



accenture

Ready for take-off

Why niche markets are
the next big thing



The idea in brief

Technological innovations are key to addressing many of today's pressing societal issues, from food security and quality healthcare to clean transportation. The most disruptive solutions are typically first commercialized in emerging, niche markets¹, which tend to be driven by startups. In the past five years, startups across eight countries we studied in Asia Pacific, Latin America and the Middle East have attracted venture capital investments at a similar pace to the US.

But many of the solutions being developed remain too subscale for too long, ultimately failing to unlock the full potential of technology and preventing an enormous

amount of societal value from being released. More mature tech-propelled markets, such as fin-tech in Asia Pacific, have been on the radar of big banks in their digital growth pursuits² for many years.

Yet other tech-propelled markets—notably agri-tech, construction-tech and clean energy-tech—are still niche, waiting to be embraced by large industry players in a big way. For example, we found that only two percent of the companies active in agri-tech (in the eight countries covered in our study) had revenues above \$5 billion. When large companies sit on the sidelines of the playing fields of tomorrow, both commerce and society lose out.

As investment growth reaches an inflection point, these niche markets are on the cusp of becoming attractive opportunities for more big businesses. In fact, our results show that large companies active in such markets have already uncovered opportunities that drive sustainable business growth and address unmet societal needs at the same time. **When making a foray into niche tech-propelled markets, these companies adopt a lens that is simultaneously much wider and sharply focused on:**



Combining societal and commercial value in new market assessments.

Only 42% of large companies measure societal value today. The strategic impetus lies in quantifying the dual potential of tech-propelled markets, not only focusing on the future market share that a company could capture for itself.



Targeting location-based opportunities with precision.

Start with tech-enabled solutions that are home-grown, in response to a well-defined, spiraling local challenge. The strategic impetus is to use the power of your business to spread such solutions in other locations with similar issues.



Remaking the rules through an ecosystem of technology partnerships.

By 2025, over 80% of companies expect to work with technology partners. The strategic impetus lies in democratizing access to new tech-enabled solutions, leveraging new forms of partnerships outside of one's industry boundaries.

**Tech-propelled
markets:
An opportunity
not to be
missed**





Far from a return to normalcy, the “post-COVID” world has been marked by ongoing crises. New variants continue to place extreme pressure on healthcare systems, even as geopolitical tensions exacerbate supply chain disruptions. Meanwhile, an increasingly uncertain global economic outlook is being compounded by rising inflation, eating into consumer confidence and spending power. Add to that the urgency to address climate crisis.

These interlinked challenges have pushed perennial—though sometimes peripheral—problems to the forefront, making issues like food security and access to healthcare suddenly pertinent to the previously comfortable, not only the under-served.

Small, entrepreneurial companies are already starting to shape new markets, taking advantage of the under-investment in technology by larger industry players.

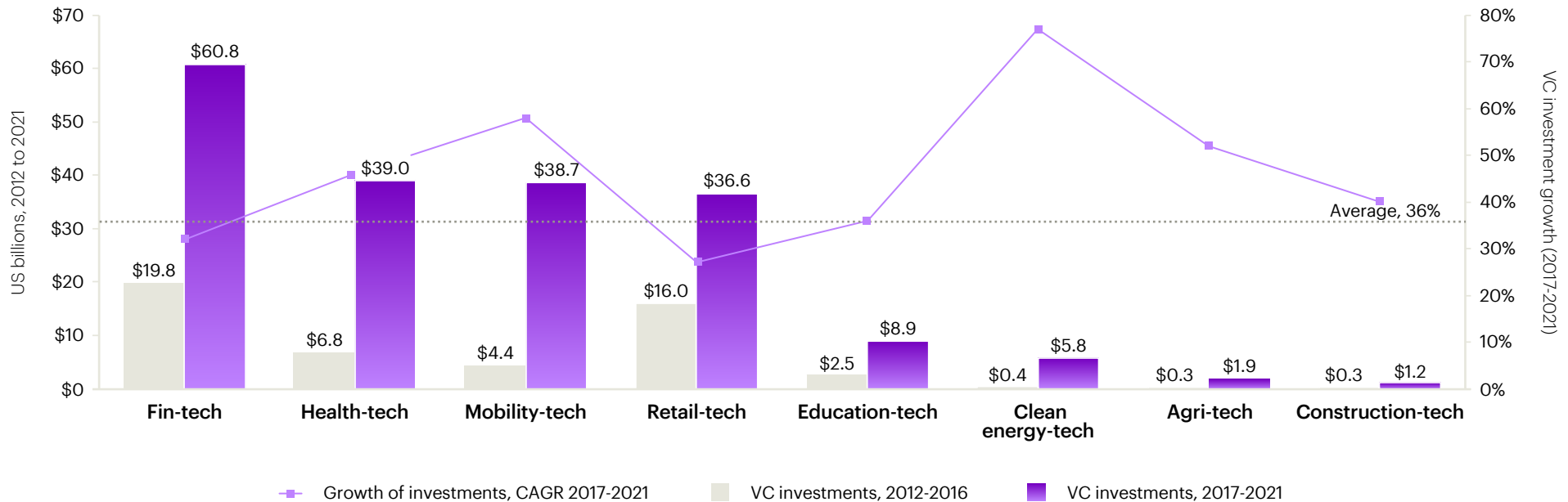
We refer to these new spaces as tech-propelled markets, where tech-enabled innovations are created to address specific unmet needs (e.g., mobility solutions for the elderly, or e-commerce solutions for the remote rural consumers).

