enabling new business

SWITZERLAND GLOBAL ENTERPRISE

Analysis of Ecosystems (full version)

April 2022

Executive Summary – Ecosystems shaping the future of Switzerland

5 ecosystems for investment promotion

Where to play

- **Ecosystems create significant economic and societal benefits for their host countries,** by increasing GDP, creating high quality employment, accelerating innovation. They are "self-reinforcing" – vibrant ecosystems attract further players to join and add high value in surrounding areas, both in terms of activities and geographies
- **Five ecosystems are suggested as priorities based on a detailed analysis of attractiveness and strategic fit with high potential for significant value-add**: (1) Life Science, (2) Future of Food, (3) Future of Finance, (4) Industry 4.0, and (5) Digital Tech
- **Six underlying technologies and capabilities are critical for the prioritized ecosystems (based on earlier work on "5Tech"):** Robotics, Data & Analytics (including Artificial intelligence), Blockchain, Biotechnology, Microtechnology, and Material Science & Eng.

Approach investment promotion Switzerland

How to win

- **Being top of mind of international executives is key to attract investment, as well as being clear on Switzerland's proposition around the (constantly evolving) attractiveness factors for decision-making.** International companies typically use a structured decision process for choosing locations, starting from a longer list of options and then evaluating critical factors of attractiveness
- **Switzerland is not always top of mind –** Switzerland's leading position in Life Sciences and Future of Finance is acknowledged globally, but the profile in Future of Food, Industry 4.0 and Digital Tech is less sharp
- **Relevant attractiveness factors for decision-making differ by ecosystem:** Talent availability is a game changer across high value-added ecosystems, as is Quality of Life. Access to growth capital beyond venture capital is important for scaling up innovative business models across ecosystems
- **Globally recognized strengths of Switzerland include quality of life, a favorable tax environment in international comparison, and regulatory reliability –** those strengths need to be highlighted
- **Talent availability (including cost of talent), lack of access to growth capital, and market access are major development areas of Switzerland** – Talent availability in particular due to complex inbound mobility and low absolute number of STEM graduates

Overall plan of implementation

Make it happen

- **Switzerland needs to act as one - orchestrating all available resources and focusing on the ecosystems.** All stakeholders (S-GE, regions, cantons, Swissnex, Switzerland Innovation, Presence Switzerland, Innosuisse, etc.) need to be aligned and committed to the direction and consequently coordinate their actions
- **Switzerland is proactive about the five ecosystems.** An overarching roadmap has been developed to support and speed up the implementation, including a clear timeline of actions as well as roles and responsibilities
- **Pilot before scale-up.** Switzerland should roll out the ecosystem approach first in selected pilot markets (e.g., USA) before adapting it globally

Content

Context

Mandate - Switzerland Global Enterprise (S-GE) supports innovative foreign companies in their establishment in Switzerland based on the mandate of the State Secretariat for Economic Affairs (SECO) and Swiss cantons

Current focus – For the current performance period, «Steuerungsgruppe Landesmarketing» (consisting of SECO, General Secretariat of the national economy, cantons and regional representative, and the S-GE) has decided to focus on five future technologies (artificial intelligence, robotics, personalized health, blockchain, advanced manufacturing) and 10 geographic markets

Further development – For the performance period 2024-2027, the «Steuerungsgruppe Landesmarketing» proposes to further develop the current 5Tech focus towards a focus on ecosystems. The group is convinced that for Switzerland the highest added value can be achieved by focusing on competence-driven and high quality FDI and settlement projects

Objective

Study – As a central element for the alignment of the national investment promotion and for validation of existing hypotheses, the study should answer the following questions:

- **Ecosystem investment promotion Switzerland** – On which ecosystems should the national investment promotion 2024-2027 focus on to optimally contribute to Swiss value creation – where to play
- **Approach investment promotion Switzerland** – How should the approach of the national investment promotion be adapted to meet the needs of the companies in prioritized ecosystems better than the competition – how to win
- **Overall plan of implementation** - What are the requirements for a successful implementation, what are the most important activities/milestones until 2024 – make it happen

Central to this is a consistent customer view, a Swiss strengths-based approach and the illustration of selected case studies

Deliverables and key questions of this study

Ecosystem investment promotion Switzerland ***Where to play*** 	Definition ecosystems and their value add (incl. case studies)	• What is an ecosystem? How can competency-based settlements and an ecosystem focus help increase value creation in Switzerland? • How can selected case studies illustrate the contribution of settlements over time for entire Switzerland?
	Global ecosystems and attractivity for Switzerland	• How are these ecosystems positioned by technology, industry and geography, globally? • What trends and developments will influence these ecosystems in the future? • Which ecosystems offer the greatest potential to generate value in Switzerland? (Further development of the 5Tech focus)?
	Strategic fit of ecosystems for Switzerland	• In which ecosystems does the country have a strong starting position and particular competitiveness (Location factors Switzerland)? • Based on this, which ones have the highest potential for value creation due to strengths of Switzerland (technology, industry, competencies)?
	Prioritization of ecosystems based on attractivity & strategic fit for Switzerland	• Which ecosystems should the National investment promotion 2024-2027 target to optimally contribute to increasing value creation?
Approach investment promotion Switzerland ***How to win*** 	Needs of the companies of the prioritized ecosystems	• What are the current and future needs of firms (key point) in the prioritized ecosystems?
	Approach investment promotion Switzerland (kept short)	• What is the impact of current and future needs of firms in the prioritized ecosystems on the investment promotion approach in Switzerland? • What adjustments need to be made generally and specifically to individual ecosystems? • How does the investment promotion Switzerland differentiate itself from competitors? (Location factors Switzerland)?
Overal plan of implementation ***Make it happen*** 	Masterplan	• How does the overall plan look like including the most important activities/ milestones until 2024
	Requirements for a successful implementation	• What are the requirements for a successful implementation?

