

ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

Determining the Factors Affecting the Success of Investment and Survival of Start-Ups: Empirical Findings on the Turkish Start-Up Ecosystem

Start-Up'ların Yatırım Başarısını ve Hayatta Kalma Sürelerini Etkileyen Faktörlerin Belirlenmesi: Türk Start-Up Ekosistemi Üzerine Ampirik Bulgular

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Abstract

Start-ups play a vital role in the world economy. They drive innovation, create jobs, promote economic growth, promote diversity and inclusion, and can disrupt established industries. Unique features are one of the factors that affect the success of start-ups. Thus, determining start-up success is crucial for researcher, entrepreneurs, and policy makers. We aim to reveal the determinants of start-up success and investments in Turkey. We apply regression and decision tree methods. The variables in our study consist of total investments, city, business model, experience, intermediaries, and woman entrepreneurs. The empirical results show that the business model has a positive and significant effect on start-up investments. Besides, total investments, business model, and experience cause significant differences between businesses that dead and alive. Additionally, the 9th year of Turkish start-ups is an important time for these businesses. Our findings present implications for the Turkish start-up ecosystem.

Keywords: Start-up, Turkish Start-up Ecosystem, Determinants of Start-up Success.

Jel Codes: M13, G30, G24.

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Özet

Start-up'lar dünya ekonomisinde önemli bir rol oynamaktadır. Bu işletmeler yenilikçiliği teşvik eder, istihdam yaratır, ekonomik büyümeyi destekler, çeşitlilik ve kapsayıcılığı artırır ve yerleşik endüstrileri dönüştürebilirler. Start-up'ların kendine özgü özellikleri, başarılarını etkileyen önemli faktörlerden biridir. Bu nedenle, Start-up başarısının belirlenmesi araştırmacılar, girişimciler ve politika yapımcılar açısından büyük önem taşımaktadır. Bu çalışmada Türkiye'deki start-up'ların yatırım ve başarı belirleyicilerini ortaya koymak amaçlanmaktadır. Çalışmada regresyon ve karar ağacı yöntemleri uygulanmıştır. Araştırmada kullanılan değişkenler toplam yatırım tutarı, şehir, iş modeli, deneyim, araçlar ve kadın girişimci değişkenlerinden oluşmaktadır. Ampirik sonuçlar, iş modelinin start-up yatırımları üzerinde pozitif ve anlamlı bir etkisi olduğunu göstermektedir. Ayrıca toplam yatırım, iş modeli ve deneyim değişkenleri, faaliyetini sürdüren ve sonlanan işletmeler arasında anlamlı farklılıklar yaratmaktadır. Bunun yanında, Türk start-up'lar için 9. yıl dönemi işletmeler açısından kritik bir aşamayı temsil etmektedir. Bulgularımız Türk start-up ekosistemi için önemli politika çıkarımları sunmaktadır.

Anahtar Kelimeler: Start-up'lar, Türk Girişim Ekosistemi, Girişim Başarısının Belirleyicileri.

JEL Kodları: M13, G30, G24.

1) Introduction

There is no universally accepted definition of a start-up. However, Blank (2013: 82) characterizes start-ups as business models that are either scalable or adaptable. In the business literature, these ventures are typically recognized for their innovative nature, agility, and rapid growth potential. (Freeman ve Engel, 2007; Örnek ve Danyal, 2015). In addition, while start-ups have innovative aspects, all start-ups are not technology companies. Thus, start-ups can operate in different areas such as fintech, agriculture, SaaS, health technology, game, etc. (Kalfaoğlu ve Bedük, 2018: 26). One of the characteristic features of start-ups is their place in the life cycle. At the beginning of their life cycle, start-ups are small-scale, and their cash flows are irregular (Sarier, 2019: 58). Thus start-ups have high the cash burning ratio. The cash burning ratio is calculated by subtracting the company's cash inflows from its cash outflows over a specified period of time, usually a month. This calculation gives an indication of how long the company can continue to operate before it runs out of cash. Hence, the financing of these business is special (Lange et al., 2007).

