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Universitatea "Lucian Blaga" din Sibiu



Field study: MANAGEMENT

PhDc Paper Thesis

**INFORMATION MANAGEMENT, SOLUTIONS
AND INSTRUMENTS FOR AN EFFICIENT
MANAGEMENT IN THE ORGANIZATIONS
ACTIVITY**

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KEYWORDS

management informations systems, software solutions integrated, ERP, CRM, BI, instruments for an efficient management, efficient management, critical succes factors CSF, efficient management

INTRODUCTION

The interest in studying the solutions and tools that support the efficient management of the organizations came mainly from my professional involvement in software consultancy activities in the organizational management. The direct contact with producers and users of information systems has generated a number of questions and research curiosities, regarding the integration versus the refusal to implement software solutions in the Romanian organizational environment.

Why are software systems still in the early stages of development in the business environment and even academically, at national level? How can the Romanian "handicap" in terms of integrated solutions be explained and solved? What are the success factors in resource planning and customer relationship management within a company? These are among the questions that guided the epistemic approach of this present thesis.

The aim of the entire research course is to measure the degree of awareness, the need and the solutions for implementing useful applications for the information management among: organizations, software producers and in the Romanian academic and research environment. The three-dimensional empirical approach (producer-organization-university) will make the work as a whole different from the common structure of the doctoral theses, a fact that gives the thesis novelty both from the point of view of structure and from that of methodological design.

The dynamics and complexity of the integrated packages derive not only from the benefits brought to the organization, but also from the actuality and their magnitude, on a global and multidisciplinary level. Although at international level, the studies that deal with information integration within organizations are very numerous and detailed in depth, in the Romanian landscape both on an empirical and applicable level, they are not sufficiently explored. From the multitude of traditional packages, I have selected for the theoretical-methodological design of the thesis, the investigation of the following three applications:

Enterprise Resource Planning - ERP, Customer Relationship Management - CRM, and Business Intelligence - BI.

Therefore, this thesis is designed to cover a research gap in the field of ERP systems analysis. The theoretical course is a major support in the configuration and field analysis of this thesis. Accordingly, the general objective of the theoretical chapter is to provide a delimitation of the operational concepts and to draw the major theoretical directions in the research of business applications of ERP, CRM, BI type.

In addition, I have opted for a mixed methodological complexity in the construction of the research hypotheses, based on the data volume, recorded in different stages and samples (producer-user-academic trainer, which have generated a three-dimensional construction of the thesis, based on a deductive type methodology, from qualitative to quantitative, from particularization to generalization, which otherwise facilitates the reading of the work in its entirety.

Also, special attention will be paid to the mapping of the factors of major importance (CSF) that facilitate the optimal functionality of the process of implementing an ERP type package in organizations, as evidenced by the analysis of the current stage of scientific knowledge regarding integrated business management systems.

In accordance with the general and operational objectives of the entire analytical course, I have postulated research questions relevant to the three target samples, which aimed at motivating the opting for certain ERP, CRM, BI integrated solution packages, success factors in the implementation of integrated software solutions, as well as recommendations in the implementation and promotion of business management software ERP, CRM and BI.

The thesis entitled "Information Management, Solutions and Tools for Performance Management in the Activity of Organizations" comes with significant contributions to the annexes and priority areas provided by CNCISIS within the National Strategy in the field of research, technological development and innovation for the period 2014-2020 ”¹, as follows:

Field 1: Information and communication technology

Research Direction 1.2 Advanced IT systems for services;

- Research topics 1.2.3 Systems and technologies for business development (ebusiness);
- Research topics 1.2.7 Information systems for risk management;

Field 9: Socio-economic and humanistic research

¹ Elaboration of the national strategy in the field of research, technological development and innovation for the period 2014-2020, document available online at <http://www.cdi2020.ro/>

Research Direction 9.1 New managerial, marketing and entrepreneurial development methods for organizational competitiveness

- Research topics 9.1.11. Innovation and competitiveness through the international transfer of managerial know-how

Research direction 9.2 Quality of education

- Research topic 9.2.14. Correlation of the educational system with the demands of the labor market.

The thesis belongs to the field of information management, an otherwise dynamic domain, dominated by the dissemination and flow of information.

Information dynamics in the current economic environment

Information is one of the most valuable resources of a company, with and around it the entire set of business processes within companies takes place.

Until the use of the Internet, companies were eager to find the necessary information for their operation and development; now things have changed radically: the information is abundant and present through all possible channels. Currently, in order to thrive you have to "choose" and filter the information to stay competitive.

The performance of an enterprise is influenced by its ability to integrate into its environment, by the effectiveness of its actions in capitalizing on the opportunities, by its ability to cope with the unfavorable situations and the risks it faces.

The information management is the process by which previously collected information is analyzed and then used by managers to make decisions.

The information in management is the information needed to make managerial decisions².

Given the importance of the Information in Management, the imperatives of its study and understanding are generated by:

- making decisions in order to improve the organization of services and facilities
- achievement of participatory planning, implementation, monitoring and evaluation.

Information Management

In order to be used in managerial decision making, the information must be processed (collected, stored and analyzed). Information management (the process of collecting and storing information) and information in management (data needed for decision making) are

² <http://cec.vcn.bc.ca/mpfc/modules/mon-miru.htm> accessed on May 14, 2014

different notions; however, they complement each other and cannot be separated into daily activities³.

Thus, information in management involves:

- determining what information is needed;
- collecting and analyzing it;
- storing and recovering it when necessary;
- its use
- its dissemination

A considerable amount of information is obtained during the planning, management and monitoring of the project. Some of this information is used in making immediate decisions; others, for further decisions. Therefore, an efficient management information system helps project managers to find out the information needed to make different decisions at different times⁴.

Management Information Collection and Analysis: Information can be obtained from various sources: technical personnel reports, registers, questionnaires completed by various participants, working meetings, interviews, charts.

Information Storage: It is important that the information is stored for later use.

