Entrepreneurial Ecosystem as the origin of entrepreneurial opportunities: the case of Estonian ICT startup ecosystem

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ABSTRACT
One of the most important tasks of the ecosystem’s functioning is the creation of the base for the identification of entrepreneurial opportunities. To date, there has been little agreement on how entrepreneurial opportunity and the entrepreneurial ecosystem are interconnected. What is the connection between an evolutional trajectory of the ecosystem and the developmental trajectory of entrepreneurial opportunities? What is a window of opportunity in the context of an entrepreneurial ecosystem?

This paper aims to close these research gaps, specifically to develop an approach to understanding the interaction between the ecosystem and the opportunity and to identify interconnections between developmental trajectories of the opportunity and evolutional trajectories of the ecosystem.

The present paper focuses on studying the role of the entrepreneurial ecosystem as the important and specific for the origin of the opportunity identification and transformation process in Estonia (on the example of ICT sector, as one of the fastest growing spheres, which gives a significant number of startups). Estonian ecosystem provides a special interest as an example of successful and dynamically developing transition country.

Keywords: entrepreneurial ecosystem; opportunity transformation; window of opportunity

INTRODUCTION
The concept of the entrepreneurial ecosystem has become one of the central issues in studying entrepreneurship. A developed entrepreneurial ecosystem provides better conditions for entrepreneurship, influencing a region’s development. One of the most important tasks of the ecosystem’s functioning is the creation of the base for the identification of entrepreneurial opportunities. As Shane and Venkataraman (2000, p. 220) claim “to have entrepreneurship, you must first have entrepreneurial opportunities”. However, after a long history of entrepreneurial opportunities research, there is yet no consent on the most basic questions among scholars. To date, there has been little agreement on how entrepreneurial opportunity and the entrepreneurial ecosystem are interconnected. Researchers (Shane, 2000; Dimov, 2018) argue that opportunities are “born” from fertile soil, develop under the influence of an entrepreneurial ecosystem, depend on the entrepreneurial ecosystem characteristics and peculiarities. However, there are numerous aspects and gaps left mostly ignored in this topic, among them: What is the connection between an evolutional trajectory of the ecosystem and the developmental
trajectory of entrepreneurial opportunities? What is a window of opportunity in the context of an entrepreneurial ecosystem?

This paper aims to close these research gaps, specifically to develop an approach to understanding the interaction between the ecosystem and the opportunity and to identify interconnections between developmental trajectories of the opportunity and evolitional trajectories of the ecosystem.

Another objective of the paper is to shed light on the geographical aspect of interconnection between the entrepreneurial ecosystem and entrepreneurial opportunities. It is vital to study the interconnection between a national and the global ecosystem, conditions created by an ecosystem in order to identify global entrepreneurial opportunities and influence of the ecosystem on start-ups' decision to globalize as well as their rate of globalization.

On the basis of a phase model of economic development (Smith, 2000), model of ecosystem (Stam, 2015), a dynamical approach to studying an ecosystem (Mason and Brown, 2014), and seeing the opportunity as a phenomenon lasting in time dimension (Dimov, 2015) the authors show how the evolution of the ecosystem is connected to developmental trajectories of entrepreneurial opportunities, what specific combinations of the ecosystem’s pillars at particular developmental phases of the ecosystem create a window of opportunity as a necessary base for identification and transformation of the opportunity.

The paper focuses on peculiarities of evolutionary trajectories of the entrepreneurial ecosystem, formation of a window of opportunity, dynamic development of the opportunity in a (post) transition country with Estonia serving as an example. Transition countries display hallmarks of the ecosystem’s evolution when compared to, for instance, the Western countries. In a very short period of time (about a quarter of century) Estonia has come a long way from an efficiency-driven to innovation-driven phase, from zero (in the Soviet era entrepreneurship was banned) to the creation of a smart economy and a highly developed entrepreneurial ecosystem that produced a whole series of global start-ups that, in their turn, have reached the status of unicorns\(^1\). The country has overcome dependence on Soviet military-oriented economic structure; the specification has been completely changed from energy-consuming heavy industry, agriculture and light industry to smart specialization. Such successful development and start-up booming in Estonia are in many ways determined by the introduction of Educational Tiger Leap Program, which leads to (Landler, 2005; Mets, 2017a) orientation on human capital as well as on the development of competence in the area of ICT industry.

To identify the connection between the ecosystem and the opportunity the paper contains the dynamic analysis of Estonian ecosystem and analysis of the connection between ecosystem evolution and trajectories of opportunity identification (using cases as examples).

An utterly important objective of the paper is to analyze the evolution of ecosystems and trajectories of opportunity transformation in the ICT sector. In the ICT sector, the number of companies has increased dramatically, and many companies in the

\(^1\) Unicorn – a startup valued 1 billion USD or more.
sector belong to high growth entrepreneurship. The ICT sector is the source of innovations, actively influencing the development of the ecosystem (role models, entrepreneurial mindset, new consumer practices etc.). It is essential to make concentrated efforts to understand conditions for high growth entrepreneurship.

The paper is structured in the following way: the first section is dedicated to the analysis of the current state of discourse on the entrepreneurial ecosystem, models of the ecosystems, dynamic view on the entrepreneurial opportunity, and interconnection between the ecosystem and the opportunity. Further, there is a section with the dynamic analysis of the Estonian entrepreneurial ecosystem, according to the suggested model. The next section contains the analysis of the cases of Estonian start-ups, reflecting the essence and dynamic development of Estonian entrepreneurial ecosystem. Finally, the discussions and conclusions give a summary and critique of the findings.

ENTREPRENEURIAL ECOSYSTEM AS AN ORIGIN OF ENTREPRENEURIAL OPPORTUNITY

One major theoretical issue that has dominated the study on the entrepreneurship for many years concerns entrepreneurial opportunity. Despite the considerable amount of literature published on the entrepreneurial opportunity (Alvarez, Barney, 2007; Ardichvili, Cardozo, Ray, 2003; Davidsson, 2015; Lumpkin, Lichtenstein, 2005), the nature of opportunity is still one of the most significant current discussions. One of the most discussed issues is an interconnection of the opportunity and the ecosystem.

The concept of the ecosystem was initially developed and applied to biological processes. The use of the ecosystem concept in business research was proposed by Moore in 1993 who suggested that entrepreneurship does not exist in the vacuum, but develops through the system of relations and interaction. The ecosystem concept has become firmly established in the field of entrepreneurial studies (Bahrami & Evans, 1995) and is widely used as a set of interconnected factors that facilitate the development of entrepreneurship (Mason and Brown, 2014; Stam (2015).

In recent years, there has been an increasing interest in entrepreneurial ecosystem both by researchers (Cohen, 2006; Foster 2013; Isenberg, 2010; Venkataraman 2004) and by international organizations (WEF, OECD, World Bank).

