



A ROADMAP TO A SUCCESSFUL INCUBATOR

edited by

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CAN ENTREPRENEURSHIP BE TAUGHT?

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Abstract: *Although most people still believe that entrepreneurship is ‘an innate talent coded in your genes’, the interest in entrepreneurship education has only grown over the last decade. Entrepreneurship is an experiential subject that requires learning by doing. EU Modernization Agenda lists; stimulating the development of entrepreneurial, creative and innovation skills in all disciplines, promoting through more interactive learning environments, strengthening the knowledge-transfer infrastructures and enhancing their capacity to engage in start-ups as priority areas for higher education institutions in an attempt stimulate entrepreneurial thinking and reduce youth unemployment. Entrepreneurial teaching must focus on offering an ecosystem where people can learn and acquire the skills they need to reach their goals and become their future selves through interaction with peers, mentors and role models.*

As youth unemployment rates increase and governments struggle to create new jobs entrepreneurship becomes the best employer. Entrepreneurship is defined as ‘the capacity and willingness to develop, organize and manage a business venture along with any of its risks in order to make a profit.’ by Business Dictionary. EU Modernization Agenda lists; stimulating the development of entrepreneurial, creative and innovation skills in all disciplines, promoting through more interactive learning environments, strengthening the knowledge-transfer infrastructures and enhancing their capacity to engage in start-ups as priority areas for higher education institutions in an attempt to stimulate entrepreneurial thinking and reduce youth unemployment.

Although the interest in entrepreneurship education has only grown over the last decade, the ongoing debate that entrepreneurship is ‘an innate talent coded in your genes’ supported by stories of successful alpha wolves and young college drop-out entrepreneurs set many back from trying to become one. They are held back by the idea that entrepreneurship can only be learned by doing in the real world and the skills an entrepreneur needs to be successful go beyond the finance, accounting and economics that are taught in classroom safety and certainty. People believe that only flamboyant personalities with charisma, vision and courage can become entrepreneurs.

On the other end, people debate that entrepreneurial skills can be learned and mastered over time through experience and they support their idea with the success of MBA

programs that have been teaching business for decades. In 1932, Ralph Heilman in his article titled 'Can business be taught?' advocated analyzing, resolving and organizing what worked for successful businesses and teaching them in class, and that is how business have been taught ever since. Heilman's approach is similar to the way scientists understand nature. Scientists observe nature, analyze, experiment and formulize their findings and mimic it to find solution for daily problems. This approach can very well be applied to entrepreneurship and as Peter Drucker, who taught management to world, said on entrepreneurial training, 'It's not magic, it's not mysterious, and it has nothing to do with genes. It's a discipline, and like any discipline, it can be learned.' If practical subjects such as medicine and law, which require theoretical, practical and real life knowledge, can be taught in class, why cannot entrepreneurship?

Some people, rather than siding with one of the opponents of this debate, argue that genetic factors are essential for becoming successful entrepreneurs, but qualifications required to create a successful and viable business, such as technical and financial competencies, must still be acquired. They believe that entrepreneurs who get such education are more likely to pay attention to detail, and secure their start-up on a more rigid foundation.

Maybe the better question to ask is: 'How entrepreneurship must be taught?'

American philosopher Henry David Thoreau argues that people are born with a drive to succeed. Therefore, students must be given a purpose and be inspired to benefit from their education in reaching their utmost potential. High-level basic or transversal competences that are also called the 21st century skills are a set of abilities that young students need to develop in order to succeed in the information age. The rapid changes in our world require students to be innovative and flexible to adapt to changes in technology. To hold information-age jobs, students also need to think analytically, solve problems creatively, work in teams, communicate clearly in many media and deal easily with a flood of information. Skills enable people to reach higher goals and give them the capacity to function. Both cognitive/basic and noncognitive/transversal skills may be shaped and changed over the life cycle. Greater levels of skills foster social inclusion and promote productivity. Skills give young people the tools to shape their lives and achieve their full potential.

As it is difficult to assess these skills in a regular stream of course work, the main focus must be shifted to improvement of these skills through extra or co-curricular activities and real life experiences. These activities, which allow hands-on or on-site experience, such as internship or mentorship programs, reinforce the attainment of effective learning outcomes. A coherent model for integrating non-cognitive skills in the classical curriculum should serve as the basis for the development of transversal skills.

Entrepreneurship is an experiential subject that requires learning by doing. Academic environment is advantageous as it offers a risk-free space for exploration of ideas

without the practical necessity of a specific outcome. You might not be able to teach entrepreneurship in class, but you might stimulate someone's imagination and get it initiated there. Nevertheless, entrepreneurial education must at least give a sneak peek to real world experience. Therefore, it is important to create entrepreneurial ecosystems engaged in market with incubators and accelerators that provide teaching, mentoring, networking, and funding opportunities. These ecosystems meet all requirements of David Kolb's experiential learning cycle, published in 1984; concrete experience, reflective observation of the new experience, abstract conceptualization and active experimentation. Thus, people would have the chance to observe what it takes to start a business and plan and execute their ventures by making use of readily available experience, resources and information at those hubs.

It is undeniable that some people are more predisposed to becoming entrepreneurs and succeeding at it. Like any skill or field of study, entrepreneurship can be taught and not necessarily in schools. Most self-made entrepreneurs learn from immersing themselves in an environment and creating learning experiences. It is important to note that, a great percentage of entrepreneurs, not necessarily those ones making millions of dollars at Silicon Valley, start their ventures just because of economic necessity and lack of education to get employed.

Entrepreneurial teaching must focus on offering an environment where people can learn and acquire the skills they need to reach their goals and become their future selves. The new methodologies created by entrepreneurs, such as Alexander Osterwalder's Business Model Canvas and Eric Ries' Lean Startup, also help students engage in market to build their business model over time. No amount of practice can completely prepare someone for starting and running a business in real world that is extremely unpredictable. However, being as prepared as possible help lower the risks and enable you to survive worst conditions.

Even the critics support instilling business principles and entrepreneurial basics in youth of all backgrounds and personalities. Experiential entrepreneurial training given at schools, incubators and accelerators help people acquire necessary knowledge and skills while honing their best and curtailing their worst. They offer optimal conditions for learning to happen, bringing together talented and experienced people and providing them with the resources that they need to succeed. In that environment, students can get to know an industry and people in that industry. They would learn to judge each day by the seeds they plant instead of the harvest they reap.

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THE LINKED FATES OF INCUBATORS AND OF THEIR INCUBATED FIRMS

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***Abstract:** I argue that incubators, as higher-level entities, should have their own business models, in addition to influencing the business models of the incubated firms. I also discuss the multiple and important roles that the incubator managers plays in the lives of the incubated firms. I review evidence on the impact of incubation on the business success of the firms during their post-incubation lives.*

A macro-environment that is conducive to innovativeness

The inability of the European Union countries to catch up or win in the innovation race with the United States is puzzling. The problem persists in spite of substantial funding efforts and numerous initiatives on the part of the EU. I believe one of the main causes is not lack of material support but insufficient emphasis on developing appropriate organizational culture, i.e. the soft skills. This is indeed ironic, since changing organizational cultures requires only modification of mental attitudes, not costly investments in infrastructure etc. Traditional and non-innovative modes of thinking dominate not only in universities and governmental institutions, but also in R&D organizations, think tanks and foundations.

Amazingly, even European start-ups, when they are created by academically trained entrepreneurs, often develop organizational customs and informal behaviors that, unwittingly, resemble those dominating in the more traditional academic institutions. The typical features are: a hierarchical pecking order, hierarchy based on age and title rather than accomplishments, and cross-disciplinary or even cross-institutional links greeted with suspicion. This is a recipe for stagnation, not innovation.

Innovation-oriented research is expensive and often no longer has the enviable characteristic of being financed-by-the-state-so-it-makes-no-difference-if-anything-useful-comes-out-of-it! There are important criteria that should be taken into account. How much of actual R&D effort in Europe, compared to the U.S., is covered or supported by competitively-assigned grants rather than government subsidies? Where do the funds

for R&D come from: the state or industry? What fraction of all research carried out in Europe has clear practical application? These questions have quantitatively different answers in different European countries, but they are criteria by which European innovativeness should be judged.

In contrast, even those American universities (such as Harvard University) that place great emphasis on cultivating traditions and customs, have established new policies and organizational culture which ensure energetic and vigorous commitment to pushing the innovation frontier. Mentioning here the innovation-oriented and youthful entrepreneurial cultures of the Silicon Valley or the Kendall Square area in Boston would be stating the obvious. Most new companies there are founded not by professors, but by graduate students and recent PhDs. What makes Kendall Square and Silicon Valley great is young dynamism and egalitarian culture, in addition to standards of quality kept in check by experienced venture capital managers.

I argue that the workplace to form environment conducive to innovativeness should possess certain characteristics and they are described in chapter XX of this volume. I then ask how to build the environment conducive to innovativeness? The policy makers should put emphasis on funding workshops of soft skills, i.e. of training non-autocratic management styles and creative/heuristic methods, both at the level of business incubators and of individual firms. I believe it is possible to train managers to be “softer” and to train employees to be more creative (and some applicable approaches are described in other chapters of this book). Finally, scientific funding agencies in each EU-member country should be required to create cross-disciplinary grant panels – a lack of such venues means that many truly innovative research proposals never receive a fair chance of funding.

Academic entrepreneurship must be friendly to young minds (based on Jasiński, 2014)

Of all the varieties of entrepreneurship, the, so-called, “academic” entrepreneurship is growing in importance because we are past the romantic era of garage-based, intuitively innovative inventors. Intuition and tinkering just do not cut it any more. Competences required in biotechnology, nanotechnology, telecommunications, robotics etc., or, in other words, in the fields which propel our civilization forward, begin at the PhD level. There is no way around it. One could say poetically that all the low-hanging apples were already picked or fell on the heads of 20th-century Newtons. Whatever is left to be discovered and turned into innovations in this century, cannot be reached without sophisticated, high-quality research. The miraculous graphene is, of course, the perfect example of such new and demanding innovation.

Emphasis should be placed on developing criteria of professional quality more strongly based on verifiable, quantitative methods, and applying them to academic entrepreneurs and academic consultants (see Jasiński, 2013 for a detailed review of various bibliometric

tools, such as the famed h-index). Quantitative tools used for measuring scientific quality of researchers usually provide unequivocal evidence for the non-existence of the local academic celebrities on the global scene. Furthermore, their “firms” use up resources of technological parks or incubators, but are just official venues for private consulting offered by professorial experts, and are not meant to grow and turn into real enterprises. Incubator managers should weed such firm out.

Bibliometric criteria should be used by the EU agencies in selecting candidates for their governing and advisory boards. Importantly, such decisions should not be made at the level of the participating countries, but by the EU agencies themselves. This procedure would allow excellent researchers to be freed from limitations of their local national hierarchies and social barriers. Until we start seeing in Europe young, blue jeans- and sneakers-wearing graduate students as the true academic entrepreneurs, we will be stuck in this stuffy, hierarchical world of academic pseudo-business activity.

Incubatees and the incubator itself should have their own business models

A new wave of thinking in business is focused on business models (BM). Each company, big and small, should have one, but most do not even know what BM is or confuse it with the concept of a business plan. BM is an integrated description of the way an organization functions, integrating knowledge about its external and internal processes and resources. It is essential for modern organizations, because its main goal is clearly specifying how to create value for the customers, whatever they may be. I want to argue here that business incubators should also work on developing their own BMs if they are to be effective players in a modern, innovation-driven, entrepreneurial environment. They have a role to play as creators of that environment.

According to Osterwalder and Pigneur (2010), who proposed a popular approach to BM known as “Canvas”, nine building blocks should be distinguished to make a BM truly comprehensive, beginning with the one of fundamental importance, i.e. the “customer value proposition” that addresses the customers’ needs. “Customer segments” are well thought-through groups of people whose needs the firm aims to serve and tries to reach through appropriate and efficient “channels” of communication. “Key resources” that the firm should have at its disposal may be of physical, financial, intellectual or human kind. They make creating and delivering value possible, by engaging certain “key activities” and with full awareness of the financial aspects („cost structure” and „revenue streams”). Reaching outside the firm, “key partners” (collaborators and suppliers) form a network actively cultivated by the firm’s managers. Maintaining “customer relationships” requires equal attention, since it is in the firm’s best interest to keep the customers satisfied for a long time.

However, the incubator itself, as a separate and real business entity, should possess and work on its own *modus operandi*. The BM of an incubator should comprise all building blocks, with interesting twists. The customers of the incubator, its key resources and

often its key partners are the very same firms that are parts of it. This all does not mean that we call for encircling incubator members with a rigid corset of incubator-imposed rules, procedures and regulations. That would be a disaster. The incubator's form of functioning should be protective, ensuring (intellectual and physical) safety for the firms, not restrictive or stressful. Such firms should feel the friendliness of the incubator's environment.

An optimal business model of a incubator must, therefore, as its key activities and a fundamental value offered to its own firms, emphasize those activities that foster and cultivate social capital among the incubated firms. The incubator's goal should be to reach a critical threshold of venture capital, human capital, and inter-organizational connections. The one word that captures the essence of social capital is "trust". Once the incubator managers succeed in building such social connectedness, the magic of incubator synergy begins.

Incubation should lead to a reinvention of business models – for incubatees and the incubator

So, a challenge in the world of business is to keep a BM fresh and dynamically adjust it to the fluctuating business environment. However, the reinvention of BMs of individual members of an incubator, even though it looks progressive, is not sufficient. The BM of their incubator must also go through the same process.

How can a business enterprise, of any size and of any level of complexity, from a simple startup to a technological park and an incubator, rethink its BM? There are no universal recipes, but there are universal tools that take the form of either broadly applicable informal tricks or quite formal, algorithm-like, procedures. Informal tricks begin with such semi-serious ideas like "casual Fridays" which intuitively sounds like a great way to introduce some creative "fizz" into organizational culture. Formal procedures are based on actual research, not only intuition, and more explicitly modify one or many aspects of a business model.

One rich source of ideas on how to reinvent a BM is the methodology of TRIZ by G. Altshuller (1979), derived from engineering. Its author proposed 40 unique inventive principles, i.e. specific actions that may increase the chance of eliminating a particular technical problem, such as when reducing a construction element's weight lowers its mechanical rigidity. One may use one's imagination and translate them into situations relevant for managers. For example, the principle "Counterweight" (when an object can be made lighter by combining it with another) could stimulate us to suggest that one may improve the reputation of the firm by associating its brand name with a „lofty“ cause. Elsewhere we present many other ideas of how to use the TRIZ method in business and management (Jasieński & Rzeźnik, 2014).

Larry Keeley and other authors of the concept of "Ten Types of Innovation" (2013; see also Jasieński & Rzeźnik, 2016), developed over 100 tactics (below we mention their

names in italics) that are meant to be used as tools of reinvention. For example, rethink your organization's customer value proposition and decide which basic services could be offered for free... How can it possibly be a viable business strategy? It cannot be, unless the profit model (called *freemium*) includes charging money for advanced or special features (like with Dropbox or Skype). The incubator may help its firms by facilitating their access to *crowdsourcing* options, by sharing costs of protecting their intellectual property or by introducing the practice of *standardizing* the resources or processes used by the member firms to reduce their costs by benefiting from economy of scale.

The incubator could stimulate *coopetition* (Brandenburger & Nalebuff, 1996) among its member firms, a somewhat counterintuitive interaction in which competitors cooperate. Can it make business sense? It turns out that mutual benefits from joining forces and resources by competing firms may more than compensate the losses from limiting competition between them. Also, the marketing idea of *co-branding*, when firms combine their brands to improve each brand's credibility, may be more easily realized in the context of an incubator. Further, the incubator could also help its members build shared *competency centers* and shared *outsourcing* options, or create shared centers to implement BigData-based *predictive analytics* to detect or model market trends (benefiting each firm separately, but using shared software, hardware and specialists).

The many roles of incubator managers

I present below a brief discussion of research on the theory and practice of business incubators (BI), published in top academic journals during the last 10 years (2008-2017). The most relevant references about BIs in specific countries of the world are compiled in the Appendix.

Collaboration or an iterative dialogue between incubator managers and the incubatee leaders is needed to enhance the firms' absorptive capacity, i.e. their "ability to recognize the value of new information, assimilate it, and apply it to commercial ends" (as defined by Cohen and Levinthal, 1990), ultimately improving their business models (Patton, 2014). Also important is increasing the incubatees' financial knowledge and the skills of raising capital (Rubin et al., 2015). The role of BIs' managers as coaches who create learning environment for incubatees is critically important (Patton & Marlow, 2011; Scillitoe & Chakrabarti, 2010).

Paradoxically, the abundance of resources available to the incubated firms does not solve the problem of how to make these resources work. They are often waiting for the recipients. The entrepreneurs are often unable to specify their needs and they tend to be also short-term oriented (van Weele et al., 2017). Furthermore, the incubatees differ and, consequently, the resources may not be transformed into real benefits unless the incubator managers can tailor their offerings to the individual entrepreneurs, as argued by Monsson & Jorgensen (2016).

Also, the BI types (basic research, university, economic development, or private) differ

in specific business issues characterizing them, so their managers should have a clear understanding of the type of BI they run. For example, the BI type may affect what kinds of innovations are more likely to be developed there (for details see Barbero et al., 2014). Public BIs offer physical resources, space and know-how to incubatees at prices below market value, so they may not be economically profitable. However, their social profitability may be substantial. For example, a study of 40 incubators in the Spanish Valencian Community showed that each euro spent on entrepreneurship brings 2.8 euro collected via taxes (Sentana et al., 2017). At the same time, the government-supported incubators were found to be less effective than those managed by business professionals in providing consulting and networking services, even though they provided sufficient infrastructure and administrative support (Tang et al., 2014; but see Zhang & Sonobe, 2011, who did not find differences in effectiveness between university-based and government-supported technology BIs in China)). Likewise, the regional-development incubators did not meet the objectives for which they were created, in contrast to private, basic-research, and university BIs (Barbero et al., 2012). Kim & Jung (2010) discuss how the local government and the BI's management should build the collaboration to improve the effectiveness of the BIs.

Such diversity of types of BIs and of economic contexts in which they function makes it really difficult to formulate universally applicable recommendations about how to run incubators. Nevertheless, some suggestions for the incubators' managers can be formulated. For example, a longitudinal study of 131 technology-based firms from 16 incubators in Sweden showed that developing patents at early stages of the firms' life was very significant for their survival (which was found to be 55% during the 8 years of the study; Lofsten, 2016). Incubators' role may extend also to broader value creation, such as strategy building, internationalization, or positioning the incubatee in the value chain, thus going beyond the strict incubation activities (Baraldi & Havenvid, 2016). There lies the role that the incubator managers can play when providing advice to the incubated firms.

Clarifying who the actual customer of the incubator is (the incubated firms? local governmental agencies?) would certainly help in defining the role of BIs in the local economy (Aaboen, 2009). At the same time, disputes caused by a lack of clarity with respect to the share ownership (in the case of corporate incubators) or to the value of intellectual property added to the firm by the incubator may hinder the incubation process (Branstad & Seatre, 2016).

The composition of the incubatee population is an outcome of the selection process carried out by the BIs management that weighs the benefits and disadvantages of specialization and diversification. The criteria (such as profitability, survivability, or worker absorption) used by the managers when selecting the firms should be taken into account, together with the incubator's business philosophy and business goals. Selection of firms for incubation may be driven by idea-focused or entrepreneur-focused approaches, and

management philosophies of BIs leaders may also vary, from the “laissez-faire” to “strong intervention” strategies (Bergek & Norrman, 2008). There is evidence that properly conducted by BIs managers multi-criterion screening/selection processes lead to greater incubatee success (Wulung et al., 2014).

An impact of incubation on future prospects of incubated firms

In general, it is not easy to assess the impact of the incubation period on the firm’s survival and growth. An ideal way, but logically impossible, would be to simultaneously assess the economic growth of a firm outside and inside of an incubator. Using a comparative approach, one study showed that e.g. job creation was higher in incubated (versus non-incubated) firms (Stokan et al., 2015). Roig-Tierno et al. (2015) documented positive effects of the support infrastructure (such as incubators) on firm growth in a sample of 107 young innovative firms. However, there is conflicting evidence about the impact of BIs on the long-term survival of incubator firms.

A study compared 371 firms that were graduates of 5 German BIs with 371 comparable non-incubated firms. Paradoxically, support received by incubatees was for 3 BIs actually associated with lower chances of survival (Schwartz, 2013), as if the incubation period made the firms less skillful in facing the challenges of “real life” after graduation. Schwartz (2011) used employment and sales data in a study of 324 firms graduated from German BIs and found no evidence of sustainable and strong performance of such firms in the post-incubation period. Similar conclusions can be drawn from a study of 65 incubated and 90 non-incubated firms in Italy (Salvador & Rolfo, 2011). In general, however, incubation by itself cannot significantly affect the survival of the firms (Mas-Verdu et al., 2015).

It is certainly not the richness of resource provided in abundance by the sponsors (in this case – by the incubators), but a more nuanced fit of the resource base and the organizational characteristics of the recipient firms (Amezcuca et al., 2013). Providing money is not enough: resources made available by the BI do not compensate for low innovativeness of the firms (and vice versa), but when both are present, then the growth of the firms is higher (O’Cass and Sok, 2014). However, an incubation environment that is too protecting, thus isolating the incubatees from key resource dependencies, may prevent the firms from maturing and ready to face the challenges upon graduation from the incubator (Lasrado et al., 2016).

Appendix - Incubators in various countries: selected academic publications from the Web of Science journals from the years 2008-2017

country	references
Australia	Rubin et al. (2015)
Brazil	Fonseca & Jabbour (2012); Carvalho & Galina (2015); Allahar & Brathwaite (2016); Fernandes et al. (2017); Ferreira et al. (2017)
Canada	Sa & Lee (2012)
Chile	Allahar & Brathwaite (2016)
China	Zhang & Sonobe (2011); Lin et al. (2012); Tang et al. (2013); Tang et al. (2014)
Czechia	Prochazkova (2012)
Denmark	Monsson & Jorgensen (2016)
Europe	Aernoudt (2004); Pauwels et al. (2016); van Weele et al. (2017)
Germany	Schwartz & Hornych (2008, 2010); Schwartz (2009, 2011, 2013); Schwartz & Gothner (2009); Zolin et al. (2011); Schmidt et al. (2014); Heinrichs et al. (2015); Tsaplin & Pozdeeva (2017)
Greece	Avdikos & Kalogerisis (2017)
India	Tang et al. (2013)
Indonesia	Gozali et al. (2016)
Iran	Ghasemizad et al. (2011)
Israel	Frenkel et al. (2008); Gimmon & Levie (2010); Rubin et al. (2015)
Italy	Salvador (2011); Salvador & Rolfo (2011)
Kazakhstan	Radosevic & Myrzakhmet (2009)
Lithuania	Gstraunthaler (2010)
Netherlands	Soetanto & Jack (2016)
Norway	Soetanto & Jack (2016)
Poland	Siemieniuk (2016)
Portugal	Ratinho & Henriques (2010); Carvalho & Galina (2015)
Russia	Tsaplin & Pozdeeva (2017)
Saudi Arabia	Khorsheed et al. (2014)
Slovakia	Lesakova (2012)
South Africa	Ndabeni (2008); Chakma et al. (2010)
South Korea	Kim & Jung (2010)
Spain	Sanchez et al. (2014); Fernandez et al. (2015); Albort-Morant & Oghazi (2016); Sentana et al. (2017)
Sweden	Bergek & Norrman (2008); Baraldi & Havensvid (2016); Lofsten (2016)
Taiwan	Tsai et al. (2009); Wann et al. (2017)
Thailand	Somsuk et al. (2012); Wonglimpiyarat (2016)

Trinidad and Tobago	Allahar & Brathwaite (2016)
Turkey	Ascigil et al. (2011)
UK	Patton et al. (2009); Soetanto & Jack (2013, 2016); Minguillo et al. (2015); McAdam et al. (2016)
Ukraine	Tulchinska (2015)
USA	Aernoudt (2004); Hackett & Dilts (2008); Qian et al. (2011); Lasrado et al. (2016); Tsaplin & Pozdeeva (2017)

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Michal Jasienski (please see the profile on page 104).

INTRODUCTION TO UNIVERSITY KNOWLEDGE AND TECHNOLOGY TRANSFER

“THE ROLE OF TECHNOLOGY TRANSFER: LINKING ACADEMIA AND THE CREATION OF NEW BUSINESS”

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***Abstract:** This chapter presents an overview of the evolution of the University knowledge and Technology Transfer process by which innovative academic research results flow to industrial applications and public use. The role of Technology Transfer offices in nurturing entrepreneurial culture and boosting the establishment of new high-tech companies is analysed, also through the presentation of the Politecnico di Torino's models and experiences.*

Academia is no longer an “isolated island of knowledge” (Klofsten & Jones-Evans, 2000), but it has become “an economic actor in its own right” (Etzkowitz, 2004), playing an active role in the innovation ecosystem and increasingly often taking the lead in the innovation process and becoming the reference point for all the other actors. In this framework, knowledge and technology transfer plays a crucial role, and Universities’ strategic goals are changing, shifting their knowledge production towards problem-oriented research. The aim is to commercialize their outputs while playing an important role in spreading innovations into society. This university paradigm is expressed by the triple helix concept regarding university-industry-government collaboration.

As a general definition, the mechanisms of technology transfer include joint laboratories between academia and business, spin-offs, licensing of Intellectual Property, research contracts, mobility of researchers, joint publications, conferences, informal contact within

professional networks, and a flow of graduates to industry (Heinzl et al., 2008). Bercovitz & Feldman (2006) also identify sponsored research, hiring of students and serendipity as other mechanisms of technology transfer.

Both faculty and students can serve as academic entrepreneurs in the process. Graduate and post-doctoral students may be especially crucial to university spinoff development, particularly in the early stages (Boh et al., 2012). Universities can improve technology transfer and entrepreneurship by following guidelines such as aligning the objectives of the university, technology transfer office, faculty and graduate students; leveraging all potential university resources; encouraging graduate students to see technology commercialization as a career option (Boh et al., 2012).

The evolution of Technology Transfer

The Technology Transfer process has evolved following the key economic and technological moments of the last 40 years that have influenced the collaboration between Industry and University. This development of technology transfer activities has also depended on the strategies that governments and public bodies have implemented in order to support the transfer of academic inventions to industry and to foster the commercial development of these inventions.

In general, the first input for the whole transformation process began in the USA in 1980, when the Bayh-Dole Act was approved. There has been a huge difference in the approaches of universities to the transfer of technology, but collectively they enforced their patenting and licensing activities and over time they have developed other instruments and strategies to commercialize academic invention and foster academic entrepreneurship.

In the last 35 years, Technology Transfer has grown to include technology development, entrepreneurial training, start-up incubation and funding, industry collaborations, and business development. The overall process has been influenced in each region/country by the specific public policy and legal framework adopted in order to foster the collaboration between universities and the private sector. The aim was to avoid the lack of exploitation of knowledge and technologies developed by the public research institutions and to strengthen the innovation ecosystem. In this regard, both in the USA and in Europe there have been significant changes in legislation and policy related to Intellectual Property Rights, development of Technology Transfer Offices, creation of regional clusters, science parks and funding schemes for industry-science collaborations.