Content

Executive Summary – Where to play

Context and objectives	• **S-GE is supporting innovative foreign companies to establish in Switzerland** on behalf of SECO and the Swiss cantons • **Objective of this study is the definition of prioritized ecosystems** for the national location promotion strategy of Switzerland with optimal impact on economic value-add for the time period 2024-2027, evolving the current strategy with focus on 5Tech
Importance of ecosystems (why)	• **Ecosystems are a set of highly interconnected stakeholders** across different industries which are providing innovative products and services based on leading technology and a partnership mindset – Value-add of the system goes far beyond what the sum of individual players could deliver and is increasing disproportionately by adding further players, driven strongly by regional spillovers & embedded in global ecosystems • **Global ecosystem case studies** show that ecosystems create significant economic and societal benefits for their host countries, e.g., employment, GDP increase, high R&D activity, future innovation. Several enablers need to be in place to create a successful ecosystem, e.g., human capital and talent, state of the art research centers • **Strong starting point in Switzerland with several ecosystems at different maturity levels today** which generate significant value for the economy – notable examples are (1) Life Science, (2) Digital services & IT / Digital content (3) Crypto Valley
Definition of ecosystems (what)	• **There are 14 global ecosystems** defined based on overarching customer needs – Each ecosystem consists of a large number of sub-industries • **Ecosystems are influenced by global macro trends, societal game changers, and CH-specific developments**: Global macro trends with the highest importance are aging population and conscious eating; talent economy is the societal game changer with the highest impact; CH-specific developments include increasing venture capital, and promotion of innovation through the Swiss National Science Foundation
Prioritization of ecosystems in Switzerland (where)	• **The overall list of ecosystems and sub-industries is prioritized through a two-step process** : 1) Non fitting ecosystems / sub-industries were excluded based on a missing link to the Swiss economy (limited science & tech focus, lack of sustainability, missing competencies, no compliance with Swiss foreign policy , 2) Detailed analysis of attractiveness and strategic fit for Switzerland • **Based on the analyses, 5 ecosystems are suggested as priorities**: – **Life Sciences:** BioPharma (oncology, immunosuppr., derma., vaccines), MedTech (in-vitro-diagn., dental, urology / neprhology, endoscopy) – **Future of Food:** Food & nutrition with focus on Food Science, AgTech, Consumer Tech – **Future of Finance:** Wealth & asset management with focus on Sustainable investing & finance and financial software – **Industry 4.0:** Industrial automation with focus on “machinery, robotics & control equipment”, “tooling, components & sensors”, and “connectivity platforms & software” – **Digital Tech:** Interactive Entertainment & Media, with focus on social networking platforms, video games, search engines, and content streaming • **Six underlying technologies / capabilities are critical for the prioritized ecosystems (based on earlier work on “5Tech”):** Robotics, Data & Analytics (including Artificial intelligence), Blockchain, Biotechnology, Microtechnology, and Material Science & Engineering

5 ecosystems for investment promotion (where to play)

WHY are ecosystems important for economies?

- **Definition & Value creation**
- Global ecosystem case studies
- Perspective Switzerland

WHAT are relevant ecosystems and its drivers?

WHERE should Switzerland focus?

Definition of ecosystems

A common understanding of the term “Ecosystem” is key to the success of the study

Definition

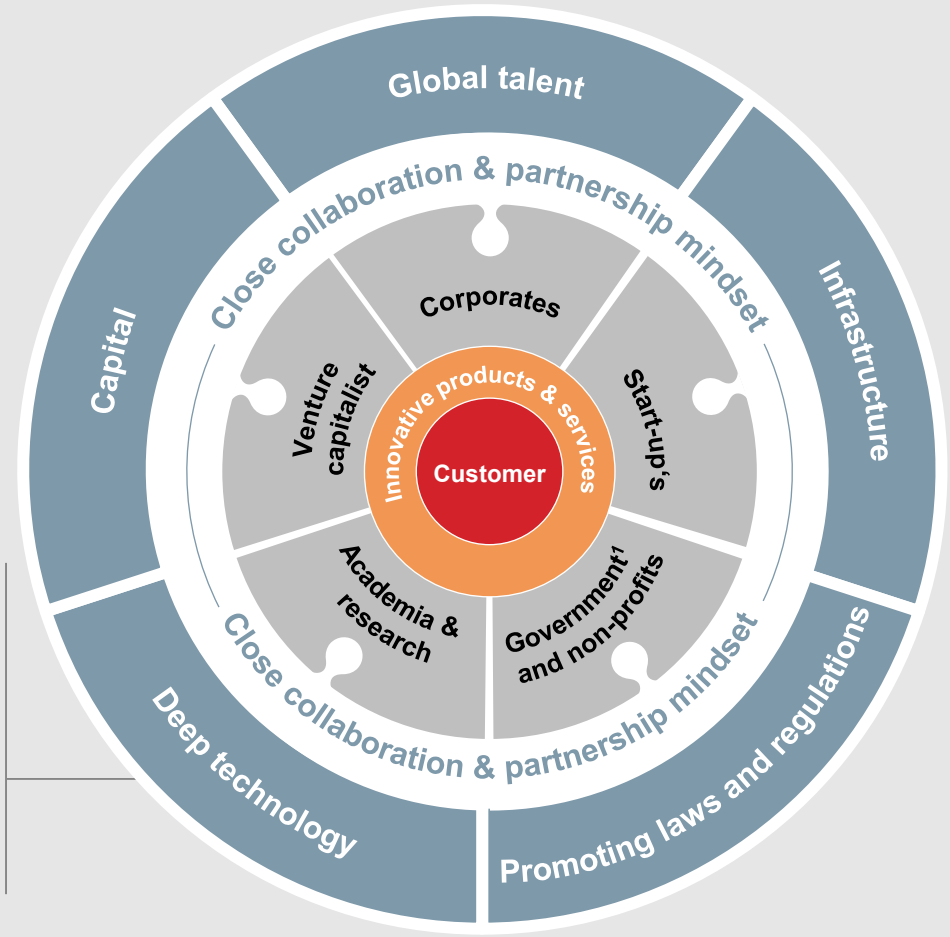
Set of **highly interconnected stakeholders** across different industries (corporates with different size and focus, start-ups, research centers and universities, governments and regulators, etc.) which are **providing innovative products and services based on leading technology and a partnership mindset.**

Value-add of the system goes far beyond what the sum of individual player could deliver and is increasing disproportionately by adding further players (network effect), driven strongly by regional spillovers.

