

BUSINESS MODELS FOR INCREASING TECHNOLOGICAL TRANSFER EFFECTIVENESS

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Rezumat. *Prezenta lucrare este dedicată analizei recomandărilor destinate creșterii eficienței activității organizațiilor (centrelor) de transfer de tehnologie din ReNITT, prin utilizarea instrumentelor specifice modelelor de afaceri de tip Canvas, asociate lanțului valoric al transferului de cunoaștere aplicat serviciilor cu valoare adăugată adresate clienților și în acord cu cerințele unei strategii perfecționate continuu, de creștere a competitivității, prin evaluarea corectă a concurenței.*

Abstract. *The present paper is devoted to analyze the appropriate recommendations to increase the effectiveness of technology transfer organizations (centers) from ReNITT, by using the specific instruments of Business Model Canvas, associated to the technological transfer value chain for the value added services addressed to their clients and according to a continuously improved competitive strategy over competition analysis.*

Keywords: Business Models, Technology Transfer Centers, Contingent Effectiveness Model, Technology Transfer Value Chain, Technology Readiness Level

1. Introduction

The first step in creating a sustainable and healthy Technological Transfer – TT mechanism is to define the “technology” which will be transferred [1]. The focus must be set on technology as an entity, not as a science or a study of the practical industrial arts and certainly not any specific applied science. The transfer object, the technology, must rely on a subjectively determined but specifiable set of processes and products. Focusing on the product is not sufficient to the transfer and diffusion of technology. It is not merely the product that is transferred but also knowledge of its use and application. For technologies that exist in considerable variation, one faces a challenging task of demarcating the transfer

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object from its environment. The technology is adapted through personalized application, based on some combination of unique needs and tacit knowledge.

TT is defined in many different ways, according to the discipline of the research, but also according to the purpose of the research [2]. Nevertheless, one general definition of TT could be “the movement of know-how, technical knowledge, or technology from one organizational setting to another”. Those from the business disciplines tend to focus on stages of TT, particularly relating design and production stages, as well as sales, to transfer. Management researchers are more likely than others to focus on intra-sector transfer and on the relation of TT to strategy.

The history of technology policy could be described in terms of three competing paradigms, the market failure paradigm, the mission paradigm, and the cooperative technology paradigm [2]. The one that best fits to this concept is the cooperative technology policy paradigm as it relates closely to TT.

It is an umbrella term for a set of values emphasizing cooperation among sectors – industry, government, and university – and cooperation among rival firms in development of pre-competitive technologies and “infra-technologies”. Thereby the central point is to put TT and government laboratories to greater use as progenitors of technology and applied science. The state government and intergovernmental policies must emphasize technology-based economic development programs.

The Contingent Effectiveness Model draws its name from its assumption that parties to TT have multiple goals and effectiveness criteria [2]. The model includes five broad dimensions determine effectiveness:

- characteristics of the transfer agent;
- characteristics of the transfer media;
- characteristics of the transfer object;
- the demand environment;
- characteristics of the transfer recipient.

The arrows in the model (see Figure 1) indicate relations among the dimensions and the broken lines indicate weaker links.

The model can be understood in terms of who is doing the transfer, how they are doing it, what is being transferred and to whom. Thus, the Technology Transfer Centers – TTCs, belonging to the National Network for Innovation and Technological Transfer - ReNITT must accept and recognize the importance of effectiveness issues.

