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THE ROLE OF ENTREPRENEURIAL ECOSYSTEM IN THE DEVELOPMENT OF OPPORTUNITIES

Master Thesis

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I have written this Research paper/Bachelor Thesis independently. Any ideas or data taken from other authors or other sources have been fully referenced.

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1 Introduction

Nowadays more and more attention is drawn to the high growth entrepreneurship, as not all entrepreneurship is able to boost regional economies and create welfare. The ecosystem approach has emerged in response to the ineffectiveness of previous policies due to its holistic nature. While it allows to connect the theory and the policy making practices widely used by modern economists, the current research employs the Erik Stam entrepreneurial ecosystem.

The main purpose of the paper is to investigate the entrepreneurial ecosystem of Tartu, the second largest city of Estonia and see how the interconnection of all domains of an ecosystem and actors create the opportunities for doing business, or, in other words, influence the productive entrepreneurship. Tartu was chosen due to existence of local startup community and being a typical European university town, where an old university drastically shapes a town life.

The research question of the current research sounds the following way: How does the Tartu entrepreneurial ecosystem influence the development of opportunities? To reach the research goal, the following research tasks were formulated and accomplished:

- To investigate the nature of entrepreneurial opportunities;
- To study an entrepreneurial ecosystem in a nutshell, investigate various ecosystem approaches and choose one for the current research;
- To conduct semi-structured interviews with mapped experts to investigate the performance of Tartu entrepreneurial opportunities;
- To interpret the results of conducted qualitative analysis to understand how performance of an ecosystem influences on development of opportunities;
- To underline future perspectives for studying Tartu entrepreneurial ecosystem.

The current research employs **the qualitative research design** to deeply investigate the Tartu entrepreneurial ecosystem. Therefore, it uses a case study approach backed with **semi-structured interviews** as a main data collection method. The interviews were conducted with fifteen experts which represent business support organisation, academia, local government, and representatives of a local start-up community. Such a pool of experts helps understanding how well the Tartu entrepreneurial ecosystem performs and which barriers hinder development of

new opportunities for entrepreneurs. The questions were built around ten pillars of a popular ecosystem model of Erik Stam and were analysed accordingly.

The current paper is divided into five chapters and structured the following way. The first two chapters are dedicated to literature review which provides a conceptualised framework for the study carried out within this paper. While the **first chapter** sheds light on the nature of opportunities and explains the linkage between the ecosystem conditions and the development of opportunities for entrepreneurs, the **second chapter** talks about the entrepreneurial ecosystem approach and gives details on the main elements of Stam's model employed in this research. The **third chapter** elaborates on the used methodology and justify its relevance for the research. The **fourth chapter** characterises the entrepreneurial ecosystem of Tartu backed by the results of the conducted qualitative research. It is followed by the **final chapter** which encompass main findings of the research based on the conducted interviews and discussion of the limitations.

Keywords: entrepreneurship, entrepreneurial ecosystem, entrepreneurial opportunities, development of opportunities, Tartu

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1. How are entrepreneurial opportunities formed?

Broadly speaking, an opportunity in entrepreneurship "may be the chance to meet a market need" (Ardichvili, Cardozo, & Ray, 2003). In particular, it is an ability to transform ideas into life by brining specific results and creating new value at the market (Trabskaja & Mets, 2019). While one of the most crucial skills of an entrepreneur is to identify and choose opportunities which will create new businesses or scale up existing ones, the discovery and development of opportunities is a key part of entrepreneurship research (Venkataraman, 1997).

So far, researchers have been presenting various models of opportunities development and identification which are categorized by a range of disciplines such as psychology, sociology, economics, management, and by different analysis level such as micro, meso and macro. Despite abundance of research, there is no comprehensive and unified framework in existing literature on how opportunities are developed or/and identified. All existing models are mostly based on different and even conflicting assumptions, hence dividing researchers into environment-centric and individualistic-centric camps.

In other words, there are two main set of theories which explain how the opportunities appear in the reality: discovery and creation theories. Generally, the discovery theory represents the Kirznerian perspective, and the creation theory is associated with Schumpeterian

perspective on entrepreneurship. While both theories try to explain the behavior of entrepreneurs aimed at the creation and use of various opportunities, they differ at three critical assumptions: nature of opportunity, entrepreneurs, and decision-making context (Alvarez & Barney, 2007). Table below summarizes main differences between these theories.

Table 1

Differences between discovery and creation theories

Criteria	**Discovery theory**	**Creation theory**
Nature of opportunities	Opportunities exist independently from entrepreneurs	Entrepreneurs create new opportunities
Nature of entrepreneurs	Ex ante entrepreneurs are different from non-entrepreneurs.	Ex ante, entrepreneurs may or may not be different from non-entrepreneurs. Difference may emerge ex post.
Nature of decision-making context	Risky	Uncertain

Source: Alvarez & Barney, 2007

1.1 Discovery and creation theories explained

As for the nature of opportunities, Alvarez and Barney use an illustrative metaphor of mountain climbing for the discovery theory where the opportunities exist in objective reality independently from entrepreneurs. These "mountains" are created by the market imperfection due to various political, technological, and socio-demographic changes and therefore await entrepreneurs to be discovered (Shane, 2003, p. 3). Opposite, the creation theory does not see exogenous shocks as opportunities' nature. The companies create those "mountains" by acting and observing how consumers react to new products and services. According to Baker and Nelson, oftentimes companies "create something from nothing" or use bricolage in tightly resource-constrained environment, which stimulate their growth (Baker & Nelson, 2005). In other words, the discovery theory says an entrepreneur uses existing economic disequilibrium at the market while creation theory claims that an entrepreneur brings disequilibrium into a market.

The second criterion is the nature of entrepreneurs. For the representatives of the discovery theory, entrepreneurs operating in a particular market or industry have higher chances to notice and hence exploit opportunities than nonentrepreneurs due to potential information asymmetries, different risk perception and preferences, and significant cognitive

differences (Shane, 2003). However, it not simply about possession of information, but rather the alertness to information which make them know where to find the relevant sources, e.g., to hire employees aware of profit opportunities (Kirzner, 1973, p. 68). The research shows that a high level of entrepreneurial alertness result in successful opportunity recognition (Ardichvili, Cardozo, & Ray, 2003, p. 120). Alternatively, the creation theory suggests that nonentrepreneurs may not be necessarily different from entrepreneurs, and their ability to create opportunities can be explained through various variables such as geographical location (Alvarez & Barney, 2007), luck (Barney, 1986), overconfidence (Hayward, Shepherd, & Griffin, 2006) and existence of entrepreneurial practice. In other words, the very process of constant decision-making shape and enhance the imagination and aspirations of entrepreneurs, eventually developing skills which lead them to better innovativeness (Sarasvathy, 2001).

The decision-making context in discovery theory is risky due to objectiveness of all opportunities, implying possibility to collect data, analyse it and evaluate consequences associated with each chosen strategy. The creation decision making context is uncertain, as "it is not possible to measure the height of a mountain that has not yet been created" (Alvarez & Barney, 2007). This way, people simply cannot evaluate the probability of each outcome formed by their actions.

1.2 The need for interdisciplinary approach

The existence of such conflicting perspectives make it difficult to bridge research and practice. That is why, some researchers argue that both types of opportunities may be present in the economy[1]. In influential book "A general theory of entrepreneurship", Scott Shane (2003, p. 3) noticed: "Neither the environment-centric nor the individual-centric approach toward entrepreneurship is more 'correct' than the other." Therefore, revealing problems with previous research, researcher offered an interdisciplinary approach based on works from the fields of psychology, economics, organization theory, finance, strategy, technology management and public policy. He called this approach *individual–opportunity nexus perspective* where opportunities "have an objective component, but that the process of discovery and exploitation requires creativity to formulate new means–ends frameworks to recombine resources" (p. 43).

[1] Such works as Eckhardt and Shane, 2003; Shane and Venkataraman, 2000; Venkataraman, 1997.

According to Shane's framework depicted in Figure 1, for entrepreneurial process to start people need to have a certain perception of opportunities' existence. In other words, there should be situations where resources can be transformed into a new form (new goods and services, new ways of organizing, new methods of production, new markets or new materials). After entrepreneurs identify such opportunity, they evaluate their potential efforts and take decision whether to exploit it or not. Then exploit the opportunities by obtaining necessary resources; designing a process of resource management; developing and implementing strategy for further exploitation. In Shane's opinion, all these activities are constantly influenced by both individual attributes (psychological and demographic) and environmental characteristics such institution- and industry-level factors (p. 10).

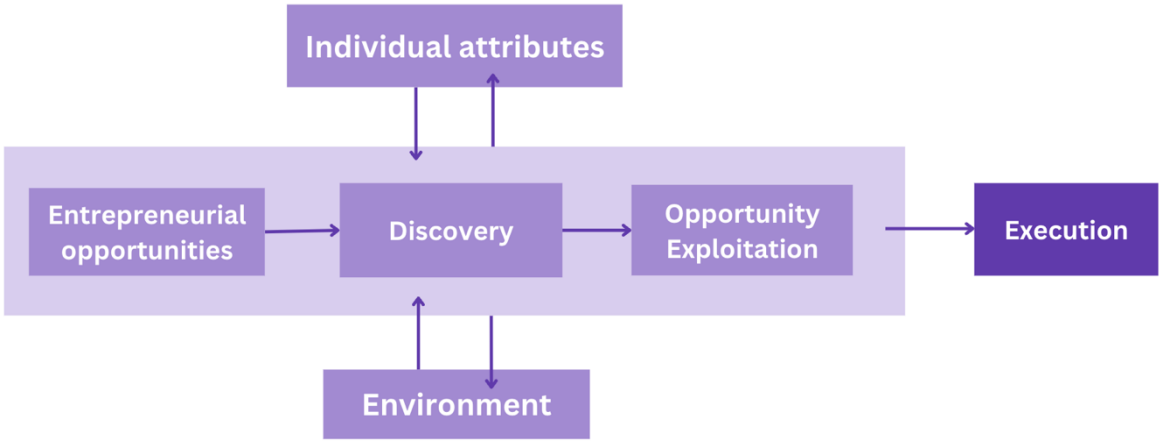

Figure 1. Scott Shane's individual-opportunities nexus model of entrepreneurship.

Source: Shane, 2003.

1.2. The entrepreneurial ecosystem as a source of opportunities

The current research was mostly inspired by the scientific work of J. Trabskaja and T. Mets "Ecosystem as the Source of Entrepreneurial Opportunities", published in 2019. By far, they are the first to explicitly link an entrepreneurial ecosystem and the development of opportunities, claiming that the first one serves as a source of the latter. More specifically, the interconnection of all ecosystem pillars forms a window of opportunities at a certain stage of economic development (Trabskaja & Mets, 2019, p. 12). Although they bring up the concept of a window of opportunities which is widely used in economic theory, it actually brings very little explanatory power to the nature of opportunities, and it is still to be explored in the context of entrepreneurial ecosystems.

Nevertheless, an entrepreneurial ecosystem framework which is a mainstream approach in entrepreneurship research nowadays, has demonstrated a great potential to bridge research and practice which was lacking previously. Despite the framework still being developed and sparks a lot of interdisciplinary debates, it allows to synthesize a variety of theoretical constructs and scientific disciplines. It aimed at revealing "new research questions and avenues of inquiry into both policy-related issues regarding how to support economic growth and prosperity as well as more fundamental social science questions such as the relationship between structure and agency in modern capitalism" (Wurth, Stam, & Spigel, 2022). The entrepreneurial ecosystem research prioritizes the role of entrepreneurs and highlights their abilities in destroying existing structures and building new ones based on their individual attributes and various circumstances (Ibid).