Structure

Enabler

Interconnected stakeholder



- Artificial Intelligence
- Robotics
- Personalized health
- Blockchain
- Advanced manufacturing
- ...

Further definitions

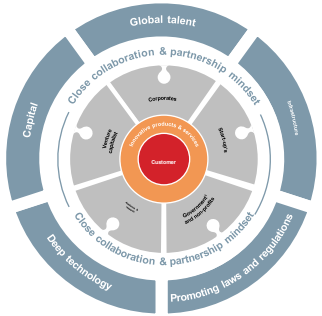
In distinction to “ecosystems” further terms need to be defined

Term	Definition
Industry	Set of companies that are related based on their business activities – providing similar products/services and customer value
Cluster	A multitude of companies of one industry located in a same region
Company	Legal entity formed by a group of individuals to provide products/services
Technology	Application of skills, methods, processes, software, hardware, and other devices with the purpose to provide products / services
Trend	A change/shift with the potential to shape/distrupt industry structures including its value drivers

NOT EXHAUSTIVE

Ecosystem value creation (1/2)

Ecosystems create mutual benefits for the involved stakeholders…

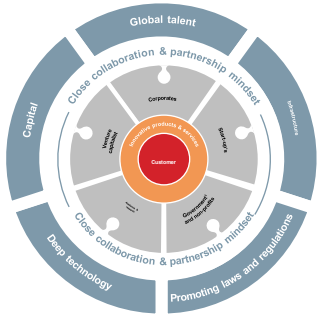


Start-ups	• Access to funding opportunities • Access to a strong workforce pool • Knowledge transfer from research institutions
Venture capital	• Investment opportunities, e.g., in university spin-offs • Access to early insights into emerging technology trends
Government and non-profits	• Increase of corporate tax revenues • Enhancement of public national image
Corporates	• Access to a strong workforce pool • Innovative partnerships across companies • Beneficial regulation and legislation
Academia & research centers	• Opportunities for research collaborations with industry • Access to global talents

NOT EXHAUSTIVE

Ecosystem value creation (2/2)

…but also overall benefits for society and the entire economy



Employment	Creation of high-skill employment opportunities for local talents in both large multinational corporations and smaller-scale start-ups
Consumption	Access of local customers to innovative products and services developed and produced by the companies within the ecosystem
Cross-industry growth	Spillover effects to local industries and companies outside the ecosystem (e.g., real estate and housing for company staff, business travel industry)
Regional development	Increase of locational attractiveness and economic prosperity of peripheral regions near the main ecosystem hubs, e.g., growth of suppliers in adjacent regions
Education	Enhancement of higher education quality through attraction of top scholars, increased funding of local universities and research institutions

5 ecosystems for investment promotion (where to play)

WHY are ecosystems important for economies?

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Ecosystem case examples

6 international case studies reveal that ecosystems generate a significant impact for the host country

Boston-Cambridge: Life Science

Israel: AgTech / FoodTech

Singapore: Life Science

Luxembourg: Finance / FinTech

Ireland: Life Science

Silicon Valley: Tech

Note: Most case studies have been chosen based on similar country attributes compared to Switzerland in terms of size and wage cost structure

Source: Pictures based on web research

Lessons learned from global case studies (1/2)

Ecosystems create significant economic impact for their host countries

Impact	Description	Example
Creation of employment	Ecosystems lead to a significant growth of attractive employment opportunities, typically for highly qualified staff	8.5% annual R&D job growth in biopharma ecosystem in greater Boston area
GDP increase	Ecosystems have the potential to substantially increase a country's output	Financial sector representing a third of Luxembourg's GDP
High R&D activity	High R&D spending of corporations within the ecosystem lead to creation of innovation	EUR 2 bn annual R&D spend by IDA Ireland client companies in biopharma
Future innovation	Ecosystems often „generate" a high number of innovative start-ups with significant future growth potential	>330 biomedical science start-ups in Singapore (doubled since 2014)
Distribution of wealth	Through targeted location promotion and network effects, peripheral regions can also benefit from ecosystems	Israel is focusing its food tech investments to rural areas with higher unemployment and poverty

Lessons learned from global case studies (2/2)

Several enablers need to be in place to create a successful ecosystem

Enablers & success factors	Description	Example
Human capital and talent	Access to highly qualified talent is key for most companies to be successful	Ireland invested EUR 60 mn in a research and training center which gave training to over 4,000 people in 2019 in Bioprocessing
State-of-the art research centers	Research is the engine for innovation and therefore for companies in ecosystems to develop new offerings	Singapore launched „Biopolis“ in 2003 as a biomedical research hub that hosts more than 40 research labs
Regulation & policy	Unbureaucratic and business-friendly regulation & policy can decrease cost significantly and increase speed of action	Luxembourg House of Financial Technology established the FIN5LAB, which offers due diligence and integration services
Funding / Investment	Funding enables institutions to promote specific industries and influence corporate decisions	Israel has promised agri-food tech companies in Northern Galilee salary subsidies, free land and tax breaks
Connectivity	Best-practice sharing between different parties of economies increases overall output	Organizations such as the Irish Centre for Business Excellence and IBEC, work with the IDA to facilitate best practice-sharing between companies.

Case study Boston-Cambridge

High density of intellectual capital made Boston-Cambridge is one of the most important Life Sciences cluster in the world

- **Life Science ecosystem in Boston-Cambridge area is recognized as one of the leading ecosystems in the world**
- **Established in 1978** with Biogen after Cambridge City Council allowed DNA experimentation
- **Kendall Square in Cambridge has the highest concentration of Biotech companies in the world**

Anchor institutions & Key Player

Enablers & success factors

- **Network Effects** from high density of firms and research institutions accelerate growth
  - **Top 10 pharma companies** have a presence in Boston
  - **7 of the US News' Top 50 universities** are in the Boston Area
  - **High number of incubators and VC firms** – over USD 40 bn of VC invested from 2017 - 2022
  - **~50% of top NIH funded research hospitals** are in Massachusetts
- **Strong government support** investing over USD 1 bn from 2008-2023
  - **Up to USD 30 mn in tax credits** per year for property acquisition or construction
  - **Grants** for researchers
  - **Capital investments** for necessary Life Science infrastructure (e.g., labs)