Start-ups play a pivotal role in fostering innovation, employment generation, and economic expansion within a country. These enterprises serve as key drivers of job creation, employing individuals with diverse expertise and skill sets. As start-ups grow, they further stimulate labor market opportunities, thereby lowering unemployment rates and enhancing economic development. Moreover, they contribute to market competitiveness, operational efficiency, and increased overall productivity. (Fritsc and Noseleit, 2013). Besides, they are constantly pushing the boundaries of what is possible and introducing new products and services that improve people's lives. This innovation also has a ripple effect on the wider economy, spurring growth and creating new opportunities. Start-ups frequently lead the charge in driving economic growth, as their expansion significantly contributes to the country's GDP and generates tax revenue (Gries and Naudé, 2009). Additionally, their accomplishments attract investment and foster a conducive environment for the growth of other businesses. By fostering a culture of innovation and risk-taking, startups promote entrepreneurship,

benefiting not only the individuals involved but also contributing to the comprehensive development of the country's business ecosystem (Cavallo et al., 2019).

Although start-ups hold substantial economic potential, they are inherently risky ventures. Establishing a new business, particularly a start-up, requires significant financial investment and is accompanied by considerable uncertainty. Research indicates that the majority of start-ups fail within their initial years of operation, resulting in notable financial losses for both investors and founders (Mahmood et al., 2019). Additionally, the high failure rate of start-ups is often attributed to factors such as inadequate market timing, insufficient product-market fit, or intense competition. This reality can be a significant risk for investors and entrepreneurs. Moreover, startups often have limited resources, including staff, funding, and time. This can make it challenging to compete with more established companies in the same industry (Elston and Audretsch, 2010). Therefore, it is important for startups to receive investment and have effective financing. In this context, the determination of the investment success and survival ability of startups are crucial for researchers and entrepreneurs (Reid and Smith, 2000).

This study examines to reveal the factors that affect the success of start-ups in receiving investment. For this reason, the effect of financial and non-financial variables of start-ups on total investment is analyzed. We apply regression and decision tree methods. Our findings may be guide for researchers and practitioners. Studies, which have empirical results on start-up success, are quite limited. Our study contributes to the literature by analyzing the factors on the success of start-ups in Turkey.

This paper is organized as follows: Section 2 deals with the literature, Section 3 examines methodology and data, Section 4 discusses the empirical results, and we conclude this study in Section 5.

2) Theoretical Background

As a result of the innovation concept in entrepreneurship and economic growth, start-ups have emerged. A start-up is a newly formed company that aims to create and scale a distinctive product or service that has the potential to revolutionize an industry or create a new market. In contrast to other new businesses, start-ups are usually characterized by a high level of uncertainty regarding their business model, target audience, and revenue streams. They frequently operate in nascent or rapidly evolving markets and their ability to rapidly adjust to changing circumstances often dictates their success (York and Danes, 2014). Start-ups have quickly institutionalized due to their benefits. Governments and investors have supported them. In addition, start-up ecosystems, which involve governments, researchers and investors have been established (Stuart and Abetti, 1987). Since it is a new concept and different perspective of each discipline, there is no common start-up definition (Adam, 2014). Despite this, definitions of start-ups in the literature have common aspects (Korosteleva and Mickiewicz, 2011; Cockayne, 2019):

- Start-ups are new business ideas with growth potential are new business ideas with growth potential.
- Start-ups are at the beginning of the company life cycle.
- Start-ups are high-tech businesses which R&D activities are carried out intensively.
- Start-ups have new business models that can transform the market.
- Start-ups have resource shortages, high financing needs and limited organization.

One of the most difficult components of starting and growing a new venture is obtaining appropriate capital and other non-financial sources (connections, human resources, consulting). Financing has a special importance for sustainability of newly established enterprises. Although financing is an important process in the activities of all enterprises, the financing of start-ups has become an important field of study for researchers and practitioners due to the characteristics. (Manchanda and Muralidharan, 2014: 369). The absence of a credit history and the immaturity of their operations often prevent start-ups from building confidence, which sets them apart from traditional companies. Another disadvantage in financing these businesses is that despite their small size, they carry higher credit risks than a typical small or medium-sized enterprise due to the high risks they possess and their new business models. Moreover, the increasing monitoring and supervision costs may negatively affect financial institutions' involvement in start-up financing processes. A weak local business environment and suppressed financial systems, including inadequate legal frameworks for start-up financing, can also contribute to the relative difficulty in accessing finance for start-ups (Korosteleva ve Mickiewicz, 2011: 23 – 24).