In fact, the entrepreneurial ecosystem research was led by the works of policymakers such as the Kaufman Foundation, OECD, and the World Economic Forum, which is far from an ideal situation when existing policies are backed up by rigorous academic research (Stam & Bosma, Local policies for high-growth firms, 2015); (Stam & Spiegel, Entrepreneurial Ecosystems, 2018). Instead of advancing the intellectual debate on the nature of opportunities (environment-centric and individual-centric), practitioners caught up with the idea of the entrepreneurial ecosystem as a burning necessity of the interdisciplinary approach shown by academics. This gave birth to new global indices (e.g., GEM and GEDI) which attempted at measuring entrepreneurial activity all over the world and find a formula for a high-growth venture formation.

Indeed, currently policymakers are heavily focused on support for growth-oriented entrepreneurship and hence promoting high-growth firms, which are a driving force for new employment, innovations, and business internationalization (Mason & Brown, 2018, p. 3). Due to its holistic nature, the ecosystem approach has appeared as a response to the ineffectiveness of previous policies aimed at increasing the number of high-growth firms. These policies were fed by initial works on national systems of innovation, learning regions, regional clusters, Triple Helix Model, and regional innovation systems (Wurth, Stam, & Spigel, 2022). However, these works focused mostly on new venture creation of multinational companies and innovation resulting in low-growth entrepreneurship (Ibid). So, the main advancement of the ecosystem approach lies down in its attention to productive entrepreneurship which is "any entrepreneurial activity that contributes directly or indirectly to the net output of the economy or to the capacity to produce additional output" (Baumol, 1990, p. 30). While mostly productive

entrepreneurship is proxied by the number of high-growth firms, can include innovative start-ups and entrepreneurial employees (Wurth, Stam, & Spigel, 2022).

Considering mentioned advancements of entrepreneurial ecosystem's approach, it is employed as a practical framework to analyze the development of the entrepreneurial opportunities in Tartu, Estonia in the current research. To provide more details, the next chapter explains the elements of an entrepreneurial ecosystem and justifies why Stam's model of the ecosystem is chosen among others by current research.

2 Entrepreneurial ecosystem in a nutshell

2.1 Defining an entrepreneurial ecosystem

There are many definitions of an "entrepreneurial ecosystem". However, first, it is important to understand the meaning of each component. The word *entrepreneurial* characterises mostly micro, small, and medium-sized firms which are in their initial and scaling phases of development (Kreuzer et al., 2008: 10). Although the role of the entrepreneurship context is emphasized, a main focal point of the ecosystem approach is rather an entrepreneur than a firm itself. *Entrepreneurs* are "those persons (business owners) who seek to generate value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets" (Ahmad & Seymour, 2008, p. 9).

An *ecosystem* refers to a set of groups, individual actors, organisations, and institutions which interact with each other forming communities and networks. Initially, this term was coined by James Moore, who argued that the way firms interact with suppliers, customers, and financiers is relationally embedded, and businesses don't evolve in a vacuum (Moore, 1993). Most importantly, the interdependence of various ecosystem elements implies not only cooperative but also competitive relationships due to their interests, contributing to the complexity of the ecosystem in general.

2.2 The elements of an entrepreneurial ecosystem

Although each ecosystem is unique due to its development under idiosyncratic circumstances, the key elements can be distinguished into separate groups of factors (Isenberg D. J., 2011). One of the first scholars who attempted to do so were Van de Ven and Garud. They listed three components of the so-called "social system framework for understanding the industry and technological development": (1) institutional arrangements such as legitimation, regulation and technological standards; (2) public resource endowments – basic research, finance and competent labour; (3) technical economic activities, including applied R&D and

testing, manufacturing, and marketing and distribution (Van de Ven & Garud, 1989). The authors suggested that each industry should be seen as a social system which includes not only firms as stated by the traditional economic view but a wide range of actors which stimulate the transformation of technological innovation into commercially viable products. This framework was used further to analyse the emergence of new industries, e.g., the cochlear implants industry in the U.S.A. (Van de Ven & Garud, 1993).

The shift from an individualistic focus to a wider community perspective fed the works of the influential scholar Daniel J. Isenberg. Based on successful cases of high growth around the world, he developed practical principles for governments on how to build a successful ecosystem (Isenberg D. J., 2010) and further distinguished **six main ecosystem domains** (Isenberg D. J., 2011):

- Policy: leadership and government,
- Finance: available financial capital,
- Culture: societal norms,
- Support: infrastructure, support professionals, non-governmental institutions,
- Human capital: characteristics of labour,
- Markets: early customers and networks.

Advancing this direction further, the working group of the World Economic Forum has elaborated a model adding two additional pillars (World Economic Forum, 2013). First, special attention is drawn to **major universities**, which are seen as growth catalysts, because they promote a culture of respect to entrepreneurship, provide ideas to create new companies, and feed companies with new graduates. The second additional pillar was **education and training** which creates an available workforce through pre-university, university education, as well as specific entrepreneurial courses. This model was backed by evidence-based research – 1,042 entrepreneurs from 43 countries were surveyed to understand which pillars tend to give the biggest growth stimuli.

Although these models are still widely used by many policymakers and academic community, their simplicity does not imply their profundity. There is no clear cause-and-effect reasoning in this approach, but only a long list of variables. As a Dutch economist Erik Stam claims, these variables “offer no consistent explanation of their coherence or their interdependent effects on entrepreneurship – and, ultimately, on aggregate welfare” (Stam, 2015, p. 1764). Additionally, he notices that an analytical target this approach aims is still

unclear: whether it is geographically determined such as a city, region, or country, or spatially less strictly defined.

While trying to overcome these shortcomings, Stam has developed his own integrative model of entrepreneurial ecosystems consisting of ten elements and entrepreneurial outputs which are presented in Figure 2. Essentially, this framework is a synthesis of existing models[2] and his previous works on the ecosystem, conceptually based on the infrastructure for entrepreneurship of Van de Ven and Garud mentioned previously.

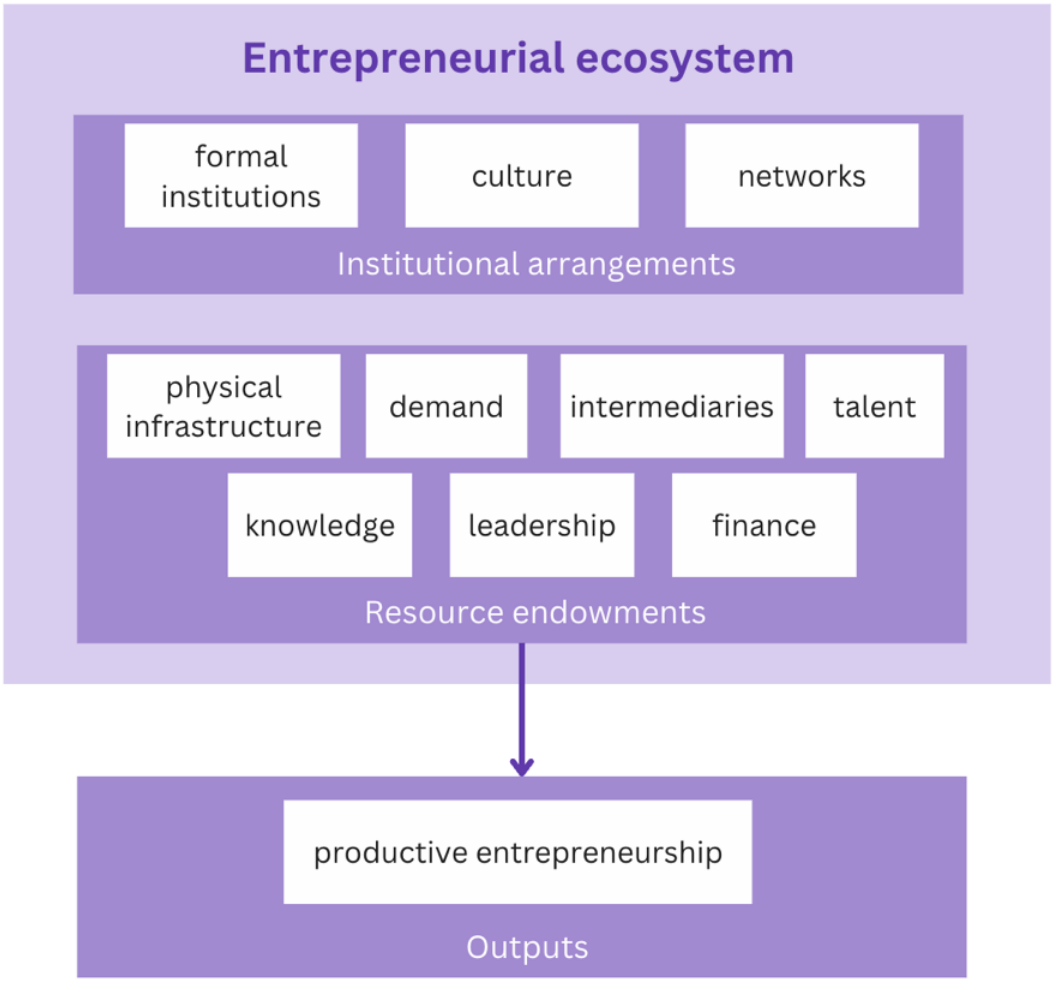

Figure 2. The Stam's model of the entrepreneurial ecosystem. Compiled by the author based on Stam, 2021.

Source: Stam, 2021.

As it is suggested in the picture, the main goal of any ecosystem is productive entrepreneurship which creates "aggregate welfare increase" (Stam, 2015, p. 1765). This output

[2] For example, resource endowments are mostly derived from Feld (2012) and Spigel (2015).

eventually leads to value creation in the region which is characterised by four indicators: labour productivity, income, employment, and well-being based on the quality of life (Ibid).

Stam's model consists of ten constructs which are explained in Table 2. It is important to emphasize that the current model (Stam & Van de Ven, 2021) is based on the previous work (Stam, 2015) which distinguished the systemic and framework conditions. Instead, the current model distinguishes institutional arrangements and resource endowments.

The choice of this framework is a compromise among other models consisting of five elements (Vedula & Kim, 2019), six domains (Isenberg D. J., 2011), seven (Radosevic & Yoruk, 2013) and 14 elements (Acs Z. J., 2014). Most importantly, such a compromise is also supported by the research community, as Erik Stam is the most cited researcher among listed ones who keeps testing and developing his model[3].

2.3 Stam's entrepreneurial ecosystem pillars explained

Although Stam's model comprises "middle-level" constructs which are abstract concepts formulated based on the exhaustive literature, they can be measured and hence operationalised into variables which may vary depending on investigated context (Stam & Van de Ven, 2021, p. 815).

2.3.1 Institutional arrangements

Formal institutions are defined as "the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction" (North, 1990, p. 3). Well-functioning formal institutions are compulsory for entrepreneurship (Granovetter, 1992). It is important to consider them while looking at economic growth, as they provide incentives for all the economic actors in an ecosystem, especially influencing the scope of investments in physical and human capital, technology and production (Acemoglu, Johnson, & Robinson, 2005, p. 389). Usually, it is the efficiency and quality of formal institutions which draw scientists' attention. At the empirical level, these can be captured through a combination of various variables such as perception of corruption in a country, political stability, the rule of law, the effectiveness of public services, and accountability[4].

[3] His number of citations is more than 4 thousands on Scopus and more than 14 thousands on Google Scholar.