Five principal levels of technology transfer evolution can be defined, starting from the first experiments in the USA in the 1980s until now, and all of them are still used depending on the context and policy of each university.

Technology Transfer 1.0

The first and most famous example of a regulatory provision concerning Intellectual

Property Rights on university inventions is the Bayh-Dole Act, issued in the United States in 1980, with the aim of increasing the percentage of patents filed and exploited by universities and research bodies.

The Bayh-Dole Act was in response to the fact that there were thousands of patents owned by the U.S. Federal Government that were not being commercialized. The intention of the act was to boost the economy through the commercialization of patents resulting from University research.

This change of paradigm is at the origin of the activities of the Technological Transfer Offices as we know them today. The Bayh-Dole Act has granted Universities and non-profit organizations the right to hold intellectual property rights over inventions arising from publicly funded research, in return for a commitment by universities to make greater efforts to commercialize the patents. This regulatory provision has therefore allowed American universities to directly manage the exploitation, including commercial exploitation, of the results of their research, as well as to freely use the proceeds deriving from this exploitation of the results, without prejudicing the distribution of a share of these proceeds to the inventors.

The European Union, in the strategies and indications to the Member States adopted since the 1990s to overcome the so-called “European paradox”, has placed the emphasis on the need to standardize between the Member States the systems of ownership of academic inventions. From this point of view, the majority of European countries have adopted legislation along the same lines as the Bayh-Dole-Act, thus attributing the ownership of academic inventions directly to the universities.

Therefore, from the late Eighties, universities have focused mainly on patenting and licensing, following the new momentum provided by the Bayh-Dole Act and similar legislations. The involvement of faculty members in the technology transfer process was one of the main issues to address, with the aim of moving from the research-for-research-sake to the actual implementation of the inventions as patentable and marketable innovations. Marketing the technologies, for most universities, was limited to providing brief non-confidential summaries or advertising brochures to companies and, in more advanced cases, using networks of contacts in business and venture communities to increase awareness of the outcomes of the research carried out in their labs.

Technology Transfer 2.0

The need to strengthen relationships with industry, as well as to protect non-patentable research results and to develop tailored communications to different stakeholders along with the existence of a more entrepreneurial university community, were the main drivers of this next phase of the Technology Transfer Offices. This phase was characterized by the increase in industry-sponsored research and in technology licensing to faculty-owned startups.

Technology Transfer Offices were increasingly involved in negotiating industry sponsored research agreements. The negotiations principally addressed intellectual property related issues such as ownership and licensing. They still relied on the support from external law firms and faced the bargaining power of big firms that considered University research as a cheap way to introduce new technologies and ideas into their R&D departments.

In the same period, driven by the desire to address the “valley of death”, capture value in licensing and the increased risk aversion in industry, universities started proof of concept (POC) and gap funding programs to address the gap between funding basic research and technology development.

However, faced by a growth in technology transfer initiatives, at this stage most universities struggled to give the inventors the necessary support to help them develop their projects and turn them into new startup companies.

Technology Transfer 3.0

As a result of the integration of industry-sponsored research and collaborations together with startup and seed funding development and economic development, the third phase of Technology Transfer was better funded and gained a more prominent role in the University organization. This progress was prompted by engaging industry participation proactively and also by the pressure from governments to create more qualified technology based jobs, the lack of early stage seed funding for university spin-offs, and the first visible successes of technology transfer outcomes achieved by some better developed universities in the United States.

With the aim of contributing to the spread of entrepreneurial culture, many universities set up and enhanced the offer of startup programs and infrastructures aimed at assisting students, PhDs and researchers with the establishment of new technological companies. These programs provided mentorship to new entrepreneurs by university experts and experienced entrepreneurs, as well as support for accessing venture capital and national and international grants. In addition, Universities started to build an innovation network with investors, Venture Capitalists and Corporate Venture Capitalists in order to address the lack of availability of seed-stage venture funding in many areas, and to foster the development of prototypes.

Finally, from the organizational point of view, this phase of Technology Transfer Office evolution saw the addition of legal staff to the organizational chart in order to manage a growing and complicated portfolio of intellectual property.

Technology Transfer 4.0

This phase was characterized by the focus on clinical research. In particular, it was devoted to the improvement of clinical research management, the development of core competencies in clinical and translational science, and the acceleration of the dissemination of research findings into clinical practice. In addition, the scope of technology transfer

increased even more by encompassing innovations (versus inventions) and including liberal arts, social sciences, training and clinical programs.

Traditional research-intensive universities started to commercialize training and clinical programs, mobile apps, non-software copyright materials and educational tools. While the innovations from these disciplines are usually not patentable, they represent novel approaches and advancements that can be commercialized. Programs to capitalize on these types of innovations were established in several universities. Rather than focusing on intellectual property protection and licensing only, Technology Transfer Offices adopted a broader perspective and methods in order to disseminate different kinds of innovation. This means exploring other mechanisms, in addition to the traditional technology licensing approach, which let the institution distribute the innovation directly to the end-users, using instruments such as transaction-based technology portals, app stores, and publication downloads.

The future of Technology Transfer

Nowadays Technology Transfer is continuing to evolve. New models of interaction between companies and universities and between universities and venture funds are being explored.

In addition to Gap funds, universities have begun to establish infrastructures and facilities to promote innovations and to foster collaboration with local companies to tackle their specific problems.

Universities are focusing more and more on entrepreneurship, prompted by the need to play an active role in the innovation ecosystem and have a positive social and economic impact. In this perspective, universities, also through their Technology Transfer Offices, are creating programs to boost the entrepreneurial skills of students, researchers and small and medium-sized companies. The marketing promotion of academic innovative results is also becoming more common and effective.

Technology Transfer Professionals are constantly evolving their roles, as they need to manage increasingly complex projects that have multiple aspects, such as joint development agreements, long-term partnerships, the licensing and commercialization of research results and spin-off creation.

Technology Transfer models at Politecnico di Torino

The most recent history and development of the Technology Transfer strategy and activities at Politecnico di Torino (Polito) are an example of how the previous outline of the different stages of the evolution of Technology Transfer applies to the real case.

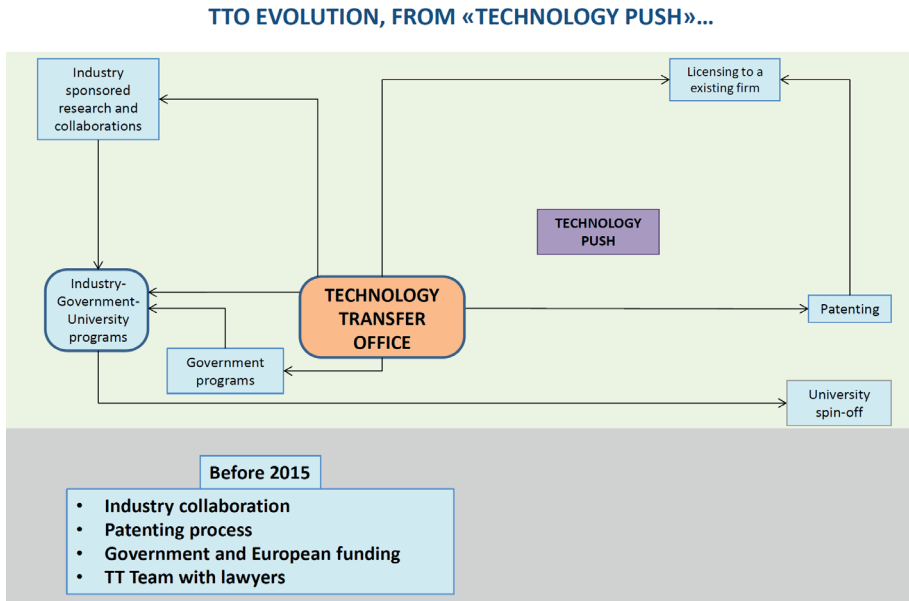


Figure 1 - The first phase of the Technology Transfer Office at Politecnico di Torino. The model was based on the “technology push” approach.

In the “*Orizzonte 2020*” Strategic Plan adopted by Politecnico di Torino in the year 2014, it is recognized that “*knowledge sharing*” activity has enabled, and now contributes to enhancing, the Technology Transfer (TT) processes. These TT processes, in turn, have enabled the support of the industrial exploitation of research results, the establishment of important collaborations with industry, the attraction of strategic investments and, ultimately, have had an impact at local level, involving both institutional and private stakeholders.

The Technology Transfer activities of Politecnico di Torino have been developed following a similar path as the one described previously. Initially, the activities were mainly driven by the so-called “technology push” mechanism, focused on research sponsored by the government and industry, and licensing to existing firms. The new innovations come directly from the R&D activities conducted at the University (Fig. 1).

The next phases of the TT at Politecnico di Torino were influenced by “market pull” approach (Fig. 2), experimenting with the innovations based upon market pull demand developed by carrying out R&D activities according to an identified market need.

The Technology Transfer model of Politecnico di Torino is a process that has been consolidated in recent years with its own peculiarities, system and structure. In addition

to the nature and function of the stakeholders and professionals (subjects) involved, what guarantees a high added value are the relationships and networks that connect these subjects. Indeed, within each administrative body that deals with technology transfer, there is a mix of different competences and skills that ensures a constant link between the various organizational levels of the University (institutional, academic, research, administrative, managerial). This results in a global engagement and the constant sharing of ideas on the technology transfer issues, including the Departments and their fundamental contribution to performing research and generating innovative results.

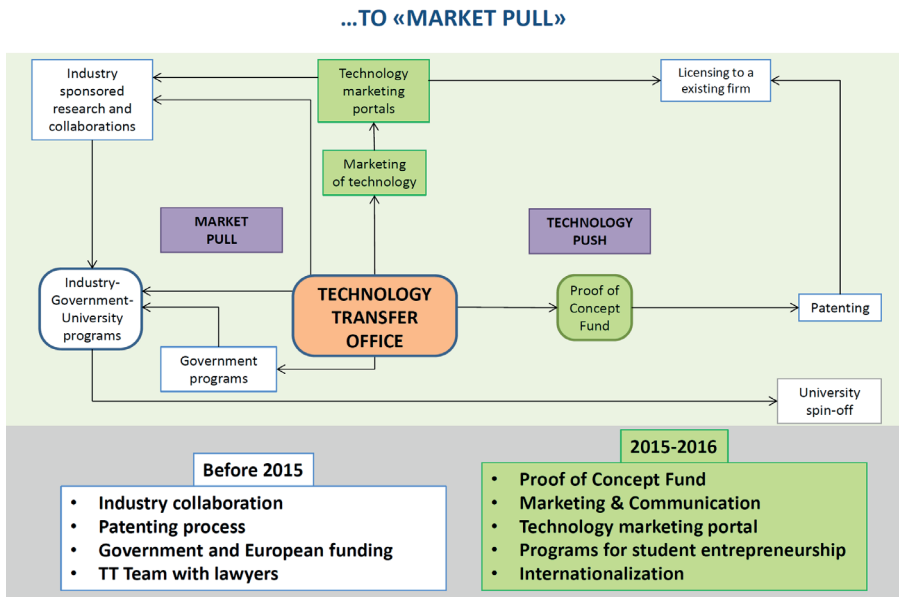


Figure 2 - The evolution of the Technology Transfer Office at Politecnico di Torino. The influence of the “market pull” approach on the TT process.

Today the Technology Transfer process at Politecnico di Torino is organized considering various new streams of activity (Fig. 3). In particular, proof of concept funds and marketing and communication activities have been introduced in the process in order to increase the success rate of the exploitation and promotion of the research results.

The next objective is to strengthen the model implemented until now, with increasing involvement of different actors of the innovation ecosystem, such as small and medium local enterprises, big corporations, research centers and other universities.

2017-2019 TTO MODEL, THE SITUATION TODAY

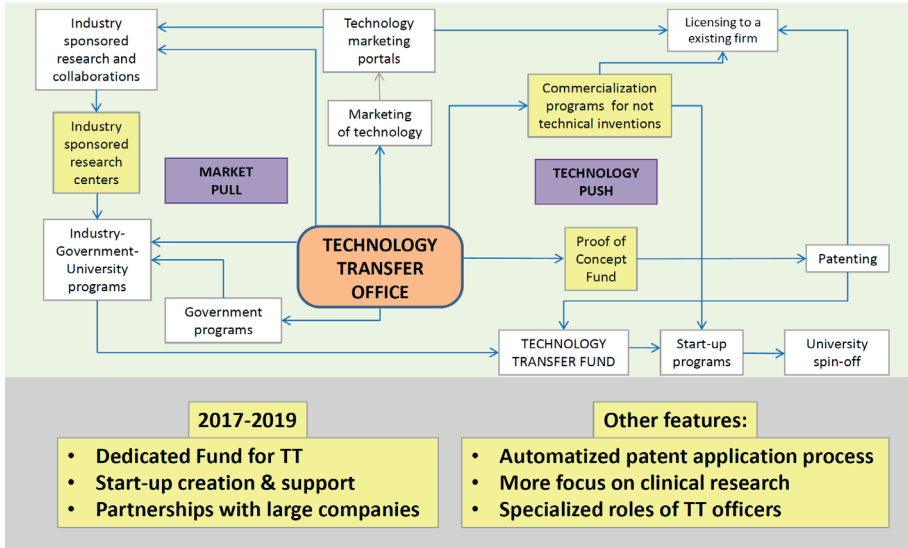


Figure 3 - The evolution of the Technology Transfer Office at Politecnico di Torino. Current situation and future development perspective (2017-2019).

The organizational model of the Technology Transfer and Industrial Liaison Area (TRIN) at Politecnico di Torino was designed with the aim of enforcing the sharing and dissemination of innovation, starting from basic research to the industrial/commercial application of the research results.

The Technology Transfer and Industrial Liaison Area of Politecnico di Torino is responsible for the following main tasks:

- receiving the disclosure of patentable inventions of Politecnico’s personnel and following the patenting process;
- managing the patent portfolio of the university and promoting actions and events to disseminate the research results and patents in order to boost the development and exploitation of technologies;
- supporting and monitoring the establishment of spin-off companies;
- negotiating the strategic partnership agreements and contracts between the university and companies;
- networking with the stakeholders from the industrial ecosystem and institutions working in the innovation sector nationally and internationally;
- providing support to the decentralized structures of the University (e.g. Departments)

regarding intellectual property management in commercial contracts and collaborative research.

Moreover, complementary to the TRIN Area, Politecnico di Torino has set up an internal interdisciplinary laboratory: “The Interdepartmental Laboratory for Technology Transfer” (LabTT). Working at the LabTT are the “Knowledge Transfer Managers” (KTM), professionals with a technical and academic research background. The KTMs are the first reference for professors, researchers and students who intend to patent an invention, develop a business idea or require consultancy in the field of Intellectual property.

From the organizational point of view, TRIN and the LabTT follow a model of matrix interaction (Fig. 4): TRIN performs vertical and specialized activities, while LabTT integrates these competencies in the evolution of the work cycle in a transversal manner. The Knowledge Transfer Managers are in charge of specific projects and they interact with the administrative and management personnel of the TRIN Area at each stage of the process: the result is a constant multidisciplinary vision of the whole process.

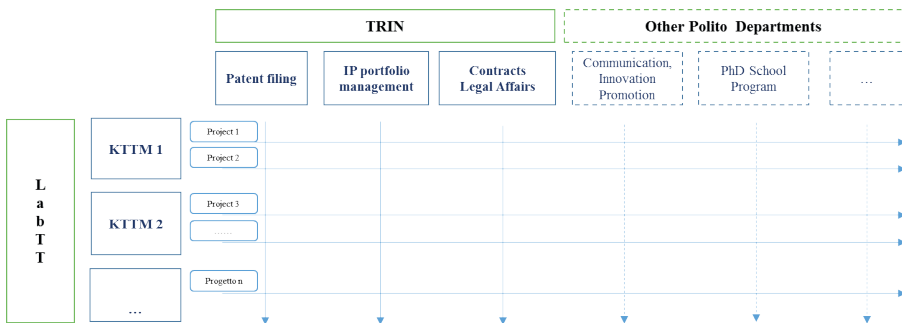


Figure 4 - LabTT organizational model.

IP management process at Politecnico di Torino

As far as concerns the management of the research results, the LabTT is the contact point for researchers, PhD candidates and students who achieve an innovative result (invention, software, design, etc.) during their research activities.

The process starts with the notification of the achievement of an innovative research result by the researcher or the research group concerned to LabTT/TRIN. The procedure involves filling out a disclosure form (often referred to as a “*report of invention*” – ROI) that describes the type, nature and characteristics of the result. At this stage, one KTM is appointed as project manager of the technology and is responsible for the analysis and preliminary evaluation of the disclosure form; the KTM also performs the due diligence procedure regarding the framework situation in which the result has been achieved (e.g. institutional research or funded research; numbers of inventors and share of inventive contribution, etc.).

The KTM then presents the technology and the preliminary analysis to the University Patent Committee, which is in charge of making the decision about the patentability of the technology and the prosecution of the patents. Following the decision of the Patent Committee, the KTM will remain the main interface for the inventors throughout the whole lifecycle of the technology, from the filing of the patent or the registration of the relevant intellectual property rights to the application/industrialization, supporting the researchers in their relations with the external partners and always being able to count on the full range of complementary competencies of the TRIN Area (i.e. legal, administrative, etc.).

The Center for Entrepreneurship and Innovation (EIC)

The Center for Entrepreneurship and Innovation (EIC) was established in 2016, as a complement to TRIN's and the LabTT's organizational structure, with a special focus on research and education on entrepreneurship. EIC researchers come mainly from the Management Engineering Department, but it is open to any other Department's contribution. Its work is closely linked to research on technology transfer, innovation and entrepreneurship.

EIC plays a key role in completing the internal model of Technology Transfer within Politecnico, since the research work and the knowledge generated about the local innovation ecosystem and other related issues can represent an invaluable source of information to better design new Knowledge and Tech Transfer programs/initiatives deployed by the operational structures, TRIN and LabTT. Moreover, EIC represents the place where the practical and theoretical parts of the Technology Transfer process meet, and gives the KTMs the opportunity to access students and engage them in hands-on training, based on the real cases managed by the offices.

Governance of the Technology Transfer Office

From the governance point of view, the LabTT Advisory Committee is in charge of defining the strategies of the technology transfer operations and it is also the subject that links, from a strategic point of view, the different areas of the University dealing with Technology Transfer. In fact, the members of the Advisory Committee are the following: the Vice Rector for Technology Transfer, the Vice Rector for Research, delegates of Politecnico's Board of directors, the TRIN Area Manager, the Research Area Manager, and some delegates from the Departments.

In addition, even more effective action on the overall coordination of Technology Transfer is guaranteed by the fact that some members of the Advisory Committee are also members of the University's Patent and Spin-off Commissions. Once again, information flows have shared contact points, facilitating the approach and matching the vision of the internal institutional processes and the need of companies and businesses. Altogether, there are about 40 people involved in technology transfer activities, including professors, PhD students, researchers, lawyers, administrators and Knowledge and Technology

Transfer Managers.

In summary, the main strengths of TT's organizational model at Politecnico di Torino are the following:

- active involvement and consequent alignment of all levels of the University, administration and departments, thanks to the participation of the LabTT Advisory Committee;
- the proposal and the realization of the most useful and effective actions in real time;
- the presence of professionals, such as Knowledge and Technology Transfer Managers, with technical backgrounds that allow them to interact easily with inventors when scientific research generates technology and intellectual property to be protected and exploited.

Politecnico di Torino experiences: instruments for the creation of new business and entrepreneurial culture

Considering that academic results are often early stage technologies, intermediate steps are necessary to commercially exploit these technologies in order to demonstrate their applicability and to access the market with suitable products. This process is important in order to maximize the research and patenting investments. In this regard, Politecnico has established collaborations with corporations and small or medium enterprises in order to foster the transfer of knowledge and technologies through different tools and initiatives.

In this framework, initiatives that also involve entrepreneurial education are crucial to creating awareness among the students and faculty about the strategy for developing ideas and innovative technologies. In the following paragraphs, the most successful initiatives organized in the last two years by Politecnico di Torino are reported.

European Innovation Academy (EIA)

Politecnico di Torino has hosted, since the year 2016, the European Innovation Academy (EIA) Summer program. The EIA is a non-profit educational institution recognized for its excellence in tech entrepreneurship education. EIA educational programs are jointly developed with professionals of world class partner universities and companies: UC Berkeley, Stanford University, Google, Amadeus, CA and many others. Future entrepreneurs and business leaders are immersed in a multicultural ecosystem of 4000+ alumni and faculty from 75 different nationalities.

The aim of EIA Summer program is to develop a new venture for the market within the 15-day program. During the program, the participants focus on learning by doing, not the typical learning processes. Thus, all the intense work is done in teams of 5 and with the help of highly accomplished experts as their mentors (Business mentor, IT mentor, Design mentor, IP mentor, Investor/VC). Working together with the most renowned influencers from Silicon Valley and top level institutions like Google, Stanford University, or UC Berkeley, is a feature of the whole program. EIA holds the Silicon Valley mindset in

high regard and has partnered with its tech leaders to offer the benefits of their mindset to the participants. Industry leaders and professionals from all fields in the startup ecosystem shape the program into a catalyst for tangible outcomes and successes.

The participants of EIA gain valuable new experiences by mastering how to work together with people from all over the globe. All individual members of EIA education programs leave with a new skill set thanks to the immersion experience.

The EIA summer school has become a strategic part of the Technology Transfer process of Politecnico as it allows the teams which develop the most promising technology to rapidly experiment and assess their business model, having access to a unique pool of mentors and experiences.

Innovation for Change

Innovation for Change (IFC) is an interdisciplinary project which started in 2015. This project is promoted by Scuola di Alta Formazione al Management (SAFM), Politecnico di Torino and IdeaSquare, a dedicated facility for experimental innovation at the European Organization for Nuclear Research (CERN).

Innovation for Change is a competition between multidisciplinary teams which aims to find an innovative solution to some global social issues, according to an entrepreneurial startup program that uses breakthrough technologies. Teams of MBA students from SAFM and selected doctoral students of the Politecnico, with a high level technical background, are involved in the project for five months, working in Geneva (at IdeaSquare) and in Turin between training sessions and group work. Within each team transversal skills must be present to promote a diversified approach to both the theoretical and practical plan.

Global stakeholders, like big industrial companies, NGOs and other kinds of organization also collaborate with the teams by selecting relevant challenges, guiding them through a joint effort to find viable and sustainable innovative solutions. Institutions and companies involved in the past editions include the following: the Italian Ministry of Economic Development, the United Nations Organization for Industrial Development (UNIDO), ENEL S.p.a., Humanitas Research Hospital, ENI S.p.a., Barilla S.p.a., AIULC (Associazione Italiana ULcere Cutanee). The challenges the teams faced in the past two editions were "Water & Air" in 2016 and "Food and Health" in the 2017.

The next phase of the competition is dedicated to the creation of the solutions over a period of five months. Students are supported by alumni SAFM who have become entrepreneurs or work in large industrial groups, as well as by researchers at CERN and Politecnico. In their work they can use tools and advanced technology solutions, but also widely used and tested technologies, in order to develop prototypes. Support for the working groups is provided with various resources from the Politecnico and CERN, in the form of access to research staff and results, patents and technologies, in addition to the involvement of teachers, scientists and experts.

At the end of the project, the teams share the outcome of their work with a group of companies, entrepreneurs and investors, in a public pitch also attended by the heads of the founding institutions. Finally, a panel of experts decides on the winning project.

The 2016 edition focused on Water and Air issues, and the winning project was “Aquasmart”, an intelligent meter integrated into the water supply system to locate water losses in real time and intervene in a timely manner. The winning team was awarded the contribution of 50,000 € donated by the Agnelli Foundation as part of the celebrations for its fiftieth anniversary, with the goal of helping the working group to launch a real start-up.

The 2017 edition focused on Health and Food issues. The winning project was “SoundBubble”, a software which is compatible with most commercial headphones and allows the user to select what sounds and/or voices they want to hear, filtering out all the remaining sounds. It combines sound source separation, noise cancellation techniques and a speaker recognition feature to give the user full control over what they can hear, with particular useful applications in the industrial environment.

Proof of Concept (PoC) model, methods, experiences

In October 2016, for the first time among Italian universities, Politecnico di Torino launched the Proof of Concept (PoC) funding initiative for researchers and students who have already achieved a patent with a low degree of technological maturity, measured by TRL (Technology Readiness Level).

These financial resources are devoted to designing, processing and purchasing materials, as well as to cover initial promotional expenses. The PoC aims to provide funds for validation and prototyping in order to reduce technological risk and to offer financial and entrepreneurial tutoring services by industry experts, thus promoting access to business through the marketing of patents and the constitution of spin-off companies. In the first PoC edition, the funded amount was 430,000 €, partly supported by the Compagnia di San Paolo, one of the major banking foundations in the area.

The selection of the projects to be financed envisages an application phase and the evaluation of the proposals by an evaluation Committee. The evaluation criteria and the composition of the Committee are of great importance, therefore investors, entrepreneurs, technology transfer managers are involved in the evaluation process. The projects are analyzed considering the description provided in the application form (i.e. the possibility of increasing the TRL rate and its possible value increase), the project team, the technology potential and the budget proposed.

In the first call of 2017 (two calls per year are scheduled), 12 technologies were funded for a total of € 350,000. Each team funded within the POC also has the opportunity to attend a boot camp, focusing on topics related to IPRs, innovation and entrepreneurship, to further increase researchers' sensitivity towards these issues. The first technologies

selected covered various sectors, from civil and environmental engineering to biomedical and chemical engineering.

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ACADEMIC ENTREPRENEURSHIP BUSINESS IN COLLABORATION WITH UNIVERSITIES

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***Abstract:** The goal of the chapter is to characterize the environment of starting up a business using the knowledge sourced in Universities. Main problems of source of knowledge for business are discussed, as well as challenges with University-business knowledge transfer. The regulation regarding IP protection and commercialization at the University is described and basic forms of academy-based business activities (academic entrepreneurship) like: academic spin-offs and spin-outs are discussed.*

University-business knowledge transfer

University-business collaboration in most situations it brings good results in forms of innovation. From the centuries universities all over the world were a source of knowledge and well educated people starting their own businesses. This activity called academic entrepreneurship is defined as: *“undertaking a business activity by the representatives of an academic environment – students, PhD students, research personnel. The channel of the transfer of knowledge and innovations is setting up enterprises by the academic staff, students, PhD students, within the university borders or in its proximity”* (Shane, 2004).

