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THE ROLE OF KNOWLEDGE AND TECHNOLOGY TRANSFER MECHANISMS IN STIMULATING INNOVATION

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Abstract: In the context of globalization and integration, the ability to translate research funding into products and services through knowledge and technology transfer (KTT) is critically important. Analyzing and understanding how to manage KTT from academic and scientific institutions into marketable ideas is currently one of the most important topics in academic research. In the present century, universities are being evaluated by their ability to patent and license technology, and to spin out firms based on university research. This new focus has shifted attention away from the main roles of the university as teaching, research and knowledge generating institutions. Many current studies of economic growth emphasize the role of universities and other institutions of higher education, and have found an increasing focus on TT.
This paper discusses technology transfer mechanisms which facilitate commercialization of research by transforming the research conducted by universities and research institutions and putting them in a form which is usable by technology mechanisms in stimulating innovation as well as the financial framework needed to facilitate innovation-based entrepreneurship. This is achieved through a combination of descriptive statistics and a literature survey. The following "modes" of KTT were surveyed: R&D collaboration, contract research projects, scientific or technological services; commercialization of R&D results by patenting, licensing; entrepreneurship (spin-outs from university, start-ups); student mobility, career services; student projects with businesses; mobility of academics between science and businesses; involvement of businesses in curricula development; lifelong learning, training courses. Given the difficulty in measuring innovation and KTT and given that available measures are often only available for a small number of countries we revert to a literature survey to understand the causes and channels of technology diffusion

Key words: knowledge and technological transfer**,** technological validation, innovation, economic efficiency, contemporary manufacturing.

1. INTRODUCTION

Knowledge and technology transfer is a key factor with a considerable impact on both short-term and long-term economic growth. The access to knowledge and technology and their use in economic processes largely determines the competitive position of economic actors in the internal and external market. Structural changes in the national economy are almost impossible without an efficient transfer of knowledge and technology and a well-defined innovation system. Both these factors led to a dramatic increase of competitiveness and economic success in the and economic success in Asian and other countries.
The knowledge and technological process is a complicated one and includes several closely related elements, such as - technology (built-in and unincorporated; for example, parts / cars, patents / licenses) and knowledge (for example: new phenomena, new effects, new experiences, new organizational models and schemes).
Sometimes, the technology transfer is analysed in relation with the innovation, where the last one incorporates some specific knowledge about a product or service.

2. LITERATURE REVIEW

Acquiring new knowledge is a difficult process, that involves research tools and not lastly, a human capital with a special training of researchers. New knowledge is generated in laboratories, universities and research institutes, so they become providers of them. New knowledge becomes valuable only when it can be taken and used by producers of social and material goods. Knowledge transfer is also a process in itself, but it refers to the selection (sharing), knowledge dissemination and information providing solving of concrete problems from the

great diversity of human activities [13]. In business environment the knowledge transfers focus on the implementation of technological platforms, application of market experience, managerial expertise, corporate culture and other intellectual capital is able to improve the competitiveness of companies.

According to Parent et.al [14], knowledge could be associated with experiences; contextual understanding, value-added information or those based on comprehension frameworks that are in the individuals' minds and must be managed by themselves.

The notion of *knowledge transfers and exchange* (KTE) has been proposed to complement the existing conceptual framework. It represents the complex process of delivery and knowledge exchange between individuals and organizations [7]. In the new approach, knowledge transfer refers to the acquisition and application of knowledge on developing a new idea or achieving a faster, better or safer process. Thus, an efficient transfer of knowledge promotes a better understanding in the organizational environment and reduces the uncertainty between stakeholders.

In the specialty literature there are various models of knowledge transfer. The classical model has the following form: Knowledge producers (laboratories, universities and research institutes) → Transmitters → Knowledge receivers (practitioners) and involves a top-down hierarchical relationship between the knowledge producers who own the resource and the user (receiver).

Technology transfer involves the allocation of technological intellectual property, developed and generated in one place, to another, by legal means, such as technology licensing or franchises are [3].

Technology transfer is achieved through a set of activities under predetermined conditions [2]. There are a lot of researches that highlight the technology from transfer methods, so Malik K. presented a conceptual model for intra-firm technology transfer based on empirical research undertaken at a UK cable manufacturer [9]. investigated the international technology transfer and distribution of technology capabilities, based on a study on railway development in Indonesia. Theodorakopoulos N. [16] demonstrated how technology transfer between universities and rural industries in developing countries can be done efficiently, using research and consulting centres as intermediaries.