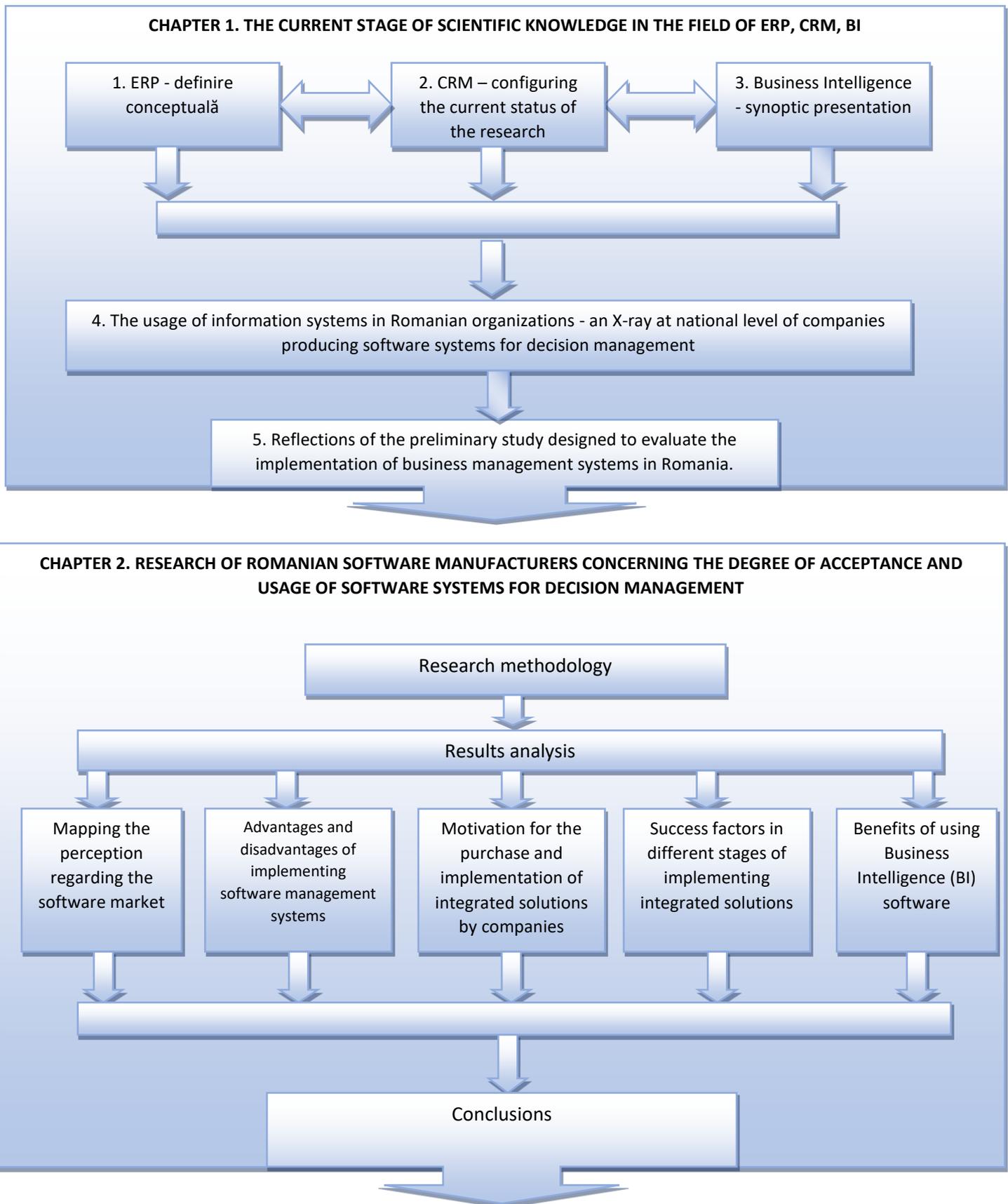
Information can be stored in community registers, project reports, forms and it can also be recorded. The basic rule is that information can be easily found and accessed.

The effectiveness of information management and knowledge management is imperative in ensuring uninterrupted organizational survival and competition in the face of constant changes in the organizational environment. Thus, the present paper is designed to cover a research gap in the field of information management following the logical path set out in the scheme below:

