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The determinants of the growth of Japanese start-ups: A resource-based view analysis*

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Abstract

The objective of this article is to determine and analyse the factors behind the growth of Japanese startups. The framework of reference is derived from the Resource Based View of the firm (Penrose 2009) and the quantitative analysis relies on data from a survey carried out in 2022 with 753 Japanese startups. The article assesses internal (entrepreneur, workforce, innovation) and external (finance, knowledge access and location) resources under uncertainty. Econometric findings suggest that larger but younger firms with a domestic market orientation, and experienced entrepreneurs drive growth, while intellectual property ownership and equity financing for fixed capital investment positively impact economic success. Market-product mismatches and weak supplier quality hinder growth, and Tokyo's location benefits ICT start-ups but not others. Employment growth, though weakly linked to sales growth is strongly influenced by business confidence and access to skilled labour and investors. These findings provide strategic insights to inform policies to foster start-up success in Japan.

Keywords: Internal resource, External resource, Uncertainty

JEL Classification: M13, O32, G32, R58

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Contents

1. Introduction

Startups are potential economic agents to induce economic dynamism and externalities especially in tech-intensive sectors (Decker and Haltiwanger 2023; U.S. Department of the Treasury, 2024). Notwithstanding, for being relatively younger and smaller than their well-established counterparts, they face the hurdles of any micro and small business, especially their financing gap. Moreover, by being involved in developing new products and services, startups deal with the challenges of economic, market and technology uncertainties.

Such fragility has attracted researchers to investigate factors conditioning the effects of the newness of startups to flip between liability and advantage. Recent studies (Yang and Aldrich, 2017; Gimenez-Fernandez et al., 2020) examined the growth strategies of start-up companies from multiple perspectives, including fundraising, corporate organization and human resources, partnerships, and innovation. Based on understandings gained from them, governments have tailored individual and collective measures to reduce failures and increase successes of start-ups. Still, the prevailing low survival rate suggests that there are still many things we do not know about their nature.

Japan, which we focus on in this study, is no exception to the growing rally of startups. Startup investment in Japan has surged in recent years. Both the number of companies that raised funds (4,041) and the total amount of funds raised (7,435 million USD) reached a record high in 2022. Noteworthily, Japan has an active capital market for start-ups through an initial public offering (IPO). According to Venture Enterprise Center (2023), there were 97 IPOs annually on average between 2018 and 2022. METI (2022) specified that the high share of IPO in start-up exit (76%) is a distinguishing feature of Japan, compared to a mere 10% in the USA and 33% in Europe.

However, the outlook for start-up businesses in Japan is not necessarily bright. Despite being a large economy and having a mature capital market and a high level of industrial technology, there are few so-called “unicorns” growing up in Japan. It has been pointed out that one of the reasons startups have difficulty achieving rapid growth is the small size of venture funds that provide risk capital (Fendoglu and Xu, 2024).

Expecting to strengthen the inherently transformative role of start-ups, the Cabinet Office (2023) announced its "Five-Year Plan for Start-up Development", with goals such as a 10-fold increase in start-up investment, the creation of 100,000 companies, and the production of 100 unicorns. Expectations for start-up companies are not limited to the areas of cutting-edge technologies such as artificial intelligence, quantum computers, new

medicine, and renewable energy but are also attracting attention as social entrepreneurs who would address social issues such as child-rearing support and environmental protections.

Despite much attention on the policy front, there is still not enough recent empirical research on the factors that influence the growth of startups in Japan. Thus, the objective of this article is to analyze the performance and the sources of growth of Japanese start-ups based on an original company-level survey conducted by the Tokyo Shoko Research on behalf of the Research Institute of Economy, Trade and Industry (hereafter referred to as the RIETI Survey).

The contributions of this article are threefold. Firstly, we propose a framework for analyzing multidimensional factors related to the growth of start-ups. Unlike previous studies that focused on individual factors such as entrepreneurship, innovation, or financing, we incorporate multiple factors by relying on the resource-based view (RBV) theory of the growth of the firm. We believe that this approach allows for a comprehensive understanding of the growth factors of start-ups, and we hope to contribute to the debate on the development of a framework for an empirical analysis that is broadly applicable to a variety of cases. With the Japanese context as a reference, our basic proposition is that the growth of a start-up is a function of resources which are both internal and external to firms. Secondly, this is an empirical study based on a recent survey that contacted 5,140 previously defined startups companies of which 739 responses were obtained, a response rate of 14.4%. Fieldwork was carried out between September and November 2023. Thirdly, the panel of respondents allowed us to undertake a sequence of quantitative exercises: descriptive, econometric and cluster analysis. The framework of reference, the evidence made available, and the use of quantitative techniques allowed us to thoroughly carry out a cross-section, state of the arts analysis of the dynamics of growth and relevant influencing factors of Japanese startups.

Section 2 provides the analytical framework to characterise a startup, the specific features of its growth and conditioning factors based on the conceptual model of the resource-based view of the firm. Such literature review and framework of reference was of fundamental importance for the design of the questionnaire that was then applied to a RIETI promoted survey. Section 3 explains our methodological approach, providing an overview of the questionnaire survey, key variables we extracted from the survey, and the analytical model of start-up growth analysis. Section 4 portrays the profile of surveyed firms using summary statistics. Section 5 estimates an ordinal logit model with discrete growth performance indicators as the dependent variable and analyses the relationship

between internal resource and market relationship strategies and start-up growth. Section 6 summarises main findings and discusses the pertinent policy implications.

2. The framework of reference

2.1 Characterizing startups

To the best of our knowledge from previous studies, there is no consensus on what constitutes a start-up firm. Newness is an obvious characteristic that defines start-ups. Cefis and Marsili (2011) notes that in previous entrepreneurial studies, start-ups have been defined by researchers using various criteria ranging from five to nine years. For example, the European Commission (2018) roughly describes start-ups as younger than ten years/ five years, depending on the sector. Looze and Goff (2022) called a firm start-up that is 0–1 year old, distinguishing it from a younger firm (2–10 years old).

The perspective of employing innovative technologies is relevant in distinguishing start-ups from general newly opened firms. The intensity of research and development, share of research personnel in employment, number of patents, number of unique products, intensity of the use of information technology, or nature of the firm's economic activity are all commonly used measures of innovative firms.