Impact

Economic Output

- Over **80,000** biopharma employees in Massachusetts
- **Steady job growth**
  - **40,000 net new employees expected** in Life Science by 2024
  - **8.5% R&D job growth** per year
- **USD 160 k average salary** of biomanufacturing employees

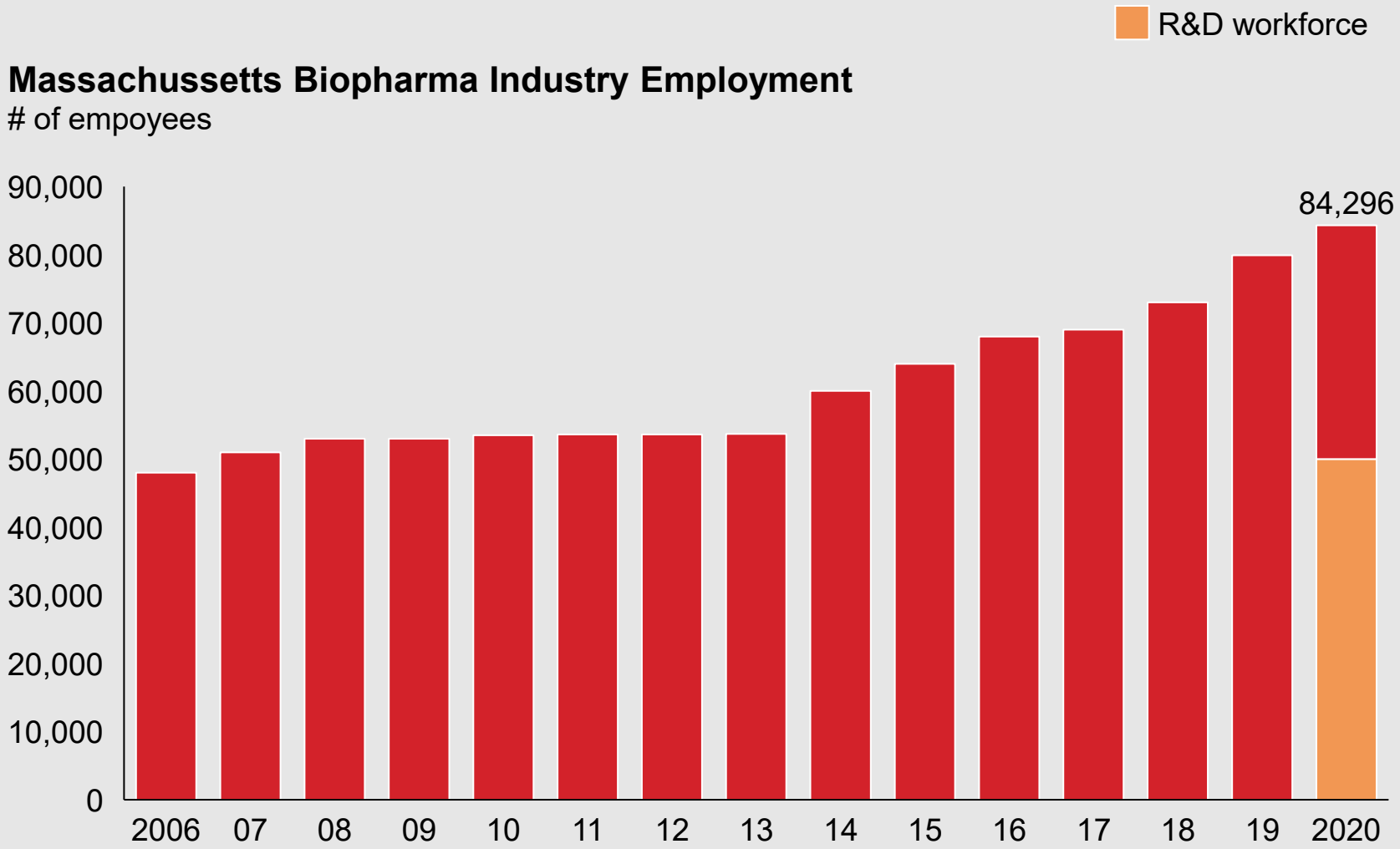
Innovation

- **Highest number of patents** of any biopharmaceutical cluster from 2000-2015
- **Highest industry investment** in R&D per capita in the country
- **High amount of biotech IPOs -** 21 in 2020

Source: Press search, The Boston Foundation, Massachusetts Life Sciences Center website, MassBio, Pitchbook

Deep Dive Boston-Cambridge

Significant employment growth in last 15 years in Life Science ecosystem (55% since 2008) – The core of it continues to be the R&D workforce



Source: MassBio

Case study Singapore

Singapore's strategy has brought significant results for the biomedical industry

- **Prioritization of the Biomedical and health sector** as one of the key pillars since the first 5-year National Plan in 1991[1]
- **Vision is to make Singapore a leading hub** that transforms and protects health, advances human potential and creates economic value
- **High relevance due to rapidly ageing population** and a rising chronic disease burden

Anchor institutions & Key Player

NOVARTIS

Roche

Agency for Science, Technology and Research SINGAPORE

gsk

EDB SINGAPORE

P&G

Ministry of Education SINGAPORE

Enablers & success factors

- **Creation of the One-north technology park in 2001** comprising biomedical sciences, ICT and media industries
- **Establishment of Biopolis, a research hub for biomedical sciences built on 2 million sq. ft in 2003** with strategic government support through investment, promotion, and favourable regulation
- **Allocation of USD 4 billion (~ USD 3 bn[2])** for public sector research in biomedical science **in 2016-2020**, 8% more than the previous 5-year period with 40% designated for competitive founding, up from 20% before
- **World class intellectual property protection**, while legal hassles in recruiting patients for clinical trials are minimal
- **Tax deductions for companies investing in R&D**

Impact

Economic output

- **8x of the biomedical sector manufacturing output produced today since 2000** (USD 32 bn in 2016 vs USD 4 bn in 2002)
- **4% contribution to SG's GDP** from Biopharma and MedTech in 2019
- **>24,000 workforce in 2019**
- **8 of the top 10 pharmaceutical companies have facilities in Singapore,** manufacturing 4 of the top 10 drugs by global revenue

