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Incentivizing Start-Ups and Start-Up Ecosystems in European Project Funds – the Case of Grant "Performance and Excellence in the Field of Environment and Renewable Energy through Modern Cluster Entities"

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Abstract: Capital providers, such as shareholders on capital markets or European funding providers, are interested in the net present value of discounted cash flow and the risks or opportunities that may contribute to financial planning in a negative or positive way. In an uncertain environment however, the lean start-up movement means venture capital is used to finance business models. The lean start-up complements the business plan via discovery driven planning. These are holistic approaches to uncertainty management in all business aspects, with a designated methodology. This methodology will be the scholarly literature review in this article, whose goal is to elaborate the reference lean start-up methodologies and their relevance in empirical data analysis, European project funding calls. European projects demand uncertainty management. The article purposes to make European funds easy to understand as their requirements are explained and the most suitable scientific solution is sought. The methodology is a descriptive case study, with instrumental value. Findings are that funding authorities, be they capital markets or public funds, benefit highly in their decisions by lean start-up techniques. The research concerns the suitability of start-up ecosystems with European funds, and the conclusion is a high interest from the latter to the former.

Keywords: innovation, open innovation, ecosystems, lean start-up, business models, venture capital, incubators, discovery driven planning, classic valuation

1. Introduction

This article analyzes alternatives to valuation in a certain environment via equity and debt, which enterprise risk management, real options valuation and venture capital are. As the Industrial Economy transforms into the New Economy, the certain environment moves towards risk or uncertainty. Since 2013, a new management and financing technique called the lean start-up has taken the world by storm. In this view, business models replace business plans, venture capital traditional capital, and start-ups cost almost nothing to found as organizational units internal or external to corporations. The new management technique becomes an issue for management in all decisions: operational, investment and financing. McGrath and MacMillan (1995, 2009) and other authors argue the lean start-up is a suitable management technique for an uncertain environment. It may have been preceeded by discovery driven planning, where several stages of discovery build the assumptions necessary to compute the net present value of discounted cash flow. In this view, the lean start-up requires business models to decide financing, and Harvard authors like Drucker (1994), Hamel and Prahalad (2000), Magretta (2002), and Ovans (2015) agree business models may be defined as hypotheses to build a business on. The search for hypotheses is an iterative process called agile development. Valuation does not compute the foreseeable future, but gambles to allocate capital to the most successful moon shots. In this approach, capital providers are not shareholders but risk management funds. Capital is not equity but risk capital or venture capital. The lean start-up has become very popular today all over the world. The European Union seeks to incentivize lean start-ups, start-up incubators and start-up ecosystems. There are several programs in the European Union that encourage and finance lean start-ups via European funds. Not only start-ups, but start-up ecosystems and incubators are encouraged too. The goal of

this research is to provide a general review of lean start-up methodology and European programs' support for start-ups. The methodology is a descriptive, analytical and instrumental case study. The case object is the lean start-up technique. The case subject are European projects about start-ups, start up incubators and start-up ecosystems. Findings show a high level of interest in start-up at European Union level. The interest is not only in start-ups, but also in start-up incubators, spin-offs, and start-up ecosystems.