In the last five years, venture capital investments in startups across the eight countries in our study (Australia, Brazil, China, India, Indonesia, Japan, Singapore and United Arab Emirates) grew 36%, reaching \$361 billion. This growth rate is comparable to the US, where venture capital investments grew by 30% over the same period. More importantly, over 50% of that venture capital investment was directed to eight tech-propelled markets (Figure 1).

Figure 1: Promising new markets are forming where venture capital-driven innovation meets old, under-tched industries. Yet several, such as construction-tech and agri-tech, remain niche.

Venture capital investments in new tech-propelled markets

Focus countries (Australia, Brazil, China, India, Indonesia, Japan, Singapore and United Arab Emirates)



Venture capital funding rounds include Angel, Seed, Series A to D
 Source: Accenture analysis, © CB Information Services, Inc.— used with permission.

Will these new markets be attractive enough to matter to big businesses? Consider the state of e-commerce in 1994, when a Sting CD was the first product to be sold online securely.ⁱⁱⁱ The company that facilitated the purchase was NetMarket, one of many experimental startups that proliferated in the online space created by the absence of large competitors. It would take more traditional retailers like Walmart another 20 years to catch up, by which time startups like Amazon had grown into today's tech giants.

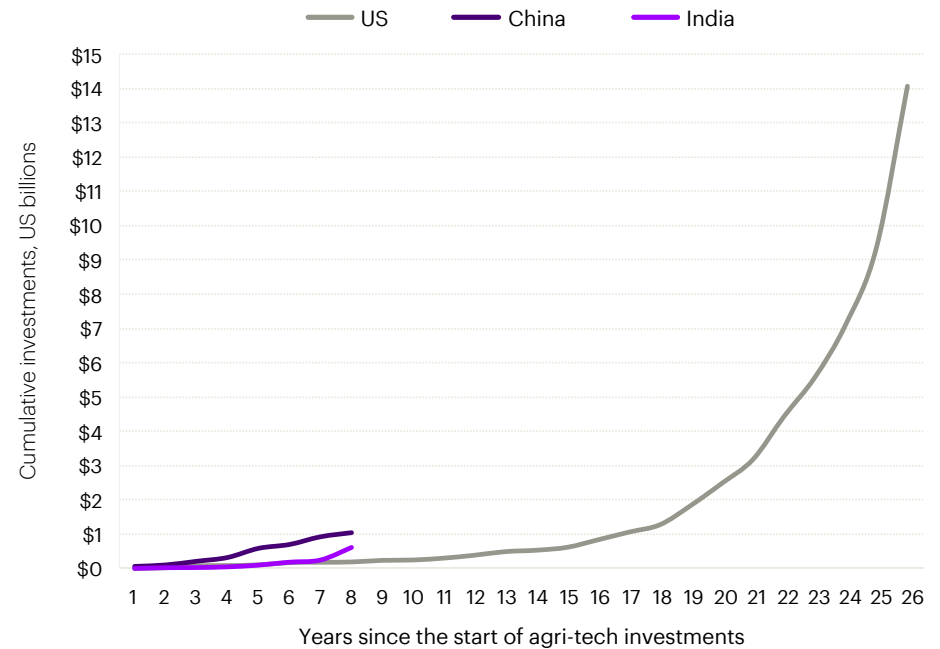
What is notable is that the tipping point for some of these new markets could arrive much faster in large Asian economies. Take agri-tech for example, where it took just eight years for venture capital investments to reach the \$1 billion mark in China, compared to 17 years for the US (Figure 2).

“One of the risks is to underestimate change on a 10-year horizon... The change from now till 2030 will be dramatic in terms of customer requirements and we expect to see a higher demand for fresh vegetables that are grown locally across Asia Pacific.”

**Head of Global Digital Farming Unit
Leading agrochemical producer, APAC**

Figure 2: Agri-tech innovation ready for take-off in Asia

Venture capital investments in agri-tech



Venture capital funding rounds include Angel, Seed, Series A to D

Source: Accenture analysis, © CB Information Services, Inc.— used with permission. Accenture interviews with senior business leaders.

While the absolute amount of investment into agri-tech in China and India might be dwarfed by the amount of capital available in the US, the exponential growth of the sector in Asia means that it is likely to catch up with the US much sooner than expected. This high growth rate coupled with the rising importance of food production in Asia all but ensures that agri-tech innovation becomes key to the region's new agricultural revolution.^{iv} The question is not if it will happen, but when big business will step up and enable it to become the next big thing.

In fact, tech-enabled innovations behind agri-tech such as vertical farming are on the cusp of being embraced by big businesses.

