



Can Fast Growing Unicorns Revive Productivity and Economic Performance?

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Summary

The productivity drought and the unending search for GDP growth by high- and middle-income countries has drawn attention to the flagging vigor of large incumbent corporations and the need to groom a crop of unicorns. Highly valued, entrepreneurial, superstar firms can potentially dial up competition, innovation, and productivity. For a country like Korea that has folded the 'breeding' of unicorns into its growth strategy, success would restore economic momentum, diversify exports, strengthen the services sector, and challenge the dominance of conglomerates. The paper explains why unicorns deserve the attention of policymakers, how Korea—one of the OECD's most dynamic economies—is pursuing its firm level objective, and the takeaways for other economies. Thus far the outcomes are mixed. Achieving the desired goal may require an elaboration of existing efforts, enlarging the stock of unicorns, and more time.

1. The growth context for middle- and high-income countries

Every country irrespective of its position on the income ladder remains committed to growing its economy—occasional talk of 'degrowth' notwithstanding.¹ Countries expressing greater awareness of risks associated with climate change, environmental degradation and biodiversity losses want growth to be green and sustainable. Those that perceive the political and social costs of inequality add inclusiveness to the growth agenda. Middle- and high-income countries are also discovering that from near the turn of the century and more decisively since the Financial Crisis of 2009, an

1 Hickel et al. (2022); <https://www.nytimes.com/2021/09/16/opinion/degrowth-climate-change.html>

increasing share of their growth must be sourced from improvements in total factor productivity derived from innovation, greater allocative efficiency, and the effective harnessing of intangibles. Physical capital will continue to play a role, albeit a diminishing one, and increments in the quality of human capital and in the labor force² can also contribute some tens of basis points; however, many countries are coming to terms with a shrinking workforce, if not immediately then within a decade or two.³

The importance assigned to factor productivity has sharpened the focus on firms that generate the lion's share of productivity gains.⁴ By identifying the class (or classes) of firms that are the principal drivers of growth, the attributes responsible for their superior performance, and factors conducive to their emergence and proliferation, countries could in principle, design policies and institutions that promote potentially higher sustainable growth. This leads us to consider the role of unicorns, defined as new firms (start-ups) that have managed to achieve or exceed valuations of \$1 billion.⁵ Quite frequently, these high-growth firms take the form of gazelles or start-ups that have seen their revenues increase by 20 percent or more in their first four years of existence.

Adding to the numbers of gazelles and unicorns can be a means for OECD and middle-income countries to reinforce the growth impetus derived from other sources.⁶ But as pointed out by a World Bank report (Goswami et al. 2019), “the fragile and elusive nature of the high-growth firms means that targeting them may be neither feasible nor advisable.” For this reason, examining the underlying factors that can promote unicorns is a policy priority for many governments seeking new sources of growth.

The rest of this paper is divided into five parts. Part 2 examines the role of the technology frontier hugging high growth unicorns that challenge the dominance of large incumbent firms and impart new sizzle to the growth process, a sizzle that is being lost as the productivity of large incumbents wanes. Part 3 turns the spotlight on unicorns, their rise and potential. Section 4 discusses why and how Korea is targeting unicorns as part of its growth strategy. Ways of strengthening the strategies adopted by Korea and other countries with an eye on high growth firms, is the topic of section 5.

2 See Baily, Bosworth and Kennedy (2021) on issues with education, training, absorption of foreign workers and international collaboration that affect labor productivity in the US, Germany and Japan.

3 The threat from a decline in the workforce is especially acute for Korea because its total fertility rate had fallen to 0.78 in 2022, the world's lowest, with the number of deaths exceeding births. Several East European countries are in a comparable predicament, with emigration accelerating the reduction in workforce numbers. China's population fell by 850,000 in 2022. <https://www.imf.org/en/Publications/fandd/issues/2020/03/future-of-aging-populations-and-economic-growth-in-eastern-europe-petrakis>; <https://www.cgdev.org/blog/worker-crisis-southern-and-eastern-europe-too-many-leaving-not-enough-coming>; <https://worldpopulationreview.com/country-rankings/countries-with-declining-population>

4 Du and Temouri (2015) find that factor productivity contributes to the emergence of high growth firms, and it is these often young firms that continue to push the productivity needle. Such performance outcomes are strongest during the stage of rapid growth. Bisztray, de Nicola and Murakozy (2022).

5 This was a term coined in 2013 by Aileen Lee. <https://techcrunch.com/2013/11/02/welcome-to-the-unicorn-club/>

6 This is the objective of the European Tech Champions Initiative launched in February 2023 by the European Investment Bank Group and five EU member states. The Fund of Funds supports the maturing of innovative companies by providing late-stage financing. <https://www.eib.org/en/events/european-tech-champions-initiative>; https://www.eif.org/what_we_do/news/2023/launch-of-new-fund-of-funds-to-support-european-tech-champions.htm

Part 6 offers concluding observations on what both Korea and other countries could do to facilitate the entry of firms to the unicorn club and whether this would suffice to durably accelerate growth.

2. The importance of the sprinters

Research on firms in mature economies has pointed consistently to the outsized contribution of firms at the global productivity frontier. This relatively small subset of firms are the “movers and shakers” in an economy. On average, they can be 4 to 5 times more productive than firms in the interior of the production space and their lead over the average firms is increasing (Decker et al. 2018; McKinsey 2023; Ciani et al. 2020). They account for the much of the investment in intangibles including R&D and training, lead the field in commercializing and scaling up new technology and they drive incremental innovation. New entrants among them can introduce disruptive innovations that result in desirable churning of an industry. Firms operating at or near the frontier also lead the rest in the net creation of jobs (Andrews et al. 2015, 2016; Pugsley et al. 2018; Criscuolo, Gal and Menon 2014).

On closer examination, the frontier hugging (and superstar) firms are on balance larger than the average, more profitable, are more likely to be engaged in international trade, and some tend to be affiliated with a multinational conglomerate (Freund and Pierola 2020).⁷ A striking feature of some of the fastest growing and most dynamic firms—the ones that can morph into unicorns—is that they tend to be relatively young firms. These so-called gazelles frequently owe their growth impetus to their innovativeness, and it is by capitalizing on this capability that they can remain at the forefront of their industry. The winner-take-all dynamics of some industries benefitting from digitalization and network externalities, is also responsible for the emergence of several ‘superstar firms’⁸ (Tambe et al. 2021; McKinsey Global Institute 2018; Manyika et al. 2021).⁹

Rising to the top of the heap can be a brutal selection process. Many promising start-ups fail to realize their potential—are squeezed out or taken over by incumbent companies—their growth falters and over a period of five years, four fifth have either exited the industry or are no longer at the cutting edge (Haltiwanger 2022; Calvino et al. 2016). Among the survivors, firms that are in the manufacturing business show greater persistence than firms that are providers of services. It is because young fast-growing firms are a conduit for innovation of all sorts despite their small numbers (as few as 5 percent of the start-up population), they determine the dynamism of their

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- 7 It has been frequently noted that there are too few large firms in developing countries with an international reach and this could be one reason why productivity, exports and growth perform below expectations. The IGC sponsored Enterprise Map Project managed by John Sutton found that the fewness of large firms—especially in the manufacturing sector—was one important hurdle for African economies. <https://www.lse.ac.uk/Research/research-impact-case-studies/managing-sustaining-growth-african-economies>; <https://www.theigc.org/project/the-enterprise-map-series/>; Ciani et al. 2020.
 - 8 The term was coined by Sherwin Rosen (1981) and applies to firms and individuals earning vast amounts and dominating activities and industries. The IT revolution contributed to the emergence and growth of superstars from the 1990s. Aghion, Antonin and Bunel (2021).
 - 9 Almost three fourths of the GDP of OECD countries is contributed by corporations and while this has remained constant for decades, the share of corporations with annual revenues of over \$1 billion has climbed steadily—by 60 percent relative to their country’s GDP between 1995 and 2018. (Manyika et al. 2021).

respective industries. These firms give rise to vertical spillovers aiding suppliers lower down the production chain and to horizontal spillovers that transfer knowledge, create networks, and stimulate competition. When an economy is nurturing significant numbers of high growth firms, it can move into the growth sweet spot with economic momentum largely derived from technological innovation and gains in productivity within a competitive milieu.