Knowledge transfer from university to business can be presented in the form of market (see Fig. 1) supported by intermediary and supporting organizations like: technology transfer offices (TTOs), science and technology parks, or business incubators. In the market, there exists a supply side: universities and innovative enterprises conducting scientific research. The demand side of the knowledge/technology market consists of enterprises implementing new knowledge-based solutions in their products and processes. For operating on this market it is crucial to understand that demand for knowledge and technologies is driven by the demand on the final market. For example, demand for mobile devices technologies is driven by the huge market of final users of mobile devices. Final users pay for mobile devices, applications and services, then

producers, service providers and application developers pay for the technologies and other implemented knowledge.

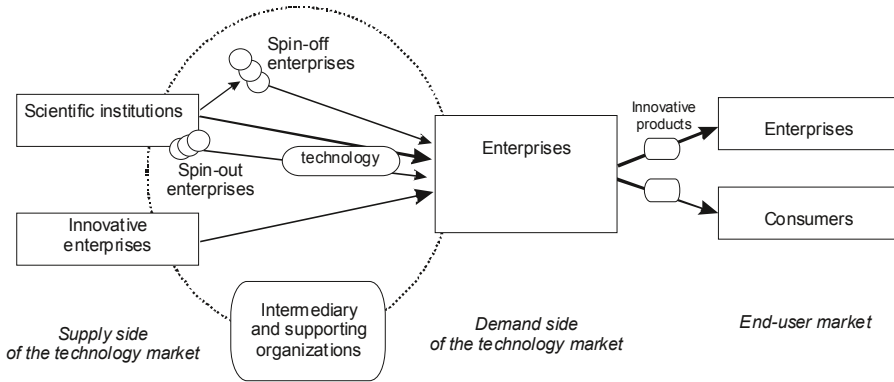


Figure 1 - Model of university-business knowledge transfer. Source: Olko, 2009

In Figure 1 we can observe also new enterprises (start-ups) created as an university splintered company for knowledge commercialisation. These enterprises called spin-offs or spin-outs are established by a group of entrepreneurs, based on exploitation of an invention or technological innovation and which employ a high proportion of qualified employees. Creation of new companies for knowledge commercialisation is one of the forms of knowledge transfer or technology transfer described in the literature (Trott, 2008). This activity is not limited only to university-business knowledge transfer. Companies also create new businesses to commercialise knowledge or technologies. In most of cases the IP is transferred to a new company.

Academic spin-offs and spin-outs

Figure 1 shows also a spin-out as a specific type of university start-up. Many authors do not distinguish spin-offs and spin-outs, but those who can indicate some specific features of spin-outs, argue that *“spin-out companies remain closely tied to the parent institution by means of financial or operational (i.e. shared professional and administrative) dependencies”* (Tang et al., 2004). In particular it is stressed that spin-out to be effective as a company will need to bring together various assets and resources to commercialise the IP. These resources are likely to include money, but almost certainly will include other things, such as specialist management and facilities such as laboratories and/or manufacturing (Rowland & Knowles, 2010).

Relationships between university and spin-outs often create an ethical problem of the use of scientific equipment and laboratories. The key questions:

- How to calculate the prices of such services?
- How to negotiate conditions of using specialist scientific apparatus enabling scientific

and commercial purposes?

rarely appear in the case of spin-offs – they are separated from universities, even in the situations when they use the same personnel. There are no simple answers to the questions above, but it is the university's role to create a scientific environment accessible for research purposes, educational purposes and finally commercial purposes – including spin-out and spin-off companies.

There is a discussion of how academic spin-offs can be defined – it is very important for public support for this type of companies (e.g. to obtain a place in university incubator). According to Tamowicz's (2006) consideration, we can distinguish the following definition:

- Wide definition: spin-off is a knowledge-based firm founded by scientist as well as graduate students (e.g. Massachusetts Institute of Technology).
- Narrow definition: spin-off is a new business established for the commercialisation of knowledge/technology delivered by home institution and supported by financial institution e.g. venture capital found: *„New company founded to exploit a piece of intellectual property created in an academic institution. Companies established by current or former members of a university, which do not commercialize intellectual property created in academic institutions, are not included in the definition of a spin-off employed here. Thus university spin-offs are a subset of all start-up companies created by the students and employees of academic institutions”* (Shane, 2004).

In the case of academic entrepreneurship intellectual property is subject of exchange between organizations while, from the beginning it concerns academic people: scientist and students. At this point, it is worth emphasizing the difference between scientists and students as potential owners of IP. Scientist, as a university employee, agreed that intellectual property belongs to the employer. This is a general rule at the universities world-wide. The inventor remains the author of IP (for example, a patent), while the IP belongs to the organization (e.g. the university) identified as the assignee. The employer may reward the author (inventor) in the case of IP commercialization, however it is never 100% of the revenue form commercialisation. In case of students, as a general rule, IP does not belong to universities.

Students are not rewarded for their work during studies, so if they invent something (even by inspiration of academic teachers and using the university's scientific equipment) the IP belongs to them. This principle applies to PhD students. However, there can be a number of exceptions to this general principle: for example, student participation in special research projects, or when a student generates IP using the university's facilities. These exceptions require mutual university-student agreements.

There are the following types of spin-offs transferring knowledge form university to business, depending on the level of personal involvement of the scientist (inventor):

- the orthodox type – the enterprise bases its activity on an academic-inventor, and

- the technology is transferred;
- the hybrid type - the company uses the technology transferred whereas scholars and other persons engaged in the enterprise may be still within the university and in the company they are, for instance, members of scientific board (consulting function) or supervisory board (control function);
 - the technological type - the spin-off company uses the technology transferred from the university on the principle of cooperative technology transfer, and the scholar has no contact with the newly formed company; the inventor may, however, have the company shares or offer consultation services (Nicolau & Birley, 2003).

Knowledge transfer and intellectual property

Every business needs knowledge to operate effectively. Considering how the innovative company (e.g. technology startup) can obtain useful knowledge, we can indicate the following situations:

- Knowledge self-created by the company or entrepreneur – neglecting the existing state of knowledge and technology. This strategy is very labour-intensive and requires very highly qualified scientists (geniuses). Moreover, there is a risk that the invented solution will be incompatible with the existing standards.
- Buy the knowledge (or pay for the research) from external organisation – strategy appropriate for large enterprises with capacious R&D budgets.
- Using open sources of knowledge or collaboration with other entities of similar research interest.

In practice, companies use different (combined) sources of knowledge, but for the newly created companies it is crucial to understand the role of intellectual property (IP) in the process of knowledge transfer. The basic meaning of IP indicates that it belongs to somebody (person, organization) and it is legally protected. Even in the situation when we use the open innovation business model, there are some rules to be followed (recognition of authorship, administrative fees for open licences). Open innovation (OI) business model does not always mean free access to knowledge. The open innovation definition states that it is: *"...the paradigm assuming that an enterprise may and should use the external sources of knowledge together with the internal ones and external and internal ways of access do the market. [...] The paradigm of open innovation treats the function of research and development as an open system."* (Chesbrough et al., 2006).

The entrepreneur must know which types of knowledge (and knowledge transfer) can be protected and which types of knowledge cannot be protected. In the following situations the knowledge cannot be protected:

- know-how agreement,
- transfer of personnel between companies,
- transfer of scientist from the university to business,

- publications in scientific articles,
- conferences and seminars,
- informal contacts of scientists and business people,
- university-business collaboration (with no IP transfer),
- business-to-business collaboration (with no IP transfer),
- research purchased at universities.

In the following situations the knowledge can be formally protected:

- selling the rights to patent, utility model, trademark, copyrights;
- selling licences to protected knowledge by patent, utility model, trademark, copyrights;
- creating new companies (spin-offs, spin-out), especially when the knowledge is transferred to a new enterprise as an apportionment,
- joint venture companies.

Transferring IP at the Silesian University of Technology (SUT)

As previously emphasized, spin-off and spin-out companies use the knowledge sourced in university. That is why is so important for the start-up's to understand and meet conditions established in universities' regulations regarding IP protection and commercialisation. Every university should have such regulations that are complementary to the national legislation.

Silesian University of Technology (SUT) have two internal regulations regarding protecting and transferring IP:

1. Regulations for the protection and use of intellectual property.
2. Regulations for the commercialization of intellectual property.

Protection of IP is connected with confidentiality. If, as a result of the scientific work, intellectual property such as invention, know-how, utility model, industrial design, or topography of an integrated circuit is created, an employee of the University may not disclose the results of such work to the public without the written consent of the head of the department, in particular by publishing scientific works or delivering papers at conferences. It is burdensome for scientists, but IP cannot be effectively protected if it has previously been made public (in a conference presentation or an article).

If the head of University department considers the good to be valuable for the market, the notifications of intellectual interest of the University must be prepared. The Notification is sent to the Centre of Innovation and Technology Transfer (CITT). CITT is responsible for the final valuation of the IP and prepares the appropriate protection both for the domestic market and globally.

According to the presented regulations, these are the following forms of transferring IP

to external entities:

- granting permission to use intellectual property to other entities for remuneration, in particular by granting a license entitling to use intellectual property;
- transfer of intellectual property rights to a third party for remuneration;
- creating or joining a spin-off company with the participation of the University or creating a commercialisation company (special purpose company);
- creating of a research and commercialization consortium.

As we can see, spin-outs are not formally regulated in the commercialisation regulation – the Deans of the departments have autonomy in this area. They especially may decide about space rental agreements for the spin-outs. The problem of sharing and renting scientific equipment is subject to separate regulations.

There are indicated in the regulations specific institutions responsible for IP protection and commercialisation at SUT:

- Centre of Innovation and Technology Transfer (CITT) – responsible for preparing appropriate protection form of intellectual property, valuation of IP, preparation of technology transfer agreements, license agreements and other legal forms of transferring IP. CITT is academic Technology Transfer Office (TTOs), working similar to the TTO Politecnico di Torino, described in chapter 3 (Introduction to university knowledge and technology transfer).
- Technopark Gliwice – as a technology park with strong relations with STU and located in the vicinity of the University, Technopark Gliwice is indicated as the organization cooperating with the University in the process of commercialisation by spin-off companies.

Very important for the commercialisation processes is the percentage distribution of revenues from commercialisation. In the STU regulation, every type of commercialisation revenue (licensing, selling the rights to IP, establishing spin-off company) is divided as follows:

- 50% for the authors (inventors),
- 10% for the organizational unit (Faculty)
- 40% for Centre of Innovation and Technology Transfer (CITT).

In particular, the revenues for CITT are transferred to the commercialisation fund. The fund is used for financing further applications of intellectual property as well as protection and commercialization activities. In case of revenues from the commercialization company, the revenues are divided as follows:

- 50% for the authors (inventors),
- 50% for the payment of dividends to the University or covering the costs of commercialization conducted by the special commercialisation company (detailed

rules are defined by the University in the form of a resolution of the general meeting of shareholders of the commercialisation company).

As we can see in the example of SUT, functioning in the world of protected IP, which is called by Chesbrough et al. (2006) the closed innovation model, could be very difficult for the spin-off companies. Many universities all over the world use this model of protecting and transferring IP, but more and more scientific organizations use the open innovation model. Cooke (2005) assumes that two models of innovation will function in economic practice: an open one, called a channel, providing knowledge externalities for other market participants, and a closed one, called a pipeline, where the innovation process is limited to a closed group of participants. The pipeline offers greater possibility of protecting intellectual property as well as relying on formal contracts and lesser possibility of 'leaks' of knowledge to the other market participants (Cooke, 2005).

While adapting Chesbrough's approach, P. Trott (2008) points out the following sources of knowledge in the model of open innovation:

- External research project – instead of conducting own research and development projects, an entrepreneur can take advantage of the already realized projects on a similar topic, especially when it concerns pre-competitive research
- Venture investing – apart from providing capital, investors also provide access to technology in the interest own their own investment
- Technology in-licensing – through monitoring the condition of technology development, available in the environment technologies might be identified and obtained through purchasing the licence
- Technology acquisition – owing to the acquisition of a company both technology as intellectual property and hidden knowledge are obtained (Trott 2008).

It is worth to notice that mere protection of intellectual property (e. g. patent protection) does not restrict openness of and accessibility to the protected solutions. The point of the existence of protection rights (such as patents, utility model, trademark, copyright etc.) is establishing who the owner of the rights is and with whom negotiations concerning the future prospects of using the protected solutions should be carried out.

The open innovation model, while being very promising, is at the same time very difficult to understand by the academic people. The described formal regulations for open and closed models of innovation can cause some problems, but real barriers are in weak entrepreneurial culture of academic environments. The EU report on barriers of splintered companies indicates, as the most important barriers for spin-off companies, a weak entrepreneurship culture. This barrier has been pointed out by over 65% of the respondents: academics involved in spin-off companies. The other indicated barriers, like a lack of training in entrepreneurship (indicated by 45% of the respondents) and commercial risk (36% of respondents), have definitely lower values (EU Report, 2002).

From the time of this research no major changes have occurred: scientist remain scientist, entrepreneurs remain entrepreneurs or both of the environments are even better in performing their roles. But intermediary and supporting organizations have developed in recent years being more and more professional and offering more sophisticated services. Academic incubators supported by other organizations (Universities and TTOs) could actually support the knowledge transfer process in the future.

Conclusions

For the start-up in the incubator the easiest way of transferring knowledge from university is establishing business by students (no IP restrictions). In case of spin-offs formal transfer of IP to the new company must be settled. Even open models of knowledge transfer require entrepreneurs' attention in the area of respect for intellectual property. Cooperation of enterprises and universities must be carried out in accordance with internal university regulations regarding the protection and transfer of intellectual property as well as specific regulations in the research projects financed by external sponsors.

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FUNDAMENTALS OF MODELING BUSINESS IN INCUBATORS

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***Abstract:** The chapter presents the basic activities related to starting a business in an incubator like designing a business model, preparation of the business plan, basic business and market analysis for the start-ups. Fundamental analysis are presented with examples of business analysis for the start-up referring to the value generation for the customers, financing business, cost analysis, revenue streams (price and unit sales) and profit calculation.*

Commencement of the start-up undertaking requires preparation of relevant documents and management instruments. The most important and useful ones for the beginner entrepreneur include development of a business model and business plan. The first one is a presentation of the business concept, sources of value creation, competitive advantage and income. In turn, business plan allows an assessment of the effectiveness of future operations and risk related to it. It also includes financial, marketing and technical plan. Both documents are of great importance both for obtaining funds (capital) and management of the start-up.

Business models

Business architecture represents the structure of such a model and should allow for the creation of value for a client and affect the growth of the company's value allowing for its sustainability in the longer term. Achieved values decide whether such a business model is effective to achieve assumed goals and economic, market and social effects. It underlines its ability to implement innovations, which currently are perceived as the basis for creating a company's value (Brzóska & Jelonek, 2015). Interest in business modeling results from the search for effective methods of competing and using widely understood cooperation. Modern business models enable the creation of value based on innovations and cooperation effects, as Chesbrough (2010) and Teece (2010) believe.

In particular, development of the theory and the application of work-related business

models results from the following reasons:

- applying business models as a clear concept of creating value, both for the client and for the owners of the company,
- in case of the logistic company, the value is related to the type of logistic service and used resources.
- In the logistic companies, improving transportation, forwarding and warehousing processes is especially important
- treating the business model as a system of interrelated operations, strongly focused on creating value,
- the search for the instruments and methods of achieving a competitive edge by implementing innovations,
- treating the business model as an architecture of business operations, which is able to provide the organization with effectiveness by generating profit,
- treating the business model as a carrier of various innovations,
- the business model represents a valuable tool for strategic management, which is also useful in the company's operational activities,
- using the business model as a vision of an idea for a business, representing a proposal for potential investors.

Business models can be applied both as an instrument for the management of existing companies and represent the grounds for planning the operations of new organization. Development of research into business models bore fruit in the form of many definitions and concepts. References concerning business modeling (2001-2015) enable the identification of more than 150 different definitions and concepts of business models.

Functions, areas and models of companies operation are good basis for building their business models. They are perceived by a given company as concepts of business ("idea for business") and related to creating value. They allow for implementation of its strategy and represent the grounds for operational management of such organization. Growth of interest in and development of research of business models noticed within the past 20 years, borne fruits in the form of many definitions and concepts. Problems related to business model are described elsewhere (Brzóska, 2014). Selected concepts of the investigated idea, presented herein below, allowed for understanding of the nature of creating value in companies, which represents fundamental element and general result of the applied business model at the same time In case of social economy, its counterpart can be social added value of social economy entities defined as: "degree at which social economy companies are socially useful. Social usefulness is the degree at which these entities fulfill the goals, put before them" (Głowacki & Jelonek, 2013).

In one of the most thorough papers devoted to building business models A. Afuah (2004, pp. 18-41) presented a company business model as a set of tasks, methods and

time for their performance, using own resources in order to create the highest quality for customer and guarantee a position to take over goodwill. It says that in practice, innovations can be applied within all its elements, however they are necessary to create value for customer (Afuah, 2004, pp. 38-42).

Architecture of the business model elements was presented by F. Newth (2012, p. 8) based on such elements as: proposal of value, dynamic abilities and strategic processes, resources, income flows, form of profit, and structure of costs. The first three components are of quality character and require description. The remaining ones represent specified proposals of sources and methods of generating incomes on sale, formula of profit and margin and show the structure of costs resulting from the applied resources and processes for implementation of value.

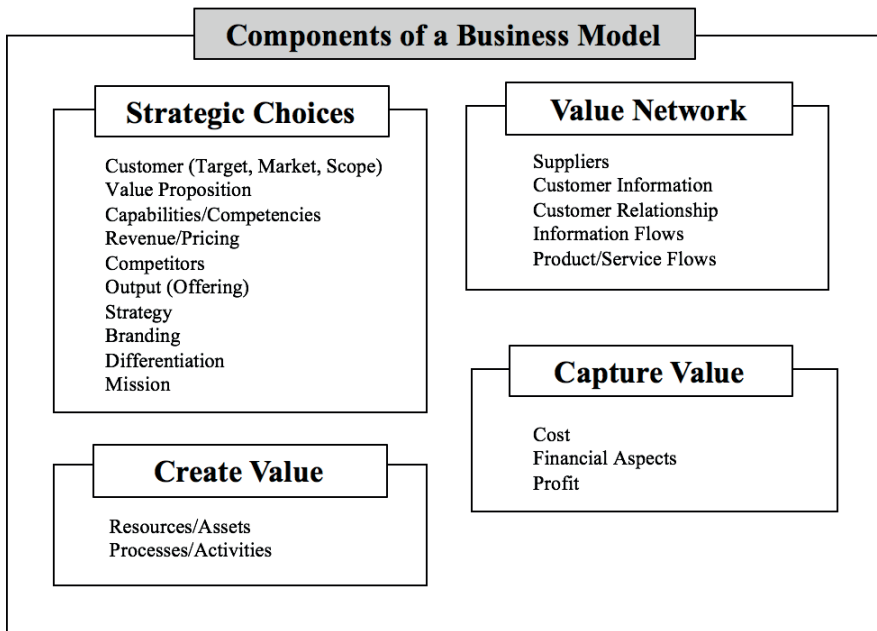


Figure 1 - Components of business model – the affinity diagram. Source: Shafer et al. (2005, p. 202), modified.

Other concept for creating business model is the approach presented by a team of researchers S.M. Shafer, H. J. Smith, and J. C. Linder (2005, p. 202) who define business model as a representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network. These authors, using the analysis covering the work of 12 other researchers, concerning business models during the period 1998-2005, formed their own concept, based on four components (Shafer et al., 2005, p. 202-205). They based it on four categories that include the elements necessary for the

construction of a business model, as given in Figure 1.

Referring to the impact of innovation to increase of the competitiveness and development organization, G. Hamel (2002) formulated business concept innovation, the result and application base of which is proper business model. His opinions are expressed in the business concept innovation, the result of which and basis for application is proper business model. In order to use business model for carrying out radical (revolutionary) changes (innovations), one must understand business model as the whole consisting of many elements cooperating with each other. G. Hamel creates architecture of such model consisting of four main components: basic strategy, strategic resources, communication and customers relations, and the value of the network. The two last elements of the model require innovative utilization and generation of information to create knowledge for innovation. Business models oriented at innovations, to a significantly higher extent than e.g. at new technologies, change the existing system of competition, frequently destroying the existing state of the art. Companies and sectors perceived as modern (IT telecommunication, pharmaceutical industry), are the space for such radical changes.

A very interesting and innovative approach to creation of strategy based on innovations is presented by W. Chan Kim and R. Mauborgne (2005). The presented strategy is called a blue ocean (as distinct from current concept of competing commonly called "red ocean strategy") and is based on value innovation. The mentioned authors presented the principles, tools and diagrams of operations that allow construction as well as utilization of new market space. In their opinion, it is a space free from competition. Such space can be created only by the whole system of operations leading to gradual increase of value, both for customer and the whole company. The system is focused on searching for new market area capturing demand in it (Kim & Mauborgne, 2005, p. 37-49).

K. Obłój (2002, p. 97) when defining business model "as combination of company strategic concept and technology of its practical execution understood as a construction of value chain that allows for efficient operation and restoration of resources and skills" - sees threats emerging from competitive surrounding. The most severe are related to imitations. Elimination of such threats requires the need for continuous improvement of business models that can be specified as some form of "running forward". The most important instrument of their improvement is partial and breakthrough innovations. The first of them are such changes within the scope of the existing model, which express themselves with constructing competitive edge. Introduction of breakthrough innovations is the second way of "running forward". It consists in innovative shaping of the value chain in order to create innovation that initiates a wave of creative destruction on the market leading to creating completely new business model, which fact is represented by market successes of many companies (Obłój, 2002, p. 102).

In her research concerning social companies, W. Czemieli-Grzybowska (2010, p. 120-121) presented business models of these companies, emphasizing their specific nature which distinguishes them from strictly business companies. Discriminants of the business

model in social companies are as follows:

- formulated social goals;
- straightforward expression of economic goals (perceived as a striving for gaining determined level of incomes on sales of products and services and as suffering the economic risk),
- democratic management,
- social value.

Such specificity is, in the author's opinion, not strong but rather weak side of a social company business model. In particular, by preferring social goals, one might find these companies crippled to some extent on a competitive market. As W. Czemieli-Grzybowska (2010) correctly remarks, economic activity performed within the scope of such entity entails larger risk related to its operation, because of difficulties related to human capital obtained from the area of social exclusion. In this context, research devoted to creating and applying business model of social companies must be recognized as necessary and important for the social economy development.

Under practical application, business model concept developed by A. Osterwalder and Y. Pigneur (2010, p. 26-29) is important, as they defined this concept as: "business model describes premises behind the methods by means of which an organization creates value and produces profits based on the generated value". This definition emphasizes the focus on creating value, which provides profit thanks to specified elements and methods of company functioning. It is based on nine components, i.e.:

- customers segments,
- value proposal,
- communication, distribution and sales channels,
- relations with customers,
- streams of receipts,
- key resources,
- key tasks,
- key partners,
- cost structure.

This business model clearly shows the logic of relationship and combination of elements related on the one hand with the market (client segment, communication, distribution and sales channels, relations with customers, streams of incomes) and on the other with the company's potential (key resources and operations, key partners, cost structure), creating value for client, thus the company. This model is schematically presented in Figure 2.

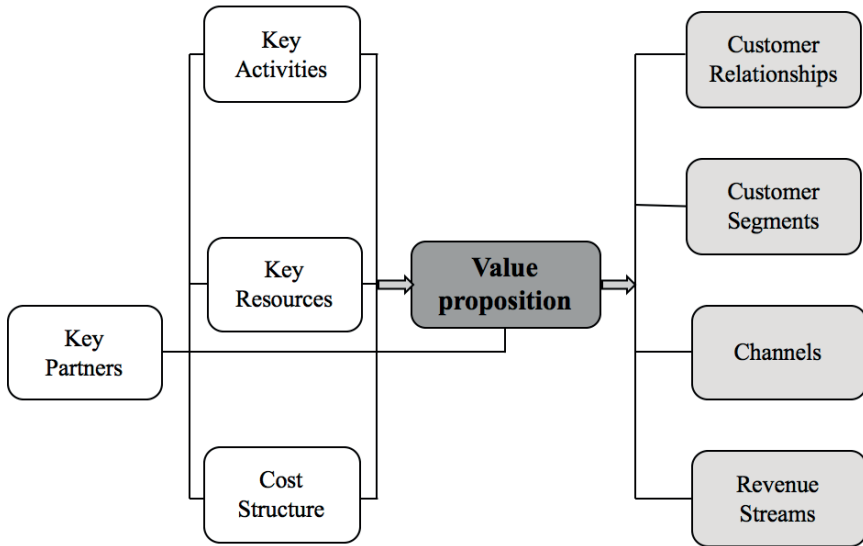


Figure 2 - The business model canvas template Source: Osterwalder & Pigneur (2010, p. 18-19).

This concept, after implementation of elements specific for a company, has become the basis for developing business model that can be applied by it. It is interesting that the authors of the model (Figure 2) presented it in terms of the Blue Ocean Strategy concept (Kim & Mauborgne, 2005, p. 37-52) that is based on construction of a new market space. Attaining this space is possible by two types of operations. The first operations are to lead to a reduction of the costs that can be attributed to the elements on the left side of the business diagram, which are not shaded. The second group are operations leading to step-wise increment of value for both the customer and for the company. Business model elements presented on the right side of the diagram are held responsible for that goal (shaded part, Figure 2).

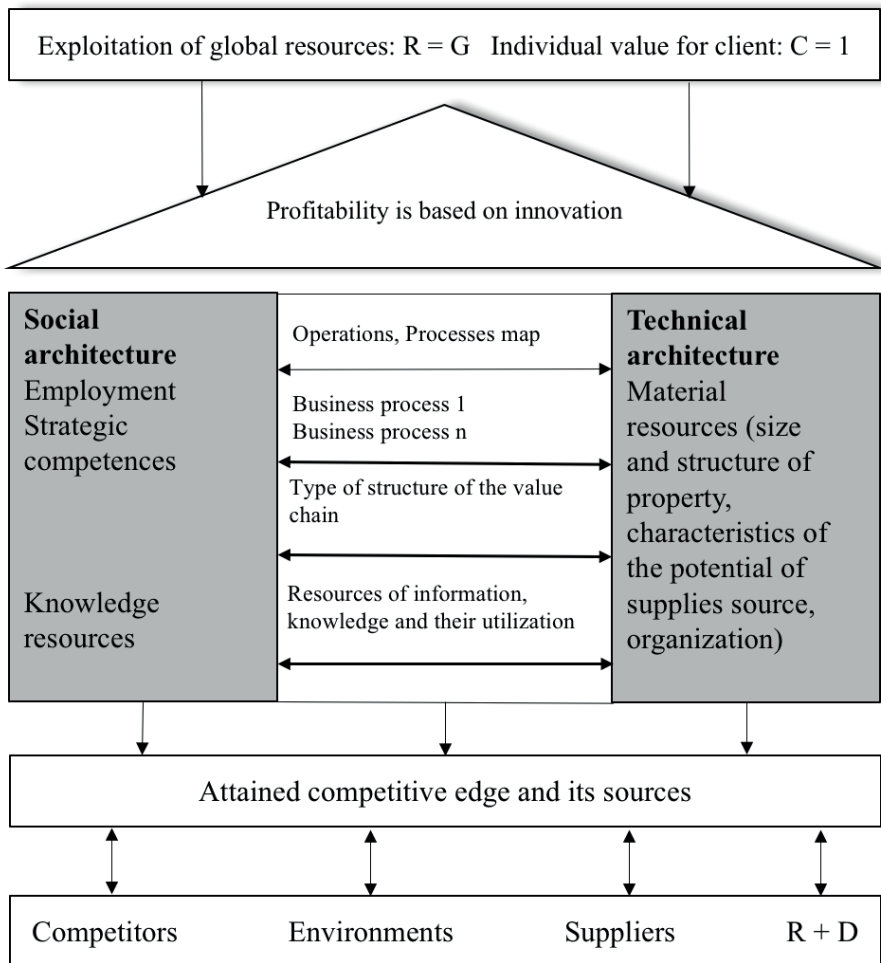


Figure 3 - Scheme of the concept of the method to examine the business model changes in an innovative company. Source: own study, based on Prahalad & Krishnan (2008, p. 6).

