IOSUD – „DUNĂREA DE JOS" UNIVERSITY OF GALAȚI

Doctoral School of Fundamental Sciences and Engineering

PHD THESIS

ENTREPRENEURIAL MANAGEMENT IN THE PHYTOPHARMACEUTICAL PRODUCTS SECTOR

SUMMARY

PhD Student,

Camelia Costela FASOLA (LUNGEANU)

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Series I 9: Engineering and management in agriculture and rural development, No.9

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Chapter I

In Chapter one I discussed about the quality of small and medium business management which is a key factor in ensuring economic efficiency at the unit level and summary at the meso and macroeconomic level. It was taken into consideration the share of the small and medium enterprise sector in the total number of enterprises. Advancing the issue of small and medium business management, I noticed that it is necessary to have knowledge about management which is being considered a supporting factor in building a smart economic society, amid to increasing competition between all economic "rivals".

Lack or insufficient knowledge in the field of management generates multiple problems in ensuring, organizing the efficient management of enterprise resources. Many entrepreneurs have only interesting and timely business ideas, but few have the skills or knowledge to implement them. Starting a business is just the first step in capitalizing on the business idea. If the state ensures, through its policies to support the activity of the SME sector, with all the necessary conditions for development, it will not be enough because due to the lack or insufficient knowledge of entrepreneurs-managers to capitalize on these opportunities, the expected results will not come again. Therfore it will be an encreasing number of companies which have long periods of losses, or which remain formally open. The problem of inefficient management in small and medium-sized businesses is topical, regardless of the efforts made by researchers in the local scientific area in search of solutions to solve these issues.

From the Romanian area of expertise, the most cited scientists, concerned with the issues of small and medium business management, are Nicolescu Ov., Russu C., Rusu C., Sasu C., Istocescu A., Mureşanu D., Istudor N., Ursachi I. et al. Among the notorious personalities, known and appreciated worldwide, our attention was given with priority to L. Greiner, N. Churchill, V. Lewis, A. Gibb, who focused on researching the evolution of small and medium-sized businesses, through the prism of their passage through stages life cycle and the conformation of knowledge of the entrepreneurs, the leadership style, the strategies and the characteristics of the management specific to each stage.

Problems addressed in the works of field specialists in the country are notable, but do not fully reveal the complex vision of the development of small and medium business management. The emphasis is being on the development of only some elements of management, highlighted separately.

The aim of the research was to identify ways and means of developing small and medium business management in the conditions of the competitive economy. The basic objective was represented by the elaboration of the development model of the management of small and medium businesses in the conditions of the competitive economy. The study in Chapter I focused on:

1. Defining the concept of small and medium business management.
2. Identifying the particularities of exercising the functions of small and medium business management.
3. Analysis of the evolution of the small and medium enterprise sector.
4. Researching the obstacles in achieving the management of small and medium businesses.
5. Identifying the possibilities for developing the management of small and medium businesses in the conditions of the competitive economy.

The field of study of the paper is the management of small and medium businesses.

Today, the global economy is undergoing major changes in structure and operation. Large companies continue to dominate international trade due to factors such as: monopoly

on certain products and services, the development of the Internet, the emergence of new business platforms, increasing the level of education of the population, the growing openness of the world economy.

The starting point in approaching the business management in the phytopharmaceutical products sector is the definition and significance of the notions of competitive economy, business and management.

Another theory that had to be highlighted, due to the importance it has on the development of business in the phytopharmaceutical sector, was the life cycle theory of the enterprise. The life cycle theory of the enterprise is a theory based on the situational behavior of leaders, based on the concept that effective and efficient behavior can be obtained when it changes, in close connection with the "maturity" of subordinates. In other words when they can assume responsibilities. In our opinion, business development, through life cycle theory, can bring the desired advantages and results, if the entrepreneur wants to change his personal and professional characteristics in accordance with the requirements and needs of each stage being supported by the team of specialists and employees loyal to the company.

In present, the theory of the cooperation of small and large enterprises has a greater spread. Large companies do not tend to liquidate small businesses, but use them as a convenient area of capital investment. Small and medium-sized enterprises increase the viability and competitiveness of large enterprises by the fact that certain activities can be better carried out by small and medium-sized enterprises.

In addition to economic, organizational and managerial theories, in the conditions of the market economy, the basis of management, including the management of small and medium-sized businesses, are economic and managerial laws.

After that, we considered indisputable the usefulness of the general management principles proposed by Ov. Nicolescu and I. Verboncu:

- the principle of ensuring the concordance between the parameters of the company's management system and its essential characteristics on the environment, the content of which results from the dynamism of economic, technological, scientific development, etc. As a result, management variables change their parameters under the influence of micro and macro environments, causing changes in the content of the management process.

- the principle of participatory management, refers more to medium-sized enterprises, and requires the involvement of all participants in the management process, which provides a high level of professionalism.

- the principle of motivating all the factors involved in the company's activities, expresses the need to establish and use incentives, material and moral sanctions for the parties involved in the company's activity.

- the principle of effectiveness and efficiency. Effectiveness means fulfilling the objectives and tasks set within the planned deadline, which is often considered as a decisive element for the competitiveness of the company. Economic efficiency requires obtaining higher income than expenses involved. Piter Drucker, who is considered the father of modern management, in his work "The age of discontinuity: guidelines to our changing society", defines 5 principles of management:

1. Setting the objectives of the undertaking,
2. Organization of production and work,
3. Motivation and communication,
4. Establishing methods for measuring performance,
5. Permanent development of employee performance.