2. Literature Review

By the late 20th century, authors like Mc Grath (McGrath and MacMillan, 1995, 2009) note the emergence of the uncertain environment. The business plan is replaced by the business model, which may be defined as the hypotheses to build a business upon according to Drucker (Ovans, 2015). In a new look at management, business models become the main management tools (Hamel, 2000) and are made up of: customer interface, customer benefits, core strategy, configuration, strategic resources, company boundaries and value network. There are several definitions of business models. The main stream definition is the business model canvas from Osterwalder, Pigneur and Smith (2010) and includes the following elements: the value proposition; customer relationships; customer segments; channels; revenue streams; key activities; key resources; key partners; cost structure. This is the most popular approach. Essentially, business models are divided into pipeline business models and network based business models. Traditional business models are pipeline business models. New Economy business models are network business models. They may be described as ecosystems (Ben Letaifa, 2014), where all stakeholders thrive together. Ecosystems create more value than their constituent components, Deloitte argue. There are two basic types of business ecosystem that can be observed in practice: solution ecosystems, which create and/or deliver a product or service by coordinating various contributors, and transaction ecosystems, which match or link participants in a two-sided market through a (digital) platform (BCG, 2019). Similarly Roland Berger notes there are ecosystems of value networks. One of these ecosystems is ecosystems of innovation. They have been noted by Chesbrough (2002, 2012), where open innovation in ecosystems is regarded as the contemporary form of innovation. By moving from the corporate laboratory to the open network of innovation, innovation is to be boosted.

New business models involve open networks. According to Van Alstyne (2002), open innovation is part of the new, network based, business model logic. The logic of the New Economy underpins the generation of invention: invention tends to be a knowledge intensive act (Daum, 2003), involving intellectual capital, where knowledge is managed in open networks. Knowledge is created in networks, and economics theory poses the value of knowledge grows as the network and the use of knowledge grow too. The proponent of open innovation asserts the new strategy accelerates innovation via inflows and outflows of knowledge, via creating markets for the knowledge. Open innovation is a radical paradigm shift to laboratory innovation (Chesbrough, 2002, 2012; Open Innovation Community, 2017). Van der Borgh et al. (2012) note that organizations moved from closed enterprises to eco-systems in order to exploit open innovation. Co-creating value via innovation (Iansiti and Levien, 2004) is the purpose of ecosystems. Ideas come from all parts of the network. Customer relationships are closed, as customers may be involved in the open innovation process. In this view, open innovation is placed eminently in start-ups (Chesbrough, 2002, 2012). Open innovation involves the following techniques: external partnerships, crowdsourcing, idea contests, co-creation, social media (blogging, wikis). Social media, Web 2.0 and Enterprise 2.0 (Mc Afee, 2006) have facilitated open innovation, collaboration, innovation eco-systems. Adner and Kapoor (2010) claim that social media, Web 2.0 and Enterprise 2.0 have facilitated open innovation, collaboration, innovation eco-systems. Kothandaraman and Wilson (2001) assert that knowledge management creates networks in which individuals, partners, clients, suppliers, competitors collaborate for knowledge creation. Velu et al (2013) note that innovation opportunities are stimulated, captured and exploited in eco-systems. Innovation opportunities are stimulated, captured and exploited in eco-systems (Ben Letaifa, 2014).

Start-ups in innovation ecosystems are financed by the lean start-up technique. As Mc Grath (McGrath and MacMillan, 1995, 2009) and Magretta (2002) point out, the lean start-up technique is suitable for an uncertain business environment, in which financing is based on hypotheses rather than a predicted business plan. Business plans are the classic financial management tools, suitable for a certain business environment. They are financed by equity and debt. The logic of the financing process is consistent with the Capital Asset Pricing Model. By contrast, business models are financed by venture capital. This has given the success of Sillicon Valley. Venture capital and other forms of risk capital are now available on an international basis, as a different type of capital employed than equity. Equity financing requires the complete forecast of the net present value of discounted cash flow. This involves a business plan completed with a five

