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## SMART-LAB AS AN EXAMPLE OF THE INCUBATION AND ACCELERATION PLATFORM FOR START-UPS – CHALLENGES AND BARRIERS<sup>1</sup>

### Summary

*Purpose* – The aim of the article is to indicate the role and importance of acceleration platforms in stimulating the development of the start-up market in Poland, on the example of the Smart-Lab incubation and acceleration platform, as a part of the “e-Pionier” project implemented from EU funds under the “Polska Cyfrowa” Program.

*Research method* – The research methods are: analysis and synthesis, induction and deduction, desk research, case study.

*Results* – Five MVPs (*Minimum Viable Products*) were obtained, constituting an original, innovative Smart-Lab Project solution in response to particular socio-economic problems reported by local government units.

*Originality / value / implications / recommendations* – The article highlights the issues of the start-up market and the role of acceleration platforms in stimulating the development of this market, as part of the perceived need for a wider analysis of this kind of research problem.

**Keywords:** start-ups, innovations, competition, acceleration platforms

**JEL Classification:** L26, O31, O32

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## 1. Introduction

Nowadays, it is indicated that innovations<sup>2</sup> are the most important tool for creating competitiveness at the level of both enterprises and economies. An important tool in shaping the competitiveness of the Polish economy is raising its level of innovation. One of the ways to do it is by supporting the so-called start-ups, i.e. young innovative companies creating or using the latest technologies. At present, one of the most extensive programs is being implemented in Poland. It is named "Start in Poland" and over 3 billion zlotys were allocated to implement it. The program assumes the creation of over 1,500 companies that will be competitive not only at the national level, but also at the international and global level, becoming a vehicle for the Polish economy that will establish effective competition in the field of modern technologies. One of the motivations for launching this program was the fact that a number of young Polish scientists and entrepreneurs successfully implemented their ideas outside Poland. It was acknowledged that such large financial support for start-ups at the level of incubation, acceleration and development would contribute to inhibiting the so-called brain drain and launch a spiral of development based on the latest technologies. The program also encompasses the participation of large enterprises. Large companies are characterized by a high degree of risk, i.e. using SPV (*Special Purpose Vehicle*) to minimize and spread the risk. They should also be particularly interested in implementing innovative ideas.

The aim of the article is to indicate the role and importance of acceleration platforms in stimulating the development of the start-up market in Poland on the example of the Smart-Lab incubation and acceleration platform. A specific objective of the study is to disseminate knowledge about MVP obtained as original, innovative Smart-Lab Project solution. The implementation of research objectives required the use of desk research in the theoretical part of the study, case study analysis in the empirical part for MVP description as well as analysis, synthesis, induction and deduction throughout the study. The paper based on Smart-Lab case explains the possible, original solutions to socio-economic problems related to: public safety, education or transportation. The article presents the most important assumptions and the stage of implementation of the "Start in Poland" program with particular emphasis on Smart-Lab, which was launched as a part of the e-Pioneer program.

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<sup>2</sup> Innovation consists of the generation of a new idea and its implementation into a new product, process or service, leading to the dynamic growth of the national economy and the increase of employment as well as to the creation of pure profit for the innovative business enterprise. Innovation is never a one-time phenomenon, but a long and cumulative process of a great number of organizational decision-making processes, ranging from the phase of generation of a new idea to its implementation phase. New idea refers to the perception of a new customer's need or a new way of producing. It is generated in the cumulative process of information-gathering, coupled with an ever-challenging entrepreneurial vision. Through the implementation process the new idea is developed and commercialized into a new marketable product or a new process with attendant cost reduction and increased productivity [Popadiuk, Choo, 2006]. Innovativeness is most frequently used as a measure of the degree of "newness" of an innovation [Garcia, Calantone, 2002, pp. 110-132].

## 2. The start-up market in Poland and around the world as a tool for shaping competitiveness

Definitions of competitiveness can be presented in four dimensions: micro, macro mezzo and mega. Mezzo-competitiveness refers to the industry, branch and department. The subject of macro-competitiveness is a country in relation to the global market, and mega-competitiveness is a focused group of countries or a region relative to other geographical areas [Flejterski, 1984, p. 391].

