

Singapore Early-Stage Emerging Tech Startups 2022

(Physical Sciences, Life Sciences and Engineering)



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SGInnovate is a private organisation wholly owned by the Singapore government. We support the commercialisation of emerging technologies and their application to solve some of the world's most challenging problems. This mission is driven by our work across three strategic areas: Community, Talent and Investments.

COMMUNITY

Builds communities of practice around emerging technologies by bringing together key stakeholders on diverse platforms to accelerate the adoption of these technologies

TALENT

Runs a talent marketplace and various programmes to nurture and develop manpower capabilities and resources to support the commercialisation of emerging technologies

INVESTMENTS

Deploys early stage capital into emerging technology startups that have the greatest potential for success

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Purpose

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Foreword

We are pleased to present the second iteration of SGInnovate's Singapore Early-Stage Emerging Tech Startups report, offering an overview of ecosystem developments in 2022. The report once again focuses on closing the gap in dedicated coverage of the early-stage (under five years since incorporation) emerging tech startup pipeline in Singapore, and has since served as a source of insight for the community and various stakeholder groups keen to understand the ecosystem better.

With the definition of "emerging tech" often considered to be time and context-sensitive, we have continued our focus on the industry verticals of Advanced Manufacturing, Agrifood, Sustainability, and Health and Biomedical Sciences, identifying the startups applying Physical Sciences, Life Sciences and Engineering to solve problems in these areas. Building on the invaluable feedback we received from the ecosystem, we have also refined the report format with additional information on the outlook for many of these promising fields.

We hope this landscape report will continue to spark discussions around the gaps and opportunities in our ecosystem and welcome any feedback from the community which would help us improve future iterations. For a broader view of the venture capital landscape in Singapore, check out the "Singapore Venture Funding Landscape 2022" from Enterprise Singapore (<https://www.startupsg.gov.sg/resources>).



Hsien-Hui TONG

Executive Director,
Investments

Insights and Outlook

New steady state of startups incorporated – 60 annually

2019 was a record year for the number of emerging tech startups founded in Singapore (2019: 93). However, this has since moderated in recent years, and we foresee the number (including those yet to exit stealth mode) stabilising to around 60 annually. These incorporated startups will largely comprise graduates from either university entrepreneurship programmes, venture studios, dedicated accelerators or incubator programmes.

Majority of the funding rounds shrank in size

When compared to 2021, the number of deals dropped by 17%, with fundraising amounts decreasing by 28% in 2022. Among the startups that have fundraised, “extension” rounds (e.g. Seed extension, pre-A) were more prominent in 2022. Meanwhile, the average seed round size shrank for most verticals (Sustainability, Agrifood, and Advanced Manufacturing), potentially reflecting the declining valuations spilling over from the public markets.

Diverging signals in early-stage Health and Biomedical Startups

Despite the steady downtrend in newly incorporated health and biomedical startups, average seed round sizes doubled in this sector. These seemingly contradictory signals suggest that although investor interest in the biomedical space remains strong, systemic gaps (e.g. talent, funding, CDMO capacities) are limiting the pipeline of newly incorporated startups. This could result in a “winner-raise-all” scenario where a small number of startups raise larger rounds to draw from the same, limited pool of resources.

Weathering the ongoing macroeconomic storm

The US Federal Reserve funds rate hike and declining valuations in public markets will continue to loom over venture capital markets, which will impact growth-stage startups until there is a clear signal of a pivot. However, we believe that the local venture capital scene will continue to be active in the early-stage emerging tech space due to the influx of capital into the city-state and level of government support available.

SGInnovate's Emerging Tech Verticals

We have segmented emerging tech startups in the local ecosystem into four verticals: Advanced Manufacturing, Agrifood, Sustainability, and Health and Biomedical Sciences.



ADVANCED MANUFACTURING

Technologies that enhance manufacturing quality through innovative processes, materials, and engineering techniques.

Additive Manufacturing

Advanced Materials

Automation

Sensors and Electronics

Space Tech



AGRIFOOD

Technologies addressing the production and processing of food.

Agritech

Alternative Proteins

Food Tech



SUSTAINABILITY

Technologies that reduce carbon footprint, and/or optimise the consumption and usage of natural resources.

Decarbonisation

Resource Optimisation

Sustainable Materials



HEALTH AND BIOMEDICAL SCIENCES

Technologies with applications in determining health status, treatment and alleviation of disease.