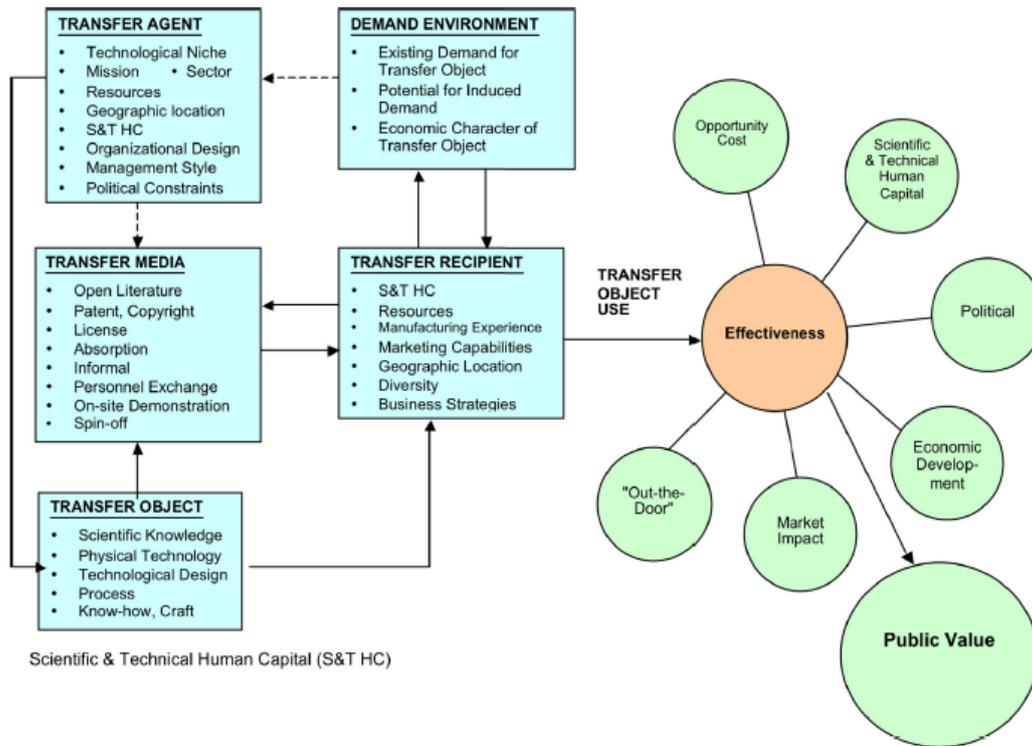


Fig. 1. Contingent effectiveness model of technology transfer [2].

2. Business models and value chain for the value-added services of the TTCs

The TTCs from ReNITT often engage themselves in thinking strategically about their TT processes than they deploy how to develop and cultivate relationships with the scientific community (i.e. inventors) and industry as well.

Specifically, researchers represent the key actors in the value proposition creation process, while established firms and new ventures play a crucial role in value exploitation. Taken together, these findings highlight the emergence of alternative Business Models (BM)s universities may use in their TT activities.

The dynamic interplay between the above can be translated into a framework of TT that consists of four different quadrants that result from different configurations of key elements representing BMs [3].

The question is “Which of these four models is now the most appropriate for the TTC’s from ReNITT?” Based on the previously showed framework, described in details in [3] (see Figure 2) we can find the graphical answer: the Romanian TTC’s must concentrate on starting to be an: “Orchestrators of Local Buzz” and when successful than moving in the direction of a “Catalyst”.

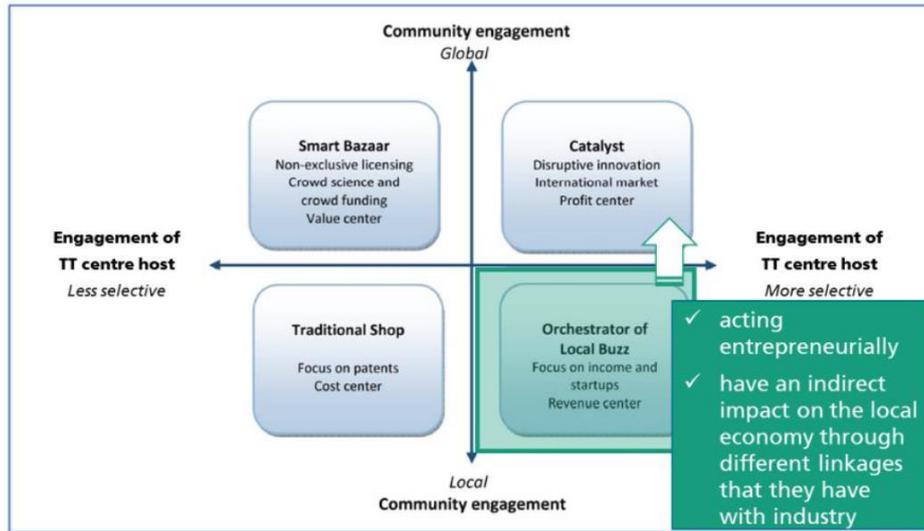


Fig. 2. A proposal for BMs development framework of the TTC’s from ReNITT.

2.1. Value chain of value-added services

In order to increase the efficiency of the TTC’s, meaning every TTC to efficiently use its specific key resources (physical, intellectual, human and financial), the BM of the corresponding TTC must be centered on one of the three stages of the value chain of value-added services depending of their own resources (see Figure 3).