Regarding size, in several countries, including Japan, company size is the basic criterion for selecting eligible firms for policy purposes as they adopt existing legal scope of small and medium-sized enterprises support measures. The concept of the liability of newness includes factors that can be confused with the liability of smallness (Abatecola et al., 2012). Audretsch and Mahmood (1995) related exposure to higher risk of failure to their suboptimal small operational scale.

Further, we did not base our selection on the growth rate either because surveying only successful firms would cause sample selection bias. We take growth as an outcome, not a defining nature of a start-up.

Based on the above considerations, we characterize startups as young firms (from 3 to 10 years) operating with innovative technologies. We also assume that startups are independent who are not subsidiaries of large corporations.

2.2 Resource-based view of start-up growth and its determinants[1]

The conceptual framework for this article is derived from the resource-based view (RBV)

[1] This part draws on Hamaguchi and Ferraz (2023).

influenced by the seminal work of Edith Penrose (2009)[2]. She established the idea of defining a firm as a collection of resources owned as organizational assets and managerial services of the manager and his/her team. She also considered the growth could be constrained by uncertainty because uncertainty would limit firms from fully using their resources.

2.2.1 Internal resources

Start-up firms' resources consist of entrepreneurs' competence and organizational assets incorporated as fixed capital and employed human resources. Other intangible organizational assets such as innovative technology and distinctive corporate philosophy must also be considered. When presented with an opportunity, a firm must decide how to mobilise resources it owns.

The quality of the entrepreneur is an essential element of internal resources. Running a start-up business necessitates strong creativity, analytical flexibility, generalized problem-solving, and complex interpersonal. These attributes are coined by entrepreneurship as it is defined by Penrose (2009) as the founder's ability to recognize and capitalize on growth opportunities (p.29): versatility (p. 32), fundraising ingenuity (p. 34), and ambition (p. 35). Furthering this point, Botelho et al. (2021) associate innovation-driven entrepreneurs with their higher educational background, diverse work experience, and good broad knowledge rather than being a specialist. Younger entrepreneurs are as good as older in creativity and analytical flexibility, but they fall short in terms of the breadth of knowledge from work experience. The founding team acts as a partner to compensate for the qualities that the founder does not possess (D'Acunto et al. 2020; Kor et al. 2016).

Increasing organizational internal resources, such as fixed assets, technology and highly skilled workers, is also essential to the growth of a firm. Increases in fixed assets are constrained by the availability of financial resources. Founders' own savings are the main (perhaps only) source of funding in the early stages of start-ups anywhere in the world. Empirical studies show that intellectual property reduces the likelihood of bankruptcy (Coleman et al. 2013; Kato et al. 2022). Possession of technology with established intellectual property rights not only represents high technological potential but also allows access to external funding from an early stage, which is advantageous for enhancing fixed assets. Regarding employment, theories of ability sorting predict that

[2] The first edition of her book was published in 1959.

high-ability workers will choose jobs in established firms, leaving low-ability workers to take lower-paying and riskier jobs in start-ups (Roach and Sauermann, 2023).

2.2.2 External resources

Startups have a great need to leverage external productive services to supplement insufficient internal resources. Mathews (2003) proposed an extended RBV in which firms base their success on their ability to draw on a wide array of external services by contracting, sharing, and cooperating with resources owned by others. We shall call them "external resources". External resources to be considered are labour markets that facilitate the hiring of high-quality employees, access to financial institutions and investors and the location of the firm to be able to access know-how and product markets.

Researchers still disagree about the relationship between the form of external finance and firm growth. Cole and Sokolyk (2018) report that firms using debt financing at the initial year of operations are significantly more likely to survive and achieve higher levels of revenue later. Honjo (2021) argues that start-up firms reliant on debt financing at founding are less likely to grow at a higher rate. The role of equity investors is often emphasized in start-up financing. Lerner and Nanda (2020) reported that venture capital funds (VCs) grew significantly in the United States as prudential deregulation allowed pension funds and insurance firms to diversify their portfolios.

Establishing access to qualified workers is critical to startup growth (Kiminami et al. 2021). Assuming assortative matching between high-ability workers and more established or more innovative firms, we expect co-agglomeration of more productive workers and innovative start-ups in particular places (Carlino and Drautzburg, 2020; Acs and Armington, 2003). In Japan, where the concentration of resources and population in Tokyo is intensifying, this trend is particularly pronounced (Hemmert et al. 2019).

Given that innovative activities tend to cluster in specific regions (Carlino & Kerr, 2015), the location of firms has important implications for access to the pool of talent and knowledge. Human network also plays a key role. Despite potential benefits, the alignment of the partnership might face uncertainties arising from asymmetry in bargaining power, goals, and organizational culture. (De Groote and Backmann 2020). Opportunities of open innovation may not be fully exploited also because of the lack of information about the capability and trustworthiness of partners (Hewitt-Dundas and Roper, 2018). Schoonhoven et al. (1990) found that firms founded in a region that centres innovative activities have a shorter time to launch the first product. Therefore, we expect that the location of the firm and its connectivity to the network contain information about

how much access the firm has to external resources.

3. Sources of data and methodological approach

3.1 The structure of the survey

Following the review of resource-based view, we model the growth outcome as a function of internal resource and external resource. We developed a questionnaire consisting of questions corresponding to these growth factors and indicators to measure growth.

Internal resources consist of founders' individual resources and firms' organizational resources. Founders' resources are described by their age, attained level of education, and work and managerial experience. Organizational resources depend on innovation capacity and human resources. Innovation capacity is related to research and development expenditures, development of new products, and ownership of intellectual property rights.

External resources cover access to finance and knowledge from the third party. There are various ways to raise funds other than funds from the founders themselves or their family and friends. The preference for funding sources will depend on the situation and the intended use of the funds. Start-ups can supplement knowledge lacking in-house through joint research and consultancy service contracts. Questions on location choice are critical here. A firm would choose a location by balancing good accessibility to necessary external resources and the costs associated with locating there. It also seeks a favorable ecosystem which is bounded geographically.

