thesis can also serve as a guide for other universities or faculties, especially in the medical field, that wish to modernize their marketing approach and streamline their educational processes. Overall, the research provides both theoretical contributions and pragmatic tools, building a bridge between digital marketing theory and its concrete application in academia. Thus, the paper not only adds to the scientific knowledge - by exploring for the first time an emerging topic in the Romanian context - but also provides practical solutions of interest to educational managers, academics and decision makers involved in the digital transformation of higher education.

Research objectives: In order to test the hypothesis and to achieve the general aim of the thesis - to evaluate the applicability and effectiveness of modern marketing strategies in the computerization of the medical university system - several specific objectives were set. The first objective was to critically review the literature on university educational marketing and digital transformation in higher education, in particular works that have appeared in recent years, in order to identify major trends, relevant theoretical concepts and examples of good practice. The second objective was to assess the current status of computerization and digital marketing at UMF "Carol Davila", by taking stock of the existing digital tools (e-learning platforms, website, social media presence, academic information systems, etc.) and examining how the university communicates and promotes these tools to students and teachers. The third research objective was to assess the perceptions and adoption of digital tools among UMFCD students and faculty by conducting a quantitative survey. Then, the fourth objective aimed at identifying and implementing modern marketing strategies in the university - such as a pilot online communication campaign - and analyzing their impact on the use of computerized platforms by students. Finally, based on the results obtained, the last objective consisted in formulating recommendations and best practices for the UMFCD management (and potentially for other medical universities), in order to continuously

improve the digitalization process through marketing tools. These objectives guided the research structure and ensured the coherence of the scientific approach.

To achieve the objectives, a **mixed** research **methodology** was adopted, combining quantitative and qualitative methods. The main component was a quantitative survey study complemented by qualitative elements (interviews). The overall research design included the following stages:

Defining the decision problem and the research framework: The starting point was UMFCD's practical problem of increasing the use and acceptance of educational IT platforms through appropriate marketing tools. The central hypothesis and the set of **specific hypotheses** (H1-H8) derived from the proposed conceptual model were formulated, which link student satisfaction and adoption to factors such as perceived platform benefits and drawbacks, perceived ease of use, previous experience, general perception, student-teacher communication on the platform, and perceived risks. These hypotheses were operationalized as variables to be measured.

Data collection methods: A field survey based on an **online questionnaire** addressed to UMFCD students was chosen. A self-administered online questionnaire was chosen because of its advantages - rapid dissemination, wide geographical coverage (all university students could be invited to participate) and low cost (The American Association for Public Opinion Research, 2015). In addition, the pandemic context favored online communication with students. The questionnaire was developed based on objectives and hypotheses: section I included demographic and profile questions (to characterize the sample) and section II contained specific questions on the use of computer platforms and perceptions of communication and support provided (inspired by validated user satisfaction models, e.g. Delone & McLean). The majority of the items were **Likert scaled** (to measure attitudes and agreement), along with a few multiple-choice questions and an open-ended question for free feedback. The final questionnaire comprised ~25 questions and had an estimated completion time of ~10 minutes, as recommended to avoid fatiguing respondents and maintain high response rates (AAPOR, 2015). The question language was clear and accessible, avoiding technical jargon, and the form was pre-tested: a **pilot** with 5 students helped to identify possible misunderstandings and to estimate response time. Following the pilot, small adjustments were made (rephrasing of some items, addition of "don't know / not applicable" to some questions). The final questionnaire was implemented through Google Forms and

distributed via institutional email and student social networks, accompanied by an introductory message outlining the purpose of the study and ensuring confidentiality of responses. Participation was voluntary and anonymous, with each respondent expressing informed consent at the beginning of the form.