For example, Emirates' investment in the world's largest vertical farm^v enabled the airline to secure its own supply chain of locally sourced, fresh vegetables using 95% less water than outdoor farming.^{vi} As large companies scale such solutions beyond the confines of a single business, these gains are just the beginning of a much larger opportunity.



A vibrant, low-angle street scene at sunrise or sunset. The sun is low on the horizon, creating a bright, golden glow and dramatic lens flare effects across the image. Silhouettes of pedestrians are visible as they walk across the street. The architecture is modern, with tall buildings and a glass facade on the right. The overall mood is energetic and dynamic.

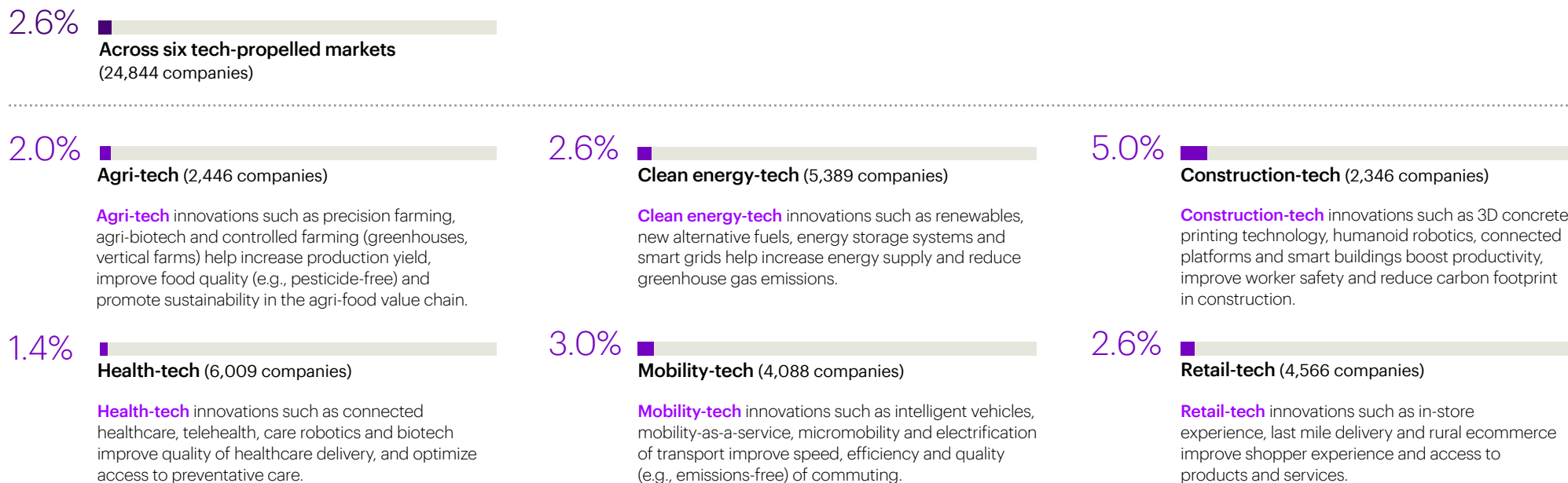
**Big businesses are
missing in action**

Despite the interest from startups, big businesses remain largely absent from these opportunities. In fact, less than 3% of the companies active in six tech-propelled markets we studied had revenues above \$5 billion. The situation was particularly acute in health-tech and agri-tech. (Figure 3)

Figure 3: Large companies are slow to embrace tech-propelled markets

Active market participants in tech-propelled markets

Indicative percentage of large companies (more than US\$5 billion in revenues), as of 2021



Focus countries (Australia, Brazil, China, India, Indonesia, Japan, Singapore and United Arab Emirates)

Sources: Accenture analysis, Quid analysis.

The low footprint of large companies in these markets means that innovation is happening on too small a scale to have the needed impact, or is not happening in the places where it is needed the most.^{vii}

One reason for this absence is that these tech-propelled markets fall in the blind spot of big companies, which consider them to be the exclusive realm of social-tech entrepreneurs.^{viii}

Furthermore, many might not see the potential to build meaningful scale in these new, niche markets while maintaining profitability. Even though companies say that they prioritize innovation over maintaining the status quo, 70% of IT budgets are allocated to operations or maintenance while innovation commands just 30%^{ix}, suggesting that it is difficult for large firms to commit resources to venturing into new areas fast enough.





**Sharpen
your focus,
or face another
disruption**

Given the many issues that are on the minds of business leaders in our current climate, what makes tech-propelled markets such a compelling opportunity?

Large businesses that fail to heed the call of tech-propelled markets could end up being caught by surprise by the next wave of disruptive tech companies that emerge. Instead of playing a waiting game, some large companies have already ventured into tech-propelled markets. Executives we interviewed said that gaining a first mover advantage and pre-empting competitive pressures were among their main reasons for entering tech-propelled markets, even if their rivals have yet to do the same.

The good news is that large companies already present in tech-propelled markets have activated opportunities that can drive sustainable business growth and address unmet societal needs at the same time.

