HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE SCIENCES

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EE Eentrepreneurial Ecosystem

EU European Union

GDP Gross Domestic Product

OECD Organization for Economic Co-operation and Development

R&D Research and Development

SMEs Small and Medium-Sized Enterprises

CHAPTER 1. INTRODUCTION

1.1 Purpose and motivation of the research

Every research has got a purpose and motivation. The purpose of the topic and the originality of each work is the critical point to distinguish one piece of research from another. In this section I briefly present the purpose and motivation behind my dissertation work.

The purpose behind my research can be summarized as below:

First of all, the aim of this study is to analysis the innovative entrepreneurship ecosystems in Azerbaijan. Specifically, the primary actors and catalysts for innovative entrepreneurship ecosystems such as startups, their interrelations, funding methods, the influence of business incubators and accelerators are of great interest. The central driving force behind my research proposal stems from the emphasis placed Azerbaijani governments on fostering the growth of innovative entrepreneurship.

With an increasing number of startup companies and business incubators entrepreneurship ecosystem of Azerbaijan is experiencing significant growth. Furthermore, innovative entrepreneurship has not received enough attention by researchers and scholars in Azerbaijan until the introduction of long-term strategy of ”Azerbaijan 2030: National Priorities for Socio-Economic Development”. To this end the results of my research is of great importance for both researchers and ecosystem.

What makes my dissertation quite original is that development of favourable innovative entrepreneurship ecosystem is one of the priorities of the Azerbaijan government as stated in the abovementioned long-term strategy. Therefore, my research outcome is of great interest to both policy makers and decision makers.

To enhance the international relevance of my research, I conduct a comparative analysis of the startup ecosystems in Azerbaijan and Hungary. Azerbaijan and Hungary differ greatly in aspects like geography, demographics, business environment, market, and culture. By comparing the start-up ecosystems of these countries we can evaluate the generalizability of research findings and better understand the dynamics of different startup ecosystems. My research addresses the research gap in comparative startup ecosystem analysis between former Soviet and European countries. Additionally, empirical analysis provides valuable policy insights for various stakeholders.

1.2 Research objective and research questions

The objective of this research is to comprehensively explore and analyze critical factors that influence the success and challenges faced by startups within a specific local ecosystem. The study is guided by five primary research questions:

1. Motivation and Previous Experience of the Startup Team: The first objective is to investigate the role that the motivation and prior experience of startup teams play in the success and growth of their ventures. Understanding how these factors contribute to the overall performance and sustainability of startups will provide insights into the importance of human capital in entrepreneurial success.

2. Advantages and Disadvantages of the Local Startup Ecosystem: The second objective is to identify and evaluate the advantages and disadvantages inherent in the local startup ecosystem. This includes assessing the support structures, resources, and opportunities available to startups, as well as the potential drawbacks and barriers that may exist within the ecosystem.

3.Challenges of the Local Startup Ecosystem: The third objective is to identify and analyze the main challenges that startups encounter within the local ecosystem. These challenges may include funding difficulties, regulatory obstacles, market access, and competition, all of which can impact the viability and growth of new ventures.

4. Funding Methods and Revenue Models: The fourth objective is to explore the various funding methods available to local startups and to examine the revenue models that are most commonly adopted. This analysis will shed light on how startups finance their operations and generate income, providing a clearer understanding of the financial strategies that are most effective in the local context.

5. Local Market Landscape and Customer Base: The fifth and final objective is to assess the local market landscape and the characteristics of the local customer base. This involves examining market size, customer segmentation, and the level of customer engagement, which are crucial for determining the potential success of startups in the region.

Overall, this research aims to provide a detailed understanding of the factors that contribute to the success and challenges of startups in the local ecosystem, offering valuable insights for entrepreneurs, investors, and policymakers.
Therefore, the following research questions and hypothesis were the main drivers of the analysis throughout the research.

RQ1: How important are the motivation and previous experience of startup teams in startup success?
Hypothesis 1: There is no relationship between startup success and motivation and previous experience of startup teams

RQ2: How is the local market landscape and local customer base?
Hypothesis 2: The local market is well-defined and there is a loyal customer base.

RQ3: What funding methods are available, and what revenue models are mostly adopted by local startups?
Hypothesis 3a: Local startups do not face funding issues.
Hypothesis 3b: Local startups lack differentiated revenue models

RQ4: What are the advantages and disadvantages of the local startup ecosystem?
Hypothesis 4a: The local startup ecosystem does not offer any advantage.
Hypothesis 4b: The local startup ecosystem creates unfair competition.

RQ5: What are the main challenges of the local startup ecosystem?
Hypothesis 5: There are no big challenges in the local startup ecosystem.

The below table 1 illustrates which survey questions are associated with which research questions.

Table 1. Relations of survey questions with research questions

Researh Questions (RQ)	Related Hypothesis	Related Survey Questions
RQ1: How important are the motivation and previous experience of	Hypothesis 1: There is no relationship between startup success and	Q1. Have you participated in an entrepreneurship survey before? Q2. Your position/role at the startup Q3. How many members does your

startup teams in startup success?	motivation and previous experience of startup teams	startup have? Q5. What is your motivation and aspiration for being in a startup? Q6. How old are you? Q7. What was the previous work experience before joining a startup?
RQ2: How is the local market landscape and local customer base?	Hypothesis 2: The local market is well-defined and there is a loyal customer base.	Q4. How many years has your startup been on the market with a product/service offering? Q8. What kind of customers are you targeting? Q19. Connections with foreign startup ecosystems Q20. What sector do you operate in?
RQ3: What funding methods are available, and what revenue models are mostly adopted by local startups?	Hypothesis 3a: Local startups do not face funding issues. Hypothesis 3b: Local startups lack differentiated revenue models	Q9. What term best describes your revenue model? Q10. Which of the followings were your initial funding methods? Q13. What are the biggest expenses you are facing currently?
RQ4: What are the advantages and disadvantages of the local startup ecosystem?	Hypothesis 4a: The local startup ecosystem does not offer any advantage. Hypothesis 4b: The local startup ecosystem creates competition.	Q12. In what form would you like the state to support startups? Q15. What are the advantages of Baku Startup Ecosystem? Q16. What are the disadvantages of Baku Startup Ecosystem? Q17. What resources/opportunities lack in Baku Startup Ecosystem?
RQ5: What are the main challenges of the local startup ecosystem?	Hypothesis 5: There are no big challenges in the local startup ecosystem	Q11. What obstacles do you think are making it difficult for your startup to grow? Q14. How hard is to overcome the following challenges? Q18. Evaluation of the impact of Covid-19 on the business processes

Source: Author's own construction

The survey was designed to be conducted in both Azerbaijan and Hungary. However, despite all efforts to conduct a comparative survey between Azerbaijan and Hungary, the study was hampered by significant difficulties in reaching Hungarian startups. Although I co-authored a paper with Judit Szakos, *(JAFAROV, N., & SZAKOS, J. (2022). Review of entrepreneurial ecosystem models. ASERC Journal of Socio-Economic Studies, 5(1), 3-16.)* a PhD graduate from Ludovika University of Public Service, who successfully defended her dissertation on a related topic, we encountered considerable difficulties in securing interviews with Hungarian startups. In spite of the fact that she is hungarian and has good network in local startup ecosystem she had tremendous difficulties to interview start-ups. These challenges persisted, ultimately affecting my ability to gather the necessary data for the comparative analysis.

1.3 Structure of the dissertation

Chapter 1 outlines the purpose and motivation behind my dissertation work. The research objectives and methodology of the study were introduced in this section along with the originality of the study.

The chapters proceed as follows. Chapter 2 comprehends theoretical framework of entrepreneurship research in chapter 3, literature review of entrepreneurial ecosystem chapter 4 presents the role of startups in the innovative entrepreneurship ecosystem of Azerbaijan and Hungary. Chapter 5 outlines the research methodology and chapter 6 discusses research outcomes, and chapter 7 presents recommendations, research limitations and future research agenda and chapter 8 presents new scientific findings.

CHAPTER 2. THEORETICAL FRAMEWORK OF ENTREPRENEURSHIP RESEARCH

2.1 Introduction

Scholarly research into the field of entrepreneurship perhaps goes back to the 18th century when CANTILLON (1755) described the entrepreneurs as risk takers. Richard Cantillon (168?-173?) in his "*Essai sur la Nature du Commerce en Général"* introduced the first theoretical analysis of commerce which was available for the scientific environment in 1755. The *Essai* paved the way for the seminal works that published later by authors like David Hume, Adam Smith so on. Nevertheless, his seminal work "*Essai sur la Nature du Commerce en Général"* was not discussed to the great extent until rediscovered by William Stanley in the 19th century. In his opinion, Cantillon contributed to numerous economic spheres from principles to the complex macroeconomic models also considering circular-flow model and the price-specie flow mechanism.

On top of the economic contributions, Cantillon is considered one of the first scholar developing the theory of entrepreneurship and MURPHY et al. (2006) mentioned him as "*the* original thinker on entrepreneurship in the entrepreneurship literature". Even though it is considered that the term "entrepreneur" was first introduced by Jean-Baptiste Say, it is widely accepted that it was Cantillon who initiated the term and used in its modern notion (BROWN and THORNTON, 2013)

However, this field gained currency after the research of SCHUMPETER (1934) who initiated the concept of creative destruction and mentioned the entrepreneurship as one of the most important factors of production for the first time. To put simply, creative destruction means the process of competition among old firms with new innovative firms that end ups with the failure of the old ones.

Therefore, the entrepreneur is not only a factor of production but is the most important factor among the factors of production. It is because an entrepreneur allocates all other factors of production, including his/her energy, passion, and vision, that at the end it becomes distinct from surroundings (PELIKAN, 1993). It plays a leverage role on the rate of return of all factors of production.

COLE'S (1959) interdisciplinary research of entrepreneurship opened a new page in this field of study. In his research on motivation and change, he combined the fields of sociology and psychology and defined the entrepreneur as someone who is seeking to profit by the commercialization of innovation.

MCCLELLAND (1961) took this further and suggested predictive ability of psychological traits that are observed in entrepreneurs.

McClelland's work paved a way for the new research area, the so-called psychology of entrepreneurs and led to the study of entrepreneurial intentions by BIRD & JELELNICK (1988), as well as analytically and psychoanalytically oriented research by LANDSTROM (1999).

2.2 Entrepreneurship concept and entrepreneurship research

Although there are a few definitions, it may be better to consider the most cited definition of entrepreneurship (SHANE and VENKATARAMAN, 2000). They coined the following definition:

"the field involves the study of sources of opportunities; the processes of discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate, and exploit them" (SHANE and VENKATARAMAN, 2000, p. 218)

This definition further extended by SHANE and VENKATARAMAN (2000) and listed three research questions that organization scholars mainly interested in about entrepreneurship.

1) The factors, timing, and processes involved in the emergence of opportunities for developing goods and services.

2) why, when, and how certain individuals identify and take advantage of these opportunities while others do not.

3) why, when, and how various approaches utilized to capitalize on entrepreneurial opportunities

However, when it comes to the analysis of entrepreneurship research, economics does not pay enough attention to the importance of entrepreneurship research (BAUMOL 2009, DAN JOHANSSON, 2004, BARRETO 1989). As William Baumol emphasizes in his "The Microtheory of Innovative Entrepreneurship" book, there is a huge need to redirect microeconomic analysis from statics toward dynamics and pay attention to the most ignored fourth factor of production- entrepreneurship. In an attempt to address the issue of "how to bring entrepreneurship into static microeconomic theory", he suggests working with Schumpeter's informal ideas. Having done some formal analysis, he points out the importance of price discrimination to an entrepreneur. As a result of his analysis, we learn that available price

discrimination does not imply the problem in market contestability but rather shows the normal functioning of the market. Additionally, the existence of price discrimination in the markets without obstacles for entry is not an indicator of monopoly power.

Contrary to PHIPPS et al. (2012), BAUMOL (2011), DAN JOHANSSON (2004) and BARRETO (1989) in his "Economics of Entrepreneurship" book SIMON PARKER argues (2009) that economics instead proposes various methods and theories to facilitate the study of entrepreneurship. These methods and theories sometimes quantitative and are based on the models and econometric analyses. He tries to exemplify and put forward counter-arguments against the misperceptions of non-economists on the role and potential of economics under four instances.

1. He argues that, development of neoclassical economics has not stopped after completion of the general equilibrium theory in 1960s and 1970s and modern economic theory does not ignore the entrepreneur either. However, he does agree with the criticism that the terms 'entrepreneur' and 'entrepreneurship' are omitted in the main economics textbooks in microeconomics, macroeconomics and industrial organization (KENT AND RUSHING, 1999). As we have discussed above, Simon indirectly agrees with JOHANSSON'S (2004) critics, as well.

2. Even an entrepreneur fails to optimize his activities it does not mean that modern economic theory is not applicable because this theory is based on the optimization. In order to elaborate on this issue more, he reiterates FRIEDMAN'S (1953) example where billiard players do not figure out the angles and reflection before they strike, although they strike as if they have optimized solution. Moreover, where this argument is not applicable, he reminds BAUMOL'S opinion (1993) who emphasized the optimization as a valuable benchmark in entrepreneurship. Furthermore, he mentions Bayesian methods as a very suitable tool for modelling entrepreneurial uncertainty (ALVAREZ and PARKER, 2009). He also counter argues by saying that "although the rational expectations hypothesis' does not allow agents to this is far from being the only school of thought in modern economics" and points out that "economic models are increasingly beginning to incorporate persistent over optimism, bounded rationality and other cognitive biases into individual behaviors and choices (MINNITI and LEVESQUE, 2008)".

3. Sometimes economics is mentioned as a limited field of science due to the incapability of enlightening the psychology of entrepreneurs and other features of social relations. Simon argues that this judgement is unfair, and all subjects have some limitation and only aggressive economists would argue the vice versa.

4.Since economics assumes perfect information and competition, contrary to the real world where there is imperfect information and imperfect competition, no profit motive is attainable for entrepreneurs. To address this argument Parker points out that it is important not to mix “normal” earnings with “supernormal” one. In the competitive market conditions, the latter will disappear through competition. Therefore, it is not fair to argue that these entrepreneurship activities will cease to be attractive because of perfect competition.

DAN JOHANSSON’S (2004) interesting research shed a light on the attitudes of the economics education towards entrepreneurship and institutions based on the keywords of the economic books taught in Sweden’s Ph.D. programs. He names this relationship in his paper by pointing out” it has the dual lacunae of entrepreneurship and institutions”. When it comes to equilibrium thinking, it is mainly a mathematical representation of the theory that relies on numerous axioms. Johansson cites BARRETO (1989) who described it very originally:

> “The confrontation between the basic axioms and the entrepreneur leaves two possibilities: to accept the entrepreneur and reject the modern theory of the firm, or to reject the entrepreneur and maintain allegiance to the modern theory of the firm. . . . Simply put, entrepreneurship is above ‘formalization’—it cannot be neatly packaged within a mechanistic, deterministic model. Importantly, the choice is an ‘either-or’ proposition; there is no happy medium. The corner solution which economic theory has chosen is consistency and for this reason the entrepreneur disappeared from microeconomic theory (BARRETO 1989: 115, 141)

Johansson’s findings in terms of Sweden’s Ph.D. programs are very valuable. He has searched the eight terms in two subsets. The first set of terms of search is related to knowledge and discovery: *entrepreneur*, *innovation*, *invention, tacit knowledge, bounded rationality*. The second set of terms of search that is related to entrepreneurship were: *institutions*, *property rights*, and *economic freedom*.

As such, altogether 19 textbooks were analyzed and only 16 have five or fewer references to any of the searched eight terms. Additionally, eight of the main textbooks have no reference to any of the terms. Among the 19 books, 5 referred to *institutions*, 2 references are made to *entrepreneur*, 8 books referred to property rights, with no reference to *economic freedom*, *invention*, or *tacit knowledge*.

As a concluding remark, he concludes by saying “the problem with economics education is not the training we do have, but the training we do *not* have.”(JOHANSSON, 2004, page 533)

The main limitation of his research is being very local, that is, he analyzed the only Ph.D. programs in economics in Sweden for the academic year 2003-04. But as the author also emphasized, since Ph.D. programs in Sweden are very similar to that of in the United States and almost all textbooks examined are authored by the United States economists the result of the research makes sense.

PHIPPS et al. (2012) research about the discussion and the extent to which entrepreneurship is included in the economics textbooks is also very valuable. The overall opinion of the authors is in consensus with the opinion of the authors we have discussed above. While considering the material that is devoted to macroeconomics, which is explaining growth issues with a discussion of capital, technology development, health, and education, they conclude that microeconomic discussions are missing the integral role of the entrepreneur in economic growth and innovation. They regret to mention that, the overall situation is the same as it was almost 50 years ago "and to which SCHUMPETER (1911) himself resorted, we are witnessing a performance of *Hamlet* without the Prince of Denmark".

Despite a bulk of literature about the three "factors of production"—land, labor, capital, authors emphasize that entrepreneurship was left out of the economics textbooks. According to their view, it is because the microeconomics concentrated on optimization and equilibrium. As mentioned by SCHUMPETER (1911) and KIRZNER (1973), an innovative entrepreneur cannot accept stability of equilibrium or continued disequilibrium because the optimized static equilibrium has nothing to do with the entrepreneur and where a manager is replaced by an entrepreneur. BAUMOL (1993) argued it, "The theoretical firm must choose among alternative values for a small number of rather well-defined variables . . . management is taken to consider a set of values as described by the relevant functional relationships, equations, and inequalities. Explicitly or implicitly, the firm is then taken to perform a mathematical calculation which yields optimal . . . values for all of its decision variables . . . the entrepreneur has been read out of the model" (p.12–13).

Authors also consider that do the heterogeneity of innovative entrepreneurship. Because the other three production factors can be measured in different meters but when it comes to an innovative entrepreneur, it is not measurable, and this made an obstacle of a statistical and mathematical investigation. For statistical analysis, say, for the analysis of two variables one needs a number of homogeneous observations to make sure that, the behavior between two sets of variables are random. Nevertheless, data sets are unavailable for the behavior of the innovative entrepreneurs who are working on the similar inventions.

Authors followed propositions which KENT (1989), KENT and RUSHING (1999) offered in their study after the review of 15 textbooks in 1989 and an additional 14 texts in 1999.They listed the following 6 main topics that they recommend economics books cover:

1. entrepreneurship as a distinct factor of production
2. entrepreneurship and market equilibrium
3. profits and entrepreneurship
4. entrepreneurship and innovation
5. entrepreneurship in macroeconomics
6. entrepreneurship and economic growth

In addition, it is worth noting that six topics mentioned by the KENT and RUSHING (1999) consider only if the proposition is mentioned without the quality check of the text.

PHIPPS et al. (2012) reviewed the latest versions of eight textbooks and concluded that only 3 of them spend wide discussion about entrepreneur as a factor of production. These are the following textbooks.

- MCCONNELL AND BRUE (2008)
- BAUMOL AND BLINDER (2009)
- SAMUELSON AND NORDHAUS (2010)

The authors of all 3 examined books analyze how the texts refer to entrepreneurship and review the discussion of the entrepreneur from the 6 topical standpoints proposed by KENT (1989) and compared not only the content but also the approaches of all three books.

They have concluded that all 3 reviewed books cover only five propositions, and more portion of these books are about entrepreneurship discussion than those examined by Kent and Rushing (1999). Moreover, there are also several books that to some extent discuss the importance of entrepreneurs in the market economy.

2.3 Theory of Entrepreneurship

BROWN and THORNTON (2013) research into the Cantillon's general theory of entrepreneurship by which Cantillon opened the door to the economic theory and the real-world events is very phenomenal. Authors analyzed Cantillon’s Essai and concluded that his seminal

work is of great importance to the economic and entrepreneurship theory. They give a general idea of Cantillon's contribution to the theory of economy and entrepreneurship and examine five cases from Essai showing how Cantillon uses entrepreneurial theory to create an economic theory.

They claim that Cantillon's theory of entrepreneurship is not only an “isolated brick” in the economic system but is actually better perceived as a means of constructing a brick wall. To create economic models, an entrepreneur is not only of great importance but at the same time, without an entrepreneur Cantillon’s theory would not function.

BROWN and THORNTON (2013) portray and evaluate the five economic cases that Cantillon has introduced in his Essai and they distinguish three contributions of Cantillon to the economics:

1. Entrepreneurship plays an important and necessary role in theoretical structures.
2. Cantillon explains the theoretical constructions with illustrations of entrepreneurial plans, actions, and limitations.
3. Without entrepreneurs, theories and models would fail.

2.4 Creative destruction of entrepreneurship

Although the innovation process generates a number of positive externalities, it may also lead to some economic inefficiencies. BAUMOL (2009) is posing the question of “whether the net effect of the innovation process is positive” and points out four ways to deal with this question. Firstly, he mentions that for the development in the ways of reducing poverty and inequality we owe to distributive implications of innovation spillovers. Secondly, less attention of the contemporary welfare economics to the problem of income distribution. Giving the example of the construction of an entire bridge in his third answer, he argues that, “one cannot rely on marginal analysis because marginal data relate only to small adjustments”. As a fourth point, while studying the topics of income distribution, he totally disagrees about the utilization of so-called “lump-sum transfers”. BAUMOL (2009) continues with the comparison of resource allocation advantage to the negative externalities of “creative destruction”. As a result of his comprehensive discussions, three points can be summarized.

1. Externalities of creative destruction may result in important spillovers that are likely to cause the economic efficiency and the optimal amount of innovation.
2. But the net effect of these externalities is not enough to reach the economic efficiency.
3. These externalities cause the amount of innovation to go up more than the quantity that “would be provided if inventor-entrepreneurs bore all of the social costs entailed”.

Furthermore, unproductive or even destructive entrepreneurial activities may depend on the structure of the payoffs in the economy- "the rules of the game". But the rules of the game vary substantially across the period of time and the location. In another proposition he concludes that entrepreneurs' activities can become either productive or unproductive because of the different economies.

AGHION and HOWITT (1990) examined a channel of industrial innovations that improve the quality of products. By using this knowledge accumulation channel, they have introduced the factor of obsolescence into endogenous growth theory literature. The factor of obsolescence means the more sophisticated products causes previous products obsolete. Because progress creates not only gains but also losses, obsolescence may be a good example of this feature of the growth process. Additionally, it recalls the notion of creative destruction by SCHUMPETER (1942, p. 83, his emphasis):

"The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, ... [This process] incessantly revolutionizes the economic structure ***from within,*** *incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism."*

AGHION and HOWITT (1990) simply modeled the innovation process through creative destruction, based on the patent-race literature. Furthermore, they reckon that individual innovations are quite necessary in order to influence the economy. The expected growth rate of the economy is tied to the bulk of research proportional to the size of the economy. In their article, they portray that the equilibrium in such an economy is based on a forward-looking difference equation, where the research quantity in any period relies on the expected research quantity of the next period.

Startups play a crucial role in driving innovation, economic growth, and job creation, making them vital components of modern economies. They serve as vehicles for translating novel ideas into marketable products and services, thereby fostering competition and technological advancement. In entrepreneurship research, startups are often studied as dynamic entities that embody the entrepreneurial process, from opportunity recognition to scaling and exit strategies. They provide a rich context for examining how entrepreneurs navigate challenges, leverage resources, and create value in uncertain environments. Understanding startups is essential for developing theories of entrepreneurship, as they exemplify the impact of entrepreneurial actions

on both micro and macroeconomic levels (Acs & Audretsch, 1988; Shane & Venkataraman, 2000).

It is important for the readers to clarify the concept of startup. Since startup concept is new to the business world there is not the common definition accepted by all. Therefore, I will mention few very famous definitions in global and in local communities. Steve Blank defines startups as following: "Start-ups are not smaller versions of large companies……startups operate in "search" mode, seeking a repeatable and profitable business model." (BLANK AND DORF, 2012 p 3.)

According to the Entrepreneurship Foundation Hungary 'Startup means a new company with a high growth potential or a project team starting the process of becoming a business and preparing entry to the market.'(Digital Startup Strategy of Hungary, Report of Digital Success Programme, September 2016, p.22)

ERIC RIES (2011) in his book called 'The Lean Startup' defines startup as a human institution designed to create a new product or service under conditions of extreme uncertainty.

Definition of the OECD (2010) is also famous where a startup is defined as a newly emerged business venture that aims to develop a viable business model to meet a marketplace need or problem.

2.5 Summary

This chapter provides an overview of pertinent research and literature concerning the theoretical framework of entrepreneurship. I attempted to show the current level of relationship between economics and entrepreneurship in the scholarly literature as well as in the context of economic literature.

The discussion and the result throughout this chapter might be summarized in the following way:

1. Entrepreneurship is still missing in the economic textbooks. In spite of the fact that entrepreneurship was the main player of the Cantillon's theory of entrepreneurship and economic theory in the 18th century and scholars such as SCHUMPETER (1934), BAUMOL (1993, 2009) and many others have raised the importance of entrepreneurship as the essential factor of production still the level of entrepreneurship discussion in the economic books is not sufficient (BARRETO,1989; KENT and RUSHING,1999; DAN JOHANSSON, 2004; BAUMOL, 2009; PHIPPS et al, 2012)

2. The role of entrepreneurship in the economic theory is gaining more and more attention. Nevertheless, literature is not in the consensus when we look back and study Cantillon's

contributions to economic theory. Because the development of the economics as a field of science took the other path contrary to proposed by Cantillon (BROWN and THORNTON, 2013) and as a result, after two centuries it is still arguable to what extent the entrepreneurship is back to the economic theories.

As for the limitations, it is clear that not any single study can cover the whole body of literature. I attempted to review some of the US and European scholars' discussion from the capitalist world. Therefore, it would be interesting to review other literature, specifically Asian and Latin American literature to understand how entrepreneurship is integrated with the economic theories they are learning and teaching.

CHAPTER 3. LITERATURE REVIEW OF ENTREPRENEURIAL ECOSYSTEM

3.1 Introduction

The popularity of an entrepreneurial ecosystem (EE) concept is clearly visible from the number of scholarly articles and the books being published and the increasing number of conferences being organized in the near past. Suffice it to mention that the leading scholars in the field of entrepreneurship research have published a few books related to the entrepreneurial ecosystem concept since 2018. Some of these well-known and highly cited books are as follows sorted by the year of publication:

- Entrepreneurial Ecosystems by BEN SPIGEL (2020)
- The Internet of Things Entrepreneurial Ecosystems: Challenges and Opportunities by JAMES A. CUNNINGHAM and JASON WHALLEY (2020)
- Startup communities: Building an entrepreneurial ecosystem in your city by FELD BRAD (2020).
- The Startup Community Way: Evolving an Entrepreneurial Ecosystem by FELD BRAD & HATHAWAY IAN (2020).
- Entrepreneurial ecosystems. Place-Based Transformations and Transitions by O'CONNOR, A., STAM, E., SUSSAN, F., & AUDRETSCH, D. (2018).

This list could be much longer if one would add only books on startups and scaleups.
Additionally, entrepreneurial ecosystem research is published at both Q1 and Q2 levels, and the top journals comprise more than 54% such as Research Policy (Q1), Small Business Economics (Q1), European Planning Studies (Q1), Journal of Business Venturing (Q1), Entrepreneurship Theory and Practice (Q1), Journal of Technology Transfer (Q1), Strategic Entrepreneurship Journal (Q1), Journal of Small Business Management (Q1), and Journal of Business Research(Q1) which are top most-cited journals and most of them published special issues on entrepreneurial ecosystem research (VELT et al., 2020).

Based on the abovementioned reasons it is worth conducting research related to the entrepreneurial ecosystem and contributing to the stack of knowledge in the research of the entrepreneurial ecosystem. To this end, the aim of this research is to answer the following research questions:

- How do we define the entrepreneurial ecosystem?
- What are the models developed to understand the entrepreneurial ecosystem?

The analysis and discourse presented in this chapter stem from a comprehensive review of scholarly articles, books, and scientific databases including ScienceDirect, Web of Science, Scopus, and Google Scholar. By doing so, this chapter presents the most cited entrepreneurial ecosystem models and explores the various approaches to entrepreneurial ecosystem based on these models.

3.2 Entrepreneurial ecosystem concept

It was MOORE (1993) who popularized the term "ecosystem" in a social science (MALECKI, 2017) and suggested to consider a firm not as a member of a single industry but as part of a business ecosystem.

The term of entrepreneurial 'ecosystem' is being discussed extensively by different scholars (STAM 2015; SPIGEL 2017; ACS et al. 2017) as well as practitioners (FELD 2012; ISENBERG 2010).

STAM and VAN DE VEN (2019) highlighted some empirical studies that analyse the way the entrepreneurial ecosystem leads to entrepreneurship and value creation at the regional level (FRITSCH 2013; AUTIO et al. 2014 TSVETKOVA 2015;) In addition, other researches argued how early entrepreneurial success, strong entrepreneurial culture and supportive public policies (MACK & MAYER, 2016) along with cohesive social and economic system (SPIGEL, 2017) contributed to a strong entrepreneurial ecosystem.

At the national level ACS et al.(2014) applied large-scale quantitative methods in an attempt to analyse strong entrepreneurial ecosystems.

While there are numerous other studies that enrich the literature, STAM AND VAN DE VEN (2019) specifically emphasizes several issues pertaining to the concept of entrepreneurial ecosystem.

• Tautological reasoning, such as defining entrepreneurial ecosystems as systems that produce successful entrepreneurship, and attributing successful entrepreneurial stories solely to a successful entrepreneurial ecosystem.

• While certain factors may illuminate certain aspects of entrepreneurial success, they may not fully elucidate their interdependent effects on entrepreneurship. For instance, research by THE WORLD ECONOMIC FORUM (2013) suggests that factors like market availability, workforce, and funding are crucial for entrepreneurial success, but they may not be the fundamental causes

for the success of entrepreneurial ecosystems (ACEMOGLU et al., 2005). To address this issue, STAM AND VAN DE VEN (2019) propose identifying both necessary and contingent conditions within an ecosystem, as well as recognizing the roles of government and institutions.

• Additionally, when examining entrepreneurial ecosystems geographically, they can encompass various scales such as cities, regions, countries, or sectors and technologies. Thus, there is a lack of consensus regarding the appropriate level of analysis (STAM & VAN DE VEN, 2019).

When we search the concept of entrepreneurial ecosystem, we do come across different theories and approaches come across.

As SPIGEL (2020) mentions in the introduction of his book named ”Entrepreneurial ecosystems”, the main logic of entrepreneurial ecosystems is that entrepreneurship is team sport. He continues by arguing that, entrepreneurial ecosystems provide two things for entrepreneurs:

1. Entrepreneurial resources such as funding, skilled workforce, and entrepreneurial knowledge available to use by entrepreneurs.
2. An environment where the resources mentioned above are accessible.

BURDA et al.(2020) argue that “innovation ecosystem”, “business ecosystem” “entrepreneurial ecosystem” concepts have been used interchangeably or have various definitions and sometimes “innovation ecosystem”, “business ecosystem” terms treated synonymously. As for entrepreneurial ecosystem concept, it is often referred to strategy literature and treated as a part of innovation ecosystem or business ecosystem (ACS et al., 2017).

