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Entrepreneurial growth aspirations during the COVID-19 pandemic: the role of ICT infrastructure quality versus policy response

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ABSTRACT

We posit that the quality of information and communication technology (ICT) infrastructure and the effectiveness of crisis-specific policy response are essential for entrepreneurial growth aspirations during major external shocks. Enhancing the quality of ICT infrastructure is a relevant strategy for building ecosystems that are resilient to multiple types of crises. It enhances entrepreneurs' growth ambitions during the crisis, and makes them less reliant on crisis-specific response policies adopted by governments. We provide empirical support for this, utilizing Global Entrepreneurship Monitor (GEM) data from the pandemic period in Chile.

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1. Introduction

The COVID-19 pandemic represents a prominent example of the performance challenges that the entrepreneurs experience as a result of major external shocks that take place in the environment. Previous studies have shown that entrepreneurs are particularly prone to external shocks, which can significantly impede their growth prospects (Belitski et al. 2022). More generally, recent research has recognized the crucial role of the economic, social, institutional, and policy environment in entrepreneurship (Aslesen, Martin, and Sardo 2019; Audretsch et al. 2021; Autio et al. 2014; Qin, Mickiewicz, and Estrin 2022; Savic, Smith, and Bournakis 2020; Welter, Baker, and Wirsching 2019). This entrepreneurship-relevant environment is often conceptualized as an entrepreneurial ecosystem, while emphasizing its spatial anchoring (Audretsch, and Belitski 2021; Fischer et al. 2022; Khlystova, Kalyuzhnova, and Belitski 2022). Consistent with this, research on entrepreneurship and crises has emphasized the importance of ecosystems at the country and regional levels (see Bishop 2019). More recently, a few studies have refreshed the debate about how certain environmental ecosystem conditions, such as infrastructure and government policies, may offer important

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counterforces to external shocks such as pandemics (Braunerhjelm 2022; Das, and Zhang 2021; Fritsch, Greve, and Wyrwich 2021; Grube, and Storr 2018; Belghitar, Moro, and Radić 2022).

Emergent literature on crises' impact on entrepreneurial outcomes (Doern, Williams, and Vorley 2019; Wenzel, Stanske, and Lieberman 2020) has mostly focused on the overall effect of crises on entrepreneurs (Andreas et al. 2020), on entrepreneurial activity (Fritsch, Greve, and Wyrwich 2021), on entrepreneurial survival (Belghitar, Moro, and Radić 2022) and on small/medium-sized enterprises (Kuratko and Audretsch, 2021). But it ignores the distinction between less and more ambitious forms of entrepreneurship (Puente, González, and Cervilla 2019). This is an important gap, considering that ambitious entrepreneurship is strongly associated with growth, innovation, and internationalization (Audretsch, Belitski, and Guerrero 2022; Estrin, Korosteleva, and Mickiewicz 2022). Going back to the Schumpeterian view of entrepreneurship (Schumpeter 2008[1934]), we posit that it is particularly important to pay attention to growth aspiration of newly created firms in the face of the crisis, because these growth aspirations imply that the crisis is associated with creative destruction, which is reflected in creation of new ambitious, growth-oriented firms. This approach may contrast with the focus on the survival of established firms. Crises, while offering new opportunities, also increase economic uncertainty that in turn affects growth aspirations negatively (Baker et al. 2020; Estrin, Korosteleva, and Mickiewicz 2013). The resulting overall net impact of the pandemic takes time to unfold, and entrepreneurial growth aspirations can provide a useful early indication for longer-term growth outcomes. Past empirical evidence has shown that entrepreneurial growth aspirations are closely related to actual growth outcomes (Davidsson, Delmar, and Wiklund 2006; Delmar, and Wiklund 2008; Kolvereid, and Bullvag 1996; Wiklund, and Shepherd, 2003) and therefore are a strong indicator of subsequent entrepreneurial performance.

Therefore, we address the important gap by examining when entrepreneurship growth aspirations during an external shock (e.g. the COVID-19 pandemic) are more likely to emerge. We posit that they will be influenced by the long-term factors enhancing the resilience[1] of the ecosystem (e.g. quality of ICT infrastructure represented by the low cellular call failure rates) as well as by the short-term adaptability of the ecosystem (e.g. effective policies to respond to the COVID-19 pandemic).

As a result, our study makes several contributions to the literature on entrepreneurship. Firstly, we contribute to the emerging literature on entrepreneurship outcomes in the face of the impact of the COVID-19 pandemic crisis. While researchers have started to examine the impact of the pandemic on entrepreneurship (Belitski et al. 2022; Kuratko, and Audretsch 2021), a comprehensive understanding of the effect of the crisis on entrepreneurship has not been achieved, with most of the current research focusing narrowly either on new entry or on survival of existing businesses. By examining an important aspect of entrepreneurial growth aspirations, this study offers insights into the performance consequences of the short-term effectiveness of the policy (a proxy of the ecosystem's adaptability) and the long-term quality of ICT infrastructure endowment (a proxy of the ecosystem's resilience) that can mitigate the effects of the crisis; this may also help in planning the best government response to future external shocks. Thus, we fill the gap in the literature on the contextual ecosystem factors that are conducive to entrepreneurship characterized by high-growth aspirations. In this way, we also contribute to the broader literature on the role of the social and economic environments in entrepreneurship (Braunerhjelm 2022; Das, and Zhang 2021).

Our results indicate that in the context of global crises, regional and local environments pertaining to government policies and regulatory frameworks alongside the quality of ICT infrastructure can significantly enhance the entrepreneurs' growth aspirations. We argue that the quality of ICT infrastructure played a critical role in high-growth aspiration entrepreneurship during the pandemic crisis because of the dramatic shift away from face-to-face transactions. Indeed, it is a good illustration of how a long-term ecosystem mechanism can build its resilience.

The empirical counterpart of this analysis draws on data from Chile, a country featuring both a high level of entrepreneurship activities and considerable regional heterogeneity in policies and technological infrastructure (Guerrero, and Serey 2021a), which therefore is well suited for empirical investigation of our research questions, leading to better understanding

of entrepreneurial growth ambition during the crises. We test our hypotheses using ordered logit regressions. Our results of estimations suggest that entrepreneurs in localities with more effective government policy responses exhibit higher growth aspirations than those that do not experience an effective government support. At the same time, the lack of quality technology infrastructure[2] constrains entrepreneurial growth aspirations during the pandemic. Furthermore, in localities where the quality of technology infrastructure is poorer, government support programs play a more important role in boosting entrepreneurial growth aspirations, especially in the earliest stage of the entrepreneurial process that is for nascent entrepreneurs.

2. Research setting

The decision behind selecting Chile as the research setting is supported by its features. According to Aguinis et al. (2020), Latin America is an ideal 'emerging natural laboratory' with multiple micro and macro challenges for building and testing theories. In recent decades, Chile has ranked as the top in Latin America and within the top 15 worldwide most attractive economies for doing business, based on favourable economic trends and entrepreneurial culture (Amorós, Guerrero, and Naranjo 2020). Over the medium/long term, Chile has a dynamic income growth trajectory and is one of the very few economies that managed to shift from a medium- to a high-income group of countries.[3] Yet, sustained development is accompanied by multiple societal and economic challenges (Amorós, Maribel, and Naranjo-Priego 2020). Despite being one of the most prosperous open markets in Latin America, Chile represents a challenging societal, political, economic, and natural disaster-prone environment (Macpherson et al. 2021). Like few other Latin American countries, Chile faces a social stratification/fragmentation that is accompanied by a high level of inequality in (basic) social protection, affecting the most vulnerable households (OECD 2022). Economic particularities (high-growth and open market that are characteristics of developed economies) and societal particularities (multidimensional inequalities affecting vulnerable groups, which are characteristics of developing economies) with strong regional dimension represent unique research setting to test the effect of the COVID-19 pandemic on entrepreneurial growth aspirations.