years' forecast (Blank, 2009, 2013, 2014). Lean start-ups, in contrast, begin by searching for a business model understood as hypotheses to be tested, revised and discarded. Lean start-ups continually gather customer feedback and develop their products in agile mode. This approach asserts business plans are too rigid and challenged or contested by the contact with the customer. Business models involve design, test, pivot (Osterwalder, 2011). They define the stages in a start-ups life (Ries, 2010). The first stage is customer development, and involves seeking a business model, ending when the business model has been found. Customer building entails the following stages: customer development, via customer discovery, customer validation, customer creation, company building (Ries, 2010). This stage involves hypotheses. By the customer validation stage, a scalable business model has been found. Agile development is the next stage, where both the problem and the solution are known (Blank, 2009, 2013, 2014). The Build–Measure–Learn loop emphasizes speed as a critical ingredient to product development. A team or company's effectiveness is determined by its ability to ideate, quickly build a minimum viable product of that idea, measure its effectiveness in the market, and learn from that experiment. In other words, it's a learning cycle of turning ideas into products, measuring customers' reactions and behaviors against built products, and then deciding whether to persevere or pivot the idea; this process is repeated as many times as necessary. The phases of the loop are: Ideas → Build → Product → Measure → Data → Learn (Ries, 2011a, 1011b; Maurya, 2012). Most of the experimenting is realized via minimum pivot products, which has the goal to test hypotheses about the product, strategy, and engine of growth ideas that are used to build a minimum viable product.

Start-ups involve high risk and require risk capital, from institutions such as angel investors, family offices, venture capitalists and hedge funds (Blank, 2009, 2013, 2014). Venture capital is a type of private equity, a form of financing that is provided by firms or funds to small, early-stage, emerging firms that are deemed to have high growth potential, or which have demonstrated high growth (in terms of number of employees, annual revenue, or both). The open innovation model is tied to venture capital (Chesbrough, 2002). According to Chesbrough (2002), a corporate venture capital investment is defined by two characteristics: its objective and the degree to which the operations of the investing company and the start-up are linked. Valuation via venture capital means several opportunities are invested in, with just a percentage deemed for long-term success. This allows for high risk inherent to start-ups. Innovation will be successfully diffused in agile organizations, for example start-ups.

3. Research Methodology - Materials and Methods

A descriptive, analytical and instrumental case study is deployed on European project "Performance and excellence in the field of environment and renewable energy through modern cluster entities", SMIS number 138692, funded by the Romanian Ministry of Research, Innovation and Digitisation through the Operational Competitiveness Program (POC). The empirical data in the case study comes from this project. The case describes and analyzes the activities pertinent to innovation ecosystems of start-ups, as they have been subjected in the funding request. The focus of the case study are European project requirements, meaning the documents required by the European funding agency to approve the project. The instrumental nature of the case study comes from its utility to other European project calls.

4. Results

At future renewable energy cluster now in construction, the innovation support activities comprise several activities designated to support innovation: activities related to obtaining, validating and protecting patents and other intangible assets or activities of realization of expenses related to obtaining, validating and protecting patents and other intangible assets belonging to the cluster; consulting activities in the field of innovation - activities for making expenses for the purchase of consulting services in the field of innovation; the innovation support activity – the activity of making expenses for support services an innovation.

One of the activities in the innovation cluster is consulting: activities for making expenses for the purchase of consulting services in the field of innovation. This activity contains the sub-activity of purchases of general consulting services in the field of innovation - renewable energies. Consulting services in the field of innovation will be purchased within this sub-activity. It will appeal to the specialists in the field of renewable energy innovation belonging to the institutes national research institutes and universities in the country. Innovation knowledge will be extrapolated general applying in the field of renewable energies both in universities of prestige as well as within the institutes will call on the specialists who have obtained patents in the field. Consulting services will be purchased from legal entities that have already

implemented innovation in the field of renewable energies. Example: entities that have parks of photovoltaic cells, parks of wind power plants, producers of pellets and briquettes, producers of energy willow. The result is the general consultancy insurance contract in the field of innovation. They will acquire consulting services from legal entities that have already implemented innovation in the field of renewable energies. Example: entities that have photovoltaic cell parks, wind power plants, pellet and briquette producers, energy willow producers.