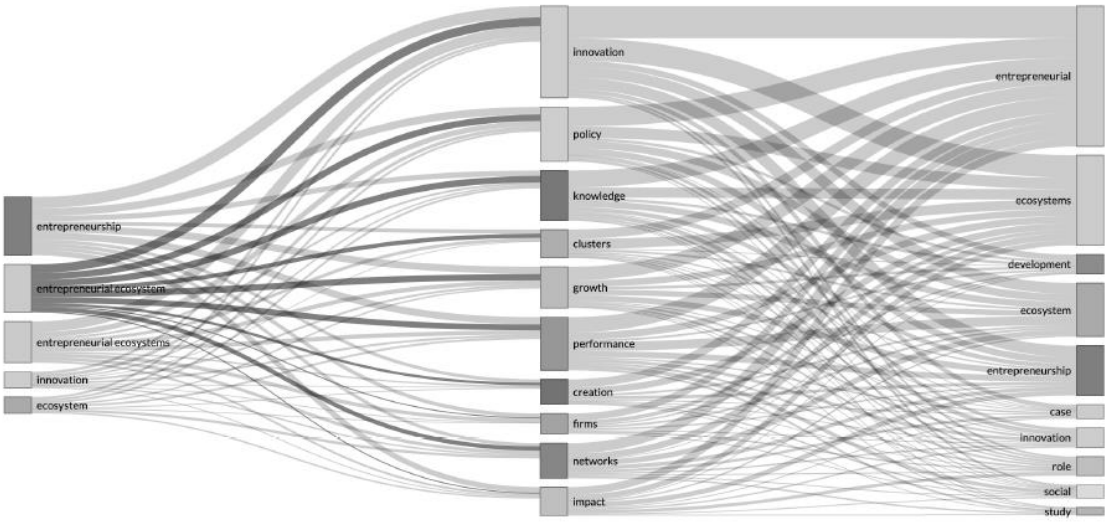


Figure 1. Three-fields plot for the entrepreneurial ecosystem dataset

Source: BURDA et al.(2020)

BURDA et al. (2020) performed a bibliometric examination of articles published in the Web of Science database spanning from 1993 to 2020. They scrutinized 777 studies pertaining to the concepts of innovation ecosystem, business ecosystem, and entrepreneurial ecosystem. One significant contribution of their work is the extraction of definitions and the identification of distinguishing characteristics among the concepts of "innovation ecosystem," "business ecosystem," and "entrepreneurial ecosystem." In terms of the focus of this study, Table 2 presents the features specific to entrepreneurial ecosystems based on the findings of BURDA et al. (2020).

Table 2. Features of entrepreneurial ecosystem concept

Feature	Entrepreneurial ecosystem
Core element / Actor	• Entrepreneurs and corresponding infrastructure (BROWN and MASON,2017) • Big incumbents (BROWN and MASON, 2017)
Role of the core element / Actor	• Promotion of networking and collaboration (SPIGEL, 2017) • Building up an environment encouraging a new round of entrepreneurship (AUTIO et al., 2014) • Identifying main issues (SPIGEL and HARRISON, 2018) • Incubation of entrepreneurs (BROWN and MASON,2017)
Types of participants (excl. core element)	• Entrepreneurs, suppliers, consumers, government (AUDRETSCH and BELITSKI, 2017; SOLESVIK, WESTHEAD, 2019;TRABSKAJA, METS, 2019)
Renewal mechanisms	• “Entrepreneurial re-cycling” BROWN and MASON,2017)
Boundaries	• Determined by a particular geographical domain (BROWN AND MASON, 2017; SPIGEL, 2017; SOLESVIK, WESTHEAD, 2019; TRABSKAJA, METS, 2019)
Target outcomes	• (New round of) entrepreneurship (ACS et al., 2017;

	SOLESVIK, WESTHEAD, 2019; TRABSKAJA, METS, 2019)
Dynamics of collaboration	• Collaboration (ACS et al., 2017) • Value creation at an individual level (ACS et al., 2017) • Socio-spatial context as a mediator of entrepreneurship (BROWN and MASON,2017) Absence of direct competition among startups within the EE (SPIGEL and HARRISON, 2018)
Nature of interdependence	• Determined by the entrepreneurial process (BROWN and MASON,2017) • Cultural (entrepreneurial mindset and environment) (BROWN AND MASON, 2017; SOLESVIK AND WESTHEAD, 2019) • Financial (capital for venture development) (BROWN AND MASON,2017) • Knowledge processing mechanisms (SPIGEL AND HARRISON, 2018)
Challenges	• Related to venture creation • Choice of firms for investments on (Brown and Mason,2017)
Shared elements	• Core technology (Spigel, 2017) • Knowledge on challenges of growing a venture (SPIGEL, 2017) • Resources and culture of the domain (ACS et al., 2017) • Knowledge about the entrepreneurial process (SPIGEL and HARRISON, 2018)
Major reason for collaboration	• Acquisition of resources, knowledge, and support, which increase competitive advantage and ability to scale up (SPIGEL and HARRISON, 2018)

Source: Adapted from BURDA et.al (2020)

According to SPIGEL AND HARRISON (2018), the conceptual framework of the entrepreneurial ecosystem is grounded in theories of entrepreneurship, regional science, and economic geography. Apart from the features of the entrepreneurial ecosystem we see in Table 3, BURDA et al. (2020) reported that their analysis of papers written on entrepreneurial ecosystem revealed the following three clusters.

1. Entrepreneurship
2. Entrepreneurial ecosystem
3. Entrepreneurial ecosystems

In this research, I concentrate on the concepts within the second and third clusters. The divergence observed in these clusters is attributed to research fragmentation and investigations into the entrepreneurial ecosystem concept and its applications (BURDA et al., 2020). Based on their findings, the authors assert that the entrepreneurial ecosystem concept is closely associated with new venture creation, regional development, and notably emphasizes collaboration and innovation. Table 3 illustrates the concept of entrepreneurial ecosystem published on the most-cited journals.

Table 3.Concept of entrepreneurial ecosystem by different scholars

	Publication	Definition
1.	SPILLING, 1996	"The entrepreneurial system consists of a complexity and diversity of actors, roles, and environmental factors that interact to determine the entrepreneurial performance of a region or locality." (p. 91)
2.	COHEN, 2006	"Entrepreneurial ecosystems represent a diverse set of interdependent actors within a geographic region that influence the formation and eventual trajectory of the entire group of actors and potentially the economy as a whole. Entrepreneurial ecosystems evolve through a set of interdependent components which interact to generate new venture creation over time" (pp. 2–3)
3.	ISENBERG, 2010	This entrepreneurship ecosystem consists of a dozen or so elements (which we consolidate into six domains for

		convenience sake …) that, although they are idiosyncratic because they interact in very complex ways, are always present if entrepreneurship is self-sustaining. So although the combinations are always unique, in order for there to be self-sustaining entrepreneurship, you need conducive policy, markets, capital, human skills, culture, and supports. (p. 46)
4.	QIANETAL.(2012)	"economic, social, institutional and all other important factors that interactively influence the creation, discovery and exploitation of entrepreneurial opportunities" (p. 562)
5.	FELD, 2012	Four principles for entrepreneurial ecosystems: "1) Entrepreneurs must lead the startup community. 2) The leaders must have a long-term commitment. 3) The startup community must be inclusive of anyone who wants to participate in it. 4) The startup community must have continual activities that engage the entire entrepreneurial stack." (p. 23)
6.	VOGEL,2013	"…an interactive community within a geographic region, composed of varied and interdependent actors (e.g. entrepreneurs, institutions and organizations) and factors (e.g. markets, regulatory framework, support setting, entrepreneurial culture), which evolves over time and whose actors and factors coexist and interact to promote new venture creation." (p. 6)
7.	AUTIO et al., 2014	"Entrepreneurial ecosystems regulate the direction and quality of entrepreneurial innovation by shaping the direction and potential rewards of alternative courses of technological development…" (p. 1100)
8.	MASON & BROWN, 2014	A set of interconnected entrepreneurial actors (….), entrepreneurial organizations (…), institutions (…), and entrepreneurial processes (…..) which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment. (p. 9)

9.	STAM, 2015	A set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship (p. 1765)
10	ROUNDY, 2016	"the sets of actors, institutions, social structures and cultural values that produce entrepreneurial activity" (p. 233)
11	AUDRETSCH AND BELITSKI, 2016	"systems of entrepreneurship (further ecosystem) as institutional and organizational as well as other systemic factors that interact and influence identification and commercialization of entrepreneurial opportunities" (p. 2)
12	WADEE AND PADAYACHEE, 2017	"an entrepreneurial ecosystem refers to the set of elements, individuals, organizations or institutions outside the individual entrepreneur that are conducive to the choice of a person to become an entrepreneur, or the probability of his or her success following launch." (p. 288)
13	ACS et al., 2017	"…The entrepreneurial ecosystem approach, just like strategy and regional development literatures, emphasizes the interdependence between actors and factors, but sees entrepreneurship (new value creation by agents) as the output of the entrepreneurial ecosystem" (p. 3)
14	AUTIO, 2017	"Entrepreneurial ecosystems are regionally embedded interaction systems that drive the allocation of resources towards productive uses through the creation and scale-up of new ventures." (p. 23)
15	BRUNS et al.,2017	The term entrepreneurial ecosystem was coined to refer to those elements in the entrepreneurs' environment that help them to succeed (or not) in their efforts to grow a new venture. (pp. 31–32)
16	SPIGEL, 2017	"Entrepreneurial ecosystems are combinations of social, political, economic, and cultural elements within a region that support the development and growth of innovative start-ups and encourage nascent entrepreneurs and other actors to take the risks of starting, funding, and otherwise assisting high-risk ventures." (p. 50)

17	THEODORAKI et al., 2018	"The entrepreneurial ecosystem includes three dimensions: actors who form it and their interactions (formal and informal network), physical infrastructure, and culture." (p. 50)
18	STAM AND SPIGEL, 2018*	"a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory" (p. 407)
19	BURDA et al., 2020*	Entrepreneurial ecosystem is focused upon the creation of a network of interrelated economic agents, concentrated within a particular geographical area, which ultimately will result in the creation of new enterprises and stimulation of regional development (p. 97)

Source: Based on BURDA et al. (2020) and SPIGEL (2020) studies.
* asterisks indicate author's own addition.

3.3 Entrepreneurial ecosystem models

There are four main models being discussed in the current literature about entrepreneurship ecosystem models (SPIGEL,2018) which are listed below and later discussed in details.

1. DANIEL ISENBERG 's (2010) ecosystem domains
2. WORLD ECONOMIC FORUM'S (2013) ecosystem pillars
3. STEVEN KOLTAI'S (2016) Six+Six entrepreneurship ecosystem model
4. BEN SPIGEL'S (2017) ECOSYSTEM ATTRIBUTES
5. MIT'S (2017) innovation-driven entrepreneurship approach
6. ERIK STAM AND ANDREW VAN DE VEN's (2021) systematic and framework conditions for ecosystems

3.3.1 Daniel Isenberg's ecosystem domains

Daniel Isenberg is one of the pioneers who has been conducting research and helping to formulate policies in the field of an entrepreneurial ecosystem.

In his model depicted in Figure 2 we see a static system showing that entrepreneurial ecosystem consists of six domains: policy, markets, finance human capital, supports and culture that are believed to promote entrepreneurship.

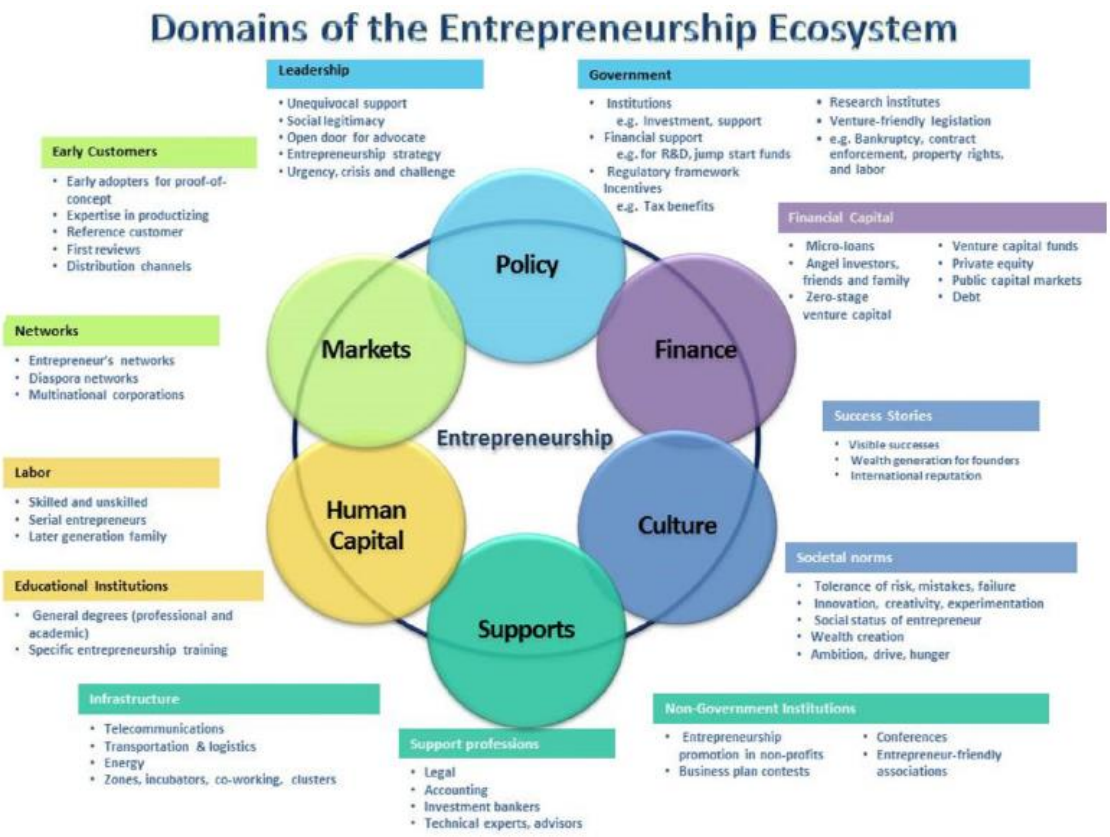


Figure 2. Domains of the entrepreneurship ecosystem.

Source: Daniel Isenberg & Vincent Onyemah, 2016, Fostering Scale Up Ecosystems for Growth: The Cases of Manizales-Mas and Scale Up Milwaukee, page 62.

Some of the elements shown in the figure are similar to the biotic[1] in natural ecosystems—such as educators and bankers while other elements such as infrastructure or culture are abiotic[2] (ISENBERG, 2016).

The author criticizes the view of equating entrepreneurship with startups and argues that the essence of entrepreneurship is growth which happens when business actors create extraordinary value for customers and capture extraordinary economic value for themselves, either through recombining assets, repurposing existing assets, acquiring new assets, or creating new assets.

[1] Biotic factors are living things within an ecosystem; such as plants, animals, and bacteria. https://www.canr.msu.edu/resources/biotic-abiotic
Accessed 11/30/2021

[2] Abiotic factors are non-living components; such as water, soil and atmosphere. https://www.canr.msu.edu/resources/biotic-abiotic
Accessed 11/30/2021

He also posits that his entrepreneurship ecosystem model resembles the natural ecosystems in not having central control, having multiple sources of intention and multiple means of meeting participants' needs. Also table 4 illustrates the possible rationales why the ecosystem actors are willing to invest in entrepreneurship.

Table 4. Possible reasons why the ecosystem actors invest in entrepreneurship.

Educators	Financers	Service professionals	Media representatives	Corporations	Elected officials
In terms of research, intellectual property, contributions, reputation, recruitment of students and faculty.	To increase return on assets or investment	To broad their client base and as a result their revenues	To create a more compelling content and attract readers and advertisers	For a better access to talent, innovation, supply chains, markets, and acquisitions	To create quality jobs, to be popular and get reelected

Source: Author's own illustration based on ISENBERG, D. J. (2016). Applying the ecosystem metaphor to entrepreneurship: uses and abuses.

3.3.2 World Economic Forum's ecosystem pillars

It is clearly mentioned in the report that the following two questions on entrepreneurial ecosystems have been central:

Question 1 – What do entrepreneurs perceive to be the differences between entrepreneurial ecosystems around the globe in terms of the ready availability of the various pillars that make up an ecosystem?

Question 2 – Which pillars of an entrepreneurial ecosystem do entrepreneurs view as most important to the growth/success of their companies?

THE WORLD ECONOMIC FORUM's (2013) model of entrepreneurial ecosystems contributed to the entrepreneurial ecosystems research in two important ways:

1. Entrepreneurs were asked both of the above mentioned two central questions whereas other analyses of entrepreneurial ecosystems do not use to support their argument gathered directly from entrepreneurs.
2. Entrepreneurs who have been surveyed were both asked the above mentioned two questions although some of the previous research papers focused on the first question only. However, without answering the second question policy-makers can not understand the most important factor which account for growth and success of entrepreneurial firms.

Based on this report, we can distinguish three pillars as the most pivotal for the growth of entrepreneurial firms: (1) accessible markets, (2) human capital/workforce, and (3) funding & finance.

The research group behind the data collection have used the following two different sources of information:

1. Online survey of more than 1,000 individuals with extensive experience in early-stage companies, the Stanford Graduate School of Business' alumni database for two-phase survey, and additional databases such as from Endeavor, Pakistan and from Australia.
2. Executive cases based on the survey among founders and senior executives of 43 early-stage companies with the focus of identifying their company growth and how entrepreneurial ecosystems contributed to this growth.

Figure 3 illustrated the World Economic Forum's model of entrepreneurial ecosystems which is comprised of eight ecosystem pillars: accessible markets, human capital, funding and financing, support systems, regulatory framework and infrastructure, education and training, major universities, and cultural supports. Although some of these pillars are similar to Isenberg's domains, major universities as catalyst pillar is addition to this model.

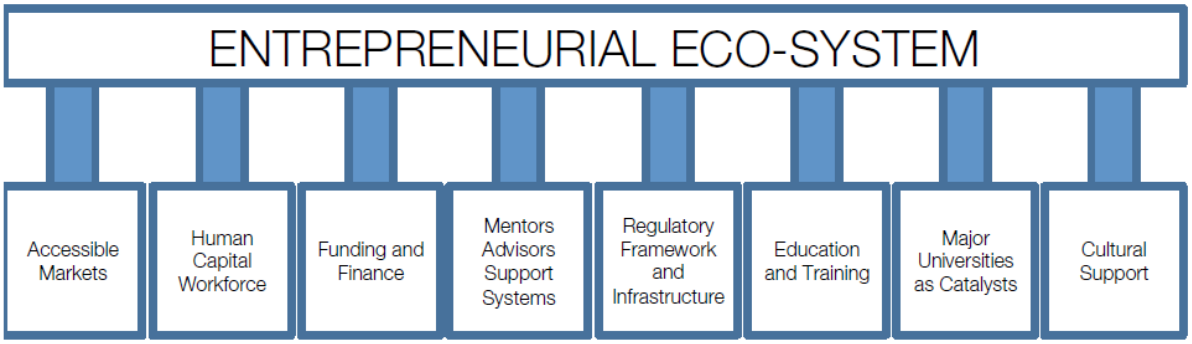


Figure 3. World Economic Forum's model of entrepreneurial ecosystems.

Source: World Economic Forum 2013, page 6

3.3.3 Koltai's Entrepreneurship Ecosystem Model

This model is developed by STEVEN KOLTAI, who created and ran the Global Entrepreneurship Program for the U.S. Department of State. The model is not the most cited among the scholars compared to the other models. Koltai's model is comprised of six pillars and six types of actors. The six pillars are: Identify, Train, Connect & Sustain, Fund, Enable, Celebrate Entrepreneurs and the six types of actors are: NGOs, Foundations, Academia, Investors, Government, and Corporations.

The author argues that entrepreneurship ecosystems play an instrumental role in producing high levels of entrepreneurship not only locally but also both at the regional and national level. Koltai believes that US government can support the development of these ecosystems in developing countries which in turn will contribute to entrepreneurship and by implication job creation that enable to absorb idle youth cohorts into the workplace. This per se will lead to an economic growth and greater stability in these countries.

As depicted in figure 4, Koltai suggests that in order to increase the quantity and quality of high-growth, job creating startups each of the six pillars of his Six + Six model needs to be developed.

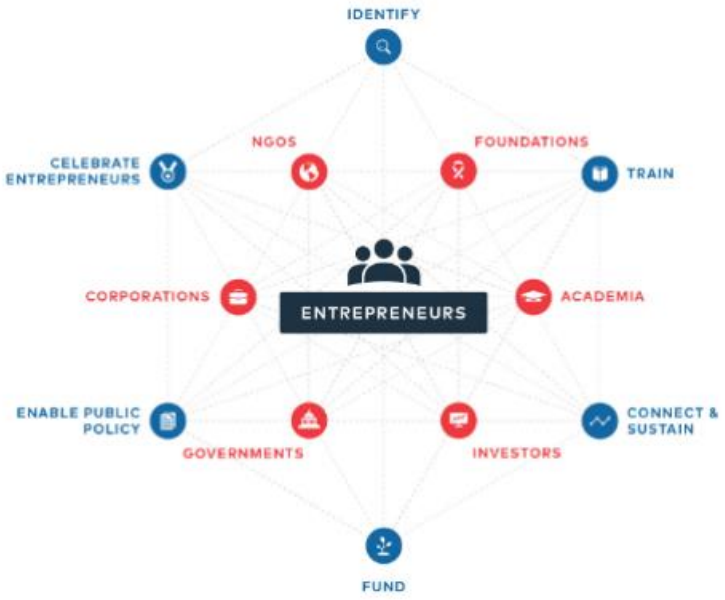


Figure 4. Koltai's Six + Six Entrepreneurship Ecosystem Model

Source: Koltai S. 2016, p.111

3.3.4 Ben Spigel's ecosystem attributes

SPIGEL (2017) argues that "entrepreneurial ecosystems are combinations of social, political, economic, and cultural elements within a region that support the development and growth of innovative startups and encourage nascent entrepreneurs and other actors to take the risks of starting, funding, and otherwise assisting high-risk ventures" (SPIGEL, 2017 p, 50)and classifies ecosystem attributes into three:

1. Cultural: These attributes are the underlying beliefs and outlooks about entrepreneurship in a specific geography and are divided into two main attributes: cultural attitudes and histories of entrepreneurship
2. Social: These attributes are the resources accessed through or embedded in networks and are divided into four main attributes: networks, investment capital, mentors and dealmakers, and worker talent.
3. Material: These attributes are those with a tangible presence and are divided into four main attributes universities, support services and facilities, policy and governance, and open markets.

By suggesting this model (see below figure), Spigel argues that ecosystems are composed of cultural, social, and material attributes that provide benefits and resources to entrepreneurs and their interrelationship helps reproduce the ecosystem over time.

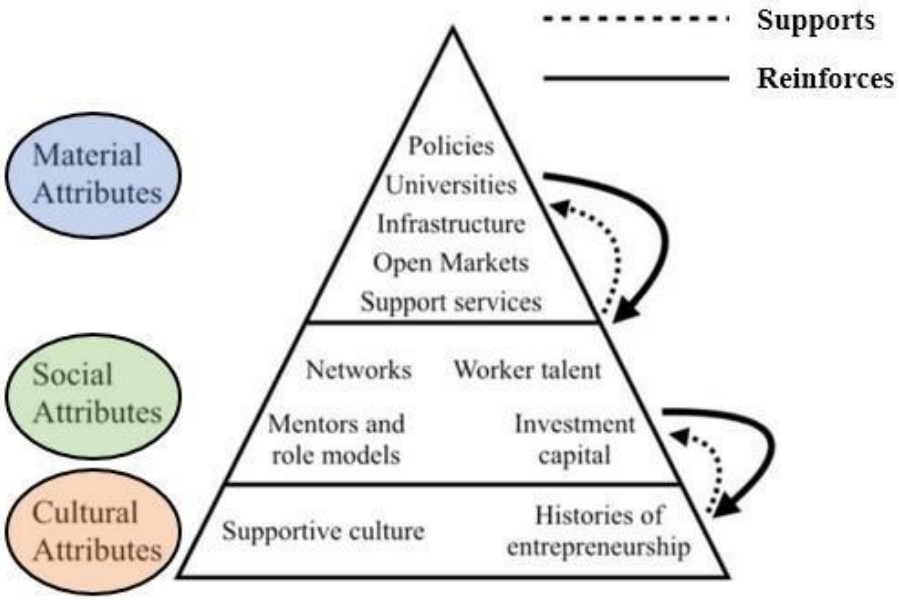


Figure 5. Spigel's model of entrepreneurial ecosystems

Source: B. Spigel 2017, page 57

3.3.5 MIT's innovation-driven entrepreneurship approach

MIT's framework uses 'innovation ecosystems' and 'entrepreneurship ecosystems' (iEcosystems), interchangeably. As depicted in figure 6, Innovation-driven entrepreneurship approach emphasizes a more comprehensive understanding of the 'system' which is broken down into four core elements (see Figure below) that lead to 'comparative advantage' and ultimately (to a greater or lesser extent) 'impact' within an iEcosystem.

Figure 6. Innovation-driven entrepreneurship model
Source: Murray and Budden, 2017, page 4

Foundational institutions are sitting at the bottom of the triangle and are comprised of institutions, rules, practices, and norms that are often taken for granted, but ensures investment protection which ultimately benefit the economy. They mainly include rule of law, property rights, financial institutions, freedom for new ideas and general ease of doing business.

Innovation Capacity (I-Cap) is one of two engines of the 'system' the capacity of a place – a city, a region or a nation – to develop new ideas and to take them from 'inception to impact' (whether this be to economic, social and/or environmental impact). To put it simply, innovation

capacity is not only the development but also the translation of scientific ‘solutions’ into useful products, technologies and/or services that truly solve problems.

Entrepreneurship Capacity (E-Cap) is another engine of the ‘system’ that is a subset of the more general entrepreneurial capability which also supports 'innovation-driven’ side of entrepreneurship capacity. Both E-Cap and I-Cap is built on foundational institutions, and their combination of (and linkages between) innovation and entrepreneurship capacities within a geographic region drives impact.

Comparative Advantage are specific areas of strength of any region's economy that distinguish it from the rest of the economies. For ‘innovation-driven entrepreneurship ecosystems’ (iEcosystems), such ‘comparative advantage’ is a distinctive strengths in both innovation and entrepreneurship capacities. For instance, comperative advantage could be geographical clusters or industrial sectors whether they be clusters in the life sciences, IT services or education.

Impact comes from the combination of E-Cap and I-Cap combined with core comparative advantage and often taking specific actions through ‘program and policy interventions’ (PPIs) that are subject to different measurement tools.
The impact can be measured in the form of economic or social progress indicators where the most commonly used metric is GDP per capita, such as the Social Progress Index (SPI) or UN Sustainable Development Goals (SGDs) respectively.

3.3.6 Erik Stam and Andrew Van de Ven‘s model of an entrepreneurial ecosystem

Building on prior academic studies ERIK STAM AND ANDREW VAN DE VEN (2021) propose an integrative model of entrepreneurial ecosystems consisting of ten elements and entrepreneurial outputs.
They based their conceptualization on the so-called infrastructure for entrepreneurship (VAN DE VEN 1993). Their entrepreneurial ecosystem concept is based on a social system framework and is comprised of the institutional arrangements and resource endowment elements of the infrastructure.
The institutional arrangements component has got three pillars which are formal institutions, culture and network elements. The physical infrastructure, finance, leadership, talent, knowledge,

intermediate services and demand elements falls under the resource endowment component. The third component is considered as the output of the entrepreneurial ecosystem and called the productive entrepreneurship where the entrepreneurial firms commercialize innovations and create new value.

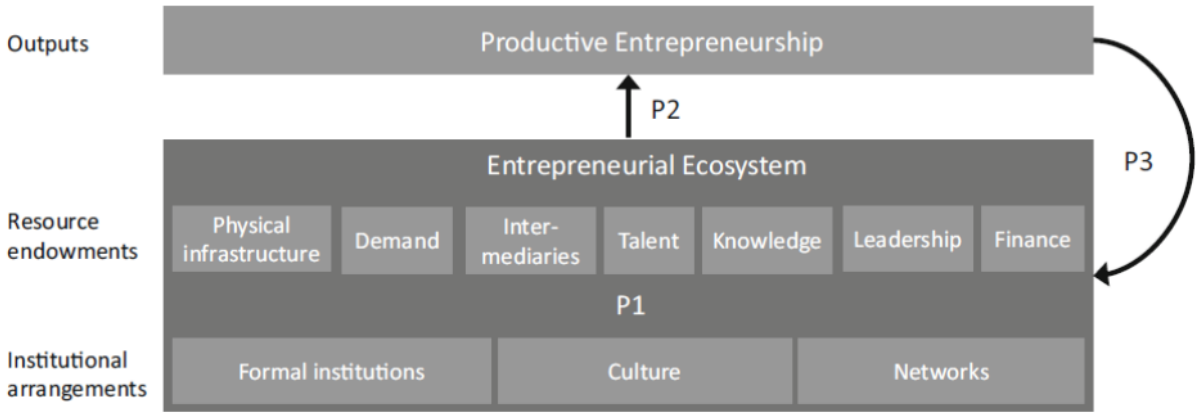


Figure 7. Elements and outputs of the entrepreneurial ecosystem

Source: Stam, E., Van de Ven, A. (2021) Entrepreneurial ecosystem elements, page 813.

In order to have an insight into the model it is worth to view the table 5 which accurately illustrates the details like concepts, definitions of constructs and, elements of entrepreneurial ecosystem model of Stam and Van de Ven.

Table 5. Constructs of entrepreneurial ecosystem elements and outputs

Concept	Construct	Definition	Element
Institutions	Formal institutions	The rules of the game in society	Formal institutions
	Informal institutions	Cultural context	Culture
	Social networks	The social context of actors, especially the degree to which they are socially connected	Networks
Resources	Physical resources	The physical context of actors that enables them to meet other actors in physical proximity	Physical infrastructure
	Financial resources	The presence of financial means to invest in activities that do not yet deliver financial means	Finance
	Leadership	Leadership that provides guidance for, and direction of, collective action	Leadership
	Human capital	The skills, knowledge and experience possessed by individuals	Talent
	Knowledge	Investments in (scientific and technological) knowledge creation	Knowledge
	Means of consumption	The presence of financial means in the population to purchase goods and services	Demand
	Producer services	The intermediate service inputs into proprietary functions	Intermediate services
New value creation	Productive entrepreneurship	Any entrepreneurial activity that contributes (in)directly to net output of the economy or to the capacity to produce additional output	Productive entrepreneurship

Source: Stam, E., Van de Ven, A. (2021) Entrepreneurial ecosystem elements, page 813.

Additionally, STAM AND VAN DE VEN'S (2021) bases their entrepreneurial ecosystem causal model on three propositions.