One direction of studying ecosystems is based on the model of Isenberg (2011). Isenberg suggests that in spite of uniqueness of ecosystems, it is possible to distinguish key elements of ecosystems and put them into groups of factors. In this direction, entrepreneurial ecosystem is defined “as a system of interrelated pillars that impact the speed and ability with which entrepreneurs can create and scale new ventures in a sustainable way” (WEF, 2014). The structure of the entrepreneurial ecosystem has been described; assessment parameters of an ecosystem have been defined, offering several elements, criteria for ecosystem assessment.

Foster (2013) mainly further developing Isenberg’s ideas introduced nine pillars of entrepreneurial ecosystem: accessible markets; human capital/workforce; education and training; cultural support; funding and finance; regulatory framework and infrastructure; legislation/policies access to basic infrastructure; major universities as catalysts.
Stam (2015) developed ideas of his successors (Forster et al. 2013) and suggested a synthetic model. Stam divided all elements of the ecosystem on systematic and framework conditions. Systematic conditions include Networks of entrepreneurial peers; Leadership – directions and role models; Access to financing; Talent; Knowledge; Support services/system. Framework conditions include Formal institutions; Culture; Physical infrastructure; Demand/accessible markets.

Speaking of the models mentioned above it is worth mentioning that a series of factors influencing the development of the ecosystem has not been widely discussed.

Firstly, the proposed models are concentrated on the regional (or national) ecosystem (for example, in the model proposed by Stam only pillars "demand/accessible markets - domestic and foreign" the author mentions a foreign market). However, in the modern world, no one entrepreneurial ecosystem can exist in the vacuum, separated from the global ecosystem. Global processes have an impact on almost every pillar of the ecosystem - for example, culture (because of the development of technology, the accessibility of the information openness), talents (an open labour market, an education system based on international student exchange, online courses, etc.), and so on. This is especially typical for the ICT sector involved in global trends and processes. Companies can belong to different ecosystems, for example, having HQ in one country, but working globally. (Mets, 2018). Thus, we suggest adding the global ecosystem in the Stam model, approach to the ecosystem in the global context.

Secondly, the models fail to mention the integration and interaction of sectoral ecosystems. The entrepreneurial ecosystem is comprised of series of sub-ecosystems which can be systematized according to activity sphere (ecosystems of different sectors including education). These ecosystems interact influencing each other.

The authors suggest studying the interaction of global and local ecosystems as well as sectoral ecosystems.

A group of researchers have addressed the question about the dynamic view of the ecosystem. Mason and Brown (2014 p.19) argue “much of the discussion of entrepreneurial ecosystems has lacked a time dimension”. The entrepreneurial ecosystem evolves and changes its form in the temporal scale drastically, reacting to changing political, economic and cultural factors. For instance, a new legal issue, new political conditions (e.g. sanctions), a new ideological environment can decisively change the ecosystem. Thus it would be erroneous to dismiss the time factor when analyzing the ecosystem.

Dynamic view on the ecosystem is closely connected with the question of path dependence. Is it possible to overcome “the narrow trajectory because of historical experience” (Roundy, Bradshaw, Brockman, 2018, p.5)? Is ecosystem sensitive to initial conditions? In the next section, the authors argue that path dependence is not an obligatory attribute of ecosystem evolution.

It is important to mention that when studying ecosystems the researchers focus on describing and evaluating elements of the ecosystem, indicators of the ecosystem’s performance (performance is defined by growth of number and quality of entrepreneurs, innovative start-ups etc.). However, the connection between the ecosystem and the opportunity, the ecosystem in its capacity as a source of the entrepreneurial opportunity is almost entirely eluded. Although, the policies of governments developing an entrepreneurial ecosystem are targeted creating better opportunities for entrepreneurs.
What is the connection between the ecosystem and the opportunity? How is the dynamics of the ecosystem connected to the opportunity? What pillars create conditions for the opportunity at different stages of development of the ecosystem? Answers to these questions are searched in the following sections.

The construct of entrepreneurial opportunity is at the heart of understanding of entrepreneurship. A great number of researches are dedicated to entrepreneurial opportunities (Ardichvili, Cardozo, Ray, 2003; Davidsson, 2015; Lumpkin, Lichtenstein, 2005; Venkataraman, 2003; Eckhardt & Shane, 2003; Klein, 2008; Dimov, 2013). Entrepreneurial opportunity is an entrepreneur’s ability to perform an entrepreneurial journey, transform an idea into specific results, bring an idea into life, and create a new value. This topic is full of debated questions; the nature of the opportunity itself is still vague. One of the reasons why researches on opportunities are still at early stages of development is that the dynamic approach to the opportunity is mostly eluded. Opportunity is studied mainly at the new venture creation stage. However, the opportunity is not only a discrete but a continuous phenomenon. In the conditions of the fast-changing market, consumer practices, competitive offers and a series of other factors an entrepreneur are constantly forced to find opportunities, at times radically transform their product, developmental trajectory of the company, and the entrepreneurial idea itself. Thus we can talk not only about the identification of the opportunity but also about a constant and long re-identification of the opportunity.

Consequently, we examine the development of the ecosystem and the identification of the opportunity in action.

A necessary condition of opportunity identification is the creation or appearance of a window of opportunity. Interpreting the definition of opportunity proposed by Dimov at the ESU 2018 conference, authors suggest that the window of opportunity is a collection of situations, conditions that allow identifying an opportunity. The factors influencing these conditions and situations also include an entrepreneurial ecosystem and its pillars. The construct of a window of opportunity is a mechanism that links the trajectory of the opportunity’s identification and the entrepreneurial ecosystem. Creation/appearance of a window is one of the most paramount performances of an entrepreneurial ecosystem.

Using the case of Estonia we have focused on the question of how the ecosystem and the opportunity are connected, what collection of the ecosystem’s pillars form a window of opportunity at a certain stage of economic development.

**METHODOLOGY**

The theoretical basis of the empirical part is the model developed by the authors based on the concept and models of the ecosystem (in particularity the Stam (2015, 2018) model). An important basis for the study is a dynamic view of the ecosystem, analysis of the ecosystem in development during its existence. The development of Estonian ecosystem is divided into three base stages according to World Economic Forum (WEF 2013) – efficiency-driven stage; the transition from the efficiency to the innovation-driven stage; innovation-driven stage.

The focus of the empirical research – Estonian entrepreneurial ecosystem. Estonia was chosen due to some factors.
First, Estonia is a notable and successful player in the world’s entrepreneurial ecosystems. Such significant results are achieved in extremely short terms in the historical perspective (27 years). The analysis of the Estonian ecosystem allows us to go further in understanding the processes of transition economy’s dynamic development. Also, Estonia is the most successful example of the entrepreneurial ecosystems’ development among post-Soviet countries and the significant part of the countries of the former socialist camp.

Secondly, Estonia is an example of a small country, which is also of interest for understanding the laws of the ecosystems’ development in small economies.