3. Theory and hypotheses

3.1. Adaptability and resilience of the entrepreneurial ecosystem

We follow Braunerhjelm's (2022) distinction between short-term and long-term policy mechanisms within an entrepreneurial ecosystem. According to Ostrom (2009), the adaptability of the system concerns its effectiveness in response to new external shakeouts when they arise (e.g. the COVID-19 pandemic). Within this framework, short-term policy response in the face of the pandemic would serve as an important indicator of such ecosystem adaptability. In contrast, the long-term mechanism represents the system resilience to any external shakeout that could transform the system away from its stable domain (Ostrom 2009). This resilience is derived from the ecosystem's capabilities. In particular, we posit that the quality of ICT technology infrastructure mattered significantly for the resilience of the entrepreneurship ecosystems during the pandemic, when a large amount of traffic in business activities and transactions moved from offline to online, particularly via mobile networks (Guthrie, Fosso-Wamba, and Arnaud 2021). Combining these insights, we propose a conceptual framework focusing on how government policy – reflecting the short-term adaptability of the ecosystem, and quality of ICT technology infrastructure – reflecting the long-term resilience of the ecosystem, interplay and substitute for each other, influencing the entrepreneurial growth aspiration in the middle of the crisis (see Figure 1).

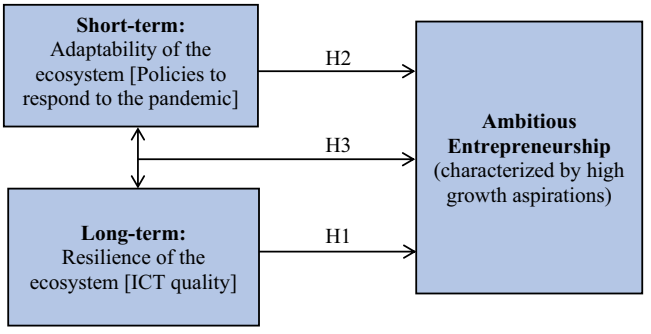

Figure 1. Proposed conceptual model.

3.2. Short-term adaptability of the ecosystem: public policy response to the pandemic

Entrepreneurs' growth aspirations are significantly influenced by the environmental factors (Autio and Acs 2010; Estrin, Korosteleva, and Mickiewicz 2013), both long term and short term. Within the latter category, government policies should include a combination of fiscal measures and knowledge-upgrading opportunities in response to supply-side crises such as COVID-19, and they should also vary significantly across localities and regions (Braunerhjelm 2022). In stable times, short-run policies may play a smaller role in alleviating entrepreneurial constraints, as then the set of entrepreneurial opportunities is bigger. In contrast, during the crises such as the COVID-19 pandemic, the policy environment and the government policy-regulation nexus are likely to play a critical role. The tailored and rapid government response represents the adaptability of the ecosystem, and reassures entrepreneurs so that they maintain their positive expectations on long-term outcomes. When they maintain a higher level of growth aspirations, these in turn are transformed into more dynamic business strategies.

The policy elements that may boost or dampen entrepreneurs' growth aspirations at time of crisis relate to government support via financial and broader assistance and knowledge-enhancing programmes. Direct support from the government can offer important alternative sources of capital to help firms overcome financial constraints (Braunerhjelm 2022) and serve to convince the entrepreneurs that the crisis will not turn into a prolonged slump. Alongside the direct support for business ventures, income support for the population can also translate both into sustained demand and into potential resources to be used for new venture creation.

However, good regional targeting remains a problem, as argued and supported by empirical evidence by Belghitar, Moro, and Radić (2022). Consistent with this, we argue that there is an inherent tension between the need for rapid policy response to the crisis and the time needed for designing the policy that accounts for place-specific requirements to make it effective on the regional level.

Moreover, regional diversity related to uneven path of development, to challenging geography, and to place-related sectoral differences imply that crisis-policies could have diverse, region-specific impact (Belghitar, Moro, and Radić 2022), and the effectiveness of policy responses perceived by residents in different regions could vary. This perception is likely to be closely tied to growth aspirations. A positive perception is likely to lead to a more optimistic view of the future. This is why we expect entrepreneurial growth aspirations to be positively associated with perceived effectiveness of government economic policy responses that would vary over regions and localities.

Hypothesis 1: Entrepreneurs, in a locality where business people perceive government response to the pandemic as effective [adaptability], will have higher growth aspiration than those in a locality with perceived lower effectiveness of government response.

3.3. Long-term resilience of the ecosystem: ICT infrastructure

While the first element, just discussed, relates to adaptability, the second represents resilience. Here, we posit that it is the ICT infrastructure that becomes particularly relevant to entrepreneurs' growth aspirations during the crisis. Given the imposition of lockdowns and transfer of work from office to home, the COVID-19 pandemic significantly amplified the importance of the internet- and phone-based means of communications. New communication technologies may affect many facets of entrepreneurial activities, including managing supply chains, delivering services, or reaching out to customers. Smart cities characterized by advanced technological infrastructure can be critical in providing multiple digital solutions, as well as in building resilience that in turn may result in engagement in high-growth aspirations entrepreneurship by innovative individuals during the COVID-19 pandemic (Das, and Zhang 2021).

As noted earlier in the paper, resilience concerns the capacity of the system to resist the impact of disturbance it encounters and resistance against moving away from its stable domain (Ostrom, 2009). The existence of quality ICT infrastructure implies the capacity of the ecosystem to rely on more remote forms of activities replacing some face-to-face communications and transactions, and such infrastructure is built and developed over a longer time span. Therefore, the quality of ICT infrastructure constitutes an important aspect of the long-term resilience of the regional entrepreneurship ecosystem to pandemic crises, during which lockdowns result in temporary restrictions on face-to-face transactions. Therefore, ICT plays a vital role in mitigating the impact of the shocks associated with pandemics. This is part of the wider progress in digital technologies, platforms, and infrastructure that led to the transformation of entrepreneurship and innovation (Nambisan, Wright, and Feldman 2019). More generally, Nambisan (2017) argues that advances in digital technologies led to new opportunities for entrepreneurs to deal with uncertainty. The latter is inherent to any entrepreneurial process (Knight 2009), but as we noted above, based on Baker et al. (2020), increased uncertainty is the key impact of the crisis. Dealing with it successfully based on technology implies that the 'creative destruction' aspects of crises (Schumpeter 2008 [1934]) are amplified. Thus, access to quality technology becomes critical for ambitious, growth-oriented entrepreneurs in the crisis period.

However, focusing on growth aspirations leads us to postulate the importance of further distinctions within the characteristics of ICT infrastructure. Previous studies have explored the relationship between technology infrastructure and entrepreneurship activities by focusing on *quantity* metrics (Nambisan 2017). Yet, our research question relates to growth aspirations of entrepreneurs, who aspire to excel in their chosen line of business and therefore need to be uncompromising in their reliance on technological *quality*, especially that they are more likely to compete in global markets with their products and services. At the same time, these limitations, especially in the ICT quality related to connectivity, became even more important during the pandemic crisis, when businesses were forced rapidly to shift away from face-to-face transactions. Consequently, we argue that it is not only the extent but even more importantly the quality of ICT infrastructure that matters to entrepreneurs' growth aspirations during the crisis.