[4] There are different existing indices used by researchers: European Quality of Government Index, Transparency International Index of Corruption, The Worldwide Governance Indicators (WGI), Sustainable Governance Indicators, the Ease of Doing Business Index, etc.

Culture or the so-called *collective programming of the mind* (Hofstede, 1980, p. 21) is an informal institution. While it is not a primary cause of entrepreneurship, it "indirectly modifies the pre-existing economic situation reinforcing or lowering the resulting performance" (Soloviev, 2018). The cultural context may determine how the entrepreneurship is perceived by society, hence influencing the aspirations of entrepreneurs, and affecting the probability that a person would become an entrepreneur (Wyrwich, Stuetzer, & Sternberg, 2016). To evaluate such effects, many scholars take Hofstede's cultural dimensions as proxies (Hofstede, 1980):

A. Power distance (PDI): the extent to which the less powerful members of organizations and institutions (such as the family) accept and expect that power is distributed unequally.
B. Masculinity (MAS) versus femininity: refers to the distribution of emotional roles between the sexes.
C. Uncertainty avoidance (UAI): deals with a society's tolerance for ambiguity.
D. Individualism (IDV) versus collectivism: refers to the degree to which individuals are integrated into groups.

There is abundant research on testing these cultural dimensions and their connection to entrepreneurship. For instance, researchers found that in cultures with low uncertainty avoidance individuals are more likely to take risks and exploit more opportunities (Busenitz & Lau, 1996); Busenitz and Lau (1996); Pinillos and Reyes (2011), Mueller and Thomas (2001)). However, the findings are not always that straightforward. While Mitchell, 2011, Hayton 2002, and Oyserman et al. 2002 concluded that a high level of collectivism is associated with low-level of entrepreneurial activity, Pinillos and Reyes (2011) and Zhao et al. (2012) showed that it is totally different for countries with low and middle GDP. Opposite, in these countries, the high level of in-group collectivism increased business activity.

One of the most recent quantitative studies uses metrics from Global Entrepreneurship Monitor (GEM) such as entrepreneurial motivation and cultural and social norms encouraging new business activity, the perceived importance of being innovative and creative, and trust in others from the European Social Survey (Leendertse, Schrijvers, & Stam, 2022).

Networks are considered a set of actors, both individuals and organisations and evolving linkages among them (Brass, 1992). Usually, networks of entrepreneurs provide not only access to capital and labour, but also intangible resources such as knowledge, information,

advice, and emotional support for entrepreneurial risk-taking (Bruderl & Preisendorfer, 1998). Many scholars claim that networks serve as an idea- and information-sharing point for entrepreneurs which they use to recognise new business opportunities (Singh, Hills, Lumpkin, & Hybels, 1999); (Hoang & Young, 2000).

For instance, Stam and van de Ven use the dominance of new firms in a region in their study of the regional systems of the Netherlands (Stam & van de Ven, 2021).

2.3.2 Resource endowments

Physical infrastructure is a significant component of an ecosystem model, as well-developed infrastructure serves as an enabler of economic interactions within any region or country (Audretsch D. , 2015). When talking about infrastructure, scholars usually consider the connectivity and quality of highways and railways, railroad infrastructure and access to telecommunications. For instance, Stam and van de Ven utilize motorway accessibility as a variable to measure the physical infrastructure (Stam & Van de Ven, 2021). Nowadays, it is especially important to consider the digital infrastructure of a region which can be measured by the percentage of households with internet access (Leendertse, Schrijvers, & Stam, 2022). Also, scholars stress the importance of knowledge infrastructure which can be measured at a minimal distance to university or research institution. In general, the geographical proximity of a universities increases the number of new firms and positively influences the innovative capacity of a region (Audretsch & Lehmann, 2005, p. 1200).

Demand for new goods and services may be an essential precondition for entrepreneurial activity. Hence, it is important to consider the purchasing power of a population which is expressed through disposable income and population size, relative to the EU (Stam & Van de Ven, 2021). Start-ups need to have a potential regional market that they can easily access, even though most firms serve larger markets than their own region (Cortright, 2002); (Reynolds, Storey, & Westhead, 1994); (Schutjens & Stam, 2003).

In general, while looking at the demand, it is important to take into consideration market size, growth, and segmentation (Shane, 2003). A lot of empirical studies show that firm creation is more likely in larger markets[5], while high-growth markets do not only have lower

[5] Highfield and Smiley (1987); Dean and Brown (1995); Dean and Meyer (1992); Acs and Audretsch (1989)

new firm failure rates[6], but also stimulate the growth of new companies[7]. In the case of segmentation, empirical research reveals that market segmentation increases the likelihood of new firm formation. Employees are more likely to locate firms to take advantage of opportunities they have identified, if the segmentation is higher in an industry (Garvin, 1983; Christiansen, 1993; Anton and Yao, 1995).

Finance is a very crucial resource within an ecosystem. Mason and Brown (2018, p. 11) claim that the existence of a critical mass of seed and start-up investors is especially important for financial support. While analysing financial opportunities, researchers not only venture capital, but also public funding schemes, opportunities for crowdsourcing, and access to debt. To evaluate the availability of finance in an ecosystem, the recent study of Leendertse, Schrijvers, and Stam (2022) uses a mix of entrepreneurship specific and general indicators: the average amount of venture capital per capita and the percentage of SMEs that is credit constrained. In their opinion, adding a measure of finance-constrained firms is valuable since it takes into account that firms in different countries may use different types of financial resources (Ibid).

Intermediaries are usually presented by recruitment agencies, incubators, accelerators, consultancy companies, such as marketing, legal, accounting firms, mentors, and economic advisors. By reducing barriers and increasing the accessibility of intermediate services, new value can be created more quickly (Stam & Van de Ven, 2021). Mason and Brown (2018, p. 12) claim that these service providers which perform non-core activities, understand the business needs and help entrepreneurs to avoid arising obstacles.

Many scholars are interested in the intermediaries' role in the innovation process. The study of Howells (2006), for example, points out ten major types of intermediaries, corresponding to their primary functions, such as foresight and brokering, intellectual property protection, commercialization, technology assessment, accreditation, training, and many others. As revealed by the research, intermediaries have a much broader, more varied, and holistic role to play in the innovation process than has generally been recognized (p. 726). Although it may be difficult to assess the impact of innovation intermediaries due to their indirect the effect on business value chain, their abundance and variety of offered services benefit their clients and hence the ecosystem in general. They not only improve the

[6] Baum and Mezias (1992); Gimeno *et al*. (1997); Mata and Portugal (1994)

[7] Makepeace (1990); Gimeno *et al*. (1997)

connectedness of actors in the ecosystem by building ties, but also create novel possibilities adding dynamism within the system (Ibid).

In quantitative studies, intermediaries can be measured through general indicators such as employment in knowledge-intensive market services representing the general availability of intermediate services and specific ones such as determining the number of incubators per capita in a specific region. However, it is important to take into account that these proxies demonstrate a prevalence of services, rather than their quality, and accessibility.

Talent is referred to the presence of a skilled group of employees in the ecosystem. It is human capital, as well as skills, experiences and expertise associated with it. That is why, usually human capital is researched with linkage to knowledge when talking about its effect on entrepreneurship. For example, the well-known theory of absorptive capacity of knowledge spillover entrepreneurship grants new knowledge a major role in the development of entrepreneurial opportunities and identifies human capital as the major source of entrepreneurial absorptive capacity (Qian, Acs, & Stough, 2013). Entrepreneurial absorptive capacity is "the ability of an entrepreneur to understand new knowledge, recognize its value, and subsequently commercialize it by creating a firm" (Acs, Audretsch, & Lehmann, 2013). This way, the human capital attraction becomes a prerequisite for successful knowledge creation within the region and stimulate entrepreneurship.

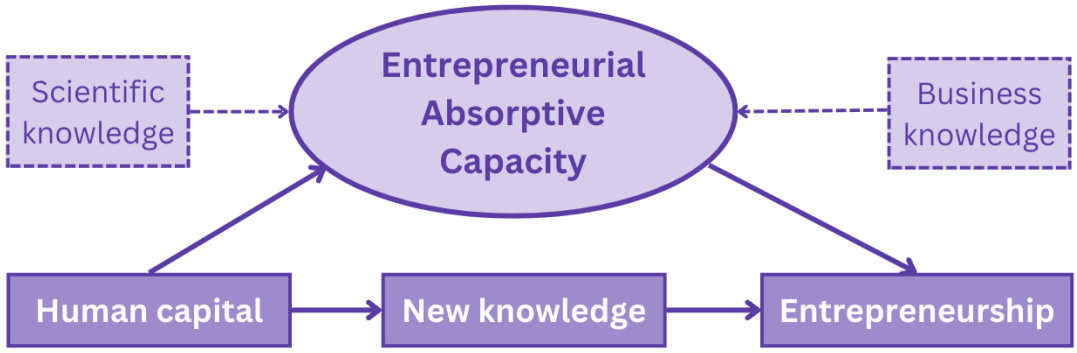

Figure 3. The absorptive capacity theory of knowledge spill over entrepreneurship

Source: Acs, Audretsch, & Lehmann, 2013.

However, talent is referred to intangible resources such as education and experience, whereas knowledge is referred to science and technology. While both concepts influence entrepreneurship, empirically they do so in different ways.

While talent is a quite broad concept, researchers tend to use general human capital indicators as well as specific entrepreneurship human capital, as may be related to start-up activities (Becker, 2009); (Rauch & Rijsdijk, 2013). As for general indicators, Leendertse, Schrivers, and Stam (2022), for example, use the percentage of the population with completed tertiary education, and the percentage of the population aged 25-64 that participates in education or training (lifelong learning) taken from Eurostat. Among specific entrepreneurship human capital proxies, they use the quality of entrepreneurship and business education from the GEM and the percentage of the population with high-level e-skills from Eurostat (Ibid). Most importantly, many scholars focus on digital skills which is considered important in modern digital society.

Knowledge that can be tacit and codified plays a central role in the development of opportunities (Qian, Acs, & Stough, 2013). Tacit knowledge is a very challenging concept to capture, but codified one is usually measured by publications, know-how and patents. Scholars widely use number of newly registered patents per capita to empirically measure the new knowledge instead publications[8]. Also, some researchers use (Ács, Szerb, Lafuente, & & Márkus, 2019) as a measurement, claiming that high spending on R&D in both private and public sectors is more likely to be translated into new business opportunities (Leendertse, Schrijvers, & Stam, 2022).

Leadership is meant to set a direction for all actors which becomes extremely essential for maintaining a healthy ecosystem (Stam & Van de Ven, 2021). Therefore, Stam and Van de Ven (p. 816) measure leadership looking at the presence of innovation project leaders in a region, selecting projects subsidized by Dutch governments or the EU that have at least two participating organisations. When looking at regional development, often leadership is perceived as "the tendency of the community to collaborate across sectors in a sustained, purposeful manner to enhance the economic performance or economic environment of its region" (Stough, DeSantis, Stimson, & Roberts, 2001, p. 177). While describing Boudler's (Colorado) startup ecosystem, Brad Feld (2012) notices that the involvement of a critical mass of experienced entrepreneurs such as leading companies, angel investors, and respected startup mentors accounts for the success of this ecosystem. These regional leaders contribute their time, energy, and wisdom to support it.

[8] See for example works of Jaffe, 1989 and Acs et al., 2002.