1. Co-evolutionary proposition- it emphasizes the co-evolution and mutual interdependence of elements of entrepreneurial ecosystems.
2. Upward causation proposition- it focuses on how the ten elements of entrepreneurial ecosystem causes productive entrepreneurship which authors refer to as upward causation: structure affecting agency.
3. Downward causation proposition- it focuses on how successful entrepreneurs becoming role models and network developers which is considered as positive feedback effects of entrepreneurs on the finance, culture, leadership and network elements of entrepreneurial ecosystems. Authors refer to this as downward causation: agency affecting structure.

Since the STAM and VAN DE VEN (2021) model is based on the other approaches and models mentioned in the literature, until now it is most structured and developed model of entrepreneurial ecosystem when compared to the Daniel Isenberg's model.

There is also another different approach suggested by BRAD FELD, an investor and an entrepreneur, in his book of Startup Communities (2012). He argued that among the fundamental principles of ecosystem development, one of the most crucial is the emphasis on bottom-up leadership originating from entrepreneurs themselves, as opposed to hierarchical direction from governmental authorities.

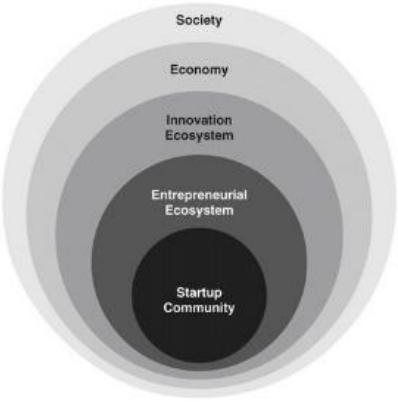


Figure 8. A nested structure of structures.

Source: The Startup Community Way by Brad Feld and Ian Hathaway, 2020

3.4 Discussion of elements of entrepreneurial ecosystems

To offer the prevalent definition of entrepreneurial ecosystem, I compared and dissected two definitions: BURDA et.al (2020) and STAM AND SPIGEL (2018) definitions of entrepreneurial ecosystem.

After their bibliometric research BURDA et al.(2020) suggested the following definition of entrepreneurial ecosystem:

"Entrepreneurial ecosystem is focused upon the creation of a network of interrelated economic agents, concentrated within a particular geographical area, which ultimately will result in the creation of new enterprises and stimulation of regional development" (BURDA et al., 2020,p. 97)

Another most-cited definition is by STAM AND SPIGEL (2018) which is originally as follows:

"a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory." (STAM AND SPIGEL, 2018, p. 407)

Spigel breaks down the above definition into four key components which is given in Table 6 in comparison with the component's in BURDA et al.(2020) suggested definition.

Table 6. Comparison of entrepreneurial ecosystem definition

Components in the definitions	STAM & SPIGEL'S (2018)	BURDA et al.(2020)
1	Interdependent actors and factors	Interrelated economic agents
2	Coordination	Network
3	Productive entrepreneurship	Creation of new enterprises
4	Within a particular territory	Within a particular geographical area

Source: Author's own comparison based on Stam & Spigel's (2018) and Burda et al.(2020) definitions.

If we compare STAM AND SPIGEL'S (2018) definition with the definition suggested by BURDA et al.(2020) we can see that STAM AND SPIGEL'S (2018) definition almost overlaps with each other with only slight difference in the wording.

In BURDA et al.'s (2020) suggested definition the component "*stimulation of regional development*" seems like only addition to the STAM AND SPIGEL'S (2018) definition which could be considered as a long-term benefit of the entrepreneurial ecosystem.

3.5 Concept of Digital Entrepreneurship Ecosystem

It is worth to start the discussion by breaking down the concepts and clarify the terms digital ecosystems and entrepreneurial ecosystems. There are a few definitions of digital ecosystem in the literature. As per the definition of LI et al. (2012, p. 119) digital ecosystem is

"…a self-organizing, scalable and sustainable system composed of heterogeneous digital entities and their interrelations focusing on interactions among entities to increase system utility, gain benefits, and promote information sharing, inner and inter cooperation and system innovation"

KOLLMANN et al (2022) identifies three different periods (which they refer as era) which I summarized in the table 7 below.

Table 7. Three eras in the historical development of digital entrepreneurship

	Seed- Era (1990–2000)	**Startup-Era (2001–2015)**	**Expansion-Era (2016–20xx)**
Technological Events	Establishment of internet technology	Open source, social media platforms, mobile, LTE, and cloud computing	Augmented Reality, 5G, Blockchain Technology, AI, Big Data Analytics
Entrepreneurial opportunities	efficiency and effectiveness through ‘‘doing business electronically’’	Collapse of the dot-com bubble, the rise in user engagement on the internet.	Turbulent turnaround and the new digital technology penetrating the global market
Publication Trends	‘‘internet entrepreneurship,’’ was most frequently used term and ‘‘virtual entrepreneurship,’’ ‘‘digital entrepreneurship,” ‘‘technopreneurship’’ was also used in the publications	'Internet entrepreneurship' continued to be the most frequently employed term, while 'technopreneurship' and 'e-entrepreneurship' were gaining popularity.	The usage of the term ‘‘digital entrepreneurship’’ increased whereas the ‘‘internet entrepreneurship’’ decreased steadily.

Source: Author's own illustration and categorization based on KOLLMANN et al.(2022)

Additionally, KOLLMANN et al, (2022) offer an overview of how the various terms are interrelated across three distinct eras, as depicted in the aforementioned table. Through this analysis, they elucidate how the understanding of digital entrepreneurship has evolved since 1990. In Figure 9 the size of the bubbles represents the total number of citations within each respective field. Additionally, the size and direction of the arrowheads indicate the frequency and influence of term mentions, respectively. Notably, two connections are particularly prominent: the correlation between 'online entrepreneurship' and 'internet entrepreneurship,' and the association between 'e-entrepreneurship' and 'digital entrepreneurship.'

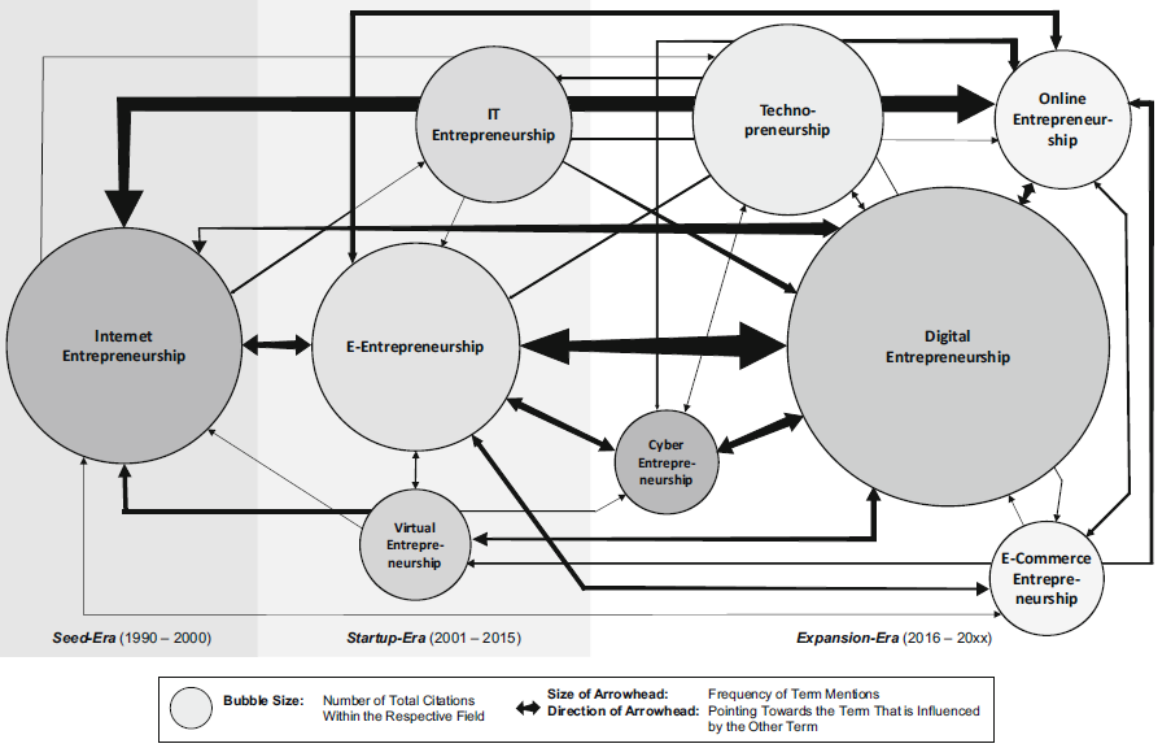


Figure 9. Analyses of cross-mentions

Source: Eras of Digital Entrepreneurship, p. 22

In my study I preferred SUSSAN AND ACS (2017) definition where the authors define the digital entrepreneurship "the matching of digital customers (users and agents) on platforms in digital space through the creative use of digital ecosystem governance and business ecosystem management to create matchmaker value and social utility by reducing transactions cost." (SUSSAN–ACS 2017, p. 63). Their model was later modified and expanded by SONG (2019). Later in this chapter we will explore both models in detail.

Another interesting point highlighted by KOLLMANN et al.(2022) is that some publications tend to offer their own definitions without referring to the prior publications although their definitions

resemble the earlier ones. KOLLMANN et al.(2022) also outline several potential avenues for future research in the field of digital entrepreneurship.

The conceptual framework of the digital entrepreneurial ecosystem, proposed by SUSSAN AND ACS (2017), indicates that it combines two streams of ecosystem literature: (1) the entrepreneurial ecosystem, which focuses on agency and institutional roles, and (2) the digital ecosystem, which emphasizes digital infrastructure and user involvement.

From this definition, we can infer that the digital entrepreneurship ecosystem emerges at the intersection of two distinct phenomena: the digital and entrepreneurial ecosystems, as depicted in the figure 10.

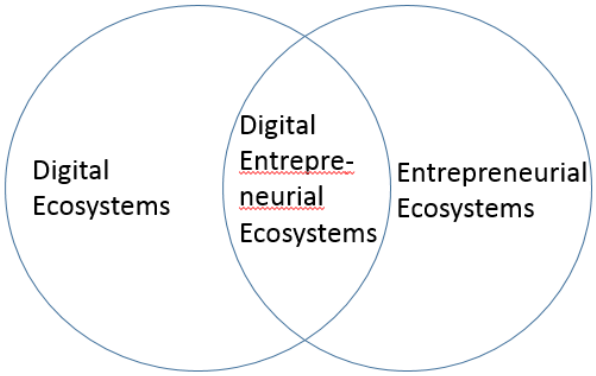


Figure 10. The Integration of Two Ecosystems

Source: SUSSAN AND ACS (2017) p.62

SUSSAN AND ACS (2017) framework has got four components:

1. Digital User Citizenship (DUC) encompasses the collaboration between users and institutions from both ecosystems, constituting the formal and informal agreements users adhere to while engaging in digital environments linked to entrepreneurial ecosystems.

2. Digital Entrepreneurship (DE) denotes the amalgamation of digital infrastructure and entrepreneurial actors within the frameworks of both ecosystems, encompassing any entity involved in digital ventures across various societal, economic, and political realms. However, the authors perceive digital entrepreneurs as adhering to Kirznarian entrepreneurship, operating within existing platforms. For instance, a taxi driver providing digital services to clients, although they may not themselves be digital in nature.

3. Digital Marketplace (DM) represents the collaboration between users and actors from both ecosystems. This quadrant pertains to value creation through the introduction of new products, services, or knowledge stemming from entrepreneurial endeavors across profit-driven, nonprofit, and governmental sectors. The outcomes of these entrepreneurial activities are embraced by users, such as e-government services, e-transportation solutions, e-learning platforms, e-commerce ventures, and social networking-based businesses like Twitter, Bold taxi, and Wikipedia.

4. Digital Infrastructure Governance (DIG) involves the regulation of digital infrastructure related to entrepreneurial pursuits, governing the social and economic interactions of users, actors, and platforms at local, national, and international levels.

The four-component framework of the digital entrepreneurship ecosystem is showen in figure 11.

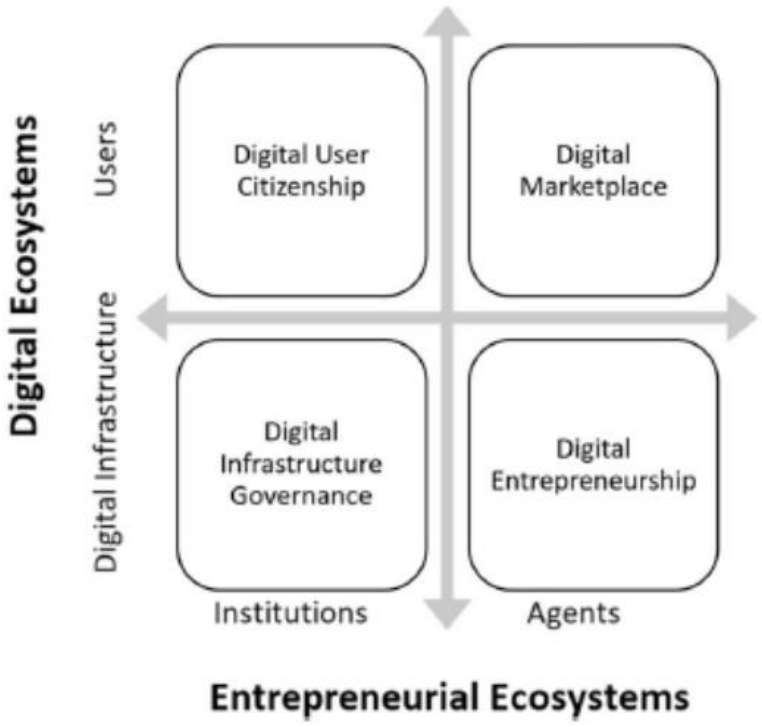


Figure 11. Conceptual framework of the digital entrepreneurship ecosystem

Source: Sussan and Acs (2017), p. 63.

SONG(2019) refined abovementioned framework and improved three components except for Digital Infrastructure Governance component. The improvements are given as reconfigurations to each three concepts separately are follows:

Reconfiguration 1: The concept of Digital User Citizenship is expanded to encompass users on both the demand-side (consumers) and the supply-side (producers). With digital users comprising

a diverse group of individuals, multi-sided platforms have emerged, contrary to traditional businesses where only one side of users is typically observed. These platforms connect heterogeneous users, as exemplified by ride-sharing platforms linking users on both the supply and demand sides. Social media platforms like Facebook further illustrate this complexity, with six distinct user categories including friends (senders), friends (receivers), businesses (senders), businesses (receivers), advertisers, and app developers. Song defines digital users as individuals who utilize digital technologies within the ecosystem for various exchanges or transactions, capable of functioning as producers, consumers, or both.

Reconfiguration 2: The concept of Digital Entrepreneurship is replaced by Digital Technology Entrepreneurship, a broader notion encompassing all agents contributing to experimentation, entrepreneurial innovation, and value creation on platforms. This reconfiguration combines the definitions of Digital Technology Entrepreneurship and Digital Entrepreneurship proposed by GIONES AND BREM (2017), thus offering a broader understanding of a digital entrepreneur compared to the definition presented by SUSSAN AND ACS (2017).

Reconfiguration 3: The concept of Digital Marketplace is substituted with Digital Multi-sided Platforms. These platforms serve as demand-side intermediaries and differ from conventional businesses due to three key reasons:

Firstly, platform enterprises serve as intermediaries or facilitators whose primary expertise lies in reducing or eliminating transaction expenses. Notably, these platforms streamline transaction costs in the external market, in contrast to traditional businesses where such costs were typically internalized. For instance, taxi apps efficiently locate and dispatch the nearest drivers upon a user's request, effectively eradicating search and coordination expenses. Moreover, through various incentives and monitoring mechanisms, these platforms mitigate enforcement costs and associated risks.

Secondly, platform enterprises are driven by demand, with users playing a pivotal role in their business models. In such platforms, increased user participation leads to faster matches and heightened value creation. Successful platforms often experience positive feedback loops that reinforce user growth and overall value, a characteristic particularly pronounced in industries with network effects, where dominance by one platform is common.

Thirdly, digital technology forms the cornerstone of value proposition and sustenance for platform enterprises. Over the past two decades, advancements such as artificial intelligence, Internet of Things, open-source software, and cloud computing, among others, have significantly reduced the costs associated with experimentation and innovation in the information and communication technology (ICT) sector. Framework by SONG (2019) is illustrated in figure 12.

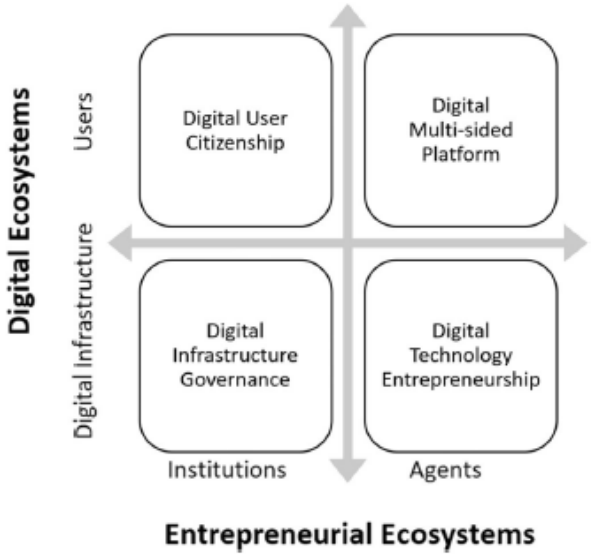


Figure 12. Digital Entrepreneurial Ecosystem

Source: Song, 2019. p. 576

Another interesting approach by SONG (2019) illustrated in figure 13 is the "Think globally, Act locally" categorization of the four domains of Digital Entrepreneurial Ecosystem. SONG (2019) refers Digital Multi-sided Platform and Digital Infrastructure Governance to "Act locally" mindset and Digital User Citizenship and Digital Technology Entrepreneurship to "Think global "mindset.

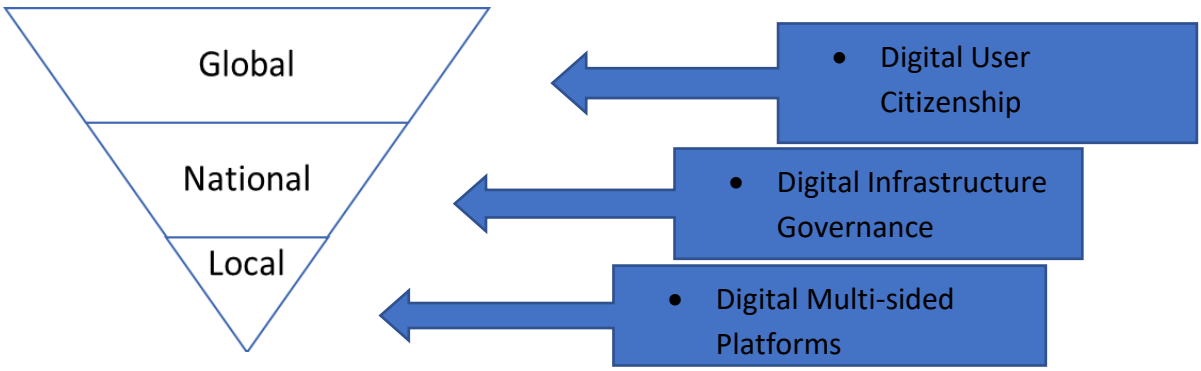


Figure 13. Multi-faceted Dimensions of the Digital Entrepreneurial Ecosystem

Source: Song, 2019. p. 576

3.5 Conclusion and Future Challenges

The purpose of this chapter is to enhance the existing knowledge on entrepreneurial ecosystems and to illuminate the predominant models and definitions associated with this concept. This chapter delves into the most frequently cited models of entrepreneurial ecosystems and outlines the key elements of the most widely accepted definition of the concept.

The significance of this chapter lies in its exploration and comparison of various approaches to understanding the entrepreneurial ecosystem concept. It aims to identify the prevailing approach based on recent discussions among scholars in the field of entrepreneurship research.

Through our analysis, we have determined that the definition proposed by STAM AND SPIGEL (2018) emerges as the most prevalent and comprehensive compared to other definitions.

Regarding future research directions, we have identified several papers deemed crucial to advancing entrepreneurial ecosystem research.

- WURTH et al (2021)– this paper presents critical literature review and a transdisciplinary research program for entrepreneurial ecosystem research and practice.
- MALECKI (2018, p. 10) – this paper argues that "in order to understand the emergence and evolution of an entrepreneurial ecosystem, we have to go beyond the lists of factors/components/elements approach."
- AUERSWALD AND DANI (2017, p.105) – This paper advocates for an evolutionary standpoint and proposes that the trajectory of entrepreneurial ecosystems (EEs) is most aptly described by "the evolutionary dynamics of complex adaptive systems.

Regarding future research opportunities, the literature review section highlights several papers authored by prominent researchers in the entrepreneurship field. However, the paper by WURTH et al (2021) is one of the latest researches which presents critical literature review and a transdisciplinary research program for entrepreneurial ecosystem research and practice.

WURTH et al., (2021) put together a very important analyses and developed their research in three key ways in order to position the entrepreneurial ecosystem in a broader concept as stated below:

1. Presented systematic literature review of the entirety of the entrepreneurial ecosystem concept (i.e. not just specific ecosystems or specific domains)

2. Identified the casual mechanisms based on the systematic literature that link the regional contexts in which entrepreneurship takes place with specific outcomes such as firm growth, innovation, and increases in overall welfare.
3. Developed a new typology of the conceptual micro foundations of entrepreneurial ecosystem thinking and suggested a research agenda to strengthen and make the conceptual and empirical basis relevant to policymakers, entrepreneurs, and researchers.

For future research directions, in order to get the most comprehensive analysis it would be better to include other relevant research databases and be able to compare other approaches and contributions to the entrepreneurial ecosystem body of knowledge. Additionally, topics like measurement approaches of entrepreneurial ecosystems, different case studies across industries, and some of the related topics are the part of the ongoing debate in the entrepreneurship literature.

Digital platforms are not only pivotal in the advancement of novel products and services but also contribute significantly to creating value for stakeholders within the digital platform economy. Consequently, they wield considerable influence compared to other actors, prompting concerns among policymakers.

In recent years, various countries have implemented regulations targeting digital platforms. However, these regulations have not always been well-received by digital platforms and have led to tensions between governments and these entities. Examples include the introduction of new digital tax regulations across several EU countries (THE ECONOMIST, 2019a), Google's response to the Australian government's proposals for regulating digital markets (THE GUARDIAN, 2021) and Meta's announcement in early 2022 regarding the potential disabling of social media platforms like Facebook and Instagram in Europe due to data privacy concerns raised by EU authorities.

According to ACS et al. (2022) the regulations governing markets, technological investments, the dynamics between governments and platforms, and digital policies collectively establish the "rules of the game" and shape the economic opportunities within digital markets.

CHAPTER 4. METHODOLOGY

4.1 Research design

This section describes the research methodologies employed in this study and the research questions that were tested as a part of the empirical research. The sample selection and data collection as well as the rationale of using both quantitative and qualitative research is highlighted.

There are many definitions of research itself. I preferred, WALLIMAN AND WALLIMAN (2011) definition which says the research simply is a process or an activity giving you an understanding of things you did not know before. When it comes to the methodology there is not only one accepted definition among researchers. BROWN (2006) describes the methodology as a framework for a research and O'LEARY (2004) as specific assumptions to carry out a research.Simply put the methodology employed by a researcher is a best possible toolset to realize one's research objectives and it should be described in a way that can be utilized by other researchers as well (ALLAN AND RANDY, 2005).

4.2 Mixed research methods

In a research project that utilizes both qualitative and quantitative data, researchers employ diverse empirical materials to comprehensively investigate the studied issue. Qualitative research involves gathering and analyzing various forms of data such as case studies, personal experiences, interviews, observations, historical documents, interactions, and visual texts. These methods are used to describe and understand the nuances and complexities of the research topic. On the other hand, quantitative research involves the collection and analysis of numerical data to identify patterns, relationships, and trends through statistical analysis. By combining both qualitative and quantitative approaches, researchers can achieve a more comprehensive understanding of the research question, incorporating both the depth of qualitative insights and the breadth of quantitative findings. This mixed-methods approach allows for a more holistic examination of the phenomenon under investigation, enriching the research findings and enhancing the overall rigor and validity of the study (DENZIN AND LINCOLN, 1994). WORTMAN AND ROBERTS (1982) argues that quantitative research primarily addresses "why" questions, while qualitative research concentrates more on "how" rather than "why." Quantitative methods are suited for examining averages, while qualitative research tends to focus on outliers or marginals. Quantitative research may seek to grasp the traits of the "average" entrepreneur using a substantial sample size and statistical distribution, while qualitative research

does not mandate a large sample size (DANA AND DANA, 2005). The approach of employing case studies in research entails conducting a comprehensive examination, delving deeply into a restricted number of subjects, individuals, or settings. Ideally, data collection in such research should encompass both observations and interviews (DANA AND DANA, 2005).

For more holistic examination and for enriching the research findings and enhancing the overall validity in my research I have used both quantitative and qualitative methods which is discussed in detail in the following sections.

4.3 Qualitative method

Qualitative method is mainly used in the literature review part of the research in order to find out the different approaches in entrepreneurial ecosystem. To this end, highly reputable web of science, science direct publications and reports of top higher education institutions has been reviewed and analyzed. The result of this analysis is presented in chapter 6.

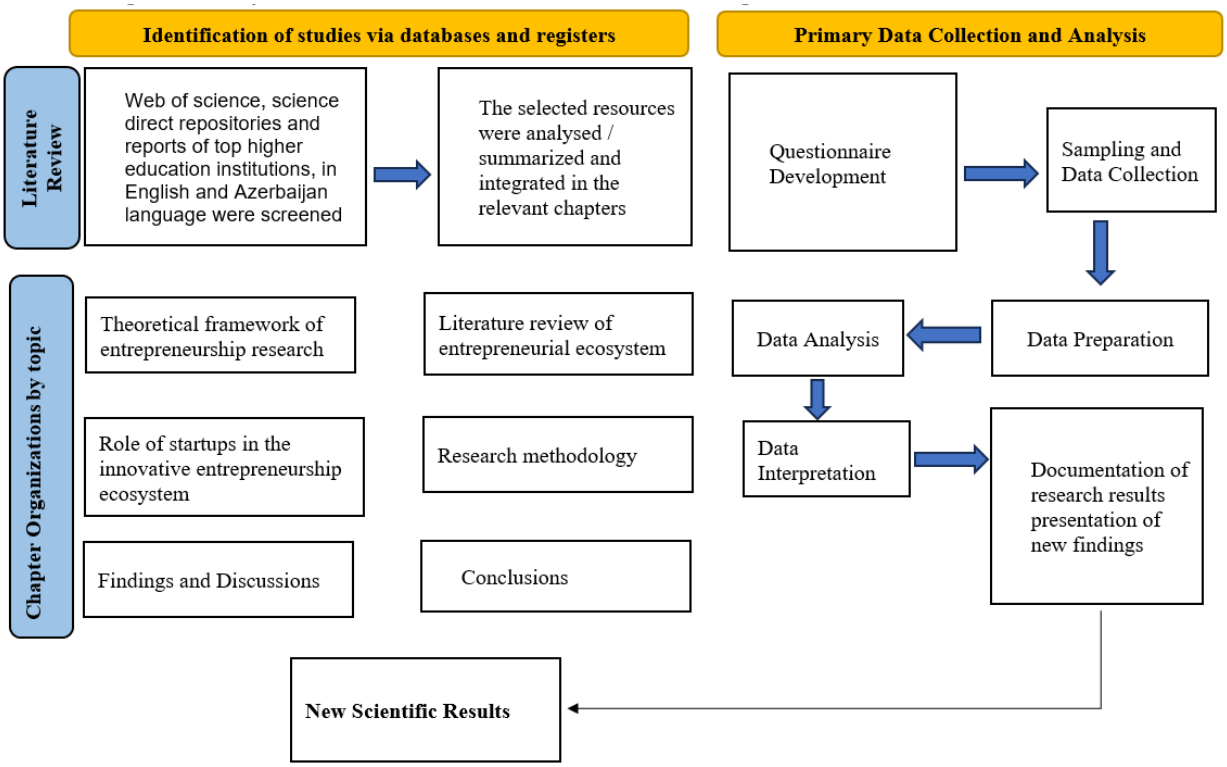


Figure 14. Research flow chart

Source: Author's own construction

Additionally, OECD and European Commission Oslo manual (2005) recommends using the qualitative data for innovation activities. Therefore, interviews with startup firms and incubation and acceleration center representatives and ecosystem players were planned but unfortunately, because of Covid-19 pandemic conditions the interview meetings had to be cancelled. I could

manage to have carry our only one interview. The result is not discussed as it was only one interview with startup founder. However, this interview helped me to reach out to other startup representatives in Azerbaijan.

Moreover, I used survey questionnaire conducted annually by Startup Hungary among the Hungarian startups as a secondary data to compare with my survey results among Azerbaijan startup ecosystem players. One of advantages of comparative approach is to add originality and value to the research also add a reflexive or intelligent benchmarking to the comparison. Last but not least, it is also important how startups are developed in their own context which will enable to avoid a mechanic copy during the comparison of results.

4.4 Quantitative method-Survey

The second research method involved administering a survey questionnaire to collect quantitative data. Surveys offer the advantage of potentially yielding a wealth of both qualitative and quantitative data on the research topic. Originally, field research including meetings with startup firms and incubation/acceleration centers was planned to gather primary data through case studies and surveys. However, as mentioned above due to the COVID-19 pandemic, face-to-face interactions were canceled, and only online surveys were conducted instead.

4.5 Sampling

There are two main types of sampling strategies in population research: probability sampling and non-probability sampling. In probability sampling every member of the target population has an equal chance of being selected. Common methods include simple random sampling, systematic sampling, stratified sampling, cluster randomization (STRATTON, 2021)

In non-probability sampling not, every member has an equal chance of being selected. Common methods include:

- Purposeful Sampling: where researchers directly select participants.
- Snowball Recruiting: Participants refer others to the researcher.
- Convenience Sampling: Participants self-select after the researcher announces the study.
- Quota Sampling: Combines convenience sampling with systematic population segmentation, often used in street interviews (STRATTON,2021).

Within the cross-sectional data analysis framework, the research employs author's own survey data of 43 respondents (83% males, 17% females). Online survey was conducted between 01.06.2022-31.08.2022 via social media in the closed groups. (Facebook and LinkedIn). The survey was initially designed to be conducted in both Azerbaijan and Hungary. However, despite

extensive efforts to carry out a comparative survey between the two countries, I encountered significant obstacles. A language barrier and the constraints imposed by the COVID-19 pandemic, which prevented face-to-face surveys or interviews, ultimately hindered the execution of the research.

The sample size seems small but as explained in the ANNEX 3, at the time of survey only 49 firms has been granted with startup certificate in Azerbaijan by the Small and Medium Business Development Agency of the Republic of Azerbaijan (SMBDA). This is state-owned agency who is the only authority that grants startup firms with startup certificates in Azerbaijan.