The quality of IT infrastructure is associated with better experience in running the business during the pandemic and helps to boost confidence – which can be reflected immediately in higher aspiration for growth, even though the benefits to the actual growth performance of the business may take time to reveal.

Hypothesis 2: During the pandemic, entrepreneurs in a locality where ICT infrastructure [resilience] is better will have higher growth aspirations than those in a locality with worse ICT infrastructure.

3.4. The interplay of long-term resilience and short-term adaptability in the ecosystem

Finally, we consider how entrepreneurial growth aspirations during the pandemic will be influenced by the interplay of the quality of the ICT infrastructure and region-specific effectiveness of policy responses that counteract the temporal effect of the crisis (Kuratko, and Audretsch 2021). We expect substitution effects between policy responses and technology infrastructure, which may both affect the directions of entrepreneurial strategy and growth expectations (Colombo et al. 2016). In the short run, we expect that effective policy response will sustain local demand, both from final consumers and within (local) business-to-business relations. This is likely to be critical to entrepreneurs who will adopt strategies oriented towards the local or regional market. In turn, quality information and communication infrastructure may be critical to those businesses that target wider markets, especially international, given the lockdown conditions during the pandemic. In that sense, effective economic support policy and infrastructure may be substitutes during the pandemic as they will be relevant to alternative strategies, which the founders of new ventures may adopt to grow (see also Braunerhjelm 2022).

Furthermore, effective government responses will reassure the entrepreneurs that the crisis is temporary; therefore, the former will be important for entrepreneurs' positive assessment of the longer-term prospects, affecting their forward-looking growth aspirations (Colombo et al. 2016; Davidsson, and Gordon 2016). Likewise, the quality of ICT infrastructure will enable the entrepreneurs to form realistic expectations that they will expand their businesses over a longer period. As both affect long-term prospects, particularly in a crisis situation, albeit in a different way, and as argued above, are likely to be associated with alternative strategies, they may act as substitutes. Consequently, we argue that higher quality of infrastructure will make entrepreneurial aspiration less reliant on the crisis-specific policy response.

In other words, we posit that there is more than one path to sustain high-growth aspirations during the crisis. More effective policies and better ICT infrastructure are likely to be associated with two different growth strategies: Growth relying on IT infrastructure during the crisis is likely to be associated with switching to internet and mobile networks in place of face-to-face transactions, which also creates new, geographically wider opportunities, and the effectiveness of such a transition is conditional on the quality of infrastructure. It leads to a structural shift of business models for entrepreneurial activities. In contrast, short-term policy response is likely to be associated with both supporting local demand and subsidizing the current line of business. It is more about continuity.

Hypothesis 3: Government response to the pandemic [adaptability] matters less to entrepreneurial growth aspirations where the quality of ICT technological infrastructure [resilience] is better, and vice versa.

4. Methodology

4.1. Data and methods

Our data came from sources that provide (i) fine-grained measures at the municipality and regional level in Chile, using public information (the 2017 Population Census and Technological Indicators)

and (ii) at the individual level, using the 2020 Adult Population Survey (APS – collected by the Chilean team as part of the Global Entrepreneurship Monitor consortium – GEM). For the latter, the sample is drawn upon the adult population in Chile, where the survey was conducted between the beginning of June and the beginning of October 2020. Overall, this produced 9,169 usable interviews. However, the actual number of observations used in regressions may be lower due to some (limited) degree of missingness in the variables of interest.[4]

4.2. The dependent variable

The dependent variable, *entrepreneurial growth aspirations*, is based on a categorical variable included in the 2020 APS GEM survey dataset. It measures the level of growth (employment) aspirations in the next 5 years. We utilize categories available in the survey dataset, where 1 relates to a start-up that expects to remain in the form of self-employment, 2 relates to between 1 and 5 employees in 5-year time, 3 denotes between 6 and 19 jobs expected and 4 corresponds to 20 and more jobs. This categorization, available from the original dataset, makes sense, as an alternative to using an underlying continuous variable is highly problematic at individual level, due to its extreme skewness driven by some high-value outliers in our sample. In addition, these outliers come with obvious measurement errors, as we deal with expectations, and categorization gives less weight to them. Finally, we added a category of zero, for those not planning to create any jobs, be it by hiring employees or by being self-employed; in other words, zero denotes those not involved in entrepreneurship. This construction of the dependent variable is similar to Estrin and Mickiewicz (2011); the higher categories represent ambitious entrepreneurial entry, where ambition is defined by growth aspirations. Combining the categories 1 to 4 would result in a simple zero-one entrepreneurial entry model. In turn, omitting the zero category would result in a model of growth aspirations, yet the one which would suffer from a selection bias.

Categories 1 to 4 (Reynolds et al. 2005) relate to nascent entrepreneurs who are engaged in start-up activities and expect to have ownership in the venture, which did not become operational yet, as defined by 'payment of any salaries and wages for more than three months to anybody, including the owners' (*Ibid*.: 210). Here, we follow the most recent literature (Fuentelsaz, González, and Mickiewicz 2023), which focuses on nascent entrepreneurs and not on owner-managers of young or established businesses. This has a major advantage of individual explanatory variables (e.g. income, employment status or skills) suffering little from reverse causality (endogeneity). Also, for this group, the current level of employment means little – nascent firms are at the very initial stage, at the point zero of entrepreneurial process, not paying wages for more than 3 months yet. Majority of them simply do not report employment, and for minority that report it, this is a figure that may change weekly if not daily – they are in the process of hiring when interviewed during the GEM survey. Therefore, the initial point of employment can be taken as zero, and as a result, the expected level of employment becomes equivalent to growth (Fuentelsaz, González, and Mickiewicz 2023). This is the approach we adopt in this paper.

4.3. Hypothesis-related explanatory variables

We include a set of explanatory variables to capture the long-term resilience (quality of ICT infrastructure) and short-term adaptability (government policy response) of the entrepreneurial ecosystem during the COVID-19 pandemic.

The long-term resilience of ecosystem is captured by the *quality of technology infrastructure* obtained from the Chilean Ministry of Communications, and represents the proportion of calls that failed in a municipality, measured by the logged percentage of calls from one cellular phone to another cellular phone that were not finalized successfully. We focus on the cellular technology as it is prevalent in Chile, with a smartphone penetration rate of 65% in 2017, ranking eighth globally, even higher than, for example, Germany. The hefty investment in mobile infrastructure allows many

Chileans without internet broadband to connect or use social media via the mobile network.[5] In the meantime, there is a considerable variation in the quality of connection across regions. In our data, the percentage of call failures across municipalities ranges widely, from practically nil (0.0001) to a staggering one-quarter (0.24).[6] As additional variables related to technology infrastructure, we also include three other measures available from the same source: density of phone lines, density of internet lines, and digital TV density measured by the digital TV subscriptions, all three divided by total population in the municipality. We also created an ICT technology scale based on these four variables, but it did not exhibit high level of reliability (Cronbach's alpha was 0.62), therefore we settled with including all the four dimensions available to us in our models. The underlying reason was a low correlation of the failure rate with more traditional 'quantitative' dimensions (correlation coefficient ranging from 0.001 to 0.103). The latter observation also reassured us that the distinction between the quality of infrastructure (in our case proxied by 'the failure rate of cellular phone calls') and the quantity of infrastructure is an important one and should be the focal point of interest.