Another activity in the European projects is the service procurement sub-activity of consulting in the field of innovation in what regards the acquisition of intangible assets and the capitalization of the intangible assets of cluster. This is supported by several subactivities: the sub-activity of purchases of general consulting services in the field of innovation - the sub-activity of making the purchase of consulting services in the field of innovation - renewable energies; the service procurement sub-activity of consulting in the field of innovation in what regards the acquisition of intangible assets - the subactivity of acquisition of consulting services in the field of innovation regarding the acquisition of intangible assets for the cluster and capitalization of the intangible assets of cluster; the sub-activity of acquisition of consulting services regarding the use of standards and regulations that contain them; the sub-activity of acquisition of consulting services in the field of innovations, assistance and professional training regarding the transfer of acquaintances.

This begins with sub activity: the sub-activity of purchases of general consulting services in the field of innovation or the sub-activity of making the purchase of consulting services in the field of innovation and renewable energies. Within this sub-activity, the acquisition of consulting services in the field will take place innovation regarding the acquisition of intangible assets, for the cluster and capitalization them. We refer to the consultancy for the acquisition of know-how, namely knowledge from the field of databases from the field of ISI Thomson, Springer Ferlag, Scopus, etc. These knowledge they will use on the one hand to achieve innovation and on the other hand they will be put to the disposition of the cluster to carry out future technological transfer activities. Within this sub-activity, only consultancy for the acquisition of resources will be provided the most valuable in the field, and within the actual acquisition will be made that is, they constitute an indispensable innovation service. The result is the insurance contract for consultancy in the field of innovation as regards acquisition of intangible assets; to see the opportunity to purchase some assets intangibles, existing offers on the national and European market. It has exceptional importance because any innovation activity must take into account the reality and the current situation the world market. Result achieved through the following activities: the sub-activity of procurement of services consulting in the field of innovation regarding the acquisition of intangible assets. Conclusion on this activity: contract, result corresponding to activity B (according to the applicant's guide), the subactivity (from the Anticipated Activities chapter). The document that proves the receipt is the consulting contact.

The next sub-activity is the acquisition of consulting services regarding the use standards and regulations that contain them. Within this subactivity, specialists in the field of standards will be consulted regulations in the field of renewable energies: a – Solar energy; b - Kinetic energy of flowing river water; c - Wind energy; d – Biomass; e – Other forms. The result is the insurance contract for consulting in the field of innovation regarding the use the standards and regulations they contain. Thus, the standards in the field will be detailed pellets and briquettes, wind energy, solar energy, biomass, etc. Result are achieved through the following activities: the sub-activity of procurement of services consulting in the field of innovation regarding the use of standards and regulations that contain conclusion on arguments; contract. The document that proves the receipt is the consulting contact.

The sub-activity of acquisition of consulting services in the field innovations, assistance and professional training regarding the transfer of acquaintances. The applicant (beneficiary/applicant) will purchase these services. Within this subactivity professional training consultancy is offered in what concerns the transfer of knowledge, with mainly elements of learning pedagogy, general and special psycho-pedagogy. For example, the particularities of this knowledge, namely "green skills", will be emphasized. Green skills is a topic on the agenda of European research centers several years, and now the subject has become particularly important for employers as well, concerned with developing their businesses sustainably. In these countries the ILO – Institute International Labor Office and CEDEFOP – EU Research Center on Training the professional have already carried out studies at the country level for the estimated needs of green skills. It should be noted that these competencies generically called "green skills" are not addressed only a certain sector, or a few sectors; on the contrary, these skills have practically penetrated in every sector of the economy - agriculture, energy, manufacturing industry, services, etc. The requirement that these sectors modernize, and in their efforts to manage a

development sustainable, it is necessary to review the competencies of all employees, and to complete them their profile with additional skills compared to their technical skills, with a set of competencies green, thus contributing to the increase of the company's competitiveness.