As far as the start-up market is concerned, one should bear in mind the specific features of these business forms. According to the definition given by Reis, the creator of the Lean Startup strategy, start-ups are enterprises whose goals are to provide a new product, service, technology or process in conditions of uncertainty [Nowoczesna inżynieria finansowa ..., 2013].

Łopusiewicz [2013] defines a start-up as a kind of activity, the goals of which are to meet consumers' needs and find the appropriate ways to earn. A proper adjustment of manufactured products to the market needs must be applied.

Considering the term of "competitiveness of startups", the definition of what "competitiveness" is in general, presented by Hampden-Turner and Trompenaars [2000, pp. 121-122], should be cited. The authors define competitiveness as competition and cooperation at the same time, which leads to constant learning about important technologies, needs and demands of customers.

In the case of start-up enterprises, according to the definition presented by Reis, innovation is an important factor. However, innovation is not only limited to learning about important technologies, as it is generally perceived, but also to the development in general. As a rule, startups, being small and new units, have two choices in the approach to competitiveness: a strict competition approach or a cooperation approach by collaborating with the existing, larger and more stable market participants. Gans, Hsu and Stern [2002, p. 571] noted that the approach taken is dependent on the business sector/branch (mezzo-competitiveness). Start-ups related to the field of biotechnology, for instance, often decide to initiate cooperation, while startups operating in the electronics area frequently choose the path of competition.

Choosing the right path (cooperation or competition) is associated with some advantages, but also with costs. The main advantage of starting cooperation is, first of all, getting the right resources to do business. The expense is usually the division of the obtained income.

The start-up's choice is conditioned by the competitiveness of a given market (mezzo-competitiveness). Research carried out by Hashai and Markovich [2017, p. 145] has shown that the level of market competitiveness is the most important factor. Most start-ups show a greater tendency to act independently when the level of competitiveness of a given market is high. When the level of competitiveness of the market is low, on the other hand, they are willing to cooperate. The level of willingness to cooperate combines three effects:

- revenue expansion effect – cooperation generates additional value of start-ups in the form of additional resources, reputation and credibility associated with higher awareness of the company's more established brand in the market (a);
- revenue sharing effect – start-ups must share their revenues with companies they have cooperated with (b);
- imitation effect related to an increase in the likelihood of imitating other enterprises (c).

The first of the effects (a) occurs in the case of both high and low level of market competitiveness. In moderate competitiveness, this effect is not so significant. Two other effects (b, c) have the highest impact on the market with a moderate level of competition.

The secondary factor is the level of innovation of a given start-up. A decrease in the imitation effect simultaneously increases the level of the start-up's competitiveness at the micro scale, increasing the value of start-up's products, as perceived by consumers, and its negotiating power [Trajtenberg, 1990, p. 185].

The sectors open to cooperation are start-ups offering financial services, the so-called fintechs and financial institutions. The fintech sector itself is dynamically developing. The value of investments in enterprises of this type on a global scale has tripled from \$4 billion to over \$12 billion in the years 2013-2014 [*The Future of Fintech and Banking: ...*, 2015, p. 4]. In the first half of 2018, global investments in fintechs reached nearly \$60 billion. In terms of geographical regions (mega-competitiveness), the largest investments were made in Europe (\$26 billion). \$16.8 billion was invested in fintechs in Asia, while in the United States investments amounted to \$14.2 billion. For both Americas, the total sum amounted to approx. \$14.8 billion [*The Pulse of Fintech ...*, 2018, p. 3]. At the same time, 45% of financial institutions around the world cooperate with fintechs, while 82% have announced their willingness to do so [*Redrawing the lines: ...*, 2018, p. 6]. This cooperation usually takes the form of three strategies: establishing contacts, cooperation of financial institutions with fintechs and investing in fintechs [*Polski rynek FinTech ...*, 2016, p. 44].

Research conducted among Polish financial start-ups showed that the main clients are direct end customers (business) and banks. For both banks and start-ups, the most important factor affecting the progress of financial innovation is developed cooperation. Fintechs see the cooperation primarily on a partnership basis. Banks also have similar opinions, but some of them see the acquisition of start-ups and investment in fintechs through specially designed funds [*Polski rynek FinTech ...*, 2016, p. 50-51]. Fintechs, in accordance with the definition of competitiveness by Hampden-Turner and Trompenaars [2000], meet the financial needs of clients belonging to the SME sector. Banks' offer in Poland is not suitably tailored to clients in the SME sector (it is confirmed by data showing the downward trend in demand for short-term and long-term loans). At the same time, globally, fintechs are treated as an opportunity for companies in this sector [*The Future of FinTech ...*, 2015, p. 10-26].