During the survey purposeful sampling, snowball recruiting, and convenience sampling method was employed. However, most of the respondents came from the convenience sampling. This method is useful for investigating new fields or areas with limited prior research, allowing researchers to discover patterns and areas of interest without requiring a representative sample. When research targets a specific group that is easily accessible, convenience sampling can provide direct access to relevant data. This is especially useful for studies focused on niche, specialized, or hard-to-reach populations that are difficult to sample randomly (GOLZAR et al.,2022).

4.6 Ethical Considerations for Research

It is a researcher's choice when it comes deciding methods to be deployed. Moreover, ethical considerations also depend on the researchers' own values. On the other hand, in academic settings when a researcher carries out any research participants need to be assured about the privacy of the research. To this end before the online survey and before the online interview(even if there was only one) participants have been informed about their rights and the way the data will be processed after the research, data access options and privacy matters. If participants had not agreed to take part in the research, I would have been unable to proceed any further. Thus, all participants were notified that the data collected would be solely used for this research, and the anonymity and confidentiality of both participants and interviewers would be maintained.

This transparency assisted participants in understanding the researcher's objectives, thereby enhancing the researcher's credibility and facilitating more convenient information sharing.

By addressing ethical concerns, we reassured participants that only the researcher would have access to the information provided during the online interviews and surveys.

CHAPTER 5. THE ROLE OF STARTUPS IN THE INNOVATIVE ENTREPRENEURSHIP ECOSYSTEM OF AZERBAIJAN AND HUNGARY

5.1 Introduction

Rotating the economies toward innovation-driven economic development phase is one of the most debated topics among researchers and policy makers. The European Commission's decision to spend up to 3 % of the European Union's GDP to support private innovation activity is a very important indicator of this trend.

After becoming member of EU, Hungary and other Central European countries' government policy on innovation activities has changed. Several reforms and decrees have been put forward and get into effect.

It was Schumpeter who for the first time pointed out the role of innovation for economic growth. SCHUMPETER (1934) discussed the following five types of innovations:

1) Introduction of new products.
2) Introduction of new methods of production.
3) Opening of new markets.
4) Development of new sources of supply for raw materials or other inputs.
5) Creation of new market structures in an industry.

His approach to innovation considered macroeconomic since he focused on nature and significance technological innovations for economy (JAÑSKA, AND BEDNARCZYK, 2015).

Despite the wide range of definitions of innovation, in this paper we consider the definition developed by OECD experts and included in the Oslo Manual. It reads as follows:

"*An innovation is the implementation of a new or significantly improved product (good or service), a new process, a new marketing method, or a new organizational method in business practices, workplace organization, or external relations*" (EUROSTAT AND OECD, 2005).

Innovation analysis has both macroeconomic and microeconomic perspectives. When the topic of discussion is innovation activity and the ability of the different actors in the economy to innovate it is the macro level. On the other hand, the measurement and assessment of innovation is not

something on the macro level instead, it is a microeconomic level (HILAMI, RAMAYAH et. al., 2010).

The term National Innovation System (NIS) has gained currency beginning from the 1990s. In an attempt to explain the innovation notion clearly, NELSON (1993) introduced National Innovation System. His National Innovation System concept rooted from microeconomic principles of innovation and was affected by the Neo-Schumpeterian economic experts (NELSON & WINTER, 1982). Additionally, it is understandable that his NIS framework rests on the bounded rational agents, function of tacit knowledge, and the importance of the institutions in economic activities. FILIPPETTI AND ARCHIBUGI (2011) names three assumptions that they believe NSI concept is based upon.

1) Systematic variations of countries can be attributed to their economic activities,

2) Economic activities (performance) are not driven only by the innovativeness potential but the well-established institutional settings also matter

3) Government policies on innovation and technology plays a crucial role in the overall performance of economies.

5.2 Innovation Performance of Azerbaijan

Since gaining independence in 1991, Azerbaijan has experienced significant economic transformation and development despite facing challenges following the collapse of the Soviet Union. Despite initial economic setbacks, the country rapidly transitioned into an upper-middle-income nation. This transformation was largely propelled by the signing of a major oil contract with international firms in 1994, leading to a surge in foreign direct investment and subsequent growth in the economy starting from 1996. Additionally, Azerbaijan initiated stabilization and structural reform programs in 1995. While the abundance of natural resources presents opportunities for economic growth, relying solely on petroleum revenues poses long-term risks and raises concerns about sustainability and macroeconomic stability. Therefore, Azerbaijan must prioritize the development of non-oil sectors to establish a diversified economy. Establishing such diversification is crucial given the lengthy timeframe required to build a sustainable and diversified economic base. The primary economic challenge for Azerbaijan lies in cultivating a diversified economy with new and sustainable sources of growth, fostering competitiveness in both global and regional markets.

Serious reforms have been carried out especially since 2015 in the direction of entrepreneurship development. For example, the types of businesses that require a license (special consent) have been reduced from 59 to 37, and the area of permits granted to types of business activity has been clarified and reduced to 86 (which is 4 times less than in the previous period). The process of issuing licenses for entrepreneurial activities has been simplified and this process has been started at ASAN service agency. The time limit for licenses has been abolished and the fees charged for issuing them have been reduced. While the fees were reduced twice in Baku, they were reduced four times in order to encourage entrepreneurial activity in the regions. At the same time, with the aim of supporting entrepreneurial activity, activities aimed at providing legal advice to the entrepreneur and facilitating legal procedures through mechanisms such as "one window" were implemented.

In 2016, a strategic plan was prepared with the aim of diversifying the economy, increasing competitiveness, and regulating small and medium-scale business activities in Azerbaijan. According to this plan, measures to be taken to achieve the goals of promoting the activities of SMEs, improving the business environment, providing profitable and efficient access to financial resources, internationalizing them and increasing access to foreign markets have been determined. At the same time, especially in the direction of the development of the non-oil sector, work was carried out in the direction of stopping inspections, creating industrial technology parks and industrial districts, promoting and supporting export and investment, supporting local production through subsidies, and making social projects more prominent. In order to ensure accessibility, transparency and flexibility of utility services needed by SMEs in this area, the Energy Regulatory Agency was established and bureaucratic obstacles in this area were reduced.

"Mortgage and Credit Guarantee Fund of the Republic of Azerbaijan" was established as a non-commercial legal entity with the aim of providing profitable and efficient access to financial resources and increasing the level of services provided in this field. This institution performs functions such as facilitating mortgage mechanisms and attracting local and foreign financial resources to mortgage lending.

Based on the assessment of the current situation in 2016, improving the business environment and regulatory framework for SME activity, ensuring profitable and efficient access to financial resources of SMEs, increasing their internationalization and access to foreign markets, increasing the knowledge and skills of SMEs, accelerating the application of advanced practices A strategic road map of actions to be implemented until 2025 was prepared in order to achieve the goals.

Innovation center, operating under the State Agency for Service to Citizens and Social Innovations under the President of the Republic of Azerbaijan, application of information technologies and provision of technical support in the field of industry, finance, science, education and other services in the private and public sector, creation and improvement of information systems and information resources is an institution that is active in the direction of.

The "Innoland" Incubation and Acceleration center was launched in 2018 under the State Agency for Citizen Service and Social Innovation under the President of the Republic of Azerbaijan. "INNOLAND" is an innovation center created with the aim of supporting the creation of a startup ecosystem, as well as promoting innovation and development of the private sector in Azerbaijan and the international arena, and consists of an Acceleration center, Coworking and an IT Training Center. The mission of the center is to develop an innovative entrepreneurial spirit and startup ecosystem, create an environment that encourages people to think differently and support entrepreneurs to develop their innovative businesses. In addition to offering startups services such as incubation by applying the best practices for the formation and development of the project at the initial stage, acceleration that helps the startup grow in Azerbaijan and the international market, and teaching programming and information technology knowledge, coding skills, in the field of startups, programmers, innovations offers an affordable and multi-functional coworking center for individuals working alone or with a small team, with 24/7 access, high-speed Internet, a single information kiosk, and mentor support.

Azerbaijan has taken some significant steps to improve its innovation system over the past decade (Alieva, 2021).

- The dynamic advancement of a national innovation system. Developing the national innovation strategy and setting up government agencies, such as the Innovation Agency in charge of innovation policy demonstrates that the government has a high level of commitment to innovation. There is a dynamic improvement in digital government platforms and public sector innovation.
- Existing public-private partnerships, building synergies for making a knowledge-based economy, developing public provisions for innovative start-ups, creating a broad arrange of logical research facilities by the Azerbaijan National Foundation of Sciences (ANAS), progress in the quality of Sciences, Technology, Engineering, and Mathematics (STEM) education demonstrate the effort of the government in the development of the innovation system.

- There is also a fitting legal framework with prerequisites for making policy. The Law on Public Participation ensures a legal basis for an innovative approach. Policymakers have started to apply foresight exercises in preparing policies. Foresight exercises in designing policies have already been started to apply by policy-makers. The analyzed Grant Scheme was reasonable with the targets of the National Strategy for the Development of the Information Society and bolstered by a project guide and a systematic selection process.

There are some recommendations by the Innovation Policy Outlook (IPO) of the United Nations Economic Commission for Europe (UNECE) in order to develop the innovation system in Azerbaijan (Alieva, 2021).

- Development of innovation governance among sectors and enabling synergies across policies. Reinforcement of innovation governance among sectors and enabling synergies across policies. It should ensure that adequate reinforcement for R&D and innovation activities in the service sector and in industries with poor technological density, in parallel with high-tech industries, are provided by the government.
- Increasing the reinforcement for start-up development and launching policy tools that ensure industry-science connections. The government should support such an ecosystem that improves a venture finance mechanism, in collaboration with international donors, to get better the initial-stage financing gap and ensure the expansion of innovative programs and technological activities. Science-industry collaboration, mutual R&D grant programs between innovative enterprises and public R&D agencies, and stimulating commercialization of innovative projects by a venture finance mechanism should be the main focuses of this ecosystem.
- Creating a more structured connection between monitoring and evaluation to policy planning, involving government agencies accountable for innovation policy. Innovation forethought practices and research activities for long-term strategic innovation development should be integrated into the policy processes to pursue future trends.

5.3 Startup ecosystem of Azerbaijan

Azerbaijan has launched some initiatives in establishing an ecosystem that supports developments of startups. Some projects intended to stimulate innovative entrepreneurship have been launched by both international organizations and the government agencies. One of such initiatives was High-Tech Park of Azerbaijan, which was established in 2012 to serve as a seedbed for new technology based startups. It currently serves as a business incubator and provides legal and accounting support to startups.

Although emerging ecosystems like Azerbaijan are trying to establish an environment supportive of new technology-based businesses, financial infrastructure for startups is still in its early stages. Risk capital market, which was completely inexistent a few years ago is now starting to emerge. However, it is worth to note that the risk capital is currently limited to pre-seed and seed stage investment offered by accelerators.

It is encouraging to see that in addition to government, academic institutions as well as private sector have also been actively contributing to establishing an ecosystem that supports technology entrepreneurship. Description of the incubators/accelerators initiated by government and private sector is given below.

"High Tech Park Azerbaijan" (HTP) was launched in 2012 through the Decree of the President of the Republic of Azerbaijan. Main goal of HTP is the development of a sustainable and competitive environment for the high tech economy in Azerbaijan. Business Incubation Center of HTP is a pilot startup incubator of High Tech Park. Center started operations in February 2014 with induction of its first cohort of startup companies. Since its opening, 70 teams have been admitted to HTP. Currently there are 26 teams at the incubator of HTP. In addition to startups, HTP also houses five resident companies from the technology sector.

Teams admitted to HTP Business Incubation Center can benefit from mentorship as well as legal, accounting and HR support provided by the administration of HTP. HTP also facilitates networking opportunity for startups and resident firms as well as entrepreneurs, investors and international experts who are invited as guest speakers to HTP. Although HTP does not offer any form of financing to startups, it helps founders to find and engage with investors locally and internationally by supporting their trips to pitch days internationally. Some of the startups at HTP have received investments to develop alpha and beta products. Founders have also received grants through ICT Fund of the Ministry of Communications and High Technologies of Azerbaijan. Success cases of startups from HTP include Nuush.az (an online food ordering service), Code Academy (coding bootcamp), Neuron Technologies (provides ICT based

innovative solutions), Bilikli.net (online test preparation service). Moreover, internationally known startup company WeTravel (wetravel.to) is managed from Silicon Valley, but much of its development takes place at HTP.

BEU Technopark and Innovation Center- the incubation and acceleration center were founded at Baku Engineering University in 2013. In addition to startups it houses around 10 residents. It admits new cohorts of startups once a year through the so called "New Idea Competition" which was launched in 2013. It was the first incubation center established at a university. Baku Engineering University supports winners of the competition by providing seed capital, and other facilities like office, internet, and laptop for one year with no stake in return. Mentorship and training schemes consists of trainings and seminars on both entrepreneurship and innovation by both local and international experts. Resident firms also provide mentorship and exchange experience at all possible circumstances.

Once startup proves to evolve into a new firm they also receive help to raise additional funds and access to the necessary network to start operating in the market. NIC has admitted 22 projects to the incubation center out of 410 applications since its foundation. A number of successful startups like Emedia (provides experts' video answers to the questions), BethClip (synchronizing clipboard with multiple devices, enabling you to have access to the same data) already have started traction.

Next Step Innovation Center: Founded by three entrepreneurs, Next Step is a private incubator that invests in new technology ideas. The founders of Next Step include three established businessmen in Azerbaijan. Given their significant business experience, the founders bring valuable experience to the accelerator. Next Step has recruited two mentors – serial entrepreneurs with experience in Silicon Valley. The accelerator started operating in 2015 and has selected 5 teams to its accelerator program. New cohorts are admitted three times a year. Applicant teams must fill out an online application. Selected teams are invited for a pitch and successful teams are invited for an interview with the mentors. Teams are not required to submit business plans.

Teams chosen for Next Step are offered a free office space, laptops and seed capital in the amount of 1500 USD monthly. In return, Next Step asks for an equity share in the range of 3-9%. The accelerator also provides legal support to founders – to register the business as well as in applying for patents. Mentors work with teams on a weekly basis and monitor progress. At the end of three-month incubation period, graduating teams pitch to investors on Demo Day.

Next Step is open for both software and hardware-based startups. One of the startups housed at Next Step, "Ustam" has started generating traction and has registered as a legal person.

Baku Business Factory is a private accelerator started operating in 2015. Baku Business Factory (BBF) provides free space and mentoring for startups. Applications to BBF take place on rolling bases. Online applications go through an initial screening. Promising applications are invited for an interview and those who pass the interview stage are admitted to the accelerator. Although all admitted teams can benefit from the resources and network of BBF, not all of them receive seed capital. Teams interested in receiving investment need to develop a business plan and pitch their business idea in front of the BBF management team.

Currently there are 19 teams in the BBF incubator. Some of the successful startups include BrandCream (offers exclusive way of brand promotions in the public) and Keepface (social influencer marketing company) which have started generating cash flow. All of the startups housed at BBF can benefit from media exposure.

Besides the four incubators analyzed in the article, there are three more incubators/accelerators in Baku supporting startups (Table 8). In addition to the government funded accelerator (HTP), and the university-based incubator (QUTechnopark), there are accelerators owned and funded by businesses such as Barama and AppLab funded by Azerbaijan's two largest mobile operators Bakcell and Azercell.

Table 8. Incubators and accelerators in Azerbaijan

Name	**Founder/ Year Founded**	**Field of startups**	**Investment**	**Equity/ revenue sharing**
Barama	Azercell 2009		Seed capital to selected startups	Revenue sharing
High Tech Park (HTP)	Public-owned 2012	web app, mobile app	No investment	No equity sharing
BEU Technopark	Baku Engineering University 2013		Seed capital to all startups	No equity sharing
AppLab	Bakcell	Mobile apps	No investment	No equity sharing
Baku Business Factory	Private 2015	Web/mobile app	Seed capital to selected startups	Equity sharing

Next Step	Private 2015	Web/mobile app	Monthly stipend	Equity sharing
Sup.az	Private 2015	Web/mobile app	Seed capital to selected startups	Equity sharing

Source: Abdurazzakov and Jafarov 2016, page 342

While it is promising to see that a number of accelerators have started operating in Azerbaijan, their support is limited to seed or pre-seed stages of a startup's life cycle.

As an example of the measures implemented by the state in order to form the entrepreneurial ecosystem, electronization of services provided to entrepreneurs, production of competitive and added value products, radical reforms in the direction of the development of the non-oil sector for the purpose of regular evaluation of the implementation of reforms and for this purpose, suspension of inspections, industrial/ measures such as construction of technology parks, industrial districts, promotion and support of export and investment, support of local production at the expense of subsidies, placing social projects in the center of attention can be mentioned.

An example of the government's innovation-supporting policy is the creation of the Small and Medium Business Development Agency (SMB) and the decision "Criteria for defining a startup". According to the Tax Code of the Republic of Azerbaijan, business entities that have received a "Startup" certificate are exempted from profit and income tax for a period of 3 years from the date of receipt of the certificate.

Another important factor is that companies invest more in innovation as a result of the increased level of competition. Because the increase in the level of competition will lead to the improvement of demand and this will lead to the development of the competitive environment in the domestic market (Porter, 1990 ; Abdurazzakov, Jafarov, Balayev, 2019). For this reason, the improvement of the competition legislation is of great importance.

5.4 Startup Ecosystem of Hungary

Gazelle is another way of definig startups in Hungarian literature which was coined by VECSENYI (2002). He defined a 'gazelle', the equivalent of a startup, as follows: 'Gazelles are dynamic, fast-growing and particularly vulnerable enterprises. Gazelle companies tend to start small yet think big from the start, i.e. the founding entrepreneurs envisage a large company. The rate of growth of gazelles is twice that of the industry average. That fast growth, however, makes

these businesses particularly vulnerable'(Digital Startup Strategy of Hungary, Report of Digital Success Programme, September 2016, p.22)

BHARGAVA-HERMAN (2017) define start-ups with three characteristic features: 1). quick reaction to seize opportunities ('scale-up'), 2) high growth potential and 3) exit strategy.

While some may attempt to adopt traditional models, others opt for agile practices, depending on their level of expertise and the specific requirements of their industry (VENCZEL, BERÉNYI & HRICZÓ, 2024).

After these definitions, it is worth to define the innovative entrepreneurship concept as well. In this study, I refer to the definition and illustration by Innovation Policy Platform, developed by the World Bank Group and the Organisation for Economic Co-operation and Development (OECD). As the Figure 15 displays, the innovative entrepreneurship is a concept that brings together the innovative businesses, young and high-growth businesses and SMEs

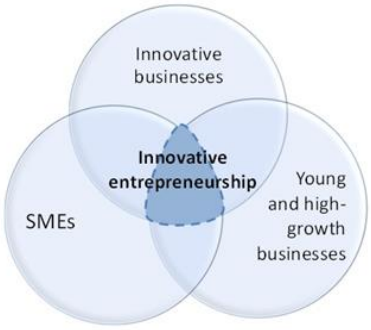


Figure 15. The module for innovative entrepreneurship

Source: Innovation Policy Platform web page.
https://www.innovationpolicyplatform.org/content/innovative-entrepreneurship

On the other hand, entrepreneurship ecosystem is closely related to entrepreneurship education as well. Many scholarly papers have researched the relationship between entrepreneurship education and entrepreneurial mindset. ILLÉS et al. (2015) indicated that goals of entrepreneurship education should be organized in a way to foster an entrepreneurial mindset and entrepreneurial capability of students. BAHRAMI et al. (2016) have researched to what extent intellectual capital (that include employees' competence, innovation capital, process capital, internal structure, social capital and external structure) affects the corporate entrepreneurship and found that intellectual capital impacts the corporate entrepreneurship in a positive way. Moreover, the entrepreneurial attitudes and intentions are very crucial to develop entrepreneurship.

It was found that entrepreneurial attitudes of Hungarian students are quite high and it is not only the case with students studying business, but also among students of agriculture, engineering, human resource and pedagogical studies (ILLÉS et al.2016) There is also a new concept of National Systems of Entrepreneurship which is defined by ACS et al.(2015) as follows:

"A National System of Entrepreneurship is the dynamic, institutionally embedded interaction by individuals between entrepreneurial attitudes, abilities, and aspirations, which drives the allocation of resources through the creation and operation of new ventures."

One of the key players of the Hungarian Innovation ecosystem is the National Research, Development and Innovation Office (NRDIO) of Hungary. Therefore, it is worth to see how National Research, Development and Innovation Office of Hungary evaluates innovation performance of the country. The following points are the excerpt from the 2014 report of National Research, Development and Innovation Office (NRDIO) of Hungary (PEREDY, 2014)

- The production of knowledge is not at the satisfactory level as well as the knowledge bases. The number of researchers is decreasing and research bodies are not internationally competitive. Therefore, scientific education potential is weak.
- Current institutions and organizations are weak to facilitate knowledge flow and transfer in a cost-efficient way.
- The problems faced by the business and community sectors engaged in knowledge utilization: big foreign firms bring along up-to-date technology and management knowledge, but the SMEs are not able to keep up the pace with the innovation.

In spite of the aforementioned challenges of Hungarian innovative ecosystem, the potential is growing over time. However, it is impossible to discuss the startup ecosystem without mentioning PETER ZÁBOJI (1943-2015) Hungarian born angel investor and entrepreneur who taught entrepreneurship at INSEAD, France, and CEU Hungary as well. Zaboji has initiated entrepreneurship workshops named the Venture Accelerator Course (VAC), in Budapest, in order to offer a basic education on how to set up a business. Later he launched 'First Monday' events in 2010, where he brought founders, investors, and bright new minds together in an attempt to unify startup community, and provided lessons on startup culture. Along with the other mind-blowing

initiative, European Entrepreneurship Foundation was another magnificent project that was a catalyst for the startup ecosystem in Hungary.

Business incubation centers are the main institutions in the innovative entrepreneurship ecosystem. MOROVÁN (2015) researched the Hungarian business incubation ecosystem and identified the main features of the ecosystem that are summarized below.

- There are not an accepted common criteria about what an incubator house is
- Lack of central database of the incubators
- Incubators are mainly in service –commerce –industry and technology –research and innovation sector.
- Financial support provided by global and local investors as well as government as a capital investment.

In terms of some difficulties, the followings are the main challenges of business incubation ecosystem in Hungary

- Risk-averse mentality.
- Very few role models and innovation culture.
- Unsatisfactory government support and corporate governance.
- Limited capacity of professional technological, engineering support.
- Emigration of high-skilled labor to the more developed countries (Brain Drain).
- Lack of recognition and public attention for entrepreneurship.

Despite the challenges the government support to the startup ecosystem is increasing regularly. One of the most strategic and recent such programme, the Digital Startup Strategy of Hungary, was adopted in Government Decree 1858/2016 (XII. 27) and was prepared in 2016 by the Prime Minister's Commissioner. The aim of Digital Startup Strategy of Hungary is to build the favorable startup ecosystem in the country not only in some cities.

Overall, the strategy covers the development of the five themes in the startup ecosystem that is described in Figure 16.

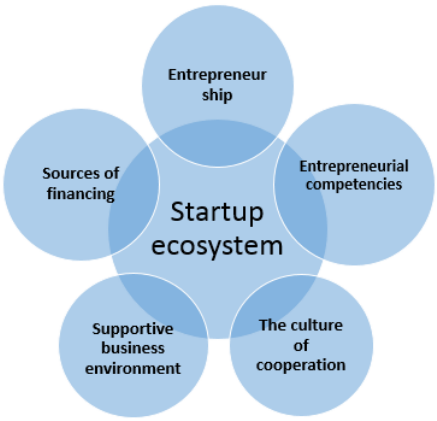


Figure 16. Five development piers of the startup ecosystem

Source: Digital Startup Strategy of Hungary, Report of Digital Success Programme, September 2016.

The history of the startup ecosystem establishment in Hungary is the near past. While discussing the potential of the local ecosystem the following features of the Hungarian startup ecosystem should not be taken granted.

- Geographic location of Hungary which is in the center of Europe
- English speaking, safe country with an easygoing people.
- Average living cost of 1.000 USD per month
- Very fast internet and world 3-rd best 4G mobile network
- The 4th in the EU in the number of ICT specialists employed in the business sector
- Success stories of Prezi, LogMeIn, Ustream, Tresorit, Fornetti

Currently, there are several key players in the development of innovation ecosystem in Hungary. Hungarian Association for Innovation, Innostart National Business and Innovation Centre, Association of Industrial Parks, Association of the Hungarian Science and Technology Parks, Association of Business Incubators just to name some.

Since University research is another pillar of the innovation ecosystem it is worth to mention about the current innovative landscape at the universities in Hungary. Followings are the main innovation centers in Hungarian universities.

The Center for Innovation at Eötvös Loránd University manages the university's tasks for the organization of research and is responsible for facilitating the exploitation of the research results produced by the University and bridging the gap between the University and industry

CEU InnovationsLab- was established in 2016 as a business incubator-accelerator at Central European University to create economic opportunity in Hungary and the Central and Eastern European region by nurturing a culture of entrepreneurship and bridging university and industry.

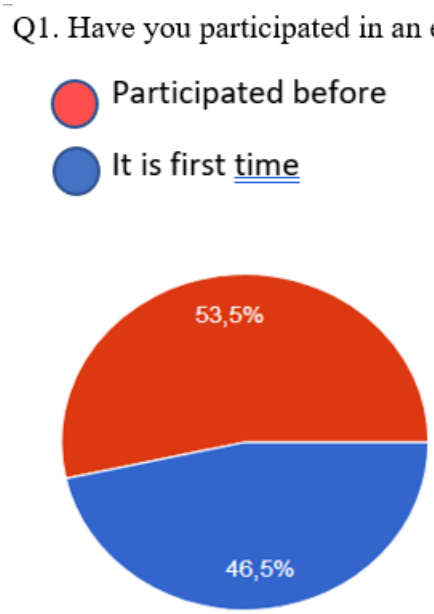
INNOTECH Innovation Park Ltd- The INNOTECH Innovation Park of the Budapest University of Technology and Economics was founded in 1987 with a total capital of HUF 97.5 billion (PÁLMAI, 2004). The INNOTECH Innovation Park is the technology transfer company of the Budapest University of Technology and Economics (BME) with the 62% share of ownership by BME, and 38% owned by the municipality of the 11th district of Budapest.

CHAPTER 6. FINDINGS AND DISCUSSIONS

This chapter holds significant importance within the thesis since it delves into the discussion of the research findings. First, we will start with the findings of the startup ecosystem of Azerbaijan. To run a qualitative analyses online survey was conducted among the startups. The startup profile is quite mixed, and majority of the participants are either based in or operating in Baku, the capital of Azerbaijan. The next section describes the results and analyses of the online survey.

6.1 Startup Ecosystem Findings: Azerbaijan

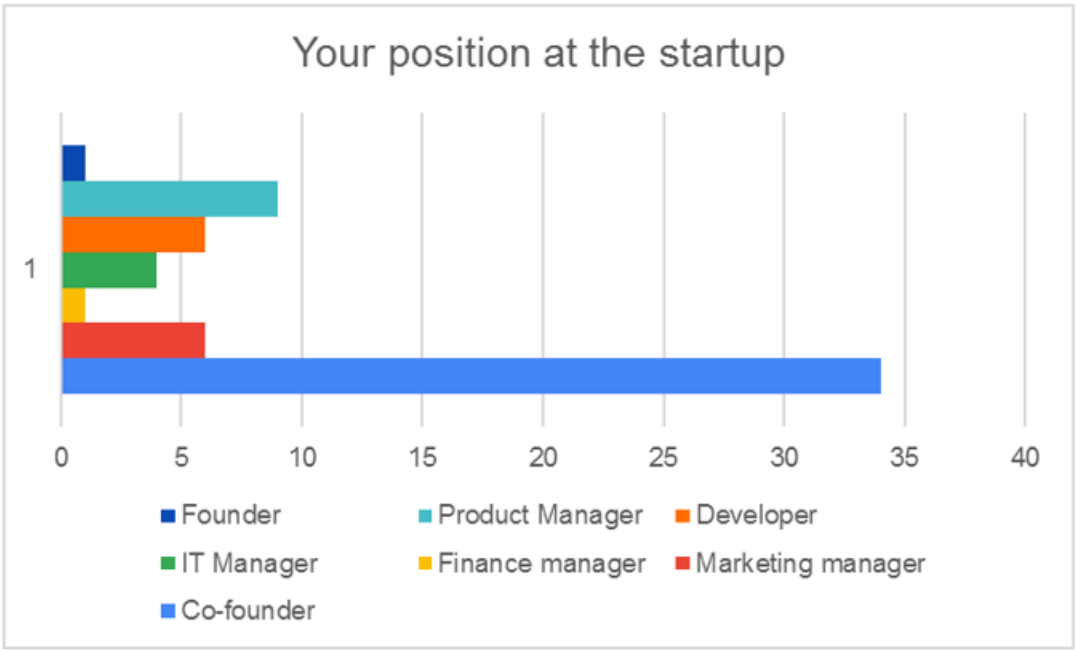
As discussed in chapter 4 the startup ecosystem a quite young and developing in spite of the challenges. To uncover and analyse these challenges the survey was conducted. The representative sample is mainly comprised of the startups mainly based in Baku, the capital city.
Survey questionnaire is prepared based on the BLANK AND DORF (2012), STARTUP HUNGARY (2022) REPORT.
The survey questionnaire visualization comes first and then explanatory comments and analysis are provided under each question.



Source: Author's own work

Almost half of the respondents have participated in an entrepreneurship survey before and for the rest of the respondents it was their first entrepreneurship survey.

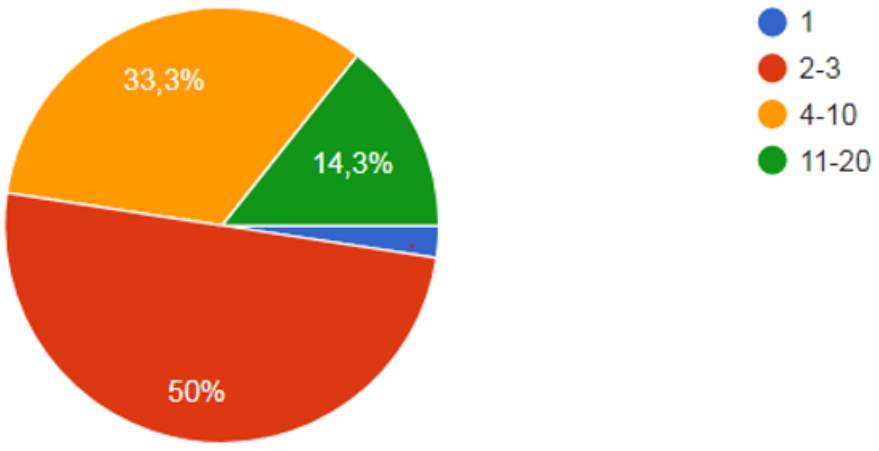
Q2. Your position/role at the startup



Source: Author's own work

It is worth to note that about 80% of the participants reported themselves as a co-founder of the startup they are currently part of. This is quite important in a sense that they are people in charge of the startup and their responses are quite critical and valuable for the research and for the policymakers.