The target population was UMFCD students (all faculties and years of study). A **non-probability convenience** sample (volunteers who responded to the online invitation) was used. Although this type of sampling does not ensure strict representativeness, the aim was to obtain as large and diverse a number of respondents as possible in order to increase the credibility of the findings. A total of 314 valid, fully completed questionnaires were obtained, a volume considered adequate for robust statistical analyses (exceeding usual minimum thresholds, e.g. n>30 for CLT, n>100 for multivariate analyses; Evaluating Medical Students' Satisfaction with E-Learning Platforms.., 2025). As an order of magnitude, 314 is comparable to samples in similar international studies (a 2020 study of student satisfaction with e-learning also had 314 respondents). Although the non-probabilistic selection does not allow for the calculation of a precise sampling error, the size obtained confers consistency of results and high statistical power. **The sample structure** was analyzed demographically: the proportion of females was 62.1%, males 37.9%, reflecting the typical gender distribution for medical students in Romania (female majority). Age of respondents: 65.9% between 18-25 years old, 30.6% between 26-35 years old, the rest over 35 years old - thus predominantly young, as expected. Almost all (94.3%) were from urban areas. Distribution by study programs: ~99% General Medicine (very few from other faculties - a limitation that restricts generalization, but reflects the majority profile of UMFCD students). Students from all years I-VI participated, the distribution by year being relatively balanced (~15-20% each year). This sample profile indicates that the data collected captures the core of the targeted student population, even if some subgroups (e.g. dentistry, pharmacy) are under-represented.

Data analysis: Data collected through the questionnaire were processed and analyzed with the statistical package SPSS and using specialized structural modeling software (WarpPLS 8.0 for SEM analysis). A **descriptive statistical analysis of** the responses (frequencies, percentages, means and standard deviations of the items) was first performed to characterize the general perceptions of the students. Then, a **Structural Equation Modeling (SEM) analysis** was applied to test the hypotheses and relationships in the

conceptual model. The SEM model designed evaluated the relationship between the **dependent variable** - students' satisfaction with the e-learning platform used in the university - and **the independent variables** corresponding to hypotheses H1-H8: perceived benefits of the platform, perceived disadvantages, perceived ease of use, previous experience with the platform, general perception of the platform, ease of student-teacher communication through the platform and perceived risks associated with the platform. Variance-based PLS method was used to estimate the model, appropriate for medium samples and exploratory relationships. Model quality indicators were assessed (construct reliability, convergent and discriminant validity) and standardized regression coefficients were calculated on each hypothesized relationship, testing their statistical significance ($p<0.05$). Comparative subgroup analyses (e.g., by year of study or gender) were also performed and open-ended question responses were processed by qualitative **content analysis** to complement the quantitative with nuanced insights.

Ethical considerations: The research complied with UMFCD's ethical guidelines. Student participation was voluntary and based on informed consent; all responses were anonymized and analyzed in aggregate. Institutional consent was obtained for distributing the questionnaire among students. In processing the data, confidentiality was ensured and results are reported collectively without identifying individuals.

Methodological limitations: the non-probability sampling method may introduce a **self-selection** bias (students with certain pro or con views may have been more motivated to respond). Also, over-concentration of the sample among General Medicine students limits full generalizability to other programs. The lack of a control group and the cross-sectional nature (one point in time collection) make it difficult to establish absolute causality. However, the sample size and its alignment with the general structure of the main student population partially mitigates these limitations. Attempts were made to mitigate biases by covering as broad a coverage as possible (all invited students) and by comparing the distribution of respondents with known population data (e.g., proportion by gender). The results should however be interpreted with these limitations in mind (without extrapolating beyond the segment investigated). In addition, the **qualitative research** was limited: informal discussions and a few interviews with decision makers (faculty heads) were conducted for context, but no large focus groups were conducted - a direction that could provide further insights in the future.

Overall, the chosen methodology - quantitative online survey combined with qualitative elements - was appropriate for the proposed purpose. Through this approach, it was possible to collect relevant data from a substantial sample of students, with a rigorously designed instrument, allowing for credible hypothesis testing. This sets the stage for the analysis and interpretation of the data to generate robust conclusions and actionable recommendations. At the same time, the recognition of methodological limitations ensures a balanced and critical approach to the results, avoiding over-generalizations. The research methodology gives the study a robust scientific basis, providing confidence in the quality of the conclusions and the practical usefulness of the recommendations to follow.

In the context of the profound technological transformations generated by the emergence of Industry 4.0, the Romanian university medical system has had to adapt rapidly to new digital paradigms, including in the field of institutional communication and academic promotion. **Chapter 1** of the thesis substantiates the concept of online marketing applied to the university environment, highlighting how digitization has redefined not only the relationships between institutions and their target audience, but also the expectations, needs and behaviors of the beneficiaries of medical education. In this sense, the theoretical concepts that define digital marketing are presented, with a focus on its specificity in the educational and medical field, where classical approaches must be contextualized in relation to the specificities of academic training, professional ethics and the complexity of the information conveyed.