The short-term ecosystem adaptability, *the effectiveness of government policy response*, is captured by a variable that we constructed from the 2020 APS GEM data. In 2020, those respondents who were owner-managers of established, young or start-up businesses were asked to assess the effectiveness of government policy in response to the pandemic. These responses have captured 4 months of the restrictions and government support, evaluated against the experienced effects of the COVID-19 pandemic, in interviews between the beginning of June and the beginning of October 2020, when the effects of both the pandemic and the associated government policies were already experienced. During the COVID-19 pandemic, the Chilean government implemented an entrepreneurial, hybrid policy framework for supporting lives and economic activities, shortly after the lockdown restrictions, which started in Chile on the 8 February 2020. The economic assistance programmes in Chile were announced between the 19 March and the 12 April 2020. These programmes targeted employment, small/medium-size enterprises, public services, and all citizens with a national identification number. The first payments to citizens were dispatched on the 17 April.[7]

Thus, the timing of the Chilean GEM survey captured the best moment to register the evaluation of the government policy effects as experienced right after their introduction. The variable representing the individual assessment of the effectiveness of government policy response is measured by the answers by nascent entrepreneurs, early-stage entrepreneurs and owner-managers of business to the following question: 'Has government so far effectively responded to pandemics' (Likert scale, from strongly disagree = 1 to strongly agree = 5). However, given that our dependent variable relates to entrepreneurial activities, our concern with assessing the government assistance programmes as an individual variable relates to endogeneity (reverse causality). Therefore, we averaged these answers across regions of Chile and used the regional variable, to avoid reverse causality.

4.4. Other explanatory variables

A critical issue for our empirical design is that while we intend to evaluate the impact of ICT infrastructure on growth aspirations during the crisis, we do not know to what extent this impact is crisis-specific. To address this problem, we include in all our estimations a measure of lagged growth aspirations, which should absorb all factors operating already in the vicinity earlier on. We therefore use 2019 data to construct average levels of growth aspirations across municipalities and plug them into our models. These municipality-level means were calculated consistent with our construction of the dependent variable, for nascent entrepreneurs. One point worth noting is that averaging over municipality improved the distribution of the variable in the sense that the extreme individual outliers are no longer present as absorbed into averages (maximum value reported in Table 2 is 5.7; taking antilogarithm we get 299 employees, still a high value, but far lower compared to the underlying individual-level variable).

We also included a long list of standard GEM control variables at the individual level. We include respondent's age (categorized), an indicator variable for female respondents, the occupational status

Table 1. Description of variables.

Variable label		Description	Source
Growth expectations	Start-up: growth expectation	The expected employment in 5 yrs of the start-up activity – those with less than 3 months in the market, but not yet paid salaries – (categorized) Not involved in entrepreneurship 0 employees 1–5 employees 6–19 employees 20 or more employees	2020 APS GEM
Persistence: quality of ICT	Log of calls failure rate	The percentage of call failures from one cellular phone to another cellular phone that were not answered or were not finalized successfully (natural logarithm)	Chilean Ministerio de Comunicaciones
Other ICT variables	TV digital connect./Pop.	Total of Digital TV subscriptions divided by the total population in the city	
	Internet fixed lines/Pop.	Number of internet fixed lines over city population	
	Phone fixed lines/Pop.	Number of phone fixed lines over city population	
Adaptability during the COVID-19 pandemic	Effective government economic response	'Has government so far effectively responded to pandemics' (Likert scale from strongly disagree = 1 to strongly agree = 5) – average regional answer by nascent entrepreneurs	2020 APS GEM
Population Density		The number of people living in a territory divided by its surface area	2017 Chiles' Census
Share of indigenous population		The percentage of indigenous people who were residing in Chile at the time of the Census	2017 Chiles' Census
COVID-19		The accumulated number of COVID cases over population in a region at the day of the interview Lowest (up to 0.0075) Middle (0.0075–0.015) Highest (more than 0.015)	Chilean Ministerio de Ciencia, Tecnología, Conocimiento e Innovación
Ln of mean expected jobs, *t*-1		Natural logarithm of mean expected jobs in the municipality Nascent entrepreneurs	2020 APS GEM
Age		Age of respondent (categorized) 18–24 years old 25–34 years old 35–44 years old 45–54 years old 55–64 years old 65–99 years old	2020 APS GEM
Female		Female respondent	2020 APS GEM
No of members of household		The number of household members alongside the respondent	2020 APS GEM
Work Status		Work status (categorized) Full-time employee Part-time employee Retired, disabled Homemaker Student Not working Self-employed	2020 APS GEM

(*Continued*)

Table 1. (Continued).

Variable label	Description	Source
Head of household income	Head of household income (categorized) Lowest 33% percentile Middle 33% percentile Highest 33% percentile	2020 APS GEM
Education	Highest level of educational attainment (categorized) Primary education or first stage of basic education Lower secondary or second stage of basic (Upper) secondary education Post-secondary non-tertiary education Short-cycle tertiary education Bachelor or equivalent Master or equivalent	2020 APS GEM
Born abroad	Born abroad	2020 APS GEM
Born in Venezuela	Born in Venezuela	
Foreign parents	Foreign parents	
Discontinued business	Discontinued business in last 12 months	2020 APS GEM
Knows entrepreneurs	Knows somebody who started a business	2020 APS GEM
Opportunities	Sees opportunities for start-up next 6 months	2020 APS GEM
Start-up knowledge, skills	Respondent declares start-up knowledge, skills, experience	2020 APS GEM
Informal investor	Informal investor within last 3 years, categorized by the size of the investment Not an informal investor Invested less than $1k Invested more than $1k and less than $3k Invested $3k or more	2020 APS GEM
Fear of failure	Would not start a business for fear it might fail, agree = 1	2020 APS GEM
Easy to start a business	In your country, it is easy to start a business, agree = 1	2020 APS GEM
Registered business	Owner-manager of operational (young or established) registered business	2020 APS GEM
Unregistered business	Owner-manager of operational (young or established) unregistered business	2020 APS GEM

Table 2. Descriptive statistics.

Variable label	Mean	S.D.	Min.	Max
Start-up: growth expectation:				
Not involved in entrepreneurship	0.80	0.40	0	1
0 employees	0.01	0.10	0	1
1–5 employees	0.12	0.32	0	1
6–19 employees	0.05	0.23	0	1
20 or more employees	0.02	0.14	0	1
Internet/population	0.18	0.10	0.00	0.56
Phones/population	0.15	0.13	0.00	0.98
TV digital/population	0.17	0.12	0.00	1.13
Ln (calls failure)	−5.64	1.38	−8.93	−1.42
Effective government response	2.32	0.13	2.12	2.62
Population density	1148	3433	0.03	17,485
Indigenous population share	0.17	0.11	0.02	0.88
COVID-19 cases/population				
Lowest (up to 0.0075)	0.31	0.46	0	1
Middle (0.0075–0.015)	0.33	0.47	0	1
Highest (more than 0.015)	0.36	0.48	0	1
Ln of mean exp. jobs, *t*-1 (nascent)	2.09	0.75	0	5.70
Age				
18–24 years old	0.10	0.30	0	1
25–34 years old	0.23	0.42	0	1
35–44 years old	0.21	0.40	0	1
45–54 years old	0.20	0.40	0	1
55–64 years old	0.15	0.36	0	1
65–99 years old	0.10	0.30	0	1
Female	0.52	0.50	0	1
No. of members of household	3.49	1.60	1	16
Work status (categorized)				
Full-time employee	0.42	0.49	0	1
Part-time employee	0.06	0.23	0	1
Retired, disabled	0.07	0.25	0	1
Homemaker	0.05	0.23	0	1
Student	0.03	0.16	0	1
Not working	0.09	0.29	0	1
Self-employed	0.28	0.45	0	1
Head of household income				
Lowest 33% percentile	0.32	0.46	0	1
Middle 33% percentile	0.44	0.50	0	1
Highest 33% percentile	0.24	0.43	0	1
Education				
Primary education or first stage of basic	0.06	0.23	0	1
Lower secondary or second stage of basic	0.07	0.25	0	1
(Upper) secondary education	0.29	0.45	0	1
Post-secondary non-tertiary education	0.21	0.41	0	1
Short-cycle tertiary education	0.07	0.26	0	1
Bachelor or equivalent	0.24	0.42	0	1
Master or equivalent	0.07	0.25	0	1
Born abroad	0.05	0.22	0	1
Born in Venezuela	0.02	0.13	0	1
Foreign parents	0.07	0.26	0	1
Discontinued business	0.08	0.26	0	1
Knows entrepreneurs	0.68	0.47	0	1
Opportunities	0.40	0.49	0	1
Start-up knowledge, skills	0.67	0.47	0	1
Informal investor	0.79	0.41	0	1
Not an investor	0.07	0.25	0	1
Invested less than $1 k	0.06	0.24	0	1
Invested more than $1 k and less than $3 k	0.08	0.27	0	1
Invested $3 k or more	0.54	0.50	0	1
Easy to start a business	0.41	0.49	0	1
Registered business	0.12	0.33	0	1
Unregistered business	0.04	0.19	0	1