In the same chapter we discussed obstacles in the development of small and medium business management. Enterprises in the phytopharmaceutical sector are the driving force of economic development and are the main source of innovation and performance. By starting their own business, active people achieve their aspirations, demonstrate their talent and leverage their creativity.

The development of the phytopharmaceutical enterprises sector is a priority and for this reason efforts are focused on measures to stimulate the population to start their own businesses, expand the economic freedom of entrepreneurs and develop the private sector, especially phytopharmaceutical enterprises. The main objectives in this direction are the following:

1. Creating a favorable business climate for the development of entrepreneurship;

2. Stimulating the development and competitiveness of enterprises in the products sector. plant protection

For the protection of competition, the Government establishes the following principles:

1. the right of economic agents to benefit from fair competition within the legislation and rules of fair and honest conduct of business;

2. the inadmissibility of the restriction of competition, the abuse of the dominant situation and the infringement of the legitimate rights of consumers;

3. the obligation for central and local public authorities to contribute to the development and protection of competition;

4. the protection by the state of the rights and interests of economic agents and citizens against unregulated monopolistic activities and unfair competition.

These principles have been developed in order to increase the competitiveness of domestic goods, the intensive implementation of new technologies, improving the quality of services and goods, eliminating unnecessary administrative obstacles and consequently ensuring the dynamic development of the national economy as a whole.

Priority directions were outlined within the State Program for supporting the development of enterprises in the phytopharmaceutical products sector.

The activities in question are part of the first stage of the reform which will continue with the establishment of a new system, built on the principles of good governance, according to which the emphasis will be on assessing the regulatory impact of legislative and normative acts. The activities in question are necessary to simplify the structure and number of administrative procedures to which the entrepreneur is subjected at different stages of the business life cycle, the effect being to reduce the "cost of running the business". In order to ensure the sustainable development of enterprises, especially small and medium-sized ones, clear and transparent laws and regulations are needed for an efficient management.

At the same time, we deepened the ways of developing the management of small and medium businesses, in the conditions of the current economy. These changes that occur as an evolution represent a qualitative leap in business development. Alan Gibb presents four approaches to small and medium business development:

1. Approaches that determine the role of the entrepreneur in business development, including the qualities, capabilities, personal goals and strategic visions of entrepreneurs.

2. Approaches that characterize the way the business develops, going through different stages of the life cycle.

3. Approaches that focus on enterprise management, the importance of planning, control and development strategies.

4. Approaches that seek to assess the influence of external factors in business development.

The stages of the life cycle of the enterprise evolve qualitatively according to the following characteristics:

Launch - entrepreneurial stage - high creative potential, the objectives are not clearly formulated;

Growth - relational stage - informal structures and relationships, high degree of responsibilities;

Maturity - the stage of formalization of management - formalization of rules, stabilization of the structure, emphasis is placed on efficiency, increases the complexity of the organizational structure, decentralization, market differentiation;

Decline - the stage of decline - high staff turnover, increases the frequency of conflicts.

Approaches that focus on enterprise management consider that business development can be achieved by streamlining the management, execution and development of organizational, informational, decision-making and methodological subsystems.

In management theory, management development tools have been proposed and may be relevant for business in the plant protection products sector. These include: management by objectives, management by projects, management by product, participatory management, etc. The basic role of management tools is to increase the efficiency and competitiveness of the enterprise. However, each of them selectively develops the elements of the management system. By applying management by objectives, the principle of efficiency and effectiveness of management is satisfied and implies a correlation between objectives, results and rewards. Objective management was developed in 1954 by P. Drucker, with the aim of "promoting self-control in the management of organizations." Subsequently, it was demonstrated that the implementation of this managerial tool leads to the development of the elements of the management system: organizational, decision-making, informational, methodological, organically combining the function of planning, organization, motivation and control.

In addition to the decisional element, through the participatory management, a positive moral-spiritual climate is ensured, the motivational and cultural element is amplified. The advantages of participatory management are summarized in:

- increasing the degree of substantiation of decisions, due to the involvement in the decision-making process of several decision makers;
- increasing the degree of responsibility in establishing and achieving individual and organizational objectives;
- the interest of the employees in the efficient development of the work processes.

At the same time, in the case of implementing participatory management in the business in the phytopharmaceutical sector, the disadvantages of this tool disappear, which, in the case of large businesses, are related to the high time consumption necessary to organize the consultation of specialists and subordinates. The development of business management in the phytopharmaceutical products sector can be achieved in the conditions of a complex and systemic approach of the elements, processes and relationships in the enterprise, in their correlation with the internal and external environmental factors.

Chapter II

Chapter II highlighted developments and trends in the phytopharmaceutical market since 1960 when the crop protection industry was worth less than $ 10 billion and there were about 100 active ingredients available to farmers. In addition, in 1960, there were 15 chemical groups on the market and today there are more than 40 different groups where the products

come from. New chemical groups often bring new modes of action that are important for solving resistance problems, whether they are insecticides, fungicides or herbicides.

We also highlighted a series of products, the most used in the phytopharmaceutical industry. In the EU, changes to the regulatory regime for substances used in pesticides have imposed stricter requirements on their use. This necessitated the introduction of hazard reduction criteria and the application of complex technical guidance procedures for risk assessment, leading to the registration of fewer new active substances in the EU. It was noted that while the number of new active ingredients introduced each year for conventional crop, protection has decreased over the last two decades and there has been a rapid increase in the number of organic products on the market.