Therapeutics

Diagnostics

Medical Devices

Platform Tech

Methodology, Scope and Definitions

METHODOLOGY

List of Startups

To build our list of Singapore-based emerging tech startups, we amalgamated information from the following sources:

- Venture capital databases, specifically CB Insights and VentureCap Insights
- Data contributed by incubators, industry platforms, and tech transfer offices (List in Acknowledgements)
- SGInnovate's deal flow

Funding Events

From the list of Singapore-based emerging tech startups, we identified funding events by looking up:

- Venture capital databases, specifically CB Insights and VentureCap Insights
- Press releases published on startups' websites or social media channels

Classification of Startups

The general principles and considerations we applied were:

1. Industry verticals and Sub-verticals

- The startups' most mature technology, product, or application is considered

2. Spinoff Source

- The startup's participation in incubator/accelerator programmes nearest to incorporation date
- Attribution on their website and social media
- Publicly announced tech licensing arrangements
- Previous employment of the founders

3. Funding Round Name (e.g. Seed, Seed Extension, Series A) and Size (in US\$)

- Press releases and social media
- Venture capital databases, specifically CB Insights and VentureCap Insights

SCOPE AND DEFINITIONS

	INCLUDED	EXCLUDED
"Early Stage" Startups	Incorporated between 1 Jan 2018 and 31 Dec 2022	Incorporated before 1 Jan 2018
"Emerging Tech" Startups	Startups developing tangible products (e.g. devices, machinery, instrumentation, food, pharmaceuticals) based on Physical Sciences, Life Sciences and/or Engineering	Artificial intelligence (AI) / machine learning (ML) startups with software products only*
Geography	Headquartered in Singapore	Have offices in but not headquartered in Singapore
Funding Rounds	Seed round and beyond	Incubator-only pre-seed funding events

* Note on excluding software-only and AI/ML-only startups

Recognising that software and AI startups have gained significant investor traction, we are focusing more on emerging tech startups developing hardware products. Emerging tech startups are generally more capital intensive and have a longer route to commercialisation, but are likely to enjoy more significant technological advantages once established.

Emerging Tech Startups Incorporated in 2022

Across the four industry verticals identified, more than 30 Singapore-based emerging tech startups were incorporated in 2022.

ADVANCED MANUFACTURING

Betelgeuse
Circuits



HIVEBOTICS



Spotics

TERAX

AGRIFOOD



ALGROW
BIOSCIENCES

allium
bio

AquaViolet
YOUR CHOICE OF UV SOLUTION



Curated Culture



Vmpacfat

Liloss



MINDFUL
DRINKS

MYCOSORTIA



prefer

PULLULO
Changing alternatives to essential

SONO
BIOSCIENCES

Mavoury Foods

SUSTAINABILITY

BioMetallica

CRecTech
Carbon Recycle Technologies



CYCFIELD



marino solar

Power
Facade

Tap Tiles

HEALTH AND BIOMEDICAL SCIENCES

ACOERELA

ArrowBiome

Autómera

Axynsis
Axynsis Therapeutics



CoVBio

Innocellular
Tech

Revival
Biotech

TRIDENT

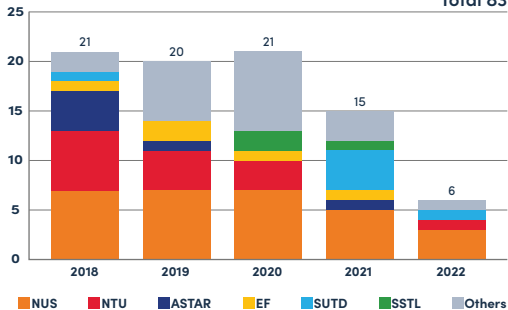
XFolio

Spinoff Sources: 2018–2022

After a peak in startup incorporation in 2019, we anticipate the number of emerging tech startups incorporated yearly to stabilise around 60.