Table 3. Estimations of entrepreneurial growth aspirations. Ordered logit models.

Explanatory variables:	(1)	(2)	(3)	(4)	(5)
(A) Logarithm of calls failure rate		0.870+	0.028***	0.871*	0.024***
		(0.063)	(0.028)	(0.057)	(0.027)
(B) Effective gov. econ. response to pandemic		2.644+	2,159.2***	2.582+	2,755.6***
		(1.419)	(4,488.651)	(1.271)	(6,069.484)
(A) × (B)			4.410***		4.692**
			(1.930)		(2.247)
Internet fixed lines/Population		1.608	2.885	1.322	2.441
		(1.510)	(2.769)	(1.194)	(2.296)
Phone lines/Population		0.555	0.515	0.666	0.605
		(0.426)	(0.402)	(0.482)	(0.453)
TV digital connections/Population		2.195	1.853	2.096	1.755
		(1.864)	(1.480)	(1.563)	(1.208)
Population density		1.017	1.014	1.009	1.007
		(0.103)	(0.097)	(0.095)	(0.101)
Share of indigenous population		2.043	1.788	1.747	1.492
		(1.260)	(1.216)	(0.979)	(0.973)
Accum. Covid cases/Pop. by region (middle)		1.094	1.083	1.114	1.101
		(0.153)	(0.154)	(0.153)	(0.154)
Accum. Covid cases/Pop. by region (highest)		1.202	1.160	1.200	1.161
		(0.149)	(0.157)	(0.143)	(0.151)
Log of mean expected jobs, municipality (*t*-1)		0.970	0.976		
		(0.068)	(0.076)		
Respondent's age interval = 25–34	0.985	0.940	0.930	0.923	0.913
	(0.135)	(0.156)	(0.155)	(0.151)	(0.149)
Respondent's age interval = 35–44	0.893	0.879	0.872	0.890	0.884
	(0.118)	(0.185)	(0.186)	(0.188)	(0.189)
Respondent's age interval = 45–54	0.843	0.795	0.790	0.806	0.800
	(0.111)	(0.131)	(0.130)	(0.132)	(0.131)
Respondent's age interval = 55–64	0.630***	0.607*	0.590**	0.608*	0.592**
	(0.079)	(0.120)	(0.119)	(0.118)	(0.117)
Respondent's age interval = 65–99	0.391***	0.329***	0.312***	0.336***	0.320***
	(0.108)	(0.107)	(0.102)	(0.100)	(0.094)
Female	0.800***	0.794*	0.797*	0.790*	0.793*
	(0.046)	(0.073)	(0.074)	(0.073)	(0.074)
No. of members of household	1.025	1.033	1.031	1.028	1.027
	(0.023)	(0.032)	(0.032)	(0.030)	(0.030)
Work status = Part time only	1.117	1.153	1.165	1.199	1.211
	(0.157)	(0.160)	(0.162)	(0.166)	(0.168)
Work status = Retired & disabled	0.452*	0.515+	0.519+	0.491*	0.495*
	(0.143)	(0.179)	(0.181)	(0.170)	(0.173)
Work status = Homemaker	1.153	1.098	1.095	1.063	1.060
	(0.209)	(0.235)	(0.233)	(0.221)	(0.219)
Work status = Student	0.320***	0.381*	0.379*	0.380*	0.376*
	(0.101)	(0.168)	(0.166)	(0.168)	(0.165)
Work status = Not working	0.921	1.026	1.026	1.042	1.042
	(0.149)	(0.190)	(0.189)	(0.182)	(0.181)
Work status = Self-employed	5.836***	5.854***	5.828***	5.886***	5.843***
	(0.384)	(0.536)	(0.535)	(0.530)	(0.528)
Head of household income = middle 33%	1.119	1.194+	1.200+	1.188+	1.193+
	(0.090)	(0.121)	(0.121)	(0.118)	(0.118)
Head of household income = upper 33%	0.944	1.094	1.099	1.098	1.104
	(0.129)	(0.171)	(0.173)	(0.177)	(0.179)
Education = Lower 2nd or 2nd stage of basic	1.138	1.021	0.992	1.081	1.046
	(0.286)	(0.308)	(0.299)	(0.329)	(0.318)
Education = (Upper) secondary	1.704*	1.531	1.489	1.644+	1.595+
	(0.390)	(0.417)	(0.411)	(0.448)	(0.441)
Education = Post-secondary non-tertiary	2.161***	1.908*	1.862*	2.026**	1.969*
	(0.493)	(0.517)	(0.507)	(0.531)	(0.522)
Education = Short-cycle tertiary	2.267***	1.979*	1.936*	2.152**	2.101**
	(0.536)	(0.563)	(0.552)	(0.595)	(0.581)
Education = Bachelor or equivalent	2.097**	1.700+	1.655+	1.833*	1.779+
	(0.530)	(0.505)	(0.498)	(0.536)	(0.526)
Education = Master or equivalent	1.970*	1.572	1.536	1.738+	1.692

(*Continued*)

Table 3. (Continued).