The study is conducted using the ICT sector as an example. First, the study of this sphere has practical importance - understanding the laws of development of one of the fastest growing spheres, which gives a significant number of start-ups (including unicorns), innovative ideas, actively changing consumer practices. Secondly, “The ICT sector was considered the one with the greatest potential” (Smart Specialisation-Qualitative Analysis, Estonian Development Fund, 2013), it gives a significant number of rapidly growing firms, so-called ambitious entrepreneurs. A lot of countries nowadays are focused on the support of ambitious entrepreneurs, “policymakers across the OECD are now strongly focused on promoting high growth firms” (Mason, Brown, 2014. p.2). It should be noted that in this paper, in the section devoted to case studies, authors are focused specifically on “ambitious entrepreneurs” who are interested in reaching high results, the creation of new value, new levels of development (for example, internationalization of their activity). Especially this type of entrepreneurs and companies that are created by them have the most significant impact for the number of components of the entrepreneurial ecosystem (entrepreneurial culture, role model motivates other entrepreneurs, makes a positive contribution to the image of the country/region, etc.). So, in the centre of our research, there are ambitious entrepreneurs who are willing to create new value, who are more inclined to opportunities’ discovery.

In the first part of the empirical section analysis of the entrepreneurial ecosystem is handled. Secondary data on Estonian entrepreneurial ecosystems was collected and analysed. Empirical research is based on data from different sources: the official databases, data provided by international organizations (World economic forum (Global Competitiveness Index); World bank; Eurostat; Global Entrepreneurship Monitor (GEM); Global Entrepreneurship Development Index (GEDI); OECD (Country statistical profiles; Freedomhouse), data provided by Estonian organizations/platforms (Statistics Estonia; Estonian Development Fund; Business Register; Bank of Estonia; StartupEstonia), other secondary data, as well as on the personal knowledge and experience of the authors who witnessed the transformation of the Estonian ecosystem.

The second part of the empirical section follows a case-study design, with an in-depth analysis of the role of the entrepreneurial ecosystem in opportunity identification and transformation processes and illustrate the dynamic development of the entrepreneurial ecosystem. Investigated companies demonstrate different paths and trajectories of development, various contributions to the entrepreneurial ecosystem of Estonia. The criteria for selecting cases were, firstly, the Estonian origins of the idea creation; and, secondly, the correspondence of each case to the studied periods of transformation of the Estonian entrepreneurial ecosystem (each analysed company was established in the corresponding period of the Estonian entrepreneurial ecosystem.
development – GrabCAD, the late 2000s; Taxify, after 2014); thirdly, company’s belonging to the ICT sector; fourthly, the successful companies, that are important players of the entrepreneurial ecosystem, have been selected; in the fifth, selected companies are among the 30 most capital raised start-ups. The case of Regio related to the first period of development of the entrepreneurial ecosystem is not fully examined since it was presented in previous publications by the authors (Mets 2008). There is a reference to the present case, and the key items were highlighted as well as various ways of interconnection between ecosystem pillars and entrepreneurial opportunities.

The case study of the startups is based mainly on public information from media, company’s web page, the official databases of Commercial Registry, including annual reports of the company. Search for research publications using Google Scholar® was carried out. That gave an overview of which aspects of studied companies-startups researchers already have covered. Besides published text, public interviews and speeches from the internet were used to interpret and code the illuminating information answers to research questions. Startups are analyzed in the context of the entrepreneurial process of opportunity development in the entrepreneurial ecosystem framework.

ESTONIAN STARTUPS’ ECOSYSTEM IN DYNAMICS

Back in 1991, Estonia was part of the Soviet Union. In the former socialist counties, a planned economy was implemented. When Estonia became independent, market relations were new for people. However, Estonia, like the entire Baltic countries, has been a part of the USSR only for 50 (and not 70 years as another part of Soviet republics). Therefore, after Estonia's independence in 1991, people had a much better understanding of the laws of private business compared to other Soviet republics.

After 1991, Estonia has taken a clear orientation to the west. The country had very limited resources, it was a difficult period, but it has been taken a number of measures to transform the planned economy into a market economy. Since 1992, the Estonian government employed a liberal economic policy, which is also known as ‘shock therapy’, and opened the Estonian market to foreign goods and capital. The country faced several challenges (social, political, economic) associated with the painful period of transformation. In the first half of the 1990s, radical reforms to new conditions: privatization, the introduction of own currency, the beginning of entrepreneurial activity of the population, a change in minds, a difficult economic situation and the search for new ways for the developing of the country.

In the second half of the 1990s, a period of stabilization and active development of entrepreneurial initiatives began. However, the conditions of doing business were complicated, not always certain. The 1990-is is called as a period of “wild capitalism”. An important event was the creation of the Estonian Regional Development Agency (ERDA) whose purpose was to support small and medium-sized businesses. In general, the development of entrepreneurship was placed among the priorities of the government. In 2000s Estonia made a significant jump in economic and social development (GDP started to grow since 1995 with speed between 4.4 and 10.5% per year until 2007). Already in 2004, Estonia joined the European Union. European standards of life and business have begun to be implemented. In 2000, the governmental agency Enterprise
Estonia was established (replaced ERDA). The strategy "Entrepreneurial Estonia" was adopted in 2002 (Mets 2017b).

The second half of the 2000s is characterized by stable conditions for business management however rather unstable political and social situation. The economic crisis had a strong negative impact (GDP growth rate dropped from +7.5% in 2007 to -14.1% in 2009). It was necessary to take decisive measures, to determine fundamentally new further ways of development. A course was taken to develop smart specialization and the knowledge-based economy.

An utterly crucial event for the evolution of Estonian entrepreneurial ecosystem is the implementation of a strategy for the creation of a digital society. The strategy concerns many areas of the mechanisms of the society, economy, and state and is a complex unified strategy. 1995-1998 saw the launch of the national ICT strategy (the “Tiger Leap” program), in 2000 establishment of e-governance and e-tax was introduced, e-voting was initiated in 2005, in 2008 e-health was installed; e-residency was put in place in 2014. The strategy is aimed at building a digital society, introducing IT solutions, cyber security, and a whole range of e-services. This strategy made it easier to run business, making the procedures quicker and decreased the number of procedures involving paperwork in the area of entrepreneurship, which in turn increased the appeal of the entrepreneurial ecosystem for entrepreneurs.

The early 2010s are characterized by economic stabilization, recovery from the crisis. A number of programs to support entrepreneurship and entrepreneurial education have been implemented. Important steps for awareness of entrepreneurship were joining the Global Entrepreneurship Monitor (GEM) and GEDI, 2012. The trend of these years was the active growth of startups knowledge base in the IT sphere, the entry of Estonian startups into the global market, the appearance of unicorns of Estonian origin.