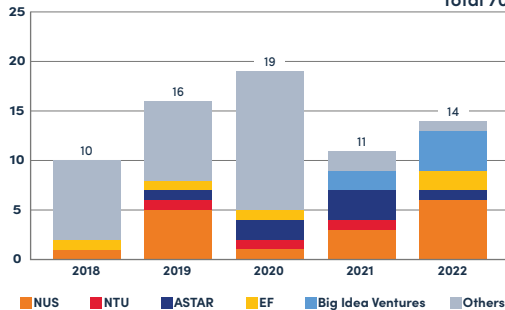
Advanced Manufacturing

Total 83



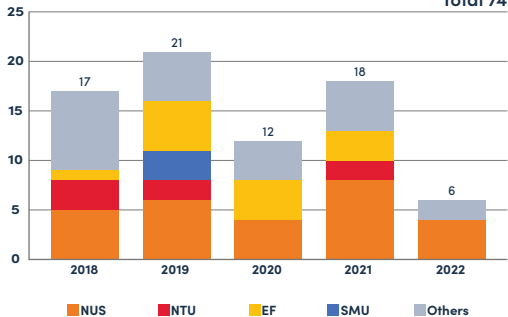
Agrifood

Total 70



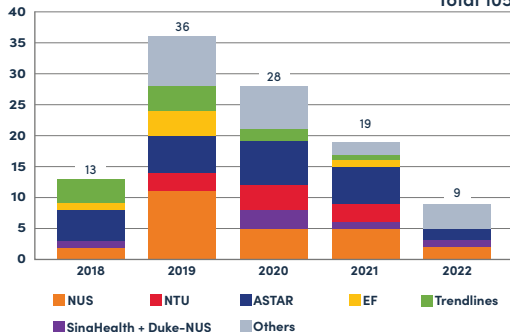
Sustainability

Total 74



Health and Biomedical Sciences

Total 105



Year	2018	2019	2020	2021	2022
Startups Incorporated	61	93	80	63	35

Landscape report updates

- The number of 2021 startups has been revised to 63, up from the previously reported estimate of 36.
- Similarly, we expect the final number of startups incorporated in 2022 to be higher as well – approximately 60 compared to the current 35, assuming a similar extent of “missingness”.

Specialised venture programmes are contributing more to the startup pipeline

- EVX Ventures is collaborating with local and overseas universities to spin out biomedical startups.
- Singapore Space and Technology Ltd has been running a space-based accelerator to incubate and support Space Tech startups.
- Food-focused Big Idea Ventures runs an accelerator programme to help food innovation startups in Singapore access the APAC region.
- Collectively, these programmes are likely to make up for the exit of Entrepreneur First (EF), which looked at a diverse range of Deep Tech verticals.

There is a shift in terms of emerging tech verticals for the startups that are being spun-out from one of the two oldest universities in recent years.

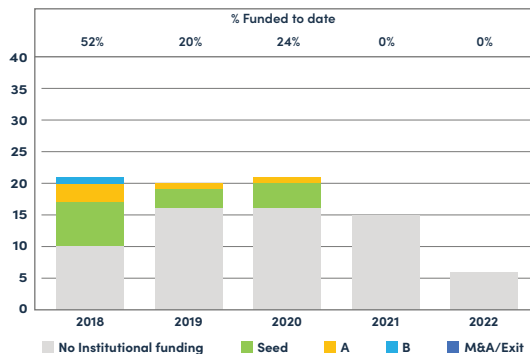
- More agrifood and sustainability startups are being spun out from NUS, especially over the past 2 years. This could be a result of shifting investor interests.

* Where startups may be attributed to more than 1 spinoff source, they are counted towards the “main” source. Where startups may be classified under multiple verticals, they are counted towards the “main” vertical.

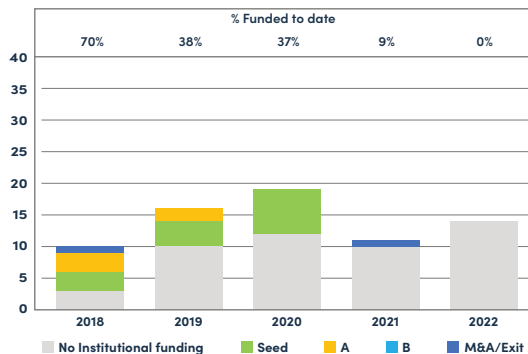
Institutional Funding Status: 2018 – 2022

Among startups incorporated in 2018 (5 years ago), it took an average of 2 years to receive their first institutional VC funding, with about 50% VC-funded to date. Those yet to receive institutional VC funding may have sought alternative funding sources to focus on their development.