The need to create technology transfer models, that have the role of facilitating efficient planning and implementation of invention or innovation has been appeared due to the difficulties and complexity faced by researchers in the field of technology transfer. The models can be both of a quantitative and qualitative nature [12]:

1. *The Bar-Zakay model* is based on a project management approach. Its main stages refer to the planning of technology transfer process, its implementation, the decision making and the way of solving the risks, the possibility to eliminate the detected errors.
2. *The Behrman & Wallender model* thoroughly approaches the product design technologies, the specification of the factory products, including the development of its infrastructure, constructions and locations, the endowment with installations and the start of the production process.
3. *The Dahlman and Westphalesteo model* is an improved version of the previous model. It includes the following stages: performing the technical-economic analysis to determine the viability of the project, preliminary identification of the necessary technologies, engineering studies, elaboration of the process flow diagram, production plans, selection of suppliers for technical endowment, machinery and equipment.
4. *The Schlie, Radnor and Wad model* includes seven elements that influence the planning, implementation and success of any technology transfer project. These seven elements are: the transfer centre, the transferee, the technology that is transferred, the transfer mechanism that was chosen to transfer the technology, the environment in which the transfer takes place, the transferee environment, the overall environment, which includes both the transfer centre and the transferee.
5. *The UNIDO model* emphasizes the technological evaluation, adaptation and absorption.
6. *Rogers' model,* also called dissemination model, assumes that an expert will transfer to a user the specialized knowledge and technology, ensuring that this one has a minimum of skills in using the invention or innovation.
7. *The knowledge use model* emphasizes the important role of interpersonal communication between technology developers and technology users and the importance of organizational barriers to technology transfer.
8. *Gibson and Slimor's model* analyses the process of technology transfer through the prism of three levels: technological development (research reports and scientific articles); acceptance of technology (simplicity and accessibility of the invention for receivers); application of technology (marketing of technology on the market).
9. *The Lin and Berg model* presents a theoretical approach to evaluating the effectiveness of technology transfer. The main factors affecting international technology transfers are: nature of the technology to be transferred, international experience and cultural differences (between provider and acceptor).

The theoretical-conceptual approaches summarized above allow us to deduce that technology transfer is a collective term for mechanisms and processes that lead to the product or technology development used for manufacturing goods (material or social ones) by applying new knowledge acquired in laboratories, universities and research centres. Academic and industrial environments are two cultures that greatly differ each from the other, but which intersect countless times through common interests and actions. The process connecting these two environments is defined as technology transfer. While technology transfer is of great importance to the knowledge-based economy and to modern society, it should be examined in all the aspects, estimated (its on the background) the roles of academia and industry in this complicated process, to quantify its usefulness and to estimate where and to which of the actors the profits would be directed.

3. UNIVERSITY KNOWLEDGE AND TECHNOLOGY TRANSFER

Universities and research centers have a very rich intellectual and creative potential, so they have an important role in creating and developing innovative businesses (Garbuz and Topala, 2017). The research function performed by universities does not only refer to the generation of knowledge. It is also important that that knowledge to be transferred to industry through research commercialization. The creative potential of academia and research must be directed to the needs of communities at local, regional, national and international levels contributing to their development.

The role of universities in transfer of knowledge and technology has increased significantly since the mid of 1980s, with creation of a favorable legal framework. The main actions referred to: state funding of research and development, amendment of the law on intellectual property, creation of licensing and technology departments in universities, but technological opportunities, as promotion of nano-technologies were the most important elements.

The process of transmitting scientific and technological information, knowledge and means of exploiting intellectual property rights to third parties, for manufacturing a product or for development a process, is shown in Figure 1.