Finance literature examines start-up financing because of the disadvantages in financing despite the high need for financing. According to the pecking order theory, start-ups tend to prioritize financing their operations in a certain sequence, starting with internal funds, followed by debt, and lastly equity. The rationale behind this is that internal funds and debt are deemed less costly and less risky compared to equity financing (Myers, 1984).

The signaling theory suggests that the way a start-up chooses to finance its operations sends a signal to investors about the company's quality. For example, if a start-up chooses to issue equity instead of debt, it signals to investors that it is confident in its future growth prospects (Ross, 1977). The focus of agency theory is the interplay between start-up owners (the principals) and the managers they employ to manage the business (the agents). The theory posits that the goals of the principals and the agents may not always be in alignment, potentially causing disputes. To alleviate this issue, one potential solution is to align incentives, such as granting managers equity in the company (Jensen and Meckling, 1976).

This theory focuses specifically on start-ups that are seeking funding from venture capitalists. It suggests that venture capitalists are looking for high-growth companies with the potential for significant returns on investment. To attract venture capital funding, start-ups need to

have a compelling business model, a strong management team, and a large potential market (Gompers, 1995).

According to the option pricing theory, investing in a start-up resembles purchasing a call option. In this scenario, the investor pays a premium (the investment) to gain the right to partake in the potential growth of the company. As a result, investors are often willing to undertake higher levels of risk in exchange for the potential for greater returns. (Black and Scholes, 1973).

The life-cycle theory suggests that the financial needs of a start-up will change over time as the company grows and matures. In the early stages, start-ups may require more equity financing to fund research and development and establish a customer base. As the company grows and becomes more established, it may shift to debt financing to fund expansion and acquisitions (Churchill and Lewis, 1983). According to resource-based theory, the prosperity of a start-up relies on the availability of its resources, encompassing not only financial assets but also intangible resources like expertise, human capital, and its connections with customers and suppliers. (Wernerfelt, 1984).

Our model is based on pecking order theory and resource based theory. We examine the impact of experience, the city, women entrepreneurs and the business model on total investments and the survival of the start-up. The theory that argues that characteristics such as the experience of start-ups, the characteristics of the entrepreneur, and the business model affect finance is the pecking order theory of capital structure. Resource-based theory also argues that the non-financial resources of the start-up are also effective in the success of these businesses.

3) Literature Review

One of the objectives of this study is to identify the financial and non-financial variables that affect the success of start-up ecosystem in Turkey. To achieve this goal, statistical methods are applied to Turkish start-ups. Identifying the variables that lead to the success of start-ups is an important topic.

Díaz-Santamaría and Bulchand-Gidumal (2021) identify the key factors in the success of start-ups by examining 340 start-up businesses in Spain. As a result of the econometric analysis, four factors that affect the success of start-ups are identified. These factors are the location of the venture, the age of the business, and the degree of commitment of the partners to the business.

Al Sahaf and Al Tahoo (2021) analyze the variables that affect the success of start-ups in Bahrain by conducting a survey among stakeholders in the industry. According to the survey results, the most influential factors in the success of start-ups in Bahrain are experience

and knowledge. Participants did not reach a consensus on the impact of financing and partnership structure.

Santisteban et al. (2021) examine the key factors that play a role in the success of start-up businesses in Peru by conducting a survey with 125 CEOs. According to the results of T-tests results, the variables that have an impact on the success of start-up businesses are as follows: keeping up with new technologies, organizational knowledge capacity and absorption, culture of innovation, customer satisfaction, and product quality.

Oliva et al. (2022) emphasize that start-ups in Industry 4.0 environment need to have a corporate vision to protect themselves from the risks.

Thanapongporn et al. (2021) argue that founder's character, education, and experience, social networks, information asymmetry, market structure, and a supportive ecosystem are important factors in the success of start-ups, based on the survey conducted among start-up entrepreneurs and venture capitalists in Thailand.

Prohorovs et al. (2019) determine the financial and non-financial variables that affect the success of start-ups in raising investments. Regression analysis is applied to survey data collected from 40 venture capitalists and start-up founders in Lithuania and Russia. According to the analysis results, the most important factor that affects the raising investments is the experience of the entrepreneur.

Skawińska and Zalewski (2020) investigate the factors that lead to the success of start-ups in European Union members. Empirical results show that more advanced members offer broad support to start-ups.