Thus, the regulatory standards to which crop protection products must adhere have become increasingly demanding, requiring new and rigorous studies with high levels of control. They affect older products during registration reviews, as well as the introduction of new products. In the 1960s, the development of pesticide products was focused on maximizing crop production by achieving the best control of weeds, pests and diseases. Since then, pesticide registration requirements have evolved so that efficacy is just one of many factors to consider.

Increased attention has been paid to the management of human and environmental risks in agriculture in addition to intensive scrutiny by stakeholders. The result has been a robust, complex regulation that requires huge amounts of study data to demonstrate the hazard profile and risk assessment of the active ingredients in the products.

Pesticides have now been examined as the most regulated substances in the world and usually have significantly more data developed than for most chemicals, even for those used daily in the household and personal care products. This is especially true for studies needed to assess the potential impact on the environment and health.

In regulating pesticides, most government authorities use risk assessment methodologies that balance the best available sciences with the political, cultural and economic priorities of their components. The science of risk assessment generally includes hazard identification, exposure measurement and modeling, and mathematical calculations that determine the likelihood of adverse effects. However, the European Union has been criticized for focusing on the potential hazard of a product rather than a realistic analysis of the potential for harm.

Product management is another area that has developed significantly in recent decades with crops. The protection industry is committed to ensuring the safe and environmentally friendly use of products throughout the life cycle of crops, from discovery to launch, use and final disposal of any dangerous product.

The impact of crop protection products on the soil is another important factor. While crop protection products will always have a certain level of persistence to ensure that the product is effective against the target pest, time is also needed to prevent the need for additional crop protection products. It is important that eventually crop protection products degrade into harmless products, which decompose in the soil. The crop protection industry must find the balance between a product that is effective but at the same time poses a minimal threat to the environment through persistence. With the current testing, assessment schemes have been developed to determine the potential persistence in the context of a year of environmental risk assessment.

Another major environmental benefit, which can be partly attributed to crop protection products, is that it has avoided deforestation and the maintenance of biodiversity. The assumption is often that alternatives to high-yield agriculture are better for the environment.

However, a study published in Nature Sustainability found that a number of high-yield practices were positive, reducing greenhouse gases, water consumption, soil loss, nitrogen and phosphorus levels. They added that these benefits only worked if higher yields led to virgin land reserves.

Based on FAO production figures between 1975 and 2017, if it were not for the increased yield, facilitated by crop protection and other agricultural contributions, no more than 370 million hectares (equivalent to 60% of the Amazon rainforest) would have been had to be used for agriculture

So the viability of European agriculture has been put under pressure. As a result of the EU's focus on hazard-based legislation, several substances used for plant protection in the EU are at risk. Although, there is not a final decision that has yet been made on which active substances should be withdrawn. Previous research has identified around 75 of the 400 currently available substances to be phased out.

Conventional pesticides are defined here as all active ingredients other than biological pesticides and antimicrobial pesticides. The pesticides, included in the estimates, are herbicides (including PGR), insecticides, fungicides, fumigants, sulfur, oils and other pesticides. Other pesticides include chemicals that can be used as pesticides but are not produced primarily as pesticides for the agricultural market (eg sulfuric acid and phosphoric acid), as well as against rodents used in domestic and industrial markets.

Biopesticides are traditional sustainable solutions due to the need to feed a growing global population combined with the growing demand for sustainable agricultural practices. Therefore this has fueled a significant increase in the demand for biopesticides. Biopesticides offer unique benefits along the food value chain, providing additional options for growers, buyers, dealers, consultants and retailers

In the early years of biopesticide development, some products promised results, but did not live up to expectations. However, commercially viable biopesticides have found success in the marketplace and more and more biopesticide technologies have been developed that offer growers more options for effective pest management. Regulatory changes, consumer demand for low residues and the need for even more productive agricultural practices are inevitable market forces, but biopesticides offer solutions in all these areas. The result is increased acceptance of biopesticides as an effective partner in crop protection programs.

Pest management, in ways that leave little or no toxic residue with minimal impact on non-target organisms and are not prone to pest resistance, has always been a challenge in modern agricultural systems. Furthermore, improving product quality, waste management, labor and crop flexibility, worker and environmental safety, are all challenges facing growers. Consumers are becoming more environmentally conscious and concerned with demanding crop-free crops.

The quality of the crops is the most important for growers and consumers alike. Plant physiology responds very much to the prevailing environmental conditions and plays an essential role in both quantity and quality. Active management of plant physiology plays an important role in crop productivity and biopesticides, especially those in the category of plant growth regulator (PGR), are key tools in this regard.

Integrated Pest Management (IPM) is an effective and environmentally sensitive approach to pest control, which is based on a combination of cultural, biological and chemical means for pest control, while reducing economic, public health and environmental risks. Biopesticides are among the most effective tools for obtaining crop protection in an IPM program. Toxicity and environmental impact are minimal or non-existent. However, real-world

challenges often dictate that IPM systems use all control methods, including conventional chemicals, to optimize productivity and sustainability. Research, field studies and performance history show that the most effective IPM programs typically consist of biopesticides used in combination or rotation with traditional chemicals. This optimizes the cultivator's ability to manage pests, manage resistance and reduce the environmental impact of the pest control used.