Success in these new playing fields calls for a new lens that is much wider, and sharply focused on:

- 1. Combining societal and commercial value in new market assessments.**
- 2. Targeting location-based opportunities with precision.**
- 3. Remaking the rules through an ecosystem of technology partnerships.**

In the following sections of this report, we take a closer look at each of the characteristics of the new lens, explaining what company leaders need to do as they prepare to drive commercial success alongside societal progress.



01

Combining societal and commercial value in new market assessments

Opportunities in tech-propelled markets are about unlocking commercial and societal value in tandem. Take, for example, the case of 3D printed concrete, a nascent technology which can dramatically shorten construction lead times, simplify supply chains and reduce environmental and safety hazards. **If this solution is scaled, our modelling estimates that the construction sector in Dubai could see an additional \$3.2–8.4 billion in revenues as well as a 2–6% reduction in emissions.** (See p. 17, “Dubai builds for the future with 3D printed concrete”)

While societal value should figure in evaluating an opportunity, commercial considerations will remain paramount. Of the 29 executives we interviewed, 10 said they wanted to gain a first-mover

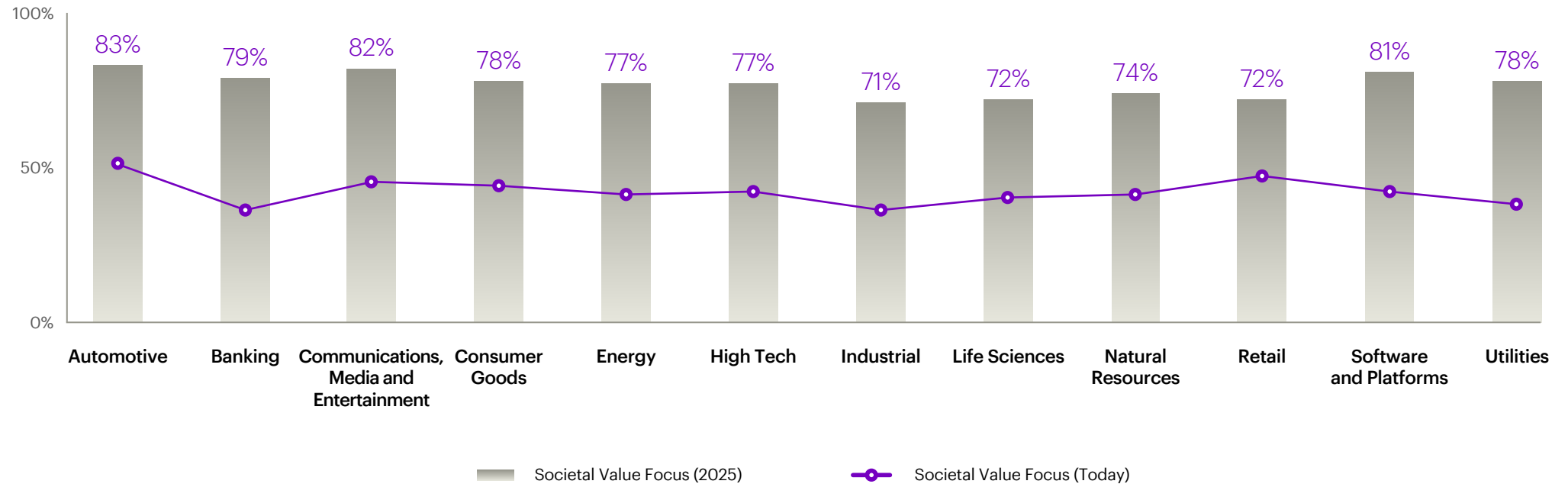
advantage in a new market, while 12 said they were motivated by driving sustainable growth for their business over the long term. As one strategy director from a leading construction company in India explained, “Our decision to enter the construction-tech market (e.g., building information modelling, drones, exoskeletons) is based on the desire to drive long-term growth because we are an old company.”

The strategic impetus lies not in merely recognizing the dual value potential of tech-propelled markets but actively quantifying them and using them to guide decision making. **Yet, a recent survey with 1,174 companies revealed that only 42% measure societal value today, although 77% expect to do so by 2025 (Figure 4).**

Figure 4: Only 42% of large companies measure societal value today

Focus of large companies on measuring societal value (Today vs. 2025)

Total Sample; n=1,174, from 14 countries across Asia Pacific, Latin America, Middle East
Percentage of respondents who selected “a very large extent” or “a large extent”



Source: Accenture C-level Executive Survey, 2022.

What can today's business leaders do?

Introduce new market assessment practice that requires the dual value potential to be critically evaluated (e.g., in addition to assessing profit pools and projecting the potential future market share that a company could capture for itself, emphasize non-financial value such as access to new consumer data or environmental benefits that could be created through business activity).

Help decision makers see both sides of the value equation, in future business cases for entry or further expansion into the relevant tech-propelled markets.