Young, high growth firms are in the limelight for two additional reasons. Research on OECD countries finds that large mature firms—long seen as the principal drivers of innovation, productivity, exports, and growth—are now punching below their weight (OECD 2021; Ciani et al. 2019). In fact, studies of apex firms in the United States conclude that the firms dominating industries are contributing less to productivity and to innovation than their counterparts did a few decades back (Gutierrez and Philippon 2020; Manera 2022; Akcigit and Ates 2019).¹⁰ This is reinforced by the findings of a Brookings study of manufacturing industries in the US, Germany, and Japan, and by evidence of declining productivity growth in Korea’s export-oriented flagship industries in the last decade (Baily, Bosworth and Doshi 2020; Lee 2013; Jones 2022; St Louis FRED 2022;¹¹ Conference Board 2022; KERI 2021¹²). The IT based superstars, which contributed to the surge in productivity between 1995 and 2005, may now be exerting a drag on productivity “because they have a discouraging effect on other firms.” Superstar firm dominance over product lines means that new entrants may need to drastically trim their prices and suffer an erosion of innovation rents. Therefore, non-superstars are discouraged from innovating and growth can suffer (Aghion, Antonin and Bunel 2021, p.122).

In China’s case the problem is being exacerbated by the increasing prominence of state-owned enterprises (SOEs) and the protection afforded to the strategic industries (Wu 2020). This is reflected in the private share of the top 100 listed companies. In mid 2021 it was 55.4 percent. By mid 2022, it had slipped to 42.8 percent (Huang and Veron (2023). Furthermore, the acquisition of “golden shares” by the state in private firms is extending the “twin governance structure” from SOEs to the non-state sector,¹³ giving the Communist Party representation,¹³ on their boards and greater leverage over decision-making.¹⁴

10 From an analysis of US data, A. Manera (2021) shows that “high-concentration sectors are absorbing excessive R&D resources, depressing aggregate research productivity. First, researchers accrued mostly to incumbent firms in concentrated sectors. Second, the quality of patents in sectors with increased concentration has fallen, as measured by patent forward citations. Third, inventors’ productivity, [measured as growth in output per worker per inventor] has decreased in these sectors. These findings suggest that additional inventors have accrued to incumbents who employed them on “defensive innovation”, that is, projects with a low growth footprint conducted with the primary aim of preventing further entry and sheltering existing dominant positions.”

11 TFP at constant national prices for ROK. <https://fred.stlouisfed.org/series/RTFPNAKRA632NRUG>

12 <http://www.koreaherald.com/view.php?ud=20210818000727>

13 This captures the coexistence of corporate and political governance enabling the CCP to exercise control over decision making and operations. Political governance of SOEs is exercised via state ownership; cadre selection and training; active participation in decision-making through representation on the company board; and intra-party supervision by Discipline Inspection Committees. Jin et al. (2022).

14 Wall Street Journal (2023, March 9th). <https://www.wsj.com/articles/xi-jinpings-subtle-strategy-to-control-chinas-big-gest-companies-ad001a63>; <https://www.wsj.com/articles/china-buys-stake-in-alibaba-unit-signaling-new-normal-of-state-oversight-11673620030>

The increasing concentration in most industries is a second reason why high growth firms and more churning at the top is becoming a priority (Grullon, Larkin, and Michaely 2019; OECD 2018).¹⁵ Concentration in the OECD countries is blamed for the slackening of competition, weakening allocative efficiency,¹⁶ a decline in industrial investment, rising market power, mark-ups and corporate profits,¹⁷ slackening antitrust enforcement (because regulators—who may already have a pro-business bias—are susceptible to political pressure exerted by powerful corporate interests and subject to capture by their industrial charges¹⁸), widening income disparities in several advanced economies, and the increased risk from macroeconomic turbulence when one or several of the leading firms is subject to an idiosyncratic shock as experienced by a Nokia or a Boeing (Philippon 2019; Philippon 2021; Gutierrez and Philippon 2017; Syverson 2019; Cortes and Tschoop 2020; Zingales and Rolnik eds. 2017; Decker et al. 2018; De Loecker and Eeckhout 2018; Grullon et al. 2017; OECD 2020; Gabaix 2011; Lee 2021a; Lee 2021b).¹⁹ Brandt et al. (2022) find that “limited market entry and exit, and a lack of resource allocation to more productive firms [is one reason why China’s TFP growth has headed south. Moreover], the relative performance of manufacturing SOEs deteriorated as leverage rose after the global financial crisis. Overall, the process of SOEs catching up to private sector levels of efficiency stalled after 2007.”²⁰

While bigger can be better because it facilitates economies of scale and scope, long term growth pegged to innovation and productivity calls for a mix of firms at the technological frontier—both giant MNCs and younger, nimbler, innovative, firms that can compete with the incumbents and displace the ones that are losing their edge. For example, Korea’s experience in the immediate aftermath of the 1997 economic crisis points to the gains from entry of new firms that challenged the dominance of the entrenched conglomerates (chaebol). Aghion et al. (2021) found that post crisis reforms that facilitated entry by non-chaebol firms and reduced the salience of conglomerates, led

15 For example, in Korea, Celltrion, Naver, NCSOFT, Coupang, and Kakao are some of the large, listed companies that have emerged in the past 20 years and taken their place alongside companies belonging to the Hyundai, Samsung and LG chaebols.

16 That concentration inevitably leads to allocative inefficiency and declining productivity is challenged by Bighelli et al’s (2022) study using European data. They find that greater concentration improves productivity.

17 De Loecker, Eeckhout and Unger (2020) observe an increase in the profit rate of US firms from 1 percent to 8 percent in parallel with higher concentration, greater market power and rising markups.

18 This much debated topic is examined in a review by Wallich (2015); more evidence via the issuance of patents comes from Tabakovic and Wollmann (2018).

19 From his review of the market power literature and analysis, Syverson (2019) identifies several trends including, “labor’s declining share of income, increasing corporate profits, increasing margins, increasing concentration, slower productivity growth, decreasing firm entry and dynamism, and reduced investment rates. While none of these metrics are perfect, many (but not all) have been replicated in multiple venues with multiple techniques, and as such can be considered quite robust....Where the literature, at this point at least, has not yet reached a conclusion is whether and to what extent increases in the average level of market power in the industry is responsible for each or all of these trends....more needs to happen before we can attribute these changes to greater market power.” Gabaix (2011) notes that shocks impinging upon giant firms that account for a non-trivial share of GDP such as Nokia in Finland or Samsung and Hyundai in Korea and others in Japan and Sweden, can trigger unsettling macroeconomic reverberations.