Innovation

- **40 corporate research labs hosted at Biopolis** of such global leaders like Novartis, Roche, GSK and P&G
- **>330 BMS start-ups in SG** (x2 since 2014)
- **5x increase in industry R&D spending** from 2013-2018

1. Renamed to Research, Innovation and Enterprise (RIE) Plans
2. Current exchange rate

Source: National Research Foundation of Singapore

Deep Dive Singapore –

Singapore has created very favorable conditions for a biomedical ecosystem through various measures

Strongest globally IP protection law

World's **fastest clinical trial approval process**

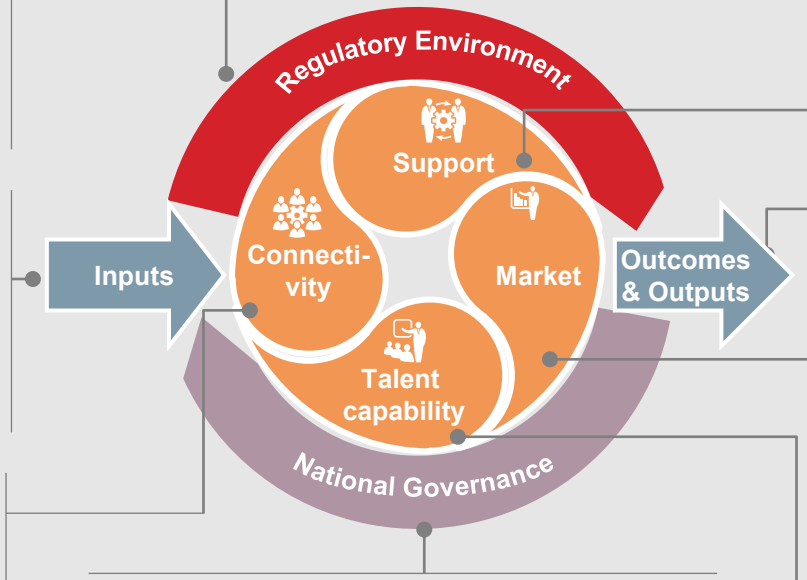
Tax deductions for companies investing in R&D

Large annual government funding for RDI in biomedical science

Biomedical science listed as one of the **priority industries** under national RIE strategy

Close collaboration between all actors of the ecosystem (incl. MOH, PRIs, universities, VCs)

Co-location of public and private research institutes



One public sector body coordinating biomedical R&D (BMRC)

Developed ecosystem of institutions stimulating RDI: formulating industry plans (EDB), promoting research (A*STAR), facilitating partnerships (BMS IPO), supporting enterprises (IP Office of Singapore)

World-class infrastructure (One-north, Biopolis)

Biomedical incubators (e.g., Biofactory)

Capital for biomedical start-ups and late-stage companies (e.g., Bio*One Capital)

Fastest growing manufacturing industry (9% growth of output in 2016)

Nanyang Technological University **tripled number of biomedical publications** over last 10 years (2017 vs 2007)

High inflow of pharma FDI

Sovereign wealth funding (Temasek Holdings)

Universities with biomedical specialization: NUS, Duke-NUS Medical School, Nanyang Technological University

Scholarships and PhD opportunities for foreign students (e.g., NUS, A*STAR)

Source: Web research

Case study Ireland

Ireland has established a major Life Sciences and Pharmaceuticals ecosystem

- **Ireland has become a major player in pharmaceuticals** in last 50 years with more than 85 operating companies and ~50 FDA approved plants
- **Pharma cluster** throughout the country with particular concentration **in Dublin, Cork and Limerick**

Anchor institutions & Key Player

biopharmachem Ireland Ibec

IDA Ireland

Johnson & Johnson

Pfizer

AMGEN

SANOFI

ICBE

ENTERPRISE IRELAND

Enablers & success factors

- **Favourable tax policies** relative to the rest of the EU
  - Ireland has a 12.5% corporate tax rate, the lowest in the EU
  - 25% R&D tax credit makes investment by Life Sciences companies appealing
- **Best-practice-sharing between companies** facilitated by organizations such as IBEC, and IDA
- **Highly skilled workforce** – >25% of all PhD graduates in Ireland work in the Bio/Pharma sector
- **Significant government funding**
  - The IDA funds over 200 million Euros of research per year
  - A 60 million Euro investment by the IDA created the National Institute for Bioprocess Research and Training, which trained over 4,000 people in 2019

Impact

Economic output

- **USD 80 bn pharma exports** which make Ireland the 3rd largest exporter in 2020
- 8% growth per year of pharma exports from 2008 to 2017
- **36% of contribution to Ireland's GDP** in 2020
- **9 of the top 10 pharma players** have a presence in Ireland
- **>32,000 workforce** in 2020

Innovation

- **~€2 bn annual R&D spend** by IDA client companies
- **Increasing talent pool** – Organisations such as the NIBRT train thousands to enter the Life Sciences sector

Source: Team analysis

Deep Dive Ireland

Regeneron invested over USD 1 bn since 2013 in Ireland

REGENERON

Company profile

- **Regeneron is a biotech company** based in the US with a European HQ in Ireland
- **Wide variety** of therapies, focusing on different antibody treatments

Key facts and timeline

- **Dublin and Limerick** locations are founded in **2013**. Dublin as a **business** office and Limerick as an industrial operations and **products supply facility**
- **Additional USD 350 mn and 200 more hired** in 2015 committed at the Limerick location
- **Commitment to hire 400 more employees** by the end of 2020

Enabler and success factors

- Regeneron cites a **favorable business environment** as a key factor of its success in Ireland
- **Strong talent pool based** on local universities (University of Limerick, Cork institute of technology, etc.)
- **Government support** by the IDA (e.g., support in hiring talents)

Impact

- **Over USD 1 billion** invested in Ireland since 2013
- **1,000+ employees**, with a commitment in 2020 to **hire 400 more**

Source: Regeneron investor relations, IDA Ireland, picture from web research

Deep Dive Ireland

There are many examples how public institutions in Ireland support in creating an attractive pharma ecosystem