Explanatory variables:	(1)	(2)	(3)	(4)	(5)
	(0.535)	(0.536)	(0.529)	(0.566)	(0.559)
Born abroad	0.816	0.815	0.830	0.804	0.817
	(0.181)	(0.204)	(0.210)	(0.207)	(0.214)
Born in Venezuela	1.482	1.425	1.414	1.446	1.432
	(0.391)	(0.552)	(0.543)	(0.549)	(0.537)
Foreign parents	1.535*	1.543*	1.522*	1.563*	1.547*
	(0.262)	(0.303)	(0.300)	(0.307)	(0.306)
Discontinued business in last 12 months	1.733***	1.618***	1.613***	1.671***	1.664***
	(0.189)	(0.189)	(0.189)	(0.185)	(0.185)
Knows somebody who started a business	2.106***	2.115***	2.103***	2.090***	2.080***
	(0.205)	(0.258)	(0.253)	(0.246)	(0.243)
Opportunities for startup next 6 months	1.282***	1.225***	1.228***	1.263***	1.266***
	(0.067)	(0.064)	(0.064)	(0.060)	(0.060)
Startup knowledge skills experience	4.526***	4.541***	4.534***	4.557***	4.549***
	(0.483)	(0.494)	(0.493)	(0.502)	(0.501)
Informal investo in last 3 yrs: <$1k	0.809+	0.777*	0.769*	0.811+	0.805*
	(0.088)	(0.090)	(0.089)	(0.091)	(0.089)
Informal investor in last 3 yrs: $1k-3k	0.840	0.844	0.849	0.817	0.822
	(0.108)	(0.151)	(0.151)	(0.142)	(0.143)
Informal investor in last 3 yrs: >$3k	1.400**	1.438*	1.446*	1.425*	1.432*
	(0.168)	(0.219)	(0.216)	(0.224)	(0.221)
Wouldn't start a business for fear it might fail	0.639***	0.632***	0.632***	0.621***	0.621***
	(0.038)	(0.033)	(0.033)	(0.038)	(0.038)
It is easy to start a business, agree	1.029	1.028	1.029	1.026	1.025
	(0.050)	(0.043)	(0.044)	(0.044)	(0.044)
Owner-manager of registered bus.	0.128***	0.112***	0.113***	0.107***	0.108***
	(0.024)	(0.023)	(0.023)	(0.022)	(0.022)
Owner-manager of unregistered bus.	0.117***	0.127***	0.124***	0.127***	0.123***
	(0.043)	(0.063)	(0.061)	(0.062)	(0.061)
Observations	7,098	5,761	5,761	5,951	5,951
Log pseudolikelihood	−3891	−3162	−3159	−3252	−3249
χ2 (joint test of interaction terms)			22.24***		23.79***
McFadden's Pseudo R2	0.169	0.170	0.171	0.172	0.173
Akaike's information criterion	7859.6	6422.5	6418.6	6600.1	6595.2
Bayesian information criterion	8127.4	6748.8	6751.4	6921.3	6923.1

Odd ratios reported instead of coefficients (higher than 1 implies positive effect).
Standard errors in parentheses.
All model estimates are based on bootstrapping with 100 repetitions.
*** significant below 0.001; ** significant below 0.01; * significant below 0.05; + significant below 0.1.

(categorical variable), head of household income split into three categories (with lowest as the benchmark), education (categorized), three indicator variables related to immigration status (born abroad; born in Venezuela – representing a country of origin that generated a humanitarian crisis leading to a large inflow of refugees to Chile; and having parents born abroad). We also include experience in informal finance categorized by the amount invested within the last three years, and two indicator variables, one representing ownership of another business that is formal, and a second one representing ownership of another business that is informal. We also include an indicator variable for closing a business in the last 12 months, and for knowing others who were engaged in starting a business. The list of individual-level objective variables is supplemented with those representing subjective indicators. Here we included indicator variables for perceived opportunities for start-up, for perceived easiness of starting a business, for self-evaluated entrepreneurial skills and for the fear of failure perceived as a factor that could stop the respondent from starting a business.

Above, we have already discussed the set of ICT variables measured at the municipality level alongside the government effectiveness variable. We also include population density evaluated at the municipality level, using data from Chile's 2017 Census.[8] Next, we include the share of the indigenous population (measured as the percentage of people who were residing in Chile, also at the

time of the Census). Last but not least, we merged in regional data accumulated number of COVID-19 cases in Chilean regions, retrieved from *Base de Datos COVID-19* and available from the Chilean *Ministerio de Ciencia, Tecnología, Conocimiento e Innovación*.[9] The data are available based on daily figures, and therefore we were able to match them with our sample using exact interview dates. This is important since the dynamics of the COVID-19 pandemic differed between regions of Chile over the span of 4 months during which the interviews were conducted in 2020. The accumulated daily regional figures are scaled by regional population. To allow for nonlinearity, we categorize the figures based on their distribution into low, medium and high incidence of COVID-19 cases. For robustness, we also run models where the variable was used in its original form with a square term added and where it was transformed into a natural logarithm. None of these alternatives made any difference for coefficients on other variables in the models, and especially for coefficients of the policy variable, and the results are available on request. All variable definitions are presented in Table 1, and descriptive statistics in Table 2. In the Appendix, we present a comprehensive set of association measures for the variables we use. These include (1) correlation table for continuous–continuous pairs of variables (Table A1), (2) Person's biserial correlations for pairs of continuous and categorical (dummy) variables (Table A2), (3) Person's $\chi 2$ for pairs of dummies based on categorical variables (Tables A3).

To further visualize the distribution of the values of our key explanatory variables, we map out the regional disparity in policy effectiveness (ecosystem adaptability), technology infrastructure quality

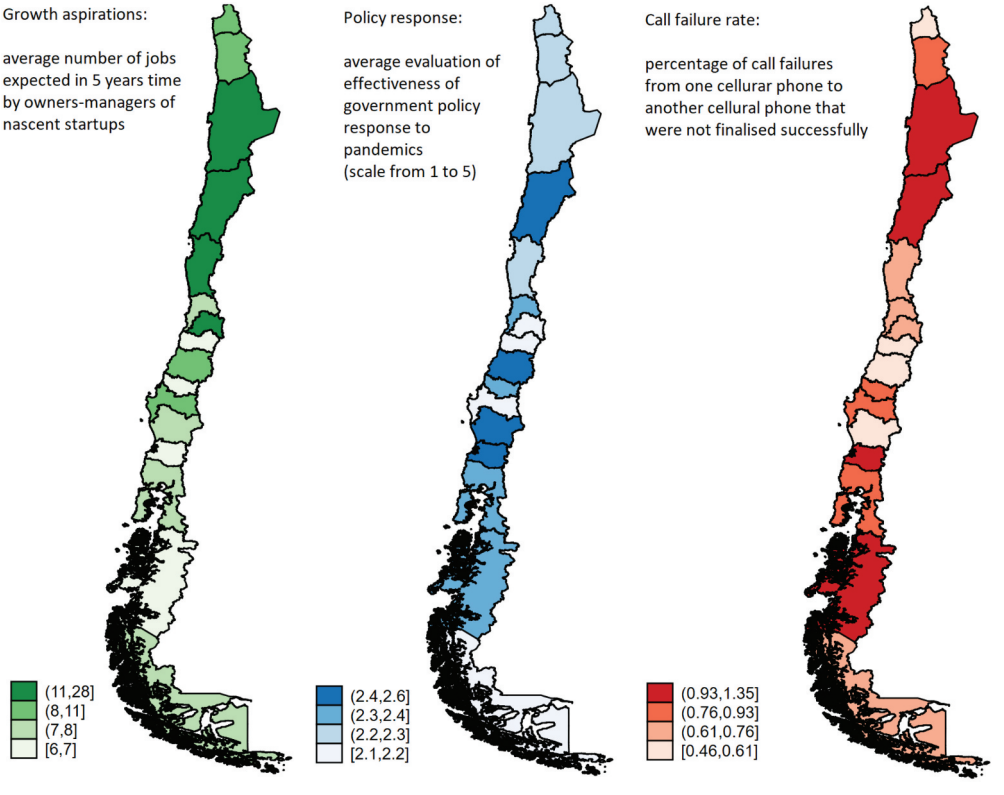

Figure 2. Mean values of key variables per region of Chile.

(ecosystem resilience), and entrepreneurship growth aspirations in Figure 2. It shows clear regional variations in these three key aspects.

Concerning the analysis, as appropriate for the categorical dependent variable, we use ordered logit estimators. We also considered a multilevel design. It turned out, however, that our explanatory variables leave little cross-regional variation to explain, even for the basic model (Equation 1 in Table 3). Applying the likelihood ratio test produces $\chi^2 = 1.36$, which is insignificant. We also run the corresponding multilevel models, and the coefficients and significance levels are virtually the same (available on request).