3 Research Methodology

3.1 Research design and methods

The main goal of the current research is to find out how the entrepreneurial ecosystem in Tartu influences the development of opportunities for its residents. By employing Stam's model described in the literature review, the author aims to see how the interdependence of all ten constructs of the model creates a "fertile soil" for business creation. Such need for a holistic approach and in-depth analysis of the system calls for **a qualitative research strategy.**

One of the strategies of qualitative research is **a case study** that investigates a contemporary phenomenon in-depth, "in its real-world context, especially when the boundaries between phenomenon and its context are not, clear." (Yin, 2014). The current research concerns the contemporary phenomenon of Tartu's entrepreneurial ecosystem in a bigger context – the Estonian entrepreneurial landscape, – unpacking the unrevealed uniqueness of Tartu. Therefore, a case study seems to be the most relevant research method.

The method of data collection employed is **the semi-structured interview**. This interview type considers using a combination of structured questions to obtain some factual information and unstructured questions to investigate deeper the people's experiences and opinions (Halperin S. H., 2020, p. 313). Hence, it enables respondents to elaborate on topics in a more detailed way, bringing more potential to the research.

Interestingly, a very well-known German development agency and consultancy GIZ describes a process of observing, analysing and visualising the entrepreneurial ecosystem as "mapping" (Kreuzer, Mengede, Oppermann, & Regh, 2018, p. 7). Although their ultimate guide on ecosystem mapping sees an ecosystem as a product of three elements (the surrounding environment, more precisely the business environment and investment climate; its interacting actors; and the evolving culture and attitudes), it provides a practical toolkit that supported the current research.

3.2 Sampling, data collection, and interview guide

The research employs in-depth semi-structured interviews with experts who possess knowledge of how the entrepreneurial ecosystem of Tartu performs. Therefore, all the respondents were chosen according to purposive sampling, as it focuses on those who can provide the best and the most relevant information regarding the case. This is a non-probability sampling method that is based on the personal judgment of the researcher (Shadish, Cook, & Campbe, 2001). Additionally, the following categories suggested by GIZ's "Guide for mapping the entrepreneurial ecosystem" (Kreuzer, Mengede, Oppermann, & Regh, 2018) were taken into account while searching for relevant experts: universities and research institutions;

government bodies; business service providers; development agencies; established companies; banks and other investors.

Hence the main goal is to interview experts who could share their knowledge, insights, and opinions on the performance of Tartu entrepreneurial ecosystem and reveal how this performance influences the development of entrepreneurial opportunities. Although it is extremely important to consider established companies and investigate their assessment on the quality of the ecosystem's characteristics, the focus of this research is set on expert interviews. While interviewing Estonian startups representatives does not present any novelty due to multiple research conducted previously, it also may complicate the data analysis as it would require a different pool of questions for this target group. In other words, the goal of the current research is to access the performance of Tartu cooperation ecosystem focusing on the cooperation among their governmental, industrial, and academic actors. These individuals directly influence a policy-making process, set current socio-economic trends and/or professionally research the local economic development and entrepreneurship.

Appendix A presents all the respondents mapped out according to the relevance of their expertise for the current research. Personal and professional contacts, as well as social networks such as LinkedIn were used to recruit respondents.

In total, twenty-four individuals were chosen as candidates for interviews but only fifteen actually responded positively and contributed to the research. Each interview was conducted online and lasted around thirty-sixty minutes depending on the availability of each expert. All the interviews were recorded by Google Meet and transcribed for further analysis. While conducting interviews, all ethical considerations such as informed consent, voluntary participation, and anonymity (when requested) were satisfied. In case experts desired to stay confidential, the use of data pseudonymization technic was used to ensure that their personal opinions were not associated with their names.

An interview-initiated introduction of the author and explanation of the main research goal. Then, some introductory questions were asked followed by main interview questions designed according to the reviewed literature and constructed around ten Stam's ecosystem pillars. The table below presents a main question for each pillar and referenced theoretical works. The full interview guide is presented in Appendix B.

Table 2

Interview questions and referenced sources

	Pillar	Main question	Referenced source(s)
1	Introductory questions	How does the entrepreneurial ecosystem of Tartu differ from the one in Tallinn?	(Reidolf, Rozeik, Mikelson, Kuttim, & Kallaste, 2018, p. 141)
2	Formal institutions	How does Tartu City government create an environment aimed at creating opportunities for future and existing companies?	Acemoglu et al., 2005
3	Culture	How encouraging is Estonian culture for entrepreneurship?	Argote and Miron-Spektor, 2011; Audretsch, 2015 Field, 2012
4	Networks	How are entrepreneurs involved into social and professional networks?	Spiegel & Harrison, 2017; Singh et al., 1999; Hoang and Young, 2000
5	Physical infrastructure	How does physical infrastructure help individuals to start and run business in Tartu?	Audretsch et al., 2015
6	Demand	How open are regional markets for new entrants?	Stam & Van de Ven, 2021
7	Intermediaries	How easy is it to access professional services such as consultancy, legal advice, accounting, insurance?	Howells, 2006 Stam & Van de Ven, 2021; Mason & Brown, 2018
8	Talent	How easy can companies access skilled talents in Tartu?	Qian , Acs, & Stough, 2013
9	Knowledge	How do local universities support translation of research and development into new businesses?	Qian , Acs, & Stough, 2013
10	Leadership	How do leaders of companies influence policy making and set trends?	Feld, 2012 Stam & Van de Ven, 2021
11	Finance	How easy is it to obtain financial support to start and run a business?	Mason & Brown, 2018

Source: Compiled by the author.

4 Tartu entrepreneurial ecosystem

This chapter sheds light on Tartu entrepreneurial ecosystem. While exploring regional ecosystems, it is extremely important to investigate them within the national context. Therefore, the first part is dedicated to the description of the Estonian entrepreneurial system

which is mostly based on various published reports and articles. The focus of the second part is on the role of the entrepreneurial ecosystem formed in Tartu in the development of opportunities for local entrepreneurs. This part is based on empirical data gathered via conducted semi-structured expert interviews.

4.1 Estonian context

Estonia represents a quite unique context, as it went from a resource-driven and zero-innovation country where any entrepreneurial activity was banned back in the Soviet Union, to an innovation-driven country giving birth to a great number of global start-ups (Trabskaia & Mets, 2019). More interestingly, this transition happened relatively quickly, since Estonia gained its independence in 1991, and in 10-15 years the country experienced a boom ICT sector.

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Estonia is small country with only 1,3 mln. population which belongs to the Baltics and shares a border with Sweden, Finland and Russia. Estonia leads OECD counties is reading, science and is placed as top-3 in mathematics. It is the birthplace to one of the oldest universities in Europe – the university of Tartu which provides country with innovative research and source it with skillful talents.

The country is known for its e-government which makes 99% of all public services available online, including tax services which facilitate the ease of doing business in a country. With around 98% of companies being established online (Invest Estonia, n.d.), Estonia is ranked 16th by World Bank in the Ease of Doing Business Index in 2019 (World Bank Group, 2019). Additionally, Estonia is well-known for its economic freedom: among all 180 countries Estonia is ranked 15th according to the Index of Economic Freedom in 2019 (Miller, Kim, & Roberts, 2019) which makes it extremely trustworthy and hence attractive for foreign investments.

Such ecosystem conditions benefit the country's economy and makes it the most entrepreneurial in the world. As of 2021, Estonia counts 1293 start-ups and has been the birthplace to 10 unicorns (CIVITTA, 2022): Skype in 2005, Playtech in 2007, Wise in

2015, Bolt in 2018, Pipedrive in 2020, Zego, ID.me and Gelato in 2021, Veriff and Glia in 2022. This means it has the biggest number of start-up per capita, as seen in Figure 4.

Estonia also leads Europe in terms of investments per capita because of successful investment management at a country level. Estonia raised the largest amount of venture capital per capita among all European countries in Europe (Atomico, 2021) where foreign investments counted around 3,6% of a total GDP (Invest Estonia, 2022).

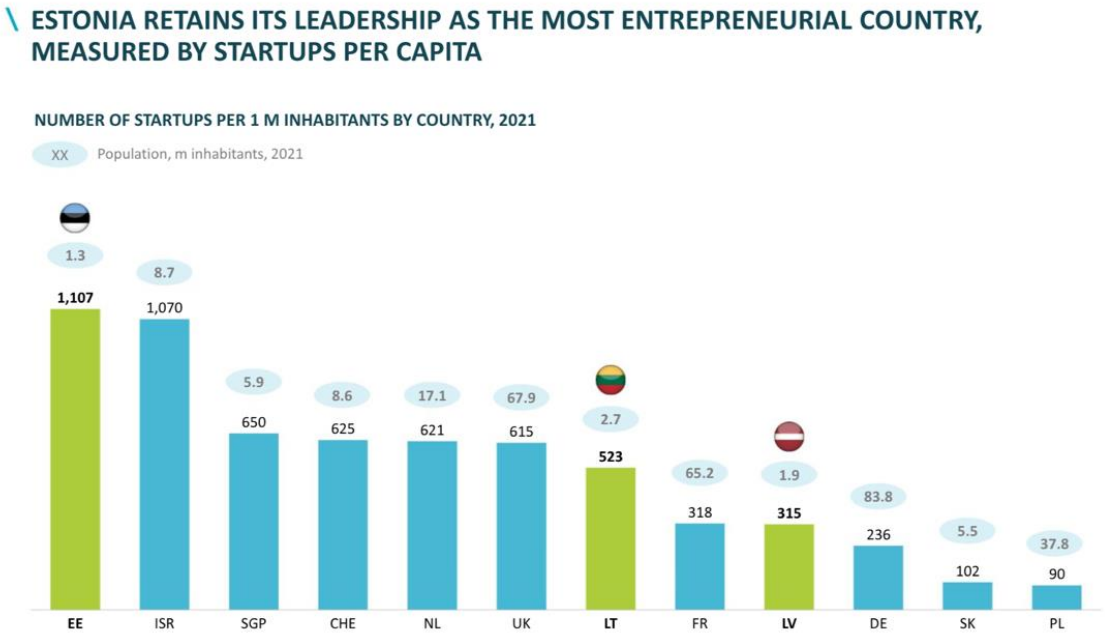

Figure 4. The number of startups per 1 mln inhbitatants.

Source: Civitta, 2022.

4.2 Analysis of Tartu according to Stam's model

Tartu is the second largest town in Estonia with a population of 97 thousand residents. Tartu is chosen for its suitability for investigating an entrepreneurial ecosystem for several reasons. To begin with, it has a strong startup community, and the local government strongly positions Tartu as a city of smart entrepreneurship with an attractive business climate (Tartu Linnavalitsus, 2016). It is the birthplace of several technological startups, hosting offices of many national and international companies. Additionally, it is considered a "*universitas* of science and innovation" with strong interconnections between top-level tech laboratories and universities (Ibid), feeding the national innovation system. Indeed, Tartu is a home for eleven higher educational institutions counting more than sixteen thousand local students and around one thousand international ones (Reseach and Education, 2020). The biggest university of

Tartu and whole Estonia is the University of Tartu which is a top 1% universities around the world (as of 2023) and offers education to more than 13 thousand students (Ibid) It is also a quite internationally minded university, as it has over 70 partnerships in 27 countries and around 800 students from 70 different counties (Ibid). Most interestingly, 99% of Estonian doctors comprise the UT medical programmes' alumni which makes UT a major excellence centre of natural science in Estonia with its laboratories famous all over world. The second largest university is the Estonian University of Life Sciences which is top100 world universities in the fields of agriculture and forestry (Ibid). Additionally, there are five centers of excellence and three competences centers in Tartu.