From 2014 Estonia has gained leading positions in entrepreneurial activity rankings. In 2014 “Estonia ranks 21st in the global ranking of entrepreneurship ecosystems, ahead of countries such as Latvia and Lithuania, Spain, Portugal and Greece, and even ahead of countries such as South Korea and Japan». (GEDI 2014, p.7). In 2018 Estonia gained a 23rd position among 120 countries that have been researched. Estonia maintains the first place on Entrepreneurial Employee Activity (EEA) index, being one of the 15 countries with the highest position on the Entrepreneurial Spirit Index (2017/18 Global entrepreneurship monitor), 29 positions in Global Competitiveness Index of 137 countries (17-18 Word Economic Forum).

In general, from 1991 to 2018, Estonia has made a tremendous jump, not only cope with impacts from the planned economy but also has made significant progress, has moved from the lowest level of factor-driven development to the highest innovation-driven (WEF, 2014). "Economic growth in Estonia increased significantly, and the Estonian economy was one of the fastest growing economies in the EU in 2017." (Quarterly Bulletin of Statistics Estonia 2/2018, p.4). Estonia has become a knowledge-based society, with a highly developed entrepreneurial ecosystem and a start-up boom in ICT.

Next, we present general data of the Estonian entrepreneurial ecosystem in dynamics: the periods of stages are divided according to the WEF; the structure of data is based on the model by Stam (2015, 2018) in the authors' interpretation (Table 1).
Table 1. Evolution of the Estonian entrepreneurial Ecosystem

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Development stage</td>
<td>Efficiency-driven</td>
<td>The transition from efficiency- to innovation-driven</td>
<td>Innovation-driven</td>
<td>WEF 2014</td>
</tr>
<tr>
<td><strong>Systemic conditions</strong></td>
<td>Individual initiatives mainly</td>
<td>Policy-supported</td>
<td>Integration with global ecosystems</td>
<td></td>
</tr>
<tr>
<td>1. Networks (+ role models)</td>
<td>First generation entrepreneurs</td>
<td>Success stories: Regio, Skype, Playtech, MicroLink, Delfi, etc.</td>
<td>Organized Estonian startup community integrated into global ecosystems</td>
<td></td>
</tr>
<tr>
<td>2. Leadership (+ role models)</td>
<td>New entrepreneurial leaders (former owners – Skype, MicroLink, etc.) + hiring foreigners to boards and executive managers</td>
<td>Globally-oriented startup entrepreneurs</td>
<td></td>
<td>Investment into Estonian startups frequently after moving HQ to abroad</td>
</tr>
<tr>
<td>3. Finance</td>
<td>FDI supported by policy</td>
<td>European structural funds</td>
<td>The growth of international startup funding</td>
<td></td>
</tr>
<tr>
<td><strong>Startup investment, million euro</strong></td>
<td>Founder, family, friends + small funds of Regional Development Agency and the unemployment office</td>
<td>5.69 (2006, started by Estonian Development Fund)</td>
<td>272.2 (2017, max value, Estonian share 1.3%)</td>
<td>Only 7.8% of accumulated 2006-2018 startup funding – Estonian capital</td>
</tr>
<tr>
<td>5. (New) Knowledge</td>
<td>Weak University-Industry linkages; restructuring of university and research system</td>
<td>The fast growth of ICT applications; globalization of knowledge-base</td>
<td>Development units of globalized Estonian startups remain in Estonia</td>
<td>The growth of startups is based on design-based tech (ICT) development mainly (see top 30 investments)</td>
</tr>
</tbody>
</table>

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² OECD 2017, legacy of the Soviet period mainly (5-years studies). Since the end of 1990-s European educational regulations implemented (3+ years studies).
### Public R&D costs, % GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>0.52</td>
</tr>
<tr>
<td>2008</td>
<td>0.72</td>
</tr>
<tr>
<td>2015</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Lags behind strategic goal 1.4%

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### 6. Support services/intermediaries

- **Entrepreneurship development centres and consultants’ network (since 1992, supported by NUTEK); Tartu Science Park 1992**
- **Enterprise Estonia (2000); science parks; business incubators; Estonian Development Fund (2006); mature business services**

Established an entrepreneurial society. Active operation of accelerators. Participation of Estonian entrepreneurs in Estonian and global accelerators and start-up support programs

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### Framework conditions

**The transition from the legacy of a Soviet command economy to a market economy; liberal economic policy; ICT strategy**

**Integration to European Union; the normal market economy**

**Smart specialization strategy**

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### 1. Formal institutions

**Privatization, simple tax system, 0 % income tax on invested profit, attracting FDI**

**The strategy “Knowledge-based Estonia”, since 2002**

**Rules & policy supporting startups’ employment and funding**

**Cultural and social norms, ranked 3-rd after Israel and USA (GEM 2016)**

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### 2. Entrepreneurship culture

**Entrepreneurial capitalism**

**Facilitation entrepreneurship**

**Strong emphases on startups**

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### TEA index

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
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</tr>
<tr>
<td>2016</td>
<td>16.2</td>
</tr>
</tbody>
</table>

GEM 2017; Lepane & Kuum 2005

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### High status to entrepreneurs, %

<table>
<thead>
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<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>NA</td>
</tr>
<tr>
<td>2016</td>
<td>63.6</td>
</tr>
</tbody>
</table>

GEM 2017

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### Career choice – self-employment/entrepreneur, %

<table>
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<tr>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>28.5</td>
</tr>
<tr>
<td>2016</td>
<td>53.2</td>
</tr>
</tbody>
</table>

GEM 2017; Lepane & Kuum 2005

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### 3. Physical infrastructure

**Poor telecom & roads; oil shale-based energy sector**

**The fast growth of telecom networking and Internet; reconstruction of roads**

**Ranked 2nd after Hong Kong (GEM 2016)**

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### 4. Demand

**Small domestic market with low purchasing power; fast re-orientation from former Soviet market to the West**

**Estonia developed into the export-oriented economy, export: 75% of GDP, 2011**

**The growth of value added from services (ICT, building, a decline of logistics); services: 66% of GDP and 33% of**

See: Mets 2018

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3 Private component of R&D (innovation) statistics up to 1.5% (2011) depends mostly on some companies’ investment into production facilities - that does not describe real R&D. The same time, development units (also R&D) of globalized startups (like Skype or GrabCAD) indicate software or other engineering services in statistics, not contractual R&D.

4 High status – Percentage of the adult population between the ages of 18 and 64 years who believe that high status is afforded to successful entrepreneurs
1. Networks

In the 90’s while transitioning to a market economy, the networking was still being formed and build predominantly on personal connections. The first wave of entrepreneurs followed western examples. In the 2000’s a whole string of success stories of Estonian origin had the significant influence on forming a positive image of entrepreneurship and an ambition to become a part of the entrepreneurial community (i.e., Regio, Skype, Playtech, MicroLink, Delfi). The early 2010’s saw another series of inspiring examples (CrabCad, Transferwise, Pipedrive, etc.). Since 2014 we can talk about a developed Estonian startup community.