Bocken (2015) investigates the issue in terms of sustainability. The author emphasizes that sustainable start-ups are more successful with financing from venture capitalists who also prioritize sustainability.

Okrah et al. (2018) emphasize that the success of a start-up is not solely dependent on financial and organizational factors, but also on the characteristics of the ecosystem in which the business operates. The openness of the market, consumer preferences, and government policies have a positive impact on start-up activities.

Marullo et al. (2018) argue that the concept of open innovation is one of the key concepts that can lead start-up businesses to success.

Schumacher (2022) investigates the success factors of digital start-ups in Germany from the perspective of venture capitalists. According to interviews with venture capitalists, the personal characteristics and leadership abilities of start-up entrepreneurs and the organization are decisive factors for start-up success.

Sevilla-Bernardo et al. (2022) point out that the key factors that contribute to start-up success include the CEO's leadership qualities, the business model, marketing approach, and the organization of the start-up.

Thanh et al. (2022) argue that market uncertainties can have a positive impact on start-up success. This effect is dependent on the innovative structure and strong R&D projects of the start-up.

Keskin et al. (2018) intellectual capital is critical to start-up success.

Kalfaoğlu and Bedük (2018) examine the start-up ecosystem in Turkey and identify the key characteristics of the businesses that are ranked high on the list of Turkey's most successful start-ups prepared jointly by the TOBB Young Entrepreneurs Council and Endeavor Turkey. The authors emphasize the necessity of the following elements for the success of start-up initiatives: strong management, attractive market, compelling new product/service, high profitability potential, flexible and strategic business models, and investor confidence.

Aydoğdu (2019) examines the significant impact of mentorship in start-up ventures. To achieve this, data obtained from 224 start-ups through a survey method are compared between companies that receive mentorship and those that do not. According to the analysis results, there is no significant difference between the start-ups that receive mentorship and those that do not, except for the number of patents.

Studies analyze start-up success from different perspectives. However, studies examining start-ups' success in receiving investment are limited. Additionally, start-up success is not sufficiently studied in domestic literature. This study contributes to the literature by focusing on start-ups' success in obtaining investment and providing insights on the Turkish context.

4) Data and Methodology

This study determines the factors affecting the investment activities and success of start-ups in Turkey. Studies analyzing the investment success and survival of start-ups are limited. Besides, there is no study in which Turkish start-ups are included as a sample. Determining the variables that affect the success of the start-up is crucial for the risk allocation, risk mitigation and benchmarking of the entrepreneurs (Frederiksen and Brem, 2017).

Our sample consists of 187 start-ups.. Start-ups and all data are available from Startups. watch database. We include the variables total investment, business model, intermediaries, city, experience, and women entrepreneurs in our analysis. Table 1 presents variables.

Table 1: Variables

Total Investment	Amount
Business Model	B2C, B2B, C2C (B2C: 1 Others: 0).
City	Operation city (İstanbul: 1 Others: 0).
Experience	Years
Intermediaries	Accelerator, Incubator, Science Park(1) None (0)
Women Entrepreneurs	Yes (1)-None (0)

This study employs regression analysis and decision tree methods to examine relationships between variables. Regression analysis is a widely used statistical technique for assessing the connection between a dependent variable and one or more independent variables. It is extensively applied in disciplines such as social sciences, business, and economics to analyze and predict how variations in independent variables influence the dependent variable. In a typical regression model, the dependent variable (Y) is expressed as a function of independent variable(s) (X), with the primary objective being to estimate this relationship and use it for predictive analysis. Various forms of regression exist, including linear regression, logistic regression, and polynomial regression. In this study, we utilize a linear regression model, as demonstrated below (Aktaş & Akdağ, 2013: 58).

$$Y = \beta_0 + \beta_1 * x_1 + ... + \beta_n x_n + \varepsilon$$

Y: Dependent Variable

xi: Independent Variable

β_i : Coefficients

ε : Error term

Decision tree analysis is a technique that aids in decision-making, often employed in data analysis and machine learning, which enables the visualization and modeling of decisions and their corresponding outcomes. This type of supervised learning algorithm utilizes a set of input variables or features to classify data or predict outcomes. A decision tree is a tree-like diagram that illustrates a series of decisions and their possible outcomes. Each decision node in the tree represents a choice or decision, while each leaf node represents a potential outcome or classification. The algorithm works by recursively partitioning the input data set into smaller subsets, based on the values of the input variables, until a decision or classification can be made at each leaf node (Kingsford and Salzberg, 2008).