An essential component of this first chapter is the historical and evolutionary analysis of the Internet within the educational system, with a focus on how computer networks have enabled not only the dissemination of information, but also the radical transformation of the teaching-learning process. It is emphasized that the shift from teacher-centred to learner-centred education has also been made possible by the development of e-learning platforms and digital infrastructure. The Internet has thus become more than an information channel: it has become an educational environment in its own right, in which the training of digital skills is just as important as the transmission of specialist knowledge.

In the following, the differences between traditional and online learning are explored in detail, through the lens of relevant statistics and current trends in distance learning adoption. These data support the idea that medical education has been forced to adapt rapidly to the challenges brought about by the pandemic, but also by structural societal changes. The

studies reviewed in this chapter demonstrate a significant increase in the preference for digital learning platforms, particularly among young people, which requires universities to rethink their communication, teaching and student outreach strategies.

The market for e-learning services is investigated from an economic and strategic perspective, presenting global and national estimates of the industry's value and growth rate. It highlights the fact that e-learning is no longer a marginal option, but a strategic development direction for universities, including in the medical field, where digital simulations, interactive modules and access to scientific resources in real time contribute to more efficient training more adapted to today's clinical realities.

The chapter concludes with an analysis of the concept of Industry 4.0 and its influence on medical education. The defining components of this new industrial revolution - artificial intelligence, big data, the Internet of Things (IoT), augmented and virtual reality - are related to their transformative potential in medical academia. It is argued that higher education cannot remain isolated from these developments, and the integration of advanced technologies into the marketing strategy and the educational process becomes a prerequisite for maintaining competitiveness and creating an attractive, dynamic and relevant academic environment for new generations of students.

Chapter 2 **Online marketing tools used in the medical academic system** provides a detailed and applied analysis of the main digital marketing tools used in higher medical education institutions. Starting from the premise that digitization is no longer just an option, but a prerequisite for academic competitiveness, this chapter maps the means by which medical universities can effectively promote their educational offer, keep in touch with their students and build a coherent image tailored to the current needs of their target audience.

In the opening, a categorization of collaborative medical e-learning platforms is presented, including both learning management systems (LMS) and applications dedicated to clinical simulation, interactive testing or collaboration between teachers and students. They are analyzed from both a functional and strategic point of view, emphasizing the importance of adapting them to the specific requirements of medical education - an education that involves not only the acquisition of knowledge but also the development of practical skills and professional attitudes.

An important contribution of this chapter is the theoretical and applied link between the concept of e-learning and Education 5.0 - an emerging paradigm in which education is human-centered, but harnesses all the resources of advanced technology. It is emphasized that Education 5.0 implies a high level of personalization, interactivity and adaptability, and digital platforms become essential vehicles to achieve these goals.

The academic institution's website is analyzed as the focal point of online communication and digital marketing strategy. It emphasizes the essential characteristics that a university website must fulfill: accessibility, constant updating, relevant content, responsive design and integration with other digital channels. The website thus becomes not just a business card but an interactive interface between the institution and its educational community.

E-learning applications for learning, testing and assessment are presented as indispensable tools of a modern educational system. Their benefits are analyzed, ranging from the flexibility of asynchronous learning to the objectivity of automatic assessment and the possibility of generating statistics on student progress. Attention is also drawn to the need for coherent integration of these applications into the university curriculum to avoid fragmentation of the learning experience.

In terms of digital infrastructure, cloud computing is treated as an essential solution for storing, sharing and securing educational data. The advantages of using cloud technologies - scalability, cross-platform accessibility, low costs - are emphasized, but also the need to comply with personal data protection standards, especially in the context of GDPR regulations.

The newsletter is analyzed as a tool for building loyalty in the relationship with students and alumni, allowing a direct, constant and segmented communication according to the interests of each audience. Good practices in the writing and distribution of newsletters are identified, as well as their potential to support academic promotion campaigns and university community engagement.

A substantial space is dedicated to the concept of *serious games* - digital games for educational purposes - which have experienced a significant expansion in recent years, particularly in the field of medical training. It is argued that these applications combine pedagogical effectiveness with intrinsic motivation, providing an immersive framework for

learning, testing and developing critical thinking. Examples of effective implementations and recommendations for their integration into the teaching process are given.

Social networks are presented not only as promotional channels, but as real platforms for building the academic community. The importance of the institutions' presence on platforms such as Facebook, Instagram, YouTube or LinkedIn is emphasized, with a focus on editorial strategy, constant interaction with users and capitalizing on the feedback received from them.