The macro-competitiveness of startups is demonstrated by public support, in particular by the venture capital market, which funds projects at the early stages of development [Świdarska, 2008, p. 39]. Various actions of governments around the world have caused an increase in the share of this type of capital [Gomper, Lerner, 1998, p. 149-192]. This kind of help has become an important element of support offered to start-ups [Hong et al., 2018, p. 1]. These funds invest capital in shares and ownership securities in the medium and long term. The purpose of the funds is to divest the purchased securities by selling them to another entity at a later date, after obtaining the appropriate rate of profit. The source of the funds' profit is an increase in the value of the owned business portfolio until they obtain another, characterized by a slower pace of development [Zasepa, 2014, p. 238-239].

The report carried out by Invest Europe indicates that the contribution of venture capital funds expended in Europe's GDP amounted to 0.039%. For Poland, this percentage was 0.011%, giving it the 17<sup>th</sup> position on the European scale. Observing the European contribution of venture capital funds, it should be borne in mind that, according to the cited report, it amounted to €6.1 billion (8.9% for all types of funds included in private equity), and the largest group of support were start-ups. The most supported sectors were ICT, biotechnology and health, consumer goods and services, energy and environment, financial and insurance activities as well as business products and services [Acs, Audretsch, 1990, p. 8].

Globally, a total of over \$140 billion was invested in the form of venture capital funds. However, it is estimated that the real impact on the economy in the years 2015-2017 reached \$230 trillion. This represents a significant increase (of almost 26%) in value added, compared to the years 2014-2016. According to the Genome report, companies in the start-up phase mainly become companies with high innovation [*Global Startup Ecosystem Report 2018 ...*, 2019, p. 8].

On the global scale, in terms of participation, the prevailing branches were: digital media (20.4%), fintechs (7.1%), health and life sciences (6.8%), data analysis using artificial intelligence and Big Data (5.0%), games (4.8%), adtechs (3.3%), edtechs (2.8%), cleantechs (2.1%), biotech (1.8%), blockchain (1.5%), advanced production and robotics (1.3%), cybersecurity (0.7%) and agtechs (0.6%) [*Global Startup Ecosystem Report 2018 ...*, 2019, p. 15-16].

ESM 2016 report<sup>3</sup> indicates that the main area of activity carried out by startups is IT and software development. The main areas of Polish start-ups are IT, software development and SaaS. Poland's significant competitors (macro-competitiveness) include Slovenia, Italy, Portugal, Hungary, Germany (IT area and software development) as well as Belgium, Finland, Spain, Austria (SaaS) and Israel (both areas) [*European Startup ...*, 2016, p. 26]. The multiplicity of programs and institutions supporting such enterprises also proves to be of great importance to start-ups [www 1].

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<sup>3</sup> 18 countries belonged in the category of ESM 2016: Austria, Belgium, Cyprus, Finland, France, Greece, Spain, the Netherlands, Ireland, Israel, Germany, Poland, Portugal, Slovenia, Switzerland, Hungary, Great Britain and Italy.

### **3. Start in Poland – program assumptions and information on the competitions that have been resolved**

“Start in Poland” is an innovative financial support program for the start-up market in Poland. A start-up is, by definition, a company which focuses on high ingenuity and has been present on the market for a very short time [www 2]. Start-ups focus mainly on modern technology. The main areas of activity of Polish start-ups are: big data 15%, Internet of things 14%, analytics 13%, fintech 11% [*Polish Start-ups*, 2018, p. 1]. “Start in Poland” enabled bringing new ideas to the start-up environment. “Start in Poland” is a program which provides start-ups not only with financing, but also equips new users with knowledge. The Ministry of Finance has allocated PLN 3 billion for the program. The basic assumptions of “Start in Poland” are [www 3]:

- developing the start-up ecosystem;
- creating a flagship program;
- opening public institutions for cooperation with start-ups;
- supporting foreign development.