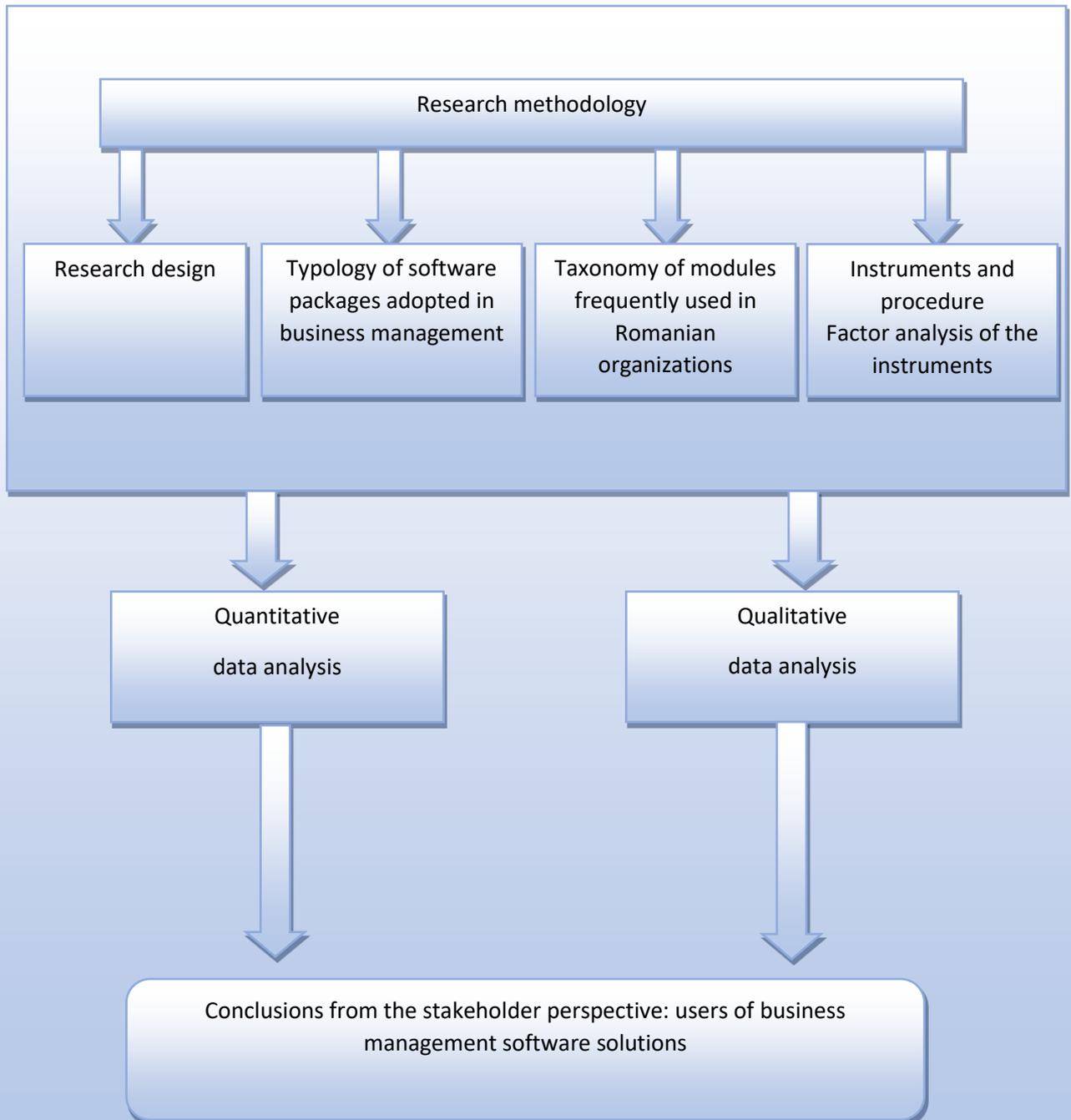
³ Idem 2

⁴ <http://cec.vcn.bc.ca/mpfc/modules/mon-miru.ht⁴.m> accessed on May 14, 2014

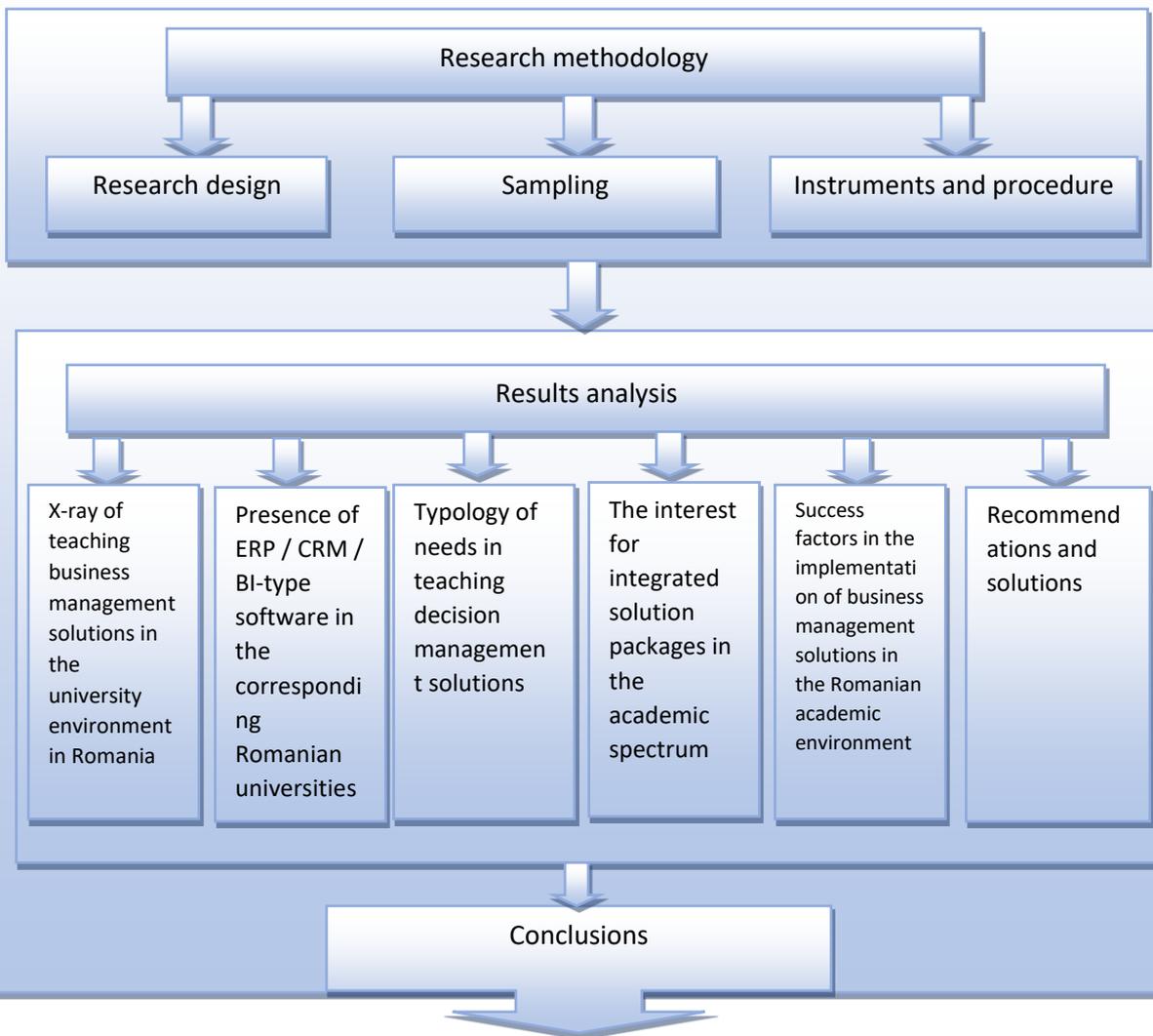
Figure 1. Logical scheme of the doctoral thesis