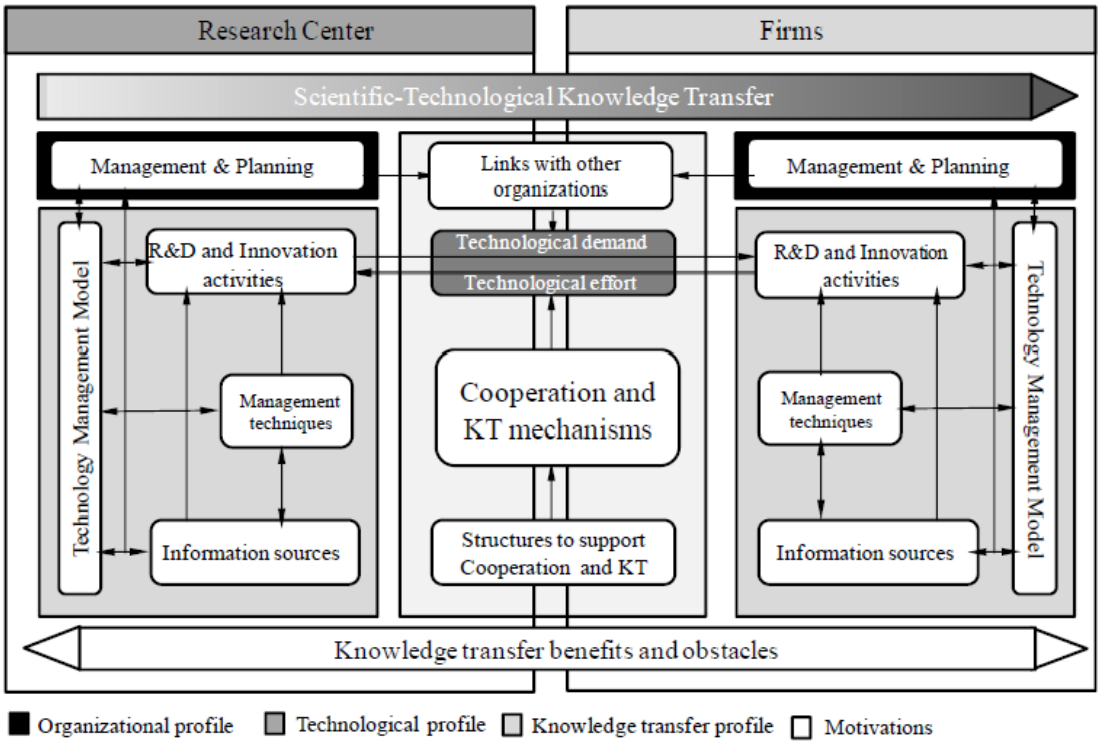

Fig. 1. Scientific-Technological Knowledge Transfer Model
Source: Feria and Hidalgo, (2011)

Technological transfers can be realized through following means:

- formal means - through technology transfer structures based on some specific procedures;
- informal means - directly between research structures and companies.

The stage of technology trading made by the technology transfer centres is presented as follows (Ungureanu, 2016):

1. *Stage of applied research, here innovation projects are created*.

From point of view of technology transfer, at this stage, it is followed: the publication degree of the research results, the financiers' rights, the provisions and functionality of consultancy agreements, etc.

2. *Preliminary disclosure stage*.

The first contact between the researcher and the technology transfer entity takes place at this stage. The researcher presents his invention and experts of the entity for technology transfer will give recommendations regarding characteristics of the product or technology, their evaluation and protection, etc. Analysis of the degree of publication of scientific results, verification of compliance with intellectual property will take place also during this stage. If the elaboration of scientific materials and their publication was done through a sponsor, it will be determined what their rights are.

3. *Technology disclosure stage*.

At this stage, it is issued an official, confidential document, that is sent to the technology transfer entity and which includes the complete description of the invention. Key information in the report should include: title of the invention, inventors' name, description of the invention, sponsorship data, if there are any, design and practical data or existing or planned publication data.

4. *Evaluation stage*

At this stage, it is realised the examination of the novelty degree of the invention, this one being compared with products and technologies already existing on the market. In this context, the technology transfer entity will analyse the following aspects: whether the invention provides a technological answer to an existing problem; if the invention has enough potential to cover a new market; what is the investment level, both, in time and money in order to bring it to the market; what will be the estimated profit for the enterprise will implement the invention; if there are any competing technologies and if there are, what is the advantage of the invention compared to them, etc.

5. *Intellectual protection stage.*

The type of intellectual protection (patents, copyrights, etc.) and its coverage (national, international) are defined at this stage. Whatever means of achieving the technology are, they must be done in accordance with intellectual property rights.

6. *Technological marketing stage*

This stage includes all the taken actions in order to bring the technology on market and to inform consumers about the benefits it has.