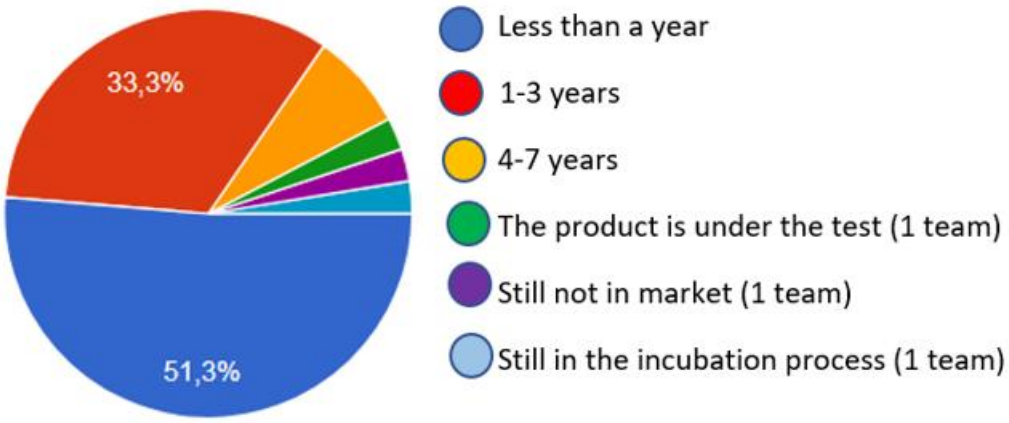
Q3. How many members does your startup have?



Source: Author's own work

Half of the startups attending the survey are small teams comprised of 2-3 members. About 33% of the teams have 4-10 members and about 14 % are considered big teams made up of 11-20 members. Among respondents only one team was recorded with only 1 member who is the only founder among others.

Q4. How many years has your startup been on the market with a product/service offering?



Source: Author's own work

It is important to see how many years the startup has been offering their product or services.
Half of the startups are still under a year and 1/3 of the teams has been around 1-3 years.
Q5. What is your motivation and aspiration for being in a startup?

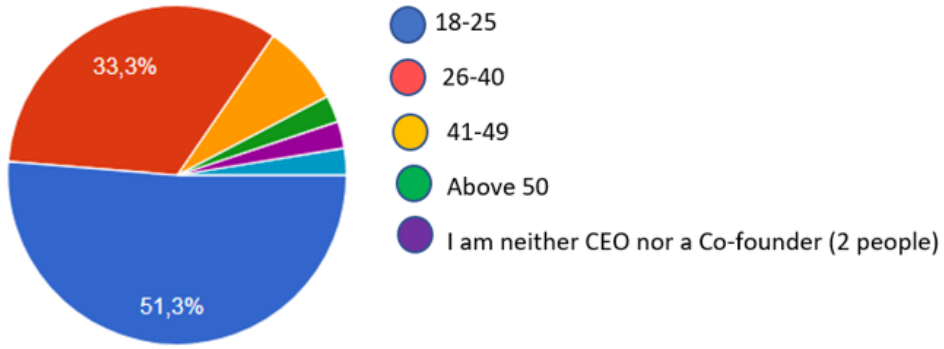
- Lifestyle Startups: Work to Live Their Passion.
- Small-Business Startups: Work to Feed the Family.
- Scalable Startups: Born to Be Big.
- Buyable Startups: Acquisition Targets.
- Social Startups: Driven to Make a Difference.
- Large-Company Startups: Innovate or Evaporate

The question of 'What is your motivation and aspiration for being in a startup' is based on a startup typology proposed by BLANK & DORF (2012).
Among the above 6 categories 3 were most preferred by the respondents. 36 startups (around 83%) opted for realizing innovative ideas, 26 startups (60%) chosen to make a difference and

meet people's needs and 20 startups (46%) have preferred to be in startups in order to live their passion.

Hungarian startups rank their motivation as follows: 49% solving an important problem, 22% want work with great people at a great company and 13 % prefer to influence/help millions of people.

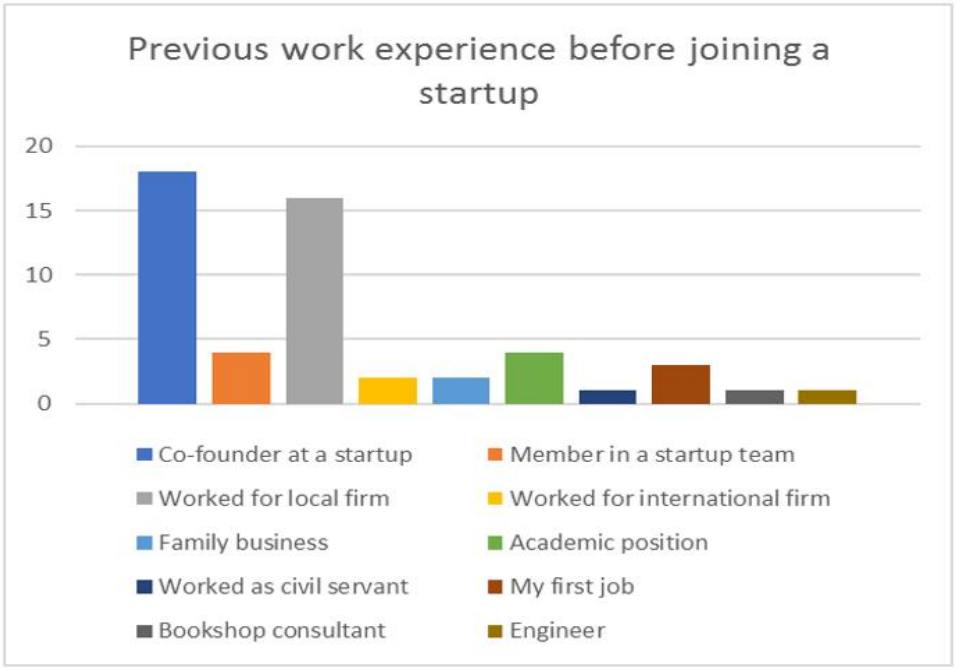
Q6. How old are you, if you are a CEO or Co-Founder?



Source: Author's own work

All the respondents answered this question. The age range of CEO or Co-Founder of the startups. It is promising to see that about half of the CEO/ Co-Founders are younger than 25 years and about 33 % are within the 26-40 age range.

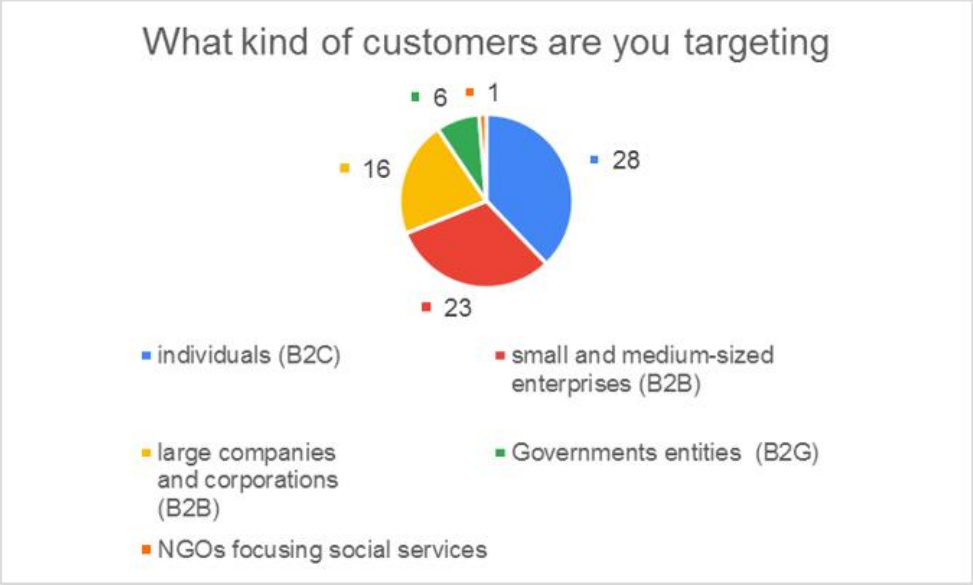
Q7. What was the previous work experience before joining a startup?



Source: Author's own work

It is worth to note that almost half of the respondents were in a managerial team of a startup company before joining the current startup.

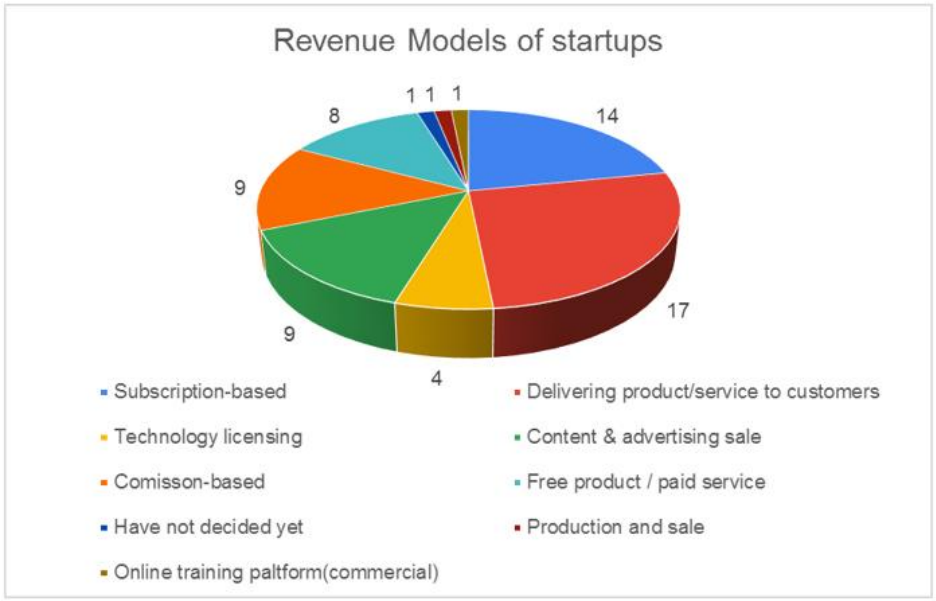
Q8. What kind of customers are you targeting?



Source: Author's own work

Around 68% and 56% of respondents aim to sell to individuals and SME firms with only 39% of total respondents targeting large corporations. When it comes to Hungarian startups, they tend to work with SME firms (about 65%) and with large corporations (about 60%)

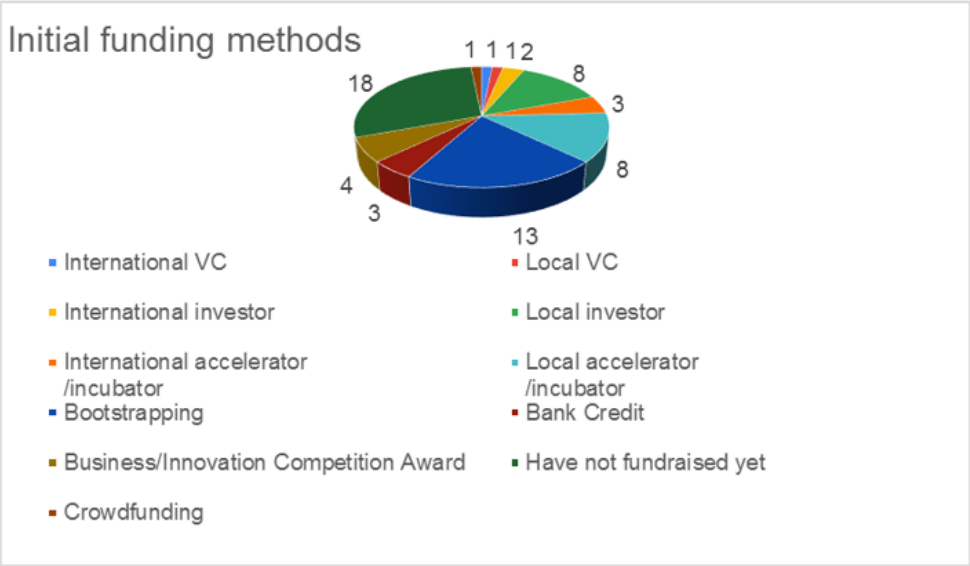
Q9. What term best describes your revenue model?



Source: Author's own work

Revenue model of startups vary with delivering product/service to customers being the most preferred and subscription-based and content & advertising sale being second and third respectively.

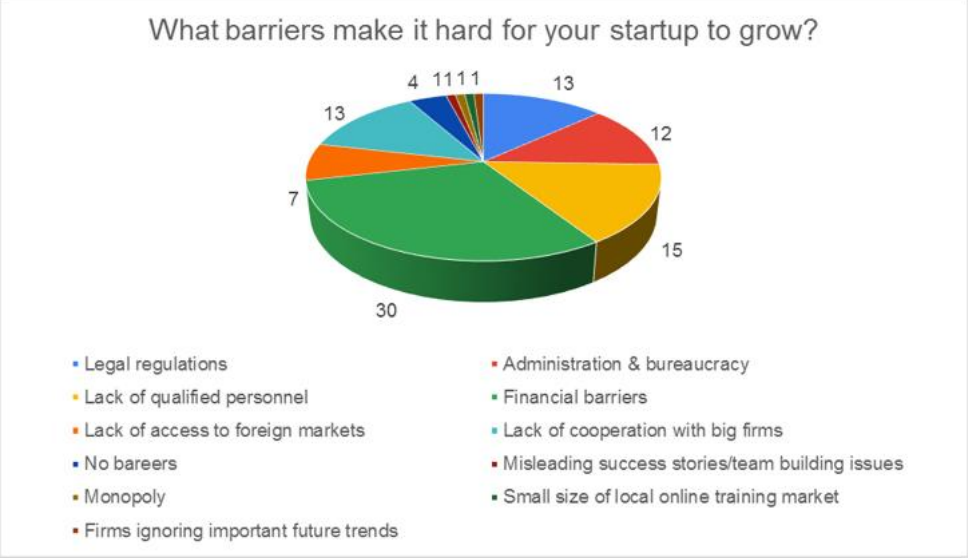
Q10. Which of the followings were your initial funding methods?



Source: Author's own work

It is interesting that almost half of the startups have not fundraised yet which means they are either new in the business or have been running the startup by the help of the savings of the startup team.

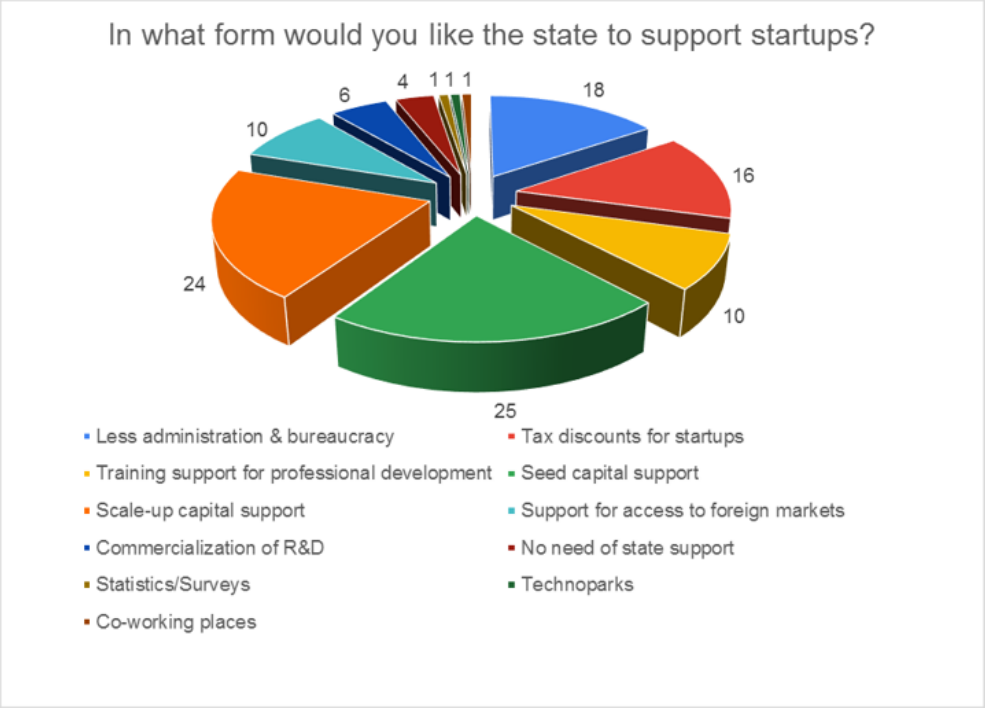
Q11. What obstacles do you think are making it difficult for your startup to grow?



Source: Author's own work

As it was obvious from the Q11 startups are facing big issues when it comes to fundraising. That is why most of the respondents ticked the financial barriers that holding back their startup and impede their growth.

Q12. In what form would you like the state to support startups?



Source: Author's own work

Although less bureaucracy is also among the most wanted but again financial support expectation (seed capital support) and tax discounts were two most expected state support by startups.

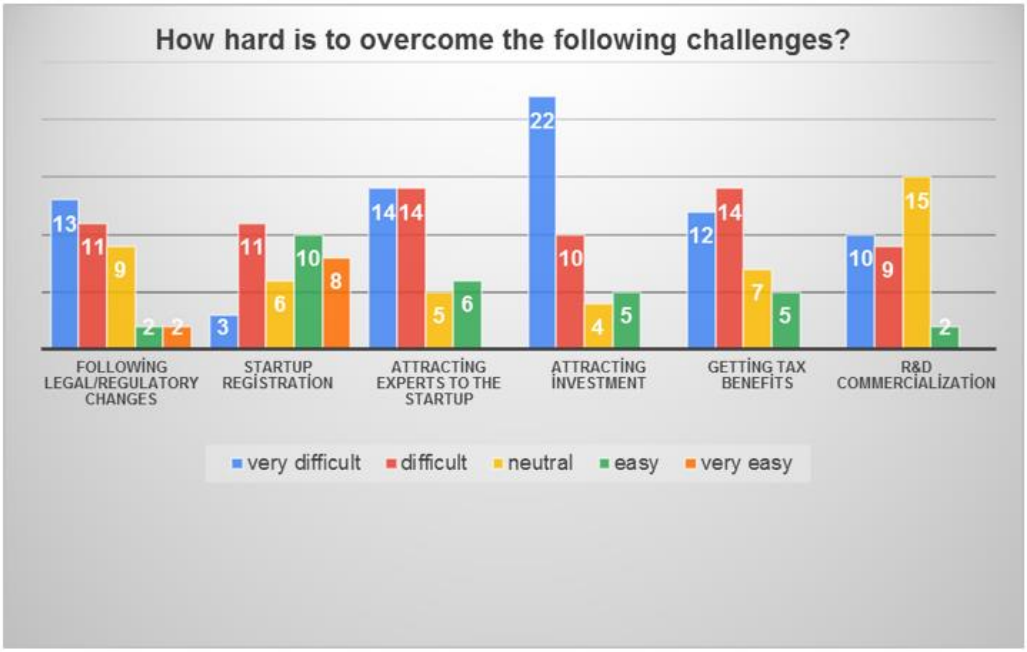
28 respondents chose MVP development cost as a biggest cost which again indicates that financing startups are not good enough in Baku startup ecosystem.

Q13. What are the biggest expenses you are facing currently?

Source: Author's own work

When it comes to overcoming challenges attracting investment is number one issue followed by attracting experts and following legal changes. It is good to see that startup registration is getting easier and probably will not require too much effort in the near future.

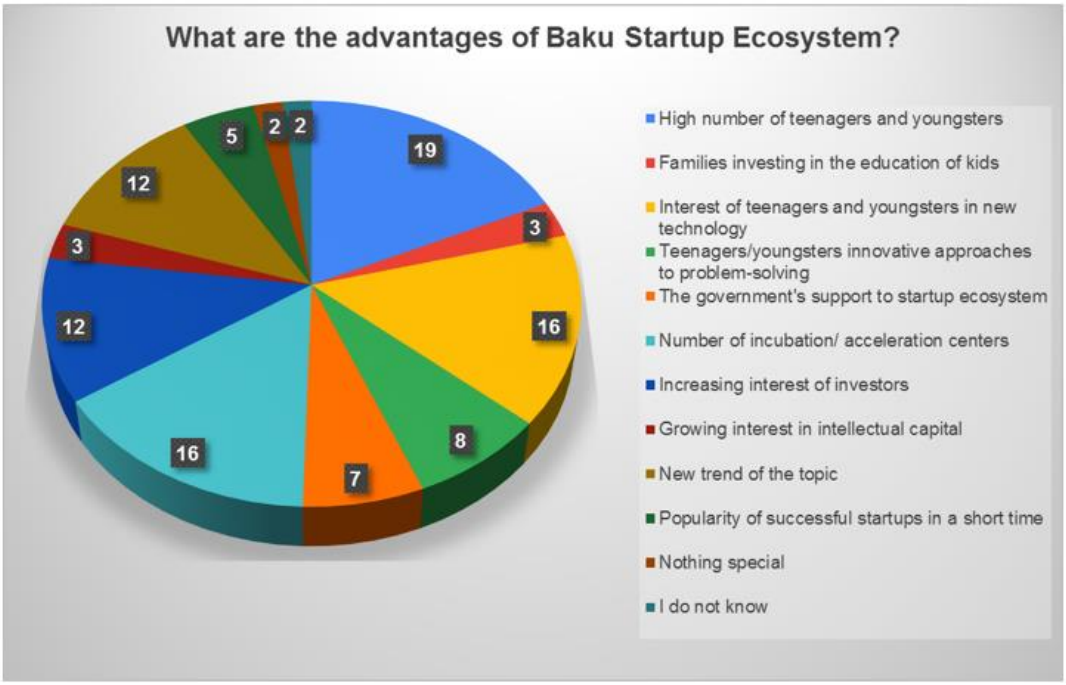
Q14. How hard is to overcome the following challenges?



Source: Author's own work

One of most important question of the survey is of course to find out the advantages of Baku startup ecosystem.

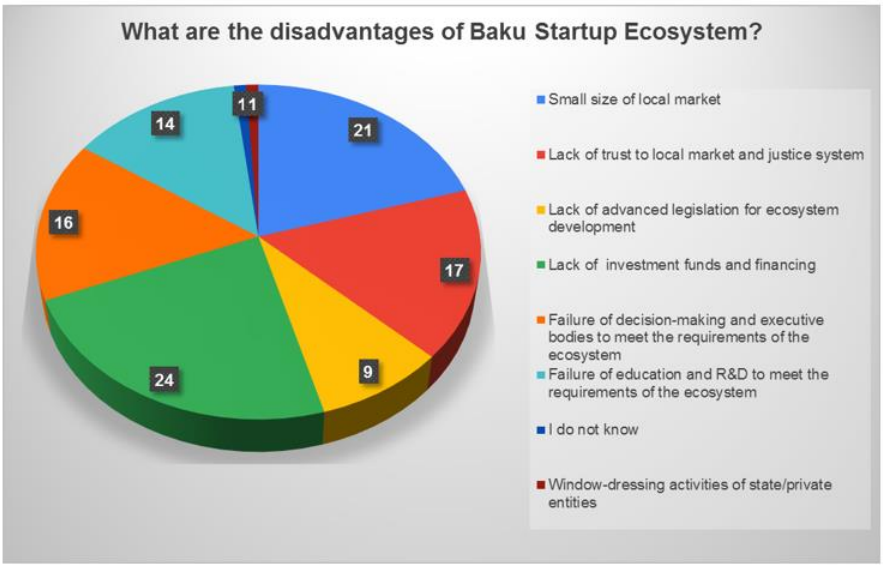
Q15. What are the advantages of Baku Startup Ecosystem?



Source: Author's own work

High number of teenagers and youngsters was the most preferred answer by respondents together with interest of teenagers and youngsters in new technology and number of incubation/ acceleration centers. It is quite promising to see youngsters are focusing more and more on technology, incubation and acceleration centers are increasing and therefore the startup ecosystem is getting bigger. As a result, Baku is strengthening it is place as a startup hub in Azerbaijan and in the Caucasus region.

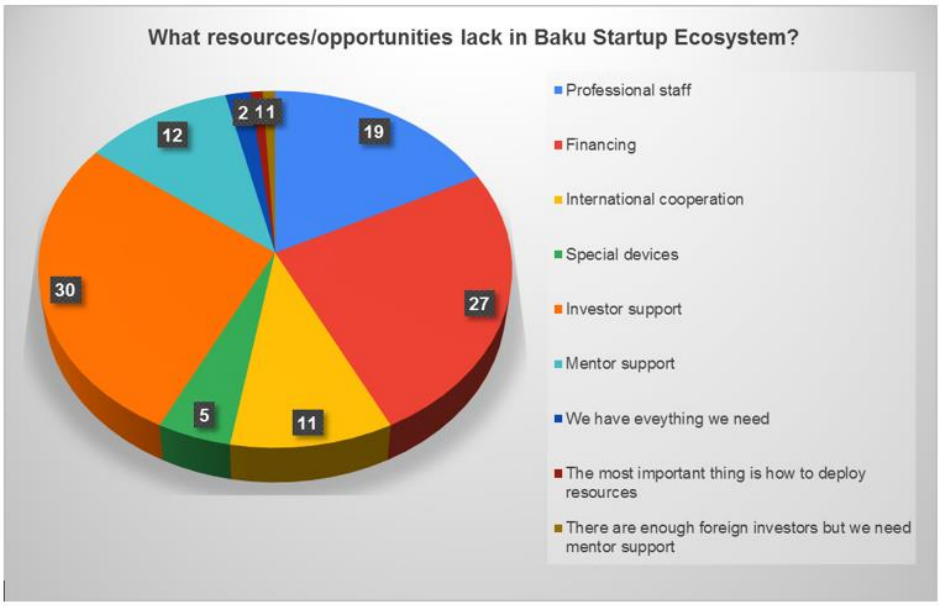
Q16. What are the disadvantages of Baku Startup Ecosystem?



Source: Author's own work

Another most important question is the disadvantages of Baku startup ecosystem. Lack of investment funds and financing is the biggest disadvantage followed by other biggest disadvantages such as small size of local market, lack of trust to local market and justice system and lack of advanced legislation for ecosystem development. The output of this question is in line with the output of the Q14.

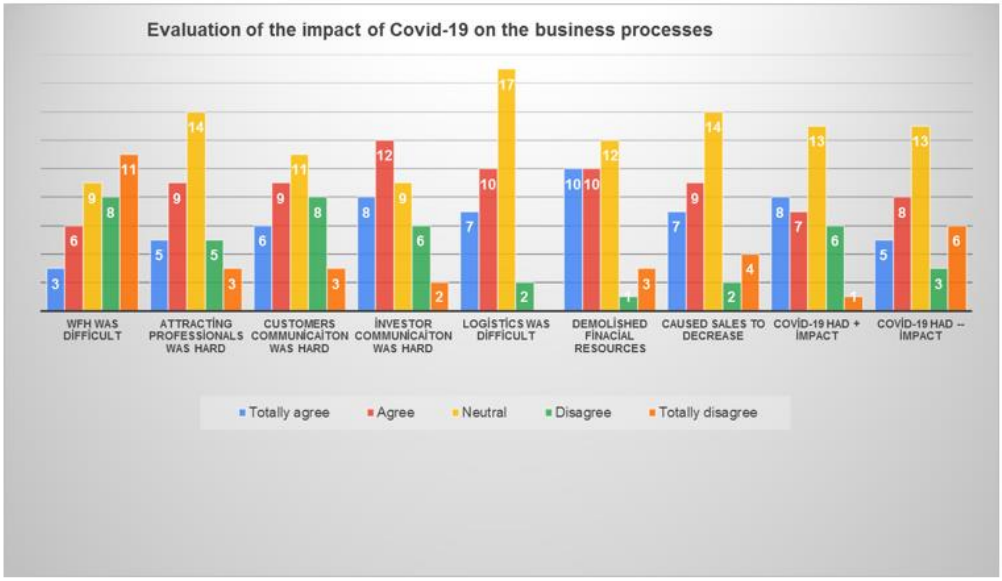
Q17. What resources/opportunities lack in Baku Startup Ecosystem?



Source: Author's own work

Resources are very important in any startup ecosystem. In Baku startup ecosystem the most needed resources are investor support, financing and professional staff.

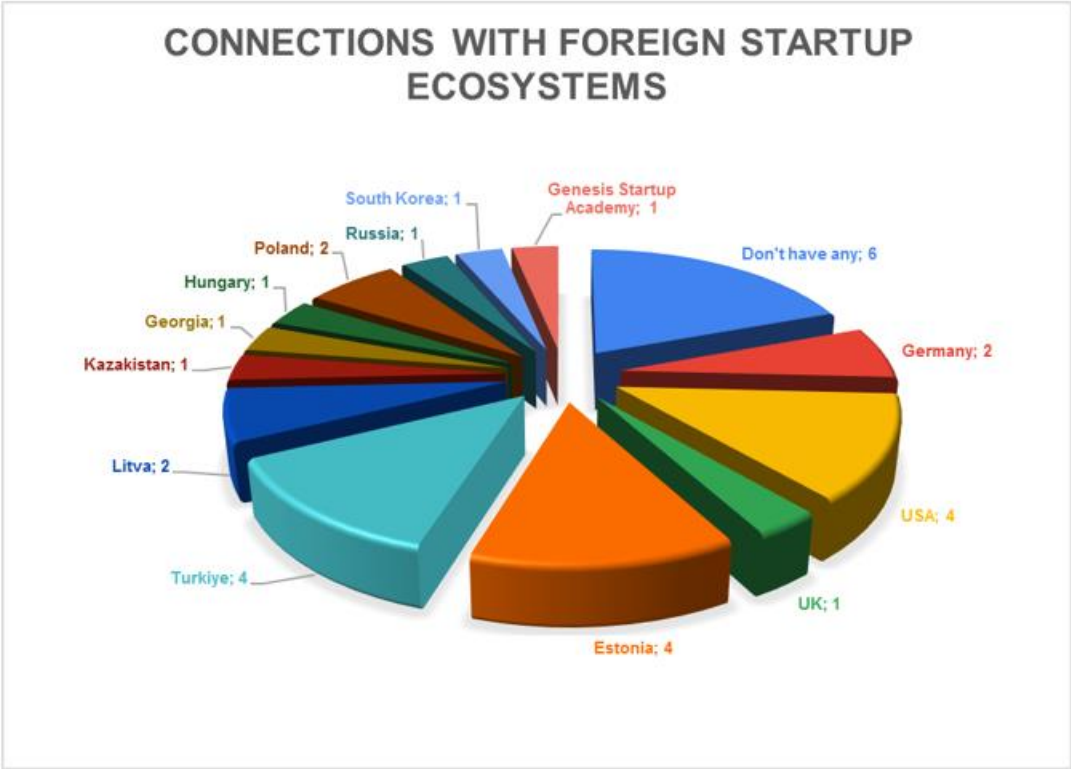
Q18. Evaluation of the impact of Covid-19 on the business processes



Source: Author's own work

As Covid-19 pandemic was the most influential global pandemic of all times it is worth to know the impact on the startups in Baku ecosystem. The good thing is work-from-home was not difficult for majority of startups. Altogether for about 40% of startups Covid-19 had positive impact and for about 30% of startups it had negative impact.