The project assumes offering assistance for enterprises at each stage of their operation. The program includes providing support in the incubation phase. At the stage of incubation, the program is coordinated by the Polish Development Fund. The next phase is acceleration, in which start-ups begin to cooperate with better-known and more experienced partners. Thanks to this, enterprises have a chance to obtain not only additional financial resources, but also the knowledge which will contribute to their development [www 4].

The main reasons for launching “Start in Poland” centered around stimulating the development of the start-up ecosystem in Poland. A start-up ecosystem is an environment in which there are many similar enterprises at different stages of life. The main elements are [www 5]:

- ideas;
- different age;
- members;
- investors;
- entrepreneurial people in the field of start-ups or outside the sector;
- mentors.

Other organizations related to the start-up ecosystem:

- universities;
- advisory organizations;
- start-up incubators;
- starter accelerators;
- employee spaces (co-working spaces);
- event organizers;
- the creators of start-up competitions;
- investor networks;
- venture capital;

- crowdfunding portals;
- other investors.

The aim of the activities related to the awakening of the ecosystem is to counteract economic stagnation and lead to overcoming the middle income trap which currently poses a challenge for Poland [www 6]. Among the main small, innovative enterprises in Poland there are:

- Digital Core Design that deals with the creation of processors;
- Leia Display System which displays images on steam;
- Better Reality company dealing with 3D visual side;
- Saule Technologies and Triggers Composites engaged in the production of drones;

Poland, surprisingly for a European country, holds a very low position in the innovation ranking. This ranking is created by the Wipo Organization in cooperation with the University of Cornell. The main aspects taken into account are: country profitability, innovation and investment efficiency [*Global Innovation Index 2018*, 2018]. Table 1 indicates Poland's position on the innovation market.

Table 1 presents the position of countries according to profitability and innovation on the basis of the Global Innovation Index.

**TABLE 1**

**Global innovation index**

<b>Position in the ranking</b>	<b>Profitability in the country</b>	<b>Points</b>
1. Switzerland	High income	68.40
2. The Netherlands	High income	63.32
3. Sweden	High income	63.08
4. Great Britain	High income	60.13
5. Singapore	High income	59.83
6. The USA	High income	59.81
...	...	...
39. Poland	High income	41.67

Source: own elaboration on the basis: [www 7].

Taking into account the fact that among the top 30 countries there are countries which have much smaller income levels than Poland, the position of Poland in the ranking stresses the lack of interest in modern approaches to solving problems [www 3]. On the other hand, the Bloomberg ranking positions Poland as the 22nd.

In the European ranking, the European Innovation Index 2018, Poland holds the 25th position (table 3). Strong points in Poland's assessment were: employment, enterprise investments or the environment conducive to the development of enterprises. The European Innovation Scoreboard includes such elements of assessment as: the use of human resources for science and technology, education, patents, expenditure and cooperation in innovative activities or access to the Internet [*Global Innovation Index 2018*, 2019].

TABLE 2

**Bloomberg Global Ranking 2018**

Country Position	Points
1. Korea	89.28
2. Sweden	84.70
3. Singapore	83.05
4. Germany	82.53
5. Switzerland	82.34
6. Japan	81.91
...	...
22. Poland	71.65

Source: own elaboration on the basis: [www 8].

TABLE 3

**The European Innovation Index 2018 – selected countries ranking**

Country Position	Result in EIS
1. Sweden	140.8
2. Denmark	132.4
3. Finland	128.7
4. The Netherlands	128.5
5. Great Britain	121.5
6. Luxembourg	121.1
...	...
25. Poland	53.6

Source: own elaboration on the basis: [www 10].

**3.1. Scale Up – the main program financed from “Start in Poland”**

The main assumption of Scale Up program is to accelerate the development of start-ups. The basic assumptions of Scale up were [Raport Scale ..., 2018, p. 4]:

- implement a 15-month-long project, in which 2 or 3 acceleration rounds will be carried out (lasting from 3 to 6 months);
- engage at least one large enterprise, including at least one State Treasury company;
- ensure the completion of the acceleration program by the minimum of 20 start-ups;
- earmark up to PLN 200,000 per start-up for the development of start-up products;
- earmark up to PLN 50,000 per start-up for the services offered to start-ups.