My own research (partial results of which are included herein) is based on business model presented by the authors of the principles of the, so called, New Age innovations, i.e. C. K. Prahalad and M. S. Krishnan (2008, p. 15-19). They treat business model as one of the most important elements of the business transformation structure. The following business model elements must be emphasized: social architecture (intangible resources), technical architecture (tangible resources) and business processes. This model is schematically presented in Figure 3.

Two principles are the pillars of the transformation:

- Value is based on exceptional personalized experience and expectations of customers. Companies must focus on individualization of value for customers. Regardless of the number of customers, attention should be centrally focused on the position of a single person. The pillar is identified as N=1 (experience of a single customer in time).
- All companies have access to the global ecosystem that also covers resources. Attention of the companies is focused on having access to the resources, not only on possessing them. This pillar is identified as R=G (global resources from many suppliers, frequently from many places around the world).

Elements of this model are:

- social architecture covering: management systems, human resources, competences, skills and HR development systems.
- business processes: marketing, production, customer service, services, sales.
- technical architecture: ICT systems, technical systems, equipment, logistics

The present model is applicable to the development of innovative start-ups. To sum up, one may say that value is the focal point of the business model.

Business plan

The most widespread and practically used plan in a company is business plan. This is a plan for running company's business, the essence of which is to formulate intentions concerning near or remote future, together with defining measures and ways to attain the objective or objectives. Business plan is a roadmap of initiatives formulated for a given period, typically in a short perspective, i.e. 1 to 3 years, or an average perspective of 3 to 5 years.

The essence of a business plan boils down to the knowledge and the art of making 'good' deals and convincing others about our own capabilities. Business plan is prepared both by companies that start their business and by already existing ones, planning new undertakings. Companies with well-developed business plans are more reliable as contractors, suppliers, investors, borrowers or lessees. Business plan is required when a company applies for a credit or grant. It helps to convince the financing institution of reality and profitability of the planned undertaking. General (main) purpose of business plan is to assess the effectiveness of undertaking and risks associated with it.

Formulated specific objectives concerning finances, market, processes or human capital are of important meaning for usefulness and credibility. Ideally speaking, each corporate, department, and section objective should be:

- Specific – target a specific area for improvement.
- Measurable – quantify or at least suggest an indicator of progress.
- Assignable – specify who will do it.
- Realistic – state what results can realistically be achieved, given available resources.

- Time-related – specify when the result(s) can be achieved.

Notice that these criteria don't say that all objectives must be quantified at all levels of management. In certain situations it is not realistic to attempt quantification, particularly in staff middle-management positions. Practicing managers and corporations can lose the benefit of a more abstract objective in order to gain quantification. It is the combination of the objective and its action plan that is really important. Therefore serious management should focus on these twins and not just the objective.

You can specify the following features of a properly prepared business plan. It should be:

- specific - assumptions and objectives should be clear and comprehensible and measurable;
- objective - the assumptions should be based on realities, their assessment belongs to the business plan's addressees;
- purposeful - all the objectives presented have a clearly defined purpose;
- flexible - the design allows changes to be made in the event of new circumstances;
- useful - it must be useful for company management;
- succinct and clear - it should be clearly worded;
- complex - the elements must contain all the information necessary for evaluating the project;

The plan has two main functions:

- internal - the plan is used as an internal planning document necessary for company management;
- external - the plan is essential for the acquisition of investors and attracting the outside resources needed to finance the projects.

There is no one standardized business plan template. However, it is possible to present typical components:

1. Summary.
2. Origin of the project - company profile.
3. Mission, vision and strategic goals.
4. Product description (services).
5. Management system and staff.
6. Market and marketing.
7. Technical plan.
8. Financial information (economic and financial analyses and forecasts).
9. Risk factors and benefits from undertaking the project (SWOT analysis).

10. Schedule of implementation

11. Attachments.

Each business plan should be prepared according to the needs of the business (start-up). Not every plan must contain all the points on the list - some points may be combined. If necessary, other chapters may be introduced. The paper, in a synthetic way, presents elements of the business plan that may constitute a specific planning guide useful for young entrepreneurs beginning their business.

1. Executive summary

It should include (with the recommended volume of summaries from 1 to 2 pages):

- the purpose of writing the business plan,
- a brief description of the product and its benefits to the customer,
- a brief description of the technology used,
- characteristics of the team developing and implementing the business plan,
- the most important financial information (financial and capital resources, return on capital),
- the benefits of the project for investors, customers and the region,
- success and risk factors,
- a brief description of the product and its benefits,
- management experience.

2. Characteristics of the project - genesis of the project

- reasons for undertaking the project
- organizational and legal form of the project being implemented (limited liability company, joint-stock company, individual economic activity),
- management system and ownership structure,
- location,
- necessary resources for the implementation of the project (employment, property, capital, logistics),
- information about the shareholders (owners)
- the risks involved in the project.

3. Vision, mission, strategic goals

- this point should define the main goal of the company's existence - its vision. The vision defines the overall goal that the organization in question has targeted and the role it plays in the environment;
- the mission of the organization should be formulated: it is the meaning of its existence

for which the enterprise was established and the role it fulfills in the environment in which it operates;

- strategic objectives in the areas of finance, market, resources, and human capital. The goals should be: specific, measurable, assignable, realistic, and time-related.

4. Product description (services)

- the main description of the product showing what is to be sold and what customer needs satisfy the products,
- market advantage of the product (price versus competition, quality, uniqueness, benefits to the customer from using the product),
- negative characteristics of the product, reducing its superiority,
- market condition of the product (market place gained, promotion phase),
- product life cycle (where the product life cycle occurs),
- new competitors' products,
- product protection (brand, trademark, patent, etc.),
- conditions for the release of the product (certificates, approvals, standards);
- quality assurance conditions,
- product development plans.

5. Management system and staff

- organizational structure,
- roles of individual managers,
- career path and achievements,
- remuneration and motivation policies for employees,
- information on current staff status (qualifications, skills, education, etc.),
- information on whether additional personnel and selection criteria will be needed in the future,
- employment and vocational training policy.

6. Market and marketing

a) Market description

Market description should be general, but should characterize the size of the market, its absorptency, territorial reach and expected growth. It is important to provide relevant statistics. An enterprise should define the market niche in which it is located by product and territory.

b) Clients

- who are the customers?

- where are they?
- why buying?
- who decides to buy?
- what is the typical size of the order?
- what are the requirements of each client?
- who are the primary customers and which of their purchasing habits are affected by the company?

c) Competition

- who are the competitors?
- where are they located?
- what is the size and potential of competitors?
- what is their market share?
- what are their strengths and weaknesses?
- what competitor strategies are preferred by competitors?
- can the company compete successfully with them?
- what is the likely response of competitors to the business plan?

d) Suppliers

- who are the suppliers and where are they located?
- what offer is the vendor setting for our company?
- what additional elements of sales support apply to the supplier?
- what is the level of competition in the suppliers sector?
- does any of the suppliers have a monopoly or dominant position in the sector?
- what is the ease and cost of changing the supplier?
- does the supplier have a significant share in the costing for the recipient?
- what is the assurance of supply and how can the risk of supplier change be assessed?
- what are the alternative sources of supply?

e) Marketing activities

- what are the territorial goals of the company?
- what price policy does the company use?
- how does the company support buying decisions (after-sale services, guarantees)?
- how does the company conduct advertising and promotional activities?
- what are the costs of these ventures and when will the benefits be derived?
- how is the distribution of the company's products organized?

f) Sales plan

Sales plan is a valuable summary of sales of individual assortments in separate periods. It is the basis for financial analysis. It is usually built in the form of an array, where the periods are placed and the individual assortments are grouped.

7. Technical plan

- a brief description of the course of production;
- information about your equipment and production facilities;
- selected technology development strategies and directions for technological change during the period covered by the business plan
- the advantage the company has over its competitors,
- quality control procedures,
- costs of different production volumes,
- current and future production capacity,
- state of production assets,
- confidence in the supply of raw materials and their alternative sources,
- availability of qualified staff for “make or buy decisions”.

8. Financial information (economic and financial analyzes and forecasts)

- financial information from previous years (balance sheets, profit and loss accounts, cash flow statements),
- opening balance,
- financial information for the years covered by the business plan on the basis of sales plan data (pro forma balances, forecasts of profit and loss accounts and cash flow statements),
- indicator analysis,
- break-even analysis (BEP),
- analysis of investment efficiency,
- repayment schedule,
- analysis of the financial sensitivity of the project.

9. Risk factors and benefits from undertaking the project

This point is primarily used for sensitivity analysis and SWOT analysis.

- Sensitivity analysis simulates how the company’s expected financial performance will change in the face of unfavorable changes in parameters, such as sales volume, prices and costs.
- SWOT analysis is a qualitative method. It requires, however, in-depth detailed analyses. Describes the strengths and weaknesses of an enterprise or venture, and the

opportunities and threats to the forecasted business environment: S (Strengths); W (Weaknesses); O (Opportunities); T (Threats).

10. Schedule of implementation

- one can apply a schedule of actions here using e.g. the Gantt chart,
- these may include actions such as raising capital, investing, promotional campaigns, developing and launching a new product,
- determine the responsibility for these tasks.

11. Attachments

- each business plan is complemented by a series of attachments documenting or supplementing the information contained therein.
- completing the attachments to the business plan is also an information function, as potential funding institutions verify the level of entrepreneur's preparation for starting a business and his/her predisposition for self-management of the company.
- entrepreneurs gathering annexes helps in identifying possible business plan deficiencies or diagnose aspects missed in its development. In a sense, the list of attachments can be treated as a checklist for the plan.

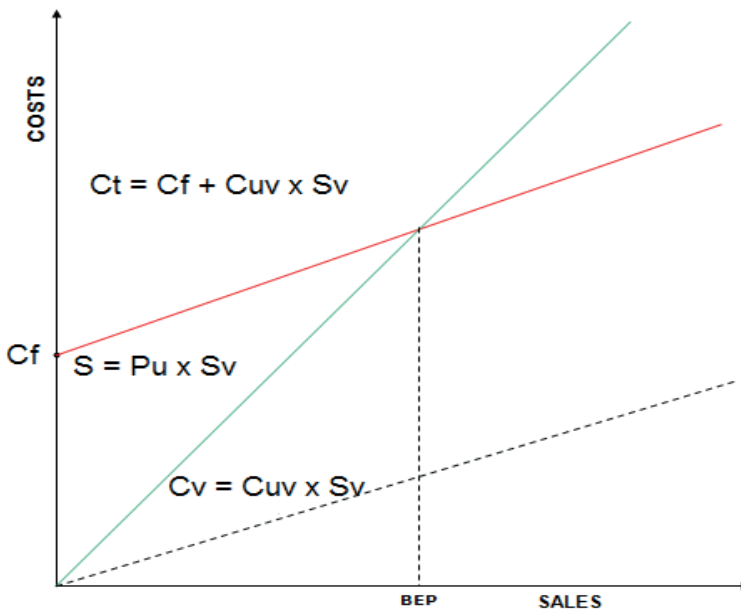


Figure 4 - Model of the break even point (BEP). Cf - fixed costs, Cv - variable costs, Ct - total costs, S - sales value, Sv - sales volume, Pu - unit price, Cuv - unit variable cost.

A breakdown of the profitability (BEP – break-even point) threshold is a very useful

instrument to enable sensitivity testing and performance evaluation. The profitability threshold reflects the situation in which sales revenue covers fixed and variable costs of an enterprise. The BEP model captures the relationship between variable costs, fixed costs, price, and sales volume. The model is shown in Figure 4. Analysis of the BEP model shows that it is important to minimize fixed costs and maximize the difference between price and unit variable cost to achieve profitability.

Example: Elements of a business plan for a selected start-up

The presented elements of business plan concern the start-up “Meet friends”. The project is based on mobile and web application which makes it easier to get together with friends. Users will be able to select the location, purpose and guests of a meeting. The application will also have a memory to save interesting places and memories of the meetings. The application will have a paid account for business clients. With this account entrepreneurs will be able to advertise their activities. In addition, it will be possible to offer promotion codes concerning services of a company which uses the account for its activities.

Market and marketing - In the case of the planned undertaking, one should make a distinction between two market segments:

- Market segment associated with application users - mobile marketplace.
- Market segment of an organization (enterprises and institutions) using the application through a suitable account allowing for advertising and promotion.

These segments concern the same geographic territory. In this case, these are European countries. When the company develops, the territory will expand by the countries of North America, Australia, New Zealand, Japan and South Korea. Such choice was made due to the similarity in organization of meetings (the main objective of the planned undertaking). In the first quarter, after completing the programming part, the territorial objective is winning 100 000 users, residing in major cities of Poland, i.e. Warsaw, Cracow, Poznań, Wrocław, Metropolis of Silesia and the Tricity.

The market objective is the expansion of the applications user base to 500 000 in the second year of business. In the following year, the objective is to implement the plan in order to acquire territorial range covering the countries of Europe, i.e. the UK, Germany, France, Italy, and Spain.

The application will be available for free. It will be distributed using an IT solution (portal) running in the cloud and by mobile marketplace for the Android and IOS platforms, respectively. Marketing activities will be carried out using:

- Youtube via a short video that promotes the application. Cost of the video 800.00 EUR.
- Promotional activities using Google Adwords techniques. Cost for the entire advertising campaign is 1500.00 EUR.
- Advertising on Facebook, linked to official fanpage of the application. Total cost of

advertising: 2500.00 EUR.

- Monitoring of social media using Brand24 tool. Monthly cost of 89.00 EUR.
- Sponsored articles in online magazines concerning social media. Average cost per 1 article depends on the reputation of the portal and varies from 250.00 - 1500.00 EUR.

The total cost of the marketing activities amounts to 17,000 EUR. The planned increase in the number of users with these marketing activities for the period covered by the business plan is 300 000 people. The cost of acquisition of 1 application user is estimated at 0.06 EUR.

Product - The subject of the business undertaking will be the creation of a product in the form of a mobile application integrated with the Internet service of the same functionality as the mobile application. The product will facilitate fast and convenient way to organize all kinds of meetings with people from among friends. The application will be based on the integration with Facebook.com, which will serve as a base of contacts. The service is addressed to persons from virtually any age group, starting with persons of school age (13 and more years old) up to the elderly people with an account in the web service. There are potentially one billion users whom we can reach. The product has a chance of success on the global market, because in America and Europe or Asia people meet in a similar manner. The application will be based on arranging a meeting with selected persons by simple clicks, without writing to each of them individually. At first, you choose a person or persons with whom you want to renew contact or meet and specify the activity type (for example: meeting at a café, theatre, pub, joint walk). Then you offer a date and time of the meeting. The person the proposal is sent to receives it through direct application notification with the possibility to accept, reject or propose other conditions of the meeting. The product will be provided free of charge to all interested persons. Advertisements, as one of the sources of income, will only be present in the application version available online. The main source of income of the start-up will be cooperation established with external parties such as restaurants, clubs, amusement parks, which will be able to promote their activities in the application against payment. This will be done by visually distinguishing such an entity from among the remaining proposed meeting places or tempting the users with the possibility of obtaining discounts at a company offering its services.

Table 1 - A sample profit and loss account Source: own study

Profit and loss account in 2019 (EUR)				
Specification	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Net revenue	15000	35000	60000	85000
Purchase of goods	1700	1700	1700	1900
Labor costs (salaries, training, insurance)	21000	28500	28500	39500
Costs of Rent	300	300	300	300
Local taxes	100	100	100	100
Advertising	1200	2200	1500	1500
Interest on loans	130	130	130	160
Media costs (electricity, water, heat)	600	600	600	600
Other costs	4800	5500	5500	6000
Net costs	30800	40000	39300	50060
Profit	-15800	-5000	20700	34940

Financial information - At the initial stage of the project, including the production of the application, the costs of the activities will be borne by the partners' own contribution. Costs in the period 04.2018 - 05.2019 (the time needed to create the 1st version of the application) are: Internet domain -240 EUR, design and implementation of company logo -350 EUR, Microsoft Azure cloud for application hosting -250 EUR, Mobile and web application template - 300 EUR, initial capital for the company (laptops, servers and office equipment) - 5000 EUR. A sample profit and loss account for the second year of the "Meet Friends" start-up activity is shown in Table 1.

Using the model shown in Figure 4, BEP was designated for this project. It represents the acquisition of 3,241 clients with company accounts. The project will be financed by equity, loans or aid (up to 20%) and crowdfunding.

The development and presentation of business model and business plan of an undertaking are important for the commencement of start-up operations. They constitute full characterisation of the idea of the business in order to attract external capital (investors, aid measures) and facilitate the management of a newly created company. Business plan and business model make young entrepreneurs aware of the need to develop and expand value for client, ensure profitability and financial capacity of the company. They indicate the importance of the resources selection, especially human capital as well as inter and intra-company resources.

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CASE STUDY: I3P, THE INNOVATIVE ENTERPRISES INCUBATOR OF POLITECNICO DI TORINO, ITALY

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***Abstract:** In this chapter we will describe the Incubator of Innovative Enterprises of Politecnico di Torino (I3P) from several perspectives: the historical evolution since foundation in 1999, the evolution of the ecosystem of I3P and its stakeholders' network, the main processes at the core of its functioning, and some results with key performance indicators.*

Introduction

I3P, the innovative enterprises Incubator of Politecnico di Torino is the oldest University-based incubator in Italy. It represents one of the most important organizations in Piemonte Region and in Italy dedicated to innovation, in particular to support innovation (taking an idea to the market by means of ideas generation, feasibility studies, prototypes and engineering; Bivee, 2014) coming from potential entrepreneurs. Since its foundation, in 1999, I3P supported more than two hundred startups: about fifty are currently hosted, eighteen of them have been acquired and about one hundred are still active on the market.

A bit of history and the Stakeholders' Network

In 1999 coming back from a visit to main USA universities several professors of Politecnico di Torino proposed to local public authorities (regional government and city government) the idea of an incubator of innovative enterprises. I3P was founded by Politecnico di Torino, City of Torino, Province of Torino, Region of Piemonte (via its financial body FinPiemonte), the Chamber of Commerce, and the Torino Wireless Foundation (the ICT Italian Innovation Pole).

Since its establishment, I3P participated also in many European project as a member and as a project leader, and the number of nodes of its stakeholders network increased along time: Financial and Advisory Services (e.g. banks and national and international venture funds), International Partners (e.g. UCLA and several main European incubators), and

Local Partners (Alumni of Politecnico di Torino, Professionals and Experts in legal and intellectual property areas, Italian Association of Managers, and Industrial Association of Torino). I3P is also the founder of National Innovation Award, assigned every year to the best startup in Italy. For a view of I3P's stakeholders network see Fig. 1.

I3P Main Processes

A business incubator like I3P is not a multi-tenant building it is the place where startups begin their lives and grow. Indeed the main activity of I3P is positioned at the core of the innovative economy: to grow startups. A startup is a legal entity setup since less than five years, with less than 5 millions euro per year of revenues, and smaller than 250 employees. Usually, the startup is developing itself around a new product, service, or application, and the founders have a risk-taking attitude and a strong commitment to innovation. In other words, they transform an idea into a product or service available on the market, by moving it along the stages of a feasibility study, a prototype, and an engineering phase.

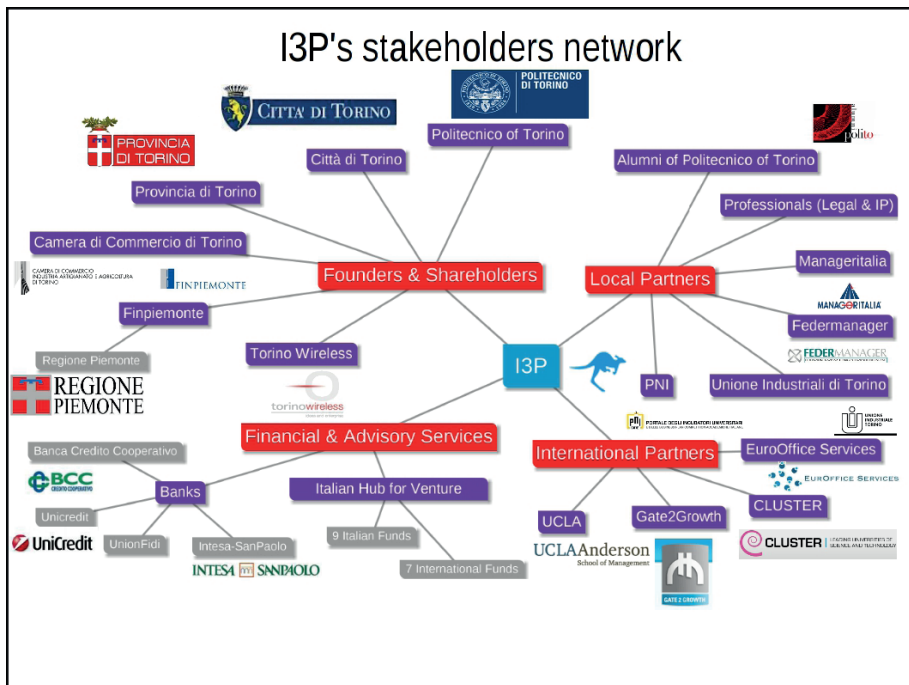


Figure 1 - I3P's stakeholders network.

I3P, like all incubators, plays a fundamental role in helping startups to grow, and take successful products and services to the market, that is, to innovate. I3P supports startups by offering an integrated package of services: workspace, coaching and mentoring, complementing the team with the right people, providing interactions with investors, supporting entry into markets, and finally to suggest an exit strategy from the incubator

to becoming a grown company.

Idea generation

Of course for setup an innovative enterprise one needs an innovative idea. So it is important to invest at national level and regional level into basic research and scouting programs. According to the EU Lisbon strategy (EU, 2017) each country should invest at least 3% of GDP in research, but this ambitious goal is not achieved in many EU countries. To cultivate idea generation it is necessary to invest into two parallel tracks of activities:

- a) creating an innovative environment,
- b) operating a technology and knowledge transfer activity.

See Fig. 2 for idea generation.

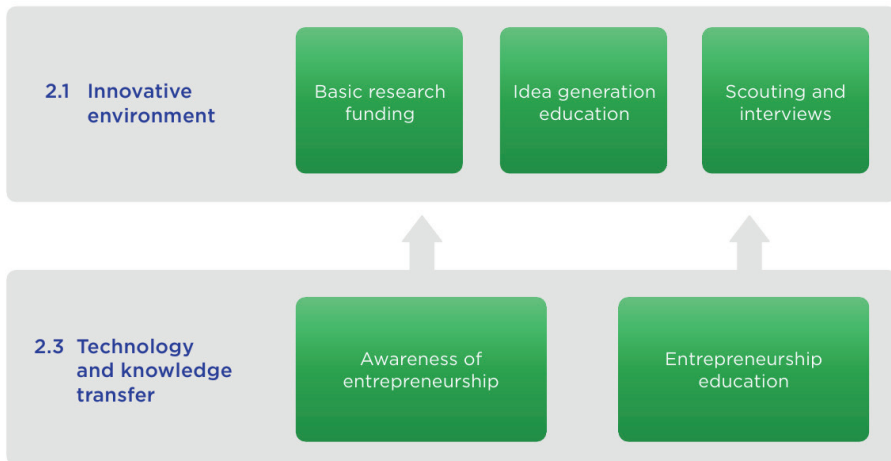


Figure 2 - Idea generation. Source: Patrignani et al. (2014)

Creating an innovative environment

I3P is inside the campus of Politecnico di Torino (the first founder of I3P), a fresh innovation cluster and an excellent scientific community. This academic area can leverage idea generation by means of basic research funding, educating young generations of researchers towards innovation, and by scouting new ideas and interviews with researchers.

I3P organizes many events for stimulating the creative process of generating, developing and communicating new ideas. In other words, I3P creates opportunities / events (brainstorming events, conferences with innovation gurus, happenings related to circular economy, etc.) that encourage people to be “divergent” in their thinking. For example, every year there are idea competitions like the Start-Cup and the Business Plan Competition (I3P, 2017a).

I3P's activities in the area of scouting new ideas is based on “mining” activities inside Politecnico di Torino (an outside!) for extracting knowledge with a strong innovative potential. The I3P people (senior coaches and mentors) have the skills and competences for continuously monitoring the research teams and identifying new ideas. Of course this implies a good relationship between I3P people and the university community, a good knowledge of issues related to intellectual property, and capability to execute “prior-art” search. Of course, I3P people are also able to identify potential markets and the gap and difficulties for going from the idea to the market. Scouts are experts usually coming from previous experiences in industry or senior professors.

Operating a technology transfer activity

I3P has a good collaboration with the Technology/Knowledge Transfer Office of Politecnico di Torino, which is one of the main hubs of academy-industry collaboration in Italy. Indeed, Politecnico di Torino is one of the first academic institutions in Italy to introduce the “third mission” (that is, *innovation*, beyond *education* and *research*): to stimulate the direct application and deployment of knowledge to contribute to the social, cultural, and economic development of society. This area is currently called “Trasferimento Tecnologico e Relazioni con l'Industria (TRIN)” (Polito, 2017). When the option of setting up a startup, as a means of knowledge transfer, is identified, a collaboration with I3P is triggered.

Of course, the “entrepreneurship” competence is one of the main requirements for creating an innovative climate. It is fundamental to motivate students by introducing them to the basic concepts of entrepreneurship, by organizing exciting events that show them opportunities, like: meeting real companies, business tours, business plan competitions, etc. In Torino, I3P and Politecnico di Torino's TRIN plan and organize these kinds of activities as their core mission.

In the campus of Politecnico di Torino there are plenty of opportunities for entrepreneurship education, mainly managed by the Entrepreneurship and Innovation Center (EIC) and the Department of Management Engineering and Production (DIGEP). It is recommended to introduce these themes in higher educational tracks in order to prepare next generations at “generating value” by startups. This education creates the proper mindset and, also, improve young generations' employment opportunities. Also, this can be an opportunity for the growing number of PhDs who cannot be adsorbed by the university system.

Selection

The selection process is necessary for picking up, among the many emerging ideas, the “best” ones. Also, an “idea competition” is indirectly giving incentives to researchers and promotes entrepreneurship.