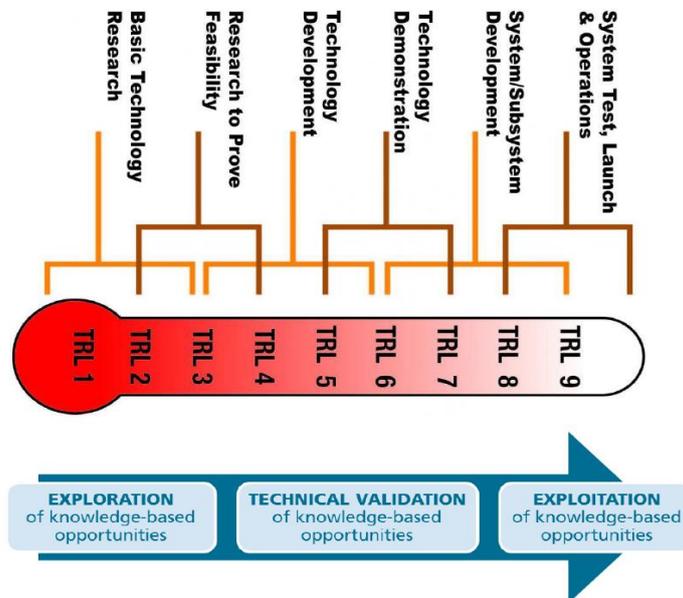


Fig. 3. The stages of the value chain of value-added services, respectively the knowledge and TT value chain in comparison with the Technology Readiness Levels (TRL).

2.2. The three corresponding BMs at a glance [4]

In the case of **exploration-centered BMs**, the targets are large companies and not the customization of services for firms. The aims are to generate a small fraction of the revenue from client firms, to forge weak ties with client firms, not to develop well defined market strategies, and to rely on researchers as the key resources in order to develop the offer to clients. The value-added services are related to:

- specify research and technological needs;
- get assistance to access pertinent research.

The **validation-centered BMs** target to customize services for firms, to target small and medium-sized enterprises (SMEs), to generate a large fraction of the revenue from client firms, to forge strong ties with client firms, to develop well-defined market strategies, and to rely on employees with technical training and experience in order to develop the offer to clients. The value-added services are related to:

- prototype design and technical feasibility testing;
- product and process safety certification;
- manufacturing practices, processes and technology improvement;
- access to specialized equipment or facilities to scale up production;
- access to expertise to scale up production.

Exploitation-centered BMs is targeting customizing services and the market of SMEs, generating a large fraction of the revenue from client firms, forging strong ties with client firms, developing well defined market strategies, and relying on employees with engineering, business training and experience in order to develop the offer to clients. The value-added services are related to:

- legal issues as preparation of patent applications, spin-off creation in order to exploit inventions, contractual agreements negotiation & management;
- capital access: commercial bank loans, angel investors or agent network, venture capital;
- commercialization: product positioning, business case development, design and implementation of business processes, advertising and promotion of new products, access to market/distribution channels, access to international market/distribution channels.

Starting from the actual structure of the TTCs from ReNITT, where their majority is either hosted by a University or by a Research Institute, their activities respectively their BM must be centered as presented in Figure 4. Nevertheless, the industry/customer know-how must be taken continuous in consideration in the strategically developed BMs of the TTCs.

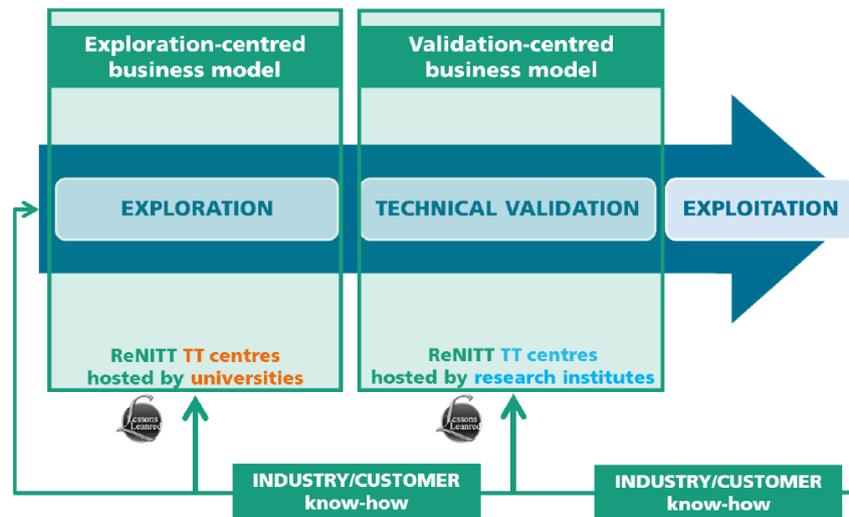


Fig. 4. The BMs of the TTCs from ReNITT must be centered differently, depending on their key resources.