IDA Ireland promotes investment in Ireland and attracts investors through marketing and providing incentives to investors

Ireland INC is a forum for Irish and American companies, facilitates partnerships and facilitates investments

The National Institute for Bioprosessing Research and Training (**NIBRT**) helped in building capabilities and provides the needed talent

Knowledge Development Box (KDB)
KDB is a Corporation Tax (CT) relief, which applies to income from innovation activities

Source: Irelandinc, NIBTR, Revenue Ireland

Case study Luxembourg

Many international financial institutions have chosen Luxembourg's financial ecosystem as a gateway to the European market

- **Luxembourg has one of the leading financial and FinTech ecosystems** with over 120 international banks, around 4,000 regulated investments funds, nearly 300 insurance companies, and more than 200 FinTech player
- **Gateway to the European Single Market** for many international financial institutions

Anchor institutions & Key Player

PayPal
amazon
Rakuten
Alipay
pingpong
cssf Commission de Surveillance du Secteur Financier
LUXEMBOURG FOR FINANCE
the LHoFT

Enablers & success factors

- **Access to EU market** through passporting of financial services
- **Financial service regulator (CSSF) has a great reputation** for its proactivity, efficacy and openness to innovation
- **Access to a large, highly skilled and multilingual talent pool –** almost 5 million potential workers living within a one-hours commute
- **Government has helped to setup The Luxembourg House of Financial Technology (LHoFT),** a not-for-profit collaboration between government and the private sector
- **Public and private sector funding programs** are available to all company sizes including Fit4Start, RD&I funding through Luxinnovation, The Luxembourg National Research Fund
- **Strong ICT infrastructure** – business can choose from a wide range of data centers

Impact

Economic output

- **The financial sector is the economic engine of the country** representing around a third of GDP, 10% of employment and contributing 13.7% of fiscal revenues in 2020
- **Financial center pays up to EUR 4 billion in taxes and duties** to the Luxembourg State every year
- **15 payment institutions and 10 electronic money institutions** has chosen Luxembourg to set up their business (including PayPal, Rakuten, and AliPay)

Innovation

- **Luxembourg has gradually become home to more than 200 FinTechs** between 2015 and 2020

Source: LuxembourgForFinance, Web research

Case study Israel

The government supports the development of the AgTech and FoodTech ecosystem with several initiatives

- **Northern Israel and the Galilee region** are now positioned as the leading region for FoodTech innovation, specifically Upper Galilee and Kiryat Shmona (“FoodTech Valley”)
- **Israel is home to over 600 start-ups and companies and 14 academic institutions in the field of agri-food innovation**

Anchor institutions & Key Player

kaiima

evogene

See Tree

START-UP NATION CENTRAL

millennium foodtech

Enablers & success factors

- **Significant government funding and support** to promote the innovation of agri-food technologies
  - Launch of the national FoodTech-center in 2021
  - Establishment of a FoodTech research center in 2022
  - Government backed FoodTech incubator
  - Introduction of the “High Salary Plan” which provides subsidies to high-tech companies that employ workers at high salaries
- **Strategic relevance for Israel** due to historical food and water shortages
- **Access to venture capital** – More than 300 venture capital funds located active in Israel
- **Innovation driven-culture in Israel** which is also boosted by significant defense and military research and the mandatory military service

Impact

Economic output

- **Israel plans to create additional 5,000 technology jobs within 7-10 years**, plus at least 3 support positions for each technology job

Innovation

- **Significant growth of AgTech and FoodTech start-ups** in recent years
- **10 Israeli companies listed among top 50 global** AgTech / FoodTech in 2020 according to SVG-THRIVE
- **Nearly 40% of FoodTech start-ups around the world are located in Israel**

Source: Start-up Nation, SVG Ventures-THRIVE, web research

Case study Silicon Valley

Intense concentration of Venture Capital funding established Silicon Valley as the top tech cluster in the world

- **Tech ecosystem in Bay area is recognized as one of the leading ecosystems in the world**
- **More than 5,000+ Tech patents are filed in the area each year**

Anchor institutions & Key Player

Alphabet

Enablers & success factors

Innovative Corporations

- **Strong focus on innovation –** USD 83 bn spent on R&D by the top 150 Silicon Valley firms and 5000+ tech patents are filed in the area yearly
- **Density of important players -** 38 Fortune 500 companies have headquarters in Silicon Valley and hundreds of new start-ups form in SV every year

Access to Capital

- **Over 40% of all US VC** went to Bay Area companies
- **Over half of all venture capital** in Silicon Valley is invested in internet or mobile & telecommunications companies

Proximity to leading universities

- **Active support and resources from Stanford** allowed launch of multiple firms - 39,900 active companies trace their roots to Stanford

Impact

Economic Output

- **Job creation engine -** Bay area experienced a 50% growth in tech jobs from 2009-2019 resulting in more than **380,000** tech jobs in the Bay Area today
- **Attractive workforce in terms of wages -** average salary of information technology employees is USD 170k with an annual wage growth of 5%

Innovation

- **Highest number of patents** of any US tech cluster from 2000-2015
- **Over 2,200 tech companies** are now located in SV

Source: Web search, expert interviews

5 ecosystems for investment promotion (where to play)

WHY are ecosystems important for economies?

- Definition & Value creation
- Global ecosystem case studies
- **Perspective Switzerland**

WHAT are relevant ecosystems and its drivers?

WHERE should Switzerland focus?