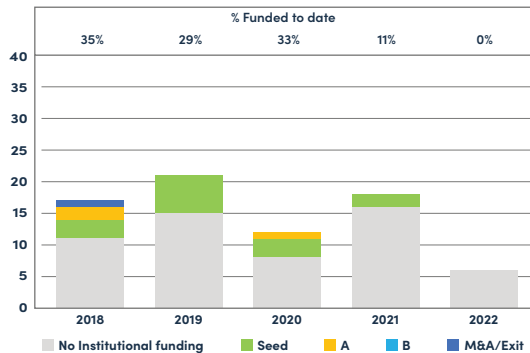
Advanced Manufacturing



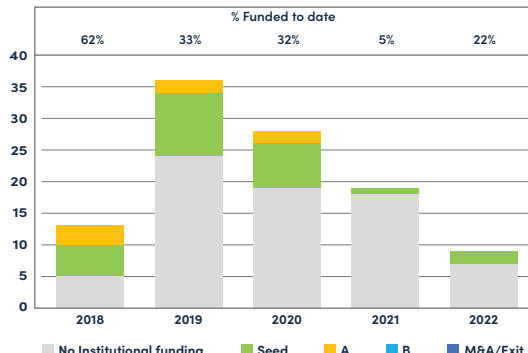
Agrifood



Sustainability



Health and Biomedical Sciences



- Among startups from the vintage year of 2018, ~50% remain without institutional funding to date
- The first institutional funding usually comes in the 3rd or 5th calendar year after incorporation

For startups incorporated in 2018, Agrifood startups received the highest proportion of institutional funding

- The excitement around Singapore's "30 by 30" initiative could have resulted in higher investor interest in this vertical in the years following the announcement.
- This is twice the proportion of cumulative funding received by sustainability startups of the same vintage year (2018).

The availability of alternative funding mechanisms may explain the low proportion of institutional funding across the verticals

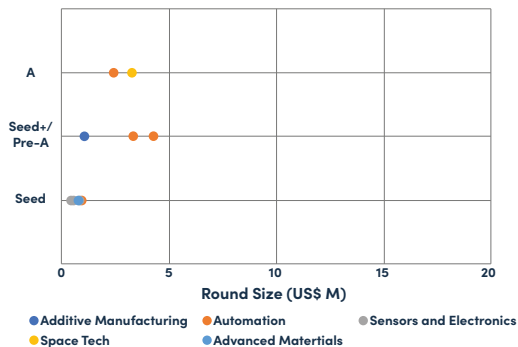
- The ability to secure sufficient funds from alternative sources will provide startups with a longer runway to focus on their development before needing to actively seek institutional funding to scale.
- Examples of such sources may include:
 - Dilutive funding from participating in accelerator / incubator programmes
 - Non-dilutive grants from governments and non-profits
 - Co-development arrangements with customers and partners
 - Bootstrapping

* Incubator-only pre-seed funding events are excluded

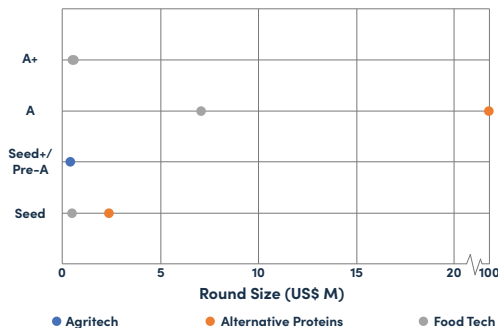
Funding Activities by Funding Round: 2022

More intermediate rounds were raised in 2022 versus 2021; the average seed round size fell for all verticals except for the Health and Biomedical Sciences.

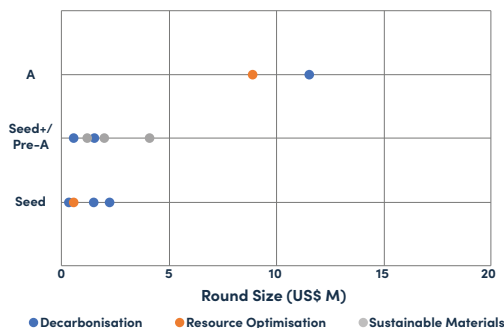
Advanced Manufacturing



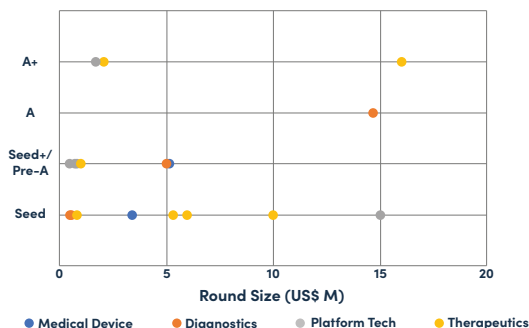
Agrifood



Sustainability



Health and Biomedical Sciences



Public market volatility is creating a ripple effect, which has introduced uncertainty into the private market

- We noticed more companies raising immediate funding rounds. This could be an attempt to extend their runway and minimise the impact on valuations until the macro-economic environment improves

	2022	2021
Seed+/Pre-A	15	7
A+	5	2

The average seed round size in 2022 varied considerably across the four verticals compared to 2021.