Dubai builds
for the
future with
3D printed
concrete



Technologies such as building information modelling, humanoid robots, prefabricated buildings and 3D concrete printing can help to build faster, more affordable homes under safer working conditions. Yet, technology adoption in the construction industry has been slow^x and dampened by high investment costs, unclear codes of practice and a shortage of skilled workers.

We expect that scaling technology investments in construction can drive significant value for companies, the planet and society at large. To illustrate this potential, we have examined one of the emerging new promises of 3D printed construction in Dubai.

Emerging concrete printing techniques are now being used in the Emirate to fabricate complex building components without any tooling or human intervention. This can dramatically shorten construction lead times, simplify supply chains and reduce logistics constraints.

The Dubai authorities have set a goal of having 25% of its buildings 3D printed by 2030.^{xi} To achieve this ambitious target, the 3D concrete printing market would have to grow exponentially over the next decade.

Meeting the target would lead to construction sector revenues worth \$3.2 billion to \$8.4 billion associated with 3D concrete printing projects in 2030.

But construction companies are not only

attracted by the market opportunity—they also see the potential of 3D printing to reduce their environmental impact.

Compared to conventional building methods, 3D printing concrete produces less CO₂, SO₂ and other forms of pollution. It also uses less energy.

Should Dubai achieve its goal of having 25% of buildings built using 3D printing, that would translate to a reduction in emissions of between 0.3 million and 0.8 million tons—a 2–6% reduction for the local construction industry overall.



02

Targeting location-based opportunities with precision

The complexity and scale of societal challenges can seem overwhelming. Consider, for example, the myriad issues created by a rapidly aging population. These require a comprehensive set of measures at a broader societal and governmental level—everything from healthcare subsidies to pension reform to a profound reshaping of the workforce.

Instead of throwing their hands up in despair, big companies can leverage their advantages to make a difference by focusing on solving predictable, spiralling local issues. **For instance, robotics and automation could be used to address the healthcare worker shortage in Japan, the world’s number one^{xiii} industrial robot manufacturer.** (See p. 21, “Japan’s transition to a solution pioneer in elder care”)

Once a company has addressed a local challenge, the strategic impetus then becomes taking such solutions to other locations that face similar issues. Consider how electronics giant Panasonic has used its expertise in caregiving robotics to promote multi-generational living outside of its headquarters in Japan.

In 2021^{xiii}, Panasonic launched a Wellness Smart Town^{xiv} in Yixing, China. Developed in partnership with a local property developer, **the plan is to build over a thousand homes in the new health-oriented retirement town, complete with smart bathrooms and bedrooms and AI-powered robots to help residents with mobility needs get around.** The initial Yixing development is expected to serve as a springboard for similar initiatives across other rapidly aging Southeast Asian nations.

What can today's business leaders do?

Set out to become a “mainstreaming” leader who turns tech-enabled solutions into universal solutions to address the needs of people within a local mass market. Examples include technology-enabled care solutions in the form of AI doctors, medical robots, telehealth, connected healthcare and wellness devices to help improve health outcomes and care affordability for the elderly.

Strategically deploy such solutions across multiple locations that share similar issues, even if these locations differ in terms of their economic maturity (e.g., from Japan to Southeast Asia).

A white humanoid robot is shown from the side, holding the hand of an elderly woman. The woman is wearing a red long-sleeved shirt and is smiling warmly at the robot. The background is a blurred indoor setting, likely a dining room, with a wooden table and chairs. The robot's hand is white and has a realistic, human-like appearance with visible joints and fingers. The woman's hand is resting on the robot's hand, and they are both positioned in the center of the frame.

Japan's
transition to
a solution
pioneer in
elder care

Japan's 'super-aged' society means the country faces the challenge of an aging and shrinking population earlier than many other industrialized economies. Currently, around 28% of the population is aged over 65.^{xv} By 2050, that figure is expected to rise to 40%.^{xvi} One consequence of this is a growing shortage of healthcare professionals. And this challenge isn't limited to Japan. **In Southeast Asia, for example, an extra 4.7 million healthcare workers are expected to be needed by the end of this decade.**^{xvii}

Technology innovation—especially in areas like artificial intelligence and robotics—will play an important part in addressing this challenge. For example, new generations of elder-care robots will be equipped to take on activities like heavy lifting, aided walking, washing and grooming, monitoring health and wellbeing, and communication on behalf of their patients. As a world leader in robot innovation and application, Japan could be among the first movers to mainstream robotic automation into its elder-care sector.

Breaking down the role of an elder-care worker into 23 critical tasks and focusing on 12 that are amenable to automation, our analysis suggests that about 23% of the elder-care workload could be handled by robotic assistants, expanding the capacity of care by the same body of healthcare workers. **This is equivalent to contributing \$1.8 billion each year in wage value by 2030.** It also promises to transform the job satisfaction of the human care workforce by reducing work-related injuries, removing monotonous tasks and preventing overwork.