That is why Tartu falls into a category of a typical European university town, where an ancient and well-established university pervades economic and social life, and may reasonably differ from towns of the same population size in a region. While the main functions of a university are teaching and basic research, universities now are perceived as economic development generators in a society, hence many have accepted an entrepreneurial paradigm (Mets, 2008). This way, universities in Tartu have become a main source of talents and a source of science-based startups (Trabskaja & Mets, 2019). Despite its uniqueness, Tartu entrepreneurial ecosystem may be a good source for policy recommendations for similar entrepreneurial ecosystems in Europe.

4.2.1 Differences between Tartu and Tallinn

The very first question was about potential differences between Tallinn and Tartu entrepreneurial ecosystems to find out if Tallinn possesses capital advantages. Indeed, almost all respondents claimed that Tallinn as a bigger city offers more workforce and financial opportunities, as almost all venture funds are located. Therefore, as the respondent noticed: "*Tartu is a small place, so if you want to raise funds, then you need to talk to VC fund in Tallinn.* Although a smaller size may bring some obstacles in seeking funds, it was presented as a great advantage of Tartu, as it makes the communication among all stakeholders more intensive and ties within networks closer. This is true not only for entrepreneurs but also for business support organisations. According to the head of the Business Advisory Service Foundation, in Tartu all business support bodies are a part of a non-governmental organisation that meets up every month altogether governmental representatives, while in Tallinn such collaboration is project-based.

An experienced start-up founder and mentor Triin Kask admits that even though most start-up founders live in Tallinn, she enjoys the close and interconnected community of "start-up-minded" people in Tartu: "*Why I don't why to leave Tartu because I feel that the community is here, the vibe is very positive".* She also mentioned that the transportation of a good quality in Estonia, so that you can easily travel by train to Tallinn and attend all the events which may happen much more often there.

4.2.2 Formal institutions

All experts, including industry representatives, find Tartu City Government an enabler of opportunities for local entrepreneurship and evaluate its efforts as highly supportive to start-ups. The Tartu City government plays a role of connector within an ecosystem, it actively or passively takes part in all the business support organisations, so that it has a comprehensive overview of public, semi-public and private actors within the ecosystem.

To get a better understanding of all governmental activities, I have taken an interview with Katrin Kask, a program manager at Business Development Department. First of all, the City Government acts separately as a public body and, unlike in Tallinn, does not provide consultancy to private sector. Individual consultancy is provided by the Foundation "Business Advisory Services" which offers free of charge support and redirect companies to other business support organisatons: Tartu Science Park, Biotechnology Park, and Tartu Centre for Creative Industries. There are three types of support measures taken by the Tartu City:

- **Direct support to companies |** This is done through giving out the digitalisation vouchers up to five thousand euros, and compensating companies' expenses to train students who obtain vocational education. These measures correspond with the focus of Tartu City Government to make it more technologically developed and cover a lack of talents with newly trained professionals.
- **Indirect support |** The Tartu City sponsors business support organisations which consult private sectors: Tartu Business Advisory Services, Tartu Science Park, Biotechnology Park, and the Tartu Centre for Creative Industries. Moreover, the Tartu City is a member of a non-governmental organisation "StartUp Day" which consists of mentioned business support organisations, the University of Tartu, and Contriber, an angel investor and mentoring network. The board members meet up monthly to check the progress and reveal the needs of local businesses.

- **Events organisation |** As it was mentioned before, the Tartu City is one of the organisers of the **StartUp Day** which is the biggest festival in the Baltics. In fact, it was born from the synergy of Tartu entrepreneurial community including the academia. Each October Tartu City organises the **Entrepreneurial Week** where the main focus is on people who would like to become entrepreneurs. Usually, the Tartu City follows the suggestions of business support organisations and an employment office on community needs to design the most beneficial programme possible. The Thematic Hackatons is another way to gather together the best entrepreneurs to solve the most burning challenges in various sectors. And, finally, the last event listed by Kartin Kask was Gala which aimed at recognition of the best performing companies. She mentioned that this status is very valuable for companies who get as it increases their reputation in the Baltics and bring more clients.

All these measures which summarized in Figure 5 contribute to *pro-entrepreneurial vibe* or, in other words, create an image of a progressive and developing city open to innovation: *"Tartu is a good place to be: they [Tartu City Government] are progressive, open and flexible".*

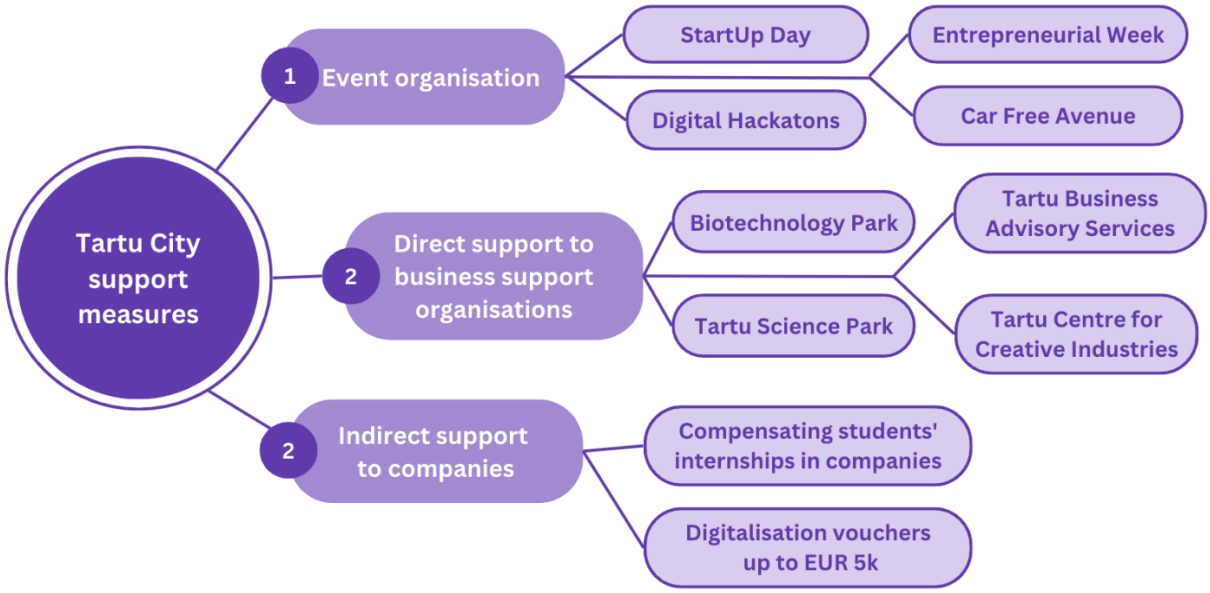

Figure 5. Tartu City support measures summarised.

Source: compiled by the author.

It seems that this image of progress is created through real support for local innovations. This way, all respondents noticed the cooperation of the Tartu City Government with Bercman Technologies, a company which develops smart pedestrian crosswalks for a better living environment. By providing them physical infrastructure, Tartu City enables testing new technologies at the streets. As Katrin Kask noticed, it is the best way to support their internal R&D instead of buying technological solutions from private companies: *"This is to make their product better, so that they are more competitive in foreign markets".* The same cooperation is established between the local government and the UT which tests their autonomous driving vehicle at Tartu streets.

Additionally, as City government is on the board with business support organisations, industry and academia representatives, it is extremely attentive to the needs of businesses in various sectors and open to feedback from them: *"As Estonia is small, we have direct access to government, decision-making and they listen to us. This is a beauty of Estonia that the government listens to ones who work every day in different industries".* Therefore, the City has a great overview of public, semi-public and private actors within the ecosystem, their needs and development goals.

4.2.3 Culture and Entrepreneurship

The interviews showed that the most common characteristic of Estonian entrepreneurs is resilience: "*I think common sense is that we don't take a failure as definite".* Such natural stubbornness is very well reflected by a recent Ready Player Me's fame and growth. Although this company has not been growing for nine years in a row, now it creates full-body 3D metaverse avatars for famous brands such as Adidas and Dior. By not giving up and advancing their own 3D technologies, they could become top-notch in the world of 3D avatars as soon as MetaVerse was announced. As noticed by an experienced start-up founder, this logic is totally distinct from Silicon Valley practices which require failing fast and starting again, but such patience may serve as a competitive advantage in the long run.

Historically, such Estonian resilience relates to a national desire for independence and being self-sustainable, and now Estonians "*are seen as strong and resilient people".* After Estonia gained its independence, the country looked up a lot to Finland, trying to copy the success of Nokia. In the late 90-s, the country chose a digital society approach which started from "Tiger Leap Programme" equipping schools with computers and Internet access. According to interview respondents, this programme gave birth to the first generation of

entrepreneurs, and after the success of home-born Skype, the country got confidence and started its own unique path in the world, becoming a homeland of many unicorns. Besides that, Estonia is always driven by competition among its neighbours and tries to be "best in the Baltics". Therefore, the recent ICT boom in Estonia and successful examples of high-growth start-ups changed the mindset of people: "*This experience started spreading in the ecosystem and these first lighthouses were the ones that helped to guide this entrepreneurial movement".*

In general, all respondents noticed that Estonian culture is very encouraging to do business. Indeed, every eighth Estonian resident has established an economically active company. A representative of industry mentioned that nowadays many Estonians manage to combine their main jobs with various "side businesses", not necessarily innovative ones whether it is selling hand-made items, pictures, or providing some kind of service.

Another distinguishing peculiarity of the Estonian culture is the egalitarian approach coupled with short power distance: "*The door of the manager is always open".* Such an approach makes it easier to take decisions within companies, as employees share their feedback and creative ideas more eagerly with company management. This makes the whole corporate culture more innovative. As for academia, the culture is way more informal than in other countries, so that professors and students *"hanging out together"* is seen as totally acceptable societal norm. Also, the flat organisational structure together with small country size facilitate direct access of city residents to the governmental institutions, aggregating their inputs for change.

4.2.4 Networks: accessibility and involvement

The majority of respondents characterised the access to the networks in Tartu as very easy. However, *"first it may be difficult to connect, but as soon as you're inside the network, the exchange of knowledge and information is easy".*

As such, there are two main access points to join a local entrepreneurial community. The first and the most common way is through various events for start-up founders and sector-related business seminars, e.g., for the wood industry or the ICT sector. All respondents mentioned StartUp Day as the brightest and the most effective Estonian event for networking which hosts a lot of investors and *start-up-minded* people in one place every year. Most interestingly, due to the small size of the country, the geographical frontiers of networks are rather blurred. Coupled with the great transport infrastructure in Estonia, and all the major startup founders, it becomes very easy to travel around to attend relevant events. This way, a lot of Tartu residents regularly use the train to attend business meetings and such well-known

events as Garage84 and Latitude organised in Tallinn. Opposite, most start-up founders who live in Tallinn are always present at major business events in Tartu. This makes an Estonian start-up community very well-integrated. The ICT sector is especially consolidated:

"When we talk about the ICT sector, then it's very-very well-integrated and there's a lot of discussion going on. And, as I mentioned, the people, who started the first round of unicorns and now we're in the third round of unicorns. So, there's a lot of integration and this kind of knowledge is openly and excessively shared with people as much as possible".

As for sector-specific events, they are mostly organised by business support organisations. For instance, Tartu Business Advisory Services organises a seminar every month which is usually attended by twenty-thirty companies.

The second access point is through business support organisations, as they play the role of a bridge for individuals and specific expertise. The Head of Tartu Business Advisory Services, Jan Lätt claims that when their clients need to connect personally to a relevant advisor/mentor or a company, they usually facilitate such introduction. So, when such a connection is provided, further success depends totally on an entrepreneur. Furthermore, startups that participate in the incubation programme, e.g., incubation programmes of the Tartu Science Park, are automatically connected to Technopol, EstBAN, angel investors, or mentors with relevant expertise.