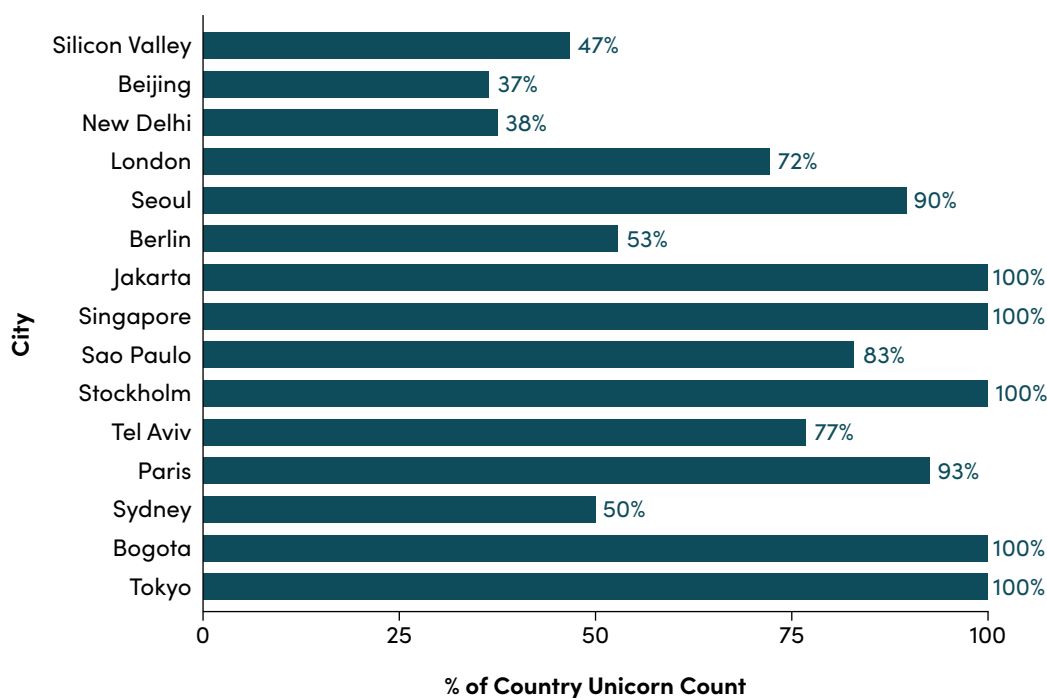
20 The productivity (and profitability) shortfall that besets China’s SOEs has been repeatedly documented—e.g., by Jurzyk and Ruane (2021). It could weigh even more on aggregate productivity as the “State Strikes Back” (Lardy 2014). And the policy of picking winners “Made in China” has not averted the decline in productivity and arguably may have made it worse. (Branstetter, Li and Ren 2023)

to increased productivity in the affected industries.²¹ Moreover, patenting by non-chaebol firms rose while that by the chaebol declined and competitive pressures compelled the chaebol to shave price mark-ups.

3. The unicorn herd

As noted earlier, the unicorn is a rare creature. Just 14 unicorns appeared between 2005 and 2010. The pace picked up from 2016 and accelerated in 2021. Of the 1205 unicorns counted at the end of 2022 valued at \$3.86 trillion,²² two of every three had joined the club during the preceding twenty-four months.²³ Unicorns can be found in forty-seven countries however, the US led the field in 2022 with 53.9 percent of the total, China was in second place with 14.3 percent, India in third with 5.7 and the UK in fourth place with 4.2 percent.²⁴ Furthermore, unicorns tend to multiply in a few globally connected, large metro regions well furnished with research universities, financial institutions, think tanks, and deep pools of workers (Figure 1).

Figure 1. Unicorns cluster in a few cities



Source: <https://blog.eladgil.com/p/unicorn-market-cap-june-2020-almost>

21 The strengthening and enforcement of antitrust laws helped as did the liberalizing of foreign direct investment permitting foreigners to increase their shares in Korean firms from 26 percent to 55 percent. (Aghion, Antonin and Bunel 2021, p.147).

22 This is something of a moving target with the numbers and valuations fluctuating from month to month.

23 Entry slowed sharply from the third quarter of 2022.

24 <https://www.cbinsights.com/research/unicorn-startup-market-map/>

The proliferation of new high valued companies is largely the result of an abundance of financing from publicly supported VC funds as in the US, the EU,²⁵ Korea, and China, because of easy credit policies and low interest rates, a glut of savings seeking high returns (many from the increasingly affluent top 1 percent), and because of investors' belief in the potential of Fintech, digital commerce, consumer technology, healthcare, new mobility solutions, and entertainment media. These activities, which were boosted by demand during the Covid pandemic, attracted a flood of venture financing (Economist 2021). Venture capitalists were joined by private equity firms, hedge funds, banks,²⁶ and institutional investors such as pension funds all lured by the promise of higher returns relative to other options.

Although the distribution of venture capital across industries continues to evolve,²⁷ as of 2022, Fintech, which includes cryptocurrency related firms,²⁸ accounted for 21 percent of unicorns, followed by internet software and services (19 percent), next came e-commerce and consumer-oriented firms (9 percent), with healthcare spawning another 8 percent.²⁹ In 2022, the three most valuable unicorns (or hectocorns) were Bytedance (with platforms such as TikTok and Toutiao, \$140 billion), SpaceX (\$127 billion) and online fashion garments retailer Shein (\$100 billion). Stripe (\$95 billion) and Checkout.com (\$40 billion) rounded out the top five.³⁰

There have been booms caused by speculative excesses before and the Dotcom bubble is a reminder that promising firms launched by rational or irrational exuberance can be forced to exit if economic headwinds arise.³¹ Some high growth firms have had a good run but whether all the newly minted will survive is unclear (several unicorns saw their valuations plummet as credit tightened, interest rates rose, and economies slowed in 2023). Moreover, it is not obvious that unicorns will continue multiplying at the rate they have over the past 5–6 years (Figure 2). And even if they do multiply, can countries like Korea, Brazil, Israel, France, and Germany with less than 25 unicorns apiece in 2022, rapidly add to the number of high growth firms? The stakes are high because experience shows that sixty percent of the world's largest firms were high growth start-ups that benefitted from venture financing during their early stages (Strebulaev and Gornall 2015). The patents filed by these firms were of higher quality and had greater impact than the average, and many continue investing heavily

25 For example, the newly created European Tech Champions Fund. https://www.eif.org/what_we_do/news/2023/launch-of-new-fund-of-funds-to-support-european-tech-champions.htm

26 The venture debt market has become an alternative source of financing for startups without the need to surrender equity stakes or accept a lower valuation. The demise of Silicon Valley Bank in 2023 could reduce financing from this source.

27 One half of the new unicorns that emerged in the US during 2022 were related to cryptocurrencies. A shift towards green tech is ongoing (van den Heuvel and Popp 2022). However, a disproportionate amount of the venture capital flows into transport and mobility related sectors—cars, batteries etc.—responsible for 16 percent of carbon emissions with industry and manufacturing accounting for 29 percent of emissions receiving only 9 percent (Cox, Johnson and Chan 2022); <https://www.forbes.com/sites/forbesfinancecouncil/2022/12/02/four-trends-in-green-technology-and-venture-investment/?sh=2c7754f54f63>; In China, the trend is shifting from consumer internet companies to green energy, semiconductors, healthcare, and logistics all tracking government priorities.

28 Lending to crypto startups went into freefall in the latter half of 2022 following the collapse of the crypto exchange FTX. This has had ripple effects that have dragged down crypto lenders and other exchanges. <https://www.washingtonpost.com/business/2022/11/16/ftx-collapse-crypto-exchanges-regulation/>; <https://www.reuters.com/technology/crypto-companies-crash-into-bankruptcy-2022-12-01/>

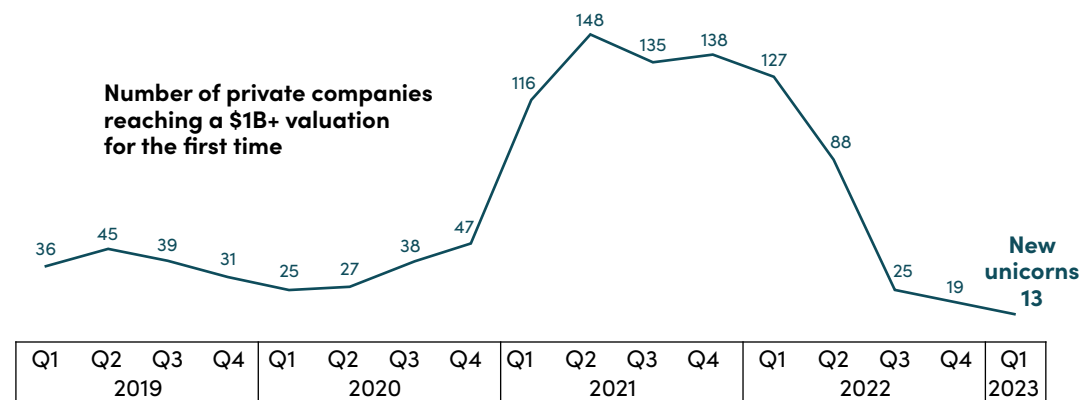
29 <https://www.cbinsights.com/research-unicorn-companies>

30 A listing of global unicorns can be found in <https://www.cbinsights.com/research-unicorn-companies> The numbers tend to vary as firms enter and leave and criteria used to determine inclusion.