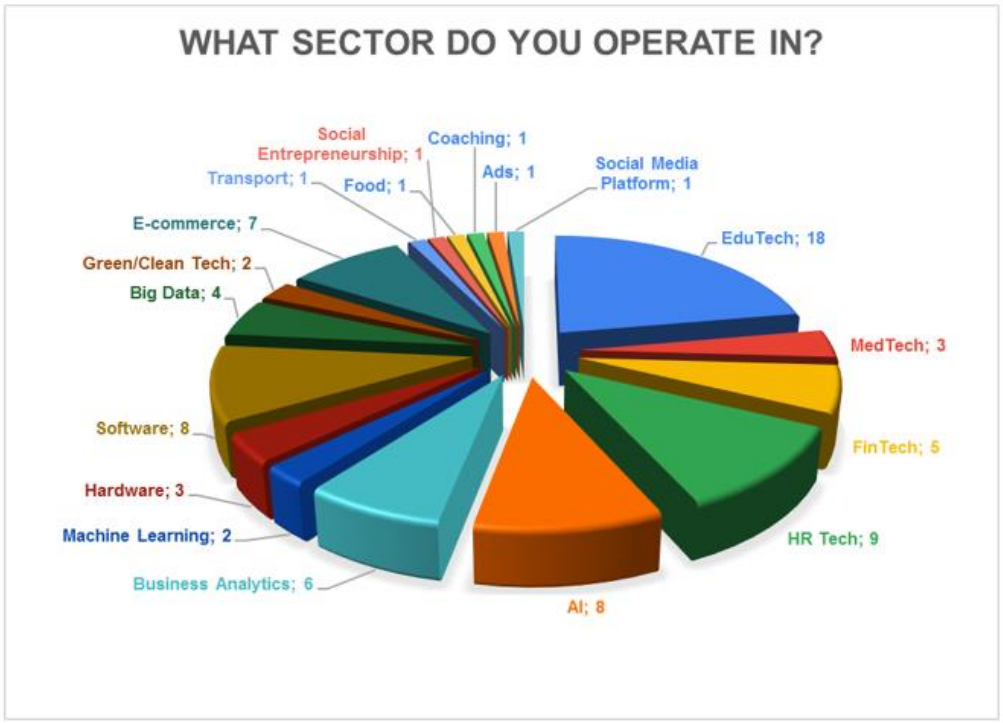
Q19. Connections with foreign startup ecosystems



Source: Author's own work

Needless to say, international connections are always good to have for any business and startups are not exceptions. The respondents are mainly cooperating with Turkish, Estonian and US startups. It is not a coincidence that the main partnerships are with European and US startups which is due to their leading role in global startup market.

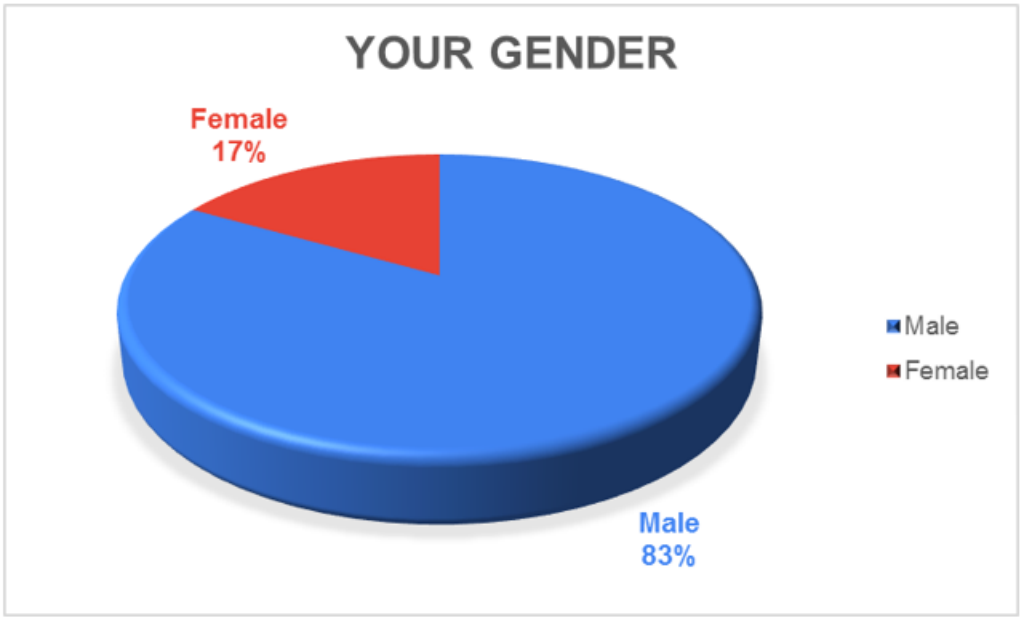
Q20. What sector do you operate in?



Source: Author's own work

The variety of startups by sector is also an advantage and shows the talent pool has a diverse background among startups. Edutech startups are leaders in the ecosystem followed by HR tech together with AI and Software startups.

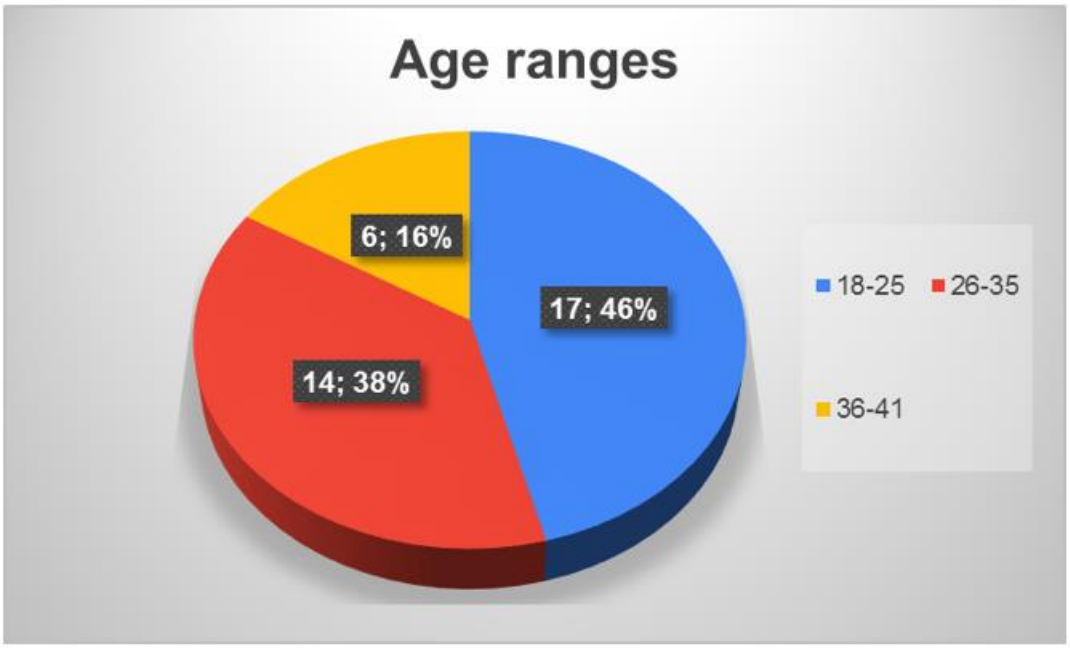
Q21. Your gender



Source: Author's own work

When it comes to the demographics about the survey respondents it is not a surprise to see that 83% percent of the respondents are male and 17% are female in the startup ecosystem. But the trend shows that the number of female founders or co-founders are going up in recent years.

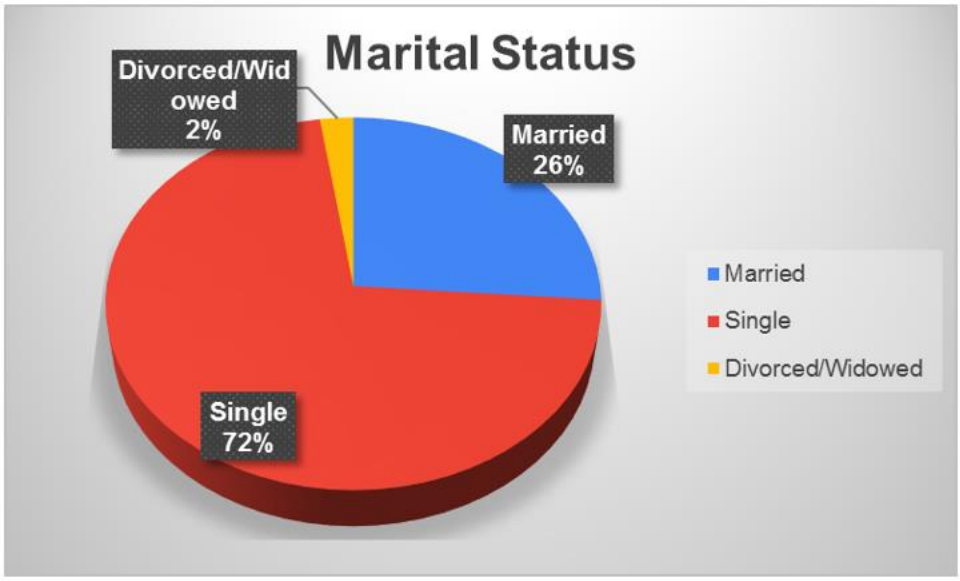
Q22. Your age



Source: Author's own work

When we look at the age and the age range statistics, it is a little bit surprising and at the same time promising to see that 46% of startups are below 26 and 38 % is under 38. This once again shows that the youngsters are a driving force of startup ecosystem. Also we have the youngest female respondent who is only 14 and very early on the startup ecosystem.

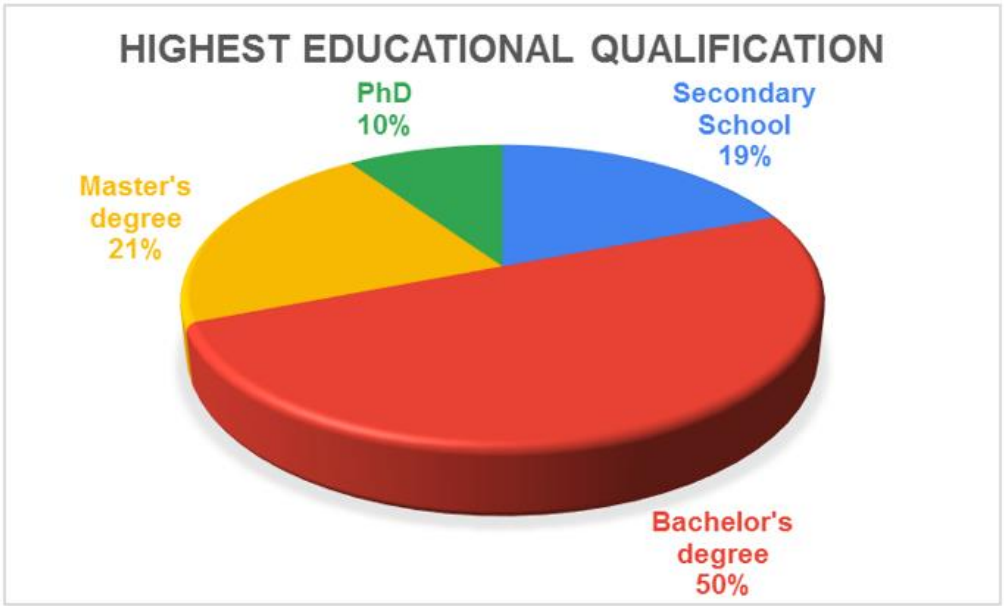
Q23. Marital status



Source: Author's own work

It's not unexpected to observe that 72 percent of the participants are unmarried, given that 84 percent fall within the 18 to 35 age range.

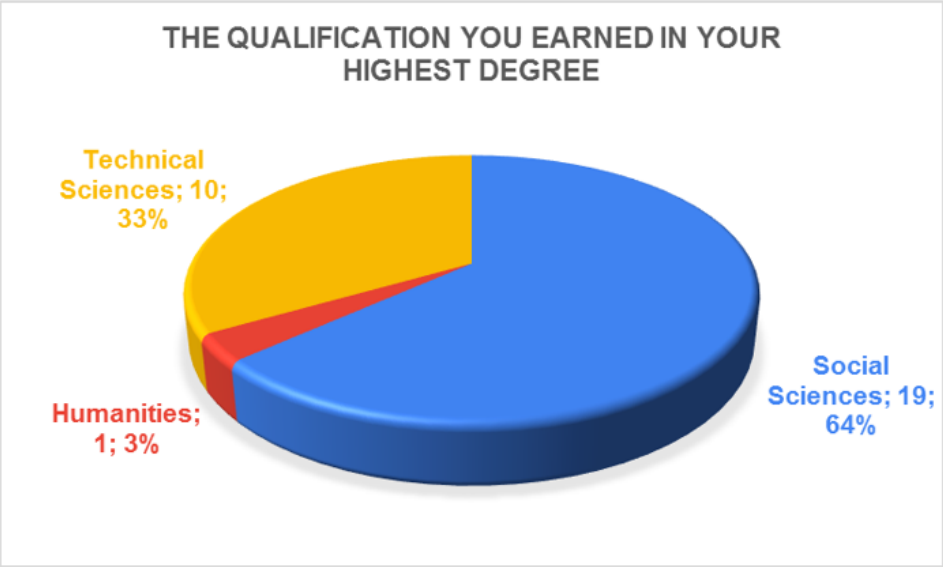
Q24.Highest educational qualification



Source: Author’s own work

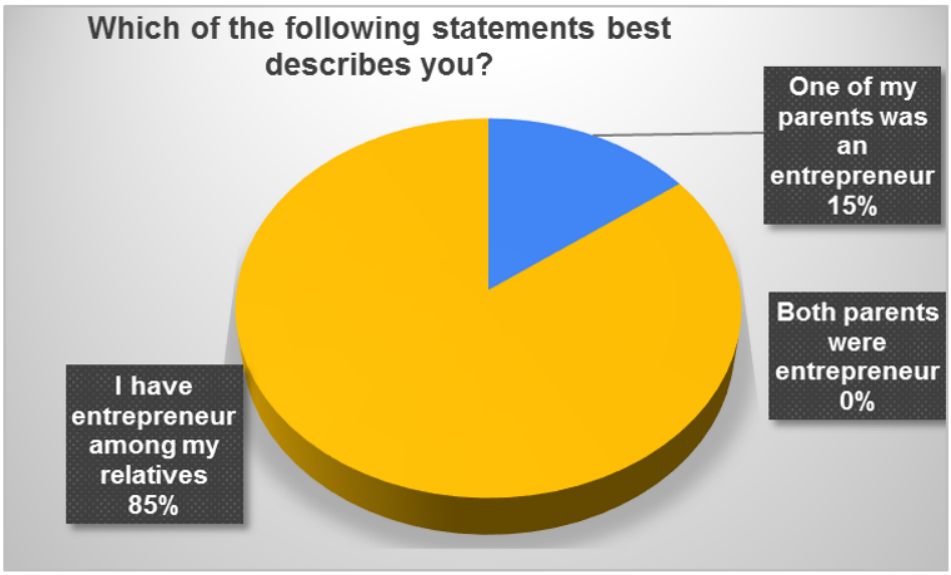
Concerning the respondents' educational attainment, half of them have completed a bachelor's degree and the rest is the mix of people holding master’s degree diploma, secondary school diploma and PhD degree with 21 percent, 19 percent and 10 percent respectively. The surprising statistics were the high percentage of the respondents with secondary school education. Usually startup ecosystem attracts fresh graduates or experienced people rather than people who have high school diploma.

Q25. The qualification you earned in your latest degree



I have grouped different qualifications under three broad categories. To my surprise, social sciences are leading the ecosystem followed by technical sciences and humanities.

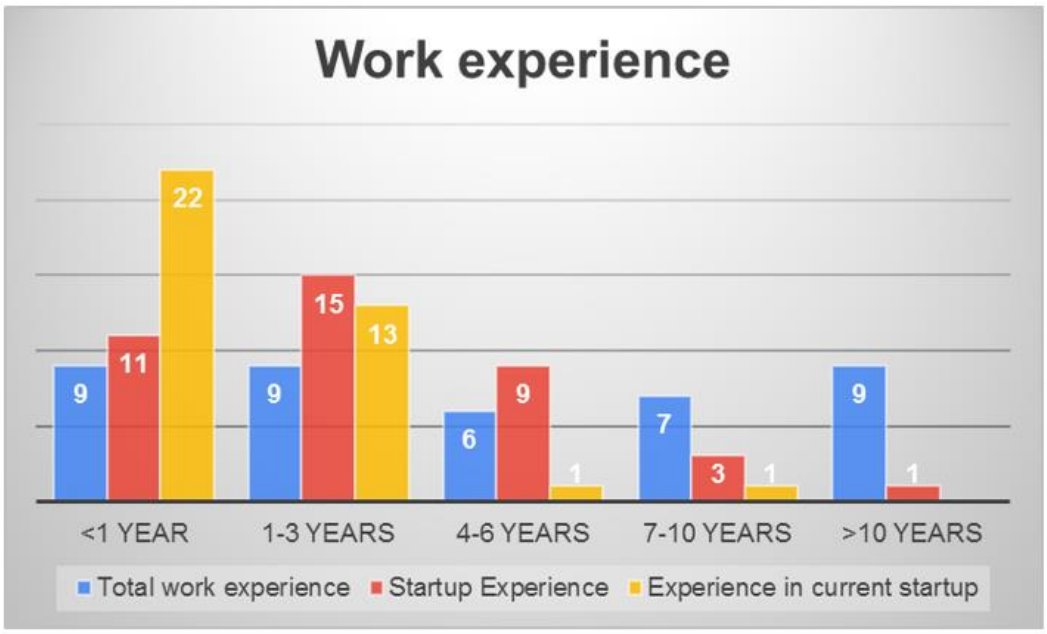
Q26. Which of the following statements best describes you?



Source: Author's own work

Having entrepreneur among the relatives could be a motivation because 85 percent of the respondents have seen their relatives as an entrepreneur and only 15 percent declared one parent as an entrepreneur. This statistic is also crucial indicator, and it could be a good evidence how entrepreneurship could be a contagious in a good way.

Q27.Your work experience



Source: Author's own work

Work experience is also important factor when evaluating the strength and the potential of the startup teams. As we have seen in the previous question the startup teams are very young and that is why about 45 % of them either have never been employed or started their professional career in a startup firm. About 20 percent of the respondents reported 4-6 years of experience in startup companies. Only around 10 percent reported to have 7-10 years of experience in startup industry. Based on the survey results the following table shows hypotheses testing result summary

Table 9. Hypotheses testing result summary

Hypothesis Statement	Decision	Explanation of Hypothesis Decision
Hypothesis 1: There is no relationship between startup success and motivation and previous experience of startup teams	Not supported	Startups led by teams with higher levels of motivation and previous entrepreneurial experience are more likely to succeed compared to those with less motivated or less experienced teams.
Hypothesis 2: The local market is well-defined and there is a loyal customer base.	Not supported	The local market is characterized by a small but growing customer base that is increasingly open to digital and technological solutions, also faces disadvantages like limited access to venture capital and international networks.
Hypothesis 3a: Local startups do not face funding issues. Hypothesis 3b: Local startups lack differentiated revenue models	Not supported	Local startups predominantly rely on self-funding and angel investors, and they frequently adopt subscription-based and service-oriented revenue models due to the market's characteristics.
Hypothesis 4a: The local startup ecosystem does not offer any advantage. Hypothesis 4b: The local startup ecosystem creates competition.	Hypothesis 4a Not supported Hypothesis 4b Supported	A local startup ecosystem provides networking opportunities and access to resources, which enhances startup growth. However due to the resource limitation may also create competitive pressures among startups.
Hypothesis 5: There are no big challenges in the local startup ecosystem	Not supported	The primary challenges in the local startup ecosystem include regulatory barriers, a lack of experienced mentors, and limited access to scale-up resources, access to funding, a small customer base which negatively impact startup survival rates.

Source: Author's own work

Apart from hypothesis 4b the rest of the hypotheses were not supported by the survey results and were rejected. The reasons why hypotheses were rejected is given in the last column under ‘ Explanation of Hypothesis Decision’. Further findings will be discussed in chapter 7 and in chapter 8.

6.2 Startup Ecosystem Findings: Hungary

Budapest, the capital city of Hungary, serves as the country's primary startup hub, characterized by its multicultural environment and boasting a vibrant ecosystem with over 900 startups, more than 50 angel investors, and numerous startup support organizations. In 2021, Budapest was recognized by Startups.co.uk as the top city for launching a business post-Brexit.

The Hungarian government plays an active role in supporting startups, with initiatives such as Hiventures, one of the largest government-funded venture capital firms in Central and Eastern Europe, offering substantial funding opportunities, amounting to EUR 258 million, for innovative and scalable micro, small, and medium-sized enterprises up to five years old.

Additionally, government entities like the Ministry of Innovation & Technology are tasked with developing national research, development, and innovation (RDI) strategies, as well as policies related to research, innovation, and higher education. The National Research, Development, and Innovation Office oversee the implementation of RDI policies and ensure adequate investment in research and innovation to enhance Hungary's innovation capacity and support leading research initiatives.

The NRDI Office also spearheads the implementation of the Smart Specialisation Strategy (S3) policy tool, aimed at advancing regional economies, accelerating industrial transformation, and promoting digitalization. Hungary's goal, as reflected in the European Innovation Scoreboard, is to become one of the top innovators in the EU by 2030. This involves enhancing the value creation capacity of the innovation ecosystem and increasing the productivity of the business sector.

The health of a startup ecosystem is often gauged by the number and value of successful, high-valuation exits, such as acquisitions or IPOs. In the Central and Eastern European (CEE) region, the Czech Republic and Poland lead with the highest number of unicorns, having produced four and 11, respectively. In contrast, Hungary has only produced one unicorn, LogMeIn (as shown in Figure 17). Due to the limited number of high-valuation exits, aspiring Hungarian entrepreneurs have fewer role models on both the investment and startup fronts compared to those in more

successful startup ecosystems. Although Hungary has a high number of startups per capita in Central Eastern Europe, the number of exits in Czechia and Poland is two to four times higher. (BACSÓ et al., 2023)

	Central Eastern Europe						Other			
	Bulgaria	Czechia	Hungary	Poland	Romania	Slovakia	Estonia	Germany	Israel	Netherlands
Financing										
Venture capital funding per capita, €	60	80	45	48	116	29	1,967	440	n/a	614
R&D										
Investment in R&D as a share of GDP, %	0.9	2.0	1.6	1.4	0.5	0.9	1.8	3.1	4.9	2.3
Talent										
Universities in top 500 for STEM	0	5	2	6	3	0	1	32	5	10
Universities in top 500 for business	0	0	1	4	1	0	0	13	3	11
Start-up activity										
Number of start-ups[1]	1,949	3,315	2,977	7,949	3,413	1,292	2,765	51,296	11,277	45,088
Start-ups per 1 million	281	310	305	209	177	237	2,077	616	1,224	2,585
Average valuation per start-up, € million[2]	1.6	6.9	2.0	5.4	7.5	0.8	11.9	8.2	37.8	6.3
Number of unicorns	0	4	1	11	1	0	7	58	91	21

[1] As of Feb 2022.

[2] Conversion rate of $1 = €0.85.

Figure 17. Start-up metrics, select countries

Source: Dealroom; OECD; QS Quacquarelli Symonds World University Rankings; McKinsey analysis

The NRDI Office also spearheads the implementation of the Smart Specialisation Strategy (S3) policy tool, aimed at advancing regional economies, accelerating industrial transformation, and promoting digitalization. Hungary's goal, as reflected in the European Innovation Scoreboard, is to become one of the top innovators in the EU by 2030. This involves enhancing the value creation capacity of the innovation ecosystem and increasing the productivity of the business sector.

To have a deep dive into the challenges holding back the startup ecosystem growth the survey data of Startup Hungary and Startup Genome was the main data source.

According to startup genome and field research, there are 3 main reasons worth to consider moving the startup to Budapest.

1. Lower living cost

Budapest is an affordable place to launch a startup and to run it compared to Western Europe and the United States ecosystems. Suffice it to say that the Cost of Living Index in Budapest is two times cheaper than that of New York. Simply put, it is because the cost of housing, utilities, and education transportation, energy, clothing, healthcare, and entertainment are all quite low compared to many other business hubs in the world.

2. Skilled Workforce

Hungary's education system prioritizes practical skills, with a focus on STEM subjects, and an emphasis on English proficiency, as evidenced by 90% of students being proficient in the language. Furthermore, approximately two-thirds of the startup workforce comprises graduates with STEM backgrounds. Therefore many pharmaceuticals, engineering, R&D, and IT firms turn to Budapest labour market in search of talent.

3.Startup-Friendly Policies

Hungarian corporate income tax rate of 9% is among the lowest in Europe, and it takes only 3 days to register and receive a tax number.

Also, startup genome reports significant developments are taking place across various industries, particularly in the realms of AI, big data, analytics, fintech, and life sciences.

1.AI, Big Data, and Analytics

Bosch is investing in a new 3,500 square meter R&D center near Zalazone, Hungary's advanced mobility solutions test site. The facility will house 200 engineers dedicated to the fields of autonomous driving, electric mobility, and artificial intelligence. Notably, a groundbreaking artificial intelligence supercomputer module was inaugurated in January 2022 through a collaboration between Mininnovation and Technology and OTP Bank.

2.Fintech

As of January 2023, Budapest is a thriving hub for fintech innovation, hosting 106 startups. The landscape is diverse, with 26% of these companies focusing on financial software development and systems integration, 19% on payment services, and 17% on data analytics and business intelligence services. This indicates a dynamic fintech ecosystem in the city.

3. Life Sciences

Hungary's life sciences sector is robust, boasting around 300 startups and employing a substantial workforce of 80,000 people. Hungary has emerged as a significant destination for pharmaceutical and biotech manufacturing, hosting production facilities for eight out of the top 10 global companies in the industry.

The education system also contributes significantly, with 14 Hungarian universities graduating over 5,000 students annually in life sciences-related fields. The sector's growth is further exemplified by the success of Turbine's cell behavior modeling platform, which secured €20 million in a Series A funding round in November 2022.

Another data source for this research is a Startup Hungary which is comprised of local startup experts. The consulting firm of Startup Hungary is one of important firms conducting surveys among startups in Hungary annually. The survey questionnaire visualization and questions are provided in the Annex 2. Here the overall analysis is given.

In the Hungarian startup landscape, the year 2022 saw significant success in terms of funding, with local startups raising over €180 million. This represented a remarkable 60% increase compared to the previous year, contributing to a 30% growth in the total investment volume in 2021. However, this growth was driven not by a higher number of startups raising funds but rather by a few standout funding rounds. Notably, SEON's record-breaking $94 million Series B round accounted for almost half of the total amount raised in 2022.

Despite the impressive funding figures, there are concerning trends within the ecosystem. Most local startups are not anticipated to raise funds in the next 1-2 years, and government-backed funding has significantly slowed down, evident in a 37% decrease in the number of deals over the last four years. The survey participation rate dropped by 25% compared to 2022, signaling a decrease in the number of active startups. Additionally, the identification of 100 dead or zombie startups among the respondents from the previous two years indicates a challenging environment, with startups either officially closing or showing signs of imminent closure. The decline in the number of startups founded in the last three years, with only 12.2% founded in 2022, further underscores the challenges faced by new ventures.

While these challenges are evident, there is still hope and promise in the Hungarian startup scene. New rising stars show potential for growth and success in the coming years. Although there's an overall decrease in the number of startups and government funding, the existence of innovative and promising startups suggests opportunities for growth and investment.

Despite the challenges faced in 2022, founders express unprecedented optimism about the future. The survey reveals that 42% of surveyed founders believe they are building the next unicorn, and 86% see themselves as major international players. This optimism is, however, tempered by the fact that twice as many founders this year express concerns about their startup's likelihood of failure.

While increased optimism and ambition are crucial for the growth of the startup ecosystem, there are indications of a misalignment between founders' aspirations and the current reality. The number of startups achieving substantial international success or attracting international venture capital does not align with the ambitious goals set by founders. Despite claiming to have a global outlook, the majority of startups generate less than half of their revenue from international markets. Operational activities are also predominantly focused on local or regional markets, with nearly half of the founders prioritizing Hungary and the wider region in the coming year.

In the local tech ecosystem, similar to global tech giants, some firms experienced significant downsizing in response to the changing macro environment, often reducing their workforce by double-digit percentages. However, according to a survey, 54% of respondents reported an increase in company size, while only 16% noted a decrease. The study also tracked 20 selected startups with over 30 employees, revealing that, collectively, they employ over 2300 people, a 16% increase from the previous year. Despite a slowdown in growth during the latter part of the year, only 4 out of the 20 scale-ups experienced a net decrease in headcount in 2022.

In conclusion, while founders in the Hungarian startup ecosystem remain highly optimistic, there is a notable disconnect between their aspirations of international success and the actual realization of these aspirations. The challenge lies in aligning these ambitions with the practicalities of international expansion and investment, emphasizing the need for strategic adjustments within the ecosystem.

CHAPTER 7. CONCLUSIONS

In this concluding chapter, we examine the current state of the startup ecosystems in Azerbaijan and Hungary, offer suggestions for enhancing their development, address research limitations, and outline potential areas for future research.

7.1 Recommendations for Azerbaijan startup ecosystem

Based on the comprehensive summary of the startup survey, here are some recommendations for the development and enhancement of the startup ecosystem in the region:

Financial Barriers

Given that a significant number of startups have not fundraised yet and financial barriers are hindering their growth, there is a need for targeted support mechanisms. Policymakers should consider initiatives such as seed capital support and tax discounts to alleviate financial challenges.

Investment Attraction

Recognizing that attracting investment is a top challenge, efforts should be directed towards creating a more supportive investment environment. This could involve establishing investment funds, facilitating investor networking events, and providing educational programs for startups on effective fundraising strategies.

Support for Small Teams

As half of the startups are small teams with 2-3 members, tailor-made support programs for micro-entrepreneurs can be beneficial. These programs could include mentorship, access to resources, and training specifically designed for small teams.

Encouraging Diversity in Education

While social sciences are leading in educational qualifications, there should be efforts to encourage diversity in educational backgrounds. Promoting programs in technical sciences and humanities can contribute to a more diverse skill set within the startup ecosystem.

Fostering International Collaboration

Since international connections are valued, fostering relationships with startups from diverse regions is crucial. Facilitating networking events, exchange programs, and collaboration platforms can encourage more cross-border partnerships.

Addressing Disadvantages

The identified disadvantages, such as the lack of investment funds and financing, small local market size, and challenges with the justice system, should be systematically addressed. Policymakers should work towards creating a more favorable business environment, including legal reforms and support for market expansion.