Uncertainty is a subjective variable which requires arbitrary configuration for measurement. We consider both the uncertainty felt from the overall situation and the uncertainty felt from the perceived inadequacy of the internal and accessible external resources possessed by the enterprise.

Our variables of measuring firm growth derive from the question about the performance in sales and employment over the last three years. This information is numerical in percentage. We will take these variables as dependent variables. Table 1 informs the structure of the questionnaire.

3.2 Surveyed firms

Following the conceptual characterization of start-ups as independent, young and technology-based firms, we pre-defined parameters for selecting firms to be surveyed from a universe of Japanese private enterprise database, the TSR Corporate Information File of the private corporate risk rating company Tokyo Shoko Research (TSR), to which

RIETI commissioned the survey. This database covers more than 4 million companies in Japan.

Table 1. Structure of the RIETI Survey

Categories	Sub-categories	Variables (Questions)
Internal resources	Founder‘s attributes	Age (Q20), Education (Q21), and Work and managerial experience (Q22, Q23).
	Organizational resources	Innovation capacity and their changes over time: R&D expenditures (Q11, Q12), Product development (Q13, Q14), and Intellectual property (Q15) Human capacity: Employment at the foundation (Q1)
External resources	Finance	Importance by source and its changes over time (Q24), Finance sources and purpose match (Q25), and Loan rejection (Q26, Q27))
	Knowledge	Use of external consultant service (Q16, Q17)) and R&D cooperation (Q18, Q19)
	Product market	Domestic market V.S. Export (Q6), First product launch (Q5)
	Location	Importance of proximity to related entities and exposed local conditions (Q28), Essential face-to-face contacts (Q30), Evaluation of local government’s support (Q33)
Uncertainty	Overall	Confidence in growth (Q9)
	Internal	Strength and weakness (Q31)
	External	Strength and weakness (Q32)
Outcomes	Sales	Current sales (Q3, Q4), and Change in the last three years (Q8)
	Employment	Current employment (Q2) and Changes in the last three years (Q7))
	Investment	Over 100 million yen investment plan in next three years (Q10)
	Location	Relocation plan (Q29)

(Source) RIETI, Survey on Growth Factors of Start-up Companies,2023.

We set the ceiling of 10 years from establishment, considering that the venture capital fund that invests in start-ups generally has an operating period of 10 years. In addition, to analyze the performance of the past three years, we restrict firms to being at least three years in existence. Therefore, the firm age cohort of the sample is 3 to 10 years, established between 2012 and 2019.

Setting technology criteria was not straightforward because there was no information to classify each firm by their technical characteristics. Therefore, we have decided to limit the survey targets according to the industry classification of the companies. We selected firms belonging to industries classified at the high or medium-high level ranks in OECD's industry classification by R&D intensity [3] and digital intensity [4]. Since the OECD industry classification is based on the International Standard Industrial Classification (ISIC Rev. 4.0), the correspondence table prepared by the Ministry of Internal Affairs and Communications was used to compare it with the Japan Standard Industrial Classification [5].

We found 87,499 companies in the TSR Company Information File meet the age and technology criteria. From here, to avoid sending questionnaires to inactive companies, we dropped firms that do not have registered telephone numbers, implying not having been regularly interviewed by TSR for credit rating review. In order to further eliminate inactive firms, we dropped those who do not have reported their company code for the new invoice system [6] to TSR. In addition, we excluded firms resulting from the spin-off of large companies and those with listed companies as shareholders. Furthermore, we omitted companies founded before 2011 to distinguish corporate name change and mergers from newly established ones.

As a result of the addition of these conditions, the population to be surveyed was narrowed down to 5,140 companies. The RIETI Survey sent questionnaires to all of them on September 29, 2023. In addition to enclosing a paper response form with the questionnaire, a response form on the web was also provided. We received 750 responses at the end date of the questionnaire collection on November 22. We added three responses that arrived later, bringing the total to 753. However, they included 14 responses that were answered twice using both a paper questionnaire and a web response form. We only considered valid the responses that received later. In the end, the total number of responses collected was 739, with a response rate of 14.4%. 86 percent of the total, or 634 responses, were conducted by web, and 105 were sent by mail.

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[3] See https://dx.doi.org/10.1787/5jlv73sqqp8r-en

[4] See https://dx.doi.org/10.1787/f404736a-en

[5] See https://www.soumu.go.jp/main_content/000394221.xls

[6] It has been announced that the Japanese Tax Authority would introduce a new invoice system in October 2023 where a qualified business entity must be registered by the local tax office with a unique company code. Companies who do not have updated this information are likely inactive.

The RIETI Survey designated the highest rank representatives to respond to the questionnaire. Of the 558 responses, or 76% of the total, were answered by the president, 9% by executives, and 15% by department managers. The high percentage of responses from top management means that the subjective responses contain high-quality information.

3.3 Analytical procedures

Linear regression is a conventional statistical model approach, and it is used for continuous dependent variable data. It takes the form as an equation (1).

$$y_i = \mathbf{x_i}\boldsymbol{\beta} + e_i \tag{1}$$

where y_i expresses the growth rate of a firm i measured with sales and employment changes in the last three years. The independent variable $\mathbf{x_i}$ describes the firm characteristics including variables which describe internal resources, external resources, and uncertainty as detailed in Table 1. The error term is denoted by e_i, which is normally distributed.

When y_i is given as ordered categorical variable for growth outcomes, such as high growth – low growth – stable – negative, we can deploy the ordered logit model to investigate factors contributing to ranking a firm to a higher growth category. This method assumes that a firm's ability to grow depends on a latent variable denoted with z_i that can be named as the growth potential of the firm. Although z_i itself is unobservable, the RBV argument suggests that firm internal resources, external resource, and uncertainty are associated with z_i. We can formulate the underlying relationship as equation (2).

$$z_i = \mathbf{x_i}\gamma + u_i \tag{2}$$

where u_i is the probability error term that follows the standard Gumbel distribution. We can characterize the correspondence of firm i to j_{th} growth category as equation (3).

$$y_i = j \Leftrightarrow \kappa_{j-1} < z_i \leq \kappa_j \tag{3}$$

where κ_j is the endpoint of j_{th} growth category.