31 Boom-bust cycles and bubbles are catalogued and discussed by Brunnermeier and Oehmke (2012).

in R&D, pushing the technology frontier, and helping to raise productivity (Howell et al. 2020). Absent the catalytic role played by VC in breeding high growth firms, aggregate growth of the US economy would have been 28 percent lower (Akcigit et al. 2019).

Figure 2. Unicorn entry by quarter: 2019–2023



Source: <https://www.cbinsights.com/research/unicorn-startup-market-map/>

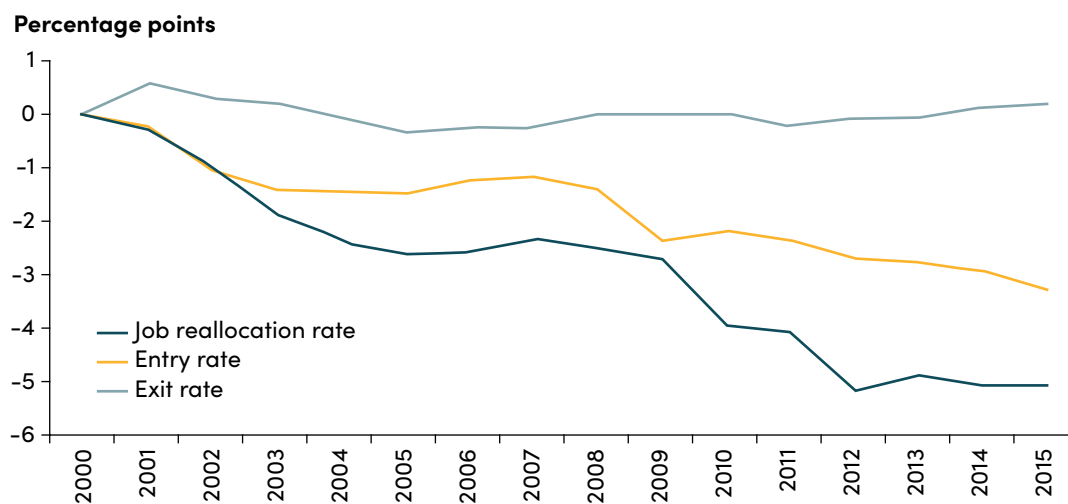
The challenge for policymakers is to create an ecosystem where gazelles can thrive, and a good number are able to morph into unicorns. Even more challenging is how to identify promising firms and help them realize their growth potential and prolong their growth spurt by enhancing their capacity to innovate, mobilize resources, and recruit workers with technical skills.³² The task of policymakers is made no easier by evidence of flagging entrepreneurship in many if not most OECD countries, with fewer start-ups and too many claimed by the “Valley of Death” (OECD 2021; Decker et al. 2014; Hathaway and Litan 2016; Haltiwanger 2022; Pugsley et al. 2018; Calvino, Criscuolo and Verlhac 2020; Figure 3).³³ Countries such as Turkey and China have not been spared. Market concentration and liquidity constraints have crimped entry by new businesses in Turkey since 2012 especially in manufacturing (Akcigit et al. 2020). China is doing no better—although barriers to entry have been lowered and there are references to the “unprecedented rise in the number of new tech companies” aided by the government using public risk capital and finance for R&D (Economist 2022a). According to Batson (2022) most of the new registrations are not of private companies but of sole proprietorships (*getihu*), which hire very few workers and are usually a vehicle of self-employment. He also shows that the share of corporate profits in national income is unchanged since 2015 (26 percent of GDP) as are profits accruing to households (5 percent of GDP). Batson suggests that the apparent increase in new company formation can be reconciled with this stagnation as it is much easier for individuals to register multiple legal entities. In other words, entrepreneurship

32 Shortages of skills in OECD countries and rising salaries of software developers also serves as a brake on start-up activity and the growth of firms. <https://www.ft.com/content/20d7183b-b7d9-466d-b95d-aea6258fa143>

33 Research on the Valley of Death (VOD), its causes and how it might be managed are examined by Gbadegeshin et al. (2022). An OECD (2021) report points to as many as 35 million missing entrepreneurs. A surge in start-up activity in the US in 2020 was the result of layoffs during the Covid pandemic that compelled many to set up their own usually one person businesses and it may not persist. Unlike transformational entrepreneurship, subsistence entrepreneurship does not impact productivity. (Haltiwanger 2021; Djankov and Zhang 2021; Schoar 2010).

in China may be marking time as it is elsewhere.³⁴ Additional evidence on start-up activity in China can be found in a paper by Cerdeiro and Ruane (2022). They document the slowing life cycle growth and declining share of revenue accruing to frequently capital constrained young firms, which are suffering from productivity deficits caused in part by insufficient investment in intangibles and exhibiting weaker life-cycle growth. Entry and the flourishing of young firms is also inhibited in provinces where SOEs have a larger share of the GDP.

Figure 3. Entry and exit rates of firms and job reallocation



Note: This figure reports average within-country-sector trends of job reallocation, entry and exit rates, based on the year coefficients of regressions within country-sector, for the period 2000–15, including 18 countries: AUT, BEL, BRA, CAN, CRI, DNK, ESP, FIN, FRA, HUN, ITA, JPN, NLD, NOR, NZL, PRT, SWE, and TUR. Each point represents cumulative change in percentage points since 2000.

Source: OECD (2021a)

Singling out the swift footed from the rest has also proven to be no easy task. Firms that eventually make their way to the forefront of an industry are generally among the larger start-ups or are SMEs that have been in business for a few years and have established a track record. The difficulty that policymakers and investors face is that the recent performance of a firm is no guarantee that it will be repeated and sustained. Most new ventures fail. Very few start-ups prove to be serial innovators.³⁵

34 Recent government cooling vis-a-vis the private sector, protestations to the contrary, might also have quenched the animal spirits of some in the entrepreneurial community (Huang and Lardy 2023). Roach (2021) observes that “China lacks the foundation of trust that underpins animal spirits...[furthermore] distrust is creeping into the business sector, where the government’s assault on tech companies is antithetical to creative energy and sheer hard work.” The deceleration in China’s growth rate is compelling the authorities to launch a charm offensive and to reaffirm that the “legitimate rights” of the corporate sector would be respected. Whether this is just a temporary reprieve and state controls will continue tightening, is uncertain. <https://www.ft.com/content/23d08688-fbf8-46fa-bb1e-674be9ff6452>

35 Based on a review of research on serial entrepreneurship, Dabic et al. (2021) note, “Surprisingly, research has found an inverse relationship between innovativeness and new venture success. Although serial entrepreneurs often change industries due to their innovativeness, serial entrepreneurs who show the greatest innovativeness fail in one industry and attempt a new venture in a different industry. Successful serial entrepreneurs typically remain within their industry and obtain economic success through less innovative performance. The more familiar the serial entrepreneur is with their industry, the lesser their innovative performance.” Lahiri and Wadhwa (2020) and Carbonara et al. (2020) also comment on the tendency of individuals who are serial entrepreneurs to remain in the same industry and to exploit opportunities rather than exploring fresh ideas—preferring stability and profitability.