The teams are encouraged to develop good business concepts, to evaluate market

potential, and to identify problems to be addressed. I3P organizes these events where people have to provide a description of their idea and the business model (usually by a business model canvas).

The participants must prepare a presentation (“a pitch”) in front of the audience that includes the evaluating commission composed by experts like private investors, bankers, serial-entrepreneurs, business coaches from I3P, etc. The evaluating criteria are: the quality of idea and the quality of the proposing team. The “winners” usually get an award and some money but the main goal is to get recognition by the innovation community, networking possibilities, exposure to the media, and promotion of the team. Usually the team applies also to the I3P incubator program.

In Torino and Piemonte Region the competition for start-ups is divided into two steps: a) Idea Competition and b) Business Plan Competition. The Idea Competition is an “open call” running the entire year; everybody can participate, from all over the world. Once every year the call is “closed” and all the submitted ideas are evaluated. The selection committee is composed of I3P’s “internal experts”, professors, external experts from specific fields, coaches, tutors, managers from companies, investors, and venture capitalists.

In 2016, I3P received 600 ideas, that generated 145 projects (“approved” business plans), among them 49 became real startups after the “Business Plan Competition” (and 15 entered I3P incubation program). This is a kind of a second step in the selection process, it is a more selective step where all projects are “re-evaluated”, not just the idea, but also the team, the intellectual property management strategy, the business plan, and the business model Canvas. Also the top winners usually receive an award (about 20,000-50,000 EUR) and can compete in the Italian national innovation competition “Premio Nazionale per l’Innovazione” (PNI, 2017).

Just before entering I3P incubator, some startups enter the so-called pre-incubation period. In this time they complete the development of the business plan, refine the value proposition, overcome obstacles concerning lack of entrepreneurship skills, insufficient marketing and business knowledge, financial risks awareness, personal skills, etc.

Another key point in setting up a startup is to have a clear strategy for intellectual property management. Since these aspects are regulated by national and international laws, some support is often needed and can vary from country to country. This complex area is supported by I3P professional legal experts that try to find a balance between the willingness to publish, typical of the academic world, and the need to protect the potential value of the work of researchers.

Incubation

Once the startup enters I3P incubator it starts receiving a collection of services that are fundamental for the success of the venture: training and coaching, business support,

mediation and networking, office spaces and test labs.

Training and coaching

During incubation inside I3P's startups receive services such as training and coaching for becoming familiar with startups' tools like: commercialization, presentation/pitch skills, human resources, identifying market opportunities, and customer relationship management. Usually a dedicated mentor or coach takes care of this personalized support.

Business support

The core value provided by I3P incubation period is the business support to startups. This is very important since many startup teams need help in approaching market and business related issues. The I3P's senior coaches and tutors taking care of startups provide: business strategy development, sales and marketing advises, support of IP management, support for legal requirements and compliance to norms.

Mediation and networking

I3P offers to startups access to its entire incubator's stakeholders network. This is an important support since gives the opportunity "*... to meet professionals and alumni associations, to establish long-term and professional relationships with higher education institutions in the region, to enter a strong and strategic network of companies and institutions and to start nurturing links with strategic partners like investors or investment funds*" (Patrignani et al., 2014).

Office spaces and test labs

The startup, of course, needs a (small) office space for starting its activities. In I3P the physical space is a basic facility, where there is one small office for each start-up with general office equipment, common meeting rooms, relaxation areas, a large conference room, and many co-working spaces. The main purpose it is not just to offer spaces, but also networking opportunities for exchanging ideas among entrepreneurs: the main source of innovation. There is access to a high-speed Internet and telecommunication network. Only a small piece of I3P spaces are reserved to administrative offices and staff. Each startup pays a small fee for the space inside I3P.

Funding startups

Of course the main problem for a startup, beyond the idea, the team and the nice support provided by I3P, is to find financial support. In Italy this is one of the main problems: the lack of investors in the early stage, in the initial stages of the company development.

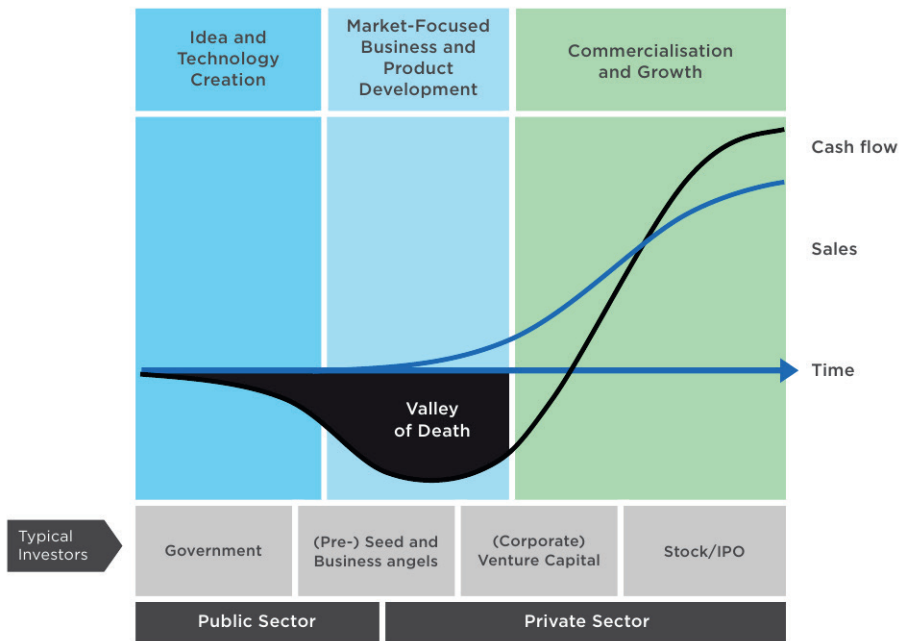


Figure 3 - Startup funding. Source: Patrignani et al. (2014)

This is highly risky since the startup risks to not being able to cross the “valley-of-death” (see Fig. 3). In this risky time, the expenses (research, development, etc.) are higher than revenues. This is particularly difficult when, in particular technology domains, there are problems of *scale* (up-scaling or pilot-production can be very capital intensive), problems of *long life cycles* (like in renewable energy where an infrastructure change may be needed), or problems of *compliance* (in some heavily regulated markets it is difficult for newcomers to propose innovative business models).

In some periods, funding initial stages of the startup (e.g. feasibility study, prototyping), could be provided by National or Regional public funding of innovation. I3P, jointly with research departments of Politecnico di Torino, can help the startups in participating and applying to these funding opportunities (in some cases even EU funding opportunities). Sometimes I3P could support in finding the, so-called, “proof-of-concept” funds, usually provided by regional / local initiatives for supporting, for example, the development of the first prototype.

I3P can support startups in finding the, so-called, “pre-seed” or “soft-loans” (with lower rate of interest and delayed payback). Once the startup is hosted by the incubator, the founders can get these relatively small amounts of money (usually around 20,000 EUR)

for the establishment of the company.

I3P has also good relationships with informal investors or “*business angels*”, even though in Italy such people are quite rare. In some cases there are senior entrepreneurs and/or former executives who are willing to give younger entrepreneurs an opportunity. On average, these special investors provide about 50,000-100,000 EUR (but it differs case by case). Sometimes they provide not just money but also their own experience, knowledge of the industry, potential customers, etc.

I3P organizes several events for facilitating matching startups and potential investors.

I3P also has formal relationships with formal “*seed investment funds*” and banks able to provide higher capital investments. Usually this is required for startups that need to develop their product or service, or to create an expensive manufacturing process. This kind of investors accept the high-risk of funding startups in this early stage and could reach also the amount of about 250,000 up to 1 Million Euro of investments.

I3P has good relationships with formal “*venture capital and corporate venture capital*”. In particular when the startup enters the “growth stage”, is extending its market with a proven product/service, with a sound business model, and a visible break-even, then this kind of investors could be interested to invest in the range of about 1 Million Euro - 5 Million Euro. Usually these startups are also towards the end of the incubation process and are trying to “exit” with a growth strategy.

Exit

A startup can stay inside I3P usually for 3 years. Then, as one startup exits, another startup enters. Indeed, at the end of the incubation period, by definition, a startup should be able to survive outside the “protected” space and enter the real competitive market. Of course this is a critical time for the startup. In order to support this delicate phase, I3P has a monitoring tool for a “health check” during the incubation phase. Of course there are many different situations, at the extreme, each startup has its own evolution rate, so it is important that the mentor/coach carefully takes care of it. For example, for ICT startups often the ‘time to market’ is shorter than for other startups that have longer physical product feasibility studies, prototypes development, and complex engineering phases.

I3P monitors the “health” of startups during the incubation phase. The I3P mentors and coaches regularly discuss with founders the startups development plan, milestones, and possible corrections of directions in case of problems.

After exit, I3P maintains a contact with the startup team for networking and for analytical purposes. Of course, then the startups need to grow and there are several trajectories for their evolution:

- a. the startup continues independently;
- b. the startup is acquired by a larger and established company;

- c. the startup participates in some specific “growth” programs (maybe offered by the incubator or by other stakeholders), maybe the team still needs support, capital-intensive infrastructures, longer go-to-market time, etc. For example, in the area of cleantech, startups I3P have strong collaboration with the Torino’s Environment Park that can host startups exiting I3P incubation;
- d. the startup discontinues its operations. Innovation is necessarily based also on failures: many failures equal many opportunities!

Key Performance Indicators

In order to have a good reporting tool and also for transparency purposes in front to all stakeholders (the university, the regional and local governments, the public and private investors, the society in general), it is important to “measure” the incubation process by means of a collection of key performance indicators (KPIs). They should be simple to understand and useful for improving the regional innovation ecosystem. It is also important to review these KPI for promoting a systemic view among the stakeholders, and crossing the different points of views, in order to provide useful suggestions for improving the social and economic results of I3P incubator.

A *general* KPI for an incubator could be the **numbers of years since foundation**, that is, the level of experience matured by the incubator: for I3P it is 18 years since foundation, it has been established in 1999.

The following KPI are proposed by I3P (I3P, 2017b):

- **Numbers of ideas evaluated / year** - this KPI gives an idea of the performance of the “idea generation” phase in Torino, and in Italy in general. In 2016, I3P has collected 600 ideas.
- **New projects or business plans accepted / year** - this KPI provides an indication of the quality of ideas and research teams. In 2016, I3P has launched 145 projects.
- **New startups established / year** - this KPI provides the level of strength of ideas and teams and also of the selection process. In 2016, I3P has supported the establishment of 49 new startups.
- **New startups entering I3P / year** - this KPI gives the level of turnover of the Incubator since I3P has a limited number of spaces available every year. In 2016, I3P has welcomed 15 new startups.
- **Seed-Investments / year** - this KPI provides an indication of the quality of the startups, how much they are attractive for this kind of investors, and how good are I3P’s mentors and coaches to establish fruitful relationship between startups and investors. In 2016, I3P was able to attract 2.9 Million Euro of seed investments.
- **Early-stage investments / year** - this KPI, as above, provides an indication of the quality of the relationship between I3P and the investors’ community. In 2016, I3P was

able to attract 5.15 Million Euro of early-stage investments.

Other KPIs could be defined in order to evaluate the incubation process. For example it could be interesting to evaluate the **number of people needed inside the incubator**, like mentors/coaches, in order to support startups. For I3P this KPI is usually: 1 mentor/coach follows 2-4 startups.

Also, another interesting KPI could be the **estimated number of jobs created by I3P** for the unit of investment. In this case it should be collected the total number of startups established (and survived) since foundation, the average number of persons employed by a startup and the total investments collected since foundation. Since foundation I3P statistics gives that about 150 startups survived, counting an average of 5 people working for each startups, the average number of jobs created is about 750.

The KPI interesting for investors could be the **total revenues of startups / year**. In 2016, the total revenues of startups have been 93 Million Euro.

In the context of the EU project InnoWomEnt, it is interesting to note the growing **women presence in I3P**: in the total number startups created since foundation, 28% of them included at least one woman in the founding team, and, even more interesting, among I3P staff about 54% are women.

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Paola Mogliotti is Director and Chief Financial Officer of I3P since 2015 with the following tasks: coordination and management of all the administrative and accounting procedures, support of Chairman, contacts with shareholders and stakeholders, management of Human Resources, planning, management and reporting of projects at the local, national and European level, to promote new entrepreneurship, business training and Business Plan Competitions. She graduated from Politecnico di Torino, with a degree in Management Engineering.

WHY AND HOW TO EVALUATE AND MONITOR INCUBATION PROGRAMMES

POLISH AND INTERNATIONAL EXPERIENCES

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***Abstract:** Discussing the implementation of incubation programmes for technology companies the question of their results rises always. Various objectives, quality and scope of the programmes combined with lack of standards for their evaluation cause a lot of doubts as regards the programmes' role in the system of knowledge commercialization and transfer of technology. To face this challenge methods of evaluation, modelled after the solutions developed and used abroad, should be establish and use in Poland to present results of the incubation programmes.*

Lack of uniformity of incubation programmes constitutes a significant challenge in terms of their evaluation – various objectives, quality and scope of the programmes combined with lack of standards for their evaluation cause a lot of doubts as regards the programmes' role in the system of knowledge commercialization and transfer of technology. Such doubts were spoken about in various groups, and they were strongly voiced in post-audit conclusions by the European Court of Auditors (ETO, p. 22) that recommended implementing a system of evaluation in every active incubator. The Court even defined the purpose of the evaluation (namely, checking if the resources were invested in an efficient and effective manner and whether they contributed to meeting strategic objectives) and its scope (gathering and recording statistical data, as well as significant information on the incubator's activity and its clients). The need to develop such system remains indisputable, so the key question is no longer "should we?" but "how?". It seems that the implementation of technology companies incubation programmes requires using special methods of evaluation which could be modelled after the solutions developed and used abroad.

Evaluation of incubation programmes is also a pressing issue for the centres involved in such activity. Discussions on the topic are largely stimulated by the organizations which

bring the centres together. The establishing and activity of, for example, International Business Innovation Association (1984), United Kingdom Business Incubation (1998), European Business Incubation Centers Network (1984), and Polish Business and Innovation Centers Association in Poland (1992) have led to increased interest in the subject and defining of challenges which it involves.

The first challenge is that incubators use various methods of measuring results of their programmes. Moreover, even if one looked at two programmes which had the same objectives (such as programmes supporting the establishing of academic spin-offs), it is not possible to identify one, common set of applied indicators (Science Alliance, 2007, pp. 12-13). The second challenge consists in adjusting the scope of measured results to the stakeholders' expectations. The number and the variety of stakeholders mean that they have not only different but also divergent demands with regard to evaluation (Mażewska & Milczarczyk, 2013, p. 23). Thirdly, there are often doubts as to the selection of indicators to evaluate results of the programmes and how those indicators correspond (or not) to the objectives of the programme. After all, what should be the basis for deciding whether achievement of objectives is better measured by the number of companies that survive a particular period of time or the number of companies that are actually successful?

Additionally, it is not clear whether the way of understanding and calculating an indicator that is called the same is identical in all programmes that use it. This issue is discussed by, among others, Al-Mubarak and Schrödl (2011, pp. 436-438) who write that the results of incubation programmes' evaluation would be meaningful only if they were a cross-section analysis of a complete (according to, e.g. territory) group of centers and applying uniform methodology (everyone collecting the same, predefined data).

Despite those difficulties, a lot of researchers and people practising in the field have attempted to create evaluation and assessment models measuring the effectiveness of incubation programmes. In the 1990s Lalkaka and Abetti (1999, p. 204) were proponents of a popular incubation programme evaluation model which in their opinion should cover various aspects adjusted to specific incubators, including:

- Enterprises established in incubation programme and increased likelihood of success thanks to being in the programme
- Number of jobs created by the companies thanks to the programme over the course of 3 years
- Number of jobs and economic activity after 3 years after participation in the incubation programme had ended
- Public financial aid to create and begin incubation programme
- Commercialized research that is the basis for establishing a company under incubation programme
- Operational self-sufficiency of the incubation programme

- Contribution of the incubation programme, companies within the incubation programme, and “graduates” of the programme to the economy through paying taxes
- Changes in national policy that could have an influence on business activity.

This proposal focuses on the evaluation of incubation programmes as a tool for intervention which is mainly intended to improve the social and economic conditions, and it touches upon only one, but very significant, aspect of the programmes' influence. In the first decade of the 21st century, two trends regarding research on incubation programmes evaluation developed. The first one, somewhat close to the ideas of Lalkaka and Abetti, focuses on evaluation perceived in the context of success achieved by the incubated companies. What Al-Mubarak and Schrödl (2011, pp. 445-447) propose, can also be viewed as part of this trend, as they wanted the evaluation to take into account:

1. Companies leaving incubation programmes and reasons for doing so; indicating whether leaving the programme is connected with the company's development (reaching milestones, needing infrastructure that the incubator could not provide), or a failed business idea.
2. Measuring the success of incubated companies, their rate of survival and generated profits (are they enough to guarantee just operational activity, or allow the company to make investments and develop); [this topic is broadly discussed by Hackett and Dilts (2004, p. 74)].
3. Jobs created in incubated companies - although it is one of the most popular indicators used in the evaluation of incubation programmes, it cannot be the only one
4. Salaries paid by incubated companies.

As proposed by Science Alliance (2007, p. 3), we can focus on other aspects related to incubated companies. The organization distinguished four such areas of evaluation on the basis of comparative analysis carried out with regard to incubation programmes in Europe and Israel:

- Level of intellectual capital implemented and used by the companies: companies would be characterized by the number of patents they hold, implemented new technologies, and innovations
- The rate of companies that complete the incubation programme (similar as proposed by Al-Mubarak and Schrödl (2011)): the analysis would involve checking how many companies completed incubation programme and how many of them continued their business activity
- Effectiveness in attracting investors: it would be interesting to learn the amounts of investments obtained by the companies participating in the incubation programme
- Return on investment (under the condition that the incubation programme as part of its activity also invests in the companies that are established within the incubator programme).

Models of evaluation which predominantly focus on incubation programmes were also proposed by Colombo and Delmastro (2001, pp. 1106-1112) who wanted to investigate the effectiveness of such programmes by comparing companies that were established with the help of incubation and without it; Schwartz (2011, p. 492), too, was a proponent of following the achievements of companies that participated in the incubation programmes (currently and in the past) as he thought it was a key to understanding the total effectiveness of incubators' activities.

Another trend presents a more holistic approach. Löfsten and Lindelöf (2002, p. 860) suggest three areas for analysis: survival rate and growth of young technology companies within the programme, development and durability of incubation programme, as well as influence on the community and local environment. On the other side, Rogova (2014, p. 269) suggests that the analysis should cover, just like in the approach described above, the development of incubated companies, the influence of incubation programme on the companies, as well as results achieved by the incubation programme itself. Similar views are expressed by Erlewine and Gerl (2004, pp. 193-195) who point to three dimensions of evaluating incubation programmes:

- 1. Measuring results**, usually by means of external evaluation that focuses on the programmes' impact on the economy and that takes into account various aspects of companies' achievements described earlier. In this process, one needs to remember that the data collected by the incubators are heterogeneous and that comparative analysis can be conducted only for those incubation programmes which share a similar mission.
- 2. Evaluation of internal effectiveness** which would be a total evaluation of operational activities (e.g. administration, management, finance, team) and evaluation of the subject matter (e.g. programme outline, the scope of provided services).
- 3. Evaluation of clients' satisfaction** which should involve regular surveys to help analyse the quality of provided services, their usefulness and effectiveness, as well as the effectiveness of working together with the incubator team.

Another approach is presented by Bigliardi et al. who proposes evaluation model based on six elements: organizational structure, internal development, impact on the surroundings, economic and financial aspects, human resources, scientific and technical efficiency, as well as relations between regions and countries. On the other hand, some researchers attempted to use methodologies applied in other research fields. Schwartz and Gothner (2009) suggested using PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluation) to compare the results of various programmes' implementation according to six criteria: average time of incubation, share of start-ups in the number incubated companies, share of technology companies in the number of incubated companies, client satisfaction level, companies survival rate, and an increase in

employment in companies that finished their participation in the incubation programme.

Examples mentioned above show that usually in the literature on the subject, evaluation of incubation programmes is correlated with the results achieved by incubated companies. This approach is not erroneous, but it is certainly insufficient. Incubation programmes are complex tools for public intervention, and their effectiveness involves at least operational aspects, clients and external factors, and it's those factors, assuming the objective of the evaluation has to be in line with the objectives of the programme, that are key factors which will shape the evaluation model of Polish incubation programmes for technology businesses.

Beginning to define the model (still in its general form, not adjusted to the Polish conditions), the author assumed that it will cover three aspects: strategic (taking into account its application in terms of creating policies and providing information on the programmes to a wider public), analytical (ensuring the possibility to define various – positive, negative, intended, and unintended – results of interventions), and methodological (covering intervention objectives, full cycle of interventions, qualitative and quantitative aspects) (Miedziński, 2008, pp. 480-495). Additionally, as the model is rooted in the theory of the programme, it shall involve evaluating the extent to which programme objectives have been met, the use of resources, as well as achieving the desired results in the context of a target group and on the strategic level. According to the author's opinion, monitoring and evaluation of incubation programmes should be performed both at the level of systemic interventions, as well as the level of individual interventions, individual programme at the planning stage (*ex-ante*), as it is ongoing (*on-going*), and when it is completed (*ex-post*). What differs those two approaches is the goal of evaluation, which in the first case consists in providing strategic information for planning interventions at state and regional level, and in the second case involves managing incubation programme run by a specific centre.

What these two approaches have in common, is an attempt at answering a question as to what the purpose of incubation programmes is, what is the sense of investing in them, and what added value they generate. Also, it is worth remembering that evaluation is a research-type process which investigates the programme, and which includes elements of judgement and provides recommendations that serve the decision makers. Evaluation is characterized by the following subsequent stages:

- defining stakeholders' expectations,
- developing and choosing indicators to measure effectiveness,
- the process of gathering data to calculate the indicators (monitoring),
- analysis of indicators and using the obtained information for the benefit of strategic management,
- presentations of results, that constitute the framework of the evaluation model of technology businesses incubation programmes put forward by the author.

The proposed evaluation model presumes that the first stage involves **defining the recipients of research information, their expectations, and the purpose of performing the evaluation**. The literature on the subject (including, for example, Kotra & Tórz, 2011, p. 173; Science Alliance, 2007, p. 47) indicated four potential groups of information recipients:

- team that runs the incubation programme and for which the purpose of the evaluation will be to obtain information about the effectiveness of their activities, strengths and weaknesses of the institution, following the institution's development in various aspects of operation that will be useful for strategic management (e.g. modifying the offer, marketing policy, etc.),
- clients and future clients who may want to use (publicly available) information from the evaluation when choosing incubation programme they want to use to pursue their business goals effectively,
- external entities (owners, shareholders, authorities at various levels) who after the evaluation may expect to see the evidence that the resources devoted to financing the incubation programmes generate public value, profit for the local community, and benefits for the economy of the region and country,
- people involved in funds (seed, venture, business angels) who may potentially use the results of the evaluation to determine the credibility of incubation programmes with regard to their potential for cooperation.

The first two groups – incubator team and clients – will be the recipients of evaluation activities performed with regard to individual interventions or specific programmes, whereas the other two groups – external entities and funds – will be interested both in obtaining information about an individual programme, as well as the general dimension of incubation programmes.

The second stage of developing evaluation model consists in **developing and choosing monitoring indicators connected with the declared objectives of incubation programmes**. Many popular indicators describe short-term perspective in presenting incubation programme results and fail to focus on the long-term influence on the surrounding environment. Indicators can be systematized according to how they are constructed (simple vs complex), type of data that is used to create them (financial vs material, as well as quantitative vs qualitative), how the data is used (contextual vs project data, as well as key vs ancillary data), and data's place in the intervention logic (product, result, and influence) (Kot & Weremiuk, 2012, pp. 9-16). According to the theory of the programme, a balanced and cross-sectional set of indicators should encompass three types of indicators:

- product (output) indicators that refer to undertakings measured in material or money units, describing output data, internal achievements,
- result indicators that refer to direct and immediate effects of the programme for

direct beneficiaries; such data provide information about changes in, for example, beneficiaries' behaviour, potential, and activity,

- impact indicators that refer to the results of the programme going beyond the immediate effects; one can distinguish direct impact (effects are seen after some time, and they are directly connected with the undertaken action and direct beneficiaries) and global impact (long-term effects that have an influence on a larger population) (European Commission, 2014).

A good indicator should have the following characteristics – it should be relevant (measuring what it intended to measure), reliable (measuring phenomena each time in the same way), understandable (easy to explain), feasible (based on data that is possible to gather), and unique (not overlap with other indicators) (Renault, 2017, p. 14). Although all of the conditions listed above are important, from a practical point of view, it is feasibility that is critical. That is because there is no good in an indicator that describes a particularly important variable of the programme if this variable cannot be obtained (calculate, sum up, etc.).

Work on the third stage of developing incubation programmes evaluation model – namely principles for the **process of gathering data to calculate the indicators** – should start with answering the question whether a particular evaluation is to be a single off action or a repeated action. If it is assumed that it is going to be a cyclic process, then it is particularly important to define the way of gathering data and the applied methodology as it translates into data comparability. In such case, it is vitally important to guarantee the collection of repeatable data (the same scope, manner, method, and from the same sources). Regularly repeated evaluation ensures data comparability and allows to follow the trends, although the latter is, of course, possible after a few years (Kotra & Tórz, 2011, p. 189). Another important step is deciding what resources are going to be used to perform the evaluation – internal (the team that runs incubation programme) or external (consulting company, research companies etc.). The first option is good for small programmes, and the second one may seem more objective, in particular from the point of view of external entities interested in evaluation results.

There are a few factors to consider before choosing a method for data collection – type of questions one wants to ask, recipients of the results, and indicators to calculate or describe which will necessitate the collection of specific data. Moreover, it is necessary to take into the account the characteristics of a group from which data will be obtained (type of entities, their number, how close they are to one another, etc.), the possibility to collect data from generally available sources (national statistics, registers, etc.), as well as available time and resources one wants to devote to data collection. The literature on the subject (Renault, 2017, p. 16) distinguishes quantitative methods which include

surveys, econometric methods and statistical analysis, bibliometrics,¹ as well as qualitative methods such as: case study, network analytics, and expert method. The decision as to which method to use (only quantitative, only qualitative, or mixed) will always depend on the cost of using particular methods, the time available, data availability and their relevance.

Once the data is collected, another step is the stage at which evaluation model is developed and at which assumptions need to be made with regard to the method for the **analysis of indicators and using the obtained results in strategic management**. It is important to include information about the method for measuring and collecting data (What are we measuring? How data should be obtained?), the way in which an indicator is going to be interpreted (how to interpret an indicator? Is it a positive or a negative variable?), and where the information is going to be used, as well the results of incubation programme implementation for the internal needs of centers and for the reporting needs in connection with authorities or owners (How to use information?) (Kotra & Tórz, 2011, pp. 178-179). In this context it is not only important to use a particular indicator in the evaluation model but also, maybe even more importantly, to define its base value and the desired target value. Only when once checks if the desired values were attained, it can be decided whether actions that were part of an incubation programme were successful.