3.4 Data and summary statistics

Table 2 presents the summary statistics of the variables included in the analysis. Sales, employment, and assets are standard measures of firm size and their growth to be used as the dependent variable. As discussed by Davidsson and Wiklund (2017), measuring the firm's growth by sales has an advantage because it contains a broad range of information,

and it is a standard performance indicator among entrepreneurs. Employment is another popular measure because there is widespread expectation for start-ups as a catalyst for new jobs creation. However, it is unlikely that employment will grow without sales growth. A growth process is likely to be driven by increased sales, leading to the acquisition of additional resources such as labor and machinery (Yasuda 2005, Davidsson and Wiklund 2017).

Therefore, we measure firms' growth first by sales growth. This variable derives from the question: "How has your company's sales changed over the past three years (2019–2022)?" As reported in Table 2, there were 718 valid responses [7] to this question with an average of 81.6%. Because this data is numerical in continuous numbers, we can conduct a linear regression analysis, taking it as a dependent variable. Employment growth will be explained by sales growth.

The independent variables are selected based on the resource-based view covering the categories of internal resources, external resources, and uncertainty. Internal resources are divided into organizational characteristics and personal characteristics of the founder. Organizational resources consist of the size of the workforce (excluding management), intellectual property rights, and market strategy whether the focus is on domestic or foreign markets. The founder's resources are evaluated based on the founder's age, experience in business management, and position prior to founding the firm.

We consider three factors for external resources: finance, knowledge, and location. The variable for finance derives from the question of "What were the company's primary sources of funding three years ago?" This variable is complemented by the information whether the financing instrument primarily for capital investment was a loan or equity. The variables of external knowledge address R&D cooperation and consulting services. The variable for location first addresses whether locating in Tokyo makes a critical difference in firm growth. In addition, we employ variables that indicate what location factors the companies consider important.

The concept of uncertainty is difficult to define, subjective, and unobservable, making it difficult to use in empirical analysis. Our valuable of overall uncertainty comes from the question of "Do you feel confidence in your company's tangible growth over the past three years (2019–2022) based on the market valuation by investors?" We consider that

[7] We dropped the replies which reported extreme values in the 3-years sales growth rate above 3000% and less than minus 100%, which is not feasible.

the negative reply (conf_capval=0) to this question expresses overall uncertainty. Alternately, we judged a firm feeling uncertain if it indicated a perception of "need for improvement" in the questions regarding various items of internal and external resources (questions 31 and 32 respectively).

Table 2 Summary statistics

Var. name	Var. description	Obs	Mean	S.Dev.	Min	Max
Outcome						
cr_sales_dec	Sales growth rate in last 3 years	718	0.816	2.300	-1.0	22.0
cr_empl_dec	Employment growth rate in last 3 years	713	0.390	1.208	-1.0	10.0
Internal resources (organization)						
q2	Full-time employees (excluding executives) in 2022	718	8.932	68.394	0	1800
q15_6	No intellectual property owned	718	0.588	0.493	0	1
domestic	Domestic market majority	697	0.920	0.272	0	1
Internal resources (founder)						
q20	Age of the president (1: 20s, 2: 30s, 3: 40s, 4: 50s or older)	718	3.514	0.633	1	4
q22	President's years of previous experience in company management (1: None, 2: less than 3 years, 3: 3-5 years, 4: more than 5 years)	718	3.216	1.214	1	4
q23	President's previous position (1: employee of another company, 2: manager of another company, 3: public official, 4: Professional, 5: Student, 6: Other)	715	1.841	1.537	1	6
External resources (finance)						
	What were the company's primary sources of funding 3 years ago?					
q24_2_1	- Owner's personal funds	718	0.603	0.490	0	1
q24_2_2	- Family/Friends' investment/loans	718	0.099	0.299	0	1
q24_2_3	- Private financial institution loans	718	0.338	0.474	0	1
q24_2_4	- Public financial institution loans	718	0.273	0.446	0	1
q24_2_5	- Private credit guarantee	718	0.049	0.215	0	1
q24_2_6	- Public credit guarantee	718	0.086	0.281	0	1
q24_2_7	- Angel investors	718	0.031	0.172	0	1
q24_2_8	- Private venture fund	718	0.031	0.172	0	1
q24_2_11	- Public grant	718	0.107	0.310	0	1
	Financing instruments primarily for capital investment					
q25_1_1	- Loans	717	0.227	0.419	0	1
q25_3_1	- Equity	717	0.029	0.169	0	1
External resources (knowledge)						
q18_7	No R&D cooperation	718	0.724	0.447	0	1
q16_8	No external consulting service used	718	0.606	0.489	0	1

Continues to next page

Continued.

External resources (location)						
tokyo	Location: Tokyo	718	0.330	0.471	0	1
	Important location conditions					
d_q28_1	- Proximity to investors and financial institutions	710	0.372	0.484	0	1
d_q28_2	- Proximity to research institutions and technical cooperation partners	710	0.446	0.497	0	1
d_q28_3	- Proximity to sales partners	710	0.556	0.497	0	1
d_q28_4	- Proximity to suppliers	709	0.392	0.489	0	1
d_q28_6	- Ease of hiring qualified employees	712	0.756	0.430	0	1
Uncertainty						
conf_capval	Self-confidence	716	0.419	0.494	0	1
d_q31_6	Weakness in market-product match	718	0.620	0.486	0	1
d_q32_3	Weakness in access to high quality input	710	0.414	0.493	0	1
d_q32_11	Weakness in local government support	707	0.301	0.459	0	1
Control by firm characteristics						
age	Years since establishment	718	7.281	2.267	4	11
q1	Full-time employees (excluding executives) at establishment	717	2.537	6.044	0	86
ict	Business area: ICT	718	0.610	0.488	0	1

4. Determinants of growth of Japanese start-ups

4.1 Analysis of sales growth

The columns (1) and (2) in Table 2 display the ordinary least square estimates on factors influencing the firm's growth measured by the growth rate of sales in the last three years. Column (1) and (2) differ in that the former uses overall uncertainty while the latter uses specific uncertainty variables. All models are controlled for the firm age (age), being in ICT-related industries (ict), and employment at the establishment (q1).