2. Leadership

It is obvious that in a planned economy (before Gorbachov Perestroika, 1986), any entrepreneurial initiative was suppressed, and a negative attitude towards entrepreneurs was created. In the 90s, the first generation entrepreneurs operated on the market. During this period, it is difficult to talk about innovation project leaders, because innovative projects were extremely small, did not play a key role and did not define the "direction of collective action" (Stam. 2015, 4). In the early 2000-2010s new leaders have appeared (former owners - Skype, MicroLink, etc.). Separately, it is worth to stress the success of Skype, the so-called Skype-effect. The success of this company has had a significant impact as role models for entrepreneurs. In the period from 2014, leadership has shifted to Globally-oriented successful startup entrepreneurs mentioned above.

3. Finance

Since the 90s, FDI has been promoted by the policy of the Estonian government. FDI has had target industries exploiting comparatively cheap labour. In the 1990-s the main sources of investment in start-ups were bootstrapping, small funds of Regional Development Agency and unemployment office.

In 2000-s and early 2010-s, Development of SMEs was partly supported by European structural funds. However, 100 % of the first investments in most growth-oriented startups were Estonian origin (€ 5.7 million 2006) (Fig 1). An important role in the financial support of start-ups during this period was played by the Estonian

Source: developed by authors

### TABLE 1

<table>
<thead>
<tr>
<th>GDP per capita, euro</th>
<th>exports</th>
<th>After crisis the level of 2008 reached in 2011</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Population, million</th>
<th></th>
<th>Trend of emigration partly replaced by re-migration since 2015</th>
</tr>
</thead>
</table>

5 Quarterly Bulletin of Statistics Estonia 2/2018
Development Fund (EDF) encouraging the involvement of Estonian private and international investments. Despite the efforts undertaken, according to the GEDI 2014 assessment, some bottlenecks have been identified in the Estonian entrepreneurial ecosystem. Among them, there were also finances.

Figure 1. Funding of Estonian startups, m€, IIQ 2018 (Source: authors, based on martin@garage48.org).

In late 2010, an important trend was the growth of annual investments in startups that reached € 272.2 in 2017. The largest amount is invested in ICT-based start-ups - TransferWise 335.6 million euros, Taxify (152 million euro), AdCash 20 million euros, GrabCAD 11.3 million euro).

In 2017, about 98% of investments in Estonian start-ups are of foreign roots (but it should be mentioned that often foreign investments are made after the transfer of HQ of startup companies to abroad, 20 start-ups received significant funding have HQ outside Estonia, while two bankrupts both HQ - Estonia ). The growth of the share of foreign capital in Estonian start-ups, including with the HQ in Estonia, is an important indicator of growing trust, positive image of Estonian entrepreneurs abroad, this is also an indicator of integration of local and global ecosystems.

4. Talent

In general, the level of the population’s education in the 1990s was high, about 30 per cent of the population (in the age 25-60 years) had the higher education (this is not a typical indication of the factor-driven economy). However, there was a sharp shortage of business education, entrepreneurial skills, which is logical and understandable for a post-communist country. In 1990s Estonia was actively creating programs that were aimed for the development of entrepreneurial skills and human capital. The experience of Western countries, the centre for the development of entrepreneurship, was adopted by the government programs of Sweden (NUTEK), Finland and the European Union (PHARE) (Kuura 2006).
In the 2000s and 2010s, the Estonian government made great efforts to grow the entrepreneurial skills of the population. Minister of Economic Affairs and Communication (MoEA&C) and Minister of Education and Research (MoE&R) adopted a declaration on the development of entrepreneurship education in 2007. Entrepreneurial education has become an obligatory part of higher education for students of all specialities, not only economic. Implementation of entrepreneurship training programs at all levels happened, and not only at the higher education, but also for adults and scholars (for example, nowadays there is a network “enterprising school”, in frames of which the entrepreneurial skills are being introduced in 80 schools and ten kindergartens).

Talking about IT education, authors have to note that Estonia has long had a strong position in this field since the Soviet times. Development and introduction of Tiger Leap program in the 1990s (later Tiger Leap Plus program the Learning Tiger program) was of great importance. This complex program has been developed in stages. In 1990-2000’s schools introduced computer classes. The early 2000-2005 saw the development and adoption of complex measures to increase ICT competence of teachers on all levels (in schools and universities) as well as those of students. From 2006 until 2012 introduction of e-learning has been emphasized as a part of educational process.

Additionally, Estonia has a program meant to expedite the development of force for the ICT sector. The program Study IT in Estonia operates under the auspices of the government and combines academic organizations (universities) as well as practitioners of the IT industry. In Estonia, the number of ICT students has been steadily increasing and now is 10% of all the intake in higher education level (Fig 2).

Figure 2. ICT bachelor and master students’ intake by the study year 2006-2017 (authors, based on MoE&R 2018)

Estonia is a small country. Accordingly, the number of workforces is limited. But the quality of the workforce is high - share of the population with higher education in 2010 grew and became 39 %. It is especially worth noting the high share of the qualified workforce in the ICT sector, which was largely the result of the IT-Tiger program’s introduction in the 1990s. It is also important to note that the high degree of globalization
of ICT sector’s companies leads to the expansion of the labour market, the ability of Estonian companies to hire qualified workforce at the global market.

Overall, it is possible to talk generally about the integration of entrepreneurial and educational ecosystems.

5. Knowledge

Over the years, the education system has been harmonized with the European system. Today, there are a number of academic and research institutions with high reputation and ranking high in international rankings (Tallinn University of Technology, University of Tartu) in Estonia. These organizations are not only a source of knowledge and innovations but also a supplier of personnel (for example, the founders of some highly successful companies came out of the university environment). But, the linkages between Estonian universities and companies are still considered being weak.

In 2018 Estonia occupies the 21st position on Quality of scientific research institutions, 17th position on Quality of education and 8th position on Quality of math and science education (among 137 countries) (WEF, 2018). A warning signal is lagging R&D expenses behind strategic goals (see Table 1) and decline of country innovativeness according to European Innovation Scoreboard (2017).

6. Support services/intermediaries

In the 90’s the development of Estonian support services has been backed up by European states Sweden (NUTEK), Finland and the European Union (PHARE) (Kuura 2006). This helped Estonia to adopt western experience faster.

In the 2000’s a group of organizations was established to support entrepreneurial activity such as Enterprise Estonia (2000), Estonian Development Fund (2006). In this period there emerged science parks, business incubators, and other mature business services.