US\$' M	2022	2021
Advanced Manufacturing	0.6	1.5
Agrifood	1.5	2.3
Sustainability	1.2	2.6
Health and Biomedical	5.2	2.1

Next Gen Foods raised a US\$100M series A round, dominating the landscape in 2022, across all four verticals.

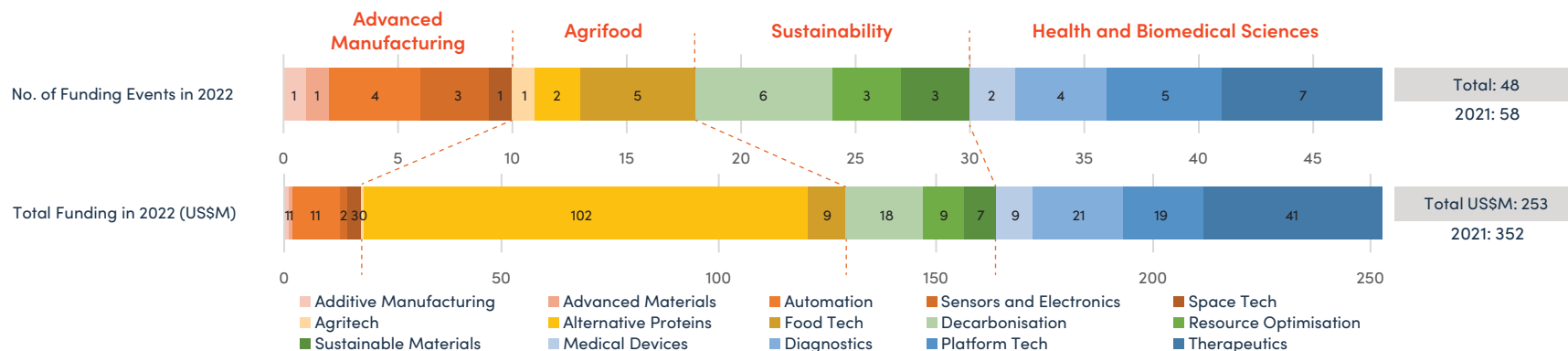
The announcement of 2 potential early public exits in the Health and Biomedical Sciences vertical has created a great deal of excitement in the local ecosystem:

- AUM Biosciences (2018) is pending a SPAC on NASDAQ through Mountain Crest Acquisition Corp
- CytoMed Therapeutics (2018) is preparing for a NASDAQ listing

* Funding round names and amounts are based on press releases, social media announcements, or entries on venture capital databases

Funding Activities in 2022 by Sub-verticals

Compared to 2021, overall funding events and amounts raised have fallen, with Alternative Protein startups seeing the biggest drop. However, we also observed a rising number of funding events in Sustainability.



Advanced Manufacturing

- Advanced Manufacturing saw a substantial decline in the total funding amount for the sector, brought on by the halving of the average seed round size as well as a decline in the number of funding events (2021: 13, 2022: 10).
- This may reflect a shift in investors' focus towards other verticals, and could also be tied to the global weakening of manufacturing activities.

Agrifood

- Only two (compared to 12 in 2021) alternative protein companies raised funds in 2022. This could be attributed to the ample cash runway the 12 startups had raised in 2021, along with the declining market valuation for new rounds in 2022.
- Without the large US\$100M Series A round by Next Gen Foods, the amount fundraised by Agrifood overall would have otherwise been relatively muted.

Health and Biomedical Sciences





- Both the number of funding events (2021: 20, 2022: 18) and total fundraised amount decreased (2021: US\$121M, 2022: US\$89M) this past year.
- While overall seed round size doubled, we also saw more extension rounds which are typically associated with smaller cheque sizes.