Analysis of gazelles has established that only a minority repeat a high growth episode (Dautzenberg et al. 2012). Almost one half that looked like winners will exit the market within three to six years and fewer than 15 percent continue to grow rapidly in subsequent periods and contribute to job creation. Those entrepreneurs that succeed in the difficult task of starting a firm frequently are unable to turn a profit, to make the firm grow and to survive the competition. All too often whether a company survives and grows depends both on R&D, the quality of innovation as well as on the investment in human and intangible capital and the ability to manage these most effectively—something that many entrepreneurs are unable to do single handedly. The leadership capacity and industry expertise of management often proves to be the Achilles heel of start-ups.³⁶

Interestingly, although knowledge intensive industries host more high growth firms, they are not necessarily high-tech firms. Research intensity is not an essential attribute of a potential highflyer; gazelles can flourish in many different industries and in fact, the policy environment should support entry in a broad range of activities. Innovation of many different kinds—organizational, marketing, design, after sales service, etc.—certainly helps impart market power as does the ability to achieve scale and reap the benefits of lower costs.

Korea, like several others in the OECD and among the EMDEs, is pursuing growth led by innovation with the utmost vigor and a major strand of its strategy is the grooming of firms with the potential of achieving unicorn status. Therefore, Korea's experience to date can provide a reading on the scope and efficacy of a unicorn focused development initiative of relevance to others that are also putting some of their chips on high growth firms.

4. Mobilizing unicorn power to restore Korea's growth momentum

Since the turn of the century, Korea's growth has been trending downward closely tracking that of OECD countries (Figure 4; Swiston 2021). This is a far cry from its performance prior to the East Asian Crisis of 1997–98 and reversing or at the minimum stabilizing growth rates, has the attention of policymakers. One strand of the strategy pursued since the 1980s³⁷ is to incentivize the SME sector and start-up activity—and contain the dominance of the large conglomerates (chaebol). But there has been limited progress. Moreover, the productivity and digital technology adoption of both types

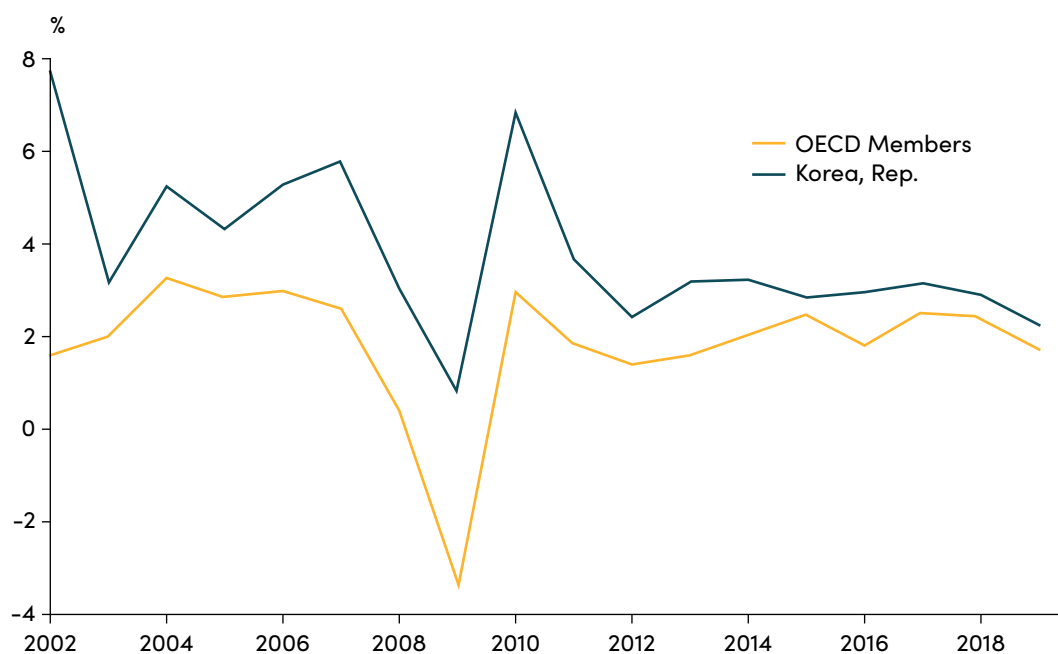
36 Managerial shortcomings are not the only reasons why so many start-ups exit. Eisenmann (2021) identifies several others. He maintains that the blame is shared by team members, manufacturing partners and investors. Eisenmann also notes that many budding entrepreneurs do not engage in 'customer discovery' and an assessment of potential demand for the product or service they intend to produce—or go through a checklist of issues they might encounter or how they might tackle them.

37 Following a slow start in the early 1980s, support for SMEs grew in the 1990s following the creation of the Small and Medium Business Administration in 1995 (SAMBA) and the Korea Small Business Innovation Research Program (KOSBIR) modeled after the US Small Business Innovation Research Program. The support for SMEs was prioritized in the aftermath of the East Asian Crisis of 1997–98. By 2019, 22 percent of total government spending on R&D was for research conducted by SMEs as against 13 percent in 2002. Gregory, Harvie and Lee (2002).

of firms (especially providers of services) over the past decade, has fallen short of expectations, and except for enterprise resource planning, is below the OECD average (Figure 5; OECD 2020; Pak, Andre, and Beom 2022).

More recently, a government supported boom in start-up activity with 22 firms achieving unicorn status by end 2022³⁸ has aroused expectations that economic performance could be spearheaded by high growth firms. Korea's past successes with industrialization, technology assimilation and the creation of frontier hugging superstar firms, underpins the belief that it will be equally successful in harnessing the innovativeness of unicorns to revive its growth.³⁹ Given its size and level of development, Korea is an important test case of a strategy hitched to unicorns and of greater relevance for other mid-sized high- and middle-income countries than economies with large domestic markets and financial systems such as the United States, China and India.⁴⁰

Figure 4. GDP growth rates (in percent): Korea and the OECD average (2002–2019)



Source: WDI (2023) <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2019&locations=KR-OE&start=2002>

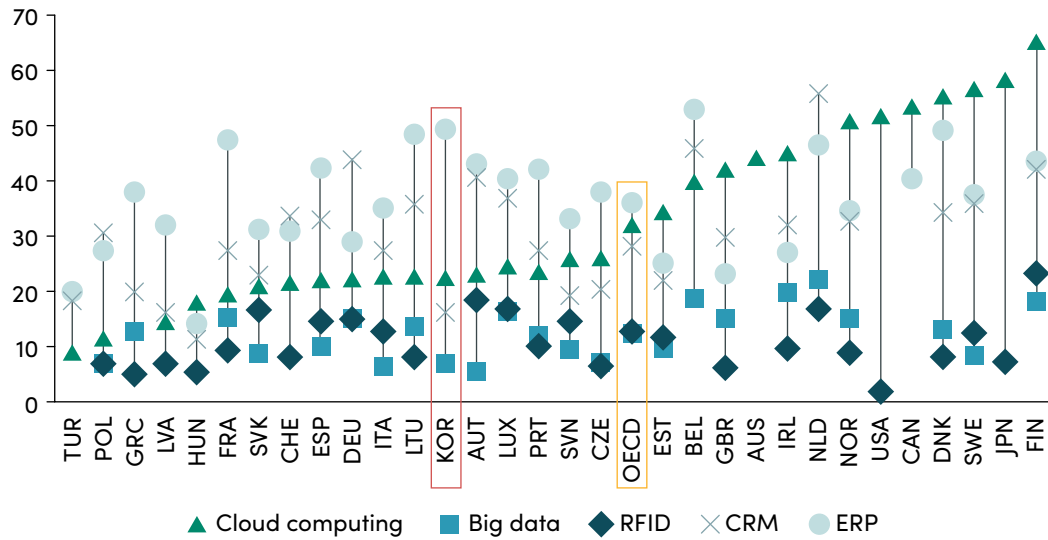
38 <https://www.korea.net/Government/Briefing-Room/Press-Releases/view?articleId=1039449&insttCode=A260117&type=N>

39 The debate on the merits of industrial policy rages on. One touchstone for those arguing in favor is the development by Korea of heavy and chemical industries in the face of heavy odds, starting in the late 1960s. "South Korea's heavy and manufacturing industries is an instance in which activist industrial policy appears to have succeeded, even taking into account its fiscal costs and general equilibrium effects." Levchenko and Choi (2021).