03

Remaking the rules through an ecosystem of technology partnerships

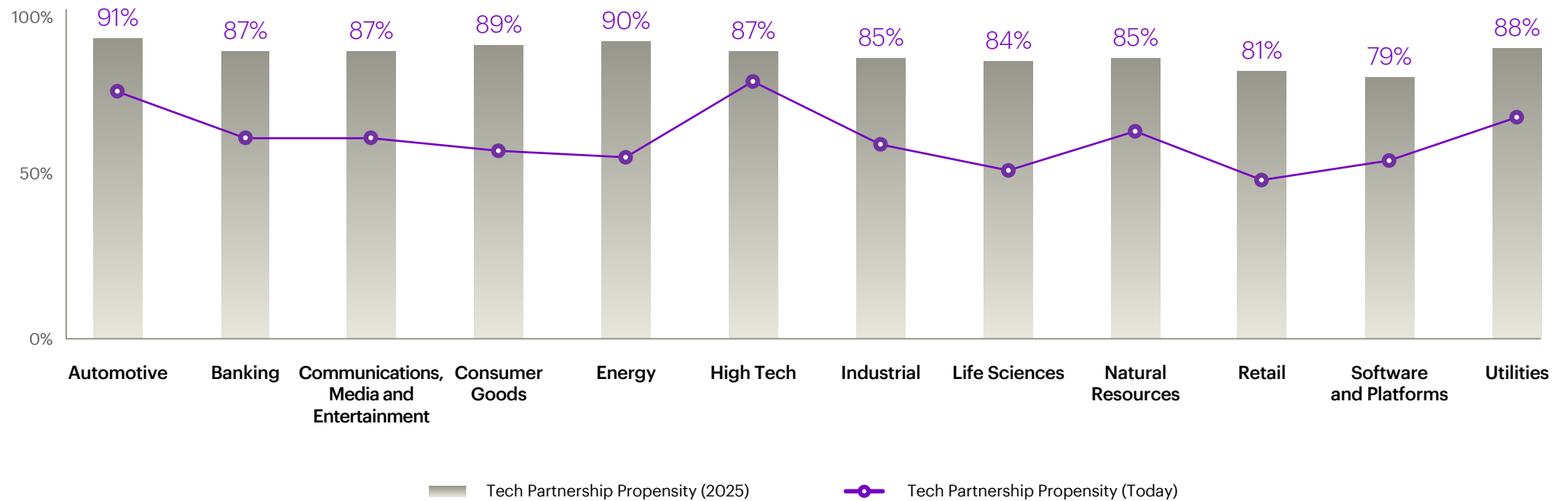
The scale of the challenges being tackled in tech-propelled markets mean that no company can solve them alone, no matter how large they are. What is needed are extensive partnerships, particularly with those with strong technology capabilities.

By 2025, over 80% of companies expect to work with technology partners (e.g., with Big Tech, science-based and startup companies) as they pursue new growth avenues, according to a recent Accenture survey (Figure 5).

Figure 5: No industry can prosper without tech partnerships

Focus of large companies on entering tech partnerships (Today vs. 2025)

Total Sample; n=1,174, from 14 countries across Asia Pacific, Latin America, Middle East
Percentage of respondents who selected “a very large extent” or “a large extent”



Source: Accenture C-level Executive Survey, 2022.

Fully realizing the potential of tech-propelled markets calls on companies to remake the rules that have dominated their industry. One way to achieve this is by creating an ecosystem of partnerships that can bring technology innovations to more people, at speed. (See p. 27, “Food security: A tale of two countries”)

In fact, some companies are already embracing this approach with unconventional partners and unexpected outcomes. Better known for their high quality, minimalist household products, Japanese lifestyle retailer Muji has recently turned its attention to addressing a problem outside of its core sphere of interest: rural mobility enabled by autonomous vehicles.

It all began with a 2017 visit to Finland by Masaaki Kanai^{xviii}, the CEO at that time who was scouting for a location for the country’s flagship store. Impressed by the automated shuttle buses being piloted in Helsinki, he began to explore making one for Muji.

The result? **An all-weather autonomous shuttle called Gacha^{xix}, unveiled in March 2019. Developed with self-driving startup Sensible 4, Gacha was initially piloted^{xx} in three Finnish cities and has recently begun plying public roads^{xxi} in Chiba, Japan.**

Ultimately, Gacha is envisioned to serve those living in rural areas where population decline means that transport options are limited. In addition to enhancing public transport, Gacha could also provide services such as a mobile supermarket or library, enhancing the lives of those that live in inaccessible areas.



What can today's business leaders do?

Become a transfer point of disruptive practices invented by partners that will spark change in your own industry. For example, fast moving consumer goods companies introducing innovative products developed by science-based partners, such as cell-based milk for infants^{xxii} or alternative meats.