The participants of the program were entities with such capabilities as:

- operating in the territory of the country;
- having a team which is properly experienced in the field of acceleration;

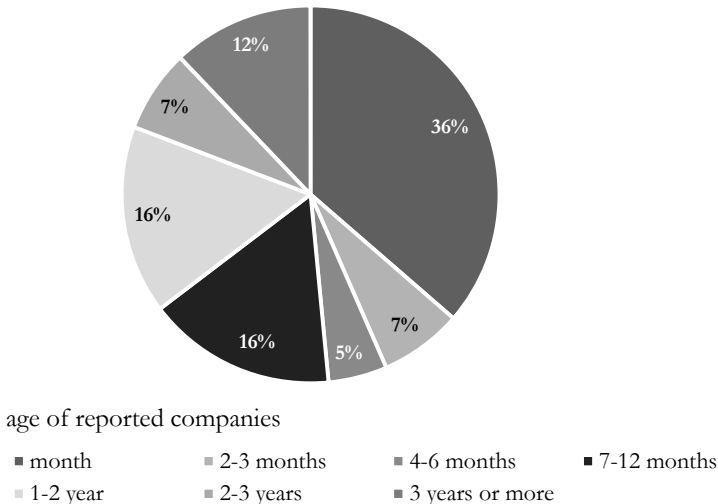


- demonstrating the ability to implement the project and being able to contribute at least 10% of the anticipated operating expenses to the project's budget.

The main condition for the implementation of such projects as Scale Up was the involvement of an entity which would be able to cover 10% of the anticipated project expenses to help the company. An important factor was the big player. At the beginning of the project there were 33 such entities and at the end of the program their number increased to 66 [Raport Scale ..., 2018, p. 12].

The results indicate that MITEF Poland recruited 46 start-ups, whereas Pilot Maker 44. Start Up Spark and Space3ac have both recruited 27 start-ups. At the other end of the scale there were Huge Thing and GammaRebels with 20 recruited start-ups. As far as the age of companies reported to Scale Up is concerned, it often did not exceed one month and the exact percentage of such companies was 36%. Those conducting their business for more than one year constituted 35.5% [Raport Scale ..., 2018, p. 14].

**CHART 1**  
**Presentation of the life span of companies reported to Scale Up**



Source: own elaboration on the basis: [Raport Scale ..., 2018]

The main cities which were in the area of interest of start-ups were Warsaw, Tri-City, Kraków, Wrocław and Poznań. Warsaw attracted the largest number of entrepreneurs and proved to be the main area for the development of start-ups. The main industries involved in the projects were the sectors related to software, natural sciences, engineering and engineering consultancy, research and development work in the field of biotechnology, internet portals, data processing [Raport Scale ..., 2018, p. 14]. The assumption of the program was for a minimum of twenty enterprises to complete the training. Scale Up had to be completed within fifteen months. Most of

the new companies, thanks to substantive support, could commercialize their activities through:

- sale and commencing commercial use;
- selling their solutions using their partner's distribution network.

An equally advantageous solution as sales was often the launch of a product test on the market. Such action was taken most often, as test implementation was declared by as many as 83 partners. The method of signing contracts between the start-up and the partner was declared by 40 entities. Over 190 startups have found their place and development [Raport Scale ..., 2018, p. 22]. Many programs are still in the implementation and development phase, for example, Huge Thing, Space3ac or electro Scale Up. This movement can be considered a breakthrough in the start-up industry. Start-up, as a new concept on the market, is focused on many types of risks [www 9]. One of the equally important success factors is the selection of the right product.

#### 4. Smart-Lab as an acceleration platform

Smart-Lab is a project co-financed by the National Center for Research and Development from the European Regional Development Fund under Measure 3.3. Operational Program Digital Poland 2014-2020 – “e-Pionier”. The “e-Pionier” project is a pilot project with a budget of approximately PLN 100 million which will have been implemented by 2020. Its aim is to stimulate the potential of gifted programmers. The program assumes funding the creation of solutions in the pre-commercial procurement (PCP) model, i.e. a contracting authority (local government entity) reports a problem that the market has no answer to in the form of an identified solution. “E-Pionier” will be implemented in cooperation with specialized accelerators using the PCP formula – support will be given to ideas based on tools offered by ICT (information and communication technologies) solving problems of social or economic significance. Interdisciplinary teams use the services of the accelerator in the field of verification of ideas in the proof of principle phase, creating MVP (*Minimum Viable Product* – the minimum necessary functionality). The aim of the Smart-Lab platform is to improve the competence of IT students by having them solve socio-economic problems reported by local government units. As a result, start-ups will be created, the business model of which will be developed and tested in the business environment that meets the client's minimum expectations. The assumptions of the Smart-Lab acceleration platform specify that it will tackle 11 problems reported by local governments. As a result of the undertaken activities, 11 teams will be created and they will develop MVP. A case study method is used to present the Smart-Lab as an acceleration platform. The selection of case studies presented below was determined by the importance of socio-economic problems reported by local governments and the urgency of providing MVP as a solution to these problems.