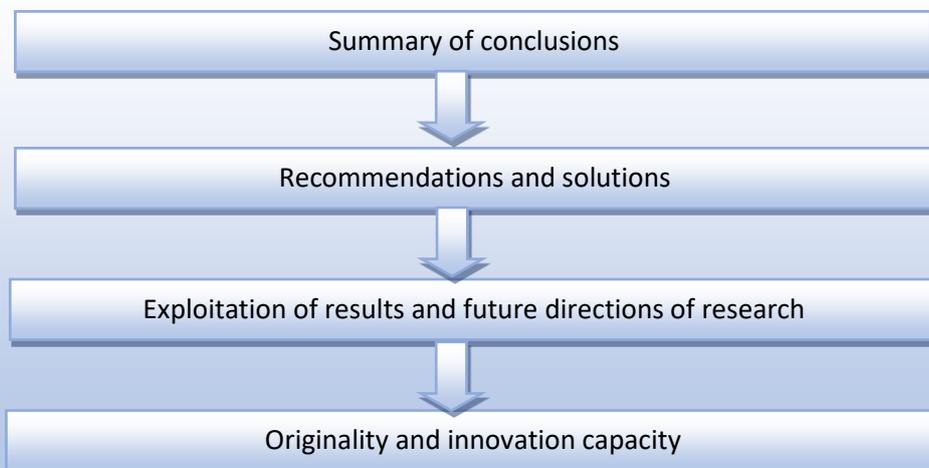
**CHAPTER 3. RESEARCH ON THE DEGREE OF INFORMATION / EDUCATION AND
USE WITHIN ROMANIAN SOFTWARE SYSTEMS FOR DECISIONAL MANAGEMENT**



CHAPTER 4: SOFTWARE SOLUTIONS ECOSYSTEM FOR THE DECISIONAL MANAGEMENT FROM THE PERSPECTIVE OF THE ROMANIAN ACADEMIC ENVIRONMENT



C CHAPTER 5. CONCLUSIONS, ORIGINAL CONTRIBUTIONS AND FUTURE RESEARCH DIRECTIONS



CHAPTER 1. The current stage of scientific knowledge in the field of ERP, CRM, BI

The first part of the corpus of this thesis is intended to review the specialized literature, especially the international literature, offering researchers and practitioners resources and solid conceptual, operational and empirical models, which, undoubtedly, have been a major support in the synchronization of the current stage of scientific knowledge in terms of packages and support solutions for decision management.

The theoretical foundation oriented around the scientific knowledge of ERP, CRM, BI type tools, in conjunction with the author's expertise, led to the start of a preliminary research process of how these information management systems are exploited in the Romanian business environment. Starting from secondary data provided by the Romanian public financial institutions, we have tried to delimit a map of companies producing software solutions, based on indicators such as the location of companies, the type of capital, the profit and the number of employees, which led to the elaboration of a series of extensive empirical studies, with different sampling and hybrid research methodologies.

Thus, the research based on secondary data available at the Ministry of Public Finance of Romania and presented in the first part of the thesis, it concludes to an image where the immaturity of the business management software solutions market prevails, this being determined by delayed foreign investments and by small software companies.

The latter are geographically located around the great Romanian university centers, which are becoming an important pole of attraction for the highly qualified human resources. Analyzing the conclusions generated by this preliminary study, we have decided to start a complex empirical analysis at the level of three interdependent communities that are directly aimed at designing, implementing and evaluating decision management systems.

The shortfall of the software market highlighted in the analysis of the Romanian companies led to the generation of a quantitative and qualitative empirical path, where a special emphasis is placed on the measurement of the state of affairs in terms of: use, production and training, advantages and disadvantages, motivations, success factors and solutions in the implementation of ERP, CRM and BI software systems.

CHAPTER 2. Research among Romanian software manufacturers on the degree of acceptance and use within companies of software systems for decision management

The second part of the thesis offers a detailed analysis of the data related to the market mapping of ERP, CRM, BI software manufacturers, of the motivations for the purchase of integrated solution packages, as well as the hierarchy of the factors that ensure success in the implementation, maintenance, evolution and updating of these software solutions, all being obtained based on the interviews started among 11 software solutions manufacturers. According to the data collected in the field we can conclude that the current market for integrated software solutions in Romania has information provided by multinationals, which explains the poor familiarity or sometimes on demand with such software packages.

Moreover, those who do not know enough about these packages, but have implemented them in their organization, use them for accounting and human resources management modules, the rest of the documents being stored on paper or in doc and excel files. The analysis of the data collected by us shows that the educational element is a major factor in the evolution of the software market in Romania. The lack of these programs in the educational curriculum creates a gap not only of research but of training of potential users who want to get involved in organizations in the field. In this direction, the big solution providers have started their own training programs or they have been made by the business owners themselves. Basically, the information flow was transmitted through a know-how owned by the foreign companies that invested in Romania in this field and not through an institutional framework, as it was natural. Moreover, those who have benefited from software implementations in Romania have done so by applying to European-type financial co-support programs, without having a proper pre-analysis of the information flows within the company and without correlating these flows with those inside the company. In addition, most ERP, CRM, BI software solutions have standard working models and in most cases, they hinder companies' need for flexibility. In other words, customization for the needs of each company is still in its infancy. In this direction, companies that change their activity in the medium and short term cannot adapt the modules of these solutions. This generates a true implementation failure, without the return on investment (ROI). Therefore, a detailed pre-analysis is recommended, adapted to the company's requirements, before starting the process of purchasing and implementing software solutions.

The collected narrative fragments, the analyzed statistical data, as well as the field experience, lead us to the conclusion that the standardized software can be optimally adapted

only in the case of stable businesses, which do not undergo changes in the medium or short term and where the business flows are stable.

This chapter provides a basis for paving the way for similar research among ERP / CRM / BI software type and software users.

Chapter 3. Research regarding the degree of information / education and use within the Romanian companies of software systems for decision management

The third part of the thesis has been the subject of a quantitative research, where an increased emphasis has been allocated to the degree of information / education and use within the Romanian companies of the software systems for decision management, where the target group consists of 417 users of software and integrated solutions from the Romanian market.