The benchmark OLS estimates reveal that the firm age (age) and employment at the establishment (q1) have statistically significant negative coefficients. This means that firms established more recently and with a smaller scale achieved higher sales growth in this period. Inquiring about the relationship between internal resources and sales growth, we found that firms with greater employment size (q2) and targeting mainly on the domestic market (domestic) had a positive impact on sales growth. Regarding the founder's attribute, the influence of his/her age (q20) and previous experience (q22) was not robust about the choice of uncertainty variable. Sales growth was found to be greater

Table 2 - Analysis of sales growth

Categories		OLS: cr_sales_dec		Ordered logit: cr_sales_clus_g5	
	Variables	**(1)**	**(2)**	**(3)**	**(4)**
Control	age	**-0.162*****	**-0.177*****	**0.927***	**0.915****
		(0.0394)	(0.0416)	(0.0380)	(0.0383)
	ict	-0.131	-0.0678	**0.621****	**0.664***
		(0.204)	(0.215)	(0.130)	(0.140)
	q1	**-0.0271****	**-0.0262*****	0.986	0.990
		(0.0105)	(0.00976)	(0.0106)	(0.0104)
Internal/organization	q2	**0.00175*****	**0.00212*****	**1.001*****	**1.002*****
		(0.000281)	(0.000350)	(0.000243)	(0.000276)
	q15_6	-0.0955	-0.219	**0.713***	**0.641****
		(0.214)	(0.231)	(0.128)	(0.120)
	domestic	**0.657*****	**0.582*****	**2.075****	**1.932****
		(0.196)	(0.195)	(0.649)	(0.582)
Internal/founder	1.q20	**0.678***	0.523	**2.30e-05*****	**1.68e-05*****
		(0.360)	(0.401)	(2.57e-05)	(1.90e-05)
	2.q20	0.384	0.430	**2.374****	**2.539*****
		(0.316)	(0.338)	(0.816)	(0.884)
	4.q20	0.152	0.0635	0.934	0.917
		(0.180)	(0.186)	(0.172)	(0.170)
	2.q22	0.0630	-0.0609	0.712	0.726
		(0.394)	(0.374)	(0.466)	(0.497)
	3.q22	0.267	0.271	1.081	1.073
		(0.477)	(0.498)	(0.348)	(0.363)
	4.q22	**-0.331***	-0.304	0.756	0.756
		(0.197)	(0.206)	(0.165)	(0.168)
	2.q23	**0.425***	**0.490****	1.382	**1.472***
		(0.218)	(0.218)	(0.286)	(0.304)
	3.q23	**0.840***	**0.801***	**4.724****	**4.565****
		(0.436)	(0.476)	(3.251)	(3.530)
	4.q23	-0.0201	0.0251	1.310	1.257
		(0.521)	(0.521)	(0.588)	(0.627)
	5.q23	**-1.125****	-0.852	**0.180****	**0.223****
		(0.501)	(0.522)	(0.137)	(0.146)
	6.q23	-0.211	-0.217	0.820	0.821
		(0.155)	(0.161)	(0.238)	(0.233)
External/finance	q24_2_1	**0.384****	**0.375****	**1.579*****	**1.640*****
		(0.157)	(0.159)	(0.277)	(0.288)
	q24_2_2	0.0399	-0.0753	1.271	1.126
		(0.296)	(0.311)	(0.328)	(0.292)
	q24_2_3	0.151	0.193	1.121	1.222
		(0.186)	(0.190)	(0.220)	(0.238)
	q24_2_4	0.227	0.211	1.165	1.166
		(0.216)	(0.218)	(0.236)	(0.234)
	q24_2_5	-0.401	-0.600	0.927	0.768
		(0.370)	(0.403)	(0.364)	(0.295)

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Categories		OLS: cr_sales_dec		Ordered logit: cr_sales_clus_g5	
	Variables	(1)	(2)	(3)	(4)
External/finance	q24_2_6	-0.0696	0.0123	1.216	1.240
		(0.274)	(0.303)	(0.410)	(0.443)
	q24_2_7	0.862	0.768	1.559	1.204
		(0.898)	(0.881)	(0.982)	(0.725)
	q24_2_8	0.470	0.510	1.901	**2.339***
		(1.036)	(0.986)	(0.998)	(1.126)
	q24_2_11	-0.382	-0.298	0.748	0.861
		(0.271)	(0.282)	(0.218)	(0.257)
	q25_1_1	-0.248	-0.164	1.004	1.066
		(0.207)	(0.206)	(0.194)	(0.207)
	q25_3_1	**2.475***	**2.531****	**3.024****	**3.164****
		(1.274)	(1.277)	(1.470)	(1.533)
External/knowledge	q18_7	0.145	0.0623	1.282	1.313
		(0.240)	(0.250)	(0.265)	(0.270)
	q16_8	0.0803	-0.136	0.747	**0.665****
		(0.218)	(0.207)	(0.136)	(0.121)
External/location	tokyo	0.0147	0.0303	**0.464****	**0.553***
		(0.305)	(0.308)	(0.159)	(0.197)
	tokyo#ict	0.186	0.242	**2.516****	**2.173***
		(0.379)	(0.391)	(1.023)	(0.908)
	d_q28_1	0.193	0.192	1.006	1.009
		(0.196)	(0.202)	(0.188)	(0.191)
	d_q28_2	0.0833	0.0345	0.872	0.866
		(0.165)	(0.168)	(0.163)	(0.164)
	d_q28_3	-0.101	-0.123	1.215	1.195
		(0.241)	(0.252)	(0.240)	(0.239)
	d_q28_4	0.0475	0.0468	0.861	0.894
		(0.212)	(0.218)	(0.168)	(0.177)
	d_q28_6	**0.467*****	**0.498*****	**1.392***	1.302
		(0.158)	(0.170)	(0.278)	(0.262)
Uncertainty	conf_capval	**1.148*****		**2.078*****	
		(0.203)		(0.378)	
	dq31_6		-0.164		**0.662****
			(0.194)		(0.119)
	d_q32_3		**-0.469****		**0.692***
			(0.182)		(0.135)
	d_q32_11		-0.0934		**0.542*****
			(0.204)		(0.116)
Constant		0.152	**1.353*****		
		(0.449)	(0.441)		
	Observations	684	680	684	680

Robust standard errors in parentheses. # indicates an interaction term.