Taking about involvement in networks, respondents distinguish between company size. Thus, smaller companies are involved more in social networks, while bigger companies are part of professional associations and clusters. This can be explained by the necessity to pay a fee for being a part of an official association, which companies of consolidated industries are more likely to afford. A need to comply with EU sector-specific regulation motivates companies to use joint efforts: *"There are so many European regulations which force to innovate, that means companies cannot work alone and they need to cooperate. So, I think the networks will be growing in the next years."*

Moreover, respondents mentioned that clusters have become active stakeholders within the Estonian ecosystem in general. Indeed, the Estonian ICT cluster and the Connected Health cluster were awarded an international gold label, while the Defence Estonia cluster and the Digital Construction cluster were awarded silver labels, according to the assessment by Kredex and Enterprise Estonia in 2022 (EAS and KredEx, 2023). *The silver and gold medals demonstrate the cluster's high level of excellence, making it stand out internationally. Three Enterprise Estonia (EAS) programmes support clusters and joint activities at the national level in Estonia: the first supports the development of technological development centres, the second*

supports cluster development and the third supports competence centers (A cluster: why and for whom?, 2022). *All these measures are aimed at advancing the competitiveness of Estonian entrepreneurs internationally. In total, there are fourteen clusters in various sectors in Estonia which boost cooperation and stimulate innovation* (Estonian clusters, 2022).

4.2.5 Physical infrastructure

While talking about infrastructure in Estonia in general, many respondents noticed that tele networks and transportation which facilitate connectivity benefit local networks:
"The connection is very great among cities, which helps to spread the knowledge."

As for knowledge infrastructure, Delta Center which opened up its doors to the public is a great example of how knowledge infrastructure benefits Tartu ICT sector and motivates younger generations to be entrepreneurial. The Delta building accommodates five departments: Centre for Entrepreneurship and Innovation, Institute of Computer Science, Institute of Mathematics and Statistics, Institute of Technology, School of Economics, and Business Administration. While the aim of Delta business building is to bring together science-based entrepreneurship, it also hosts such companies and business support organisations as Cybernetica, Swedbank, Statistics Estonia, STACC, SEB Pank Innovation Centre, European, Space Agency Business Incubation Centre Estonia, Tartu Science Park. Therefore, Delta business center not only enhances industry-academia cooperation but also facilitates research and development transfer into new businesses.

Triin Kask suggests that for students building a startup, Delta Center would be a first step, as it provides free working spaces. The next level would be co-working spaces which cost approximately one hundred twenty euros per month and can accommodate a small startup team. Co-working spaces are mostly business support organisations: Tartu Science Park, Biotechnology Park, Center for Creative Industries, and Tartu Business Support Services.

Most respondents revealed a lack of working space for entrepreneurs. However, this is only true for larger companies. While there are enough desks for individuals and small teams, it is *almost impossible* to accommodate a huge team which would require a few floors. However, two respondents mentioned that covid-19 pandemic demonstrated that online teams do not necessarily require a physical presence in one place, so for the ICT sector especially an office is not a compulsory attribute anymore. Besides, nowadays *the talents are scattered around the globe and do not live in a radius of 100 km from Tartu*.

As for physical infrastructure for some science-intensive applications, such as biotech, is extremely difficult to access laboratories and hardware: *"I would argue that in Tartu for a company to go from start-up to scale up and then to a mature company, then to establish a small serious production or to put up your first serial production is definitely a problem, we do not have that many capacities, or infrastructure available".* Therefore, biotech startups use the available laboratories and other necessary physical infrastructure provided by the universities, Tartu Science Park, and Tartu Biotechnology Park. However, to separate from these support organisations, a company needs to generate a decent cash flow to afford expensive experiments conducted in the laboratories.

4.2.6 Professional Services

The access to professional services was evaluated by experts as "very good": "*There is really good professional support. Enterprise Estonia with their current subsidiaries, for example, Work in Estonia, Invest in Estonia, they a really playing key players in the game."*

Enterprise Estonia is a governmental organisation that offers consultancy services up for five or six hours for free. Siim Kinnas, the representative of Enterprise Estonia, says: "*We have been called to live basically to help companies thrive where there are market failures. Basically, it is not easy for companies to access some kind of service, or there is some purpose why we should intervene and put more resources into one area or another because a free market on its own won't. So, we offer most services because it is really difficult for companies to access them on a professional level".* He claims that for an average SME, it is quite challenging to access consultancy of a top-level business management or legal consultancy firm such as Ernst&Young or MsKinsey, which is why the government attempts to provide as least some basic support services to boost entrepreneurship.

Similar basic services are also provided by Tartu Business Advisory Services. It functions as a foundation sponsored by the Ministry of Economic Affairs and Communication and the European Regional Development Services and belongs to the networks of county development centers all over Estonia. The team in Tartu comprises ten people who help starting entrepreneurs with business idea evaluation, business plan and search for finding opportunities. Also, they actively organise seminars, trainings, conferences, and business events for established companies to increase their competencies, distribute information and support networking. They have more than one thousand clients per year which suggests that Tartu residents tend to use their basic consultancy services.

The third business support organisation I have managed to get perspective from is Tartu Science Park. It is considered an engine of innovation within Tartu and offers incubation programmes together with infrastructure usage, such as hardware, laboratories, and office spaces. As Estonia is a part of the European Space Agency (ESA), Tartu Science Park hosts the ESA Business Incubation Centre. Most importantly, such programme is established by cooperation among a whole consortium of Estonian public actors: Tartu Science Park, Tallinn Science Tartu City, Tallinn City, Tallinn University of Technology, and Kredex. At the moment, the ESA BIC gives grants of up to 50 thousand euros for product development and IPR in the space industry together with mentorships and technical support. Sven Lila, an incubation manager at Tartu Science Park suggests: *"Mindset changes from investors' side, or the financial side, because we in Science Park, we are willing to take the risks. They are not too many different funds willing to take the risk in the hardware business. And we are going into today really-really deep tech business creation nowadays".*

To sum up, some basic consultancy services are available within the ecosystem, however getting more advanced consultancy may be quite challenging and expensive. The list of all business support organisations, is presented below:

- Tartu Business Advisory Services Foundation;
- Enterprise Estonia;
- Tartu Science Park;
- Buildit Accelerator;
- Tartu Centre for Creative Industries;
- Tartu Biotechnology Park;
- Centre for Entrepreneurship and Innovation of the University of Tartu;
- Institute of Technology of the University of Tartu;
- Tartu County Tourism Foundation;
- Estonian Chamber of Commerce and Industry;
- SPARK HUB.
- SPARK Demo;
- sTARTUp HUB.

4.2.7 Market

While talking about internal market, all respondents mentioned that Estonia is a small country, and the sales volume is quite modest: "*Estonia's home market is so small that almost everybody understands that Estonia is not their market. And the more complex your business is, the more international you will become".* Therefore, all start-up founders creating

innovative solutions aim to scale up from the very beginning. This is not related only to the modest market size, but also to the idea of a start-up in a nutshell.

However, such a small size of Estonia turns it into a great testing ground for new solutions, especially the digital ones. As mentioned by a respondent, the market is quite open for new entrants and all the information about customers is available either through typical desktop research (as statistics are well gathered in Estonia in general) or through other entrepreneurs that serve the same market segments.

4.2.8 Finance

There are the following funding opportunities to finance a company in Tartu:

- Grants from the unemployment office – around 6 thousand euros which can be applied twice;
- Start-up grants – around 15 thousands;
- Production development grants for innovative products – 35 thousands.
- Private capital through venture capital and angel investors.

So, it is possible to get around 70 thousand euros to fund a production development in any sector and establish an innovative production line, not counting a private capital.

As was noticed by respondents, the latest trend is the following. The local business support organisations move away from direct monetary support to individual consultancy. Indeed, as noticed it is getting more challenging to attract money: "*You still need to have some initial capital, I don't see many public funds coming, and the private capital is becoming a bit more cautious. It is getting tougher. Deep tech, green tech, climate tech are totally taking spots. Technology sector has always been in a better spot. ICT is not such a hype as it used to be."*

While talking about venture capital, Triin Kask suggests that raising funds is a bit challenging in Tartu: "*Tartu is a small place, so if you want to raise funds, then you need to talk to VC fund in Tallinn. Me, as an investor, I also talk to people here in Tartu, but here you don't draw a line between cities, you just need to find a correct institution or a person."*

Nevertheless, the first generation of start-up founders who managed to sell their own businesses successfully become affluent with money and ready to invest into local start-ups. So, there is always support for innovative ideas which brings a potential to the sustainable growth.

4.2.9 Talents

The respondents suggested that Tartu is a great place to look for talent in Estonia, as it offers the high-qualified workforce. "*Skilfulness? It's rather high",* says a respondent claiming that a lot of Tartu residents have a tertiary education, as they are either fresh graduates, or they belong to the academic community which works at the biggest employers of the town: the University of Tartu or the UT clinics. Indeed, the statistics show that around 50 thousand people out of 97 thousand have a higher education which is almost the half town population.

However, the interviews have revealed a burning problem which is a lack of talents in Tartu and in Estonia in general: "*If you're talking business-wise, market-wise, research-wise. But right now, the main talent lacking is really specific programmers. The guys which make hardware smart".*

Such scarcity of human capital is logically explained by a small population size of Estonia: *"With such low unemployment rate, it is clear that we simply lack people".* Indeed, according to statistics, an unemployment rate in Estonia was only 5,6% in 2022, while employment rate was 69,2% (Statistics Estonia, n.d.). The Tartu City representative has also mentioned that maintaining talents in Tartu, especially, fresh graduates is one of the top priorities of the current development plan. However, this problem requires a multifaceted approach aimed at creating an attractive and comfortable environment in the city in general.

Despite the lack of talents with specific skills in deep tech applications, the University of Tartu (UT) creates a lot of young talents sourcing many industries. Considering the focus of the UT on life sciences, graduates involved in the green tech and biotech sectors tend to be very skillful and have a good knowledge base while entering their first workplace. Sven Lila, an Incubation Manager at Tartu Science Park suggests that *"all basic needs are satisfied"* meaning that some project management, marketing, accounting, and other roles related to business administration functions are well-covered. This statement surprisingly corresponds with statistics. As seen in Figure 6, in 2022, the biggest group of graduates in higher professional education was in health and welfare sector, while business, administration and law were the most popular sectors among bachelor's and master's students (Statistics Estonia, n.d.).

When talking about ICT sector, Estonian companies have been especially active in head-hunting among UT students. Oftentimes, fresh master's students are being hired by local companies even before finishing their studies which directly influence the increase in dropout rate. This way, Triin Kask acknowledges two main HR strategies employed by start-ups: *"In Tartu, I have had access to talent through the University of Tartu, I had a lot of talented*

students coming from university who started as juniors. They're usually fast learners. If you need a professional, you can always outsource."

While training juniors may be costly both financially and time-wise, companies tend to outsource highly educated talents from third countries. The covid-2019 pandemic has shown that remote working makes it easier to create international teams. Hiring workers from abroad and creating remote teams has become a new reality. This trend is also supported by the eagerness of the Estonian government to attract high-skilled professionals to foster the national economy. As mentioned before, a start-up visa has been serving as an instrument to recruit international talents and make it easier for them to move to Estonia.