The issue of sludge from the perspective of the circular economy follows an ambitious way of valorization of sludge regarding sustainable development through a correct management of sludges regarding the reduction (by drying), reuse (of the biosolid) and recycling (of the fraction Wet). With the increase in the amount of sludge, the problem of their management is highlighted, because there is a risk of endangering environmental factors: water (underground through seepage, and surface through leaks), air (aerobic fermentation through gas release), soil (infestation through uncontrolled storage). Sludge collection starts from the first stage of purification, the sedimentation consisting of three layers: one clear without suspensions and another in thickened suspensions and the decanted one i.e. sludge. Romanian legislation provides by Order no. 591/2017 solutions for the recovery of sludge and clearly identify the types of sewage sludge: 1 - sludge from wastewater treatment plants in localities and from other treatment plants wastewater treatment, with a composition similar to urban wastewater; 2 - sludge from septic tanks and other similar installations, for purification waste water; 3 - sludge from sewage treatment plants, other than those mentioned in points 1 and 2; 4 - sludge treated by a biological, chemical or thermal process, by long-term storage or by any other appropriate procedure, which would significantly reduce their power of fermentation and the health risks resulting from their use.

A major advantage regarding sludges is the fact that they contain significant amounts of beneficial nutrients for fertilization: organic matter, fertilizing elements (N, K, P, etc.) and microelements (iron, manganese, copper, molybdenum, etc.). But it must be specified that, in addition to the content of nutrients, these sludges may contain and agents such as: toxic metals, pathogenic microorganisms, persistent organic compounds. To avoid the possibility of infesting the soil, crops and groundwater with pathogenic germs, parasite eggs and toxic substances, a series of measures must be taken: sterilization and destruction of all species of microorganisms (incineration, thermally conditioned, thermal dehydration); disinfection and decontamination of sludge by destroying pathogenic germs (pasteurization, treatment with chemical agents). Handling (unloading or loading) sludge presents a risk in the sludge transfer procedure, the main cause being the viscosity of the sludge and increased humidity. Temporary storage is carried out at the place of waste generation, the sludge being then transported to other destinations for treatment, disposal or reuse. Waste-sludge management from the perspective of the circular economy follows the procedures of valorization: technological valorization (recovery of industrial products), energy valorization (secondary and renewable energy resources) and capitalization in agriculture and animal husbandry (fertilizer, feed, etc.).

The result is the consulting insurance contract in the field of innovation for assistance and professional training in knowledge transfer. By courses are held, meetings with specialists, printing a professional training course and a guide in the field renewable energies, training courses within renewable energy entities. Result achieved through the following activities. The sub-activity of procurement of services consulting in the field of innovation for assistance and professional training in the transfer of knowledge. Conclusion on contract, result corresponding to activity B (according to the applicant's guide), the subactivity from the Anticipated Activities chapter. The document that proves the receipt is the consulting contact.

The next major support activity is the activity of making expenses for support services a innovation. This contains subactivities: innovation services sub-activity through data banks, libraries; innovation services sub-activity through labs; innovation services sub-activity through more effective processes and services includes services subactivity to support innovation - testing costs and quality certification for development purposes of more products, processes or services effective.

Within subactivity innovation services through data banks – the expenditure realization sub-activity for services is to support innovation through data banks, libraries. The applicant (beneficiary/applicant) will purchase these services. Within this subactivity access to prestigious institutions (universities, national research institutes and international) that will offer the know-how and services that we cannot offer with the resources material and human available in our institutions: the extension to the know-how international, know-how materialized through: access to the libraries of prestigious institutions, access to doctoral theses, access to indexed research journals, scientific works published in different journals and conferences and classified in different type databases: ISI Thomson, SCOPUS, Copernicus, etc.;

patents for inventions / innovations, international doctorates, other rights intellectual property, feasibility studies developed by prestigious institutions, studies at prestigious universities, consulting and long-term cooperation. We appreciate that without information updated in the field, present in these databases, it is not possible to carry out a subsequent innovation of real technological transfer. Results are: benefiting from access to the libraries of prestigious institutions, access to doctoral theses, access to indexed research journals, scientific papers published in various journals and conferences and classified in different type databases: ISI Thomson, SCOPUS, Copernicous, etc.; patents of inventions / innovations, international doctorates, other intellectual property rights, studies of feasibility developed by prestigious institutions, studies at prestigious universities, consultancy and last generation services. Result achieved through the following activities is: the sub-activity of innovation services by data banks. Conclusion on the contact/contracts, result corresponding to activity B (according to the applicant's guide), subactivity B.4.1 (from the chapter Anticipated activities). The document proving the receipt is the contact/contracts.