5) Empirical Results

We deploy the regression and decision tree methods to analyze the determination of the start-up success. We conduct the analyses in SPSS 25.0. Table 2 presents descriptive statistics for the 187 start-ups.

Table 2: Descriptive Statistics

	Mean	Standard Deviation	Sample
Total Investment	37,197,112	217,851	187
Business Model	0.36	0.48	187
City	0.71	0.45	187
Experience	9.79	5.65	187
Intermediaries	0.53	0.50	187
Women Entrepreneurs	0.14	0.35	187

The following hypotheses is examined by multiple regression analysis, which is one of the quantitative research methods:

When assessing start-up opportunities, investors take into account the chosen business model, the start-up's capacity to generate internal funds, and the potential for future cash flows to repay debts. These factors directly influence the start-up's financing decisions and overall financial well-being, as suggested by the Pecking order theory (Minola et al., 2013). So;

Hypothesis 1: H_0 : Business model does not significantly affect start-ups' total investments.

H_1 : Business model has a significant effect on total investments.

Spatial finance theory argues that location affects businesses' access to finance, regulations, labor market, business environment and costs (Pena, 2002). So;

Hypothesis 2: H_0 : City does not significantly affect start-ups' total investments.

H_1 : City has a significant effect on total investments.

Proposed by Michael Spence in 1973 and expanded upon by other economists, the signaling theory addresses the reduction of information asymmetry between investors and entrepreneurs. In the realm of start-up investments, the theory posits that entrepreneurs with pertinent business experience can employ specific signals to communicate their competence, quality, and potential success to investors. According to the theory, business experience can provide positive signals for business success, reduced information asymmetry, information for effective start-up valuation and capital inflows (Nigam et al., 2020). So;

Hypothesis 3: H_0 : Experience does not significantly affect start-ups' total investments.

H_1 : Experience has a significant effect on total investments.

The Informational asymmetry theory is closely linked to intermediaries and their role in start-up investments (Nofsinger and Wang, 2011):

a) Reducing Informational Asymmetry: Intermediaries assist in lessening the information gap between entrepreneurs and investors. They conduct due diligence, evaluate the start-up's potential, and verify provided information, enabling investors to make better-informed decisions.

b) Screening and Selection: Intermediaries act as gatekeepers, screening and selecting start-ups that meet specific criteria or exhibit growth and profitability potential. This increases the likelihood of investors encountering higher-quality investment opportunities.

c) Monitoring and Control: Intermediaries often provide ongoing monitoring and oversight of invested start-ups. This alignment of interests between entrepreneurs and investors helps mitigate risks associated with adverse selection and moral hazard.

d) Syndication and Diversification: Intermediaries facilitate syndication, where multiple investors pool resources to invest in a start-up. This allows investors to diversify risk across multiple start-ups, reducing the impact of individual start-up failures on their overall investment portfolio.

e) Negotiation and Deal Structuring: Intermediaries play a vital role in negotiating investment terms and deal structures that benefit both entrepreneurs and investors. They seek common ground and align incentives to foster mutually advantageous agreements. So;

Hypothesis 4: H_0 : Intermediaries do not significantly affect start-ups' total investments.

H_1 : Intermediaries have a significant effect on total investments.

The role of women entrepreneurs in start-up financing can be explained by gender lens investing theory. Gender lens investing theory in relation to women entrepreneurship and start-up investments highlights several key aspects (Robino and Jackson, 2022):

a) Diverse Perspectives: Gender diversity fosters a wide range of perspectives, experiences, and problem-solving approaches. Women-led start-ups can offer unique insights and innovative strategies, appealing to investors seeking forward-thinking decision-making.

b) Market Opportunities: Women entrepreneurs often identify untapped markets and unmet needs overlooked in male-dominated entrepreneurship. Investors recognize the potential value of start-ups targeting underserved markets and demonstrating a strong grasp of female consumers.

c) Risk Management: Gender diversity in start-up leadership enhances risk management practices. Diverse teams exhibit prudence in risk evaluation and well-informed decision-making, reducing the likelihood of costly errors.

d) Social Impact and Corporate Values: Investors adopting a gender lens approach prioritize supporting women-led start-ups for their positive social impact and alignment with diversity goals and corporate values.

e) Performance and Returns: Research indicates that companies with greater gender diversity at the executive level tend to outperform peers. Investors seeking higher returns find appeal in start-ups with gender-diverse leadership.

f) Access to Capital: Despite challenges posed by gender bias, investors employing a gender lens approach actively seek out and support women-led start-ups, enhancing their access to much-needed funding.