7. *Analysis stage of business development options through innovation.*

8. *Contracting stage.*

If the board of the institution decides not to develop a business, it is chosen a trading option of the invention. It is signed a commercial agreement for the invention between the university and a third party, which describes all rights and responsibilities regarding the use and exploitation of intellectual property and payments.

The main types of legal agreements for carrying out technology transfer are the following:

- partial or total sales or transfer contracts for intellectual property rights;
- contracts for exclusive or non-exclusive IP rights;
- know-how contract. In some cases, the subject of the know-how contract is included in the license agreement;
- franchise agreements are contracts where the franchisor grants the franchisee the right to operate franchises;
- joint venture contract. Joint venture is business cooperation between two or more companies, engaged in a specific project for the development of a business through innovation, by creating a new company based on the same business strategy;
- turnkey projects involve the realization of a project based on an order by a specialized unit for a third party;
- consulting contracts;
- technical cooperation means cooperation agreements between two or more organizations to develop new products or technologies;
- technical assistance trade agreement represents the sale of products or technologies with the included technical assistance;
- manufacturing agreement represents sale of the manufacturing right for products or technologies;
- subcontracting agreement.

The legal relationship between an individual or a transferring organization and the recipient of the technology is recorded through the contract, therefore the transferor agrees to transfer the intellectual property rights or know-how spoken about. In many countries, these agreements are registered at the National Intellectual Property Office.

The knowledge and technology transfer is the process of moving the results of laboratory research to market and offers intrinsic benefits to universities through licenses and royalties.

4. ASSESSING MECHANISMS FOR THE TRANSFER OF KNOWLEDGE AND TECHNOLOGY FROM THE ACADEMIC ENVIRONMENT TO THE BUSINESS AND SOCIAL AREA

Technology transfer is the most important component of the innovation system and has significant economic and societal effects. The system of correlations between scientific research, knowledge and technology transfer and economic development is characterized by a high complexity of its structure and includes various transfer flows of knowledge and technologies, as well as the financial flows caused by them, in different directions. Therefore, there is a need to evaluate the efficiency of technology and knowledge transfer processes and to measure their impact.

Until now, there have been several initiatives for measuring and evaluating the transfer of knowledge from academia to business. Most of them are based on the American model developed by the Association of University Technology Managers (AUTM). The key indicator of the success on technology and knowledge transfer processes in this model is the level of income from intellectual property, assessed by the association during its annual licensing activity [1].

There are other approaches, including the UK model. Since 2001, the country unfolds a national survey entitled „Higher Education - Business and Community Study" [8], this one takes into account a wide range of university activities related to the transfer of knowledge and technology.

In the USA, AUTM is implementing the Better World project which aims is to present examples and case studies on the transfer of university research results to economics and society, leading to economic and non-economic benefits.

Taking into account that existing models do not address the issue of assessing the „effect" of knowledge transfer, some UK knowledge transfer experts have developed mechanisms of measuring the success of university participation in knowledge and technology transfer activities (2007). A metric system has been developed, as a result, that includes the following tools and mechanisms: joint and contractual researches; licenses; creation of innovative enterprises (spin-out companies); additional vocation-educational programs; counselling activities. Further, we will analyse the effectiveness of each of them.

Joint and contractual researches. The implementation of a joint research is one of the key mechanisms for the academic transfer of knowledge.

Collaborative research refers to structural research projects, in which, additional to the institution itself, two or more partners are involved. All participants work together to achieve a common goal through the exchange of knowledge and peer learning. It is beneficial in terms of the different knowledge, skills and expertise of the consortium members. Thus, collaborative research plays the role of an important channel for the transfer of knowledge between academia and industry, business and government, acting in both directions. This form of research can be implemented in the form of long-term projects. Moreover, collaborative research may, as a consequence, lead to the emergence of other forms of knowledge transfer, such as licensing and the creation of spin-out companies.

Contract research is a form of scientific research that aims to solve problems submitted by the client. In this situation, intellectual property usually remains at the client, rather than in the institution of higher education.

The following quantitative and qualitative characteristics are used to assess the success and significance of the results of joint and contractual research as mechanisms for knowledge transfer.

The main quantitative indicators for measuring the effectiveness of this knowledge transfer mechanism include:

- number of contracts or grants for joint research;
- cost / income from the implementation of grants or contracts for the joint research;
- occupied market share.