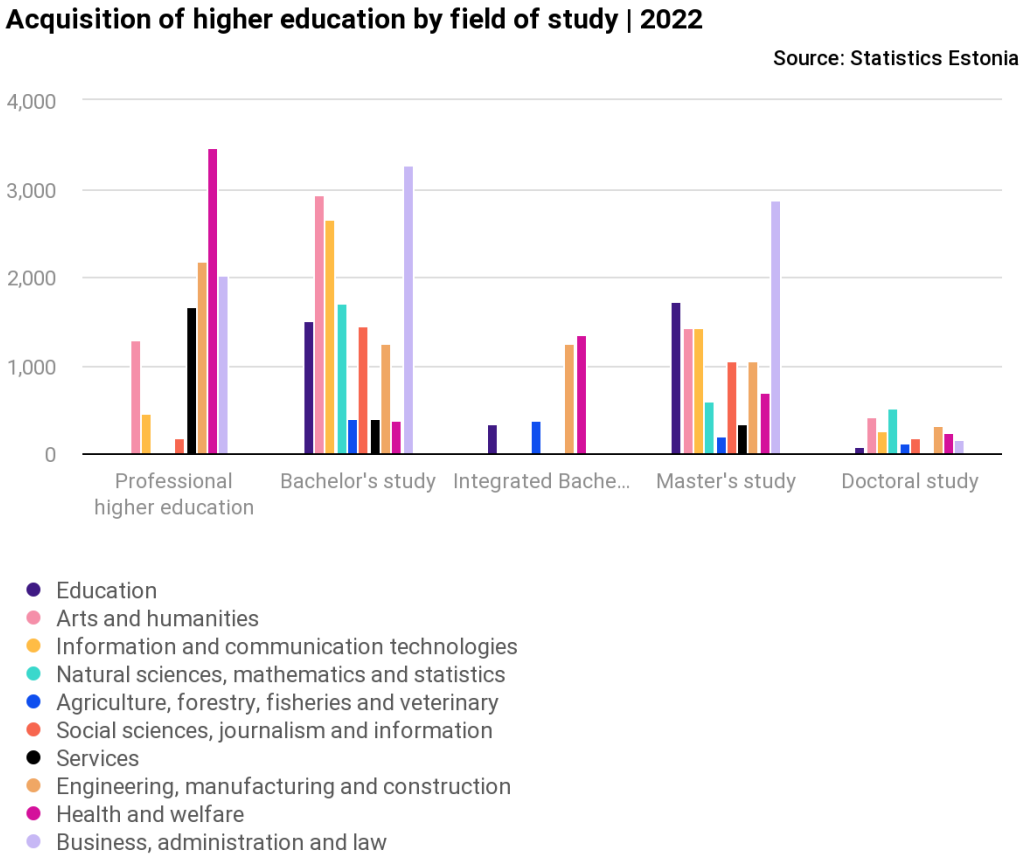

Figure 6. Acquisition of higher education by field of study, 2022.

Source: Statistics Estonia.

4.2.10 Knowledge and the role of universities in translation of R&D into new businesses

While the main role of the university is to create skilful talent to source the ecosystem, local universities tend to be more and more entrepreneurial. However, as many respondents

mentioned, there is still a huge room for improvement in this direction: *"Universities are very academically focused. Sometimes they have knowledge, but they don't have the same speed of decision-making. Universities and the professors mostly take care of citations. So, universities don't have a lot of incentives for supporting businesses."*

The main problem reflected by all the experts is the regulation of the intellectual property rights which makes it difficult to for universities to cooperate with private companies. However, to solve this problem a UniTartu venture fund was created, so that the university can hold a share in private companies. Now the spin off programme at the UT counts around 50-60 science-based start-ups. Also, the University of Tartu has been always closely cooperating with the government, launching cooperative programmes and closely working on the policymaking.

4.2.11 Regional leaders

In order to learn if there are some strong leaders in Tartu, I have asked about their capacity to influence policy-making and set trends. The opinions of experts were quite distinct. For instance, an experienced start-up founder Triin Kask listed three examples of the successful influence of start-ups on policy making:

- the introduction of start-up visas for third-country talents to ease the bureaucratic burden and shorten the hiring time for ICT companies;
- the most recent achievement is an online notary procedure which makes it easier to sign shareholders agreements with investors, as they do not need to fly to Estonia anymore;
- Start-up founders worked together with the government on the ramification law.

On the other hand, the representatives of academia and business support organisations claimed that the influence of the regional leaders is rather weak. According to their opinion, usually, representatives of established industries dominate the policy boards, not the founders who *may be busy building their multiply start-ups.* Mostly, they are invited to *high-level policy events as opinion leaders*. However, Sven Lilla who is an expert in deep tech applications, there is active cooperation among younger companies and the government in the creation of the space law. Hence, such influence may really depend on the sector entrepreneurs belong to.

While talking about setting trends and benefiting local community in general, it was mentioned that the main driver has been the first generation of successful start-up founders

who have become affluent with money and ready to give back to the Estonian entrepreneurial community. And as there are no large corporate companies in Estonia, they tend to invest back in local start-ups and sponsor such initiatives such as the code school "kood/Jõhvi" which offers a free full-stack development course for both Estonian nationals and residents older than 18 y.o. This initiative was created to attract bright young talents and turn them into a high-qualified workforce to source Estonian companies. Kadri Ukrainski claimed that experienced startup founders are also quite active in attending events for young entrepreneurs and quite eagerly provide mentorship and advice. In general, prosperous start-up founders seem to be extremely interested in regional development, and *instead of buying villas, they stay and benefit the community*.

4.2.12 Possible obstacles for starting a business

While talking about obstacles to starting a business, all respondents mentioned that bureaucratic procedures are cut to the minimum, as it is extremely easy to register a company. It takes around 15 minutes to open a company online in Estonia. Therefore, a georgical location does not represent any problem whatsoever, as 99% of all public services are available online all around the country. Therefore, experts claimed that a very main difficulty of an entrepreneur is how to finance a business. This is a typical puzzle that an entrepreneur needs to solve which applies to every ecosystem. Although there are some private and public – both local and national funds (this will be explained further in the paper), capital is getting more and more difficult to access.

Regards opening a start-up in very science-intensive sectors or, in other words, "deep tech", it may be extremely difficult to find a good business advisor who will guide to the right direction and understand potential risks. Besides, finding an experienced team member or a co-founder with relevant or complimentary expertise may also be an obstacle: "*There's always an issue of team members because there is always an extra need for them".*

4.2.13 Main fundings and observations

The general findings of the interview analysis are summarised in the Table 3.

Table 3

Main findings summarised

Pillar	Findings
Formal institutions	• Very supportive business environment created by the local government through three main measures:

	(1) direct support to companies, (2) indirect support through sponsorship and coordination of business support organisations, (3) event organisation; • The main development focus is making Tartu more technologically developed and to maintain talents within the ecosystem.
Culture	• Resilience as a main characteristic of Estonians which is historically explained by the national desire to be independent. • The Estonian culture is very supportive to business. • As there no large corporate companies in Estonia, the country is marked by egalitarian culture with short power distance and flat organisational structure at workplaces.
Networks	• Well-integrated networks, especially in ICT sector, which comprise of consolidated startup community and 14 Estonian clusters in various sectors. • Younger companies are more involved into social networks and attend fewer formal events, while more established companies are more involved into clusters and associations which require a fee payment.
Physical infrastructure	• Delta Business Center as a main connector between academia and industry and support of R&D into new businesses. • Lack of office spaces for big established companies. • Great geographical connectivity within the country facilitates the cooperation among Estonian startup community, blurring networks' borders.
Demand	• Small internal market coupled with attractiveness for foreign investments makes startups grow internationally.
Finance	• Not enough local funds for startups. • There is enough support for innovative ideas in science-intense applications from angel investors.
Intermediaries	• A very well-connected networks of business support organisations sponsored by national and European development funds. • Basic free services are accessible and free, more advanced expertise may be tricky to access
Talent	• Tartu is a geographical skilled and educated talent. • Lack of talents in technological sectors. • The university of Tartu is a main source of talent for private companies.
Knowledge	• Lack of IPR regulations which hinders the R&D translation in Tartu. • The University of Tartu is the most progressive university which has been actively taking measures to be more entrepreneurial.

Leadership	• There is no significant influence from regional leaders on the policy making, but there are still a few successful examples how they change the legal landscape make it easier to do business in Estonia. • Entrepreneurs create initiatives which benefit local communities such as programming school. • The first generation of Estonian startup founders became affluent with capital and now invests in local startups that show potential growth.

Source: compiled by the author.

The analysis of the Tartu ecosystem has given birth to a few observations. Interestingly, although this research is purely qualitative, analysis of some pillars such as Talent, Demand and Finance could not be done without some desktop research: exploring some statistics and official websites which complement the expert opinions and delivers more comprehensive information to a reader. Does it undermine the usability of Erik Stam's model for qualitative research? The answer is rather no, as it may not be the case in another research. Additionally, it seems that for such a small country as Estonia, many resources endowments such as talent, intermediaries, and finance are not connected to a geographical location anymore. This can be explained by well-developed physical and ICT infrastructure which facilitates access to mentioned resources, as well as well-established networks which connect actors in the country fast and effectively. Although it may seem that distinguishing Tartu as a separate and unique ecosystem rather than researching the Estonian ecosystem may be an unfortunate research choice, I would argue the opposite, it incentives further research, allowing the creation and testing of new hypotheses about entrepreneurship in small-sized countries.

5 Conclusions

This thesis represents the research on the performance of Tartu entrepreneurial ecosystem. This way, all tasks set at the beginning of the research were completed. This way, it was revealed that there is no comprehensive framework which would explain how opportunities are developed within an ecosystem. There are two main perspectives which researchers employ while perceiving entrepreneurial opportunities. While the creation theory implies that opportunities are created by entrepreneurs, the discovery theory claims that opportunities may exist objectively from them and can be identified by individuals with some developed qualities. Such existence of conflicting arguments made it clear that a novel interdisciplinary approach is required. According to the author's opinion, an entrepreneurial

ecosystem approach has become a bridge between practice and research, connecting both individualist-centred and environment-centred camps.

While digging more into the ecosystem approach, an entrepreneurial ecosystem was operationalised and various frameworks were studied, including Daniel Isenberg's six domains ecosystem. The most suitable framework for the current research is Erik Stam's ten pillars ecosystem model which is rather a compromise among others due to a better credibility among the academic community. It claims that each ecosystem has certain systemic conditions or institutional arrangements, and resource endowments which distribution may affect productive entrepreneurship within an ecosystem boosting regional growth (Stam, 2015). Therefore, a questionnaire based on ten ecosystem pillars was formed and used to interview mapped experts: formal institutions, culture, networks, knowledge, physical infrastructure, demand, finance, intermediaries, talent, and leadership.

By conducting fifteen semi-structured interviews with various experts, qualitative data for analysis of Tartu entrepreneurial ecosystem was gathered. As for institutional arrangements, all three pillars – formal institutions, networks, and culture provide a strong and functioning foundation enabling individuals to create new businesses and grow existing ones. It was revealed that Tartu has a quite supportive local government which takes certain measures in boosting entrepreneurship and created a positive image of entrepreneurs publicly. The culture was characterised as egalitarian and hence very encouraging for doing business, while Estonians were described as resilient people due to historical reasons to be independent. The well-integrated networks in a country build a solid foundation for resource distribution within a national ecosystem.