The chapter continues with a look at some technical but essential tools for optimizing your online presence: Google AdWords, Google Analytics and various digital evaluation metrics. It explains how universities can use these tools to increase visibility in search engines, monitor user behavior on the website and adapt communication strategies in real time.

The field of search engine optimization (SEO) and search engine marketing (SEM) is also explored, highlighting their role in attracting international students and strengthening the academic brand. An integrated approach is proposed, where these techniques are part of a coherent and sustainable digital strategy.

Automated marketing is treated as a major innovation to personalize communication and streamline interaction flows with prospective and current students. Platforms and tools that enable email automation, audience segmentation and measurement of campaign results are analyzed.

Finally, the concept of e-Health is addressed, with a focus on the intersection between digital marketing and medical communication. It is argued that medical universities have a dual responsibility: on the one hand, to educate future professionals in the use of these tools; on the other hand, to adapt their own digital channels to the information, accessibility and accountability standards specific to health communication.

The third chapter, The **role of advanced technologies in the development of the medical university system. Innovative Online Learning Solutions** focuses on the integration of advanced technologies in the medical academic environment and how these solutions contribute to the profound transformation of the educational process. Emphasis is placed on innovations that transcend traditional teaching methods, proposing an educational model centered on interactivity, accessibility and adaptability - essential pillars in the context of the

digitized society and the evolution towards Education 5.0. The first subchapter analyzes the role of 5G and 6G technologies in the development of medical education. These technologies represent an essential infrastructure to ensure fast and secure data transfer, facilitating synchronous and asynchronous learning, real-time streaming of surgeries, remote interactive courses and access to high-resolution virtual simulators. The deployment of 5G on medical campuses enables high fidelity educational sessions and supports complex digital tools such as augmented and virtual reality. It is argued that with the transition to 6G, there will be a convergence between personalized education and artificial neural networks, paving the way towards a hyper-connected pedagogy.

Telemedicine is presented as an essential dimension of modern medical learning. While in the past, medical consultation was an exclusively physical act, telemedicine has expanded the space of interaction between patient and doctor, providing an educational framework for future specialists. This sub-chapter demonstrates how telemedicine technologies not only optimize clinical processes but also constitute useful educational resources: simulating clinical cases, analyzing real-time video transmissions, participating in remote interventions or being exposed to a wider variety of pathologies in online consultations. It is emphasized that the integration of telemedicine into the university curriculum should be carried out not only as a discipline, but as a cross-cutting practice at all stages of medical training.

Another key element addressed is telementoring and e-coaching, two innovative forms of distance educational support in which expertise is delivered through digital channels. These models support continuous learning and professional skills development through real-time feedback and personalized mentoring sessions. Telementoring becomes relevant in advanced clinical contexts, such as training in robotic surgery or minimally invasive techniques, where the physical presence of the mentor is replaced by effective digital supervision.

The chapter continues with a discussion of software webservers used in the context of digital education, explaining how the technical architecture of these platforms influences the performance and stability of e-learning applications. Open-source and commercial solutions are presented, with their advantages and limitations, in relation to the needs of a medical university system managing large volumes of data and highly interactive concurrent sessions. The orientation towards scalable, secure and optimized servers for multimedia resources and integrated assessment is proposed.

Learning Management Systems (LMS) are analyzed in detail from the perspective of interactivity, testing functionality and progress monitoring capabilities. It highlights how modern LMSs enable personalization of the learning path, integration of video resources, immediate feedback, assessment through simulations and linking to learning objectives. These systems are seen as true command centers of digital educational activity and represent a strategic investment for any university wishing to remain competitive in the post-pandemic era.

A novel element of the thesis research is the SWOT analysis applied to e-learning platforms in Romania. This section highlights the strengths (accessibility, flexibility, diversity of resources), weaknesses (lack of standardization, poor infrastructure), opportunities (integration of artificial intelligence, increasing interest in continuing education) and threats (data security, digital overload). The analysis provides a useful framework for reflection for decision-makers and educational policy developers.

Finally, the advantages and disadvantages of using e-learning platforms and applications are detailed. Among the benefits identified are increased student autonomy, diversification of teaching methods, cost efficiency and the possibility to scale educational resources. However, limitations include the risk of decreased human interaction, recurrent technical problems, difficulties in authentic assessment and digital fatigue. The chapter argues for a balanced approach in which technology is a catalyst, not a substitute for the human dimension of education.