Case study Life Science

Life Science is an ecosystem with a long history of success in Switzerland – More than 95,000 jobs are created

- **33% of Swiss export goods are chemical-pharmaceutical products** representing the most important exported good
- **Switzerland has more than 60 Life Science manufacturing plants** across the country
- **More than 70 major Life Science companies have their global or regional headquarter in Switzerland**

Anchor institutions & Key Player

NOVARTIS
Roche
BAYER
Boehringer Ingelheim
ACTELION
Abbott
SWITZERLAND INNOVATION PARK BASEL AREA
BASEL AREA MORE TO DISCOVER
Johnson & Johnson
Takeda
Lonza

Enablers & success factors

- **Large talent pool** – presence of top-class universities such as the Swiss Federal Institute of Technology Zurich (ETH) and university of Basel
- **Modern research laboratories** including Bio-Technopark Schlieren Zurich, Switzerland Innovation Park, Technologiepark Basel, Getec Park Swiss, Campus Biotech, etc.
- **Excellent R&D infrastructure** – Swiss companies invested ~ CHF 6bn for R&D in 2019
- **Switzerland Innovation launched in 2015** to create a platform for companies to team up with top-notch institutions
- **Simple and efficient registration procedure for protecting intellectual property** – e.g., a single authority governs applications in biotech and genetic engineering

Impact

Economic output

- **33% of Swiss export goods are chemical-pharmaceutical products** representing the most important exported good
- **More than 95,000 jobs in Life Science in 2019 in Switzerland –** cantons with most jobs created are Basel Stadt (~21,000), Aargau (10,000), Zurich (~9,000), and Vaud (~8,000)
- **Strong increase in workforce in last 10 years –** e.g., 6,000 FTE in Basel area and 5,000 FTE in Zurich

Innovation

- **Highest number of biotechnology patents per capita** (521) after Germany in 2020

Source: Basel area website, Switzerland Global Enterprises, Canton Zurich – Department of Economic Affairs, EPO, KMPG, Bundesamt für Statistik

Case study Future of Finance (Crypto Valley)

«Crypto Valley» is a newly emerging ecosystem with growth potential

- **"Crypto Valley" is one of the world leading blockchain ecosystems located** in Switzerland and Liechtenstein (mainly in Zug)
- **>900 blockchain-related companies** located in "Crypto Valley" – rapidly growing since the invention of Bitcoin in 2009

Anchor institutions & Key Player

capital markets and technology association.

ethereum

GBBC Global Blockchain Business Council

DFINITY

Polkadot.

Crypto Valley

BITMAIN

GREATER ZURICH AREA

SYGNUM

SEBA BANK

SAC SWISS ASSOCIATION OF CRYPTO INVESTORS VIRES IN NUMERIS

Enablers & success factors

- **Large talent pool for Blockchain business**
  - The Blockchain Center at the University of Zurich is led by 22 professors
  - The two federal science and technology institutions in Lausanne and Zurich (EPFL and ETH Zurich) have been recognized as global leaders in crypto education
  - The Bosch Internet of Things Lab is a cooperation between the University of St. Gallen, ETH Zurich and Bosch
- **Swiss authorities began to remove barriers** to entry for FinTech back in 2016, introducing a sandbox regime in 2017
- **Clear guidelines on ICOs** and classifications for tokens published by FINMA1 in 2018
- **Swiss authorities passed a legislative package** to bring favorable changes for the blockchain and DLT sector in 2020 (Security Law, Insolvency Law, Financial Market Regulation, etc.)

Impact

Economic output

- **USD 255 bn valuation** of the top 50 companies in the Crypto Valley in Feb 2021 (USD 98 bn excluding Ethereum)
- **USD 3.7 billion overall funding** of the top 50 companies of
- **>5,100 workforce** in 2021 – overall employment growth of 8% in one year

Innovation

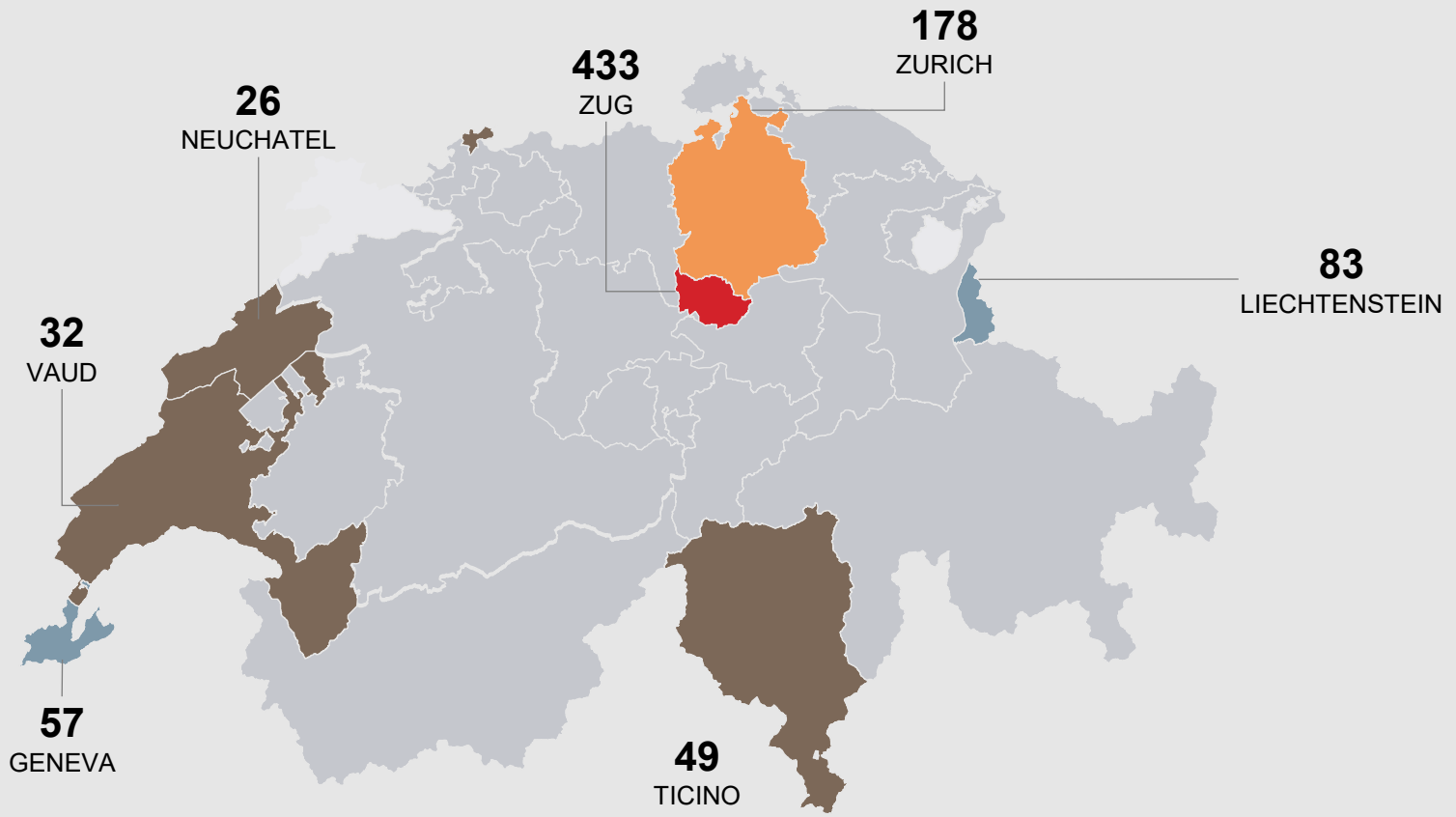
- **11 unicorns located in Crypto Valley** (Ethereum, Cardano, Polkadot, Aave, Cosmos, Solana, Tezos, Dfinity, Near, Nexo, and Diem)
- **No.1 ranked as most Blockchain friendly country in Europe** by BlockShow Europe in 2018