Coordinating the harvest with the availability of labor is one of the main challenges of a cultivator. Heat or cold season, excessive rain or early frost can also be impediments. Biopesticides are important tools for an agricultural manager in many ways. Most biopesticides have short entry intervals allowing workers to return safely to fields with minimal delay.

Today's "green movement" means consumers are more aware than ever of the chemicals used in food production. Many believe that products grown with minimal or no chemical application are healthier, safer and better for the environment. Listening to the demands of their customers, several European food chain stores and food processing companies have called for significantly lower levels of pesticide residues than maximum government-approved residue levels. Indeed, the art of being a top grower depends on maximizing the return on investment, while being a responsible administrator of the land on which future generations will depend for their livelihood.

Biopesticides help on both fronts by managing pests without having any negative impact on the environment.

Chapter III

This chapter provides a description of the study area, research design, target study population, sampling techniques adopted, and sample size. In addition, it describes the method of data collection and analysis as well as the statistical tool used to analyze the data collected. It also includes the challenges encountered in collecting and analyzing data. A case study method was used in conducting the study.

A research design involves a research plan and structure. This means conceptualizing and structuring the research problem to serve as a practical guide the researcher for data collection and analysis. The design survey research was used using both quantitative and qualitative methods to assess the clarity and completeness of the questionnaire, as well as the feasibility of the survey as a whole. Thus, a pilot study was conducted. As several researchers have argued, such evidence studies are needed to demonstrate the methodological rigor of a survey. The sample used in this study was compiled primarily from a database of farmers. The response indicated that farmers in Galati County have heard of integrated pest management programs but have little knowledge about it and its benefits to them and the work environment.

Environmental concerns, such as depletion of natural resources, soil, air, water pollution and chemical residues in food have become important topics in agricultural production. Excessive use of pesticides has created an increased risk to public health as well as a devastating impact on the environment, all of which have resulted in a need to re-evaluate current chemical practices based on pest integration management.

In most developing countries, information, training and extension services are designed to encourage the use of chemicals that protect plants. The concept shows a remarkable change in its technical content, from a threshold theory developed in the late 1950s to the growth of a healthy culture in the 1990s. Integrated pest management is a holistic way

of thinking that improves the ability to mitigate the negative effects of pests in agricultural, horticultural and other knee fields while reducing control costs and improving the quality of the environment.

The benefits of integrated pest management extend beyond just short-term economic improvement. The economic implications have shown in studies that lack of familiarity, time and resources have been recurring reasons for using non-integrated pest management practices. Therefore, researchers and extension staff need to develop integrated pest management programs that are both cost-effective and easy to use. The potential reduction in the development of insecticide resistance must also be considered.

Integrated pest management is a broad concept, which consists of a full range of biological control methods, genetic, physical and chemical cultures, and the integrated use of these methods. It is a way of introducing farmers to discover the basis of dealing with pest management issues, in particular, and crop management. Therefore, it has been widely used as a valuable extension tool. The success of adopting integrated pest management depends to a large extent on removing barriers to its adoption, such as the socio-economic situations of farmers.

This new knowledge can lead to a change in behavior and a new way of growing, which would increase the yield and sustainability of the environment for continuous and less poisonous production for our food crops.

The research was based on socio-economic and institutional factors, including age, gender of farmers, level of formal education attained, farm size, access to information on integrated pest management, training on integrated pest management, all of which influence the level of knowledge of farmers and integrated pest management practices. They influenced all levels of use of integrated pest management in the study area on vegetable production.

Integrated pest management is a prevention, monitoring and control program that provides the opportunity to eliminate or drastically reduce the use of pesticides, as well as minimize toxicity and exposure to any toxic product that is used. Integrated pest management does this by using a variety of methods and techniques, including cultural, biological and structural strategies to control a multitude of pest problems.

A record system is essential in integrated pest management programs to gather data on the types of pest outbreaks. This will establish trends and patterns in pest outbreaks and therefore try to anticipate future outbreaks of pests. The information recorded at each inspection or treatment must be recorded in a logbook. This would include pest identification, population size, distribution, recommendations for future prevention and comprehensive information on treatment action.

In integrated pest management, a regular assessment program is essential to determine the success of pest management strategies. Data observation and monitoring are regularly summarized and reviewed to assess the effectiveness and sustainability of the program. Pest management practices and procedures are continuously adopted and modified, based on a past with experience, results and knowledge gained over time, of the problems associated with each unit. Assessment of farmers' knowledge and perception of natural pests is especially useful for research programs established for campaign planning strategies.

Integrated pest management requires a good knowledge (defined as the result of an active learning process) of all key elements for the adoption of integrated pest management practices. Knowing a new technology is the first step in the adoption process. In the literature, agricultural innovation translates into knowledge of the adoption of a set of factors and conditions, taking into account the positive perception of farmers on the benefits of technology. Therefore, knowledge can be considered as means that people build from different elements

and information, the measures and means necessary in a given context. In many respects human actions related to practices, as well as technologies and other material artifacts, such as machines, seeds and varieties, for example, can be seen as the concrete expression of knowledge. Thus, the accumulation of knowledge on a diversified scale is an important resource that can help reduce poverty among the resources of disadvantaged farmers.

Biological control is also one of the oldest and most effective means of achieving control. This is a management tactic that involves manipulating the natural enemy in order to obtain a pest reduction. At the same time natural control refers to the control of elements other than natural enemies, such as weather and not intentional handling such as biological control which can be defined as the action against harmful predators, respectively parasitoids and pathogens by suppressing the population making it less abundant.