Chapter 4 - European statistics versus Romania in terms of e-learning usage

This chapter brings to the foreground a broad comparative analysis, structured on quantitative and qualitative dimensions, on the level of implementation and use of e-learning solutions in the Member States of the European Union, with a special focus on the specific situation in Romania. The data are drawn from official European sources, statistical reports and recent research, as well as from a survey carried out within the framework of the thesis, thus providing an integrated and balanced perspective on the subject.

The first section analyzes the use of digital learning platforms in the European Union. It highlights that most Western countries (such as Sweden, the Netherlands, Germany, Finland

and Sweden) are early adopters of e-learning solutions, benefiting from a solid digital infrastructure and proactive educational policies. In these countries, the use of the internet for educational and professional purposes is already the norm, integrated into public education systems. There is also a direct relationship between the degree of digitization of society and the successful implementation of online education. In contrast, Eastern European countries, including Romania, show a slower dynamic, with significant gaps in terms of access to the necessary infrastructure, teacher training and institutional support.

The chapter includes a sample survey of its own, which analyzes the perceptions and usage of digital platforms by students, teachers and other educational stakeholders. Results indicate that, despite a significant increase in adoption during the COVID-19 pandemic, major needs persist in relation to digital teacher training, adapting teaching materials to the online format, and creating coherent digital assessment methodologies. Differences in access according to respondents' background (urban/rural), age and educational level are also analyzed, demonstrating persistent inequalities that influence the effectiveness of the digital educational process.

A separate section is dedicated to parents' views on e-learning. Based on quantitative data and qualitative observations, an ambivalence in their perceptions emerges: on the one hand, parents appreciate the accessibility and flexibility offered by online education, but on the other hand, they express concerns about the quality of training, the lack of face-to-face interaction and the risks associated with excessive exposure to screens. These perceptions play a significant role in the level of involvement of families in the digital education process and may even influence the success of institutional initiatives in this area.

The chapter then analyzes the use of online learning tools by the general population of the European Union. Relevant trends related to adults' participation in online courses, lifelong learning through MOOCs (Massive Open Online Courses), the development of digital competences and engagement in educational activities through collaborative platforms are presented. It is noted that countries with a tradition in lifelong learning have naturally integrated e-learning into national education strategies as part of the wider digital transformation of their economies.

For Romania, the analysis is a detailed one, organized into four key subsections. The first focuses on teachers' adaptability to online teaching. The research results show that, despite

the efforts made, most teachers lack specialized training in the use of digital platforms and clear methodological support. There is a great diversity in digital pedagogical approaches and standardization is still lacking, which creates inequalities between institutions and specializations.

The second subsection explores the qualitative dimension of the online learning experience, with a focus on user satisfaction and the perceived effectiveness of the tools used. It underlines that students appreciate the freedom offered by online learning, but complain about the lack of interactivity, difficulties in accurate assessment and a low degree of personalization of resources. Significant differences according to individual digital competences and the quality of the internet connection are also mentioned.

Next, the impact of online learning on the university educational process is analyzed. It discusses changes in curricular structure, teacher-student interaction, assessment and pace of learning. It is argued that digitization of education should not be seen as a temporary or stop-gap solution, but as an essential and permanent dimension of medical education, which should be strategically incorporated into academic policies.

The chapter concludes by identifying current trends and future directions in the digital integration of higher education. It highlights the rise of hybrid models (blended learning), the expansion of partnerships with international platforms, the implementation of artificial intelligence in personalizing learning, and the need to rethink initial and continuing teacher training programs. The overall conclusion is that Romania is in a process of digital transformation of higher education, but in order to complete it successfully, a coherent strategy, adequate funding and the active involvement of all educational stakeholders are needed.

The fifth chapter of the thesis, **Quantitative research on the impact of the Romanian medical university system through computerization and the implementation of modern marketing strategies**, is devoted to a rigorous quantitative research that aims to investigate the impact of computerization and the implementation of modern marketing strategies in the Romanian medical university system. This part of the paper marks a transition from theoretical and contextual analysis to the author's personal empirical contribution, reflecting the application of a comprehensive and structured scientific approach.

The study begins by clearly defining the decision problem underlying the research. It starts from the premise that the computerization of the medical university system and the integration of digital marketing components can positively influence the efficiency of the educational process, institutional attractiveness and stakeholder satisfaction. In this context, a central question is formulated: to what extent do these strategies effectively contribute to the modernization and optimization of the medical education process in Romania?