Assessing the quality of ongoing collaborative research is also of great importance as it reflects the success and impact of this knowledge transfer mechanism. The quality of collaborative research can be measured by the following indicators:

- re-cooperation;
- positive feedback from customers;
- duration of the partnership.

Although it is more difficult to measure direct customer feedback, estimating market share can be a solution. Universities with a higher market share are more likely to be better rated by their clients than those with a lower market share.

Licensing is also one of the most important mechanisms for the transfer of university knowledge, which is the conclusion of a formal agreement stipulating the transfer of technology from one side to another, in which the technology owner (licensor) shares the rights to use the technology with the other part (licensed).

Licensing, together with the creation of spin-out companies, is an effective method of exploiting intellectual property rights created by universities. Moreover, licensing intellectual property to a small enterprise or a large

company can also trigger the development of other forms of knowledge transfer, such as consulting services, joint research, back-out companies or joint ventures.
The main quantitative features of this knowledge transfer mechanism include:
- number of licensing agreements;
- incomes received by the university from implementation of the license agreements.

The main qualitative characteristics of this knowledge transfer mechanism are:
- customer reviews;
- case studies (history of successful licensing agreements);
- re-cooperation.

Creation of innovative enterprises (spin-out companies) with the participation of universities is one of the most important mechanisms for knowledge transfer, especially in terms of technology transfer and use of intellectual property rights.
The following quantitative indicators are used to evaluate the success of university in creating spin-out companies:
- volume of attracted investments;
- size of the attracted incomes;
- market value of the company;
- number of created enterprises;
- cost of enterprises for sale.

Additionally, there will be used some qualitative indicators, which will complete the quantitative dimension:
- life expectancy of the established companies;
- customers' reviews;
- level of growth of the companies.

Continuing education programs are the most important mechanism for knowledge transfer through education. Throughout them, representatives of the professional environment improve their knowledge and skills. Training programs can be of different duration (short, medium or long term); they can be initiated by the client or by the university; they have a different target audience.
Thus, lifelong learning programs can be an integral part for the transfer of university knowledge (Garbuz, 2018), because they offer a direct transfer of knowledge from the faculty to various professional environments.
The main differences between continuing vocation-educational programs and classical higher education programs relate to the following aspects:
- a different audience: not university students study in continuing vocation-educational programs, but representatives of different professions abroad;
- the innovative nature of the knowledge transferred: learners in continuing vocational education programs receive advanced knowledge of certain fields of science, which are necessary for professional activity.

The main quantitative indicators of this mechanism refer to:
- university revenues from the implementation of continuing vocation- educational programs;
- number of implemented programs;
- number of people trained in programs.

The most important task for an effective implementation of the appropriate knowledge transfer mechanism by the university is to ensure the quality of continuing vocational education programs. The main methods for estimating the quality of training programs include students' questioning and monitoring of their satisfaction, as well as correlating educational programs with client's requirements (Garbuz, 2018).
Providing counselling or consulting services is an important mechanism for knowledge transfer in a university. Consulting is defined as the provision of specialized counselling and counselling based on the intensive intellectual input provided by the institution to the client.
An important characteristic feature of provision counselling services is the provision of direct interactions between the teaching staff of the university and representatives of the professional environment. Due to this fact, consultancy can become the basis for forming new long-term partnerships using other knowledge transfer mechanisms.
In order to determine the success and effectiveness of providing consulting services by the university, as one of the mechanisms that mediates the transfer of knowledge, the following quantitative indicators are used:
- number of ongoing consultancy contracts;
- revenues from providing consulting contracts;
- number of innovative business projects resulting from the award of consultancy contracts.

In order to evaluate the quality of consulting services, the main role is played by obtaining clients' feedback. Due to the fact that customer reviews are subjective, for a more effective assessment of the quality of consulting services provided, it is recommended to develop a customer questionnaire regarding the quality of provided services.

5. EXAMPLES OF KNOWLEDGE AND TECHNOLOGY TRANSFER FROM UNIVERSITIES IN REPUBLIC OF MOLDOVA TO THE BUSINESS ENVIRONMENT

In 2020, there were completed 8 technology transfer projects. They were unfolded by universities and research institutes in Republic of Moldova: 4 of them in the agricultural and food technologies field and other 4 in the field of micro-radioelectronics and materials processing technologies [11].