This can be done by conserving indigenous natural enemies or by mass introducing or increasing natural enemies. Spiders, for example, are very active predators, feeding on a variety of pests. Some of the predominant characteristics of natural enemies: are the ability to search; attacking only the pest target with high reproductive growth rate and shorter life cycle than the host; good adaptation to host habitats able to be maintained even after the reduction of the host population.

The adoption of technologies has been studied extensively over the years, and different authors have defined the technologies differently. In general, the new technology can be defined as a new mode of production. New technologies are usually associated with risks, uncertainty and mistrust on the part of farmers, all of which are obstacles to their adoption.

Constraints on the adoption of innovative technologies are: lack of credit, limited access to information, inadequate farm size, inadequate incentives associated with agricultural ineligibility arrangements, insufficient human capital, lack of equipment to replace labor shortages (thus preventing prompt operations).), chaotic supply (such as seeds, chemicals and water) and inadequate transport infrastructure. Economists have continuously improved technologies due to the association of lack of productivity with the reduction of labor and increased leisure time.

Vegetable growing is an important growing industry, which contributes significantly to the economy of Galati. One of the many challenges facing vegetable growers in Galati is the management of diseases and insects. Many farmers use different disease and insect management techniques as well as different pest management techniques to reduce their populations in their greenhouses. These include: pesticides, biocontrol, biopesticides and / or a combination of these techniques.

Galati County is a leader in the use of biocontrol in vegetable greenhouses, according to our study.

According to our study, vegetable farmers in Galati County, with a percentage between 90% and 79% of respondents, currently use biocontrol and biopesticides. The respondents of the survey represented 12% of the total area of vegetables grown in greenhouses in Galati County.

Chapter IV

Best Management Practices (BPM) are those tools that provide site-specific suggestions for limited inlet water quality, needed to assist consultants and agricultural advisors as they work to target BPM in placement and reduce pesticide sediments in agricultural landscapes. The effectiveness of BPM depends largely on a correct hydrological

characterization of the dominant regions. However, most BPM instruments capture either excess leakage or excess saturation but a combination of the two cannot be anticipated.

The aim is therefore to develop a user-friendly BPM tool capable of: (1) accurately determining the dominant hydrological processes in the region of interest and (2) evaluating, selecting and placing different BPMs to reduce pesticide losses.

This study shows us a model that can realistically simulate both types of processes drain. Environmental concerns, such as depletion of natural resources, soil, air, water and chemical pollution from food, have become important topics in agricultural production. Increased public health risk concerns from pesticide use as well as the burden on the environment have added impetus to the need to re-evaluate current chemical practices on which integrated pest management is based.

The benefits of integrated pest management extend beyond just short-term economic improvement. The economic implications have shown in studies that lack of familiarity, time and resources have been recurring reasons for using non-integrated pest management practices. Therefore, researchers and extension staff need to develop integrated pest management programs that are both cost-effective and easy to use. The potential reduction in the development of insecticide resistance must also be considered.

Integrated pest management has been developed primarily in response to environmental concerns about the abuse or overuse of pesticides and chemicals in the agricultural system, which are widely used in developing countries. The traditional approach has been to develop against pests and diseases, alternatives to reduce or eliminate the use of chemical pesticides. The role of this extension was to transfer and disseminate these technologies and practices directly to farmers.

Integrated pest management is a broad concept, which consists of a full range of biological control methods, genetic, physical and chemical cultures, and the integrated use of these methods. It is a way to introduce farmers to discover the base that deals with pest management and crop management issues. Therefore, it has been widely used as a valuable extension tool. The success of adopting integrated pest management depends to a large extent on removing barriers to its adoption, such as the socio-economic situations of farmers.

Integrated pest management is a prevention, monitoring and control program that provides the opportunity to eliminate or drastically reduce the use of pesticides, as well as to minimize toxicity and exposure to any toxic product that is used. Integrated pest management does this by using a variety of methods and techniques, including cultural, biological and structural strategies to control a multitude of pest problems.

The integrated pest management approach can be applied both in traditional agriculture and in green spaces at home such as in the garden for growing different crops. Integrated pest management is effective against all pests. In contrast, organic food production applies many of the same concepts as integrated pest management as well as limiting the use of pesticides that are produced from natural sources, as opposed to chemically synthesized ones.

The scientific basis of "Integrated Pest Control" has evolved over a period of about 10 years, especially among researchers at the University of California, Berkeley and the Riverside campuses. The concept was explicitly defined in 1965, at a symposium sponsored by the Food and Agriculture Organization (FAO) of the United Nations, which took place in Rome, Italy. The concept of "integrated control", initially limited to the combination of chemical and biological control methods, was greatly expanded in that symposium and redefined to become synonymous with what we now consider management, integrated pest control. Thus, the concept of "integration" resulted from foundations established in the United States of

America, is the concept of "Pest Management". Assessing the problem from this perspective, treatment options that include tolerance, sanitary conditions, and less toxic pesticides are used when non-chemical treatments are ineffective.

Pesticide treatments are carried out at appropriate times to maximize the efficacy of the products and minimize the potential for human exposure. All pesticides are handled in accordance with state law. Specific plans for each pest species must be developed in order to prevent and manage the pest problem. These plans should meet the following objectives in order to maintain a safe and healthy environment.