Hypothesis 5: H_0 : Women entrepreneurs do not significantly affect start-ups' total investments.

H_1 : Women entrepreneurs have a significant effect on total investments.

The low correlation coefficient between the variables is important in terms of the contribution of these variables to the model. For this reason, we apply correlation analyze. The results show that the correlation relationship between the variables is below 50%.

Table 3: Pearson Correlation

	Total Investment	Experience	Business Model	City	Intermediaries	Women Entrepreneurs
Total Investment	1.000	0.143	0.188	0.098	-0.029	0.133
Experience	0.143	1.000	0.022	-0.040	0.059	-0.059
Business Model	0.188	0.022	1.000	0.220	-0.442	-0.020
City	0.098	-0.040	0.220	1.000	-0.329	0.002
Intermediaries	-0.029	0.059	-0.442	-0.329	1.000	0.036
Women Entrepreneurs	0.133	-0.059	-0.020	0.002	0.036	1.000

Table 4 presents the model summary. The low R square and adjusted r square ratios show the model's insufficient explanatory.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Standard Error
1	0.290	0.421	0.363	212,199

The significance of the created model is measured by variance analysis. Significance value is less than 5 percent. This result shows that the analysis is meaningful. The analysis of variance of the model is as follows:

Table 5: Anova Analysis

	Sum of Squares	df	Mean Square	F	Significance
Regression	5.77	5	1.15	2.56	0.03
Residual	6.30	140	4.50		
Total	6.88	145			

Table 6 presents the model results. According to regression analysis, business model variable (B2C) has a statistically significant effect on total investments. Business model's coefficient is positive. Thus, increases in the B2C model positively affect total investments. Women entrepreneurs and experience are significant at the 10% level. Other variables also have a positive effect on total investments. However, this effect is statistically insignificant.

Table 6: Model Results

	Coefficient	Significance
Experience	5,709	0.075
Business Model	91,544	0.028
City	0.859	0.331
Intermediaries	3,123	0.431
Women Entrepreneurs	1.980	0.081

Our findings are consistent with start-up studies. These studies argue that the business-to-consumer (B2C) model has a significant impact on start-up investments. Investors tend to prefer B2C startups over B2B (business-to-business) startups, and that B2C startups generally receive higher valuations than B2B startups (Angerer et al., 2017).

Besides, B2C startups are more likely to receive funding from venture capitalists, while B2B startups are more likely to receive funding from corporate investors. Therefore, the type of investor may also play a role in the preference for B2C startups. B2C startups have a larger potential market and are more likely to attract consumer attention, which can drive growth and profitability (Cholakova and Clarysse, 2015).

We examine the effect of independent variables on the survival skills of start-ups. For this purpose, sample start-ups are divided into two as dead and alive start-ups. Dependent variables in decision tree analysis are dead and alive start-ups. Total investments, business model, city, experience, intermediaries, and women entrepreneurs are independent variables. The QUEST model is used, which explains the model at a rate of 82.37%. The QUEST decision tree model is a statistical learning algorithm utilized in data mining and machine learning.

By creating a tree-like structure, the non-parametric model classifies data into distinct categories based on their features. It can handle categorical, continuous variables, and missing values, and starts by dividing the data into subsets based on the most effective variables for separating it. These subsets are then recursively divided until a stopping criterion is met, and the tree structure obtained can be used for regression, classification, or survival analysis tasks (Gunduz and Lutfi, 2021).