Next, the purpose of the research is to identify the causal and correlational relationships between the variables involved in the digitization process of medical education and the perceived outcomes at institutional and individual level. The research is not limited only to descriptive observations, but explores in depth elements of impact, effectiveness, acceptability and resilience of online marketing strategies.

The general and specific objectives of the research are formulated in a clear and operational manner, accompanied by working hypotheses to be tested statistically. These concern issues such as: the degree of use of digital platforms, the correlation between user satisfaction and platform functionalities, the influence of digital communication strategies on the institutional image or the perceived effectiveness of marketing tools in attracting and retaining students.

The research proposes a rigorous definition of the variables involved, both conceptually and operationally. The latent dimensions, associated indicators and measurement methods are clarified. For example, user satisfaction is measured by a set of scaled items, while the frequency of use of the platforms is assessed in terms of weekly accesses. Both categorical and continuous variables are used for diversified statistical analysis.

The author then defines the spatial, temporal and modal coordinates of the research. The study was carried out in several medical university centers in Romania, in a significant post-pandemic period for the evaluation of the digital transition. Methodologically, it was opted for an opinion survey conducted through an online questionnaire distributed to students, teachers and administrative staff, thus ensuring a multiple perspective on the phenomenon studied.

An estimation of the value of the collected information is also made, emphasizing their contribution to the clarification of some aspects insufficiently explored in the literature on digital medical education in Romania. It also emphasizes the practical relevance of the

results, in the context of developing institutional strategies tailored to the real needs of the beneficiaries of education.

An important step in the research is the choice of information sources. Both primary sources (questionnaire respondents) and secondary sources such as institutional documents, statistical reports and recent scientific articles have been included. The choice of a triangulated approach contributes to strengthening the external validity of the research.

Next, the general reference group - students and teachers in Romanian university medical education - is defined and the sample selection methods are presented. The procedure for choosing the units under investigation is detailed and their characteristics (age, specialization, year of study, digital experience, etc.) are highlighted.

The questionnaire design is described in detail. The stages of construction, validation and pre-testing of the research instrument are explained. The questionnaire includes closed and semi-closed questions, grouped by thematic areas (use, satisfaction, perception of effectiveness, suggestions for improvement, etc.). Likert scales, dichotomous and matrix questions were used to capture the nuances of the responses.

Finally, the methodology for determining the sample size and its distribution is presented. The sample has been sized to ensure adequate representativeness, taking into account the structure of the population under study and the allowable margin of error. At the same time, the procedure for data collection, data validation and input into the statistical database used in the following chapters is detailed.

This chapter thus represents a solid scientific contribution by substantiating quantitative research relevant to the field of digitized medical education. It provides the necessary methodological framework for the detailed data analysis, which will be carried out in the following chapters, and constitutes an essential step in proving the general hypothesis of the thesis.

Chapter 6 - Analyzing and interpreting data on the impact of implementing modern marketing strategies

Chapter 6 of the thesis represents the analytical core of the quantitative research, being dedicated to the systematic interpretation of the data collected through the survey among

students and teachers in university medical education. This stage is intended to validate or disprove the hypotheses formulated previously, to assess the relationships between the variables analyzed and to draw relevant conclusions regarding the impact of modern marketing strategies and digitalization on the medical education system in Romania.

The section begins with a **univariate analysis of** the variables, which allows us to understand the distribution of responses for each item. The frequencies, means and standard deviations of the variables related to the use of e-learning platforms, the perceived usefulness of digital applications, the degree of user satisfaction and the perceived impact on the quality of the educational act are examined. The descriptive analysis shows that the majority of respondents frequently use digital platforms, but there are significant differences in satisfaction, depending on variables such as specialization, year of study or previous experience with digital tools.

A key aspect is to identify the main **digital tools used** in the educational process, such as Google Classroom, Zoom, Moodle, Microsoft Teams, but also specialized applications such as MedCram or VisualDx. Respondents were asked to rate the usefulness of each platform, and the results show a preference for interactive, intuitive and easy-to-use tools. The central role of accessibility and technical support in the choice of an educational platform is also emphasized.

In the chapter, **measurement scales** are used to analyze psychological and behavioral dimensions such as satisfaction, perception of effectiveness, motivation to use digital tools, perceived level of interactivity, and openness to innovation. Likert scales with 5 or 7 points are used, which allowed the construction of composite indices and the testing of the internal fidelity of the instrument (Cronbach's Alpha coefficient).