Sustainability

- Sustainability was the only pillar that saw a year-on-year increase in the number of funding events (2021: 5, 2022: 12).
- This could signal both a maturation of sustainability startups and growing investor interest in this vertical.

* Startups that span multiple verticals have been classified under the category that best represents their core industry.

Our Outlook for 2023 and Beyond

Verticals	Overall Outlook	Sub-verticals	Sub-vertical Outlook
 <p>Advanced Manufacturing</p>	<p>Pipeline and investor interest in hardware startups seems to be fading, possibly tied to the global weakening in manufacturing activities.</p>	Additive Manufacturing	Promise of “mass customisation” is alluring, but the challenges still lie in finding the right use cases beyond dentistry.
		Advanced Materials	Singapore maintains strong academic thought leadership in research for graphene and other advanced materials, but identifying the right market fit and scaling up remains an issue for startups.
		Automation	Robotics that can help improve productivity and safety in Maintenance, Repair and Overhaul (MRO) will continue to draw interest given rising labour costs and recovering demand in select sectors (e.g. aviation, construction, F&B).
		Sensors and Electronics	Given the benefits of Microelectromechanical systems (MEMs) and its diverse applications, this is an area to track as Singapore invests more resources to strengthen capabilities in the space.
		Space Tech	Still a very nascent area for Singapore, but commercial interest should grow as the low orbit economy starts to mature in the coming years.
 <p>Agrifood</p>	<p>Growing space due to Singapore’s “30 by 30” initiative, but unit economics and scaling up remains largely uncharted.</p>	Agritech	Farming operations are CAPEX heavy, and most startups may be better served outside the VC funding model.
		Alternative Proteins	Significant investments have already been made in Singapore in fields of technology critical to the production of alternative proteins, such as precision fermentation. Growing demand for alternative and cell-cultivated proteins continues to provide commercial opportunities for startups focused on factors of manufacturing for these products.
		Food Tech	With increased consumer emphasis on health and wellness, functional food ingredients and healthier substitutes will be key to helping food producers meet nutritional targets, expand product offerings, and meet carbon targets. Continued innovation in this space is critical to meeting Singapore’s 30 by 30 goals.
 <p>Sustainability</p>	<p>Regulatory and public pressure will make sustainability technology more relevant than ever. We are optimistic in the growth of this vertical.</p>	Decarbonisation	Singapore’s national strategy to shift half of our energy production to low-carbon hydrogen by 2050 will continue to be a crucial driver for the growth of startups developing more efficient and low-cost technologies to produce, distribute and use this fuel.
		Resource Optimisation	Singapore has existing strengths in Water and Membrane Tech. Investors can be cautiously optimistic about commercial opportunities arising from the application of these technologies to non-water-related areas.
		Sustainable Materials	Stricter regulations and consumer pressure around the use of single-use packaging and petroleum-based plastics are fuelling a growing demand for more sustainable alternatives (e.g. non-animal leather, bio-plastics).
 <p>Health and Biomedical Sciences</p>	<p>Confluence of ageing population, chronic disease, pandemic vigilance and rising affluence bodes well for continued relevance and investor interest.</p>	Medical Devices	We see this as an increasingly crowded space, with strong differentiation required to break through on the international stage. Devices addressing “home care”, “remote care”, and caregiving efficiency will be increasingly relevant as the world’s population ages at a faster pace.
		Diagnostics	Post-COVID, we expect interest to cool off for the time being. Indeed, no new incorporations were observed in 2022.
		Platform Tech	Singapore’s strength in biomedical research will continue to generate a good pipeline of investible assets.
		Therapeutics	

Acknowledgements

Data Contribution

In compiling the list of early-stage emerging tech startups, we have relied on inputs from our valued partners. We acknowledge the generous information sharing and assistance rendered by the following incubators, industry platforms and tech transfer offices:

- A*STARTCentral
- National Health Innovation Centre Singapore (NHIC)
- National University of Singapore (NUS), Industry Liaison Office
- NTUitive, Innovation and Enterprise Company of Nanyang Technological University (NTU)
- Singapore Eye Research Institute (SERI), Technology Development and Commercialisation (TD&C) Office
- Singapore Space & Technology Ltd (SSTL)
- Singapore University of Technology & Design (SUTD), Grant Partnerships & Management (Venture, Innovation & Entrepreneurship)