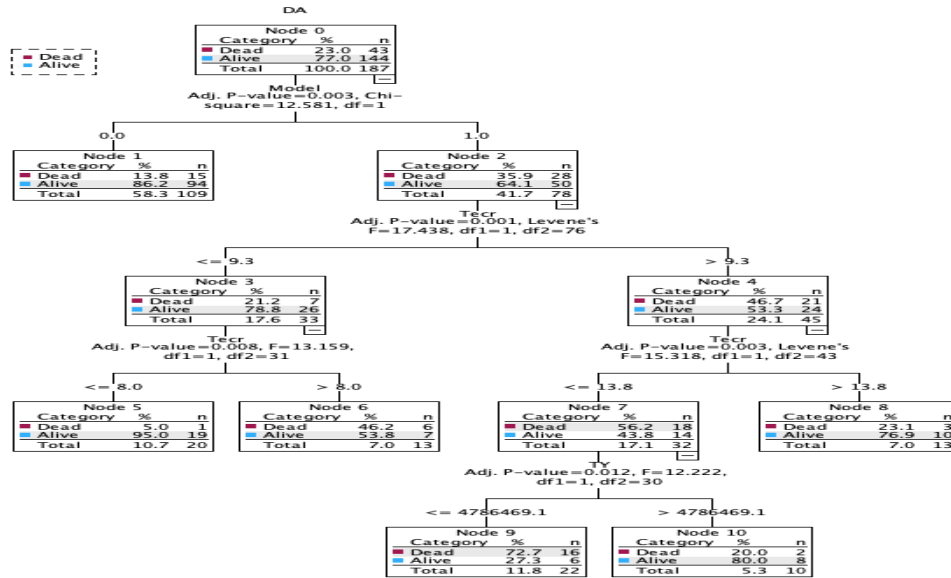


Figure 1: Decision Tree

The first node of the decision tree is divided into two according to the business model. Additionally, experience and total investments compose other nodes. Total investment is effective in the survival of start-ups with more than 9 years of experience and less than 13 years. These start-ups whose total investment exceeds 4,786,469.1 USD are alive with 80% possibility.

Studies on the life cycle of start-ups argue that these businesses need to be evaluated differently after passing the death valley stage. Some studies emphasize that start-ups will turn into scale-ups at this stage and need to be evaluated accordingly. The dominant view in the literature is that start-ups require a high level of financing in the establishment phase. However, the findings indicate that start-ups also need financing at a certain level of maturity, and start-ups that cannot reach sufficient financing cannot sustain their existence. At this stage, the market can become more saturated, and it can be difficult for start-ups to differentiate themselves and gain market share. This situation can lead to increased product development and innovation needs, as well as rising marketing and advertising costs to maintain competitiveness. In addition, start-ups may need to invest in scaling their operations and expanding their team to keep up with growing demand. All of these factors can contribute to the need for more financing to sustain growth and remain competitive (Bell, 2005).

6) Conclusion

Start-up studies examine the factors that affect the success of these businesses. However, empirical evidence revealing the drivers of start-up activities is limited. The aim of this study is to reveal the determinants of start-up success and investments. We apply regression and decision tree methods.

Our model consists of total investments, city, business model, experience, intermediaries, and woman entrepreneurs.

The regression results show that the B2C (business-to-consumer) model positively affects total investments. Start-ups with a B2C business model are generally more visible to investors and may receive more investment compared to start-ups with a B2B (business-to-business) model. This is because B2C start-ups typically have a larger target market, which can attract more customers and generate higher revenue potential. In addition, we identify the variables that cause significant differences between dead and alive start-ups with and decision tree. Total investments, business model and experience have a significant impact on the survival success of start-ups.

Start-ups need high financing despite the lack of resources. Therefore, the impact of investments on start-up activities is crucial. Experience is the another factor that effect start-up success. The operational period of a start-up refers to the time elapsed since the launch of its product or service. The operational period can be an indicator of the learning process of a start-up. Especially when a new product or service is developed, the operational period refers to the time spent on conducting necessary tests, collecting customer feedback, and optimizing the business model. As the operational period of a start-up increases, more time and resources can be allocated to factors such as building an experienced and talented team, improving products or services, and expanding the customer base. Therefore, a longer operational period can provide an advantage for the success of a start-up.

Total investments in the period of 9.3-13.8 for Turkish start-ups have a significant effect on survival skills. Our findings show that the pace of competition and technology transfer has increased since the 9th year in the Turkish startup ecosystem. Start-ups that do not have sufficient funding during this period may die.

We have some limitations. Data on the Turkish start-up ecosystem is limited. Future studies may examine a larger sample with panel data analysis. Moreover, the inclusion of financial variables of enterprises in the analysis may reveal important findings.

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