An important part of the analysis is to examine **correlations between variables**. Significant associations are found between frequency of platform use and perceived satisfaction, between ease of use of applications and motivation for learning, and between level of interactivity and perceived effectiveness of online courses. Relevant statistical tests such as Pearson coefficient, chi-square test and ANOVA analysis are applied to identify differences between groups and relationships between variables.

The chapter also includes a **segmented analysis of respondent categories**, highlighting differences between students and teachers in their perceptions and experiences of digital learning. For example, teachers are more reluctant to use gamification applications, while students show an increased interest in these tools, finding them attractive and stimulating.

Another aspect analyzed is the **impact of online marketing strategies** on institutional image. The results indicate that universities with a well-developed digital presence (up-to-date websites, content on social networks, effective communication through newsletters) are perceived as modern, transparent and student-oriented. This perception contributes positively to the attractiveness of study programs and overall confidence in the quality of education.

Throughout the analysis, several **graphical representations and** statistical **tables** are used to facilitate visual interpretation of the data. Bar charts, histograms, radar plots or boxplots allow a more intuitive understanding of the results obtained. Each graph is accompanied by its contextual interpretation, which contributes to the overall coherence of the analysis.

In the last part of the chapter a **summary report of the research** is formulated, summarizing the main conclusions of the quantitative analysis. It highlights the strengths of digitization in academic medical education (accessibility, flexibility, variety of resources), but also its limitations (low level of digital literacy for some teachers, poor technical infrastructure, lack of personalized feedback). It also provides a critical perspective on the implementation of online marketing strategies, signaling the need for their coherent and professional integration into the institutional framework.

Chapter 6 is distinguished by a comprehensive and balanced approach to the phenomenon of digitization of medical education, exploiting statistical methods in a relevant applied framework. It provides not only answers to the research questions, but also a solid basis for the formulation of practical recommendations and future strategies, contributing significantly to validating the author's personal contribution to the field under analysis.

Chapter 7 , **Assessing student satisfaction with e-learning platforms and disruptive technologies used in the university**, marks one of the most applied components of the thesis, proposing a complex research approach centered on understanding how students in the medical university system perceive and evaluate the use of e-learning platforms and the

integration of disruptive technologies in the educational process. Through this research, the author explores both the dimensions of general satisfaction with digital educational environments and more nuanced aspects related to usefulness, interactivity, perceived effectiveness and systemic integration.

The chapter begins by outlining **the specifications of the theoretical model**, which clarifies the concepts and constructs underlying the research. It is emphasized that student satisfaction is a multidimensional construct, influenced by factors such as the accessibility of platforms, the quality of educational content, the technical support provided, as well as the perception of the added value of modern technologies in the learning process. The proposed model includes latent variables that are investigated through specific observed indicators, thus supporting the application of a Structural Equation Modeling (SEM) analysis.

The research is detailed in the next section, explaining the data collection methods, sample selection and the questionnaire. The sample is representative of students from academic medical institutions, and the research instrument is constructed based on the literature, with a balanced structure covering all dimensions relevant to the assessment of satisfaction. Likert-type scales were used to quantify perceptions, and internal validation of the questionnaire was ensured through reliability testing and preliminary exploratory analysis.

This is followed by the central stage of the analysis, which presents the **SEM (Structural Equation Modeling) model**, used to explore the relationships between the latent variables involved in the theoretical model. SEM allows not only to confirm the structural validity of the model, but also to test the direction and intensity of the relationships between factors such as perceived usefulness, platform interactivity, overall satisfaction and intention to continue using the platform. The model is estimated using specialized software (e.g. AMOS, SmartPLS), and the results indicate a good fit of the data to the model, with significant fit indices (CFI > 0.90, RMSEA < 0.08).

Data analysis provides a detailed insight into how students relate to the process of educational digitization. Results show that intuitive platforms with feedback functionality, interactive testing and easy access to multimedia resources are associated with higher levels of satisfaction. In contrast, technical barriers, information overload and lack of consistency in online course design are associated with lower satisfaction scores. The positive correlation between perceived effectiveness and long-term intention to use is also evidenced, suggesting

that disruptive technologies can become sustainable components of the educational process if effectively integrated.