A record system is essential in integrated pest management programs to gather data on the types of pest outbreaks. This will establish trends and patterns in pest outbreaks and therefore try to anticipate future outbreaks of pests. The information recorded at each inspection or treatment must be recorded in a logbook. This would include pest identification, population size, distribution, recommendations for future prevention and comprehensive information on treatment action. A section of each logbook is reserved for use by personnel to alert the pest management technician.

An integrated pest management, a regular assessment program is essential to determine the success of pest management strategies. Data observation and monitoring are regularly summarized and reviewed to assess the effectiveness and sustainability of the program. Pest management practices and procedures are continuously adopted and modified, based on a past with experience, results and knowledge gained over time, of the problems associated with each unit. Assessment of farmers' knowledge and perception of natural pests is especially useful for research programs established for campaign planning strategies.

The adoption of technologies has been studied extensively over the years, and different authors have defined the technologies differently. In general, new technology can be defined as a new mode of production. New technologies are usually associated with risks, uncertainty and mistrust on the part of farmers, all of which are obstacles to their adoption.

Constraints on the adoption of innovative technologies are: lack of credit, limited access to information, inadequate farm size, inappropriate incentives with agricultural immobility arrangements, insufficient human capital, lack of equipment to replace labor shortages (thus preventing the timeliness of operations), chaotic supply (such as seeds, chemicals and water) and inadequate transport infrastructure. Economists have continuously improved technologies due to the association of lack of productivity with the reduction of labor and increased leisure time.

Factors affecting adoption are social, economic, environmental and institutional. A logistic regression analysis was used to determine the impact of various factors. First, some standard, non-linear curves were fitted to contrast with the absorption data for each of the four integrated pest management recommendations, as different factors were analyzed at different times on the recommendation takeover and there were different scenarios.

A research design involves a research plan and structure. This means conceptualizing and structuring the research problem to serve as a practical guide for the researcher to collect and analyze data. The design survey research was used using both quantitative and qualitative methods to assess the clarity and completeness of the questionnaire, as well as the feasibility of the survey as a whole. Thus, a pilot study was conducted.

The purpose of pesticides is to protect crops, including pest and disease control. However, the use of pesticides poses risks to the environment and human health. It is therefore necessary to strike a balance in their use for agriculture, for the benefit of food supply and the protection of public health. Recently, the use of chemical pesticides has been cited as one of

the plausible causes of the drastic decline trends observed in biomass in protected areas. A new class of systemic insecticides, neonicotinoids, have been found to adversely affect pollinators. In humans, acute occupational pesticide poisoning is a serious problem because farmer training programs are inadequate, especially in low- and middle-income countries.

The policy of preventing and banning the production, sale, distribution or use of sub-standard or counterfeit pesticides has been lacking in most African countries.

Pesticide registration is the formal process of evaluating data and approving pesticide products for sale, their use and conditions of use. More than half of the responding countries reported a lack of published process guidelines and data requirements for registration covering all pesticides. Major gaps in pesticide registration have been evident in Africa, Latin America and the Caribbean, including legislation to control online sales of pesticides, and specific provisions are completely lacking.

The community involved in pesticide analysis and pesticide use is extremely diverse, including all stakeholders and stakeholders, such as regulatory risk assessors, risk managers and risk communicators, as well as product authorization applicants, the wider scientific community, consultants and farmers. Several EU research projects, given the enormous variability and uncertainty associated with the behavioral component that characterizes pesticide use, have agreed that it is necessary to improve the measurement of different stakeholders' perceptions of risk in order to increase confidence in the risk of pesticides, the assessment process and the use of pesticides in accordance with the conditions designed in the risk assessment process. Research conducted in the HEROIC project shows that socio-behavioral issues are not addressed in general, except in very rare cases and it is commonly argued that involvement in unsafe practices of pesticide use and disposal is the result of lack of knowledge and misperceptions on risks.

Research in the EU Browse project on operators revealed some shortcomings in terms of appropriate behavior. Mainly regarding the wearing of an appropriate PPE, the use of the recommended spray volume, compliance with wind speed limits and the application of measures to avoid or address unintended events during application or climate-related variables. Recent risk perceptions of pesticide use by workers are to stimulate their sustainable and compliant behavior with good agricultural practice as written on pesticide labels. In all these projects and research, a participatory and inclusive approach is considered necessary in all phases of the relationship with stakeholders, from a bottom-up perspective, starting from a deep understanding of the realities and behavior of different farmers.

Nano-pesticides

With a growing interest in the development of nano-pesticides, several concerns have been raised about the risk profile of these new products. The selection of nanoparticles can have a direct impact (positive or negative) on plant growth. Assessing the occupational risk of pesticide nano-formulas on human health is difficult. Compared to conventional pesticides, nano-pesticides are more likely to enter the body of non-target organisms due to their small size. Several researchers have documented health problems for both humans and the environment, resulting from exposure to nanoscale particles (~ 1 to 100 nm). In general, silver nanomaterials are preferred for nano-formulas due to their antimicrobial activity. However, silver nanoparticles can easily enter the blood-placental barrier and cause adverse effects on the fetus.

Degradation of microbial pesticides

The persistence and fate of pesticides in the environment can be assessed from the biological data observed from the microbial consumption of certain pesticides, for example, fungi or bacteria. These microorganisms ultimately help to degrade pesticides by turning toxic compounds into non-toxic ones. The approach to micro-based degradation has gained popularity due to its high degradation potential and ecological nature.