The sub-activity of innovation services through labs involves the applicant (beneficiary/applicant) will purchase these services. Within this subactivity will appeal to the specialized laboratories in the field belonging to the national institutes of research and universities in the country, laboratories in the following fields: a. Solar energy: a1. Solar systems with the concentration of solar rays; a2. Photovoltaic systems; b. Kinetic energy of flowing river water; c. Wind energy; d. Biomass; e. Other forms. Access to high-performance equipment is also proposed for: measuring calorific power using special calorimeters; determination of the chemical compositions of the various raw materials and the residues resulting afterwarded combustion; determination of noxes following combustion. Benefiting from access to the specialized laboratories in the field belonging to the institutes national research institutes and universities in the country, laboratories in the following fields: a. Solar energy; b. Kinetic energy of flowing river water; c. Wind energy; d. Biomass; e. Other forms. Access to high-performance equipment is also proposed. Result achieved through the following activities: the sub-activity of innovation services by laboratories. Conclusion are contact/contracts, result corresponding to this activity (according to applicant guide). The document proving the receipt is the contact/contracts.

The sub-activity of innovation services through more effective processes and services – services subactivity to support innovation - testing costs and quality certification for development purposes of more products, processes or services effective. Within this sub-activity, entities with the latest generation services will be called upon to provide them incorporate the current know-how in the products and processes offered. Examples: creation of the latest generation know-how, quality testing of pellet type products and biomass, etc. Predicted results are: within this sub-activity, entities with the latest generation services will be called upon to provide them incorporate the current know-how in the products and processes offered. Examples: creation of the latest generation know-how, quality testing of pellet type products and biomass, etc.

5. Discussion

Along with the advent of the New Economy, the classic economic environment has evolved from certainty to risk and uncertainty, via designated management tools. In a certain environment, equity and debt capital are invested in cash flow and its net present value is computed. This means that all elements of the statement of cash flows are predictable. In an uncertain environment, hypotheses replace the business plan. Building hypotheses may be a definition of business models. For centuries, venture capital has been the hallmark on the Sillicon Valley and the explanation for its success. With the lean start-up movement, venture capital becomes available globally. Venture capital is a different form of capital than equity and debt. It does not suit shareholders but risk capital providers. Venture capital assumes bets on the winners of valuation, requiring business models or hypotheses for the funding effort. The proponent of venture capital, Chesbrough, argues open innovation creates networks of start-ups that are exceptionally suitable for venture capital funding. Network or ecosystem business models are suitable for start-ups. The proponent of ecosystems, Ben Letaifa, and Deloitte argue ecosystem value created in synergy far exceeds the value created by the constituents. The lean start-up in intended to stimulate innovation in start-ups and start-up networks. Empirical data shows European funds fund start-ups via several options, fund start-up incubators and ecosystems of start-ups. The programs are complex and designed to stimulate start-ups with free capital. Empirical data analysts shows concrete activities to support and incentivize start-ups that the start-up incubator intends to engage in.

6. Conclusion

Ecosystems of start-ups are incentivized by minimum documentation requirements for funding and by European funds. Literature review and empirical data analysis via European funding practices show that value creation has shifted from individual companies towards steering the ecosystem in all. A frequent from of ecosystems refer to innovation ecosystems, and open innovation via venture capital remains primer. Science needs to be enriched with research about steering ecosystems and the type of activities to be conducted therein.

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