40 For example, there may be lessons for an aspiring science superpower such as the UK. Science (2023). <https://www.science.org/doi/10.1126/science.adh3526>

Figure 5. Digital technology adoption by Korean firms

% As a percentage of enterprises with 10 or more employees, 2019 or latest available year



Note: RFID stands for radio frequency identification; CRM for customer relationship management; ERP for enterprise resource planning. The statistical unit for Korea is the establishment and not the enterprise and covers both the public and the private sector.

Source: OECD ICT Access and Usage by Business database, http://stats.oecd.org/Index.aspx?DataSetcode=ICT_BUS (accessed on 1 June 2020), as cited in Pak, Andre and Beom (2021)

Yello Mobile, Korea’s first unicorn was established by a Seoul based entrepreneur in 2012.⁴¹ By early 2023, it had been joined by 21 others⁴² with one half of the new entrants emerging since 2019 thanks to an abundance of venture capital after 2018 from public and private sources.⁴³ Korea’s newly minted unicorns are concentrated in the e-commerce, Fintech (Toss, Dunamu), games, (Shift Up, Korea is the world’s 4th largest market), cosmetics (L&P Cosmetic, GP Club), hospitality (Yanolja), wholesale and retail businesses (Danggeun Market, Market Kurly, Oasis, WeMakePrice), cloud, software and data services (Megazone Cloud, igaworks, Ridi); however, there appears to be ample scope for firms to capitalize on opportunities in the life sciences (e.g., Aprogen), in medical devices, green technologies, robotics, additive manufacturing (Industry 4.0),⁴⁴ and in the subfields spawned by AI and digital technologies (Korea is ranked fourth in number of registered AI patents⁴⁵). The resources that Korea is pouring into R&D (4.5 percent of GDP) and the thousands of patents registered each year suggest that there may be plentiful opportunities for entrepreneurs eager to create the next unicorn.

41 <https://www.koreatechdesk.com/the-rise-and-fall-of-south-koreas-one-of-the-first-unicorn-startups-yello-mobile/>

42 The numbers fluctuate as new unicorns arrive and a few are banished from the herd.

43 <https://www.reuters.com/markets/funds/skoreas-unicorn-numbers-soar-ignite-hopes-more-blockbuster-ip-os-2021-12-22/>

44 John Hart’s research opens a window on the future. <https://news.mit.edu/2019/john-hart-manufacturing-0618>; <https://news.mit.edu/2018/mit-researchers-accelerating-3d-printing-using-renewable-materials-1129> ; <https://www.nytimes.com/2022/07/03/business/3d-printing-vulcanforms.html>

45 https://english.hani.co.kr/arti/english_edition/e_business/996791.html

President Yoon's government has been quick to encourage start-up activity. The Second Venture Boom Expansion Strategy launched in 2019 to help foster 20 full-fledged unicorns has been bolstered by the announcement from the Ministry of Science and ICT in January 2023, that it would invest \$12 billion by 2027 to help create 10 or more deep tech unicorns i.e. startups that would introduce innovations in chips, displays, storage batteries, biotech, automation, and green eco-technologies with the semiconductor firms serving as the core of a new cluster in Gyeonggi Province.⁴⁶ This complements the K-Unicorn project, which seeks to identify 200 baby unicorns and help them cross the threshold into adulthood with the combined infusion of public and private venture capital. In addition, the Ministry of SMEs and Start-ups (MSS) has bigger plans in store for the sector. The intention is to build a pipeline of as many as 500 'preliminary' unicorns (valued at \$0.1 billion each) by screening the many start-ups. Food tech firms are also targeted in the hope that such unicorns could become a source of exports by 2027.⁴⁷ And that is not all. Korea's Innovation Centers in Silicon Valley, Washington D.C., Berlin, and Beijing are being mobilized to aid start-ups penetrate and expand into global markets, to be supplemented by new hubs in Seattle and New Delhi.

The economic shock inflicted by the Covid pandemic, the upsurge in inflation, debt burdens weighing on many EMDEs, and banking turmoil has cast a cloud over medium term global growth prospects.⁴⁸ Hence, achieving Korea's objectives will be more challenging nevertheless, the interest in unicorns is as strong as ever. This raises at least two important issues: Can Korea successfully hitch its growth prospects to the discovery and grooming of unicorns? And second, what mix of policies might serve to increase the number of high growth firms whether they join the ranks of unicorns or not?

As always, the evidence on the first question is mixed. Korea's start-up scene is encouraging with the number of entrants exceeding rates in several comparator economies. This is also reflected in the early-stage entrepreneurship rate, which rose to 15 in 2019 from 6.7 in 2016 and is well above rates of Japan (5.4) and Taiwan (8.4). Korea's ranking on the GEM National Entrepreneurship Context Index in 2020 was 9th in a list of 44 countries.⁴⁹ The increase was especially marked in the tech intensive businesses, but services also attracted new entrants into the hospitality and restaurant subsectors. Many start-ups in Korea—as well as in China and the United States since 2020—are by individuals engaging in business activity out of necessity and mostly a vehicle for self-employment (Djankov and

46 <https://m.pulsenews.co.kr/view.php?year=2023&no=36218>; Although earlier startups in the US had a deep tech orientation and cited 'fundamental science', this has started to wane in the face of technical challenges and the difficulty small firms face in commercializing their products. Whether Korean startups can buck this trend remains to be seen. Arora, Fosfuri, and Roende (2022); Fontana and Nanda (2022). The Yoon Administration envisages a cluster that will attract \$230 billions of investment and house five chip fabrication facilities as well as 150 fabless companies and suppliers of components and materials. This is in addition to the billions that private firms are expected to invest in advanced industries through 2026. <https://en.yna.co.kr/view/AEN20230315003751320?section=economy-finance/economy>

47 Market Kurly, Oasis Market and Tridge are the three in this space and the Ministry of Agriculture wants to increase the number tenfold with firms harnessing AI and biotech to increase variety, and improve processing, packaging, and distribution. <https://www.koreaherald.com/view.php?ud=20221214000680>

48 <https://mediacenter.imf.org/news/imf---world-economic-outlook-april-2023-update/s/e76ef1e3-88ea-4fa8-b685-72fd9d5db5c6>

49 <https://www.gemconsortium.org/reports/latest-global-report>

Zhang 2021). Offsetting the rise in entry, which is related to the upheaval caused by the pandemic,⁵⁰ is a high failure rate and subsequent exit. Korean start-ups had lower one- and two-year survival rates than those in comparators with almost two thirds exiting in the first year and another fifty percent of the remainder in the second year, an unhelpful trend. Moreover, as in China, where net company formation rose from 1 million per annum before 2012 to 4 million per annum since 2016, the impact on productivity and growth thus far, has been negligible.⁵¹

To increase survivorship and enable more firms to make a bid for preliminary unicorn status, Korea has plowed public funds into the venture capital market and crowded in private venture capital both domestic and foreign. With venture financing amounting to 0.16 percent of the GDP, and 165 active players in 2020, Korea's market is the OECD's third largest and the ranking of the Seoul ecosystem is improving rapidly from 20th in 2020 to 16th in 2021 to 10th in 2022—from among 40 countries (Startup Genome 2022).

Clearly, Korea views the new breed of unicorns and budding unicorns as additional growth drivers. They can help diversify its economy and lessen reliance on commodified and low margin manufactures e.g., steel and petrochemicals, where it faces competition from China and other countries. Unicorns can complement the strengths of chaebol in machinery and electronics industries and diminish industrial concentration if they are allowed to do so. Unicorns and other high growth firms can also breathe vigor into Korea's services sector and reduce its dependence on exports of manufactures, which would be a welcome trend, especially if unicorns can break into new innovative areas beyond their current pattern of activity.