In 2010-s and after 2014 whole string of organizations helps establish entrepreneurship and start-ups friendly conditions, such organizations as Startup Estonia, SmartCap, Ministry of Economic Affairs and Communications. Active role in implementing entrepreneurial mindset play Incubators, Pre-incubators and Accelerators – Tartu Science Park (BuildIt), Tallinn Technology Park, Tallinn Business Incubators, Startup Incubator, Startup Wise Guys, GameFounders, VUNK, Startup Wise Guys, GameFounders, BuildIT - IoT accelerator, Storytrek, Startup Incubator Technolpol, Mektory at Tallinn University of Technology, Idea Lab – University of Tartu. These organizations offer various instruments to stimulate and support entrepreneurship, from idea hackathons to mentor events that support initiatives; from single master classes to months-long complex educational and mentor programs.

**FRAMEWORK CONDITIONS**

1. Formal institutions

From 1990-s until now, Estonia has come through a long way in developing an entrepreneurship-friendly business environment. A low level of corruption and significant simplification of bureaucratic procedures characterizes this environment. In 2017, Estonia is the 12th position on the Ease of Doing Business index (World Bank, 2017).
It should be stressed that today 99% of public services are available online. Bureaucratic procedures are brought to a minimum. All operations can be done electronically and in the shortest possible time. Also, Estonia provides opportunities for foreign residents to start a business in Estonia online - the Startup Visa program, an "e-residency" program (about 21,000 e-residents). (Freedomhouse, 2017).

Weak sides of formal institutions are the tax policy, which long time was considered a competitive advantage for involving FDI as being simple and flat. So, among the most problematic factors for doing business, the WEF takes tax rates regulations (WEF global competitiveness index 2017-2018). In the GEDI 2014 report, recommendations for overcoming the bottlenecks ecosystem were presented, among recommendations is - "create tax incentives to encourage business angels and crowdfunding investors" (GEDI, 2014 p.7).

2. Entrepreneurship culture

Entrepreneurial capitalism and founding new companies are representative of the 1990’s. The 2000’s and early 2010’s were marked by facilitation entrepreneurship, in 2010 the start-up culture was highly developed. The attitude towards entrepreneurship has shifted from negative (negative perception of entrepreneurship was instilled within the context of the planned economy) to high status to entrepreneurs – 63.6% in 2016 (GEM 2017). TEA index has grown from 5 in 2004 to 16.2 in 2016 (GEM 2017; Lepane & Kuum 2005). The desire to be an entrepreneur has become more widespread in society (career choice – self-employment/entrepreneur 28.5 (2004) to 53.2 (2016) (GEM 2017; Lepane & Kuum 2005).

The creation of the entrepreneurial culture has been aided by state programs of entrepreneurial development, incubators, accelerators, programs for the development of entrepreneurial skills offered by universities. Special attention is paid to promoting entrepreneurship among technical students who are making the ICT sphere more popular among young specialists. Regular airing TV show Brain-hunt (Aju jaht) has become a significant event. This national show is a competition of business ideas. Notably, in 2016 32 % of the ideas came from the ICT sector. At the same time, the show promotes and introduces the entrepreneurial culture, providing real support to beginning entrepreneurs. This show has spawned many companies like Click & Grow, Minu Kleeps, Bikeep, Timbeter, GoWorkaBit, Huntloc, Jiffi, Taxify and many others.

3. Physical infrastructure

The relatively low development of infrastructure is a characteristic of the 1990s. One of the remarkable decisions by Estonian government from this period for infrastructure development was an abandonment of analog telecommunication system and giving telecom concession to the private company AS Eesti Telekom, in 1992.

In 2000-s there was a rapid development of telecom networking and Internet; as well as the reconstruction of roads with the support of EU. Among the government’s priorities was the development of the ICT sector.

After 2014 Estonia was ranked the 2nd after Hong Kong (GEM 2016). In 2017/18 according to WEF (Global competitiveness index). More than 99% of the territory is covered with the Internet connection. Estonia has high mobile phone penetration and Wi-Fi access. The most problematic indicator according to WEF evaluation is “Available
airline seat kilometres”, and the strongest ones are – “Quality of overall infrastructure”, “Quality of port infrastructure”, “Mobile-cellular telephone subscriptions”, “Quality of roads”.

Also, according to the evaluation of Freedomhouse (2017), Estonia is the model of the open Internet. Estonia ranks 1st in the Freedom of Internet.

4. Demand/accessible markets

Estonia is a small country (number of residents: 1.4M 1995; 1.3M 2008; 1.3M 2016), respectively, the internal market is small. And in 2018, according to the WEF, for Market size estimate, Estonia ranks 98th out of 137 countries. The 1990s are characterized by the low purchasing power of the population (GDP per capita, euro in 1995 was 1,935). It became obvious that with the combination of these two factors, the country's economic development largely depends on the openness of the economy. In the 2000s and early 2010s, Estonia was developed into the export-oriented economy, export: 75% of GDP, 2011. With the entry into the European Union and the harmonization of the economic processes and norms with the European ones, the global market became open to Estonian entrepreneurs. Combination of a small domestic market and an open global market leads many companies to the choice of the international or global development path. Push factors are the need to cover the costs for R&D and limited demand in the domestic market. However, it is worth noting that for the ICT sector it is typical to focus on the global market, even in countries with large domestic markets the ICT sector is focused on a global strategy/ and rarely focus exclusively on the local market. The share of value-added services (leading sectors: ICT, building, a decline in logistics): 66% of GDP and 33% of exports.

This tendency raises some debates as far as the development of the IT sector in many areas oriented to the global market and creates positive effects for the country (hire foreign workers, transfer companies abroad, for example to London, etc.).

It should be noted that despite the small domestic market, Estonia occupies the 29th place in the “Quality of demand conditions” (WEF 2018). The share of export of ICT sector products/services in the total export of Estonia over the period from 2005 to 2013 increased from 5 to 14 per cent.

GRABCAD – REVOLUTIONARY OF ENGINEERING INDUSTRY

Both founders, Hardi Meybaum and Indrek Narusk, were mechanical engineers founding their engineering services company Futeq in 2007. Indrek Narusk described the start: “We run a small engineering services office back in the days, and as there was more work coming in than 2 of us could handle, we started thinking about how to expand. As everything around us is moving to the web, this seemed like the only option for us as well. So we started building the library as a first step”.

Very soon they reached an idea to solicit all the engineers into the same virtual space to exchange resources, meeting the clients and to ‘grab’ CAD designs and models. So, starting from their own needs, like engineers, the idea of GrabCAD was born. A three-page business plan was presented to the Estonian Development Fund (EDF) at the end of 2009. Two local investors Astrec Baltic and EDF made the first seed investment of €260k into the new body, GrabCAD, in 2010.
Free CAD 3D-models library was launched in September 2010. Engineers could share ready components and products there; this was the step enabling engineers to cut routine work and focus on unique technical solutions. Further developments were very fast, although platform software development remained in Estonia, headquarter (HQ) of the holding company and business development unit moved to Boston in 2011. Engineering technology unit was settled in Cambridge, UK. These steps were necessary to be near to top-level competencies, clients and funding. GrabCAD won competitions of SeedCamp and TechStars getting seed investment of $1.1M in 2011, followed by $4M and $8.15M in 2012. Narusk left the company, 2012.