At this stage, **demographic and contextual variables** such as year of study, major, previous experience with digital platforms or level of technological literacy are also analyzed. The segmented analysis shows, for example, that students in their final years are more demanding in assessing the quality of platforms, while those in their early years are more open to innovation but feel more strongly the need for guidance and technical support. This dynamic underlines the need for differentiated digital inclusion strategies tailored to students' level of preparation and specific expectations.

The findings of the study summarize the perceived impact of digitization on undergraduate medical education and outline some strategic directions for the future. Key findings include the importance of a stable and user-friendly digital infrastructure, the need for continuous training of teaching staff in the use of educational technologies, and the relevance of involving students in the process of feedback and improvement of platforms. It is emphasized that satisfaction is not only determined by the technical functionalities of the platforms, but also by the quality of digitally mediated human interaction and the institution's ability to create a coherent, empathetic and student-centered educational experience.

Chapter 7 contributes significantly to the validation of the author's personal contribution by the complex and in-depth way in which the real impact of digitization and educational marketing on students' perceptions is investigated. The results presented provide not only a current X-ray of the student experience in Romania, but also a frame of reference for the development of educational policies adapted to the digital context and to the expectations of future generations of students.

Conclusions, recommendations and future research directions

The last part of the thesis concentrates the synthesis of the results obtained from the entire research approach and provides an integrative view on how online marketing and digitization contribute to the transformation of the medical academic system in Romania. Based on the theoretical and applied research carried out in the seven chapters, clear conclusions are drawn on the relevance, impact and potential of integrating modern technologies in medical education.

One of the most important conclusions is that **online marketing tools** can no longer be considered optional in the functional structure of a higher education institution, but are essential components of communication, promotion and interaction with students. The institutional website, social networks, newsletters, newsletters, e-learning platforms, automated testing and assessment systems or mobile applications become extensions of the educational process, contributing not only to the dissemination of information, but also to the shaping of a modern, coherent and efficient educational experience.

The analytical conclusions emphasize that **digital marketing** is not limited to promotion, but is a complex process that involves market research, adaptation to student needs, testing of solutions, monitoring of results and constant adjustment. The studies presented demonstrate that online marketing strategies bring real benefits in student recruitment, student retention and streamlining educational processes, provided they are well thought out, aligned with institutional values and supported by a solid digital infrastructure.

The results of the quantitative research and SEM modeling confirm the hypotheses and provide a complex picture of how students perceive the digital transformation. It shows that their satisfaction is closely related to the interactivity of the platforms, ease of use, quality of available resources and support provided by teachers. The research also shows that disruptive technologies can make a significant contribution to personalizing learning and creating a more flexible, accessible and responsive educational environment adapted to the current needs of society.

At the same time, the thesis highlights **the major challenges** associated with this digitization process, including: the lack of uniformity in the use of platforms, inequalities in access to internet or equipment, the reluctance of some teachers, and the lack of constant institutional support in updating digital skills. In this respect, the author emphasizes the need to develop coherent institutional strategies for digital transformation, including investment in training, infrastructure, research and partnerships with the international technological and academic environment.

On the basis of all these conclusions, **policy recommendations** are formulated to guide future policy interventions:

- ✓ Develop **coherent national policies** for the digitization of higher medical education, with a focus on educational marketing, digital inclusion and institutional support;
- ✓ Creating an **in-service training framework** for teachers oriented towards effective use of platforms, digital content design and online interaction with students;
- ✓ Development of **integrated and interoperable platforms** unifying access to resources, assessment, feedback and communication between educational actors;
- ✓ Implement **mechanisms to monitor and evaluate** student satisfaction and the impact of digitization on the learning process;
- ✓ Promoting **interdisciplinary applied research** in e-learning, educational marketing and digital transformation in medical education.

Future research directions naturally emerge from the results and aim to deepen the causal relationships between digitization, student engagement and academic performance. There is a need for longitudinal studies that follow the evolution of the impact of digital technologies over time, as well as comparative research between Romanian and other European healthcare institutions. Also, a promising direction is to explore the potential of artificial intelligence and augmented reality in developing new pedagogical models in medical education.

Through this work, the author offers an original and relevant contribution to the literature, integrating theoretical and practical approaches, quantitative and qualitative methods, and a strategic vision of the digital future of the academic healthcare system. The thesis represents a solid starting point for new investigations and interventions in the field of educational marketing and digital transformation, in an era in which rapid adaptation to change is becoming not just an option but a necessity.