Work with mature startups and other partners to accelerate diffusion of new innovations to ensure their growing business is sustainable. For example, energy companies are now helping ride-hailing service providers in their transition to a 100% electric vehicle fleet.^{xxiii}

Food
security:
A tale of two
countries



For highly import-dependent food markets such as Singapore, the bid to strengthen their food security and safety has led the government to set bold targets for domestic food production in the next 10 years.^{xxiv} To meet consumption growth and national food security targets, we estimate that **Singapore farms will need to scale up their annual production, thereby opening up a \$191 million vertical farming market by 2030.**

Although several promising vertical farming startups have sprouted up across the island in recent years, intervention from large companies is still needed to accelerate progress. Recognizing this need, Singapore's sovereign wealth fund

Temasek Holdings has entered a \$30-million joint venture with German life sciences multinational Bayer.^{xxv} As part of the Unfold collaboration, Bayer will provide proprietary germplasm to support new varieties of lettuce, spinach and tomatoes tailored for the unique indoor environment of vertical farms. Temasek, on the other hand, aims to bridge the gap between Big Ag and the country's nascent agri-tech firms by introducing Unfold's high-yield seeds to its network of startups such as Sustenir Agriculture.^{xxvi}

Brazil, on the other hand, has taken a different approach to addressing the agriculture industry's issues. Instead of vertical farming, precision farming is being

pursued, this time in a partnership between two giants: a US farm equipment manufacturer and global networking company Ericsson.

The two companies plan to bring precision agriculture to Brazil by expanding 5G networks in the country's underserved rural areas. Currently, only about 10% of Brazil's farmland has internet connectivity, limiting the opportunity for the country's farmers to benefit from innovations such as **autonomous tractors, Internet of Things crop sensors and computer vision-guided fertilizer use.**^{xxvii} Ericsson estimates that low-latency, high-bandwidth 5G could boost global agricultural earnings by \$1.9 billion over the next decade.

A close-up portrait of a young Black woman with a joyful expression, looking upwards and to the right. She has a bright smile showing her teeth. Her hair is dark and curly. She is wearing a light-colored top with a colorful floral pattern. The background is a vibrant, out-of-focus scene with warm tones of orange, red, and yellow. Overlaid on the image are several glowing, concentric circular light trails in shades of blue, purple, and white, creating a sense of motion and energy.

**Big business
making a big
difference:
Are you ready
to step up?**

Technology-led innovation has the power to deliver extraordinary returns for businesses and societies alike. But there is a whole range of markets—in particular the “tech-propelled” markets we highlight in this report—where a more prominent presence of big business is needed to unlock their full potential.

With their resources, concentration of skills and ability to rapidly scale solutions, large companies are in a unique position to address some of the world’s most pressing societal problems, an expanded mission that many have embraced.

As a start, big businesses need to transform how they evaluate the potential of these new markets where niche innovation is flourishing. When big businesses also begin to target location-based opportunities with precision and re-write the old rules in their own industry through an ecosystem of technology partnerships, everyone wins.

About the Research

The findings in this report draw on four streams of research.

1. Tech-propelled market identification

We started with the assumption that tech-propelled markets are forming at the nexus of “under-tched” industries and growing presence of innovative startups. Our methodology in qualifying what constitutes a tech-propelled market involved:

a. Developing a cross-cutting indicator to assess industry technology intensity

We draw on various databases and economic data to assess technology maturity of different sectors in eight countries across Asia Pacific, Middle East and Latin America.

The Industry Technology Intensity measures the value of total technology investments made by companies operating in an industry, relative to the total value created by the industry (i.e., industry contribution to Gross Value Added). It is a comparative measure that can be used to benchmark across industries or countries.

Our analysis revealed that many traditional industries (e.g., Agriculture, Construction) remain “under-tched”, hindering their ability to accelerate innovations.

b. Assessing the growth of innovative startups in under-tched markets

We leveraged data from CB Insights, a business analytics platform and global database that provides market intelligence on private companies and investor activities. Our analysis of venture capital deals (i.e., Angel, Seed, Series A to D fundings) covered the United States and eight countries across Asia Pacific, Middle East and Latin America during 2012 to 2021.

We assessed and categorized each deal based on our definition of tech-propelled markets that were informed by CB Insights Expert Collections, wide literature review and subject matter expertise from our research and consulting practice.

| Tech-propelled markets | Coverage |
|------------------------|---|
| Agri-tech | Precision agriculture, agri-biotech, controlled environment agriculture (vertical farms, greenhouses), alternative proteins. Excludes food technologies for health supplements, wellness drinks, food additives. |
| Clean energy-tech | Renewables, new alternative fuels, energy storage and smart grids. Excludes Oil & Gas tech, smart cities, electric vehicles, carbon sequestration. |
| Construction-tech | 3D concrete printing, prefabricated homes, construction management software (e.g., building information modelling), construction robotics, smart buildings (using smart materials and IoT). Excludes real estate, smart cities and interior design technologies. |
| Education-tech | Online learning, AR/VR in education, education management software, gamified learning and smart classrooms. |
| Fin-tech | Online banking, digital banks, mobile payments, digital identity technology, blockchain and cryptocurrency. Excludes financing and insurance services in health, mobility, agriculture, construction and retail. |
| Health-tech | Telehealth, healthcare operation and management services, tech-enabled wellness services, medical technologies, biotech, diagnostics and monitoring services. Excludes drug and treatment development and pharmaceuticals. |
| Mobility-tech | Electric vehicles and charging infrastructure, intelligent vehicles (automated and connected), micromobility, mobility-as-a-service and flying cars. Excludes supply chain and logistics technologies (air, marine, freight), drones for delivery and construction, vehicle financing or insurance technologies. |
| Retail-tech | In-store retail tech, e-commerce, last mile goods delivery, customer experience technology. Excludes food delivery and fuel retail |

2. Tech-propelled market value modelling

We partnered with Oxford Economics to assess the dual value potential (commercial + societal value) of select tech-propelled market opportunities over the next decade.