GrabCAD became the cloud-based virtual collaboration environment for mechanical engineers and industry; appropriate means for that – Workbench, was launched in 2013. Its online community grew fast from 8000 engineers in June 2011 to one million users in January 2014. GrabCAD has made it much easier to find team members for engineering projects in the public domain and globalized collaboration of teams in private environments. It has shortened new product cycle reaching to markets up to 2-3 or even more times, linking new ideas to production. The biggest customers became General Electric and NASA.

Initial idea: attraction customers to engineering services via the Internet, succeeded very fast. That was the service of single domain – sales of competence of technical design and drawing. This service went global from the inception as the first order came from Canada. But, understanding the difficulty to continue with the service, they stepped back from the global market to prepare the next services: Library, crowdsourcing of ideas and Workbench, forming already multiple domain collaboration and service platform for global community and market. In such a way they created open innovation platform breaking the logic of the traditional engineering industry.

In September 2014 it was announced that 3D printing giant Stratasys acquired GrabCAD, the value of the deal was supposedly around $100 million. Investors were happy. The community of users in GrabCAD reached 1.5 million. It was the most outstanding startup sales for Estonians after Skype. Harri Maybaum stayed as the CEO in the company. His visionary management has led to the biggest change in engineering design in the last 20-30 years. He was named “Businessman of the year 2014” in Estonia by Äripäev (Business Daily). Although he continued in the company with the new owner, we do not know if it was a continuation of his entrepreneurial journey. In October 2015, a press release announced that Meybaum left GrabCAD; it already had 2.5 million members (01/11/2015). He started a new job in the Cambridge office of the venture capital company Matrix Partners, USA. Matrix was his advisor in his entrepreneurial journey with GrabCAD.

**TAXIFY — NEW GLOBAL GIGANT IN SHARING ECONOMY CONDITIONS**

Taxify, founded Feb. 07 2013 is one of the success stories for Ajujaht, Estonian business idea competition (Brain Hunt), although not winning the competition (2-and place). But, already in June, the application of taxi ordering of Taxify won the competition for mobile apps in Estonia. Taxify as the startup and its mobile apps is targeted for consumers and drivers representing sharing economy business.
Somehow, Taxify could be considered the “child” of Estonian startup community and ecosystem. The initial idea came from Martin Villing, the member of the Skype team from the inception before its fast growth (Pashchynska 2018). In 2012 he visited Kiev in Ukraine and saw that locals were ordering taxis via web service (Treija 2016). There were no similar services in Tallinn and Riga, capitals of Baltic States Estonia and Latvia, having very fragmented taxi markets with over 25 taxi companies (ibid).

The younger brother of Martin – Markus (19 at that time) applied to found a company under the name m’Takso (renamed Taxify in January 2014) at the Commercial Registry in February 2013. Besides the family members, Oliver Leisalu belonged to the first owners/founders list of Taxify.

In 2014, getting recognition of the business concept, Taxify widened its activities, besides Estonia, to Finland, Latvia, Lithuania, Belarus, the Netherlands, and Georgia and involved already investors’ capital 1.4 million euro. At the end of the year, the company had 14 employees. Shareholders circle widened with investors of Estonian origin, incl. Adcash, Mobi Solutions and Rain Johanson from the former Skype team. 2015 was a year of further (product) development and growth of sales approximately five times up to 0.7 million euros.

In 2016, the company’s growth continued, sales reached 2.8 million euros, and the cash flow became positive in the last quarter. Taxify started to operate in Africa. Markus Villig, the CEO, was announced the title of Young Entrepreneur of the Year by the Estonian Chamber of Commerce and Industry (ECCI) and Swedbank.

At the end of 2017, Taxify operated in 30 cities of 23 countries and employed 150 people in Estonia and 350 globally, had subsidiaries in 19 countries, incl. Australia, Egypt, Kenya, South Africa, Mexico, Canada, Great Britain, the Netherlands, France, Finland, etc. The growth in sales was from 2.8 million in 2016 to 18 million euros in 2017 (but still not profitable, from the annual report). Eight months later the number of cities reached 47 in 27 countries (https://taxify.eu/cities/), which means that fast growth could also be expected in 2018.

2017-2018 are years of more rapid changes and growth. Taxify involved into shareholders list Chinese (Hong Kong) company Didi Chuxing (leading IT platform for transport) starting strategic collaboration in China (01.08.2017, https://geenius.ee/uudis/taxify-sai-investeeringu-ja-alustab-strateegilist-koostood-didi-chuxingiga/). Founders registered their holding companies from Estonia to Latvia. Daimler Mobility Services GmbH joined the company shareholders in May 2018. The contracts with these global players sophisticated partnership regulations but facilitated more investors to join Taxify.

FORBES named Markus Villing among the 30 most influential young people under 30 in Europe - Technology 2018 (Forbes, 2018).

In May 2018, there was announced involving over 150 million euros investment into the company. With this round, the value of Taxify became the next to TransferWise, the candidate for the fourth position among so-called ‘unicorns’ of Estonian origin. With this step, Taxify differs from Estonian startups moving their headquarters to global centres (California, Boston, and London) before bigger international funding rounds. Taxify remains in Estonia. Is this the proof that Estonia has become a global startup centre (ecosystem)?
DISCUSSION AND CONCLUSIONS

This paper aims to understand the interaction between the ecosystem and the opportunity, and to identify interconnections between developmental trajectories of the opportunity and evolutinal trajectories of the ecosystem.

The previous studies were mainly focused on the interconnection of the ecosystem’s factors, the linkages between the level of development of the ecosystem and the creation of new ventures. Researches into the opportunity examined elements of the ecosystem as well as their influence on the entrepreneurial opportunity.

We focused on the question of the connection between the ecosystem and the opportunity, what set of pillars of the ecosystem form a window of opportunity at a certain stage of economic development. At the same time, the authors consider a window of opportunity to be a combination of particular conditions and situations. What is the connection between the trajectories of the ecosystem’s evolution and trajectories of the formation of the opportunity? An important task was to identify key aspects in Table 1 creating a window of opportunity.

The authors have found that at different phases of economy development various combinations of pillars of an ecosystem become key factors in creating a window of opportunity and influence on opportunity identification and transformation process. More the economy is developed – wider the boundaries of the ecosystem around the startup reaching different ecosystems in geographical as well business field meaning.