The research design was conceived in this third part of the thesis, following a dichotomous structure. On the one hand, following the criteria of conceptual homogeneity, during the analytical-methodological course of quantitative type we considered the recording and analysis of updated data, relative to: the psychometric qualities of the data collection tools among the users of business management solutions, the motivation for the purchase and implementation of integrated solutions by companies, the success factors at different stages of implementation, and the benefits of using the Business Intelligence software solution (BI).

On the other hand, qualitative research techniques have led us to select and analyse answers regarding: the benefits versus the impediments brought to the users of software systems of ERP, CRM, BI type, to the determinants in the decision, the purchase, the implementation and the use of a package of solutions integrated in the investigated companies; to represent the degree of satisfaction with the use of business management solutions of ERP, CRM, BI type, in the corresponding organizations, as well as recommendations and solutions for users and the academic and educational environment, respectively, in order to adjust the business decision-making process. From the answers to the open questions provided by the interviewed users, we tried to extract those fragments, which, although small in size, are textual, they contain specific information for the mapping of the factual state in the efficient implementation and use of the integrated solution packages in the Romanian companies.

Most of the conclusions derived from the analysis of the answers offered by the participants refer to the integrative facilities, monitoring, efficient communication,

productivity improvement, reducing costs, increasing performance, improving the relationship with customers and suppliers, as well as reducing procedures in processing documents, and the time allotted to them.

CHAPTER 4 The ecosystem of software solutions to support decision management from the perspective of the Romanian academic environment

The fourth part of the thesis is dedicated to analyzing the data collected among 55 teachers from the Romanian university environment, in an attempt to analyze empirical answers of high scientific quality relative to the ecosystem of software solutions, for the support of the decisional management in the matter of teaching, presence of ERP / CRM / BI type software in the corresponding Romanian universities, of interest for integrated solution packages in the academic spectrum both from the perspective of the teachers, as well as the social representation of the students, producers and users.

From the cumulative of descriptive analyzes performed in the fourth part of the thesis, regarding the investigation of the presence of business management software in the Romanian academic environment which in fact was the subject of our first research question, we can conclude the following:

About one third of the Romanian universities investigated have acquired business management software especially ERP; more than half of the participants support the existence in the analytical program through courses / seminars / laboratories intended for teaching / learning ERP / CRM / BI business management software, where the software solutions are mainly taught at the bachelor programs, at courses / seminars such as: Integrated Information Systems, Management Information Systems; Information Systems in Business Administration, Marketing Information Systems. Moreover, the data collected from the items regarding the representation of the openness of the stakeholders directly involved in the delivery and applicability of software solutions for decision management, the data converge towards synthesizing a robust response to the need to devote more attention to involving more actors in the process of learning, teaching, and cooperation and application of the set of knowledge and skills in decision management software systems.

The most important determinants of the successful implementation of decision management software packages are: the role of the project team, the involvement of the users, the influences of the management and the available resources.

The recorded data has confirmed the need for the involvement of companies producing such systems, which must be achieved through a bottom-up approach, where the coordination of the teaching / learning process is carried out, from an early stage, through the specialists from the academic and business environment, with the aim of direct employability from companies that facilitate or employ professionally trained young people, to respond to the demand of the labor market.

The synthesis of the typologies of needs in teaching business management software solutions, as evidenced by the qualitative data collected among the respondents from the academic environment, is represented as follows: specialized human resources / training / further education; consulting and collaboration with specialized companies; advanced technological resources (packages, license, procurement, infrastructure); updating the curriculum / study program; awareness and use of integrated management software solutions; financial resources.

In conclusion, it is recommended a direct involvement of the teachers, in terms of the revision of the curriculum, adaptation to the requirements of the study programs, to reflect on the plan and objectives of the courses, on the allocation of financial resources, and on adapting the IT infrastructure. Most of the recommendations provided by the interviewed teachers refer to the following five major issues: 1. Further education / training / workshops; 2. Orientation of teaching and implicitly of the educational curriculum and of the research directions, more towards practice; 3. Collaboration with companies providing integrated software solutions; 4. Lobby; 5. Updating the curriculum and the educational program.

This research complements the previously provided models among manufacturers and users of decision management software solutions serving as a working tool for future research, both in academia and in development within companies that produce, develop and implement such support solutions for the decision management.

Chapter 5. CONCLUSIONS, RECOMMENDATIONS, ORIGINAL CONTRIBUTIONS AND FUTURE RESEARCH DIRECTIONS

Summary of conclusions

During my educational training, I have rarely encountered theoretical or practical elements in the area of ERP, CRM, BI. However, my professional activity, has confirmed to me that these are nothing but the tools of an effective management. Moreover, during my lucrative activity, I have encountered these software solutions that proved to be the determining tools in the competition with other companies of profile. Their experience and exploitation has shown me, numerous times, that these solutions, correctly implemented and exploited, can make the difference between the loser and the winner; those who know and use them in the business activities can have great advantages in the strong daily struggle with competing companies.

However, I have encountered public and private institutions, which are resisting, refusing to implement such decision management solutions. I wondered where does the reluctance / demotivation come from in terms of advanced business management solutions, even of the well-positioned companies in the market? What does the implementation of such solutions depend of in a Romania where the market for custom software solutions is required and in a continuous emergency? Why don't companies hire young graduates with experience in these software packages?

These questions, together with partially founded answers, obtained from various collaborators who produce or implement ERP, CRM, BI packages, led me to start an empirical analysis process on how these tools of operational and executive management are designed, used and exploited from a three-dimensional perspective.

Thus, the first part of the paper is destined for a theoretical incursion in the field of ERP, CRM and BI (the state of the knowledge in the field), followed by a preliminary study based on secondary data provided by the public financial institutions in Romania. The general objective of this analysis is to confirm the initial presumptions, prior to the doctoral thesis, namely that in Romania we have a knowledge disability regarding "software solutions", which can be used by top management decision-makers to be efficient in their activities.