We first run ordered logit regressions, to evaluate the association of the quality of technological infrastructure, perceived effectiveness of public policy, and their interaction with the growth aspirations during the first 8 months of the pandemic. To account for any residual regional-level effects, we cluster standard errors on regions, as recommended by Cameron, and Miller (2015), applying bootstrapping with 100 repetitions.

5. Results

Models 1–3 in Table 3 present the core results in the form of odds ratios, to facilitate interpretation of the size of effects. Our analysis reveals that entrepreneurial growth aspirations are positively associated (odds ratios >1) with the effectiveness of government economic response during the pandemic (short-term ecosystem adaptability condition): entrepreneurs in a municipality where the government response to the pandemic is seen as more effective demonstrate higher growth aspiration than those in a municipality with perceived less effective government responses. The effect is positive and highly significant at 0.001 level in Model 3 and marginally significant at 0.1 in Model 2 of Table 3, consistent with Hypothesis 1. The results suggest that the ecosystem adaptability to the pandemic via policies has a significant impact on entrepreneurial growth aspirations.

Next, for calls' failure rate (representing long-term quality of ICT infrastructure), the coefficient is similarly highly significant at 0.001 level in Model 3 and marginally significant at 0.1 in Model 2 in Table 3. Overall, the pattern of results is clear: there is no support for quantity measures of ICT infrastructure, yet there is support for the role of its quality as represented by calls' failure rate. The results suggest that this long-term ecosystem characteristic represents resilience and has a significant impact on entrepreneurial growth aspirations during the crisis.

Regarding the interaction effect of policy with the ICT quality infrastructure, we present the results in Model 3 in Table 3. They show that the perception of the effectiveness of government response to the pandemic (short-term ecosystem adaptability) matters more where the quality of technological infrastructure (long-term ecosystem resilience) is lower. Thus, in a crisis environment, a more effective government policy response to the pandemic can compensate for the lower quality of infrastructure in the short term. The interaction term is highly significant with a probability level below 0.001. The post-estimation joint test of interactions and the corresponding two individual terms shows equally strong result, with the corresponding $\chi^2 = 22.24$, again below 0.001 probability threshold. This indicates strong support for Hypothesis 3.

Ai, and Norton (2003) recommend to always inspect the marginal effects for interactions in logit models, alongside odds ratio. We evaluated these and present the results in Figure 3; these were obtained using *margins* command in Stata. Figure 3 presents change in probability of the respondent to be located in each of the ordered logit categories 1–5, resulting from change in failure rate and in government policy correspondingly, where both changes are evaluated in the range of approximately one standard deviation up and down from their respective means. The results reveal some interesting patterns. The marginal effects are strongest for entrepreneurial entry with 1–5 jobs expected. Here, when perceived effectiveness of government policy response is low, the entry rate clearly decreases with higher failure rate. However, this regularity (negative slope) disappears when the perceived effectiveness of government policy is high. The pattern is similar for higher growth

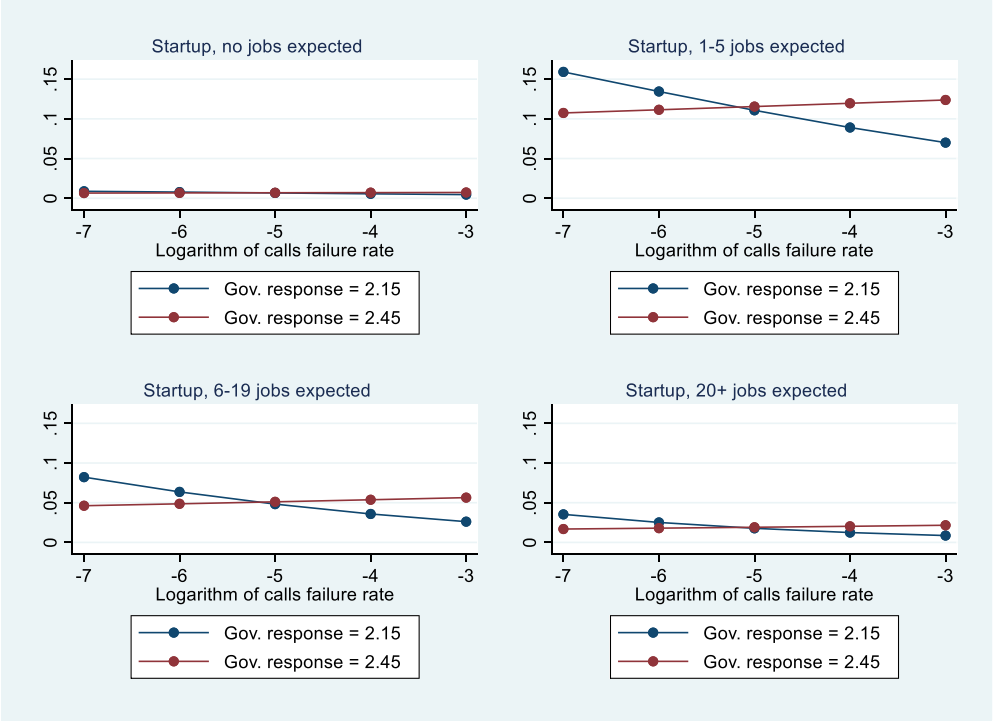

Figure 3. Marginal effects of the interaction between policy and ICT infrastructure quality, for categories 1–4 of the dependent variable.

aspirations categories, yet the overall marginal effects get weaker. In turn, for entry with no declared job creation (entrepreneurs expect to remain solo self-employed), there are no effects.

With respect to control variables, a couple of significant associations are fairly standard (e.g. Estrin, Korosteleva, and Mickiewicz 2013): old age is negatively correlated with entrepreneurial growth aspirations, likewise being female and lower level of education. In addition, retired and students have lower growth aspirations. Those nascent entrepreneurs who are already self-employed (representing serial entrepreneurship) have higher growth aspirations, but, on the other hand, having another company is associated with a negative effect (odds ratio <1). In the latter case, while serial entrepreneurship could imply more ambitious projects, there is also an opportunity cost that has the opposite effect. Even more striking is that those who discontinued a business have higher ambitions, indicating learning from past projects (combined with lower opportunity cost compared with those who continue to own-manage other businesses), consistent with Fuentelsaz, González, and Mickiewicz (2023). Likewise, those who know other entrepreneurs, and those who invested substantial sums of money as informal investors within the last three years have higher ambitions. Being an immigrant has no impact, but interestingly it is the second generation of immigrants who are characterized by high ambitions. Fear of failure results in lower growth ambition, as expected.

Adding control for past growth aspirations could distort the results; therefore, as robustness checks, we also explore whether omitting it from the models affects the key results. The corresponding estimations are presented in columns 4 and 5 of Table 3. The results are reassuring, as the hypotheses-related results are very similar.

As another set of robustness checks, we run a series of models where we omitted the internet density and phone density measures in turn. This was motivated by what we observed in our set of association measures presented in the Appendix (Tables A1–A3). Namely, there is a high correlation between phone density and internet density, and between phone density and population density.

These experiments with altering model specifications did not weaken the significance of the coefficients on the ICT infrastructure measures; on the contrary, some of the coefficients of the rate of failure, our key variable of interest, became more significant. Despite that, we follow the recent literature and prioritize minimizing omitted variable bias over reducing multicollinearity (Lindner, Puck, and Verbeke 2020) and retain the longer specifications as our core models in Table 3.

Last but not least, we may inspect goodness-of-fit measures. These are reported in the final three rows of Table 3. Following recommendation by Greene, and Hensher (2010), who specifically discuss ordinal choice models, we pay particular attention to Akaike's Information Criterion. We see that its value diminishes as we move from Model 1, to 2, and 3. This suggests that the model with interaction of calls failure rate and effective government response represents the best fit with data. It is also better than the alternative models 4 and 5 that omit past municipal average rates of growth aspirations, based on the same criterion.