Transfer and integration of technology competencies across borders between different ecosystems have a two-way meaning on the example of GrabCAD. First, for creating engineering crowdsourcing platform, entrepreneurs involve software, mechanical engineering and design, and marketing competencies originating from and dispersed between different geographical regions Estonia, UK, and the USA by founding company’s development branches in these countries. Second, GrabCAD integrates currently half of the six-million’ community of mechanical engineers worldwide linking them with potential customers and production industry into knowledge and collaboration platform which appears some kind of new ecosystem worldwide. That means embedding and integrating existing and new knowledge into the universal global professional library, collaboration and exchange network. GrabCAD links engineers and their customers with the industries (producers) worldwide accelerating teambuilding, project management, and any (idea generation, 3D-design, production) collaboration into the common platform. As a result, the productivity of engineers is growing, production cycle and market launch of new products are shortening remarkably. All these achievements have already been proven by the biggest customers, General Electric and NASA. In this way, GrabCAD sourcing a new network – virtual ecosystem revolutionizes whole structure as well as the process of the engineering industry.

The case of GrabCAD also demonstrates the contradictoriness and dynamics of the engineering ecosystem. GrabCAD lost its independence by being acquired by Stratasys for $100M in September 2014. Venture capital investors were happy. GrabCAD, creating a new collaboration platform for the industry, became an object of open innovation ecosystem where industry giants deal with innovations. There, one could ask about the happiness of stakeholders, besides venture capitalists, including the homeland GrabCAD was born. Fostering startup processes and concentration of hi-tech startups, like GrabCAD, can be a challenge for the further economic development of their
country of origin – Estonia. That raises the question of whether intensive production of (ideas for) hi-tech startups can be an engine to restructure a traditional economy country into a ‘smart economy’. Also, is an acquisition the best or optimal solution for such a hi-tech company like GrabCAD?

There is no doubt that GrabCAD, reaching international venture funding, channeled this cash flow into competencies’ and software development and relevant employment contributing to the socio-economic welfare of Estonia. International investors forced faster launch and globalization of the company. Entrepreneurs paid for success by losing control over the business. Seems, that was a certain step for them in reaching a competitive advantage. Meybaum met later, after the sale of GrabCAD, a man developing the similar platform, but in Spanish. That means, only a little lead in the networking and English language usage enabled the breakthrough for what the competitor delayed. That also means that besides usual ‘push-pull’ factors of early internationalization, mentioned by Luostarinen & Gabrielsson (2004), intensity and speed of the development process appear to be critical to meet “opportunity window”. Seems, that the case of GrabCAD is a next proof of the first mover advantages and that winner-take-all in the platform business (about these phenomena, e.g. Lieberman and Mongomery, 1988; Eisenmann, Parker and Van Alstyne, 2011). But behind that phenomenon is more globally integrated Estonian entrepreneurship ecosystem accelerating the whole venture development process for GrabCAD, and which characteristics were missed in 10 years earlier periods for Mobi Solutions (see, i.e. Mets 2016). The case also demonstrates how hi-tech startups can implement global networking and knowledge crowdsourcing for their success.

The paper contains an analysis of the development of an entrepreneurial ecosystem in a (post)transition country. Among transition and post-transition countries, Estonia is a unique example showing one of the most successful trajectories of development from zero to smart specialization and a highly developed ecosystem. The developmental journey of Estonian entrepreneurial ecosystem is different from the traditional journey completed by the majority of the Western European countries. Estonia lacked entrepreneurial traditions, infrastructure or experience. However, despite this Estonia has achieved impressive results in such a short time. Estonia did start from scratch like other transition countries and changed the structure of its industries and infrastructure. Another unique feature is that to create a successful ecosystem it did not take a huge amount of investment but rather human capital. Therefore, the development trajectory of Estonian entrepreneurial ecosystem defied the theory of path dependence (Roundy, Bradshaw, Brockman, 2018). In most cases, an ecosystem is sensitive to starting conditions. However, Estonia despite its historical background developed the new path (i.e., implementing a wide range of e-services and e-government), and moreover – skipped several stages (i.e., digital vs analog telephony, mobile vs cash-machine parking system, etc.) of “traditional” ecosystem evolution in western countries.

The study demonstrates the company way of growth and also a combination of constraints on growth and maintenance of companies in the small emerging country. The special emphasis was placed on the ICT-based sectors as the most dynamically developing sectors of the economy, producing a significant proportion of success stories, innovative ideas, identification and implementation of opportunities.
The conducted analysis showed that different stages of ecosystem’s evolution see different entrepreneurial journeys, different entrepreneurial opportunities. Thus, for instance, the speed of an entrepreneurial journey and the speed of development of a product have changed significantly.

For companies, these developments in the ecosystem mean a drastic shortening of the period of product development. In the 1990-is and at the beginning for 2000-is, this period could last 7-10 years, i.e. Regio or Mobi Solutions (Mets 2008, 2016) were mainly “bootstrapping” their product development. GrabCAD and Taxify present much faster developments – 2-4 years with much bigger investments accelerating the processes. That characterizes growing competition for exploiting entrepreneurial opportunities – that also means temporal narrowing of opportunity window – ecosystem aspect. But, that is also the sign of growing maturity of the entrepreneurial ecosystem in Estonia as well as globally.

Firstly, integration and cooperation of sectoral ecosystems (educational, entrepreneurial, engineering, design, etc.). The integration partly succeeded on account of developing and introducing long-term programs for the development of ecosystem (digital telecom), education (ICT) and entrepreneurial skills at all levels, long-term vision and development of human capital. GrabCAD is proof of the integration trend by the company transforming knowledge from entrepreneurial, educational, engineering, design ecosystems to the industries’ ecosystems globally.

Secondly, the integration of local and global entrepreneurial ecosystems. It happened due to Estonia’s joining international and global organizations who oversee political, trading, military, educational and industrial matters and introducing western social and economic standards, role models and open innovations. This helped Estonian companies to enter the global market, facilitating a positive image. Cases of GrabCAD and Taxify prove this trend. The companies were initially supported by local ecosystem stakeholders and as a result had the opportunity to enter the global market, to use global networking and knowledge.

Thirdly, growing trust level manifests itself through increasing foreign investments in general and a share of foreign investments in startups. At the beginning of Estonian entrepreneurial ecosystem development, 100% of investments in Estonian startups originated from Estonia. In 2017 share of foreign investments reaches 98%. Also, Estonian startups have begun to stay they HQ in Estonia (as Taxify), instead of moving abroad, that shows trust increasing not only from the side of foreign investors but also from the side of entrepreneurs.

Fourthly, the formation of an entrepreneurial mindset, the brand of entrepreneurship in Estonia. Thus, a new positive image of entrepreneurs was established, making entrepreneurs new heroes, role models. Estonia is one of the 15 countries with the highest position on the Entrepreneurial Spirit Index and one of the places for the most intensive birth of startups in the world.

Concluding the paper the authors assert that small (post-)transition Estonia with its startups demonstrates a good synchronism of globally oriented new venture creation and entrepreneurial ecosystem development. That enabled the integration of different ecosystems to global networks. Less are studied factors behind these enthusiastic processes in a small society. Is that phenomenon some ability to mobilize small society or any another mechanism remains the question for the next studies.
The proposed research contributes to existing approaches toward ecosystem by examining the understanding of an ecosystem’s role as an origin of opportunity identification and transformation process.

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