*** p<0.01, ** p<0.05, * p<0.1. Ordered logit's cut points of the latent variable are (1) 1.855, 5.410, 27.51, and 43.94 and (2) 0.669, 1.904, 9.308, 14.89. OLS's R-squared is (3) 0.221 and (4) 0.177.

when the founder was a manager of another firm (2.q23) or a public officer (3.q23) before founding the start-up, and smaller when the founder was a student (5.q23). The results suggest that the founders' prior knowledge and experience of the markets they entered contributed to business growth.

Next, let us turn to the relationship between external resources and sales growth. For finance, no significant relationship was found between external resources and sales growth, whether loans or equity, only the relationship with own funds was significant. Yet, we found that firms tend to achieve higher sales growth when they deploy equity finance primarily for fixed capital investment (d25_3_1). The importance of equity financing for the growth of start-ups is often stressed. However, the results of this analysis show that it is necessary to focus on a combination of funding uses and financing instruments, such that equity is allocated to higher-risk capital investments and safe capital, such as own funds (q24_2_1), is generally emphasized. This perspective suggests that start-up support measures should not be biased towards equity funding, but rather a variety of instruments should be provided to meet diverse fund needs.

None of the variables related to external resources of knowledge and location had a statistically significant impact on sales growth rates, except for the location condition of ease of recruitment (d_q28_6). The results show that human resources can be a critical constraint on start-up growth.

We found that the overall uncertainty (conf_capval) was a relevant factor for start-up growth. Introduction of specific uncertainty perceptions revealed that firms pointing at weakness in access to high-quality input (d_q32_3) among external resources experienced lower sales growth.

For the robustness check, we will test the model with a slightly different specification. We applied a cluster analysis to divide the sample into five groups by the sales growth rate, using the Ward method for measuring the distance between the clusters. Table 3 shows the descriptive statistics for each group. The average growth rates of sales of the five groups, from the lowest to the highest, were -41.1%, 12.4%, 174.7%, 516.4%, and 1245.7%. We named each group respectively as "negative growth", "low growth", "medium growth", "high growth" and "ultra-high growth" groups and created a categorical variable ordered respectively from 1 to 5. Taking this ordered-categorical dependent variable, we shall estimate an ordered logit model.

Table 3: Five-step grouping of sales growth rates by cluster analysis

Sales Growth Group	Each group Average growth rate	Standard deviation	Min.	Max.	Frequency
Negative growth	-41.1027	24.27392	-100	-7	149
Low growth	12.37753	18.00109	-5	75	401
Medium growth	174.6977	60.94634	90	305	119
High growth	516.3765	116.4829	337	780	38
Ultra-high growth	1245.732	364.6573	868	2200	18
All samples	85.06704	235.5846	-100	2200	725

These results are shown in columns (3) and (4) in Table 2. For the ease of interpretation, we report the estimates of odds ratio (OR), meaning that OR>1 (OR<1) indicates that a one-unit increase in that variable has a (OR-1)*100% (or OR times) more likely to be in the higher growth rate category. Therefore, OR>1 (OR<1) corresponds to a positive (negative) OLS estimate coefficient.

The ordered logit estimates are generally consistent with OLS, but it contains richer information. Inquiring about internal resources, the ordered logit results are consistent about the positive association with employment size and domestic market orientation and founder's previous experience as a manager in another firm or public officer. The ordered logit provides additional insights in the negative association with "no intellectual property owned" (q15_6), suggesting the role of innovation capability in internal resource on firm growth. Regarding the founder's age, the ordered logit estimates revealed that those in 20s (1.q20) experienced (nearly 100%!) lower sales growth while those in 30s (2.q20) are 2.4-2.5 times more likely to be ranked in the higher sales growth category compared to those in the age of 40s. These results suggest that the youth of the founder is linked to growth, but growth also requires a certain amount of experience.

Consistent with the OLS regarding external resources, the ordered logit detects the importance of founder's own funds and equity finance primarily for fixed capital investment for sales growth. Model (4) found "no use of any type of external consulting service" (q16_8) is linked to 33.5% lower probability of being in a higher growth category, suggesting the relevance of looking for outside managerial resources.

The ordered logit estimates show statistically significant OR<1 regarding firms in ICT

related industries (ict) and located in Tokyo (tokyo), suggesting a negative correlation of these variables independently with the sales growth, although these relations were not significant in OLS estimates. However, the positively significant OR of interaction term (tokyo#ict) suggests that those in ICT and also located in Tokyo are more than two times more likely to be in higher growth groups. This result justifies the strong concentration of ICT related start-ups in Tokyo. In other words, start-ups in other than ICT-related industries have a chance to grow outside Tokyo.

Finally, the positive effect of confidence (less overall uncertainty) on growth is commonly detected in OLS and ordered logit. The ordered logit estimates show statistically significant negative impact of the three variables representing specific uncertainty (weaknesses) in market-product match (dq31_6) among internal resources and access to high quality input (d_q32_3) and local government support (d_q32_11) among external resources.

4.2 Analysis of employment growth

Table 4 reports the results of the regression model analysis using the growth rate of employment in the last three years as the dependent variable. This analysis exploits the hypothesis that sales growth is linked to employment growth, but the impact is significantly low. The table first reports the OLS estimates using employment at the establishment (q1) as a control. We also included the variables of the confidence (as an inverse to uncertainty) and dummies indicating the importance of proximity to essential business resources, investors and financial institutions (d_q28_1) and qualified workers (d_q28_6) as essential location factors. We expect that these factors also enhance employment growth.

The results show that the elasticity of the sales growth rate on the employment growth rate is 0.178, meaning that a one percent increase in sales growth increases employment only 0.178%, which is significantly low as expected. All other independent variables have statistically significant coefficient estimates, except q1, with expected signs.

However, the OLS may suffer from an endogeneity issue because the sales growth rate might have been affected by employment growth. We addressed this issue with the instrumental variable method, using the firm age (age) and the importance of own funds for investment (q24_2_1) as instruments. The IV estimates are exhibited in the third column. It shows a slightly higher elasticity of 0.200, but our conclusion of low impact of sales on employment growth is sustained.