In this context the strategic basis of the development framework of the BMs, specifically for each TTC of ReNITT, must take in consideration the specifications presented in Figure 5.

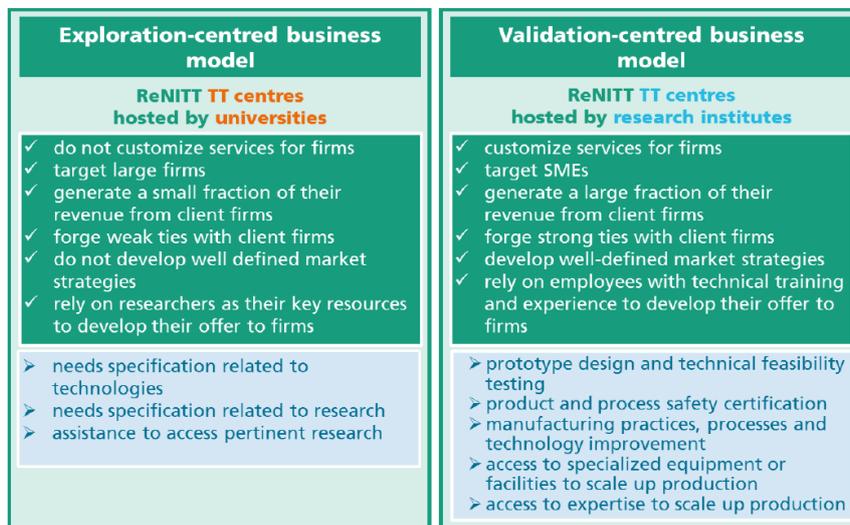


Fig. 5. Specification for the BMs development framework of the of the TTCs from ReNITT.

All TTCs from ReNITT need to and must have an up to date BM which describes the rationale of how the respective TTC creates, delivers, and captures value [5]. The BM is the most important instrument in order to increase the effectiveness of the TTC's and in the same time the most useful in order to keep the overview and consider the whole TT activity of an specific TTC.

TTCs must develop their business taken in account:

- their resources (physical, intellectual, human, etc.): so they must center their BM on a specific part of the value chain of value-added services;
- the industry/customer know-how: a continuous input for developing and updating the BM;
- their role as “Orchestrator of Local Buzz”.

3. Recommendations for increasing technology transfer effectiveness

Some practical steps are recommended to be applied at the level of the TTCs from ReNITT, in order to increase their effectiveness, in the context of their BMs development framework (see Figure 6).

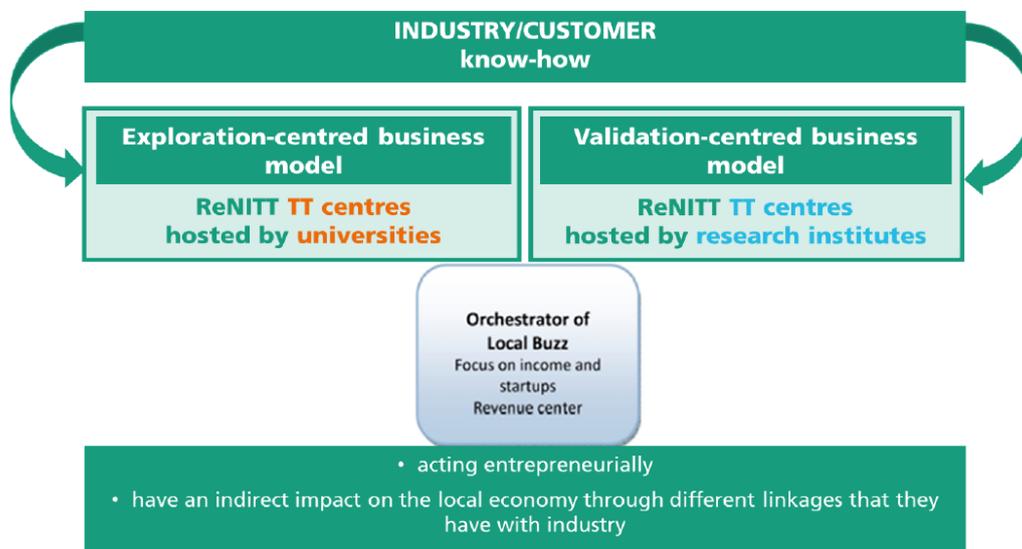


Fig. 6. Business model development framework.