In the field of food technologies, a project was implemented by the company „Rose Line", in collaboration with the Technical University of Moldova (TUM), in order to develop the advanced processing technology for rosehip and other dried fruits and to obtain powders with increased biological value for use in the food industry. There were developed own technologies for cultivation and processing of vitamin-rich rosehip, blackcurrant, chokeberry, hawthorn and Japanese quince. Thanks to the collaboration with TUM, there were identified possibilities for the implementation of food manufacturing technology (ice cream, yogurt) with high biological value through the use of vegetable powders, production of water-soluble and alcoholic extracts from processed powders, and cold pressed oil from rosehip and sea buckthorn seeds. "Rose Line" negotiates with companies for introducing vegetable powders in food, to replace synthetic additives (dyes, flavorings, preservatives) and to diversify the range of finished products. The wide range of vegetable powder mixes (rosehip-chokeberry, rosehip-hawthorn, rosehip-apple, rosehip-nut cotyledon) is successfully sold both in the country and in the Russian Federation, in such store networks as „Season", Universam „Nevskii", Universam „Severnii"in St. Petersburg, are, as well as in the food tents in Moscow.

The company. „Trimexpo", project director Maria Goncearіuc, has implemented lavender varieties resistant to abiotic factors, which ensure high productivity and aims to substantially increase profits in agriculture, create jobs in Ungheni district and reduce the consequences of drought. About 100 thousand seedlings of three varieties of lavender were produced and an industrial plantation of 3 ha was founded. The raw material processing equipment was purchased, installed and tested (the company „Aura Industrie", France). The first 26 tons of raw material were processed and over 300 kg of essential oil were produced. The project was implemented in collaboration with the Institute of Genetics, Physiology and Plant Protection and the Institute of Chemistry of MECC. Lavender varieties grown by the company „Trimexpo" are in demand in the European Union (Romania, Bulgaria, France), Ukraine and other countries, due to high productivity, drought resistance, as well as frost and winter.

Another project in the field of food technologies was implemented by ARTPROECO SRL, Floresti district, in collaboration with the Technical University of Moldova, by Bio production of flour and gluten-free mixes from whole meal flours enriched with protein powder from seeds. The project is of particular importance, especially, for a category of patients with gluten intolerance and malabsorption, whose number is constantly growing. A certified mill of agglutinative products was put into operation and a wide range of agglutinative biological products was made from grape, pumpkin and sunflower seeds, nutmeg, etc. Gluten-free flours have been capitalized on by making culinary preparations, pastries and gluten-free bakery products. The commercialization of such elaborated products is to be organized, the process is at an incipient phase, but there is a wide perspective of commercialization both in the country and abroad, first of all, in the big stores in Romania.

The company „Major Auto", from the town Taraclia, in collaboration with TUM, has implemented a modified atmosphere packaging machine for conditioning sheep's cheese in brine. The optimal composition of the packaging atmosphere was determined. It was found that the use of CO2 atmosphere 30% + N2 70% extends the shelf life of the cheese from 10 days (in case of keeping it in the air) to 3 months, without changing its chemical or physical characteristics in the absence of synthetic additives. In the immediate future, it is required a thorough analysis of the market, the economic effect and the assurance of quality raw materials.

Another technology transfer project was focused on the development of plastics waste processing technologies and, first of all, those generated by the activities of medical institutions. This project was implemented by the company „UISPAC", project director Dr. Aliona Mereuță. UISPAC already has experience in this type of activity. The current technology transfer project aimed at developing, manufacturing, testing, standardizing and implementing the local equipment Termoshreder 420 for neutralizing medical waste, so that it can be placed on the market of the Republic of Moldova. The technological documentation was designed and elaborated for the manufacture of the processing plant. In order to assess the utility, the tests and analysis of the microbiological condition of the sterilized medical waste were performed. Given the specifics of the field in which it operates, it was necessary to standardize the equipment made by the approval of health and environmental approvals by the relevant bodies. After the development of the first installation, contracts were signed with over 400 economic agents generating medical waste, as the amount of medical waste subjected to treatment increased significantly due to the pandemic situation in the last year. In addition to the operation of the first set of machines, the second set of machines was also manufactured, which is intended for sale. The activities carried out demonstrate the existence of a development perspective of the enterprise UISPAC.