We used a “use case” approach to produce these scenario projections, defined as identifying specific examples of the opportunity in specific geographies, based on the availability of reliable data, a sound economic framework and relevance to the wider opportunity themes.

Details behind the three use cases featured in this report:

a. The rise of vertical farming in Singapore

Premise for use case: In an era of heightened risks from global warming, supply chain interruptions and labor market constraints, vertical farming (VF) techniques could be used by several economies to address local food security issues and reduce the environmental footprint of food

production. Highly import-dependent food markets such as Singapore might provide the most immediate opportunity for rapid upscaling.

Assumptions used in our model:

- Singapore sources more than 90% of its vertical farming compatible basket (VF basket) of goods from Asia Pacific countries today.
- The Singapore Food Agency set a target to produce 30% of its domestic food needs by 2030 to strengthen the country’s food security and safety.
- VF-basket consumption is expected to grow in line with total consumer food spending during 2020 to 2030.
- Societal value that could be unlocked include improved food security, better health and food safety, reduced emissions, and a boost to agricultural workforce skills.

b. 3D concrete printing finds a home in Dubai

Premise for use case: Technology adoption in the high-value construction industry has been slow.

Nascent concrete printing techniques could dramatically shorten construction lead times, simplify supply chains and reduce logistical constraints, including environmental and safety hazards in harsh environments. Rapid progress might be driven by markets with the biggest impetus to invest early in this technology. In Dubai, strong demand for property construction is constrained by a lack of local labor and hazardous working environments.

Assumptions used in our model:

- Based on external reference sources, 3D concrete printing is expected to grow exponentially from \$0.15 million to \$888 million during the period 2016-2025.
- Applied the 25% national target on projected gross output of construction activities in Dubai from 2026 to 2030 and developed two scenarios: residential only or all buildings.
- Switching from conventional concrete construction to 3D concrete printing could reduce environmental impact^{xviii}

in terms of CO₂ production, SO₂ production, energy usage and pollution.

- Estimated the emissions produced per million USD of gross output associated with two 2030 comparative settings for Dubai: a baseline using conventional construction and 3D concrete printing alternative.

c. Mainstreaming elder-care robots in Japan

Premise for use case: Aging societies like Japan will face an elder-care crisis in the next decade as demand for healthcare professionals outstrips supply. The crisis requires a multi-faceted solution including family care, labor force participation, immigration and tech-enabled care innovations. As a world leader in robot innovation and application, Japan could be among the first movers to mainstream robotic automation into its elder-care sector.

Assumptions used in our model:

- Identified five key care functions in elder-care facilities that can be

automated with robots: heavy-lifting, mobile service, communication, personal hygiene and monitoring.

- The number of elder-care facilities is expected to grow in line with the elderly population.
- Defined two scenarios in which robots are 'mainstreamed' throughout Japan's elder-care system to the extent that they support staff across the five work functions, from five to ten robots per care facility.
- Using Oxford Economics Skills Matching Model, we assessed that 12 out of 23 critical tasks performed by the archetypal elder-care worker are automatable.
- The automatable share of elder-care tasks is converted into total number of jobs assuming that as some tasks are displaced by robots, robot-enabled workers spend the saved time on other tasks, thereby increasing the capacity of care.

3. Qualitative interviews

We conducted 29 in-depth interviews with senior business leaders in Australia, Brazil, China, India, Indonesia, Japan, Singapore and United Arab Emirates to understand companies' motivation in venturing into emerging tech-propelled markets and how they are planning to accelerate the creation and scaling of new businesses in these new markets.

We targeted companies with more than \$500 million in revenue currently operating a new business or planning to start a new business in emerging tech-propelled markets, namely agri-tech, construction-tech, education-tech, health-tech, mobility-tech and retail-tech.

These companies were selected from a list of active market participants (including both publicly listed and startup companies) in tech-propelled markets. We leveraged Netbase Quid, an AI-powered market intelligence platform which uses Natural Language Processing (NLP) on

company databases drawn from S&P Capital IQ and Crunchbase company profiles. To identify and profile (by country, industry and revenue size) active market participants, we developed customized search algorithms that were applied on company descriptions for each tech-propelled market featured in our study.

4. C-level executive survey

We conducted an extensive survey with 1,174 senior business leaders across 14 countries in Asia Pacific, Latin America and Middle East. Each respondent represented a company at or larger than \$500 million in annual revenues. The companies were based in Argentina, Australia, Brazil, Greater China, India, Indonesia, Japan, Malaysia, Mexico, Philippines, Saudi Arabia, Singapore, Thailand and United Arab Emirates.

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