To achieve a degree of success, Korea will need to craft the requisite enabling environment⁵² for a decade likely to be filled with uncertainty emanating from several quarters, economic (real estate bubble, private debt), epidemiological, political, climatic, and from international tensions arising in a fractionated global environment (Swiston 2021; Economist 2022). Perhaps even more importantly, when viewed from a Schumpeterian perspective, is whether "creation" by unicorns can handily exceed "destruction" to credibly add value with winners gaining well in excess of what is lost by those who are the victims of the evolutionary spiral. Many have pointed out that it is difficult to divorce public policies aimed at supporting gazelles and eventual unicorns from active competition policy. If these new start-ups cannot acquire a foothold because of excessive market power wielded by

50 The pandemic generated both pressures and opportunities. Those who lost their jobs scrambled to set up new businesses. Given the demand for certain services and products and the digital technologies at hand, most new starts—a few of which grew into unicorns—catered to the demands of an increasingly home bound clientele (e.g., non-store retail, personal and business services, trucking, and food services etc.). It was the confluence of these (Covid induced) demands and the availability of an enabling technology that lowered entry barriers that was responsible for the rise of so many unicorns in a short space of time. The decline since and a return to earlier trend rates could persist and it is quite possible that some of the existing unicorns may fall below the \$1 billion capitalization threshold.

51 Start-up activity is welcomed because it sustains creative destruction, but it is a plus only when creation exceeds destruction and preferably by a sizable margin. But that is not always the case. Komlos (2014) for example, points to strategies pursued by the digital products industry that contribute little to welfare and in fact, some kinds of social media have diminished well-being of users. He goes on to note "Obsolescence is a favorite strategy for products such as video games, textbooks, software, consumer electronics, where upgrades and the latest versions with minor improvements are introduced periodically with the aim of convincing the consumer of its superiority."

52 Continuing robust M&A activity would be a plus. <https://pulsenews.co.kr/view.php?year=2023&no=18921>

incumbents that can use ‘killer acquisitions’ to suppress/discontinue innovations or introduce their own competing products, as Korean chaebol have done, policies to promote them can easily waste resources and not yield the desired outcomes (Kim 2019; OECD 2020a; Cunningham, Ederer, and Ma 2021).⁵³

5. Unicorn enabling policy environment

A growth strategy focused on improvements in productivity led by value adding innovations is desirable for a country at Korea’s level of development—and for upper middle-income countries aspiring to cross the threshold into the upper income category. An earlier strategy that relied on high levels of investment in export-oriented manufacturing and a growing, youthful, better educated workforce can no longer be repeated, not by Korea or by any of the high-income countries. On the contrary, Korea’s demographics—and that of others in East Asia and Europe—will be a drag on its economic performance over the foreseeable future. Moreover, given Korea’s current and trending ICOR (incremental capital-output ratio), gross investment averaging 32 percent of GDP generates very modest growth. In all likelihood, if Korea follows the path other advanced OECD economies have taken, gross investment will fall into the mid 20 percent of GDP range and manufacturing as a share of GDP, currently 25 percent and far above the OECD average of 13 percent, will also shrink.⁵⁴ If so, growth of between 2–4 percent p.a.—in Korea and in others—may need to be sourced increasingly from high growth firms leveraging digital technologies and engaged in servitized manufacturing (OECD 2022; Jones 2022).

To achieve these objectives, Korea is pulling all the stops. The number of accelerators and incubators is on the rise and an innovation academy project is being rolled out to train IT professionals.⁵⁵ A startup ecosystem portal has been created to woo potential candidates and a Baby Unicorn 200 Fostering Project for identifying infant unicorns with potential is in full swing. This is singling out firms that could be fast tracked and offering generous incentives (Figure 6). The annual K Start Up Challenge is an attempt to attract teams with promising ideas and to provide the ones selected to develop their proposals at the Pangyo Startup Campus.⁵⁶ The winning teams some of which might be non-Korean, receive infrastructure services, mentoring, are introduced to local companies, and the National IT Industry Promotion Agency (NIPA) offers immigration services facilitating the acquisition of visas by eligible startups and entrepreneurs. In short, Korea has set sights on leveraging the potential of high growth firms to become a hub for innovative firms with Seoul as

53 A recent comment on Apple’s tactics highlights the difficulties smaller innovators can encounter. “When Apple takes an interest in a company, it is the kiss of death. First you get all excited. Then you realize that the long-term plan is to do it themselves and take it all.” WSJ (2023, April 21st). <https://www.wsj.com/articles/apple-watch-patents-5b52cda0>

54 “Curbing financialization and restoring manufacturing strength” as proposed by Keun Lee (2021) will in all probability, not bring back the high rates of growth with equity that Korea enjoyed during much of the last quarter of the 20th century. Two recent studies of Korea’s industrialization in the 1970s, point to the likelihood of resource misallocation and the negative effects that had on aggregate total factor productivity. NBER Digest (2021)

55 <https://www.xyzlab.com/post/startup-accelerators-incubators-in-south-korea>

56 <https://koreatechdesk.com/pangyo-techno-valley-a-thriving-startup-hub-in-korea/>

the epicenter and to build its stable of unicorns to promote economic diversification, employment, widen the mix of exports, and to sustain moderately high growth rates with the help of productivity gains. There is no doubting the government’s commitment. Budding unicorns have increasing access to financing and services, and a full range of incentives are on offer. Whether these programs will deliver the desired results now that the pandemic related boom is receding is difficult to forecast. Arguably, the current incentives are sufficiently generous, and any additions or changes need to be guided by experience. Doubling the number of unicorns during the 2020s would be a considerable feat for Korea, other mid-sized European countries, and also for EMDEs that are banking on unicorns to boost their growth rates.

Figure 6. Incentives for “Baby Unicorns”

ENTERING NEW MARKETS	FINANCIAL R&D MANAGEMENT SUPPORT	
<ul style="list-style-type: none"> • Funds to enter new markets (Max. KRW 300 million) 	<ul style="list-style-type: none"> • Special guarantee (KIBO, maximum KRW 5 billion) 	<ul style="list-style-type: none"> • Local specialized R&D support
<ul style="list-style-type: none"> • Support meetings with VCs and investors 	<ul style="list-style-type: none"> • Policy funds (KOSMES, max. KRW 10 billion) 	<ul style="list-style-type: none"> • R&D planning support program
<ul style="list-style-type: none"> • Foreign market entering program for KISED 	<ul style="list-style-type: none"> • Priority support with financial institutions 	<ul style="list-style-type: none"> • Connection to the Youth Job Seeking Grant
<ul style="list-style-type: none"> • Regulatory sandbox support 	<ul style="list-style-type: none"> • Technology innovation development R&D (TIPA, maximum KRW 2 billion) 	<ul style="list-style-type: none"> • Support to broadcast advertisements

Source: Ministry of SMEs and Startups (2023) <https://www.mss.go.kr/site/eng/ex/bbs/View.do?cbIdx=244&bcIdx=1039531>

Like Korea, many countries are experimenting with a panoply of policies that could multiply gazelles—and future unicorns. These include a strengthening of the fundamentals (what Josh Lerner calls “setting the table”) that is the functioning of product, capital, and labor markets, and of legal systems expeditiously enforcing contracts and adjudicating bankruptcy laws, which do not overly penalize failure. Because entrepreneurs and so-called “venture labor” are sensitive to tax policies, in particular capital gains taxes, countries attempt to align these with a high growth firm strategy (Lerner 2009; Neff 2015). Other initiatives include investment in R&D, in human talent, state-of-the art digital infrastructure, incentives for venture capital and other kinds of risk financing, establishing incubators and accelerators, crowd sourcing innovations, using tournaments and prizes to cultivate ideas, and the creation of a few, strategic tech zones bundled with fiscal and financial incentives. Many entrepreneurs come from the corporate sector (where they have gained experience) and from academia, which can help forge university-industry linkages. Companies are encouraged to more actively support ‘intrapreneuring’,⁵⁷ enabling employees with promising ideas to get started and universities urged to establish linkages with businesses.