The last element of the evaluation process is **presenting its results** the purpose of which is to:

- share the results and prove the effectiveness of incubation programmes,
- report results to the owners and stakeholders,
- promote incubation programme's achievements,
- attract sponsors,
- networking by sharing results with other centres (Dichter & Reis, 2010, p. 35).

Evaluation results and conclusions can be presented in a number of different ways, but each way should be adjusted to the needs of the target group to whom you want to get your message across. The most elaborate way of presenting results is a report. It should describe the purpose of evaluation, applied methodology (including questions that were used) and how it matched the scope of the incubation programme, characterize indicators, describe how data was obtained (the level of response, selection of respondents, and information whether the group of respondents was representative), conclusions and recommendations, as well as presentation of the team responsible for

1 Bibliometrics – the term used since 1969 by Alan Pritchard and Robert A. Faithorne which replaced previously used term statistical bibliography that was not very precise. This science originated from scientometric studies and it is a collection of mathematical and statistical methods used to investigate written communication. It involves the analysis of written publications according to the following features: journal, author, subject classification entries or country. (<https://pl.wikipedia.org/wiki/Bibliometria>; accessed on 25.09.2017)..

the evaluation. Other ways of presenting evaluation results would use a report as its basis. The main objective of another way of presenting results, namely in the form of a brief report, would be to present the information in a synthetic manner using less professional jargon. It should focus on results and recommendations, and be easy to read. This way of presenting results can be published on a website or blog which could serve as a basis for writing an article to a local newspaper or presenting the information to the general public. An even shorter form of presenting results is a press release sent to the media which is intended to spark interest in the evaluation results.

Words written by H. J. Harrington (2006) in one of his articles can serve as a summary of the discussion about evaluation: "Measurement is the first step that leads to control, and, eventually, to improvement. If you can't measure something, you can't understand it. If you can't understand it, you can't control it. If you can't control it, you can't improve it."

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EVALUATION OF THE EFFECTIVENESS OF TECHNOLOGY INCUBATORS IN POLAND

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***Abstract:** The concept of innovativeness has been gaining popularity both in the literature on the subject, as well as in the social awareness. It is assumed that actions taken by innovation centres have a positive impact on the local and regional development. Therefore, during the 2004-2006 and 2007-2014 programming periods, large amounts of money were assigned for this purpose in Poland. As a consequence of so much support given to innovation centres (including those who run incubation programmes like business incubators, technology incubators and science and technology parks), there is an increasing expectation that the subsidized institutions will be able to indicate how effective the implementation of their activities was. The evaluation of effectiveness of technology entrepreneurship incubation programmes may improve their quality from the point of view of beneficiaries, managing institutions and financing institutions. The mechanisms of collecting information about the results of the programmes and examples of good practices from abroad prove that the use of the evaluation conclusions at the stage of planning and implementation of incubation programmes has an impact on their quality improvement. Due to the design of incubation and intervention programmes, for which they are tools, evaluation model based on the programme theory is the most suitable one to assess their effectiveness.*

At the beginning of the 21st century, Poland was an economy with a moderate level of innovation. This situation has gradually improved since joining the European Union, thanks to, among others, putting emphasis on innovative development of entrepreneurship. The concept of innovativeness has been gaining popularity both in the literature on the subject, as well as in the social awareness.

An important part of the contemporary economic theory is a knowledge-based economy. Such an economy is characterised by organisational and institutional support facilitating knowledge absorption and its use in the process of manufacturing material goods and development of services (Gaczek, 2009). Various support institutions are responsible for creating such conditions - these institutions operate at the meeting point of the national and regional innovation systems, and they include innovation centres supporting innovation processes through various forms of assistance and pro-innovation services (Matusiak, 2011; Matusiak & Guliński, 2010).

One of the tasks of **innovation centres** is to help create new companies. This task is

inspired by the experience of countries such as the United States, Israel or Finland showing how competent stimulation of innovativeness combined with ensuring intuitional forms of support can guarantee faster economic growth. One of the ways to facilitate the growth of innovative business is to run incubation programs.

Business incubation program is defined as a form of support in the process of social and economic development focused on providing advice to potential beginner entrepreneurs, organizing and accelerating their development and success thanks to a comprehensive business support program. The main objective of incubation programs is to promote efficient enterprises which, after their participation in the program has ended after a certain period of time, will be able to survive independently on the market (Matusiak, 2011). Incubation programs include three complementary and consecutive stages, i.e.: pre-incubation, incubation, and acceleration, that can be addressed to different target groups. They have individual characteristics related to the potential of the scientific, economic, industrial and cultural environment.

When analysing incubation programs in the context of developing a knowledge-based economy, the focus should be on programs targeted at technology companies, i.e. companies focusing on the development and/or use of high-tech products or services resulting from the application of scientific or technical knowledge (Stawasz, 2011). The institutions that implement this particular type of incubation programs are **business incubators, technology incubators** and **science and technology parks**.

It is assumed that actions taken by innovation centres have a positive impact on the local and regional development. Therefore, during the 2004-2006 and 2007-2014 programming periods, large amounts of money were assigned for this purpose in Poland. As a consequence of so much support given to innovation centres, there is an increasing expectation that the subsidised institutions will be able to indicate how effective the implementation of their activities was.

Management sciences assume that evaluation is a systematic examination, carried out using a variety of methods including data collection, analysis, evaluation and communication about the results. The aim of such evaluation (against clearly described criteria) is to examine process quality and value, as well as the effects of public interventions (Bienias et al., 2012). Evaluations rely on a system of criteria (standards) according to which assessment is made against the assumed objectives. The criteria include: relevance, efficiency, effectiveness, utility, and sustainability². This chapter focuses on one of the evaluation criteria - **effectiveness**.

The literature on the subject considers an action to be **effective** if it allows (completely or at least partially) to achieve the pursued objective or at least helps to achieve it in the future (Pszczolowski, 1982). T. Kotarbiński (1975), in accordance with the principles of praxeology, defines an effective action as an activity resulting in the effect that was the

2 http://www.ewaluacja.gov.pl/ewaluacja_wstep/Strony/Methodologia.aspx

intended objective. Effectiveness may be greater or smaller, depending on whether the objective has been achieved or whether one managed to get close to it. As mentioned above, the assessment of effectiveness must relate to business objectives - in the case of incubation program centres, the objectives for which they were established should be the starting point.

The effectiveness of innovation centres with regard to the incubation programs they implement can be analysed from many perspectives. In the case of this chapter they include the perspectives of:

- the incubation program's client,
- the innovation centre implementing the incubation program,
- the institutions financing incubation programs.

Despite the fact that the evaluation of the effectiveness of activities carried out by innovation centres is an increasingly important issue, it is not a popular subject of analysis in Poland. On the national scale, research was conducted by the Polish Business and Innovation Centers Association in Poland and it was presented for the first time in the publication entitled *Innovation and entrepreneurship centres in Poland. Report 2012*, however, it concerned only the activity of technology parks and incubators. Abroad, such research is conducted by the International Association of Science Parks and Areas of Innovations, the International Business Innovation Association, as well as by the EBN – The European BIC Network, to name a few.

In Poland, various methods are used to evaluate the effectiveness of incubation programs of technology enterprises, yet the knowledge about evaluation in the centres responsible for the programs is insufficient. A critical analysis of the Polish innovation centres' activities raises a number of questions. How many innovation centres carry out any evaluation of their activities? If the centres do assess the effectiveness of their operations, what methods and tools do they use? What are the evaluation results used for? These doubts, in turn, lead to questions on how to evaluate the incubation programs carried out by innovation centres, in order to clearly prove the effectiveness of their activities and how to use the results of the evaluation to avoid irregularities in the management, ensure implementation of corrective actions, and guarantee that they are managed better.

The overview of literature on the subject and the conducted individual in-depth interviews with stakeholders have made it possible to systematise the knowledge on incubation programs and to identify the possible ways of measuring their effectiveness. Hence, it has become possible to propose a model for evaluating the effectiveness of interventions in the context of incubation programs and to formulate recommendations for innovation centres including a set of indicators to assess incubation programs' effectiveness. The results of analytical research focused on the innovation centres running incubation programs of Polish technology companies have allowed for the systematisation and broadening of knowledge concerning the methods and scope of monitoring of the

results of incubation programs implemented by Polish innovation centres. The practical nature of the study has made it possible to use its results to verify the model, modify it in relation to the original proposal and propose a solution that would correspond to the conditions of the centres' operations.

The conducted research has resulted in the following conclusions and recommendations:

- Difficulties in the monitoring and evaluation of incubation programs take place mainly due to the lack of a mechanism that would apply to all the centres - since currently there is no such a mechanism, there are neither reliable data nor information available about the local political conditions and the incubators' diversity. The way to overcome these difficulties is to implement a program-based model.
- Monitoring and evaluation of incubation programs should be carried out both at the level of systemic interventions, as well as at the level of specific programs and should take the following three areas into account - centres as organisations, enterprises supported by the centres, entrepreneurs and employees of the supported businesses. Evaluation of incubation programs should be carried out at the planning stage (ex-ante), during their implementation (ongoing) and after they have been completed (ex-post). Only such an approach can ensure maximum effectiveness of incubation programs.
- Polish incubation programs need to build their identity in order to distinguish themselves from technology parks, science and technology parks, and acceleration programs, which is quite significant since, to some extent, all of them compete for the same clients with seed funds, acceleration programs (the so-called upscaling programs) with more flexible start-up communities. Instead of focusing on obtaining structural funds, incubation programs must concentrate on the clients and their needs, only then will they be able to offer something of value.
- If incubation programs are to be used more effectively as tools for implementing policies to stimulate innovation and entrepreneurship growth, it is necessary to obtain information on key performance indicators. This could be possible thanks to the introduction of a standard of technological incubator operation, the certification of centres using the name "incubator", and the introduction of a nationwide system of evaluation and monitoring of interventions in this area.
- When creating the system, it must be remembered that not only should it contain assessment elements, but it should also provide decision making recommendations. Elements increasing the chances of creating an effective and up-to-date evaluation system include ensuring that end-users are involved in its creation and that the system is useful to them (e. g. suitable for use in the day-to-day management of the centre), supporting entities participating in the research and being open to the diversity of centres, emphasizing that evaluation is primarily used to check their own results and improve their performance.
- As it is impossible to create a single model of evaluation universal for all incubation

programs in Poland, it is recommended that a fixed model be developed and implemented containing, on the one hand, a minimum range of requirements for program evaluation (system level), but at the same time allowing specific programs to extend the scope of evaluation according to their individual needs (as part of self-evaluation). This requires defining, on a central level, a universal and minimum target to be met by each incubation program and an indication of the minimum level of monitoring expected by the public administration in connection with the defined target. Such a model should take into account stakeholder expectations, performance measurement indicators, data collection process for the indicators calculation, indicators analysis methods and use of the obtained information for the benefit of strategic management, as well as the results presentation.

Evaluation of the effectiveness of technology entrepreneurship incubation programs may improve their quality from the point of view of the beneficiaries, managing institutions and financing institutions. The mechanisms of collecting information on the programs' results and examples of good practices from abroad prove that the use of the evaluation conclusions at the stage of incubation programs' planning and implementation results in their quality improvement. Due to the design of incubation and intervention programs, evaluation model based on the program theory is the most suitable one to assess their effectiveness. The program theory focused on the evaluation of the objectives' achievement, utilisation of financial and human resources, achievement of results at the level of target group and strategic results makes it possible to track the most important elements also for the incubation programs.

It is also true that if additional external conditions related to the organisation, administration and financing of monitoring and evaluation systems are met, it may increase the incubation programs' effectiveness. The conclusions drawn from desk research and studies show that the most important conditions to consider are:

- design of the support system for innovation centres – the presence in the system of all necessary stakeholders, definition of their expectations, mutual relations and tasks;
- level, potential and structure of the innovative environment - the number of centres, scope and quality of support services provided by them;
- maturity of the sector - organisational, managerial, and financial maturity, as well as maturity in the context of the subject matter they are focusing on;
- presence, diversity and activity of other innovation centres - the existence of centres with a complementary offer in the system, networking of centres, exchange of good practices, mutual support for customers;
- principles of incubation programs' funding - financial support for the programs, linking receiving funds for the programs running with achieving quantitative and qualitative objectives;
- clients' needs and expectations - knowing the clients' needs and constant monitoring

thereof, adjusting the program offer to the actual needs of service recipients.

The proposals on how to improve research on the effectiveness of incubation programs include the analysis of the incubation programs' impact on the improvement of innovativeness and economic development, as well as the study of the results of incubation programs implementation. The research problem, which has not been explored in depth in the Polish scientific discourse, is a comprehensive long-term analysis of the correlation between the quality of the implemented monitoring and evaluation system, both at the general level and at the level of individual programs, as well as the change in the indicators of performance and results. Another research area may also involve examining the importance of quality management of support services for the development of companies located in parks and beyond. An important issue mentioned by the researchers who are sceptical about the importance of incubation programs as intervention tools, is checking the differences in the growth of companies benefiting from incubation programs and those developing outside them, especially in terms of sales volumes, employment, profits and growth rates.

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REINVENTING ORGANIZATIONS BY CREATING ENVIRONMENT FOR THE INCUBATION OF INNOVATIONS

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***Abstract:** Referring to Blikle’s and Laloux’s approach to reinventing organizations, we discuss how to build organizational culture that is conducive to cooperation and innovativeness. We argue that it should possess several characteristics and it is possible for the incubator’s managers to encourage or stimulate the firms to adopt these characteristics. Environment in which innovations thrive should be e.g. gender-neutral, egalitarian, and stimulate the formation of reciprocity-based networks among people and among firms. In addition, to generate what is known as the synergistic „Medici effect”, the incubated firms should have complementary profiles.*

Building organizational environment that is conducive to innovativeness

We argue that organizational culture of organizations (firms and other institutions) should possess several essential characteristics and it is possible for the incubator’s managers to encourage or stimulate the firms to adopt or gradually build these characteristics. We called such a organizational context “an environment conducive to innovativeness” (Jasiński & Rzeźnik, 2012). Creativity needs certain conditions to be fulfilled and in this case human social and psychological requirements are quite fundamental: the negative effects associated with any group activity (e.g. competition, social loafing) should be reduced or minimized, while the positive effects (teamwork) should be strengthened.

Any well thought-through management goal should recognize human needs with respect to social behavior (Jasiński, 2012). Especially relevant are the needs related to trust and cooperation. In fact, designers of efficient systems for e-learning or teamwork pay attention to this social dimension (Brown et al, 2004; Sarker et al, 2011; Thomas & Bostrom, 2008). Therefore, a context conducive to creativity should possess certain features that will make more likely building the social learning environment. One could speculate that such environment should be (in no particular order) as it is described in the box below:

- focused, because unmanaged creativity is not likely to reach any goal; “creative chaos” is beneficial only if it is under some control;
- hierarchy-free (egalitarian), because employees perform better and their spontaneity is improved when formal relations among them are minimized rather than emphasized;
- interdisciplinary, because providing inspiration from other disciplines may generate the beneficial effect of “consilience”. Innovative manager should look for inspiration in areas other than his/her area of technical expertise, but always staying in touch with the needs of the industry. Radically new ideas and novel solutions to old problem reside in the zone of influence of many disparate disciplines. It is also called the “Medici effect” (Johansson, 2004).
- orderly and structured, because providing easy access to fact checking facilitates idea evaluation by removing ambiguities or imprecision.
- organic, because searchable resources (databases or the Internet) are “alive” – they may stimulate creativity better than pre-selected databases of ideas; they have the capability to grow out of our control by leading from one source citing another source etc. and, therefore, they may surprise us with unexpected insights.
- routine-free, suspenseful and fun, because people are easily bored, enjoy being spontaneous and tend to be more creative when they are playful;
- stimulating by providing immediate feedback and hints, because people are impatient and adding a sense of urgency has a beneficial effect on the creative process;
- stress-free and peer-pressure-free, because employees are easily intimidated and embarrassed, when their contributions are expected to be non-standard or novel;
- gender-neutral, because lowering up front the quality of creative output from 50% of potential contributors is not helpful from the perspective of the organization’s benefits; most of the time, of course, it means that contributions of women team members are either undervalued or under-represented.

Rules for building organizational environment that promotes cooperation

Robert Axelrod (1984) developed a theory of cooperation based on reciprocity and was able to translate game theory concepts into practical issues that are of high relevance to the functioning of organizations. Without such direct connections to the real-life problems, Axelrod’s theory would remain one of numerous abstract theories. Instead, it is of universal importance, because it explains the social phenomena at the level of individuals, families, neighborhoods, groups of coworkers, firms, corporations, regions, and countries.

The five aspects of organizational culture presented in the box below are very easy to describe and, at the same time, have clear practical implications for business practitioners.

They provide incubator managers with specific recommendations how to build the environment that promotes cooperation. Each of them should be further adopted at two levels: of a particular incubator and within each incubated firm.

- culture of reciprocity - We should promote the notion that cooperative behavior is valuable and admired by our team, firm or community. Giving praise for cooperative acts is the first step to modifying the attitude of team members or coworkers towards cooperation. Do we discuss and praise cases of cooperative behaviors observed in our team?
- shadow of the future – We should modify situations within which interaction occur in such a way that the shadow of the future „feels“ stronger and longer. It gives the interacting people a sense that they will interact with each other frequently and for a long time. In such a situation the danger of being taken advantage of is lower because the cheater is likely to be punished for his or her behavior. How to make the shadow of the future appear longer?
- arrangement of space - Stability of interactions is helped by appropriate way of arranging space we operate in. There should be places (both physical and also in online settings) that make meetings of people easier. How would you modify space in your place of work to make interactions between people more frequent and/or more pleasant?
- individual recognition – We should work on improving our ability and skills of individually recognizing people we interact with. We should remember their names and details about their lives. A good measure of trustworthiness cannot be easily falsified or faked or bought. The only way to build your trustworthiness is through long-term work and accumulation of good (even if informal) evaluations. How to improve our skills of individually recognizing people we interact with?
- rewards and penalties – There should be a system of rewards and penalties to send a clear signal that we promote cooperative behaviors and we consider non-cooperative or selfish behaviors harmful or not fitting for our firm. What rewards and penalties could be introduced?

Laloux's and Blikle's approach to improving organizations

Building on Frederic Laloux's (2014) approach to reinventing organizations, we continue discussion of how to build organizational culture that is conducive to innovativeness. An idea of organizational cultures called by Laloux "teal" (turquoise) is also being explored and promoted by Andrzej Jacek Blikle, a Polish professor of mathematics and computer science, and an entrepreneur, interested in TQM (Total Quality Management) issues.

The main assumption behind the idea of a teal (turquoise) organization is that people work most effectively when they are free, fulfilled and have a sense that they carry out an important mission. In Blikle's opinion these conditions are the most conducive to

fulfillment of employees' natural needs for being innovative, creative and filled with self-esteem. Working in such an environment freely leads to rising many initiatives dealing with an organizational structure improvement and better work in organizations.

What is then the recipe for creating a turquoise organizational culture? As Blikle (2017) assures us, there is no single recipe, because there are many ways to achieve this goal, depending on the organization and people working in it. However, one can point out the main directions, and express them as "10 commandments".

Blikle's "ten commandments" for enlightened managers

- ***Do not look for somebody who is guilty in order to punish him/her – instead, look for ways to remove the problem.*** Finding the culprit does not lead to the best solution and it is often a step back. A more efficient way of managing is to concentrate on eliminating causes of the problem.
- ***Do not expect perfection, because it is not achievable – instead, expect progress, because it is always possible.*** Striving to create perfect solutions can cause people to focus too much on details – because details are always easier to fix than big things. They may become stuck in conviction that the product/outcome is never good enough. Openness to experimenting, tolerance for making mistakes and introducing gradual changes all lead to progress that supports constant development and improvement.
- ***Avoid competition that destroys partnerships – instead, create conditions for cooperation.*** A team is more efficient than a single employee, so avoiding competition, setting common goals and striving to be good in doing something is the best base for building an efficient organizational culture.
- ***Do not judge, because it destroys – instead, appreciate, because it strengthens.*** An act of appreciation, especially from a superior, moves the more delicate strings of human inner motivation. It is likely to be more effective than a judgmental attitude. The latter is typical for old-fashioned managers, who mistakenly think that praising their subordinates erodes their own authority.
- ***Do not point to what is wrong – instead, suggest what could be better.*** Focusing on mistakes is looking backward. We should look forward. In order to gain progress it is better to concentrate on positive aspects and to direct efforts and energy on those things that can be improved.
- ***Do not ask what people could do better – instead, ask what disturbs them in the workplace.*** Having knowledge about what features of organizational design and culture your people find bothersome, unpleasant, inconvenient or even offensive is the first step to improve conditions of their work and generate better commitment.

- *Do not build on controlling – instead, build on trust.* Trust is the condition for teamwork and good cooperation, so building on trust is essential. Additionally, a trust-based organization saves by decreasing costs of controlling, double-checking, verifying, co-signing and all other procedures necessitated by a lack of trust.
- *Do not say that someone is bad – instead, say how you feel about it.* Focusing on our own feelings and withholding judgment is the base of an effective and, so-called, nonviolent communication.
- *Do not manage – instead, create conditions for self-organization.* Switch off lights at intersections; trust the drivers who will manage without them. Building organizational culture that strengthens self-organization means that managers must trust their subordinates. That gives them more decisional power and a sense of responsibility, a priceless resource.
- *Do not be a supervisor - be a teacher, a moderator and a student.* Setting goals top-down and tasks assignment by the superiors do not necessarily improve work efficiency. Performing different roles in the organization by flexible managers and having more perspectives leads to a better understanding and cooperation. It also flattens the hierarchy – the worst enemy of cooperation, enthusiasm, creativity and innovation.

In the box above, in italics, are our free translations of Blikle's ideas, followed by brief commentaries. His simple thoughts can help us create an ideal organizational culture.

The turquoise organization approach is based on trust, cooperation and responsibility – three features that all naturally release creativity. The approach definitely argues that managers should abandon the “carrot-and-stick” style of management. The myth of the effectiveness of that method dispels also Daniel Pink (2009) who argues that it works only in a narrow set of circumstances (e.g. when solving algorithmic tasks).

An incubator's internal environment

Although one may notice that business incubators (BIs) often emphasize or advertise the availability of physical infrastructure (e.g. facility renting), the intangible assets (such as coaching and connecting) may be of greater importance. A study of 100 incubated firms in Brazil documented that focusing on providing them with know-how and relationships assets by BIs' managers was more effective than focusing only on providing physical support (Fernandes et al., 2017). In fact, among the U.K. incubated firms, intangible resources were found to be the stronger reason to develop networks than were tangible resources (Soetanto & Jack, 2013).

Of course, tangible resource in the form of incubator site design may directly affect the intensity and the nature of human interactions. In a study using network analysis, Cooper et al. (2012) found that face-to-face interactions among tenants were predominant, building on the physical proximity in the studied incubator. The epitome of the

value of networking, co-location and cooperation are the “bottom-up” BIs. They are self-generated, i.e. organized by entrepreneurs themselves, are not supported by any external funds, but they possess many characteristics of traditional BIs, such as sharing infrastructure (Bollingtoft, 2012).

Networks developing in specialized BIs may have stronger communication abilities than those in diversified BIs (Zhang et al., 2016; but see Schwartz & Hornych [2010], who obtained a different result). In other words, heterogeneity of the incubated firms’ business profiles may reduce the spread of knowledge among these firms. However, Vanderstraeten & Matthyssens (2012) argue that a generalist strategy employed by a BI may in some situations be warranted.

Networking behavior is important because it translates directly into the number of future business partners (Ebbers, 2014). Exchange of knowledge among incubated firms in local networks formed in BIs improves with the duration of the incubation period (Diez-Vial and Montoro-Sanchez, 2017), although it is still not clear how such time affects the long-term growth prospects of the firms (see also discussion in Soetanto and Jack, 2016).

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DIAGNOSING AND UTILIZING INNOVATIVE POTENTIAL WITHIN AND AMONG THE INCUBATED TEAMS

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***Abstract:** We present tools that allow entrepreneurs and incubator managers assess the degree to which the firms have the potential to be innovative. First, one may use the Innovator’s DNA approach to provide individual employees of the incubated firms with ways of assessing their, so called, discovery skills and attitudes (in the areas of creativity, networking, exploration, openness to experience etc.) Second, the Team Climate Inventory enables managers to assess the elements of teamwork dynamics that are essential for effective entrepreneurship. Finally, we discuss methods by which the incubator’s managers may stimulate creativity of the employees of their incubated firms.*

In this chapter we show how to assess the heterogeneous pool of employees working in incubators. The methods may be applied with equal ease to incubator staff teams and to within-firm teams. The complex social structure of the incubator is also a source of benefits. There are two methods of creative thinking that work well *because* people participating in creative sessions do not know each other. Therefore, an incubator with its multiple and independent groups of entrepreneurs is the perfect setting for the implementation of such methods.

The Innovator’s DNA approach to diagnosing individual innovativeness

Discovery and delivery skills - This approach provides individual employees of the incubated companies with ways of assessing their, so called, discovery skills and attitudes (in the areas of creativity, networking, exploration, openness to experience etc.). Innovative entrepreneurs and managers require a specific set of competences that foster innovative thinking and action. The metaphorical toolbox of skills for innovative people should be based on knowledge in the field of organizational behavior, creative psychology, literature, art, design, quantitative methods, computer science, bibliometrics etc.

According to Jeff Dyer, Hal Gregersen and Clayton M. Christensen, the authors of the book “*The Innovator’s DNA. Mastering the five skills of disruptive innovators*” (2011),

you do not have to be Steve Jobs or Thomas Edison to aspire to authoring breakthrough innovations. Although they use the genetic term “DNA”, the authors do not have in their minds innate features. Only one third of the variability among people in creative thinking is due to genetic differences between them. This means that 2/3 of the variation is due to environmental differences among people, for example, differences in the quality of education they received. So, creative thinking can be improved by training. To develop competences and habits that could improve the capacity of innovative thinking it is enough to take action on developing such behaviors and habits. This, in turn, leads to the creation of new value, distinguishing the organization, for example products, services, processes or its business model.

Dyer and co-authors carried out research for eight years among inventors, managers, and founders of innovative companies to find sources of their creative, often revolutionary, ideas that often have contributed to the success of their companies. For this purpose, the initial phase of interviews covered almost 100 innovative companies, products and services, not selected in a competition of popular vote (such as, for instance, the BusinessWeek rankings) - but based on a quantitative and transparent, although difficult to calculate, the „innovation premium” criterion (Dyer et al., 2011). Innovation premium is the difference between the market value of a company and its cash flows generated by current activity and sales of the existing products. The premium is positive when the market value of the company is higher than it “should be”, i.e. when investors want to own the shares of this company, even overpaying for them. A high innovation premium is the result of investors’ expectations about the future of the company and its new profitable products or services.