Moreover, the theoretical section has facilitated the understanding of how these constructs were validated in our case studies, otherwise pre-tested in the pilot analysis (the radiography at national level of the companies producing software systems for decision-making management, based on data extracted from the Ministry of Public Finance "of

Romania; data accessed from the section "economic agents "according to the criterion" Tax information and balance sheets ", and respectively the CAEN code of companies).

The second part of the paper was allocated to the research elaborated through semi-structured interviews among the software solution manufacturers (N = 11), a special attention being paid to the radiography of the ERP, CRM and BI software production market, of the representation of the buyers' typology, of the motivations for the purchase of integrated solution packages, as well as of the factors that ensure success in the implementation, maintenance and updating of these types of software solutions.

The third part of the thesis was reserved for the representation that software users have regarding the necessity of implementing such software solutions, the impediments versus the benefits brought by these tools and the degree of satisfaction with the way they are used in the Romanian companies. Greater attention was paid to the analysis from the methodological perspective of the measurement samples applied to the users.

Moreover, the data collected through qualitative and quantitative techniques led to an in-depth understanding of the use of integrated business management solutions of the ERP type, CRM, BI, in the corresponding organizations (N = 417).

The fourth part offered a holistic perspective of the software solutions ecosystem from the perspective of the Romanian academics (N = 55). In this study we tried to provide empirically validated answers regarding the mapping of software solutions for operational management, the presence of the taught courses, the needs of the investigated departments, as well as the perception of the success factors in the implementation of these software solutions in the national academic environment and of the proposals for improvement in the educational program, teaching and research.

In the line drawn by the theoretical used models, by the methodological proposed design and consequently, by the formulated objectives and hypotheses, we have sought to provide as complete explanations as possible regarding the situation of the Romanian market for ERP CRM, BI software. Putting together the conclusions we reached, after the three pieces of researches, we observe the particularization of the representation that the interviewed experts have regarding the representation of the software support market.

Synthesizing the results obtained from the qualitative and quantitative analyzes among custom software solutions manufacturers, we can say that the market for ERP, CRM, BI solutions is a developing one, of maturation, guided still by native solutions and the use of in-house systems, the deficiency in the educational and training process, of European type financing and or of the most convenient price. In addition, the manufacturers claim that the

current market for integrated software solutions in Romania has information provided by multinationals, which explains the poor familiarization of companies with such software packages. Moreover, those who do not know enough about these packages, but have implemented them in their organization, use them for accounting and human resources management modules, the rest of the documents being stored on paper or in doc and excel files.

The typology of the software buyer is not a homogeneous one, being perceived differently by the manufacturers depending on: the type of capital (Romanian, mixed or foreign), the size of the company, by the support offered by top management, by the cost and potential of financing, by the corporate vision, by the change management criteria, as well as by the expectations on the product which is supplied. Buyers' motivations for purchasing and implementing integrated solutions are centered around those facilities related to: efficient management of operations, automation of procedures, as well as increased productivity, reduction of time, improvement of customer relations, integration of bases in a common platform, improvement of company image, customer satisfaction, and efficient management of human resources. Moreover, the empirical data obtained from the manufacturers of business management software solutions, in terms of success factors, provided us with valuable information regarding the decision, implementation and post-implementation of the integrated solutions. From the analysis of the elaborated statistical data it was found that the main factor in an efficient implementation remains the training of the users, followed by the specificity of the project management, the support of the top management personnel and the costs of the implementation.

Last but not least, the manufacturers insisted on the coordination of academic training and involvement, which is a major factor in the evolution of the software market in Romania. The reduced presence of these programs in the educational curriculum creates not only a gap of research but also of training of potential users interested in getting involved in organizations in the field. In this direction, the large solution providers have started their own schooling programs or these have been made by the business owners themselves. Basically, the information flow was transmitted through a know-how owned by companies from abroad, who invested in Romania in this field and not through an institutional framework, as it was natural. Moreover, those who benefited from software implementations in Romania did so by applying to European-type financial co-support programs, without having a correct pre-analysis of the information flows in the company and without correlating these flows with those inside the company. In addition, most ERP, CRM, BI software solutions have standard

working models and, in most cases, they hinder companies' need for flexibility. In other words, customization for the needs of each company is still in its infancy. In this direction, companies that change their activity in the medium and short term cannot adapt the modules of these solutions. This generates a true implementation failure without ROI. As a result, manufacturers and implementers recommend a detailed pre-analysis tailored to the requirements of the company before initiating the purchasing process and implementing software solutions.

The results obtained from the market using integrated solutions complement the research conducted among the manufacturers. A major methodological contribution is given here by the psychometric qualities and the factorial structure of the applied instruments.

The main conclusions that emerged from the analysis of the quantitative type data started among the users of integrated type solutions, are that they are more familiar with ERP, CRM, BI and less with WHM systems.

In addition, the modules most often used by the interviewed companies are: invoicing, operational, commercial-sales, purchasing, human resources, marketing, administration, IT-management, transport-delivery, production, financial-accounting, and less the modules necessary for the research-development department, legal, car park, maintenance. Regarding the hierarchy of motivation for the purchase and implementation of integrated solutions by the interviewed companies, this is done according to operationalization and automation procedures and the particularization of the business plan, as well as the organizational vision and culture of each company. The hierarchical representation of the success factors in the decision to implement an ERP / CRM software, in the opinion of the interviewed users, refers especially to the need in terms of adjusting the accuracy of the data and converting them, to the major requirement of clear goal setting and objectives, as well as the competence of the team involved in the project.