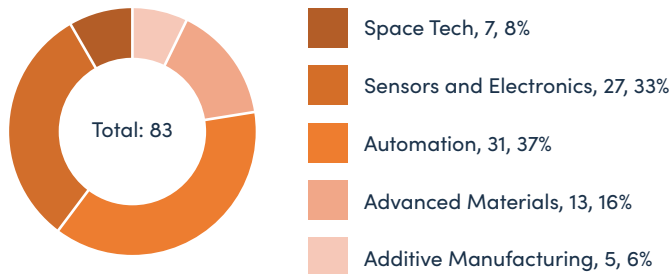
To make future iterations of this report more complete, we look forward to information exchange with our existing and prospective partners. Do reach out to the Investments (Corporate Engagement) Team at SGInnovate: ce@sginnovate.com.

Appendix: Definition of Sub-verticals

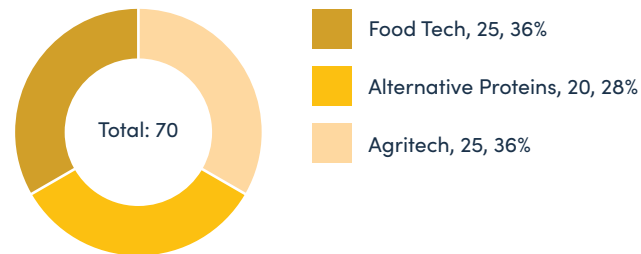
Verticals	Sub-verticals	Definitions
 <p>Advanced Manufacturing</p>	Additive Manufacturing	Processes, materials for additive manufacturing, applications of additive manufacturing (e.g. bio-printing, 3D printed food/implants).
	Advanced Materials	Nano-materials (e.g. graphene), smart materials (e.g. self-healing materials, stimuli responsive polymers), multi-materials (e.g. metal/polymeric composites). Excludes: Materials for hydrogen, batteries, additive manufacturing.
	Automation	Robotics, autonomous navigation systems (e.g. drones).
	Sensors and Electronics	Photonics, electronics, semiconductor, sensors and IoT, quantum sensors.
	Space Tech	Space vehicles (e.g. spacecraft, satellites), space communication (e.g. quantum communication), propulsion, launch systems, and a wide variety of other technologies including support infrastructure equipment and procedures.
 <p>Agrifood</p>	Agritech	Technologies that aim to increase farming efficiency, including the whole of food production up to the farm gate. Includes: Vertical/indoor farming systems, farm IoT, animal health.
	Alternative Proteins	Technologies seeking to produce protein-rich food with increased efficiency and sustainability. Includes: Plant-based and fermentation-based protein, and cultivated meat.
	Food Tech	Technologies that aim to promote wellness, and efficiency in designing, producing, choosing, delivering and enjoying food. Excludes: Alternative proteins. Includes: Other functional/novel ingredients, culinary robotics.
 <p>Sustainability</p>	Decarbonisation	Hydrogen, Carbon Capture, Utilisation and Storage, Renewables (wind, solar, bio-fuels, etc.), electrification.
	Resource Optimisation	Technology that enables the reduced consumption of natural resources and energy.
	Sustainable Materials	Materials that enable the reduction of carbon footprint or consumption (e.g. sustainable packaging, building materials).
 <p>Health and Biomedical Sciences</p>	Medical Devices	Devices used for medical purposes. Includes: Implants, surgical tools, monitoring systems.
	Diagnostics	Technologies applied for determining disease status or prognosis.
	Platform Tech	Technologies, services and tools used as the basis for other applications and processes.
	Therapeutics	Technologies for treating diseases (e.g. small molecules, biologics, immunotherapy, gene therapy) Excludes: Digital therapeutics and implants.

Appendix: Emerging Tech Startups Incorporated between 2018-2022 by Sub-verticals

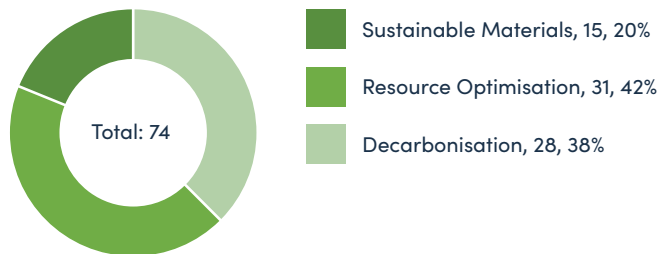
Advanced Manufacturing



Agrifood



Sustainability



Health and Biomedical Sciences