Subsequently, more than five hundred innovators and more than five thousand managers from 75 countries were surveyed to discover specific behavior patterns of the most innovative entrepreneurs and managers. First of all, the researchers wanted to find answers to the question of what made those people different from other entrepreneurs and managers and what and when led them to develop their groundbreaking ideas. Among others, the authors studied the habits of such leaders as Michael Dell and Kevin Rollins (Dell Computer), Michael Lazaridis (Research In Motion), Pierre Omidyar (eBay), Scott Cook (Intuit), Marc Benioff (salesforce.com), Jeff Bezos (Amazon), Ratan Tata (Tata Group), A. G. Lafley (former chairman of Procter & Gamble), and Niklas Zeeenström (Skype). Whenever possible, talks with upper-level executives who knew the innovative entrepreneurs well, were also held to get outside opinions about them.

As a result of the study, a palette of specific behaviors has been identified that highlight creativity of the surveyed individuals. The common denominator of real innovators is a well-developed set of five discovery skills: questioning, observing, experimenting, networking and, finally - associating. The essential function is an ability to build associations, based on the four remaining discovery skills. Because they are not fixed and unchanging, there is nothing to prevent one from actively, on a daily basis, practicing and

strengthening them. It is important, of course, to realize that mastering these skills does not guarantee a successful career, but they are indispensable, and are at the core of the process of creating innovative solutions.

The innovator constantly asks questions that undermine the existing state of affairs, and they often lead to groundbreaking conclusions and fresh ideas. Carrying out insightful observations of everyday phenomena and keeping a close eye on the external environment and analyzing customer behavior and habits of the competitors leads to insights that ignite creativity and discover new ways of acting. The innovator actively tests her/his ideas in practice, checks the detailed rules of the operation of objects or processes, creates prototypes or pilot versions, is not afraid to make mistakes, and treats them only as excellent opportunities to learn new things. The experience of working abroad and the opportunity to explore new cultures also reinforce these skills.

Building a network of contacts is another skill innovative entrepreneurs should possess. They make friends with people from different backgrounds, representing different fields of knowledge and views. It broadens the horizons of thought and, as a result, allows them to see the problem from a completely different perspective, giving rise to original undertakings. Having these skills helps create an eclectic database that can be used to build associations by combining seemingly unrelated problems, questions, and ideas. Everyone can develop their discovery skills and form their own innovator's DNA to enter the world of innovation.

The survey to assess the skills - Discovering specific successful innovators' ways of acting (questioning, observing, experimenting, networking and associating) has become the basis for creating a survey. It was designed to diagnose discovery skills of innovative entrepreneurs and executives from around the world. The full version of the survey (in its early version, with open access) consisted of 57 statements and, in addition to discovery skills (26 items), examined also delivery skills (16 items) and leadership in innovation skills (15 items). The part of the survey referring to five discovery skills included 4 items for each skill. In addition, that part of the survey was extended by 6 statements related to the feature that the authors called "the courage to innovate". Respondents answered using the scale from 1 to 7 (from "strongly disagree" to "strongly agree").

The skill of asking questions is analyzed on the basis of results that determine the degree of agreement with statements such as: "I regularly ask questions that challenge others' fundamental assumptions," or "I ask insightful 'what if' questions that provoke exploration of new possibilities and frontiers." The skill of observing is explored using findings related to such statements as "I often pay attention to everyday experiences to get new ideas," or "I get innovative ideas by directly observing how people interact with products and services." The level of the experimenting skills is examined on the basis of statements such as "I am adventurous, always looking for new experiences" and "I have a history of taking things apart to see how they work". The networking skills are assessed by statements such as "I regularly talk with a diverse set of people (e.g., from

different functions, industries, geographies) to find and refine new business ideas,” as well as “I actively seek out individuals from very different backgrounds who can help find and evaluate new ideas.” Examples of statements that analyze the main discovery skill – associating which is based on the four other skills, are: “I often find solutions to problems by drawing on solutions or ideas developed in other industries, fields, or disciplines” and “I frequently connect ideas from industries or situations unrelated to our business (often through analogy).” Full information about the survey and the ways of accessing it is available at <http://www.innovatorsdna.com>.

Figure 1 presents an example of the scores obtained by one employee (red graph) who had above-average results in the researched firm X, against the background of that company’s averaged scores (blue graph), as well as the average results of all respondents surveyed by the authors of the book “Innovator’s DNA” (green graph).

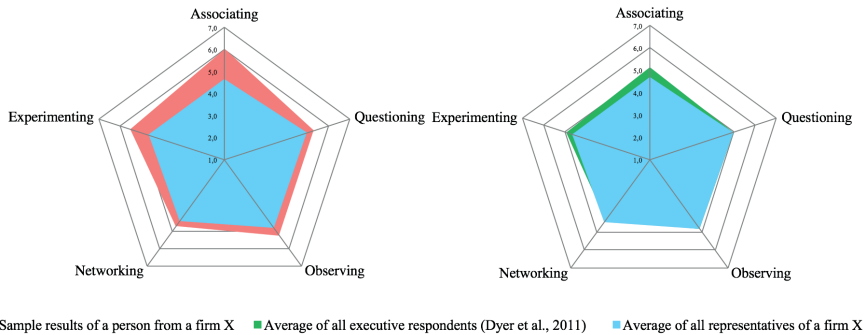


Figure 1 - A distribution of results from a survey of “innovator’s DNA” - only the part of the survey that corresponds to the discovery skills is shown. Participants of the study were employees of an IT firm X.

The Team Climate Inventory

This tool enables managers to assess the elements of teamwork dynamics that are essential for effective and innovation-oriented entrepreneurship. The initial and full version of the survey was developed by Neil Anderson and Michael A. West (1996, 1998), based on a conceptual model by West (1990). Four factors were identified in that model, as determinants of team climate: vision, participative safety, support for innovation, and task orientation. It had 61 items, and was subsequently condensed to 38 or 44 statements (see also Tseng et al., 2009). After the necessary evaluation of its psychometric properties, an even shorter version was developed by Kivimäki and Elovainio (1999) and confirmed by Strating and Nieboer (2009). It has only 14 statements, divided into four categories. The statements may be assessed on a 5-level scale, ranging either from “to a very little extent” to “to a very great extent” or from “strongly disagree” to “strongly agree”.

The category “Vision” is explored by questions of the following type: “To what extent do you think your team’s objectives are clearly understood by other members of the

team, and how achievable and worthwhile they are?”. The category “Participation safety” includes statements focused on whether people feel understood and accepted by each other and keep each other informed about work-related issues. The category “Support for innovation” explores the issue if “people in this team co-operate and are always searching for new perspectives in developing and applying new ideas”. Finally, the category “Task orientation” explores if the team members are ready to question the basis of what the team is doing and critically appraise potential weaknesses. Full texts of either long or short versions of the TCI questionnaire may be found in the publications listed above.

We recommend using the short version of the TCI since it is very easy to administer and analyze. For illustration we include examples of the results from three published studies, but they are not benchmark values or norms for comparisons.

Table 1 – The TCI scores obtained in three published studies: average values.

	Vision	Participation safety	Support for innovation	Task orientation	Source
Australia	4.16	3.98	3.82	3.81	McMurray et al., 2012
England	3.54	3.79	3.68	3.35	Goh et al., 2009
Netherlands	4.08	4.10	3.64	3.71	Strating & Nieboer, 2009

However, the full value of this method may appear when the incubator managers will use the TCI survey repeatedly in the same teams. Data collected at intervals of, for example, 6 months, will provide a good insight about the direction of development of teamwork in the incubated firms. Any trend that would suggest a worsening of the team climate or any of its four components may be an indication that specific workshops should be administered by the incubator’s management. Furthermore, it would be of interest to explore the potential (and expected) correlations between the TCI scores and business effectiveness, as measured, on one hand, by employee turnover or absenteeism in the incubated firms and, on the other hand, by customer satisfaction, product quality level and sales.

Creative methods capitalizing on the independence of firms within the incubator

The methods of creative thinking presented here are most effective when people participating in creative sessions are not closely familiar with the professional profiles of other participants and with business details of other firms in their incubator. Only then can the organizers hope for a true diversity of ideas and completely unexpected insights generated from people who are unaware of limitations, expectations, and mental barriers. In general, it is not easy to create such a setting, unless the firm pays outside people to participate in the creative session. Therefore, an incubator with its multiple and independent groups of entrepreneurs is the perfect setting for the implementation of such methods. Such groups work with intense focus on their own projects, but

they are part of the same business community of a single incubator and, by definition, are expected to be friendlier and should feel some sense of loyalty to each other. The incubator's managers should work on building such attitudes among the incubatees.

Stepwise convergence of ideas generated by semi-independent teams (based on Jasienski, 2013).

How to avoid one version of groupthink during a group debate when one of the ideas proposed during the debate is, without justification, considered as better than others? Consequently, the creative potential of the entire group is reduced, since the participants limit their idea-generation efforts to only a few directions (Greenberg & Baron, 2000). „Discussion 66“ (see Denton, 1999; Proctor, 2013) is a potential remedy, and it involves splitting all participants into small teams – in an incubator such team ideally may represent employees of individual firms. The teams generate ideas separately and, because of that, along independent trajectories. They confront their ideas with the outputs of other teams. The danger of all participants becoming fixed on one particular line of thought is reduced.

When the description of the problem to be solved has been presented to all participants, the teams start working under time constraint (in sessions lasting only 5-7 minutes), and then must present their solutions to the entire group. After each open discussion, the teams return for the next team session. One striking feature of this method is that adopting and developing other teams' ideas is allowed (if the teams deem it beneficial). The process is repeated until a convergence of the proposed solutions has been achieved, i.e. ideas proposed by all teams are basically the same and, hopefully, the best. The final outcome of this process is a composite of creative contributions of all subgroups, adopted and modified at different stages of the process.

The entire method may be carried out in traditional settings or only online, with teams having access to their team profiles. All participants have access to the general forum, to exchange ideas between the successive rounds. Behavior of teams may involve continuing with development of their own ideas or switching between the ideas which were proposed in earlier rounds by other teams. Managing this process may be greatly helped by an online platform maintained by the incubator.

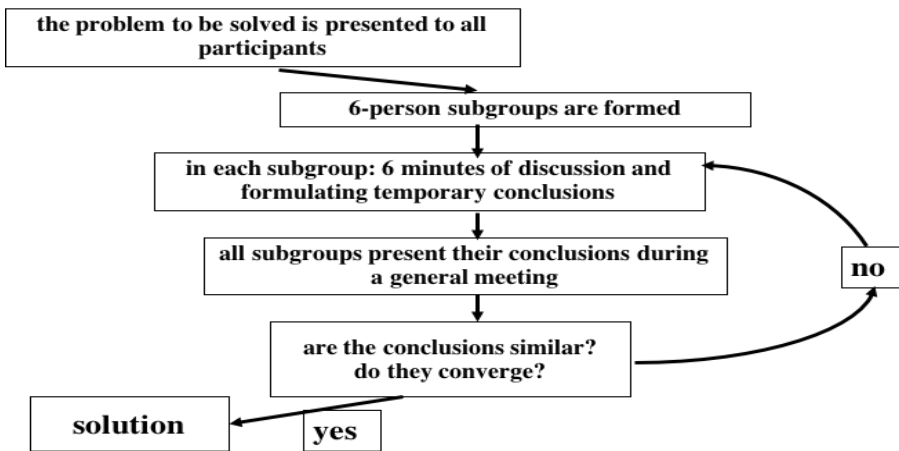


Figure 2 - The flowchart illustrating stepwise convergence between ideas generated by semi-independent subgroups („Discussion 66“) (from Jasiński, 2013, modified).

The Gordon-Little version of a brainstorming session: ignorance is neutral and helps creativity!

The method described here is practically impossible to implement if the participants recruited to participate in the creativity session are too familiar with the topic. Therefore, it relies on participation of people who are employees of other firms from the same incubator and have no idea about the specific issues important for the firm in need of new ideas. They form the pool of participants who are likely to be asked to help by participating in the Gordon-Little version of a brainstorming session.

The essence of this method is that the participants are not told beforehand what the problem is that should be solved – only the moderator knows it. There is no introductory lecture which explains the issue – instead, the moderator provides only hints rather than detailed information and should be very careful not to reveal too much too early. In spite of this semi-paradoxical deficiency, the participants are supposed to provide specific solutions – not some general and vague ideas, but solutions that may be implemented.

For example, when we look for a new therapy for coronary artery (atherosclerotic heart) disease, an introductory and general hint could be “How to improve the flow when flow is limited?” (see Crum, 1971 for the source of inspiration for this example). However, the response should not be “Remove the obstacle”, because that would be vague and unhelpful. The participant should assume some specific situation (such as the flow of money blocked by lack of funds, flow of water in river impeded by debris in river bed, flow of water in pipes clogged by solidified fat etc.), and then propose a specific solution. It could be, respectively: a bank loan, removal of debris by heavy machines, or using a chemical de-clogger/drain cleaner. Of course, most of the time the proposed

solutions are not on target, but they are still retained in the session records, because they may be the source of truly fresh and innovative solutions that would never occur to the participants if they knew the specific topic from the beginning. With each successive hint the information becomes more detailed, and the range of possible applications becomes narrower. Finally, after several rounds, lasting maybe even an hour, the actual specific issue is presented and all the proposed solutions (even those that seemingly have nothing in common with this issue) are analyzed.

An important advantage of this method is that the participants' attention and enthusiasm are kept high, because they do not know what the direction of the new hints will be. However, if all the participants are from the same team which have struggled with the main issue, there could be no surprises. That is why this method works best with outsiders, i.e. employees of other firms in the incubator.

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BUSINESS ETHICS AND CORPORATE SOCIAL RESPONSIBILITY

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***Abstract:** Business ethics and Corporate Social Responsibility have recently become more and more important for companies and enterprises. Adequate salaries, safety and hygiene of work are nowadays important not only for employers, but also for companies' customers. On the other hand, there is an unfair competition and dissemination false information about one's enterprise, which may ruin even the best companies. Mass media make it easier to assess the actions of the companies and also to publish misleading information about others. The paper presents the most important issues related to business ethics as well as Corporate Social Responsibility and sustainable development.*

Introduction

Business ethics and corporate social responsibility are extremely important issues that should be present at every stage of preparing potential entrepreneurs to run a business. Each enterprise must also take into account social needs in its activities.

As incubators play an important role in supporting entrepreneurship, these entities may include education in the field of business ethics and CSR in the substantive support of start-ups. Therefore, it is worth pointing out the most important issues that will bring the reader into ethical business issues, which are important both for incubators supporting the creation of small and medium enterprises, as well as academic business incubators or incubators of social economy entities.

It is more and more common to search for companies that not only have an appropriate offers but also are socially responsible. Therefore they use CSR in their actions. The business practice marked by various irregularities gave birth to the need for ethical discussion and as a result it influenced the emergence of a new, detailed scientific discipline dealing with the ethical side of business. What makes a company valuable and desirable in the market is its good name, connected also with its credibility (Balunova, 2017).

Business ethics: History and subject of research

Various issues are raised on the basis of business ethics. The subject of research is quite

wide and diverse. It is worth repeating here that business ethics deals with ethical problems of work, ethical problems of competition, ethical problems of advertising and promotion, behaviors of business people in interactions with others and problems of environmental protection (Maciuszek, 1997). Within the ethical problems of work, the issues of occupational health and safety, just and fair payment for work performed, respect for human dignity and respect for work as a value in itself are considered (A. Kuzior, 2017).

There are many examples of breaking these rules. Often, the payment for the work performed is not adequate to the effort put in, and there is also a lack of respect for human dignity and violation of human rights or lack of health and safety at work. The last exemplification may be the behavior of the Johns-Manville Corporation management, which exposed the health and lives of many people without implementing appropriate health and safety standards and not informing employees about harmful working conditions. Johns-Manville Corporation was involved in the production of asbestos and belonged to the giants of American business. Problems associated with unethical behavior of the company towards its employees led to its collapse. In the 1960s, 70s, and 80s, thousands of lawsuits were filed against John Manville Corporation due to diseases caused by contact with asbestos, such as asbestosis, lung cancer and malignant mesothelioma (Castleman & Berger, 2004).

Management concealed the results of research on the harmful effects of asbestos dust on the human body. It also failed to implement any premeditated protective measures by condemning its employees to serious fatal diseases. Managers preferred to cheat people and let them die, often in agony, instead of looking for safer ways of production and invest in appropriate protective measures. When the case finally came to light, the company had to pay gigantic compensation, allocating over 80% of its assets and lost its dominant position on the market. Immoral decisions of managers, in a scandalous way violating the rights of employees, consequently led the company to ruin, and people condemned to suffering (Gellerman, 1986).

Another example of a breach of health and safety at work was the activity of the American company Union Carbide, with a subsidiary located in Bhopal, India, producing pesticides. In 1984, a tragic industrial catastrophe took place there. Leaking 40 tons of methyl isocyanate, a highly toxic substance, causing pulmonary edema and, consequently, death, leaked out of the leaking installation. As a result of the chemical reaction of methyl isocyanate with the components of the atmosphere, also other poisonous gases were created, e.g. hydrogen cyanide that also contributed to the death of many people.

Different sources give different statistics of the victims of the disaster. It is estimated that as a result of the catastrophe 15,000 people died and 560,000 were injured. Union Carbide discharged responsibility for the disaster for sabotage, not admitting negligence and shortcomings, but the state of security and technical condition of the installation did not meet the security requirements, which as a result of the control before the

disaster was demonstrated by scientists employed by the corporation. Reports from this audit, however, were not passed to the company's management in the United States. The disaster in Bhopal is assessed as the most tragic industrial catastrophe.³

One may say, that business ethics begins where the legal rules end. It is basically concerned with those issues that are not covered at all, or only slightly covered by the law. Nowadays, business ethics is a widely discussed topic when wondering how to increase the prominence of an enterprise (Crane & Matten, 2016). Sometimes entrepreneurs use media to help them show their company to a wider audience.

Mass media and business ethics

New media are an inseparable part of a modern man. Contemporary mass media allow publicizing such matters that, when they reach public opinion, are discussed and evaluated, also in terms of ethics (A. Kuzior & P. Kuzior, 2015). The Internet makes the information reach a very large number of different users, and what is most important, the information once put there, remains "online" forever. It reminds the users of itself when searching websites, and it encourages reflection. If the information is true and reliable, this feature is an undeniable advantage of the network.

However, as mentioned earlier, information that is false and defamatory, used by unfair competition, is permanently stored in the Internet's memory. Thus, the unfair competition practices include: buying relevant commercial information, buying employees important for the company's operation, disseminating false information about someone's business, unfair advertising, counterfeiting or trademark infringement (Maciuszek, 1997). Unfair competition may also be defined as any illegal, unfair or deceitful business practice and unfair, false or misleading advertising (Davis, 2015).

Legal regulations

In Poland, issues concerning legal protection in this respect are regulated by: the Act on Copyright and Related Rights, the Act - Industrial Property Law, the Act on Database Protection and Copyright Law, the Act on Combating Unfair Competition already referenced in this study. Alongside legal issues, ethical issues become important, especially in cases not regulated by law, and in some sense violating the interest of the brand or trademark owner.

For example, an ambiguous in legal and ethical terms should be considered a "battle for memory" about Czesław Niemen. Małgorzata Niemen, the widow of the renowned artist Czesław Niemen, through a representative filed a lawsuit for infringement of copyrights and rights to the image of the artist against the Świebodzinski "Czesław Niemen Memorial Association", which in her opinion infringes the trademark of the artist's first and last name. The members of the association, defending themselves, argued that for them Czesław Niemen is not a trademark, but a memory. The Regional Court in Zielona Góra

3 <http://web.archive.org/web/20041209055928/http://web.amnesty.org/pages/ec-bhopal-eng>.

after a year-long trial issued a sentence in favor of the association that does not have to remove the artist's name and has the right to venerate his memory (Safwacka, 2016).

In contrast, Yoko Ono, the widow of John Lennon, sued in the court in The Hague the Silesian company John Lemon. The lawyer of Yoko Ono accused the company of infringing on the trademark "John Lennon" and on the personal rights of the late artist. Eventually, the process did not take place, as a result of the settlement, the Silesian company changed its name and the name of the product (varietal orange soda) to On Lemon. The same quality product returned to the market after rebranding forced by the threat of the trial and by the settlement.⁴

The examples provided concern the protection of trademark and personal rights and are different in their legal and ethical meaning; the first one does not raise any ethical doubts, because it reveals that the artist's name was not used for profit.

Unfair advertising

Unfair advertising involves the use of unlawful practices related to the manipulation of instincts and emotions of a potential client. Advertising that reliably informs about products or services is not very effective, which is why creators often use manipulative and persuasive tools to achieve the goal of raising the need to have a product or use the service. There are many critics as well as defenders of advertising. Undoubtedly, however, the advertising market is growing, in particular television and internet advertising. In 2016, Polish companies allocated for advertising 8,333 billion PLN.⁵

Fair competition applies tools related to offering products and services of better quality at affordable prices (in addition to using dumping prices as a sign of unhealthy competition) and finding innovative niches that allow customers to offer new technologies and new solutions not yet available on the market, based on unique know-how, which improve the company's competitiveness on the market (Masiarek, 2016). The companies are subjected to some competition regime, which consists of three major components: liberalization, harmonization and the application of the rules of the law, namely the Treaty on the Functioning of the European Union (Carbonnaux, 2013).

Another issue of ethical perception is the attitude of business people to employees, contractors, and clients. In these relationships the most important principle should be respect for human dignity and the principle of "pacta sunt servanda" (Maciuszek, 1997). This principle may be found under the Article 26 of Vienna Convention on the Law of Treaties and is as important as the loyalty principle described under Article 4(3) of the Treaty on European Union (Davison-Vecchione, 2015).

4 <http://www.dailymail.co.uk/news/article-4902842/Yoko-Ono-sues-small-British-lemonade-firm.html>

5 <http://www.wirtualnemedi.pl/arttykul/wydatki-reklamowe-w-polsce-2016-internet-zyskuje-kosztem-prasy-i-telewizji-branza-handlowa>

Attitude to natural environment

Nowadays, the attitude to the natural environment is also widely discussed in business ethics. The development of civilization - economic and technological has led to the disturbance of the stability of ecosystems and the degradation of air, soil and water. The ecological crisis of the 1960s gave birth to the need to implement appropriate remedial actions and re-evaluate the relationship between man and nature. The assessment of the state of the natural environment has been undertaken by the United Nations. On its behalf, environmental studies were prepared, on the basis of which the famous U Thant Report (U Thant, 1969), then the UN Secretary General function was created, and the UN Secretary General in 1969 initiated a global environmental debate (A. Kuzior, 2014).

The assessment of the state of the natural environment has also been undertaken by scientists gathered around the Club of Rome. The first report of the Club of Rome was "Limits to Growth" (Meadows et al., 1972). The authors warned against demographic explosion, progressive environmental degradation, depletion of non-renewable natural resources of the land, and uncontrolled development of cities (Sikora, 2010). The book "Beyond the Limits: confronting global collapse", envisioning a sustainable future, released 20 years later (Meadows et al., 1992) was an update and verification of research from 20 years earlier, and an even more radical warning against catastrophic events effects of uncontrolled development of civilization (A. Kuzior, 2014).

Both the U Thant Report and reports for the Club of Rome and subsequent UN initiatives such as the Stockholm Conference (1972) and the Brundtland Report (1987) contributed to the concept of sustainable development, which considers the protection of the natural environment as an integral and necessary component of development.

The "Our Common Future" Report published in 1987 revealed disturbing facts:

- a) each year 6 million hectares of fertile land is desertified;
- b) more than 11 million hectares of forests are destroyed each year;
- c) many species of plants and animals die each year, resulting in the reduction of biodiversity;
- d) in Europe acid rains cause the destruction of forests and lakes and artistic and architectural heritage;
- e) the emission of carbon dioxide into the atmosphere causes the greenhouse effect;
- f) ozone hole causes higher incidence of cancer and people (Our Common Future, 1987).

For years, the United Nations has worked on the components of sustainable development and better quality of human life on Earth. In 2012 there took place the Earth Summit in Rio De Janeiro, entitled "Rio +20". After more than 20 years from the "Our Common Future" report, the scale of the world's problems increased. The result of the Earth Summit in Rio was the adoption of the document "Future we want". The document stressed, among other issues, the importance of gender equality, the need to strengthen the position of

women and to guarantee them equal development opportunities.⁶

Undoubtedly, the rapidly growing industry, excessive consumerism and lack of respect for nature contributed to the degradation of the natural environment and irreversible changes in the biosphere. Since the 1960s, the situation has slightly improved in relation to nature and its resources. The Earth Summit in Rio de Janeiro (1992) and the establishment of the Global Agenda 21 Action Program were of crucial importance. Caring for the condition of the natural environment is one of its main demands. In this extensive document you can find detailed guidelines for implementing the assumptions of the concept of sustainable development in the area of responsible for the state of the natural environment of business, for which the right political and legal conditions for the development of "green" enterprises should be created, in which production processes are optimized, cleaner, environment-friendly technologies are applied, and great importance is attached to the use of preventive development strategies.

These activities should by definition limit and significantly reduce the negative impact on the environment, including by reducing waste and rational resource management. Agenda 21 assumes the implementation of a development strategy based on cleaner production and responsible entrepreneurship. He points out that the promotion of responsible entrepreneurship can play an important role in improving the efficiency of the use of limited resources and the use of environmentally friendly technologies (Agenda 21, 1993; A. Kuzior, 2014). The Agenda 21 referred to in paragraph 30. The references to pro-ecological strategies take into account the assumptions of the World Program of Cleaner Production, which was initiated by UNEP. Environmental obligations are also included in the Global Compact document. Currently, environmental protection has become one of the elements of CSR - Corporate Social Responsibility.

Corporate Social Responsibility (CSR)

In business schools it is very important to properly teach about Corporate Social Responsibility. However, teaching and research on this subject is still discouraged (Matten & Moon, 2004). But on the other hand, ethical action in business is slowly becoming a global trend. Reliability and diligence of entrepreneurs are again sought after and valued, which is especially evident in large international companies. More and more companies are promoting themselves as operating in accordance with the CSR assumptions (Lindgreen & Swaen, 2010). One of the manifestations of this style of doing business is creating so-called ethical codes that describe internal rules of conduct. These norms rely heavily on local culture and take into account not only legal regulations, but also social expectations.⁷

CSR is also one of the interesting issues undertaken by business ethics, both in the normative and application (applied) layers. CSR is defined as the voluntary involvement

6 <https://sustainabledevelopment.un.org/futurewewant.html>

7 <https://e-biznes.pl/etyka-w-biznesie>

of enterprises in social issues and environmental protection (Communication from the Commission to the European Parliament, 2006). The definition indicates that the undertaken activities of enterprises are not only compliance with legal regulations, but should result from moral motives. Therefore, the ethical principles will be the basis of the CSR thus understood. Are they in reality? Currently, many enterprises implement various types of activities (social, ecological), but often the motivation for these activities is the desire to build a positive image of the company in the eyes of stakeholders. Thus, CSR becomes not a moral obligation, but a PR tool. The ISO 26 000 standard, which is a kind of guide after the implementation of CSR, also does not include ethical foundations (at least not literally).