So, by applying the Business Model Canvas, we should always start with the Customer Segments (including a detailed market analysis) [5,6]. Afterwards, is necessary to pass at defining the Value Proposition (not abilities of the TTC’s human, intellectual or physical resources!), as the bundle of products and services that create Customer Value (Benefit – Costs = Customer Value) for a specific Customer Segment, that solves a customer problem or satisfies a customer need. It follows defining the Channels and Customer Relationships, and when having a first version of these four elements of the BM, a Competitive Analysis and Strategy must be done at scientific, economic and geographic level. In this way, it is possible to identify the TTC specific „Unique Selling Proposition" (USP) and to develop the TTC Competitive Strategy (cost leadership or differentiation or focus strategy).

Having the results of the Competitive Analysis and Strategy, all BM Building Blocks must be completed and fine-tuned continuously, for reshaping the Customers Segments, Value Proposition, Channels and Customer Relationships in order to maintain competitiveness and profitability in time (see Figure 7 and Figure 8). These steps must be done every 6 months, because nowadays the TT mechanism, i.e. the technology itself, the competitors at scientific, economic and geographic level, the markets etc., are moving very fast.

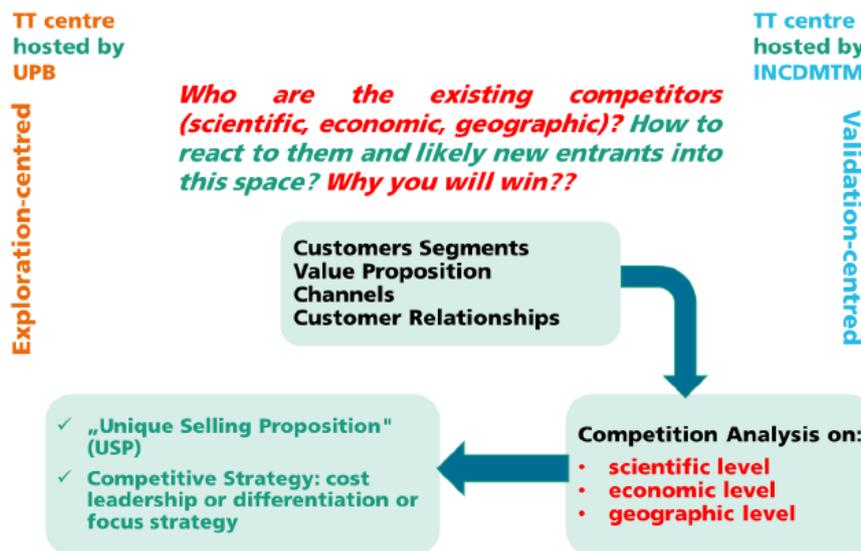


Fig. 7. Competitive Strategy over Competition Analysis (1/2).

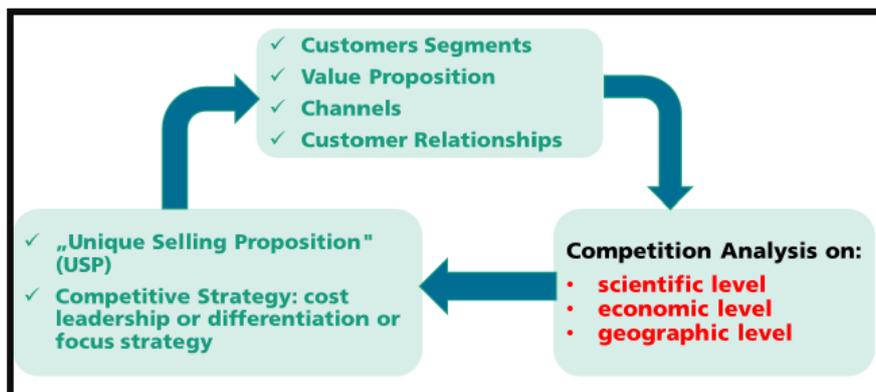


Fig. 8. Competitive Strategy over Competition Analysis (2/2).

Conclusions

Resuming all aspects presented above, the following mechanism (see Figure 9) will offer the possibility of increasing the effectiveness of the TTCs from ReNITT, in the context of their development framework (see Figure 6).