A project in the field of industrial technologies development was implemented by the TOPAZ plant, project director corresponding member Alexandr Dicusar. Within this project, a universal pulse generator for EDM machine tools was developed and manufactured. The developed machine implements new technologies, which allow the processing of various conductive materials with different geometric shapes. This project was carried out in close collaboration with researchers from the Institute of Applied Physics, including the project director, with the technical and engineering staff from the TOPAZ plant. The IFA team also has a rich experience of international collaboration in this technological field, being also a member of a consortium, which currently implements a project within the Horizon 2020 program with the acronym SMARTELECTRODES, which is also made in partnership with the TOPAZ plant. The elaboration of the mentioned generator can be seen as a first phase of activity, because the commercialization of the project results has yet to be demonstrated, but, taking into account the performance parameters of the elaborated machine, there is certainly a large-scale commercialization perspective. In this regard, the commission for evaluating the results of technology transfer projects continued to wish success to the project executors, and economists noted that the industrial production of the developed prototype would create many jobs. The production processes must be desing take into account quality, cost and time according to the authors from [19].
Regarding the field of telecommunications and information technologies, the company DAS Solutions has implemented a business messaging project using RCS (rich communication services) technologies. The experts found that basic functionalities of the developed platform meet the recommendations of the GSMA standards in the field. There were created and installed 11 virtual machines and the necessary programs for the realization of the RCS project within the platform. From the project analysis, experts appreciated that the created infrastructure and the available resources allow the further development of the project with innovative elements, which are to be finished in the next phases. The project was realized through the collaboration of DAS Solutions with the Technical University of Moldova, including also students ' training in the platform development. During the project implementation, there were established communication and negotiation relations with 18 potential clients, with some of them being concluded contracts for service providing in using the platform. Experts found that this activity is at an early stage and much more efforts are needed to reach a wide range of services to corporate customers, and for the platform sale it requires automation and expansion of the functionality of the developed platform.
At the intersection of microelectronics and biomedicine, ELIRI, together with TUM, has developed a SMART clothing system for premature babies with vital parameters monitoring. Several clothing models with integrated electronic system (temperature sensors, respiration and heart rate) were made within the project. The functionality of the electronic system was tested in laboratory conditions on an interactive mannequin, but also on a small child. Experts considered that commercialization of the obtained results is a weak point of the project, because a pertinent analysis of the sales market was not performed, the preparation level of the elaborated clothing is not sufficiently advanced, because there were not performed any clinical testing of the results within IMPS SCM „Gheorghe Paladi”, as it was provided in one of the project objectives.

6. CONCLUSIONS

Analysing processes of obtaining new knowledge, creation of inventions and innovations, as well as their transformation into a benefit for the whole society, through transfer to the adapter allow us to conclude:
- obtaining new knowledge has turned into a continuous and complex process, of a prime importance for human society, a confirmed fact by the ever-growing number of researchers and especially in countries with a less developed economy;
- new knowledge obtained in laboratories, universities and research institutes can be useful only when they turn into inventions and innovations, which in their turn condition and favor the development of technologies for the production of material and social goods, improvement of managerial processes at the level of economic units, companies and even countries, and finaly have the aim to improve the life quality;
- orientation towards innovation, growing trends of scientific researches, as well as the increased reliance on knowledge in the manufacturing process, have created a strong incentive to effectively transfer the discoveries created in academia to business;
- transfer of new knowledge in the form of inventions and innovations from the supplier (laboratory, university, research institute) to the adapter (factory, company, concern, institution, etc.) does not occur by itself, but through specific tools and human capital with extensive training in the field;
- universities are increasingly complementing their research and education functions with knowledge transfer aimed at direct socio-economic impact. However, contacts between universities and industry does not involve only

the transfer of knowledge from one to another one, but also help scientists to formulate interesting research issues, to conduct better research and to provide a clearer understanding of the application of research results in industry;
- key factors that directly influence the efficiency of knowledge transfer management that can be highlighted are: relevance of previous management experience in knowledge transfer organizations; need to set up knowledge and technology transfer offices at institutional and regional levels; importance of scientists' participation in the early stages of creating an invention and testing it in the business environment; need to take into account personal characteristics of the individual researcher (and his social capital) when explaining the frequency and success of the relationship between academia and industry.

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