Table 4 - Analysis of employment growth

	OLS	IV
VARIABLES	cr_empl_dec	cr_empl_dec
cr_sales_dec	0.178***	0.200***
	(0.0478)	(0.0759)
q1	-0.00837	-0.00778
	(0.00675)	(0.00668)
d_q28_1	0.221**	0.218**
	(0.0932)	(0.0930)
d_q28_6	0.189***	0.177**
	(0.0644)	(0.0697)
conf_capval	0.465***	0.437***
	(0.0913)	(0.120)
Constant	-0.159***	-0.156***
	(0.0497)	(0.0500)
Observations	703	703
R-squared	0.224	0.222

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
cr_sales_dec is instrumented by age and q24_2_1
All variables have VIF≤ 1.1 for OLS and 2.27 for IV estimate.

5. Conclusions

5.1 Summary of Main Findings

This paper examined the critical factors influencing start-up business growth, which is generally caught in difficulties termed as liability of newness. The low survival rate is still a problem despite policymakers' high attention to boost start-ups expecting their contributions to job creation and innovation. We sought to fill that gap by analyzing data from the RIETI Survey covering 753 firms and adopting a resource-based view (RBV) framework to assess internal and external factors affecting start-up success. We consider a firm's growth as dependent on internal and external resources constrained by uncertainty. We constructed a questionnaire by breaking down the three factors into specific questions which might be relevant to Japanese startups.

We adopted an econometric model for firms' sales growth as dependent on founder's

attributes and organizational assets like employees and intellectual property as internal resources, as well as on external resources such as finance, knowledge, and location, conditional upon uncertainty they face and controlling for firm age, employment size at foundation, and whether it is in ICT-related sector.

We found that: (1) larger workforce and domestic market focus boosted growth; (2) Founders with prior management or public sector experience saw higher growth; (3) Start-ups lacking intellectual property had lower growth; (4) Equity financing, when used for fixed capital investment, correlated with higher growth; (5) Access to high-quality labor was a significant growth factor; (6) Location in Tokyo benefited ICT start-ups but not others; (7) Firms confident in their valuation had higher sales growth; (8) Perceived weaknesses in market-product fit and supplier quality lowered growth; (9) Firm age and initial size negatively correlated with sales growth, that is, younger, smaller firms grew faster.

We also analyzed employment growth as dependent on sales growth and other factors. We found that the impact of sales growth on employment growth was positive, but it is weak (elasticity of 0.178–0.200). Overall confidence in business performance and proximity to qualified workers and investors boost employment.

5.2 Policy implications and agenda for future research

From this study, it was found that while it can be said that the larger the size of employees as an organizational internal resource, the higher the rate of sales growth, the positive impact of sales growth on employment growth is found, but its elasticity is low, and on average, sales growth is less related to employment growth. The results suggest that while some firms are scaling up and growing, many have not been able to enter this virtuous cycle. The fact that talent acquisition is an important growth factor is supported by the fact that the only significant location factor identified is ease of access to talent. This point is underscored by our analysis of the growth of ICT startups, especially in Tokyo, where there is a concentration of universities and research institutes and an abundance of technological talent. Policies are needed to provide start-ups with the supply of labor and access to the labor market.

We could also identify that the lack of intellectual property is detrimental to firm growth. Japanese start-up companies tend to rush to commercialize their innovation in domestic market to gain early recognition from investors. Applying for and registering their technology as intellectual property rights may not be a priority because procedures are time-consuming and expensive, and the organization does not have internal resources

for legal expertise at the early stage. However, in the field of advanced technology, where product life cycles are short, the benefits of commercialization are short-term, and focusing only on commercialization will not lead to medium- to long-term growth. Kato et al. (2022) report from a case study in Japan that holding patents increases a firm's viability. From a medium- to long-term perspective, it is necessary to support start-up companies to actively engage in intellectual property strategies.

Furthering internal resources, companies with young managers in their 30s have achieved high sales growth rates. It was also found that managers with previous experience in management or public services, implying acquisition of experience and knowledge in specific markets, have achieved higher growth. On the other hand, growth rates were lower when managers were even younger, in their 20s, or when their previous background was as a student. Seminars and programs aimed at fostering founders should be targeting young and inexperienced people.

Regarding external resources, many previous studies on start-up finance have emphasized the importance of equity financing, especially VCs. This study showed that equity financing was related to growth only when capital investment was the main objective. In general, for Japan start-ups, founder's own fund sustained growth. Since a variety of sources of funding are required for various purposes of use depending on the stage of growth of a firm, it is better to have a variety of financing instruments provided in debt and equity with both government and private sources as suppliers, rather than focusing only on private VCs. Since the objectives of each institution are different, it will be necessary to coordinate the medium- to long-term fund-provisioning plan.

Start-ups are a priority target in Japan's industrial policy, and it is expected that researchers from fields other than business administration, which have led start-up research so far, will participate in the research. Econometrics, which specializes in causal inference, should provide empirical evidence of the effects of the government's policies for R&D support, entrepreneurial support, provision of various types of financing, and support for human resource acquisition. This study sought to contribute to this regard and was able to provide some useful information. However, our conclusion is still tentative because it is hard to generalize the argument based on specific surveys[8]. It is necessary

[8] The RIETI Survey includes changes in 2022 and 2019 three years ago, and it can be imagined that companies were affected by various restrictions and unusual economic conditions due to the spread of the new coronavirus infection during this period. It will be necessary to consider how the specificity of the study period affects the results of the analysis.

to conduct similar investigations repeatedly under different circumstances in the future to confirm. It is desirable that the government engages in systematic data collection on start-ups and provides regular comprehensive start-up-specific reports.

In addition, this study statistically analyzes the relationship between corporate growth, internal resources, and market relationships, but it does not reveal what the firms to do to overcome the hurdles of accumulating internal resources, optimize the combination with external resources, and cope with uncertainties. These are future research topics, and it is hoped that the refinement of the research will encourage start-up companies, investors, and policymakers in Japan to come up with developmental ideas.

References

Abatecola, G., Cafferata, R., & Poggesi, S. (2012). Arthur Stinchcombe's “liability of newness”: contribution and impact of the construct. *Journal of Management History*, *18*(4), 402-418.