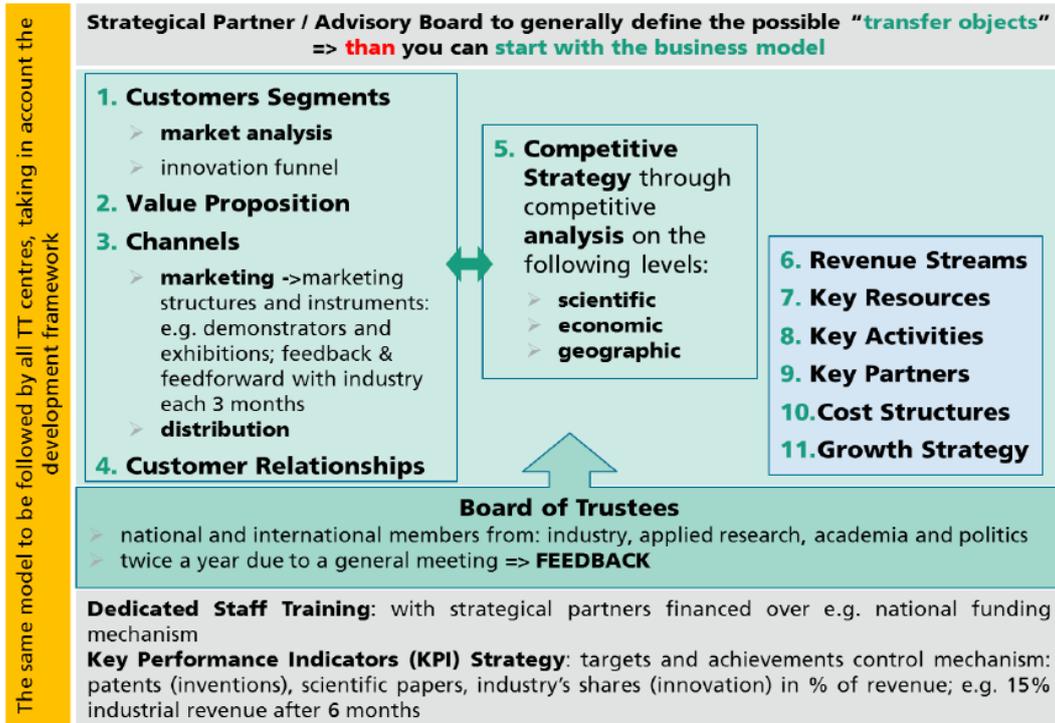


Fig. 9. Effectiveness mechanism for each TTC from ReNITT.

As a strategic orientation, each TTC should have its own Board of Trustees, comprising national and international members, i.e. representatives from industry, applied research, academia and politics. The very important role of the Board of Trustees is to offer a pragmatic perspective to the respective TTCs management, especially regarding the Value Proposition, the Customer Segments, the Key Activity and Resources and nevertheless the competitors. This feedback must be the basis for a general update of the activities of each TTC, including at least an update of all 11 Building Blocks of the BM Extended Canvas [5,6] and the appropriate measures on the operational level.

Acknowledgment

The work has been funded by the Sectoral Research Program of National Authority for Research, Development and Innovation, through the contract 10S/04.02.2015.

REFERENCES

- [1] Amesse Fernand, Cohendet Patric: Technology Transfer Revisited from the Perspective of the Knowledge-Based Economy. In: Research Policy 30 (2001), Dez., Nr. 9, S. 1459–1478.
- [2] Bozeman, Barry, Heather Rimes, Jan Youtie: The evolving state-of-the-art in technology transfer research: Revisiting the contingent effectiveness model. In: Research Policy, Volume 44, Issue 1, February 2015, Pages 34-49.
- [3] Baglieri D., Baldi F., Tucci C. (2014), Technology Transfer Office Business Models: One size does NOT fit all, Technovation, paper to be presented at DRUID15, Rome, June 15-17, 2015.
- [4] Landry, Réjean: Technology Transfer Organizations: Services and Business Models. In: Technovation: The International Journal of Technological Innovation, Entrepreneurship and Technology Management 33.12 (2013).
- [5] Alexander Osterwalder and Yves Pigneur: “Business Model Generation: A handbook for visionaries, game changers and challengers” (2010).
- [6] „Developing the ability to transfer and commercialization of research results into the applied research institutes and centers in Romania - implementation of a pilot model for specialized departments”, Phases I and II: „Analysis of the technological transfer infrastructure and research results valorization, from EU and Romania, with the identification of country and regional specific aspects”, Contract no. 10S/04.02.2015, Financed by Sectoral program of National Authority for Scientific Research and Innovation Romania.