**The problem of the “last mile” in cities** – Kurierbox – Szczecin System of Municipal Couriers (SSMK) – the aim of the project is to develop a system of gene-

rally available couriers, who will be available to all registered logistic operators (courier companies) and individuals. In the context of the city, the concept may contribute to a reduction in the number of vehicles on urban roads, as an alternative form of delivery, primarily courier, delivering goods to individual consumers.

**The system of automatic verification of the quality of services provided by carriers** for the needs of public transport in the Municipality of Goleniów. It should be emphasized that public transport in the Municipality of Goleniów is one of the few in Poland which is completely free of charge for its users. Transportation services are carried out by external carriers whose offers are evaluated and selected in accordance with the regulations in force in this area. However, this does not allow for monitoring the quality of the services provided, which includes the implementation of connections according to the planned and announced timetable. One of the forms of verification is land monitoring carried out by employees of the Municipal and Communal Office (random photographs) or complaints and interventions of passengers / users of public transport. Modern IT solutions allow smartphones and dedicated applications to be used for this purpose.

**The system of identifying and counting visitors to forest complexes and those using the State Forest infrastructure** within the city limits based on a visual monitoring system. The State Forests and other managers of forest and park areas collect information on the number of only those visitors / users who are part of organized groups. In addition to these groups, there are individuals who use the infrastructure of forest and park areas. The solution is to enable the operation based on the existing visual monitoring systems (monitoring cameras) to determine the number and composition of visitors and those using the infrastructure located in forest and park areas.

**Baggage scanner simulator enabling the effective training of airport personnel** at Szczecin Goleniów airport. The aim of the project is to build a complete solution that will enable the qualification of luggage scanner operators. In accordance with the requirements set by international aviation regulations and the Civil Aviation Office, there is a legally required permanent process of training Safety Control Operators. The greatest value of the projected simulator will be solutions based on Polish IT thought and the creation of an active information panel for the diagnosis of the trainee. The implementation of the proposed solution will allow Szczecin Goleniów Airport both to reduce the costs of training personnel responsible for the safety of persons and luggage, and to improve the effectiveness of these services.

**The use of low-budget locomotive simulator / train set** in the course of instruction at the technical secondary school. The advantage that using simulation devices in the process of acquiring competences has, compared to the process of acquiring competences with the use of real devices, is the possibility to implement critical scenarios during training, the actual implementation of which carries a high risk of accidents due to trainee's lack of experience. An experienced train driver has the skills to behave properly in various, often very stressful situations. Such experience is gained over the years. Training on the simulator allows one to acquire the

right habits in a very short time, because the simulator is equipped with a modern computer system, and the projection system provides a near-real image seen through the cab glass.

## 5. Conclusions

In the article, case studies show how acceleration platforms can be used to solve important socio-economic problems and how acceleration platforms affect the development of the start-up market in Poland. In Polish conditions, support for start-ups comes from, among others, the Operational Program “Polska Cyfrowa” (including the “e-Pionier” Program), but also from national funds such as Start-up Program in Poland. Actions subject to financing under the indicated mechanisms include competitions for accelerators whose task is to develop start-ups in cooperation with small and large companies. Accelerators are therefore a platform for contact between start-ups and business, which allows for multi-directional support for innovative projects in the incubation phase. Smart-Lab as an incubation and acceleration platform additionally benefits from the three-sector cooperation, including the local government sector, alongside the business sector and the IT sector, in the creation and implementation of innovative socio-economic solutions. Such a three-dimensional cooperation brings additional benefits, as it supports the implementation of innovative solutions that are characterized by high business potential, but also by the social impact.

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