57 Chamorro-Premuzic (2020) on intrapreneuring: “Most organizations – especially large corporations – are awash in creative ideas that never get executed. Entrepreneurship is the process that turns those ideas into actual innovations, and when it occurs in large corporations we tend to refer to it as *intrapreneurship* or corporate innovation. In essence, this means acting like an innovative entrepreneur, but within the ecosystem of a larger, more traditional, organization.” By enabling individuals to choose a job they love, according to Confucius, they never have to work a day in their lives.

Thanks to the efforts of researchers and practitioners, the policy menu for startups has been thoroughly fleshed out and many of the pitfalls to which public programs succumb have been flagged (e.g., OECD 2022a; Lerner 2016; Lerner 2020; Edwards 2022). The minimum or necessary conditions are codified for venture financing and start-up activity alike. A partial list is contained in Figure 7.

Figure 7. Policies for startups

	FOCUS		
	Access to capital	People and skills	Ecosystems
POLICY-MAKERS Federal ↑ State & regional ↓ Local	SBA loans and other loan guarantee funds		Manufacturing institutes
	Community Development Financial Institutions (CDFI)	Entrepreneurship education (mentoring, classes, online education)	Research/commercialization grants
	Angel funds and tax credits	STEM education	Cluster initiatives
	Seed investment funds	Address “middle skills” with partnerships between business and community colleges	Incubators and accelerators
	Community Reinvestment Act (CRA)		Innovation districts
	Business plan competitions		Main Street associations

Source: Mills (2015)

Irrespective of government efforts and the state of the business environment, success is never assured. As Lerner (2016) has observed, the past is littered with “broken dreams”. With good ideas and disruptive technologies becoming “harder to find” as Bloom et al. (2020) and others (Thompson 2021; Park, Leahy, and Funk 2023) show, a scatter shot of policies might be less effective than a systematic long-term strategy that aims to promote high growth firms across a range of manufacturing and services industries likely to have the greatest traction in tomorrow’s economy. A top-down, tightly targeted approach with many agencies pursuing individual initiatives drawing on a variety of funds and armed with regulations in Korea, China and elsewhere, could lead to a misallocation of resources, as issues pertaining to accountability and transparency are difficult to resolve.⁵⁸ A strategy that is market directed, addresses the kind of regulatory, certification and zoning hurdles noted by Edwards (2022) and explores opportunities across a wide range of activities, can be more effective. Moreover, currently both state and private entities support early-stage development to the

58 A lengthy list of agencies and funds are in the business of nurturing start-ups in Korea. <https://www.seoulz.com/korean-government-agencies-that-support-startups/>; Nam (2022) observes that “Each government department manages several [venture capital] funds. There are growing concerns about inefficient public spending, primarily due to unreasonable target market setting and lack of a comprehensive administration system. As an essential precondition, [government venture capital -GVC] should minimize crowding out private venture capital funds while providing a pump primer to effectively nurture the relevant market. The government should adhere to this policy objective and place relevant constraints consistently during the entire GVC funds’ cycle including fund establishment-management-liquidation phases.” The situation in China is even worse with numerous central and provincial agencies tapping over 1,600 government-guided investment funds to finance thousands of start-ups, an approach that is bound to be wasteful (Huang 2019).

neglect of the mezzanine and later stage of a start-ups life cycle with the result that Korean start-ups have a 30 percent survival rate vs. 47 percent in the U.S. and 44 percent in the EU.⁵⁹

The bedrock for productive high growth firm strategy in Korea, in European countries and upper middle-income economies, must be a system for producing ideas at home and assimilating ideas from elsewhere through collaboration, smart FDI, technology licensing, brain circulation, and joint ventures. In other words, participating actively in an open, globalized innovation system backstopped by substantial domestic investment in basic research, holds promise. Korea does plenty of research, but not necessarily enough new idea-producing basic research, and international collaboration is low (OECD 2018). During 2009–18, 1 percent of GDP invested in R&D translated into only a 0.1 percent growth in total factor productivity. Furthermore, while patent quality is comparable to that of countries such as France and Sweden, from among ten high income countries, Korea's innovation quality was ranked 10th by the WIPO (2020). So, there is scope for improvement and reason to hope that action on these several fronts will lead to results within a decade or less. Other EMDEs, most investing too little in R&D, also need to raise their game.

6. Concluding observations on the growth outcomes of a unicorn strategy

Delving into the granular details of a strategy is beyond this undertaking. Suffice it to say, that a viable strategy must bring together policies in a coordinated way impacting the overall competitiveness of the market environment. For example, the Korean product market is seen by analysts as overregulated compared to many OECD economies although regulatory reform led by the Regulatory Reform Committee is whittling the thicket of rules (OECD 2020; OECD 2021b).⁶⁰ Korean and OECD experience suggests that it could be advantageous to reassess and calibrate policies such as the ones affecting risk capital, how it is allocated, and the amounts available to firms at different stages of their life cycle. Equally important is the mentorship, relationship building, and support services provided to promising high growth firms by experienced private venture capitalists and angel investors to improve the quality of entrepreneurship and managerial capabilities. Other possible areas for policy action include initiatives that encourage firms to build and effectively leverage intangible capital, which could be the key ingredient enabling some firms to pull ahead of the pack (Haskel and Westlake 2022).⁶¹ Finally, in many successful environments, actions taken that augment agglomeration economies in urban centers have been fruitful as most unicorns germinate

59 https://www.koreatimes.co.kr/www/tech/2022/06/419_314561.html

60 Other administrative entry barriers for start-ups have been lowered and are close to the OECD average. (OECD product market regulation database). Furthermore, since 2017, the Regulatory Sandbox Program is addressing roadblocks that were stalling innovative start-ups (OECD 2021).

61 Although the ratio of intangible investment to GDP in Korea is comparable to other western economies, intangibles contribute much less to growth than tangible capital possibly because of the composition of intangible capital is heavily weighted towards R&D (Chun et al. 2015).

in major metropolitan areas.⁶² This is the milieu in which the creative class, joined by many from abroad, and labor with specialized skills can together work their magic and grow the herd of unicorns.

The unsettling fact that emerges from decades of efforts to promote high growth startups and more recently, unicorns, is that the ‘pizza has not arrived’. Korean efforts have yet to be rewarded by an upturn in productivity and growth. Nor for that matter, can some fraction of the performance of European countries, the United States, China and India over the past decade and a half be accounted for empirically by startup activity and the number of unicorns.⁶³ Nevertheless, hopes continue to ride high. For political and economic reasons, policymakers remain convinced that startup activity that could seed unicorns deserves to be pursued because in addition to employment, it could boost productivity and add many tens of basis points to GDP growth. Furthermore, it dovetails with technology and industrial policies that are increasingly in vogue. In time it might move the needle. After all, the cupboard is bare of alternative policies that offer superior outcomes. We may need to be patient. Perhaps, as Joel Mokyr (2013) remarks, “we ain’t seen nothing yet.”

62 The expense of housing in the Seoul metro areas is a major issue as property prices have doubled over the past decade. This affects labor supply and start-up activity and undermines agglomeration effects. San Francisco/Silicon Valley and New York confront very similar problems caused in part by zoning regulations, which impede the growth of some of America’s most productive metro areas. *Economist* (2022); Glaeser (2017).

63 However, a counterfactual line of reasoning would suggest that the emergence of unicorns during 2020–2021 may have averted a steeper decline in economic activity, employment, and welfare.

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My thanks to Danny Leipziger and to the reviewers for helpful comments and suggestions.

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