We also noticed that the dimensions that designate the major decision-makers in the option for certain integrated ERP / CRM / BI solutions, in the case of the users, were centered around the procedural capital constructions (goals, teamwork, implementation), technology capital (instrumentation and adaptation), end users (expectations, training, engagement, feedback), Time saving, ROI cost, human capital (team, project management, consulting), as well as IT infrastructure (extrinsic factors and legislation). Moreover, we noticed that the significant statistical predictors for the generic variable defined "success factors in the implementation of an ERP / CRM / BI software type ", in the order of importance, proved to be: implementation costs, time required for implementation, support from top management

staff, user expectations, user availability and openness, user training, user engagement and feedback, IT infrastructure, business specificity, project awareness and scale, software and hardware compatibility and last but not least, the ERP / CRM / BI consultants. In terms of business intelligence capacity, it is exploited especially for the primary data extraction facilities (objectives, teamwork, implementation), followed by the tool for analyzing the financial results, then for integrative capacity and optimization, and finally for the capacity of multidimensional and risk analysis.

The analysis of the qualitative data led us to a synthesis of the narrative fragments provided by the users, regarding the pros and cons in the use of business management solutions in the Romanian organizations. On the one hand, the advantages of implementing integrated solutions are determined by integrative and absorption facilities, operational optimization

and process, monitoring, analysis and evaluation, management and decision-making facilities, productivity and performance increase, as well as time reduction. On the other hand, the disadvantages in using business management solutions in Romanian organizations are determined by considerations related to inefficiency in strategy and operationalization, reluctance to change, organizational culture, resources of time and cost, as well as a deficit in adjustability and adaptation and a high degree of complexity, use and a lack of experience in training and use. And in the case of the user community, the main success factor in the decision process, acquisition, implementation, use of the decision management solutions packages, proved to be human capital (team, consultancy), followed by procedural capital (purpose, vision, process implementation), technological capital (selection, tools, customization), or extrinsic factors such as infrastructure, IT legislation.

The results obtained from the Romanian academic environment converge towards a broad picture that portrays the situation of teaching / learning business management solutions in the Romanian university environment. The statistical analyzes performed regarding the investigation of the presence of business management software in the Romanian academic environment, indicated that approximately one third of the investigated universities in Romania purchased business management software, especially ERP type; more than half of the participants support the existence in the analytical syllabus, represented specializations of the courses / seminars / laboratories for teaching / learning business management software type ERP / CRM / BI, where the software solutions are taught mainly at the bachelor programs, at courses / seminars such as Integrated Information Systems, Management Information Systems; Information Systems in Business Administration, Marketing

Information Systems. Moreover, the recorded data confirmed the need for the involvement of companies producing such systems, which must be achieved through a bottom-up approach, where the coordination of the teaching / learning process is to be carried out, from an early stage, through specialists from academia and business, with the purpose of direct employability from companies that facilitate or recruit young professionals who are professionally prepared to respond to the demand of the labor market.

The synthesis of the typologies of needs in the teaching of business management software solutions, as evidenced by the qualitative data collected among the respondents from the academic environment, refers to coordinates related to specialized human resources / training / further education; consulting and collaboration with specialized companies; advanced technological resources (packages, license, procurement, infrastructure); updating the curriculum / study programs; awareness and use of integrated management software solutions and financial resources. In addition, the research hypothesis from which we started the empirical approach, according to which the implementation of software management solutions of business is determined more by intrinsic factors than by extrinsic factors, it has been confirmed. This results in a direct involvement of the teachers, in terms of the revision of the curriculum, the adaptation to the requirements of the study programs, the reflection on the plan and the courses objectives, the allocation of financial resources, as well as the adaptation of the IT infrastructure.

Recommendations for the manufacturing companies

The recommendations for the producing companies come, on the one hand from the academic environment, the majority aiming at a close collaboration between producers and trainers, by providing specialized programs to the academic environment, as educational support for didactic purposes. On the other hand, the suggestions for improvement were also offered by the application developers, referring to the increased attention for the role of the implementation team, to the resources of time and cost, to the establishment of partners and support from the top management.

Recommendations for the users

The recommendations for users come from software manufacturers, referring in particular to imperatives related to: analyzing business flows, establishing partners and support from top management, as well as automating work procedures, optimizing operational management and avoiding data redundancy. On the other hand, the

recommendations also come from experts from the university environment, and from research and development, referring to resource evaluation, advanced education, training, workshops, collaboration with companies providing integrated software solutions and more lobby.

Recommendations and solutions for the Romanian academic environment

Manufacturers and users of custom software solutions offered several proposals for the academic environment. Summarizing the final conclusions, we can conclude that the major recommendations for the academic environment refer to the following aspects: the introduction of e-learning platforms, updating the educational curriculum and focusing on the practical side, updating to the current needs to the requirements of companies producing custom software solutions, have offered some proposals for the academic environment, which cover the following aspects.

Most of the recommendations provided by the interviewed teachers themselves, in order to promote business management solutions in the field of CRM / RP / BI, refer to the following five major issues: 1. Further education / training / workshops; 2. Orientation of teaching and implicitly the educational curriculum and research directions, more towards practice; 3. Collaboration with companies providing integrated software solutions; 4. Lobby; 5. Updating the curriculum and the educational program.

Capitalizing on the results, the limits of the research and the future directions of research

The doctoral thesis fulfilled its research objectives, in an attempt to map the state of fact on the software solutions for the decision makers in the operational management, either from the perspective of the manufacturers of software solutions as well as of the users and teachers from the Romanian academic environment. Of course, the research keeps the promises of deepening the casuistry, through subsequent analyzes published in specialized journals and magazines, or presented at specialized meetings, conferences and workshops aimed at efficiency in operational and strategic management.

Following this paper, we observe the opportunity of other pieces of research such as: **"ERP, CRM, BI in the educational program in Romania versus other countries"**.

The access to ERP / CRM / BI software systems in collaboration with their suppliers has to be a must for educational institutions to use means of exposing students to valuable business tools for an efficient and predictable management of the company's evolution.