Opposite, the analysis of resource endowments does not provide straightforward answers. The physical infrastructure such as railways, roads, and telecommunication, enables great geographical connectivity within the country and knowledge infrastructure such as Delta building supports knowledge spillover within Tartu. However, a lack of office spaces was mentioned as one of the most challenging problems for expanding businesses to solve. Additionally, the research showed that a possible obstacle to creating a company in Tartu still remains is a lack of finance, as there are not enough local funds available in the town. Due to the small size of the national market and moderate purchasing power, all start-ups are focused on scaling up internationally from the very beginning. Successful stories of Estonian start-up pioneers have become a "selling point" for Estonia in terms of attracting foreign investments which, in turn, diversified the investment opportunities for newcomers and made it impossible for scaled-up start-ups to focus exclusively on national grants (Prohorovs, 2020).

Another weak point of Tartu is talent (especially in technologically-intensive domains) which keeps lucking due to a small size of population and active out-migration to Tallinn and other European countries. As for leadership, there is still no critical mass of regional leaders who can influence policy-making and set trends. However, there are some examples of how successful start-up founders affluent with money create initiatives benefiting local communities and providing entrepreneurial knowledge to the ecosystem. The knowledge domain is characterised by the lack of IPR regulations which hinders the translation of research and development into new businesses. Although the University's of Tartu solution to establish a UniTartu venture for owning shares in spin-off companies, the university is still far from being entrepreneurial.

The study highlights a high level of accessibility to free business support services which have become more popular among private companies in the last five years. Interestingly, a main instrument for local government to coordinate all support structures has become the establishment of a non-governmental organisation that includes business representatives. This provides a good overview of current business needs and enhances the cooperation of industry and government.

The findings gained from the current research make a few significant contributions to academic and policy-making domains. This research has employed Stam's model of the entrepreneurial ecosystem and tested it on qualitative data gained through semi-structured interviews. There are two reasons why this represents significance. First, usually, Stam's ecosystem pillars are tested through a quantitative research strategy and there is little research exists based on expert interviews. While the model is still being constantly developed by the author and his colleagues, this research can serve as an attempt to adapt the ten pillars ecosystem model for investigating a particular town rather than using it for a comparative study. Second, while Estonia keeps drawing a lot of attention as a homeland for famous high-growth unicorns, it is well-researched by the academic community. However, so far, the author has found no good quality research in English on entrepreneurship in Tartu. Hence, the current research represents a totally novel source of information for further research on Estonian and Tartu ecosystems. The revealed findings may serve as a reference point not only for future academic entrepreneurship research but also for policymakers who may be able to get an overview of the Tartu ecosystem's performance.

As for potential limitations, the data may be biased due to the fact of recruiting mainly representatives of business support organisations. This way, the results may seem imbalanced by the respondents' vision of how "ought to be" instead of the real pragmatic evaluation of

various ecosystem pillars. Further, this limitation may be solved by expanding the sampling of respondents by mapping out a bigger number of industry representatives to access the opinion of those who use governmental support.

Additionally, this research was not focused on any sector. However, such a choice was related to the availability of relevant respondents, focusing on a particular area may bring a problem related to a lack of respondents with relevant expertise and hence difficulties with getting to a data saturation point. So, future investigation may be focused on one of the most developed fields such as bioeconomy / timber, ICT, cleantech and greentech (Invest in Estonia, n.d.).

For future research, it would be interesting to add the individual dimension and cultural attributes, which can be done by surveying residents of Tartu. A well-developed methodology of a Global Entrepreneurship Index questionnaire can be used but adapted to the needs of research. Furthermore, combining various methods or so-called triangulation "yields more complete data and results in a more credible way" (Halperin & Heath, 2020, p. 175). This way it may enable the holistic investigation of Tartu entrepreneurial ecosystem.

Lastly, the current research may transform into a comparative study, that can be enriched by analysis of similar ecosystems, for example, in the Baltics.

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APPENDIX A

Table of Respondents

N	Name	Occupation	Relevant expertise	Status
1	Kadri Ukrainski	Professor Research and Innovation Policy at University of Tartu, Chair of Public Economics and Policy	- Expert in innovation policies and regional economic development; - Information on public-private cooperation and the role of university in the development of opportunities for start-ups; Insights on how talent and knowledge is used by entrepreneurs to identify market opportunities and create innovations.	
2	Katrin Kask	Business Development Department, Tartu government	- Insights on existing governmental and local policies aimed at development of business opportunities; Funding opportunities for startups and existing cooperation between local government and support organisations.	
3	Mervi Raudsaar	Associate Professor of Entrepreneurship, University of Tartu	- Insights on Estonian human capital (talent); - The role of higher educational institutions on the knowledge-based entrepreneurship in Estonia; The key criteria for successful sustainable entrepreneurship	
4	Sven Parkel	Tartu Biotechnology Park	- Existing networks and Tartu Biotechnology Park in particular; Information on physical infrastructure which enables PPP.	
5	Lauri Sokk Mart	Organizer of a StartUp Day	- Peculiarities of Estonian entrepreneurial culture; Can share information on existing trend-setters and local leaders within business community	
6	Maret Ahonen	sTARTUp Lab Manager	- Quality and peculiarities of existing supporting services for start-ups; - The role of University of Tartu in innovation creation; The characteristics of regional startup networks.	
7	Tonu Esko	Accelerator BuildIt	- Quality and peculiarities of existing supporting services for start-ups; The characteristics of regional startup networks.	
8	Roomer Tarajev	Area Manager in Business Development Department,	Coordination of activities in the field of foreign investments, strategic planning and marketing. Strategic planning and marketing in the field of smart city.	

		Tartu government		
9	Reesi Lepa	Head of StartUp and Innovation Team, CIVITTA EESTI	- Intermediaries and support services are available for established companies and startups - Funding opportunities and startup culture in Tartu and Estonia Existing startup networks / clusters	
10	Tarmo Puolokainen	Swedbank	Can share evaluate the ease of starting and financing business – talk about access to debt	
11	Vaido Mikheim	StartUp Estonia	Has worked in Tartu Science Park for 20 years, has a great knowledge of support in science-scientific sector and R&D translation in Tartu.	
12	Sven Lilla	Tartu Science Park	Can share Tartu Science park perspective on the ecosystem and talk how they support the deep tech startups.	
13	Karl Viiol	Tartu Business Advisory Service	Can explain how companies are supported by the Business Advisory Services in Tartu	
14	Jan Latt	EstBan, the Head of Tartu Business Advisory Services	- Overview on all business support organisations in Tartu and their cooperation with the Tartu City - Financial support for entrepreneurs Insights on the networks	
15	Siim Kinnas	Estonian Business and Innovation Agency	Insights on support aimed at science-intensive sector	
16	Karry Kukk	Estonian Business and Innovation Agency	Insights on support aimed at science-intensive sector	
17	Triin Kask	Co-founder at Soulie, Board member at Estonian Founders Society, Mentor	- Industry perspective on the ecosystem; - Existing networks and events for startup founders; Funding opportunities for startup founders.	
18	Triinu Lööve	Program Manager, UT	Spinoff programmes at the University of Tartu R&D	
19	Laura Kalaus	Entrepreneurial School coordinator in Tartu	- How entrepreneurial knowledge is spread in schools; Governmental support to schools.	
20	Karl Haljasmets	Consultancy	Industry perspective on the ecosystem	

21	Külli Hansen	Tartu Centre for Creative Industries	Information on how Tartu Centre for Creative Industries Business supports creative industry in Tartu	
22	Riin Lisett	Marketing and PR at Contriber	Industry perspective on the ecosystem	
23	Alo Liles	Startup mentor and investor, Business development enthusiast	- Industry perspective on the ecosystem; - Used to organize the StartUp Day -> insights on the events in Tartu - Writes his Phd on the entrepreneurial ecosystem -> professional expertise	
24	Kristina Lillo	Innovation Lead at SEB Eesti and SEB Tartu Innovation Centre Manager	- Access to debt for entrepreneurs Funding opportunities	

Notes.

- Green – interview is conducted;
- Pink – No response from a respondent.

Source: Compiled by the author.

APPENDIX B

Full Interview Guide

	Pillar	**Questions**	**Referenced source(s)**
1	Introductory questions	• Could you please tell me more about your expertise and professional responsibilities? • How does the entrepreneurial ecosystem of Tartu differ from the one in Tallinn?	Reidolf, M et al., 2018: 141
2	Formal institutions	• How does Tartu City government create an environment aimed at creating opportunities for future and existing companies? • Do you think that there are still some difficulties which individuals need to overcome while starting a business?	Acemoglu et al., 2005
3	Culture	• How encouraging is Estonian culture for entrepreneurship? • What are the peculiarities of Estonian entrepreneurial mindset? (for example, high risk tolerance, resilience)	Argote and Miron-Spektor, 2011; Audretsch, 2015 Field, 2012
4	Networks	• How are entrepreneurs involved into social and professional networks? • How accessible for an entrepreneur to join such networks? • Which social networks or clusters exist in Estonia which help enhancing entrepreneurship?	Spiegel & Harrison, 2017; Singh et al., 1999; Hoang and Young, 2000
5	Physical infrastructure	• How does physical infrastructure help individuals to start and run business in Tartu? (Evaluate on the scale from 1-10)	Audretsch et al., 2015
6	Demand	• How open are regional markets for new entrants?	Stam & Van de Ven, 2021 Fuduric, 2008
7	Intermediaries	• How easy is it to access professional services such as consultancy, legal advice, accounting, insurance? • How affordable are such services?	Howells, 2006 Stam & Van de Ven, 2021; Mason & Brown, 2018
8	Talent (human capital)	• How skilled human capital in Tartu? • How easy can companies access skilled human capital in Tartu? • What are the peculiarities of talents in Tartu?	Qian et al., 2013
9	Knowledge	• Which role do the local universities play in sourcing companies / boosting the entrepreneur?	Qian et al., 2013

		• How do local universities support translation of research and development into new businesses?	
10	Leadership	• How do leaders of companies influence policy making and set trends? • Who are the current trend-makers in Tartu?	Feld, 2012 Stam & Van de Ven, 2021
11	Finance	• How easy is it to obtain financial support to start a business? • Are there sufficient local funds for start-ups? • What are the funding opportunities available for businesses?	Mason & Brown, 2018

Source: Compiled by the author.

7 Resümee

ETTEVÕTLUSE ÖKOSÜSTEEMI ROLL VÕIMALUSTE ARENDAMISEL

Anastasiia Nestrogaeva

Käesolev uurimus on pühendatud Tartu ettevõtlusökosüsteemi uurimisele kvalitatiivse uurimisstruktuuri abil. Uuringu põhiidee oli näha, kuidas toimib Tartu ettevõtlusökosüsteem, kasutades ökosüsteemset lähenemist. Nii viidi läbi viisteist ekspertintervjuud ning andmete analüüs ehitati üles Erik Stami tuntud ettevõtlusuuringu mudeli kümne samba ümber. Selgus, et ökosüsteemil on kvaliteetne institutsiooniline korraldus, nt väga toetav kohalik omavalitsus, mis koordineerib väga integreeritud ettevõtluse tugiorganisatsioonide võrgustikku ja säilitab kõrgetasemelise koostöö Tartu Ülikooliga. Uuringus rõhutatakse, et Eesti kultuur on ettevõtluseks julgustav, samas kui võrgustikud on hästi integreeritud ja hõlbustavad ettevõtlusega tegelemist. Tartu ettevõtlusökosüsteemi nõrgad küljed on aga rahastamisvõimaluste, talentide ja piirkondlike liidrite kriitilise massi puudumine, samuti väike nõudlus, mis tuleneb väikesest riigiturust ja idufirmade keskendumisest rahvusvahelisele arengule.

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supervised by

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18/05/2023