It assumes that the application of the guidelines may affect:

- “competitive advantage;
- the reputation of the organization;
- the ability to attract and retain employees, consumers, customers and users;
- morale, commitment and productivity of employees;
- opinions of investors, owners, donors, sponsors and the financial community;
- the organization’s relations with enterprises, government institutions, media, suppliers, similar organizations, clients and the community in which the organization operates” (ISO 26 000).

The ethical aspect of CSR has not been properly exposed in the norm.

The ISO 26 000 standard as a tool supporting the implementation of CSR takes into account seven key areas (human rights, work practices, environment, fair operating practices, consumer issues, social involvement, community development.) Moral commitments are particularly visible in the area of human rights, where there is a direct reference to the International Charter of Human Rights, which consists of: Universal Declaration of Human Rights, Human Rights Covenants and Optional Protocols (A. Kuzior, 2014).

In 2014, the institutional approach to CSR changed slightly. Directive 2014/95 / EU of the European Parliament and of the Council of October 22, 2014 imposes obligations on some large entities (over 500 employees in a financial year) related to environmental, social and labor issues, in particular with regard to human rights and preventing corruption and bribery (Official Journal of the European Union, L 330/1/2014). Therefore, it is not just a voluntary commitment, but in the case of large entities, actual commitment and the necessity to pass a report on this commitment.

CSR in worldwide companies and non-governmental organizations

CSR is a kind of companies’ vow to act ethically and contribute to local communities and society (Cierna, 2016). One of the enterprises for which the idea of business

ethics and CSR is very important is L'Occitane en Provence. It is a producer of natural cosmetics that cares about the natural environment and puts its needs in a high place when it plans to manufacture its products. It manufactures eco-supplements, and their cosmetics packaging that they sell are made of recycled materials. The company also uses renewable energy sources and sustainable forest crops. They also promote biodiversity through sustainable agriculture, that's why as much as 92% of products introduced to the market in 2016 contain at least 90% of natural ingredients.⁸

In 2006, the L'Occitane Foundation was established. During almost 12 years of its activity, the Foundation has carried out many important projects, including: UNION FOR VISION 10by20 (the aim of which is fighting avoidable blindness around the world and by contributing to ophthalmologic research and local specialists' training), Promoting women's leadership (partnership with the women of Burkina Faso who produce Shea Butter, and to concentrate its actions on supporting women's entrepreneurship to promote their emancipation), or Preservation of Natural Heritage (aiming especially at the protection of endangered species and ecosystems).⁹

In Poland, the interest of CSR companies is constantly growing, although it still can not be said that CSR is fully used to shape the so-called "Sustainable enterprise", defined as "the type of business organization guided by its principles of responsibility, precaution, prevention, prevention and optimization in three dimensions: social, ecological and economic" (A. Kuzior, 2016).

An important role in creating ethical business, taking into account the principles of sustainable development and CSR, is played by non-governmental organizations in Poland. In 2000, the Responsible Business Forum was established, an association that has been dealing with a comprehensive approach to CSR since its inception. In 2005, the Responsible Business Forum was granted the status of a public benefit organization. Responsible Business Forum conducts a series of campaigns promoting CSR about ethical business, runs, among others, website responsiblebiznes.pl, reporting "Responsible business in Poland. Good practices", in 2005 it organizes the first "CSR Good Practices Fair" in Poland, organizes conferences, publishes its own social responsibility reports.¹⁰

In 2014, an association the "Silesian Center for Business Ethics and Sustainable Development" was established at the Silesian University of Technology, Gliwice, Poland. This is the first non-governmental organization in Silesia (region in southern Poland) focused on cooperation with business, chambers of commerce in the region and universities. In order to popularize the idea of CSR and sustainable development, it publishes a magazine entitled "Business Ethics and Sustainability. Interdisciplinary theoretical-empirical studies", organizes scientific congresses in cooperation with territorial self-government units, promotes ethical behavior in business, conducts

8 <https://pl.loccitane.com>

9 <https://fondation.loccitane.com>

10 <http://odpowiedzialnybiznes.pl/aktualno%C5%9Bci/fob-obchodzi-15-urodziny>

advisory activities and promotes CSR ideas.¹¹

Summary

Business ethics and corporate social responsibility refer to many areas on which the company operates. Increasingly, attention is paid to whether the activities undertaken by companies are related to social policy. Currently, CSR is becoming a value in itself. Such a value, with the appropriate use of the CSR concept, allows us to stand out from the competition positively, as well as being a signal that a given company acts in a conscious way on the surrounding society.¹²

Due to the above-mentioned circumstances, it is important that young entrepreneurs know that apart from the business idea and the ability to sell it to customers, other values are also important, and corporate social responsibility is a kind of foundation for creating a valuable company that will be valued at market for its approach to the world around them.

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HUMANIZING THE VALUE PROPOSITION THROUGH BUILDING AN ENTREPRENEURIAL STORY

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***Abstract:** This chapter focuses on the success of storytelling as a tool to overcome challenges of defining both entrepreneurship and value proposition as its key element. The concept of value proposition has become one of the main forces in entrepreneurship and its presence often determines the success of innovation. The challenges of entrepreneurship often force the innovators overlook its importance. However, if we marry storytelling and entrepreneurship (with emphasis on value proposition) then we might humanize the whole process. This chapter offers the PHAAT story model seen through the business lens. Since the value is now becoming a key driver in the ongoing development of the business in general, good stories of value proposition remain the most powerful tools in communicating it in a way that conveys a sophisticated understanding.*

Storytelling for value proposition and against entrepreneurial challenges

Starting a startup is a process of constantly gaining knowledge and skills to say the least. By accepting to become an entrepreneur challenges automatically become a part of daily life. To overcome these challenges an entrepreneur needs to remain focused on its business model by putting a great emphasis on the value proposition. As Teece (2010) defines it, delivering or capturing value from the innovation lies along the lines of the conceptual rather than financial model of business and building a sustainable competitive advantage becomes the underlying prerequisite to success.

The ability of seeing the destination while facing many challenges is difficult and comes with practice. Start-ups often fall on hard times and make many fundamental mistakes by overlooking their story of the value proposition and forgetting the big picture along their path. Truly enough it is the power of story that emerges once more: creating a story in entrepreneurship is essential when chasing success, while owning one is a true triumph.

Owning a story is important at two levels:

- A good narrative keeps the start-up *focused on its big picture*: its business model.

It defines the entrepreneurial stages and refines the purpose, it presents its value, its sense of mission while making it desirable for the audience willing to connect to something tangible.

- The power of a good story can convince customers and should be essential in making profit. It is necessary to have it simultaneously with your innovation. A good story of the value proposition is closely related to the seller's promise and the buyer's belief. Therefore *value proposition should be placed at the core* of each sale and all the energy and start-up activities should be aligned accordingly. Value proposition is the heart of your strategy so telling a good story about it should not be omitted.

Entrepreneurial stages revealed through five elements of storytelling

According to many successful entrepreneurs, businesses need to have a story behind them. Whether at personal level, with place for emotion and subjective thinking or narratives that employ imagination through five senses, stories are always the best way to conquer the market. Crafting a memorable story that will resonate with the customers is essential and knowing storytelling elements could help entrepreneurs in these terms, as argued by Maxwell and Dickman (2007). It is known that stories make a difference if they contain the five essential PHAAT (Passion, Hero, Antagonist, Awareness, and Transformation) elements. These elements make the narrative system and the ancient Greek Philosophers identified them as ones making up the world (Fire, Earth, Water, Air and Space). As we perceive the world in facts through the lens of emotions, stories are actually facts that lead to entrepreneurial success wrapped in emotions that we often miss.

Exploring the archetypes of entrepreneurial story and the role it can play in building the business is a desired step that modern-day business makers usually take. Recognizing the elements of the story and defining them creates space for reflection and growth. Evaluating their weaknesses and strengths allows room for change and perfection.

When storytelling is used as a tool all entrepreneurial stages examined tend to become more 'humane'. If we take a closer look at the story elements, as presented by Maxwell and Dickman (2007), we can identify all stages of entrepreneurship both from the entrepreneur's point of view as well as from the enterprise's.

- **Passion** for instance is often associated with energy, the essential spark that ignites the whole process. Passion is related to the element of Fire, the energy that makes you want to have or to tell a story. Having passion even at the stage of nothingness is crucial: it keeps our thoughts focused and the ideas emerge. This *triggers idea generation* and it gives birth to the potential hero (the innovation, the product). Often times, ideas can be blurry and difficult to hatch therefore it is necessary to retain the picture of what market craves and ultimately *unlock the innovation* - again with the same passion.
- Next, the **Hero** relates to the element of Earth therefore grounds the story, the

ideas and/or the innovation. Hero *represents the point of view that is needed when incubating businesses*. Hero can be you, the product or your team as the narrative progresses and is the agent in overcoming obstacles and bringing about change. Hero has courage revealing itself clearly and conquering the world. However, conquer never comes without challenges. When creating business there are the 'seen' and the 'unseen' challenges that await each entrepreneur, i.e. obtaining patents, legal ownership (copyright of the work), trademarks may be some of the 'seen' ones, while dealing with technical, political and economic difficulties could be some of the 'unseen' problems.

- In stories, problems are often personified by the **Antagonist**. In storytelling, the Antagonist is perceived at first glance as human, yet we now know that it may be *any impediment the Hero has to overcome* in his/her journey. This element is accompanied by emotions that engage the world around us. The world is always interested in how people overcome barriers, and in moments like this the entrepreneurs should remember that this is where it all becomes real and, as enemies are introduced, the true learning process commences. In other words it is an "aha!" moment that, according to Koestler, is "the spontaneous flash of insight, which ... connects the previously unconnected frames of reference and makes us experience reality at several planes at once..." (1964, p. 45) and at this particular stage equips the Hero with power to overcome obstacles and take the right actions.
- **Awareness** relates to the element of air and without air there is no existence, or without Awareness there is no real story. The process of entrepreneurship tends to be challenging and no matter what pre-requisites an individual possesses or what the traits may be, the success seems to be unachievable for some. This is actually related to the presence of the moment of Awareness or the lack of it. The ones who get to the "aha!" moment can learn tremendously and a showcase of significantly more "heart-skills" makes positive change more attainable. Confident and creative problem-solvers, pragmatic critical thinkers, collaborative and empathic team players, personally motivated individuals *face the 'enemies' while experiencing emotions that are eventually productive*.
- As a result, the **Transformation**, the final element of the entrepreneurial story, simply happens: *the space for your business to fulfill its goals is created* and success comes. The drive and determination prevails even more at this stage because it is accompanied by the realization of the results of the Hero's efforts. It is the end of the tension caused by the problem that Antagonist brought in front of the Hero. Transformation followed by the awareness of the solution to the problem makes the resolution clearly visible.

Stating your value proposition

Communicating your value proposition to the stakeholders is an important aspect when developing the business model. There are several steps to keep in mind as suggested

by the “Crafting Your Value Proposition” workbook published in 2012 as part of MaRS Entrepreneur Workbooks and the secret lies in *‘possessing deep insight into the issues that make up the value proposition and wordsmithing’*.

Storytelling is a tool that helps the entrepreneur define the architecture of the business. Expansion paths develop from there on out, each step or new iteration is a step forward as it builds and learns from previous ones. Telling a story helps the entrepreneur test a market-making narrative and consequently test the business model in the real World. The story evolves each time it is told and the business grows. Respectively, to hone a good story for value proposition and convince the audience is another aspect of storytelling employed in this field. The value proposition needs to have the right language of the customers targeted and it must be able to describe your offer and its usefulness, and to answer questions related to it. These are some of the elements of a good story.

One of the distinctive features of the story of the value proposition is that it needs to be short and clear. It tells the audience:

- How the product or service solves/improves problems
- What benefits customers can expect
- Why customers should buy this product over other competitors

A powerful story or statement of value proposition helps make a strong first impression and makes the product memorable.

Choosing the right story

When envisioning the future of a business it is often best to plan and evaluate with the outcome in mind that the organization is to achieve, and this becomes more feasible with storytelling as a tool to narrate the achievements and adapting the changes needed. According to Martins and Terblanche (2003), there is a direct relationship between values and norms encouraging innovation and specific behavioral forms promoting creativity and innovation. When viewing storytelling from this aspect then perhaps it would not be a mistake to label it as a *‘pro-innovative behavioral form’* that deserves to be adopted in the organizational culture of a business.

By doing this, the entire process of entrepreneurship tends to become more ‘humane’ and easier to approach. These are the building blocks and they need to be pieced together accordingly. One of the ways to do it is by recognizing stories and their building blocks that are available around us. Another way would be to create and visualize a genuine story along our paths and follow it as a potential guide. In either way, it is about being positively different from others, yet remaining connected to the audience around you.

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APPENDIX

ORGANIZATIONS PARTICIPATING IN THE “InnoWomEnt” PROJECT

Bursa Technical University

Bursa Technical University was founded as the fifth technical university in Turkey and the second state university in Bursa in accordance with the decree of the Council of Ministers to specialize on certain technological concepts, such as ‘Robotics and Smart Systems’.

Bursa, which is one of the most industrialized metropolitan centers in the country, is located in Marmara Region within close proximity to ports and railways. Bursa is considered as the center of the Turkish automotive industry with its 18 organized industrial districts. The textiles, rubber, furniture and food industries are equally strong in the city.

Founded in one of the most industrialized cities of Turkey, the priority of the university is to educate students to become competent engineers and independent researchers. The university comprises six faculties (Faculty of Engineering and Natural Sciences, Faculty of Architecture and Design, Faculty of Forestry, Faculty of Humanities and Social Sciences, Faculty of Maritime Studies and the Faculty of Communication), two institutes (Graduate School of Natural and Applied Sciences and the Institute of Social Sciences), and a School of Foreign Languages. A range of programmes are taught in English, and the University hosts international students.

The education offered is rigorous and its quality is maintained by hard work of international lecturers. Bursa Technical University envisions itself as an international institution with the objective of internationalization across all fields, from activities to student/staff matters. Being new brings the advantage of structuring itself in accordance with European Standards. Flexible in establishing policies and curricular activities from fresh, university adopts Bologna Policies and ERASMUS activities with ease.

University gives significant importance and support to higher education. Co-operative projects and research play a key role in the development of research institutions, therefore staff and students are encouraged to build collaborative partnerships with institutions abroad. Bursa Technical University is an equal opportunity institution committed to diversity of people, thought, opinion and social inclusiveness.

Bursa Technical University recruits staff and students solely on their individual merits - independent of gender, race and religion. University promotes the gender equality in all activities. University adheres to regulations to create an environment where student and staff with disabilities can fully participate in all activities. Faculty and staff has been chosen from those with the background and capability to reach these preset goals.



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“Technopark Gliwice” Science and Technology Park

‘Technopark Gliwice’ Science and Technology Park is a modern centre of academic business support. The company came into being in April 2004 and it was founded by the three shareholders: the City of Gliwice, the Silesian University of Technology, and Katowice Special Economic Zone. The main activity of the park is creation and promotion of innovative and advanced technology companies and transfer of innovative technologies from the Silesian University of Technology and R&D units to small and medium-sized enterprises.

The area of Technopark Gliwice is around 2 hectares and it includes 2 modern buildings with more than 4000 m² of surface, most of which is used for rental premises for modern enterprises. Currently Technopark Gliwice render services for 75 innovative companies. Several of them are representing the high level of technology, but the vast majority of them are newly created initiatives – a companies whose owners or employed persons are mostly university graduates, mainly from the Silesian University of Technology. Technopark has a well-developed offer for students, university graduates and entrepreneurs. The proximity of the Silesian University of Technology, access to modern, well-equipped premises and innovative devices, as well as numerous training and specialized consultancy run by qualified coaches, those are only some of the advantages of our institution.

Among services addressed to enterprises you can find innovation audits, mentoring and consulting packages and the opportunity to join the Virtual Business Incubator, which allows to register your company at a prestigious address without necessity to rent a room. In our park we focus on supporting academic entrepreneurship. Extensive cooperation with various science and technology institutions, universities, science parks, and foreign organizations, as well as a number of projects that have been realized, confirmed the role of the park in the development of entrepreneurship not only in our region.

Technopark Machine Park enables us to offer specialized services such as the production of machines’ elements and devices using methods of Rapid Prototyping, coordinate measurements or waterjet machining of objects – in 3D, and 3D design using CATIA and Solid Edge software.

One of many initiatives of Technopark Gliwice is The Day of Science and Industry, which is organized once a year since 2009. The idea behind the event is to present the latest achievements of innovative companies, universities and R&D units from the Silesian region, in the form of experiments and interactive projects. The project aims to contribute to the promotion of technological innovation and research among Silesia residents. Moreover, it is a great opportunity for the representatives of science and industry to meet and to establish cooperation.

Technopark employees have several years of experience in the field of academic entrepreneurship support. Our institution constitutes an extensive, constantly extending web of contacts and relations between companies operating in different areas. It is also

a cooperation platform between science and business. Moreover, Technopark has an extensive knowledge about Silesia Region Innovation Strategy and policy. We are a partner of Marshals' Office of Silesia Voivodeship within regional specialized observatories. We are responsible for ICT observatory delivering actual knowledge about ICT sector in our region. We identify, monitor and forecast ICT trends. We also render services such as audits and trainings for companies and local government.



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I3P - The innovative companies incubator of Politecnico di Torino

I3P is the innovative companies incubator of Politecnico di Torino and is one of the most important university incubators at the European level. Founded in 1999, since now I3P has supported the creation of more than 222 technology-based start-ups in different sectors: ICT, Cleantech, Medtech, Industrial, Electronic, Automation and Social Innovation. I3P mission is to promote the creation of innovative high-tech start-ups, by providing business premises, strategic and specialist consultancy and a network of investors, partners and potential customers.

I3P offers its support to innovators coming from the Politecnico di Torino (professors, researchers, PhD and students), and to innovators coming outside the academic world, both at Italian and international level. Since its foundation, I3P has contributed to the creation of an interesting ecosystem, whose peculiarity is the capacity to generate a good equilibrium between technological spin-offs from the academic research and start-ups coming from “the market”, with more entrepreneurial competences and a stronger propensity to the market. Moreover, more and more start-ups are spin-offs of medium and big companies that want to launch to the market “non-core” projects and choose I3P as the ideal place where accelerate the development of their projects, by finding lot of competencies in the “Cittadella Politecnica” and opportunities in the services offered by I3P (consultancy, coaching, support to fundraising and business development).

In 2011, I3P launched TreataBit, a pre-incubation program designed to support the rapid growth of digital projects based on the lean start-up methodology. Since now Treatabit has supported more than 376 business ideas: about 268 projects are online and more than 118 projects have become start-ups. In 2017, 597 business ideas have been hosted, 123 entrepreneurial teams have been supported in the start of their business, 35 new start-ups have been created and 17 of these have been included in the incubation program.

In the last 3 years I3P has increased its capacity of attracting start-ups: in particular, in year 2015 the increase has been +48% in comparison with year 2014 and in year 2016 the increase has been +72% in comparison with year 2015. This shows that I3P has become a key focal point in the Italian ecosystem. From year 2011 to year 2017 the number of start-ups supported in the incubation program has increased from 136 to 222. The total employment in the 163 active startups is about 2100 employees and the total turnover is more than 114 M€ (in 2016). The total investments in venture capital received by I3P start-ups is about 58,3 M€ (from year 2007): 8 M€ in 2016 and 9 M€ in 2017.

Each year I3P promotes the “Start Cup Piemonte Valle d’Aosta” competition, which is the most important regional business plan competition at Italian level. Moreover, from 2011 to 2014 I3P has assured the role of secretary for PNICube, the Italian association of University Incubators. Each year PNICube promotes the “Innovation National Award” (the most important Italian business plan competition, with more than 3400 participants and 1100 business ideas) and the “Italian Master Start-up Award”.

I3P has developed an important experience in the definition and implementation of acceleration programs such as Treatabit.com. Focused on digital start-ups, in 5 years Treatabit has attracted hundreds of projects, by giving support to 276 business projects and helping the creation of 103 new start-ups. Some other examples of acceleration programs are the ones in partnership with big companies like Microsoft Italia (Biz&Dev Startup) and Intesa Sanpaolo (FoodIncubator).

In all these cases, I3P has demonstrated to be a good and skilled partner in order to start the experimentation and to develop the program in the following steps. I3P has offered an unique and specific value proposition which has attracted start-ups according to the strategic objectives of the partners. In particular, "Biz&Dev Start-up" has been used by Microsoft like a standard for other local initiatives.

At this moment, I3P has become an advisory partner for Italian and international universities and public institutions giving support to start-up creation and acceleration programs.

I3P is a publicly owned company whose founding partners are: Politecnico di Torino, Città Metropolitana di Torino, Città di Torino, Camera di Commercio di Torino, Finpiemonte and Fondazione Torino Wireless. It is one of the first Italian incubator to be designed as "Certified Incubator" ex. Law 221/12.

I3P is one of the main promoters of incubation and start-ups support programs, and its activities are in synergy with the global economic and development strategies at local and national levels. In this way, I3P is also a key actor in the technological transfer domain, both of Politecnico di Torino and of other important research centres. Its focus are: technological innovation, research, social innovation and innovative entrepreneurship.



I3P – Incubatore Imprese Innovative del Politecnico di Torino

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Politecnico di Torino

Politecnico di Torino (www.polito.it) was founded in 1906 and has its roots in the Technical School for Engineers created in 1859. It is internationally ranked among the most important universities in Europe for engineering and architecture studies, with 33,000 students (out of which 15% are international students coming from over 100 different countries).

Politecnico is a center of excellence for education and research in engineering, architecture, design and planning and it works in close cooperation with the socio-economic system. It is a comprehensive Research University where education and research complement each other and create synergies in order to address the needs of the economic system, of the local community and, above all, of its students.

Politecnico is committed to a strong internationalization process of its teaching, research and technology transfer activities: not only does it work in cooperation with the best universities and research centers in world, but it has also been signing agreements and contracts with important international corporations, as well as local businesses, meaning to be for the latter a focal point for innovation.



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The Silesian University of Technology

The Silesian University of Technology (SUT), is the oldest technical university in the region and one of the most prestigious in Poland. It was established in 1945 as a scientific and educational facility for Upper Silesia, the most industrialized region in Poland, and one of the most industrialized in Europe. For over 70 years of its history, it has always been a public institution, playing a cultural and opinion forming role in the region.

15 educational units of the University – 13 faculties, one college and a scientific-didactic centre – currently offer almost 60 study programmes and about 200 specializations, including the whole spectrum of engineering studies. Aside from technical programmes, candidates may also study administration, business analytics, mathematics, sociology and management – including project management – as well as foreign languages and pedagogy.

The Silesian University of Technology occupies leading positions in both national and international rankings. It ranked 5th among technical universities and 13th among all universities in Poland in the “Perspektywy” Educational Foundation Ranking. Two study programmes: environmental engineering and logistics were considered the best in Poland, which allowed SUT to rank 4th in the whole country in terms of engineering study programmes. In the SCImago Institutions Ranking (SIR), an international classification of higher education institutions, Silesian University of Technology was awarded the 4th place in Poland and 17th in Eastern Europe.

Nowadays, SUT educates over 20,000 students at all three levels of study: Bachelor (and Engineering), Master and Doctoral studies. The Silesian University of Technology offers 11 programmes conducted in English. Until now, the Silesian University of Technology promoted over 180,000 engineers, over 4,500 doctorates and almost 900 postdoctoral. Graduates of Silesian University of Technology often occupy managerial, directorial and other high positions in industrial corporations, which can be proven by numerous rankings conducted by independent research institutions.

As a prestigious European technical university, the Silesian University of Technology hosts innovative research and development activities, and educates highly professional staff for the knowledge-based society and economy. It also actively stimulates the growth of the region and the local communities. Due to the constant improvement of processes and organization, the university is a friendly and open place for the academic community, in terms of work and development. High position and prestige of the university are built through self-improvement, partnership and cooperation of the employees, students, PhD students and the social and economic environment. These conditions favour creativity, innovativeness and transfer of technologies.

The University is very active in regional activities related to development based on knowledge, technology and innovation. The representatives of SUT took part in the preparations of Regional Innovation Strategy (RIS) of the Śląskie Region for the years 2013-

2020, defining the smart specialization of the region and preparing the RIS implementation plan. The University supports students and academic staff in entrepreneurial activities: starting-up own business and commercialising knowledge. In this area the following units actively support entrepreneurial activities:

Centre for Innovation and Technology Transfer – supports the processes of formal technology transfer from the university to companies (including start-ups),

Academic Entrepreneurial Incubator – supports students in starting-up business, providing consultancy in: managerial, organizational, marketing, financial and personal areas.

In the area of academic entrepreneurship SUT cooperates with Technopark Gliwice which is located on the University's campus. Studies in the area of entrepreneurship and management are conducted on the Organization and Management Faculty located in Zabrze. Students of other fields of studies, interested in starting up their business can participate in courses and training in entrepreneurship provided by Academic Entrepreneurial Incubator or Student Career Centre.



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KOSGEB (Small and Medium Enterprises Development and Organization)

KOSGEB (Small and Medium Enterprises Development and Organization), established in 1990 by a special law, is a nonprofit, public organization responsible for the growth and development of SMEs in Turkey and functions under the Ministry of Science, Industry and Technology. Its mission is to increase SMEs' share in economy by spreading culture of entrepreneurship and support development and competitiveness of SMEs.

KOSGEB communicates its support and services to SMEs through 4 different elements: Support Programs, Funding Sources (grants, loan interest support), Laboratory Services and Information and Referral Services. Entrepreneurial trainings are offered in cooperation with chambers, business associations, foundations, municipalities and universities as part of the Entrepreneur Support Programme. Upon completion of these programs successfully, trainees receive the right to apply for grants and loan interest support.

KOSGEB provides its services to SMEs through central or provincial directorates. KOSGEB Bursa is one of the biggest provincial directorates of KOSGEB considering the amount of financial support it provided. KOSGEB Bursa directorate organized more than 200 Entrepreneurial training programs for more than 5000 trainees in cooperation with different organizations. KOSGEB Bursa has also consulted more than 500 new startups and gave financial support (both grant and interest-free credits). KOSGEB Bursa Directorate has been serving as the project coordinator of Enterprise Europe Network East Marmara as part of the call for the European Business Network to be launched within the COSME (Competitiveness Program for Enterprises and SMEs).

KOSGEB is the member of World Association of Industrial and Technological Research Organization (WAITRO) and International Association of Science Parks (IASP). KOSGEB's efforts to encourage entrepreneurship and to help SMEs improve their skills and technology have been supported by the international institutions, such as UNDP/ UNIDO (United Nations Development Program/United Nations Industrial Development Organization), WASME (World Assembly of Small and Medium Enterprises), ILO (International Labor Office), World Bank and OECD (Organization for Economic Cooperation and Development).



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