To date, our scientific efforts have materialized in four publications and several presentations at national and international congresses. Below are the publications materialized during the doctoral preparation:

1. Balaban M., Dumitrașcu D., 2016, *Who provides management software solutions in România? A preliminary analysis of information management producer organisations*, The 2nd International Scientific Conference SAMRO 2016, Păltiniș România;
2. Balaban M., Dumitrașcu D., 2016, *The development of a Romanian construction industry business: The case of UNIMAT*, The 2nd International Scientific Conference SAMRO 2016, Păltiniș România, October, 2016;
3. Balaban M., Dumitrașcu D., 2014, *The Advantages of the CRM-Type Systems for the Planning and the Management of the Resources in Companies*, *Proceedings of the 8th 23*
4. Balaban M., Dadarlat A., Dumitrașcu D., 2014, *Sisteme eficiente pentru planificarea și managementul resurselor în companii*, International Conference on European Integration – New Challenges, EINCO,
5. Balaban M., Dumitrascu D., 2018, *An empirical assessment of the Romanian business management software market: looking through the lens of the developers*, "The 11th Icebe & 7th Icie & Peesa III", International Conference on Engineering and Business Education, Innovation And Entrepreneurship and Capacity Building in Higher Education, Szczecin, Polonia, 15-19 Octombrie, 2018

The dissemination of the results from the whole body of the paper will be carried out in specialized magazines, at congresses in the field (International Management Conference IMC 2020); 10th annual International Conference of Education, Research and Innovation, in book chapters and special editions ("Risk Assessment and Management" section, "Sustainable Use of the Environment and Resources"); Circular Economy and Sustainable Strategies; Sustainable Business and Development II10; with the following title proposals: "Going beyond traditional ERP / CRM / BI System support learning in the academy"; "What to be done next in improving management tools' use in Romanian organizations".

Beyond the scientific benefit - the contribution to the definition and verification of concepts in three target subgroups, this thesis has, indubitably, a *practical utility* for several categories of beneficiaries.

On the one hand, it can provide empirical support to future researchers interested in the topic of decision management solutions, as well as teachers interested in implementing or adjusting solutions of this type in their educational environment. Access to ERP / CRM / BI software systems should be a target of trainers in the Romanian university environment to present updated, useful support solutions.

On the other hand, the paper can be a useful tool for implementers and users of integrated software solutions, who can find in it a guide in order to adjust the products supplied according to the current market requirements. The latter should be of greater concern to manufacturers / suppliers of such solutions, which are increasingly widespread, but not sufficiently explored in private, public and non-profit organizations in Romania.

Beyond personal contributions, the paper has certain limitations, which refer to the following aspects:

- omitting statistical calculations such as models of structural equations (structural equation modeling);
- using a relatively small sample, due to availability considerations among the ERP / CRM / BI solution producing community (n = 11);
- lack of content analysis of the Romanian university analytical program from the specializations of management and information systems;
- lack of analysis starting from the method of participatory observation in organizations using ERP / CRM / BI software solutions, as to how they actually use / exploit these applications;
- consulting the best practice models from other countries regarding the implementation and use of ERP / CRM / BI solutions;
- partial coverage of regionality criteria, either for reasons of geographical economic underdevelopment or for educational reasons.

Original contributions in the thesis

The research carried out on large three-dimensional samples distributed, beyond its limits, is distinguished by the element of novelty, originality.

On the one hand, the novelty of this thesis is not conferred so much by the methodological hybridization or by the combination of the paradigms already existing in the literature dedicated to integrated type solutions, but rather, by the first-hand contact that gave us the privilege of entering into the interior of less explored communities, namely users, producers of business management solutions and professionals in the academic environment. This course led us to the end of the quest for knowledge, we can verticalize three types of models: one for manufacturers, another for users, and the last for trainers in academia.

On the other hand, the *element of originality* of such a research attempt lies in the attempt to draw a connection between the design, use and training of this lucrative spectrum.

The research included in this thesis includes novelty elements related to the state of the art in terms of updated business management solutions. Moreover, the thesis offers a pluricentric analysis, offering the reader an elaborated perspective on the theme of integrated type solutions, from the perspective of users, producers, trainers and implicitly of the researchers. The analysis of the collected data, in conjunction with the secondary data analysis initially started, represents an empirical foundation for the factual state of the maturing software market in Romania, offering an apparatus sometimes critical to the actors directly involved, but reluctant to use advanced solutions in decision management.

The specialized bibliography consulted, especially of foreign origin, emphasizes once again, the developing stage in the field of research of the topics in the Romanian space, the first chapter thus offering a grounded synthesis of the current methodological and theoretical concepts and constructs. The researches in the three communities directly concerned, confirmed the testing of the constructs and concepts analyzed in the first part of the thesis.

The initiated research can have a major impact, as it offers analyzes based on elaborated statistical data (regression analyzes, ANOVA, correlational, descriptive), on the literature review, as well as practical support with a significant utility to both those who develop, train and are trained in the field of business information systems.

The volume of data collected and the narrative segments complement each other, in an attempt to provide an overview guided by qualitative and quantitative research techniques and methods, in order to achieve the general and operational objectives of the thesis.

Comparing studies from the perspective of users, producers, and researchers, represents a significant personal contribution to the studied topics.

Confirmatory and exploratory factor analyzes provide future researchers interested in the topic, an applied field instrument, whose psychometric qualities have been validated in the Romanian context.

Further analyzes could be started in similar cultural contexts or in longitudinal studies, starting from this questionnaire to evaluate the success factors in the implementation of software solutions for decision management. Moreover, the thesis has recommendations and solutions offered by and for the three studied target groups.

Undoubtedly, there remains a desire for research, the elaboration of a comparative study, with the members of individualistic cultures already mature in this lucrative spectrum (Hofstede), in order to be able to find directions of efficiency both in the production part, use as well as training in optimizing business management software solutions, from collectivist environments already investigated.

Furthermore, it is desirable to develop a good practice guide in implementing ERP / CRM / BI software solutions. The transfer of know-how, from the producer to the trainer, either from the academic or consulting environment, in the interest of the end user, remains an objective in practice. Moreover, not only can practitioners find in this paper a tangible and easy-to-use tool for optimizing their activities, as well as academics, in updating and improving the educational curriculum.

Finally, we consider that the thesis has covered a research gap in the field of support solutions for the decision management, it answered the research questions but raised even more questions to the researcher, still eager to find valid answers and solutions that have applicability among the organizations prepared to operate as efficiently as possible in a dynamic economic environment, deeply marked by technological progress.