Youth Engagement

Given that youngsters are a driving force in the startup ecosystem, efforts should be made to continue engaging and supporting young entrepreneurs. Initiatives like mentorship programs, startup competitions, and educational outreach can encourage more youth participation.

Promoting Female Entrepreneurship

While there's a positive trend in the increase of female founders, more efforts can be made to encourage and support female entrepreneurs. Initiatives such as networking events, mentorship programs, and awareness campaigns can contribute to this goal.

Ecosystem Infrastructure Development

Building on the identified advantages of the Baku startup ecosystem, such as the interest of teenagers and the number of incubation/acceleration centers, continued infrastructure development is crucial. Expanding these centers, creating innovation hubs, and facilitating knowledge-sharing platforms can further strengthen the ecosystem.

7.2 Recommendations for Hungarian startup ecosystem

The overall Budapest startup ecosystem has got higher potential. Following recommendations are developed for Hungarian Startup Ecosystem based on the analysed data.

A noteworthy observation made by seasoned investors and successful founders in Hungary is that local entrepreneurs tend to be risk-averse and lack the ambition to internationalize their businesses. An Oxford University study from 2018 ranked Hungary as the fourth lowest country out of 77 in terms of risk-taking behavior. While Hungary may have a skilled group of technically proficient entrepreneurs, their motivation and ability to build successful businesses falls short compared to their counterparts in neighboring Central and Eastern European countries.

One effective way to support the domestic startup ecosystem and boost national innovation capacity is by providing initial research grants in strategically important sectors. This targeted approach to research grants yields two primary benefits. Firstly, it directly supports startups in key sectors, allowing them to kickstart their innovation efforts and establish strong foundations.

Secondly, it contributes to the overall innovation capacity of the nation, enabling the development of cutting-edge technologies and solutions.

To truly foster innovation in Hungary, it is crucial to create a bridge between the startup community and academia. By facilitating collaboration and knowledge exchange, startups can tap into the invaluable expertise and resources available within academic institutions. Through this collaboration, startups can access relevant research and development (R&D), leverage the latest advancements, and ultimately enhance their innovation capabilities.

Hungary's innovation potential can be unleashed by connecting startups with academic institutions. By leveraging their complementary strengths, startups can benefit from academic research and expertise, while academia gains access to real-world applications and entrepreneurial spirit. Additionally, providing targeted research grants in strategic sectors can drive innovation by supporting startups and enhancing the nation's overall innovative capacity. To further stimulate innovation, it is essential for entrepreneurs to be more willing to take risks and embrace internationalization, as demonstrated by their Central and Eastern European counterparts.

Hungary is positioning itself as a significant player in cutting-edge technologies and industries, with notable developments in AI, big data, analytics, fintech, and life sciences. These advancements underscore the country's commitment to innovation and its growing influence in key sectors of the global economy.

7.3 Common Recommendations

To begin with both in Azerbaijan and in Hungary the leading hubs of the countries' startup ecosystem are operating in the capital i.e in Baku and in Budapest respectively.

The European Innovation Scorecard (2022) reveals that countries that equally support academic and entrepreneurial innovation tend to perform better in terms of innovation. The key to improving both Azerbaijan's and Hungary's startup ecosystem lies in bridging the gap between the startup scene and academia. Therefore, in the coming years, the success of both Azerbaijan's and Hungary's startup ecosystem will depend on establishing fruitful connections between startups and researchers. The survey highlighted varied impacts of COVID-19 on startups. Continuous monitoring of the situation and implementing responsive support measures can assist startups in adapting to changing circumstances.

These recommendations aim to provide a strategic roadmap for policymakers, industry stakeholders, and support organizations to nurture and advance the Baku startup ecosystem.

Regular assessments and feedback mechanisms should be implemented to ensure the effectiveness of these recommendations over time.

7.4 Limitations and Future Research Agenda

As with all research this thesis has some limitations. It would also be useful to compare the Visegrad countries that was established by four Central European countries comprised of Hungary, Poland, Czech Republic and Slovakia on the May 1, 2004, the date these countries got accepted to the EU.

Furthermore, adding case studies and interviews with startup ecosystem players would add a great value to the startup ecosystem research for both countries. As mentioned before, it was one of the research objectives but due to Covid-19 only 1 interview was carried out.

Azerbaijan is participating in eastern partnership programs organized and funded by EU. So, how these programs can be directed to develop Baku startup ecosystem could be of great value to policymakers and researchers.

CHAPTER 8. NEW SCIENTIFIC RESULTS

My research has uncovered some novel scientific results that can lay the groundwork for future research endeavors.

For Azerbaijan startup ecosystem:

1. My research findings revealed that the financial challenges need to be addressed to strengthen the local startup ecosystem under the following directions:

1.1 Financial Barriers: Offer seed capital support and tax incentives to ease financial burdens on startups.

1.2 Investment Attraction: Foster a supportive investment climate through funds and networking events.

1.3 Support for Small Teams: Provide tailored programs for micro-entrepreneurs.

2. Based on my scientific research, I found that, the following measures are pivotal to enable sustainable expansion of local startup ecosystem:

2.1 Diversity in Education: Promote diverse educational backgrounds to enhance innovation.

2.2 International Collaboration: Facilitate cross-border partnerships for market access and resources.

2.3 Addressing Disadvantages: Systematically tackle obstacles like funding shortages and legal challenges.

2.4 Youth Engagement: Support young entrepreneurs through mentorship and educational initiatives.

2.5 Promoting Female Entrepreneurship: Encourage and support female founders through networking and awareness.

2.6 Ecosystem Infrastructure: Expand incubation centers and innovation hubs for startup support.

The findings given under 1.1, 1.2, and 1.3 are related to the government bodies in charge of the economic development and namely the agencies whose mission is to support and initiate the innovation and entrepreneurship in Azerbaijan.

The findings given under 2.1, 2.2, 2.4 and 2.6 are of great interest to the Higher Education Institutions and findings 2.3 and 2.5 are of great interest for Innovation Hubs, Investors and Entrepreneurs.

Achieving these goals necessitates cooperation among policymakers, industry players, educational institutions, and the startup community to foster a thriving and inclusive startup environment.

For Hungarian startup ecosystem:

According to my research, I confirmed that the following challenges need to be addressed to increase the productivity and to uncover the potential of Hungarian startup ecosystem:

1.Providing Initial Research Grants: Offering initial research grants in strategic sectors can serve as a catalyst for innovation by providing early-stage funding for promising projects. These grants can help startups and researchers explore new ideas, develop prototypes, and conduct feasibility studies, laying the groundwork for future innovation and commercialization.

2. Bridging the Gap between Startups and Academia: Strengthening collaboration between startups and academic institutions can enhance innovation capabilities by leveraging the expertise and resources available in universities and research centers. This collaboration can take various forms, including joint research projects, technology transfer agreements, and industry-academia partnerships, facilitating the exchange of knowledge, skills, and technology between academia and the startup ecosystem.

3.Fostering a Greater Risk-Taking Attitude: Encouraging a greater risk-taking attitude among entrepreneurs is essential for fostering innovation and competitiveness in the startup ecosystem. This may involve promoting a culture of experimentation and learning from failure, providing support mechanisms such as insurance schemes or grants for high-risk ventures, and highlighting success stories of risk-taking entrepreneurs to inspire others.

4. Supporting Startups in Cutting-Edge Technologies: Providing targeted support for startups specializing in cutting-edge technologies such as artificial intelligence (AI), big data, fintech, and life sciences can help drive technological innovation and economic growth. This support may include funding programs, specialized incubation and acceleration programs, access to industry experts and mentors, and regulatory support to navigate the complexities of emerging technologies and markets. Additionally, fostering collaboration between startups in these sectors and established companies, research institutions, and government agencies can further accelerate innovation and commercialization efforts.

The comparative startup ecosystem analysis between Azerbaijan and Hungary revealed several important scientific results. To date, the startup ecosystem of Azerbaijan has not been studied in comparison with the startup ecosystem of a European country. This importat feature makes my comparison more attractive and valuable to researchers who are comparing the post-Soviet country with the European countries.

These scientific contributions can be summarized as follows:

1. Based on the survey result we can clearly see that Azerbaijan's startup ecosystem is mainly concentrated in Baku, the capital city. On the other hand, although Budapest is the capital and important startup center in the Hungarian startup ecosystem, new startup centers are emerging in Debrecen, Szeged and Pecs mainly due to the strong academic environment, growing young and educated population and increased local and foreign investment in these cities
2. Another important finding is that the Azerbaijan's startup ecosystem is quite young and therefore the network between ecosystem players is weak. In other words, the key role in Azerbaijan's Starup ecosystem is played by state institutions and a small number of local investors or banks that provide investment financing and some new innovation centers. When we compare it with the Hungarian startup ecosystem, we see that this ecosystem has a more complex structure. Ecosystem players are quite experienced with established network among them, not only state institutions but also many private firms, consulting companies and non-bank financing firms are taking active role in the development of startup ecosystem.
3. A region that historically developed a strong industrial or technological base may find its startup ecosystem naturally gravitating towards sectors related to that base, even if emerging opportunities in other sectors exist. Similarly, the entrepreneurial culture within a region is often a product of historical developments. These findings is in line with the phenomenon called path dependency. Path dependency refers to the idea that the decisions and outcomes in a particular system are heavily influenced by the historical choices, events, and circumstances that have shaped its development. (PRESTON, 2013) In the context of a startup ecosystem, path dependency helps us to understand why Baku and Budapest is an innovaiton hub. However, the lack of risk-taking culture is an obstacle for the development of startup ecosystem in both countries.

4. Azerbaijan is in the nascent stages of building its startup ecosystem, with substantial government efforts in place, but it faces significant limitations in terms of capital access and the overall maturity of the ecosystem. Conversely, Hungary's startup growth is largely driven by its advantageous location, highly skilled workforce, and robust government support. However, it encounters difficulties in securing international capital and expanding beyond its relatively small domestic market.

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ANNEX 1

Here are the survey questions that were asked from the correspondents of Azerbaijan startup firms during the online survey.

Q1. Have you participated in an entrepreneurship survey before?

Q2. Your position/role at the startup

Q3. How many members does your startup have?

Q4. How many years has your startup been on the market with a product/service offering?

Q5. What is your motivation and aspiration for being in a startup?

Q6. How old are you, if you are a CEO or Co-Founder?

Q7. What was the previous work experience before joining a startup?

Q8. What kind of customers are you targeting?

Q9. What term best describes your revenue model?

Q10. Which of the followings were your initial funding methods?

Q11. What obstacles do you think are making it difficult for your startup to grow?

Q12. In what form would you like the state to support startups?

Q13. What are the biggest expenses you are facing currently?

Q14. How hard is to overcome the following challenges?

Q15. What are the advantages of Baku Startup Ecosystem?

Q16. What are the disadvantages of Baku Startup Ecosystem?

Q17. What resources/opportunities lack in Baku Startup Ecosystem?

Q18. Evaluation of the impact of Covid-19 on the business processes

Q19. Connections with foreign startup ecosystems

Q20. What sector do you operate in?

Information about the survey respondents

Q21. Your gender

Q22. Your age

Q23. Marital status

Q24.Highest educational qualification

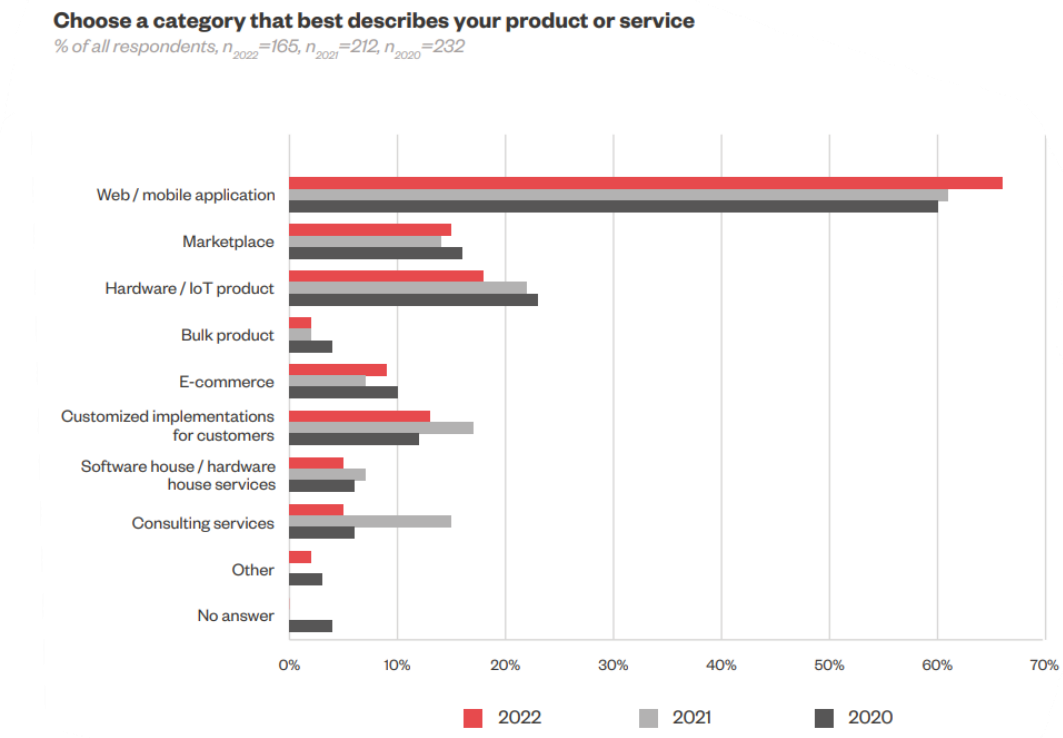
Q25. The qualification you earned in your latest degree

Q26. Which of the following statements best describes you?

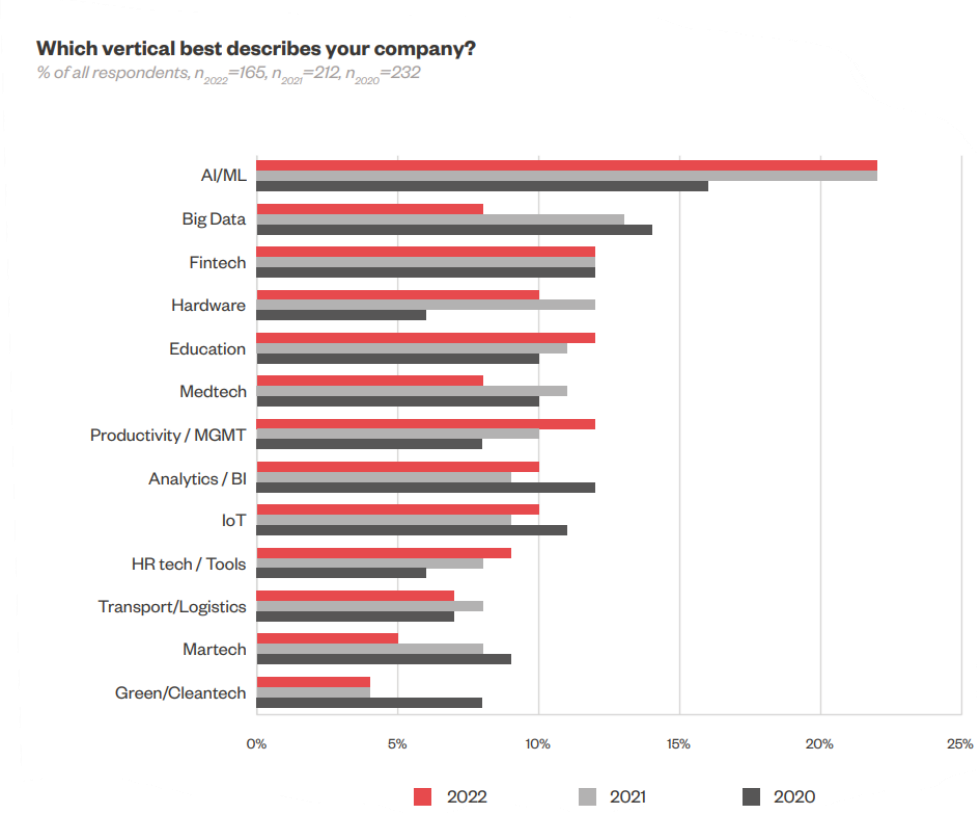
ANNEX 2

Here are the questions that were asked from the correspondents of Hungarian startup firms

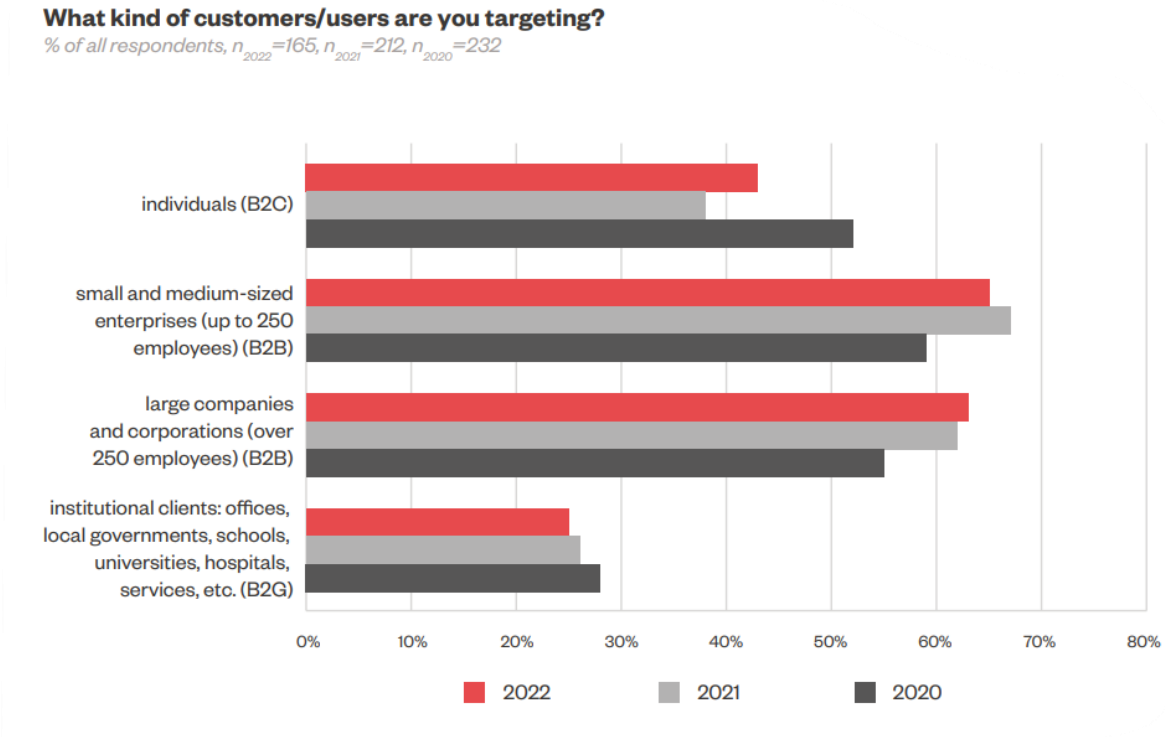
Q1. Choose a category that best describes your product or service.



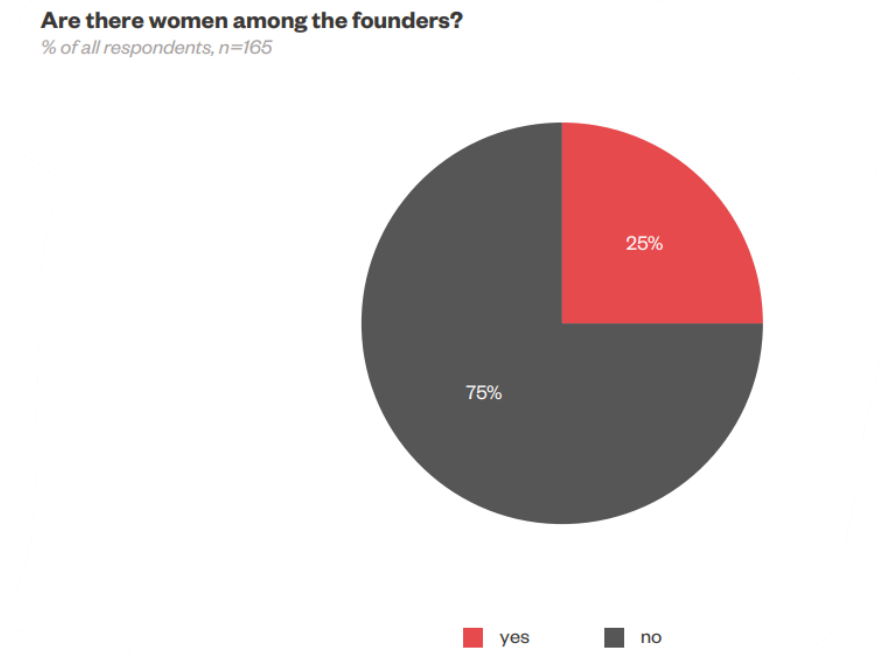
Q2. Which vertical best describes your company?



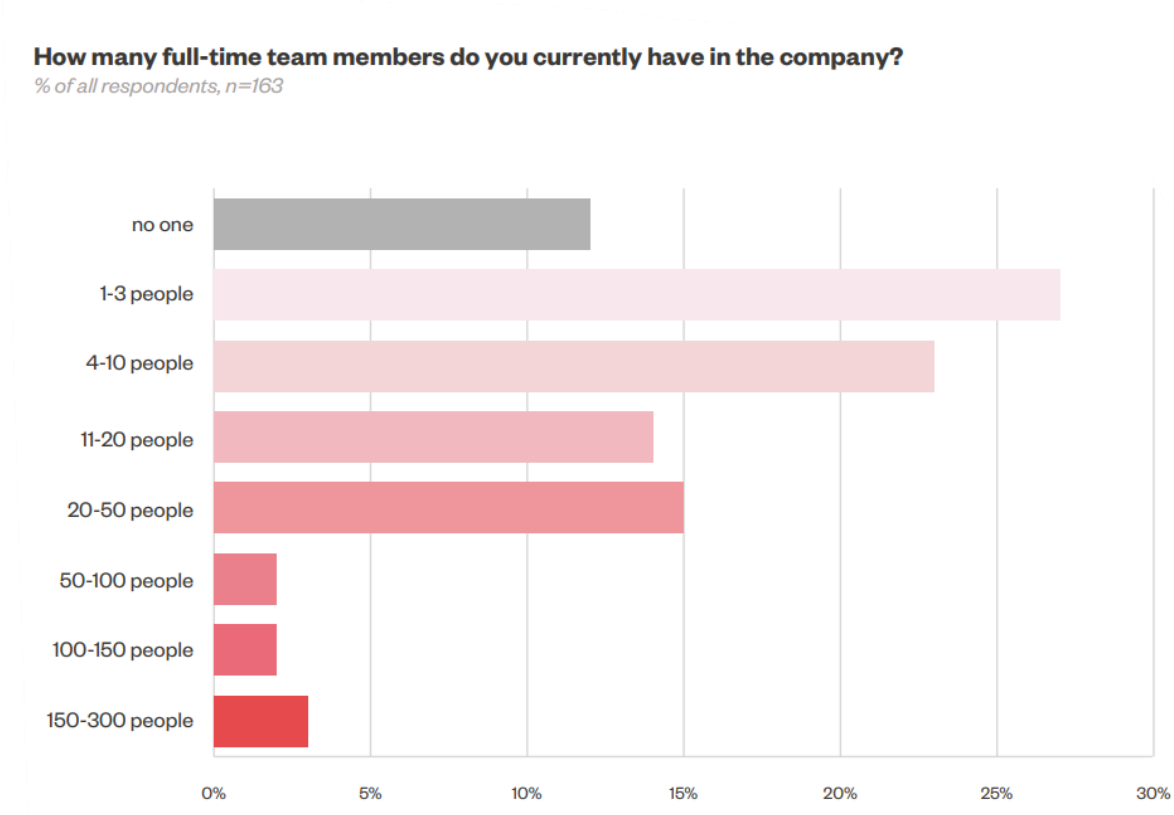
Q3.What kind of customers/users are you targeting?



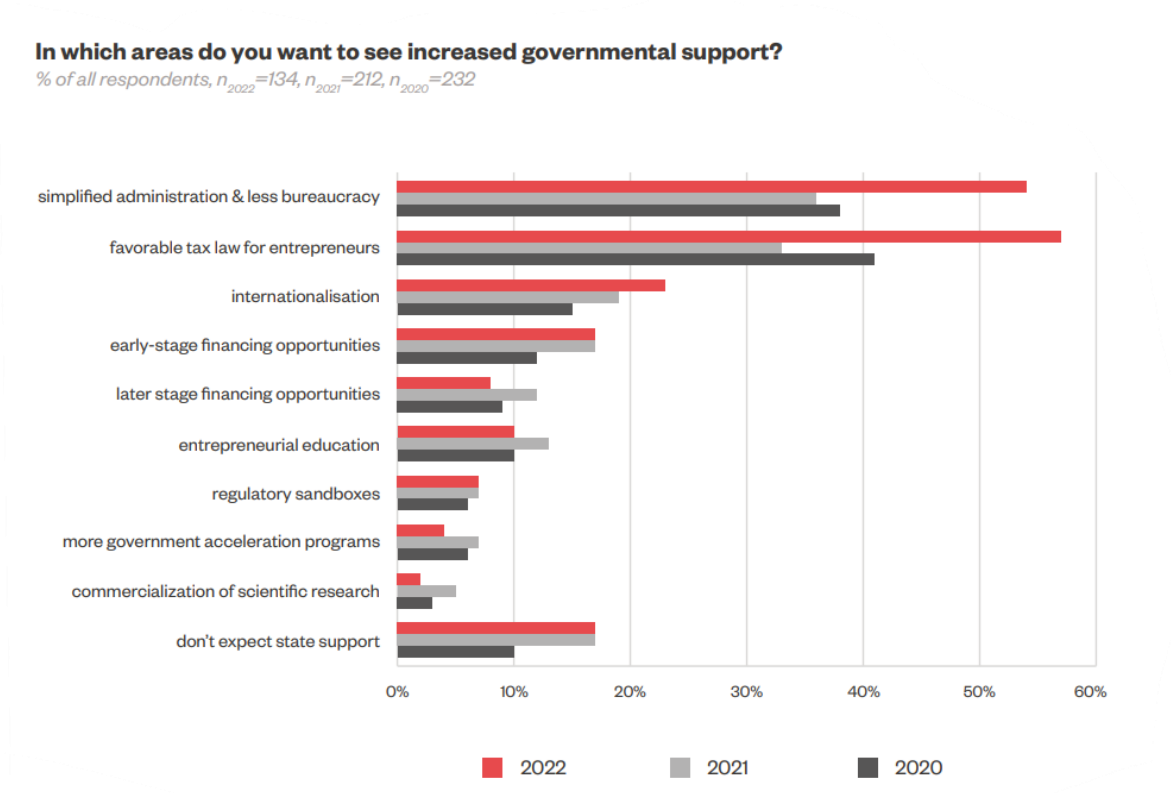
Q4. Are the founders working on the startup full-time?



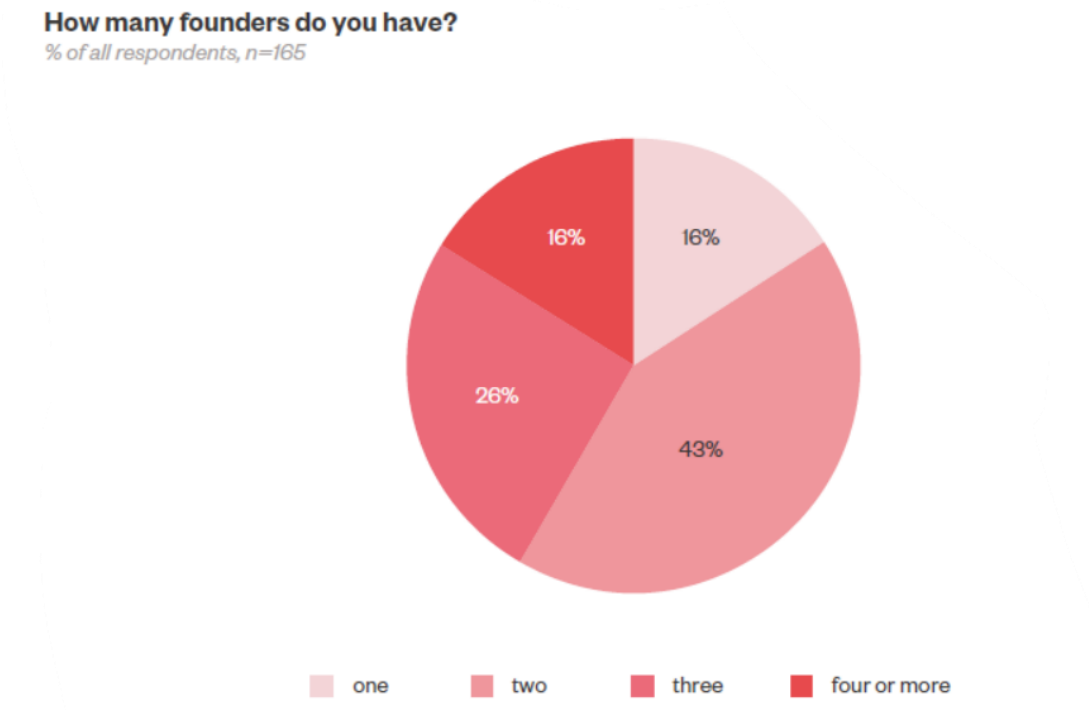
Q5. How many full-time team members do you currently have in the company?