Advanced oxidation processes using nano-catalysts

Compared to typical chemical degradation, advanced oxidation of pesticide residues includes very promising techniques for remediation of contaminated soil and water. These techniques include photocatalytic degradation, oxidation processes and plasma degradation which summarize the technological advances of various pesticide degradation processes, highlighting the experimental conditions, as well as degradation of pesticides by the authors. All advanced oxidation processes can lead to the generation of radicals for pesticide degradation.

However, the radical generation efficiency and therefore the performance of pesticide degradation depends on the generation pathway (eg heterogeneous or homogeneous).

Nowadays, biotech strategies are tending to improve plant immunity against pests / insects to reduce pesticide use.

Innovative regulation

However, regulation does not have to be conservative and if properly designed and managed, it can be an effective catalyst for change. Regulatory agencies / organizations often have opportunities to innovate with existing legislation. But other types of innovations may require status changes. Both are important, but this paper is primarily concerned with the first. The challenge is to develop a regulatory system capable of balancing the widely defined costs and benefits of biopesticides.

Given that existing actors in the policy network are primarily focused on chemical solutions, how can change occur? The situation is complicated by the fact that the EU has a leading role in pesticide legislation. Its decision-making system has built its "checks and balances" and does not promote a rapid paradigm shift. Using the information provided by network theory policy together with the evidence of the interviews, we can identify agents and processes that create the conditions under which regulatory innovation could occur. Specifically, we can investigate whether green scientific and technological innovations in pest control coincide with innovative regulations that address environmental and public safety concerns, without undue constraints, that would contribute to achieving the sustainability goals of the rural economy.

Practical training guide for vegetable growers for the adoption and use of biopesticides

The decision to incorporate a biopesticide into an IPM pest management strategy can be motivated by several reasons:

Addiction to just a few pesticides increases the risk of developing pest resistance to these control measures. When used in an IPM program, biopesticides can be a good tool to avoid developing resistance. Biopesticides usually work using multiple modes of action, which means that there is a much lower risk of pests developing resistance to them.

For some pest problems, conventional pesticides that are registered may provide inadequate control or may not exist at all for the management of that pest. When used in

conjunction with good crop management, biopesticides can help keep pest levels under control, reducing the need for others to apply.

Registration of conventional pesticides requires action by industry and perhaps be both costly and time consuming. If a market is considered too small, manufacturers may not even follow new records. On the other hand, some countries have policies in place that promote the registration and use of biopesticides. For example, data requirements may be reduced; registration fees may be lower; the registration process can be accelerated or prioritized; there may be government support available for processes; and certain products containing certain types of active substances (HS) may not need to be registered.

Some pesticides tend not to be applied in accordance with label requirements. For example, farmers can apply them late in the season, contravening the pre-harvest interval, which leads to residue problems.

Trichoderma for the management of soil pathogens in vegetable growing

Trichoderma are fungi that are known to be present in most soils globally. They are also found in the tissues of host plants in the form of endophytes (beneficial symbionts). Trichoderma species have been extensively researched as biological control agents for fungal pathogens and have been shown to control most fungal pathogens studied, although the species or strain and its efficacy may vary for any given fungal agent. Trichoderma are registered worldwide. If applied on external seed beds, apply late in the evening to avoid high temperatures.

Ampelomyces quisqualis for flour management

Ampelomyces quisqualis is registered for use in vegetable growing in several countries. Ampelomyces quisqualis is a fungus that is widely found in nature, intensively hyperparasitizing mold (Erysiphespp.), Suppressing its development. It spreads by sporulation and self-propagation. Products containing A. quisqualis can work very effectively in a spray program to prevent or control mold. Control works best if A. quisqualis is applied when mold infestation is low (below 3%), so the weather should be monitored for hot and humid conditions that are favorable for mold. Ampelomyces quisqualis can be applied using standard spray applications. action techniques.

Coniothyrium minitans for the management of Sclerotinia

Coniothyrium minitans is registered for use in vegetable growing in some countries. Coniothyrium minitans is a fungus that occurs frequently in soils around the world. It is a specialized biological control agent targeting the fungal pathogen Sclerotiniasclerotiorum and other Sclerotiniaspp. (causative agents of white mold). Coniothyrium minitans is a mycoparasite of sclerotia (supercontrolling structures of fungal pathogen) of Sclerotiniaspp. Sclerotinia can survive over the winter without host or host plant residues such as sclerotia. The hyphae of C. minitans parasitize Sclerotiniaspp sclerotia and then produce spores that are released into the environment to continue the cycle of infection.

Bacillus pumilus for the management of mold, powdery mildew and other vegetable diseases

Bacillus pumilus is registered for use in vegetable growing in many countries. Bacillus pumilus is a common bacterium that occurs in soils and water. It is a preventive biopesticide with broad spectrum used to control or suppress many important vegetable diseases, including Pythiumspp., Fusariumspp., Rhizoctoniaspp., Alternariaspp., Aspergillusspp. and blue mold

(Peronospora hyoscyami). It acts as a fungicide by forming a physical barrier between the plant surface and the fungal spores, inhibiting the growth of fungi on the plant surface and then colonizing the fungal spores. It also stimulates the immune system of treated plants. It also promotes root growth, which helps to develop strong root systems and uniform plants. It does not harm human health or the environment.