Acs ZJ, and Armington C. 2003. The Geographic Concentration of New Firm Formation and Human Capital: Evidence from the Cities. Center for Economic Studies, U.S. Census Bureau, Working Papers.

Audretsch, D. B., and Mahmood, T. (1995). New firm survival: new results using a hazard function. *The Review of Economics and Statistics*, 97-103.

Botelho, T. L., Fehder, D., and Hochberg, Y. 2021. Innovation-driven entrepreneurship. NBER Working Paper 28990.

Cabinet Office (2023) "Grand Design and Implementation Plan for a New Capitalism" (2023 Revised Edition) https://www.cas.go.jp/jp/seisaku/atarashii_sihonsyugi/pdf/ap2023.pdf (accessed March 8, 2024)

Carlino, G., & Kerr, W.R. (2015) Agglomeration and Innovation, in Duranton, G., Henderson, J.V. & Strange, W.C. eds. *Handbook of Regional and Urban Economics* Volume 5, Elsevier, 349-404.

Cefis, E., & Marsili, O. (2011). Born to flip. Exit decisions of entrepreneurial firms in high-tech and low-tech industries. *Journal of Evolutionary Economics*, 21, 473-498.

Cole, R. A., and Sokolyk, T. (2018). Debt financing, survival, and growth of start-up firms. *Journal of Corporate Finance*, 50, 609-625.

Coleman, S., Cotei, C., & Farhat, J. (2013). A resource-based view of new firm survival: New

perspectives on the role of industry and exit route. *Journal of Developmental Entrepreneurship*, 18(01), 1350002.

Davidsson, P., & Wiklund, J. (2006). Conceptual and empirical challenges in the study of firm growth. In Davidsson, P. Delmar, F. & Wiklund, J. eds. *Entrepreneurship and the Growth of Firms*, Edward Elgar, London. 39-61.

Decker, R., and Haltiwanger, J. (2023). Surging business formation in the pandemic: Causes and consequences. *Brookings Papers on Economic Activity* 54: 249-302.

De Groote, J. K., & Backmann, J. (2020). Initiating open innovation collaborations between incumbents and startups: How can David and Goliath get along?. *International Journal of Innovation Management*, 24(02), 2050011.

European Commission (2018) EU Startup Monitor 2018 Report. http://startupmonitor.eu/

Fendoglu, S. and Xu, T. (2024) Startups and Venture Capital in Japan: How to Grow, IMF Selected Issues Paper SIP/2024/027, Washington, D.C.: International Monetary Fund

Gimenez-Fernandez, E. M., Sandulli, F. D., and Bogers, M. (2020). 'Unpacking liabilities of newness and smallness in innovative start-ups: Investigating the differences in innovation performance between new and older small firms', *Research Policy*, 49(10), 104049.

Hamaguchi, N. and Ferraz, J.C. (2023) Startup growth and conditioning factors: a conceptual framework for a survey-based study, RIETI Discussion Paper 23-E-012.

Hemmert, M., Cross, A. R., Cheng, Y., Kim, J. J., Kohlbacher, F., Kotosaka, M., Waldenberger, F. & Zheng, L. J. (2019). The distinctiveness and diversity of entrepreneurial ecosystems in China, Japan, and South Korea: an exploratory analysis. *Asian Business & Management,* 18, 211-247.

Hewitt-Dundas, N., & Roper, S. (2018). Exploring market failures in open innovation. *International Small Business Journal*, 36(1), 23-40.

Honjo, Y. (2021) "Performance of IPO Companies: Results of Verification by TSE Mothers," *Journal of the Japan Finance Corporation*, No. 50 (February 2021): 47-67.

Kato, M., Onishi, K., and Honjo, Y. (2022). Does patenting always help new firm survival? Understanding heterogeneity among exit routes. *Small Business Economics*, 59(2): 449-475.

Kiminami, A., Kiminami, L., and Furuzawa, S. 2021. Impact of entrepreneurship on new firm formation in Japan: A panel data analysis using prefectural data. (In Japanese) *Studies in Regional Science* 51(2), 337–351.

Kor, Y.Y., Mahoney, J.T., Siemsen, E. and Tan, D. 2016. Penrose's The Theory of the Growth of the

Firm: An exemplar of engaged scholarship, *Production and Operations Management.* 25(10): 1727–1744.

Lerner, J., and Nanda, R. 2020. Venture capital's role in financing innovation: What we know and how much we still need to learn. *Journal of Economic Perspectives*, 34(3): 237-61.

Looze, J. and Goff, T. 2022. *Job Creation by Firm Age: Recent Trends in the United States*. Ewing Marion Kauffman Foundation, Kansas City.

Mathews, J.A. (2003). Competitive dynamics and economic learning: An extended resource-based view. Industrial and Corporate Change, 12(1), 115–145.

METI (2022) On startups. Document submitted to the Fourth Committee on New Direction of Economic and Industrial Policies, Feb. 26, 2022, Economic and Industrial Policy Bureau Ministry of Economy, Trade, and Industry. https://www.meti.go.jp/shingikai/sankoshin/shin_kijiku/004.html

Penrose, E. 2009. *The Theory of the Growth of the Firm*. Fourth Edition, Oxford, Oxford University Press.

Roach, M., and Sauermann, H. (2024) Can technology startups hire talented early employees? Ability, preferences, and employee first job choice', *Management Science*, *70*(6): 3619-3644.

Schoonhoven, C. B., Eisenhardt, K. M., & Lyman, K. (1990). Speeding products to market: Waiting time to first product introduction in new firms. *Administrative Science Quarterly*, 177-207.

U.S. Department of the Treasury (2024) Small Business and Entrepreneurship in the Post-COVID Expansion, https://home.treasury.gov/news/featured-stories/small-business-and-entrepreneurship-in-the-post-covid-expansion, accessed on March 10, 2025.

Venture Enterprise Center (2023) *Venture Enterprise White Paper 2023*.

Yang, T., and Aldrich, H. E. (2017) "The liability of newness" revisited: Theoretical restatement and empirical testing in emergent organizations, *Social Science Research*, 63, 36-53.

Yasuda, T. (2005) "Firm growth, size, age and behavior in Japanese manufacturing. *Small Business Economics* 24, 1–15. https://doi.org/10.1007/s11187-005-7568-y