6. Discussions and conclusions

Our insights contribute to the entrepreneurship literature on the role of the contextual factors in entrepreneurship (Colombo et al. 2016; Davidsson, and Gordon 2016), especially in nascent start-ups, which have not yet built their 'war chest' of proprietary resources that can make them more immune to the unexpected environmental influences (Mickiewicz et al. 2017). Drawing upon data with fine-grained measures of quantity and quality of IT infrastructure (long-term ecosystem resilience traits) and of local perceived effectiveness of economic and social support during the pandemic (short-term ecosystem adaptability traits), our results suggest the positive relationship between the effectiveness of government economic response to the pandemic (adaptability) and entrepreneurial growth aspiration. It also reveals that the perceived effectiveness of government policy at the time of pandemic (adaptability) makes the quality of the technology infrastructure (resilience) – related to mobile communications in the locality of the business – less critical. Indeed, a few editorials and academic debates about the pandemic have intuitively suggested quite similar patterns (Belitski et al. 2022; Braunerhjelm 2022; Kuratko, and Audretsch 2021).

We also contribute to the growing literature on entrepreneurship in the face of crises (Kuratko and Audretsch, 2021; Batjargal et al. 2023; Belghitar, Moro, and Radić 2022; Doern, Williams, and Vorley 2019; Wenzel, Stanske, and Lieberman 2020). We conceptually differentiate the impacts of two important aspects of the entrepreneurship ecosystem conditions: short-term adaptability of the ecosystem that is related to policy responses to disruptions versus long-term resilience of the ecosystem that is tied to the quality of infrastructure, particularly the quality of ICT infrastructure. The latter turned out to be critical, given the specific nature of the COVID-19 pandemic leading to surged demand on remote communications for business transactions. We examine the impact of these two aspects on the under-studied outcome variable of entrepreneurial growth aspiration, an important indicator of entrepreneurial ambition in the face of crises, which we interpret as an indicator of creative destruction (Schumpeter, 2008[1934]), where ambitious new projects emerge amid the economic difficulty.

To better understand our results, we searched for additional qualitative and anecdotal evidence. In interviews conducted by the GEM Chilean team with Chilean entrepreneurs, implemented during the pandemic, respondents recognized that they relied on smartphone apps or digital platforms to commercialize their products during the pandemic, given the social-distance restrictions (Guerrero, and Serey 2021b). Clearly, where the ICT quality was low (e.g. calls' failure rate was one-quarter in a given municipality – maximum for our sample) that proved difficult, hence the association we identified in logit models. Also, on the demand side, as smartphones were very useful for COVID-19 controls, diagnosis, and follow-ups; as a side effect of the pandemic, the related process of learning also likely led to the increased competence and importance of mobile communication in everyday life of customers, further enabling businesses to rely more on mobile phones in their contacts with clients and on wider use of applications

(Ibáñez et al. 2022). We also learned from the Chilean GEM team who have contacts with entrepreneurs that many informal Chilean entrepreneurs used their phones (personal WhatsApp applications, or messages) to sell services/products within both policy-prioritized and non-prioritized sectors during the initial government restrictions.

Despite the contribution as defined above, this study has a number of limitations that also open up avenues for future research. First, as a single-country study, it is hard to infer to what extent the findings are specific to the country context. Chile is already a high-income economy yet with a relatively high level of entrepreneurship, and still with a strong growth trajectory. The combination of these characteristics makes the Chilean context unique. We cannot conclude whether what we find in Chile can be generalized to other economies. Future research can validate the generalizability of our findings in different country contexts or through a cross-country study. Second, although we have controlled for a long list of factors at the regional level, other factors in the regional ecosystems (Julien 2019) may also impact entrepreneurial growth aspirations, such as the regional variation in formal institutions quality and in culture. Furthermore, at the individual level, although we control for the level of education and entrepreneurship experience, we do not have more refined measures of human capital or social network measures. This is mainly due to the constraints of GEM data. It would be interesting to explore the role of entrepreneurial agency in leveraging the infrastructures and resources in the ecosystems (Qin, Wright, and Gao, 2019) and the variation across individual entrepreneurs (Parker 2018[2009]). These aspects remain to be further examined in future studies should data be available, because they may also condition the effectiveness of policies and of the quality of ICT infrastructure. Likewise, from the discussion above, we may also imply that, for female and male entrepreneurs, the significance of ICT quality infrastructure may differ, as a different pattern of family obligations implies different needs. This may be worth exploring further.

In short, future research can build on our conceptual framework – adaptability and resilience at the ecosystem level, affecting entrepreneurial ambition during crises – and explore a wider variety of factors at the regional and individual level in conditioning the significance of the effects we identify here. Studies in different countries or cross-country studies would also be useful to test the generalizability of our findings in a wider international context, should data be available.

There are also some wider implications of our work, particularly for policymakers. Technology infrastructure needs a longer timeframe to be developed. In places where quality technology infrastructure is underdeveloped, the government can still mitigate the negative impact of the pandemic or other crises on high-ambition entrepreneurship by short-term stimulus packages that, when effectively delivered, can compensate for the lack of quality technology infrastructure. Yet, where the latter is in place, the government's crisis-response policy, which is difficult to calibrate, becomes a less critical factor. That is, to utilize the terminology we introduced, the higher resilience of the ecosystem alleviates the urgency of its adaptability.

Also, more specifically, we argue that the quality of technological infrastructure is a different policy objective than quantity. It is the former, not the latter, that matters most for ambitious and high-growth aspiration entrepreneurship.

The COVID-19 pandemic was a new type of crisis, unprecedented in recent history. Yet in the recent past, the world went through different global crises. One was the 2009 global financial crisis and its repercussion. The future climate change is looming heavily, as an unravelling global crisis. Each of the crises is of a different nature and calls for a different government response. Yet part of this response is economic policy, and at least for the pandemic crisis, our results suggest that the policy can be effective in enhancing the ambitious, dynamic component of entrepreneurship, delivering the 'creative destruction' aspect amid the crises. Moreover, our empirical tests suggest that the task facing the government is very complex, because there is substantial regional heterogeneity in the perceived impact of the nationwide measures. Calibrating the response to optimize the regional results is not an easy task, but regional decentralization in policy decision-making may help.

Our results suggest that the quality of the ICT infrastructure may be a critical factor during the COVID-19 crisis, similar to Das, and Zhang (2021). Lockdowns during the pandemic accelerated digital transformation, which in turn made the relevant infrastructure even more important than before. Given the obvious difficulties in calibrating economic policy response to local conditions, as just discussed, investing in quality ICT infrastructure is probably a superior option in increasing resilience of the entrepreneurial ecosystems, as tested during the crises.

Notes

1. We will not provide a review of the resilience and entrepreneurship literature; a comprehensive discussion is offered by Stefan, and McNaughton (2017).
2. Please see details of variable definition in the method and data section.
3. Further information is available at https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups
4. We also used 2019 APS survey to construct lagged measures of high-growth aspirations; we will discuss the motivation for that and the details below.
5. Further information is available at https://gfluence.com/countries-smartphones-penetrating/
6. These two numbers can be calculated from Table 2 by reversing the corresponding logarithms representing minimum and maximum of failure rate.
7. Further information is available at https://www.gob.cl/coronavirus/gestionpandemia/.
8. Further information is available at http://resultados.censo2017.cl/.
9. Further information is available at https://www.minciencia.gob.cl/covid19/.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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