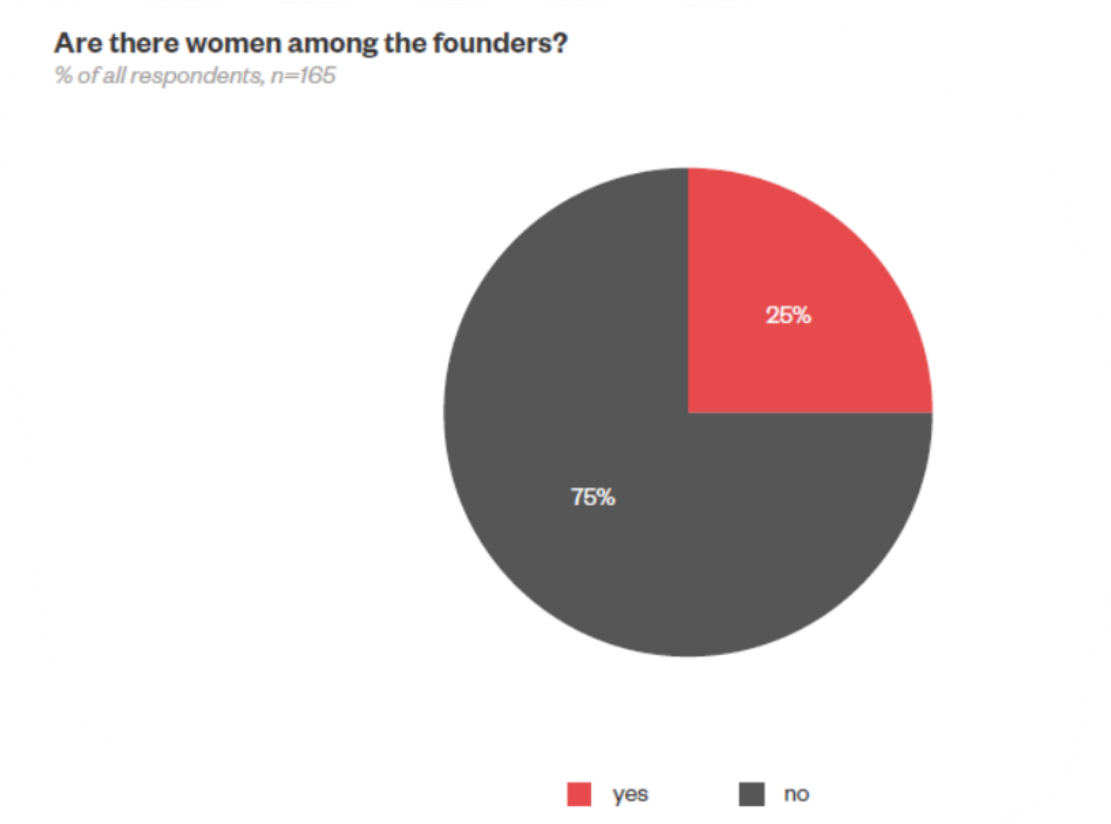
Q6. In which areas do you want to see increased governmental support?



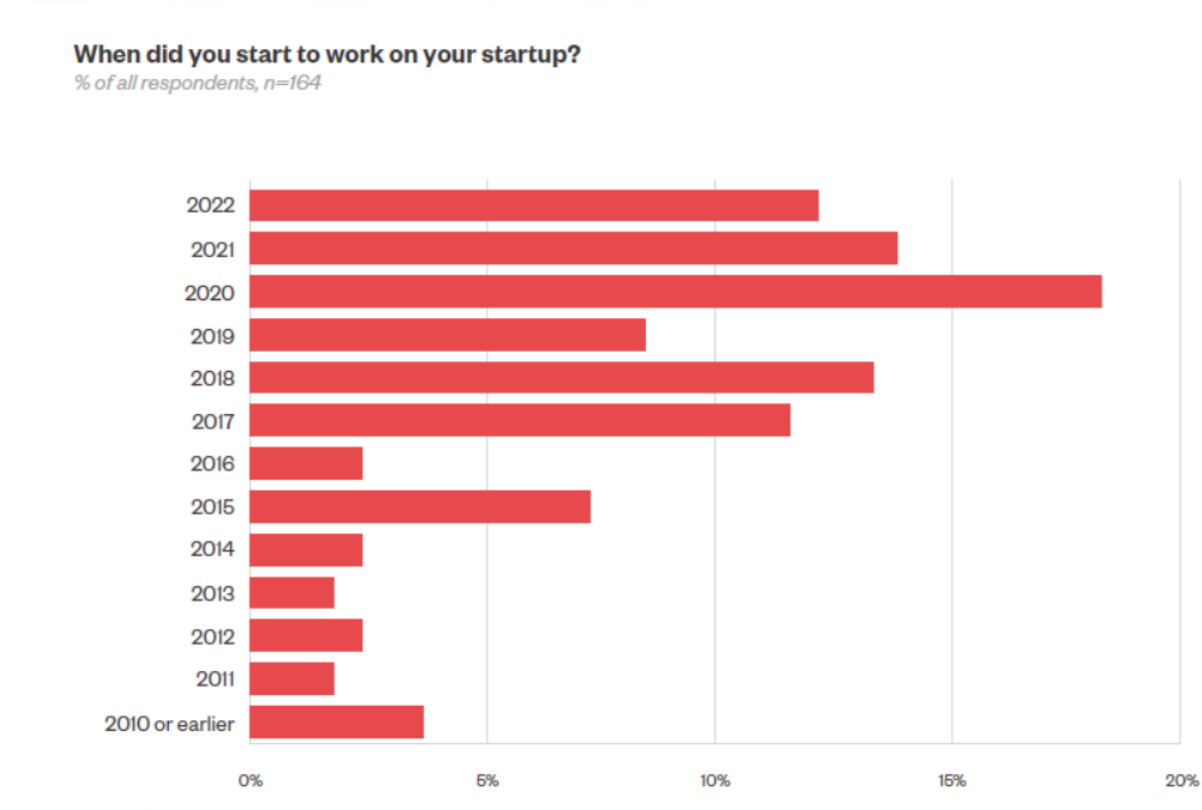
Q7.How many founders do you have?



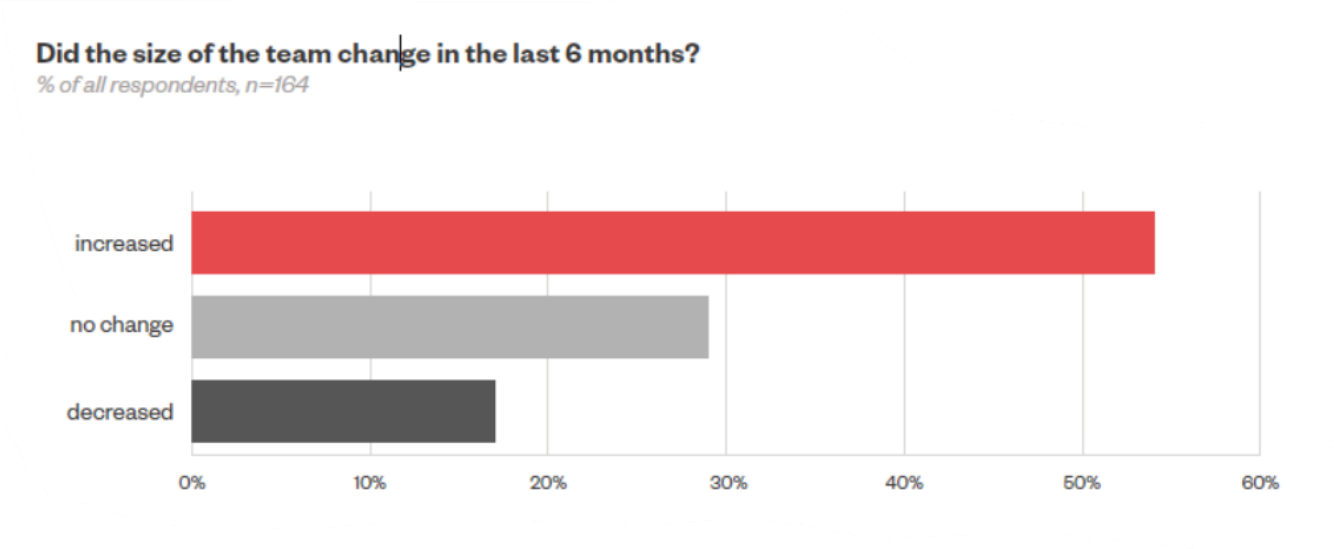
Q8.Are there women among the founders?



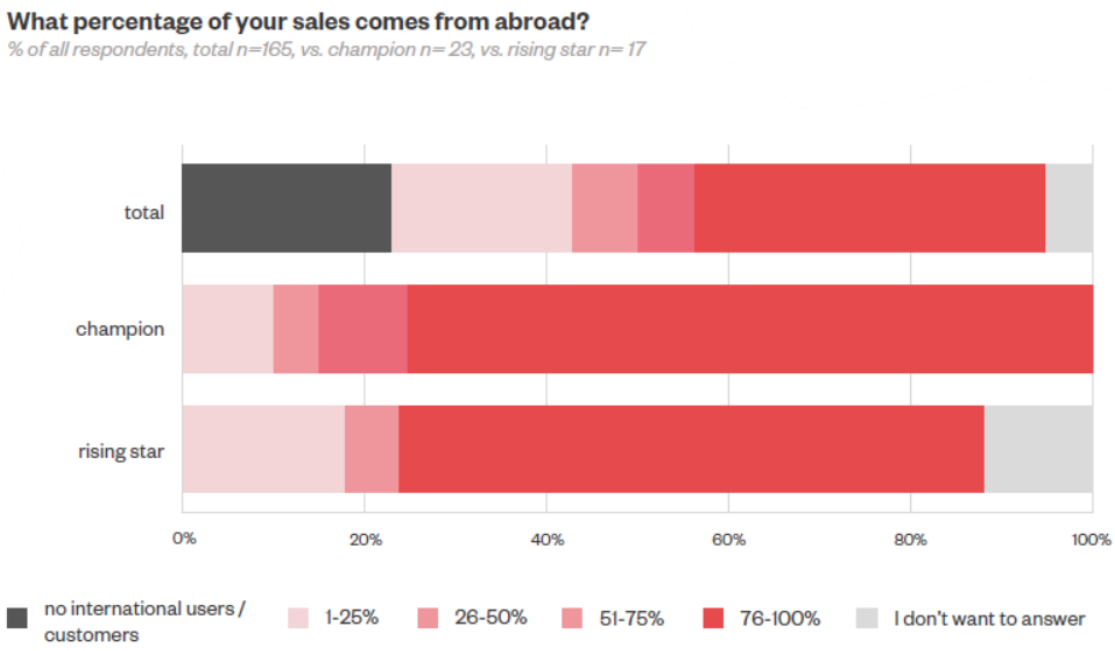
Q9. When did you start to work on your startup?



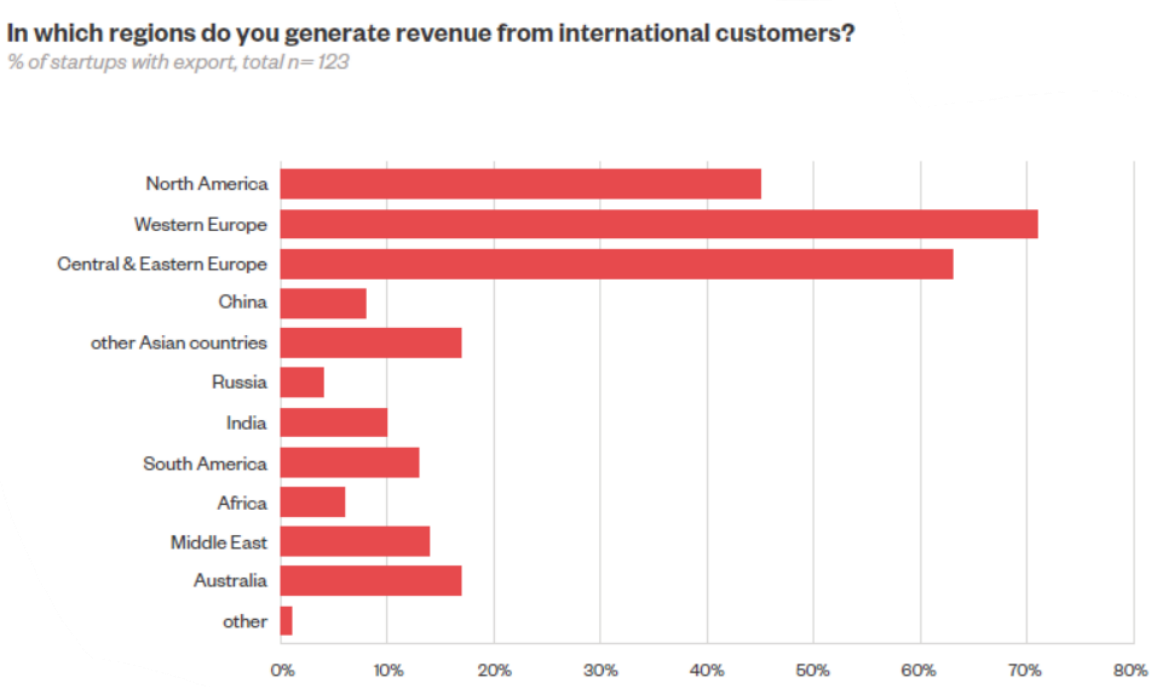
Q10. Did the size of the team change in the last 6 months?



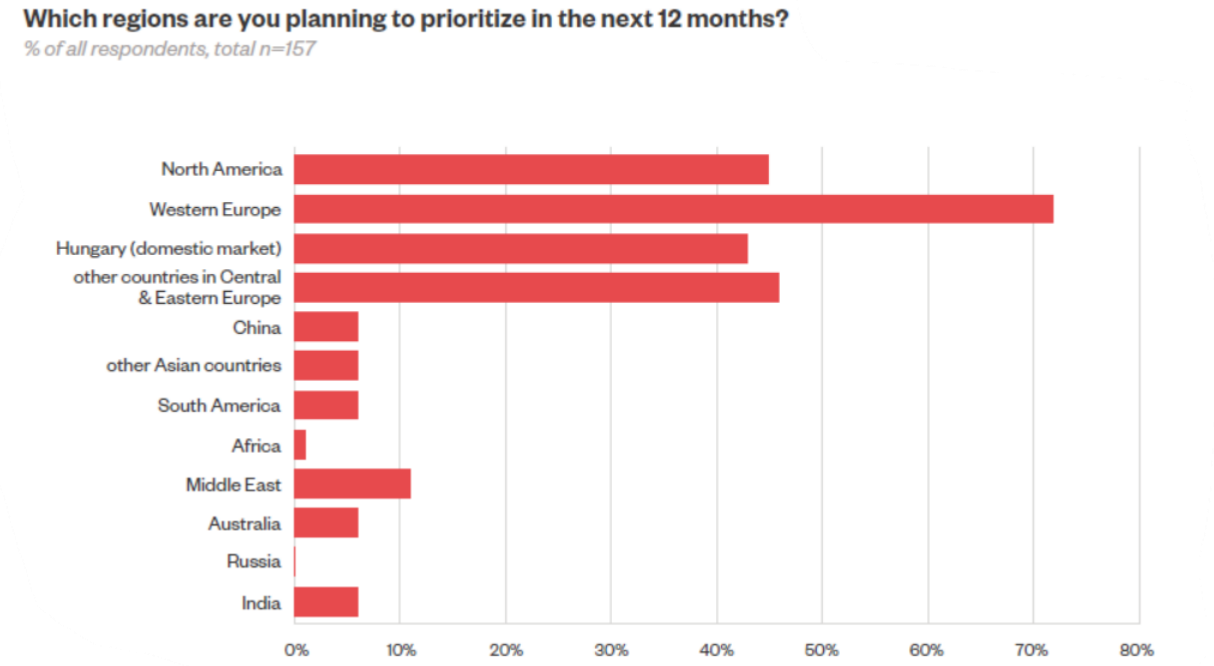
Q11.What percentage of your sales comes from abroad?



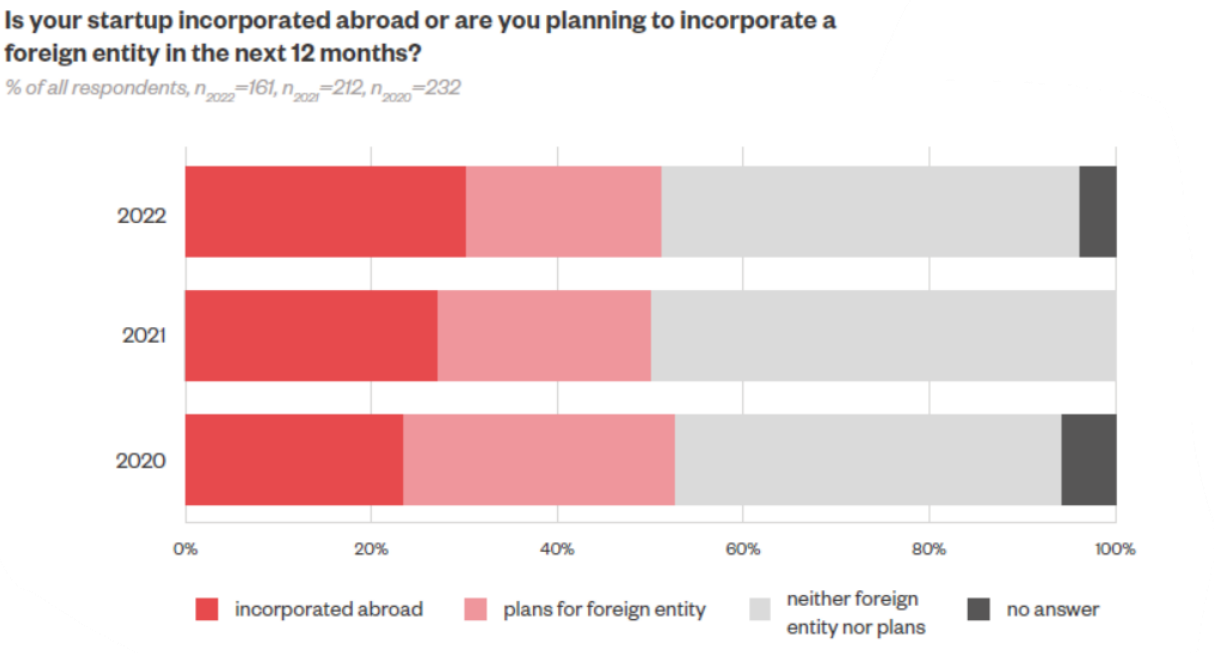
Q12.In which regions do you generate revenue from international customers?



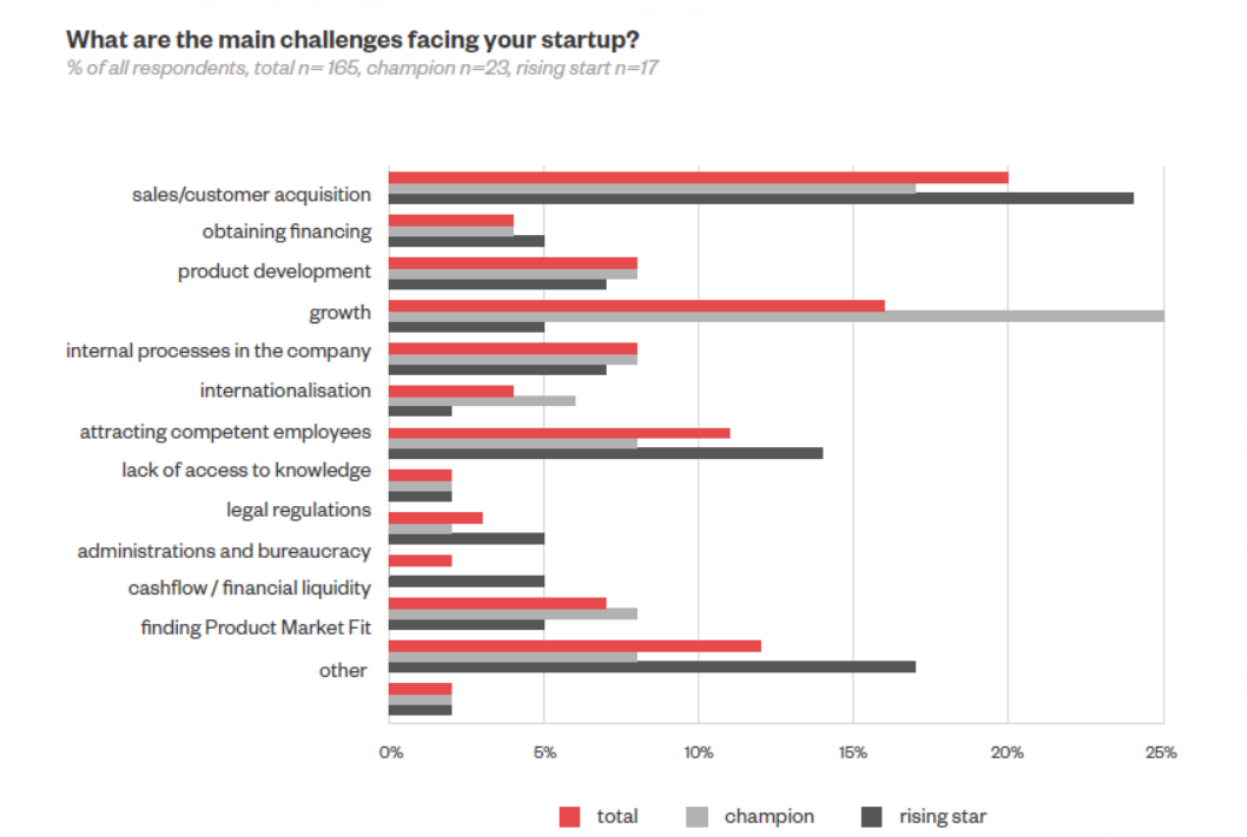
Q13.Which regions are you planning to prioritize in the next 12 months?



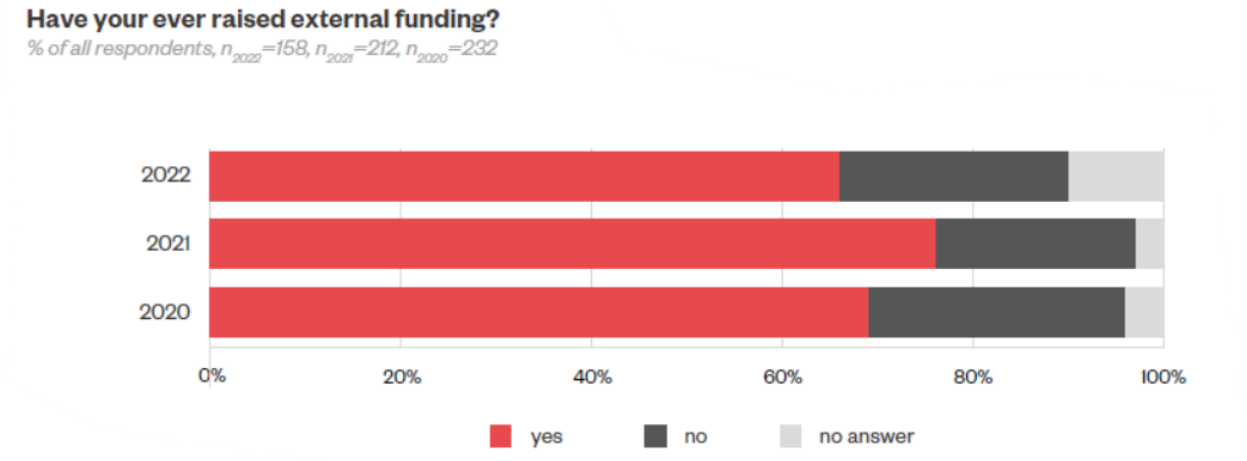
Q14. Is your startup incorporated abroad or are you planning to incorporate a foreign entity in the next 12 months?



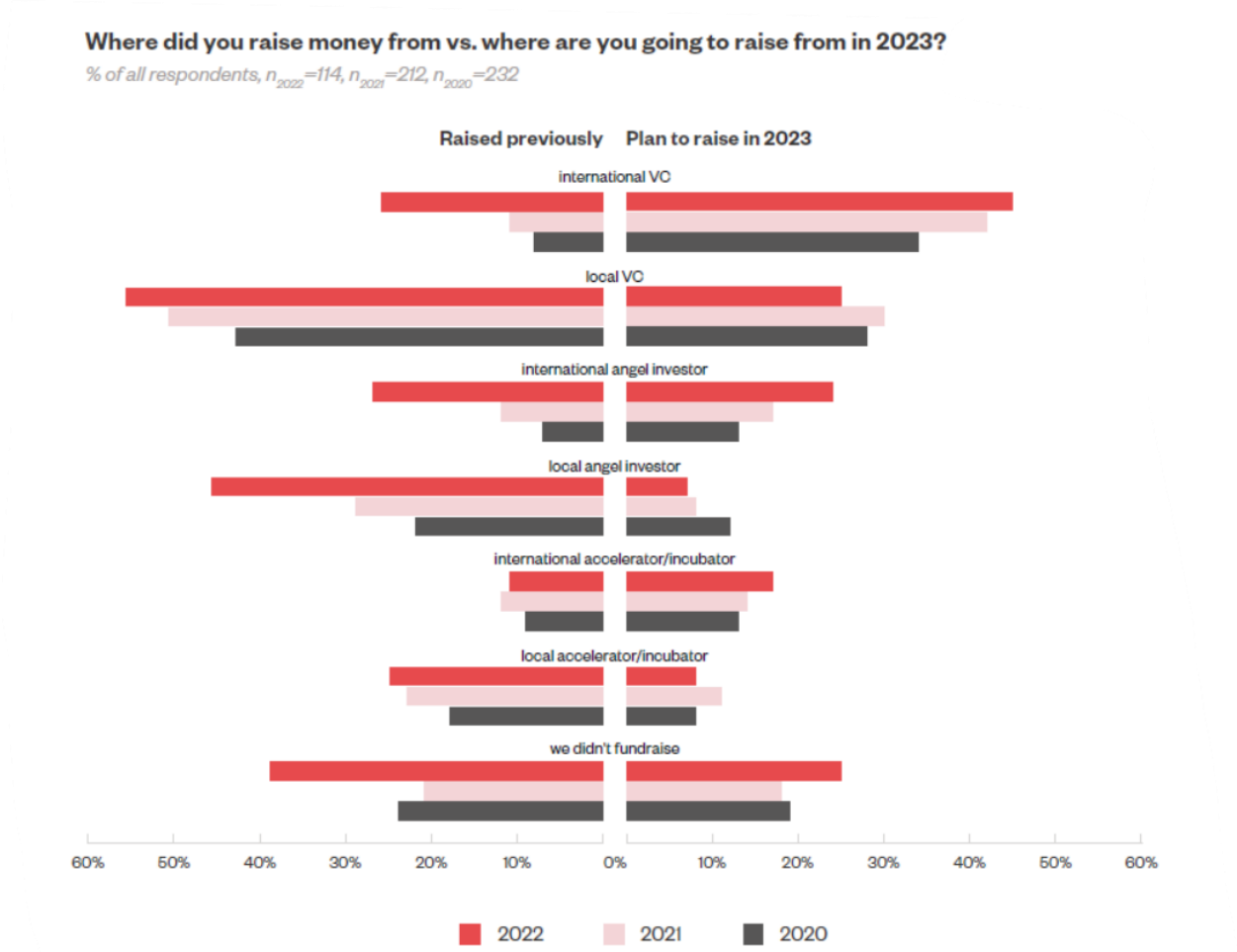
Q15.What are the main challenges facing your startup?



Q16.Have your ever raised external funding?



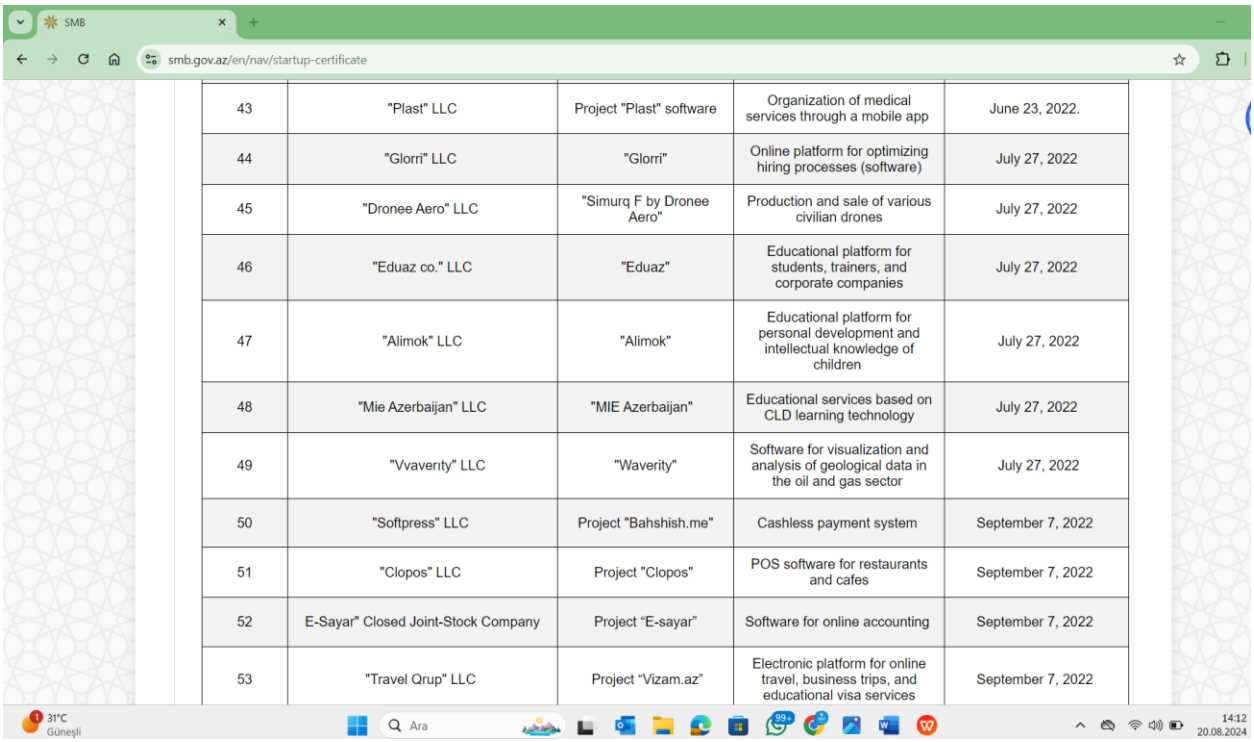
Q17. Where did you raise money from vs. where are you going to raise from in 2023?



ANNEX 3

The below screenshot is from the webpage of the Small and Medium Business Development Agency of the Republic of Azerbaijan (SMBDA). This is state-owned agency who is the only authority that grants startup firms with startup certificates in Azerbaijan. The list is available via the below link accessed in 20.08.2024

https://smb.gov.az/en/nav/startup-certificate



43	"Plast" LLC	Project "Plast" software	Organization of medical services through a mobile app	June 23, 2022.
44	"Glorri" LLC	"Glorri"	Online platform for optimizing hiring processes (software)	July 27, 2022
45	"Dronee Aero" LLC	"Simurq F by Dronee Aero"	Production and sale of various civilian drones	July 27, 2022
46	"Eduaz co." LLC	"Eduaz"	Educational platform for students, trainers, and corporate companies	July 27, 2022
47	"Alimok" LLC	"Alimok"	Educational platform for personal development and intellectual knowledge of children	July 27, 2022
48	"Mie Azerbaijan" LLC	"MIE Azerbaijan"	Educational services based on CLD learning technology	July 27, 2022
49	"Vvaverity" LLC	"Waverity"	Software for visualization and analysis of geological data in the oil and gas sector	July 27, 2022
50	"Softpress" LLC	Project "Bahshish.me"	Cashless payment system	September 7, 2022
51	"Clopos" LLC	Project "Clopos"	POS software for restaurants and cafes	September 7, 2022
52	E-Sayar" Closed Joint-Stock Company	Project "E-sayar"	Software for online accounting	September 7, 2022
53	"Travel Qrup" LLC	Project "Vizam.az"	Electronic platform for online travel, business trips, and educational visa services	September 7, 2022