Use of Metarhizium to control locusts and other insect pests

Metarhiziumspp. are registered for use in vegetable growing in many countries. In Africa, in particular, it has been used successfully to replace many extremely dangerous pesticides to control locusts and other swarming locusts. It can kill or deactivate the target host of insects. Metarhiziumspp. they are found in the soil or as endophytes (symbionts of beneficial plants). Spores or mycelium can attach to the surface of insects

Beauveria bassiana for the management of insect pests in vegetable growing

Beauveria bassiana is one of the most registered biopesticides for use in vegetable growing globally. Beauveria bassiana is one of the most widely used biopesticides worldwide to control arthropod species. It occurs naturally in soil around the world and is registered for use in many countries.

Chapter V

The investigations carried out in the first chapter allowed me to deduce that most of the gaps in the activity of enterprises in the phytopharmaceutical sector are found in the inability of their efficient management due to the lack of knowledge of entrepreneurs-managers in the field of scientific management. Realizing the role of the enterprise sector in the phytopharmaceutical sector in the sustainable development of the national economy, in this first chapter, we set the objective to identify obstacles to the development of management of this category of enterprises, through information collected from the survey of entrepreneurs-managers. offered to participate in the research.

The conclusion reached after processing the data on decision-making is that the role of involvement of key specialists in decision-making increases in proportion to the size of the enterprise and awareness of this role by entrepreneurs-managers, and the involvement of simple employees in decision-making decreases once with the increase of the size of the enterprise. The role of simple employees in micro-enterprises increases, due to the lack in the organizational structure of micro-enterprises of the hierarchical level, which includes specialized positions by fields

The theoretical and empirical research carried out within the theme of the thesis, allowed the formulation of the following conclusions:

1. Business management in the phytopharmaceutical products sector, based on the fundamentals of management science, has its own concepts, purposes and methods. However, there is no clarity in the terminological definition of business and business management in the plant protection products sector.

2. The approaches exposed in economic, organizational and managerial theories - crystallized in economic laws, laws and management principles - are also manifested in business management in the phytopharmaceutical sector: shape behavior and influence the actions of entrepreneurs-managers in certain concrete situations, substantiate decisions on how organizing the activities of the enterprise, choosing the strategy, directing business, etc.,

are able to ensure the efficient functioning of the enterprise, the normal development of administrative and organizational processes and to ensure the maintenance of the balance between the internal and external environment of the business.

3. The management processes and the relations they reflect, know a certain evolution in the history of managerial thinking, hence the need for the effort to continue research, to update them, to develop their content, so that they express the essence business management in the phytopharmaceutical sector in all its complexity. Few Romanian specialists in the field have reported and reproduced, in their works, the importance of the role played by approaches to economic, organizational, cultural and managerial theories in developing measures for business management development in the phytopharmaceutical sector in the phytopharmaceutical sector.

4.The characteristics of the business management functions in the phytopharmaceutical products sector, related by the specialists in the field in their works, do not present divergences of visions, but have a character of complementarity. The differences are related to the complexity of exposing the aspects and elements approached. There is no unanimous vision on the number and order of business management functions in the plant protection products sector

5.Businesses in the phytopharmaceutical sector go through several stages during their lives, which in turn form their life cycle. The researches and observations performed by the specialists in the field of business management in the phytopharmaceutical products sector, demonstrated the existence of the dependence between the stages of the life cycle and the entrepreneurial-managerial characteristics. Each stage of the life cycle has its own characteristics, both in terms of the characteristics of entrepreneurs and management, which during the evolution of the enterprise, register significant changes.

6. The development of business management in the phytopharmaceutical products sector is possible only under the conditions of training and development of professional managerial knowledge and skills of entrepreneurs-managers, starting with the business launch stage.

7. The analysis of the evolution of the enterprise sector in the phytopharmaceutical products sector shows the increase of the number of enterprises in the phytopharmaceutical products sector but which is not accompanied by the increase of the number of persons employed in this sector of the national economy, but vice versa. Throughout the analysis period, there is a reduction in the number of people employed in the phytopharmaceutical sector. This phenomenon is explained by the fact that there are a significant number of phytopharmaceutical enterprises that formally exist but do not operate.

8. The economic results recorded by the enterprise sector in the phytopharmaceutical sector demonstrate the importance of this sector in the national economy. However, the share of enterprises in the sector of plant protection products that record losses and those that are inactive, is more than half of the number of SMEs, a characteristic phenomenon for the entire analysis period.

9. 89.5% of the entrepreneurs participating in the survey, who started and run the business themselves, are without financial training and the main sources of learning for running the business are their own documentation and the experience gained at the previous job. Employees who are appreciated and rewarded for their merits in business development will not be motivated to go to another company and applying the remuneration system based on results and individual performance criteria, will reduce staffing problems such as: frequent business errors, lack of discipline, non-full use of working time, absenteeism, decreased level of professionalism, lack of desire of staff to continuously improve.

10. The main obstacles to the development of business management in the phytopharmaceutical sector, identified in the companies participating in the survey, are hidden in the incompetence of entrepreneurs to efficiently manage enterprise resources, giving priority to operational planning and not strategic, poor organization of activities, excessive control and insufficient motivation of staff, which generates multiple problems and honest results.

In conclusion, microbial biopesticides will be used more widely against a range of invertebrate pests. The need to properly test real IPM programs and develop better formulations and improved lifespan, which remains a problem with some microbes, ensures the continuing need for research. Furthermore, testing protocols should take into account new modes of action for microbial biopesticides. While they are mainly applied to control harmful insects, some are also active against mites. Products based on entomopathogenic fungi and nematodes are by far the most widely used in a wide range of cultures.