Source: Greater Zurich Area website, CV VC Top 50 Report H2/2020

2 Deep Dive «Crypto Valley»

Ecosystems can have a positive impact on surrounding areas

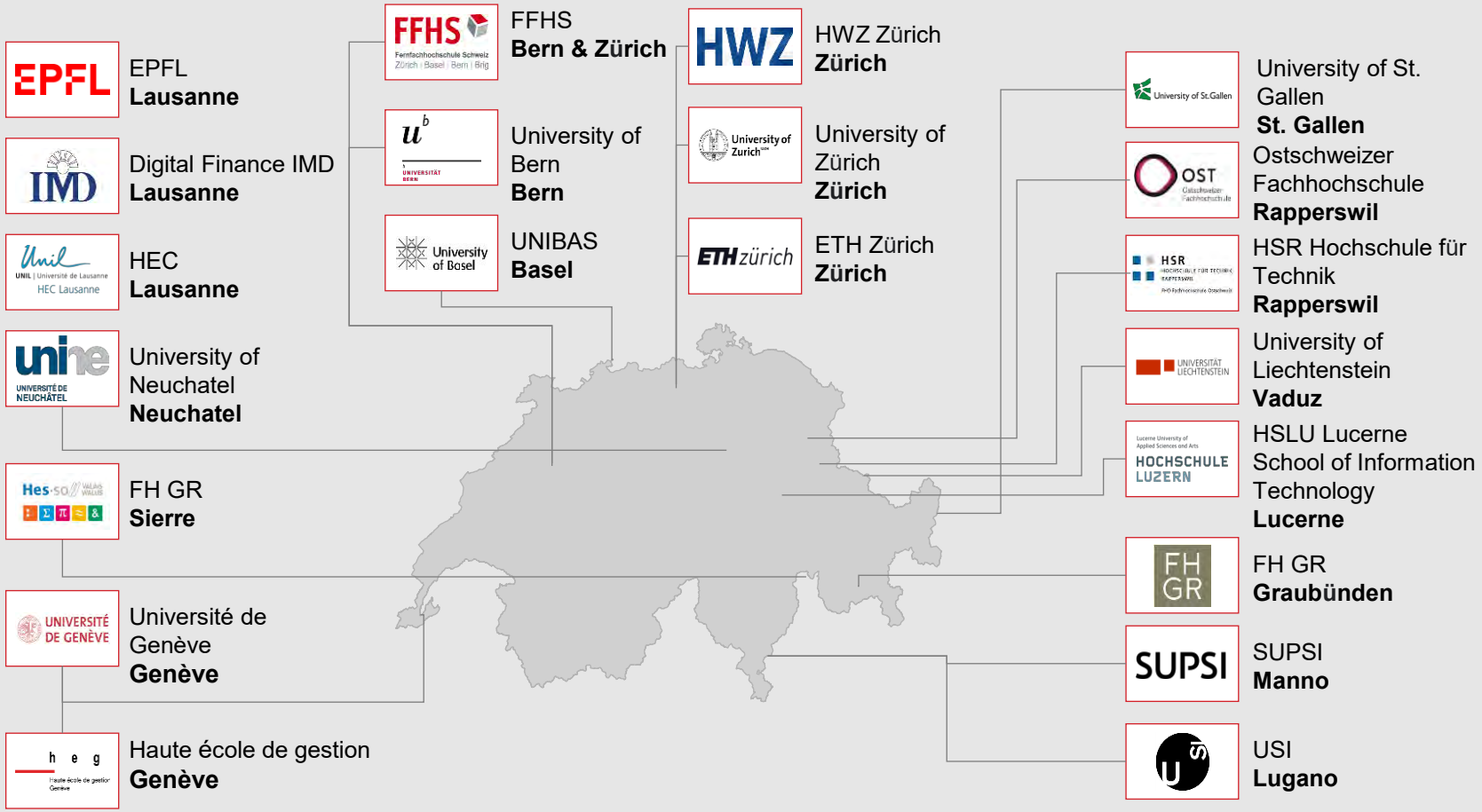
Crypto Valley Companies by Region



Source: CV VC Top 50 Report H2/2020

2 Deep Dive «Crypto Valley»

Several universities in Switzerland are engaged in blockchain technology and promote next generation of talent



Source: CV VC Top 50 Report H2/2020

3 Case study Digital Tech

Greater Zurich Area is the preferred R&D location for global tech companies

- **Information and Communication Technology (ICT) is a key technology and an innovation engine for the Swiss economy**

Anchor institutions & Key Player

Google
IBM
Disney
Microsoft
digitalswitzerland
Meta
GREATER ZURICH AREA

Enablers & success factors

- **Access to global talent with multilingual skills –** presence of renowned universities such as the ETH Zurich or the University of Zurich
- **Attractive corporate and individual taxation** compared to rest of Europe – corporate tax rate range from 12% to 24%
- **"R&D super deduction"** allows an additional tax incentive related to R&D activities carried out in Switzerland

Impact

Economic output

- **>120,000 employees in IT-services in 2019**
- **CHF 16.1 bn export volume in 2020**
- **5.1% contribution to GDP in 2018**

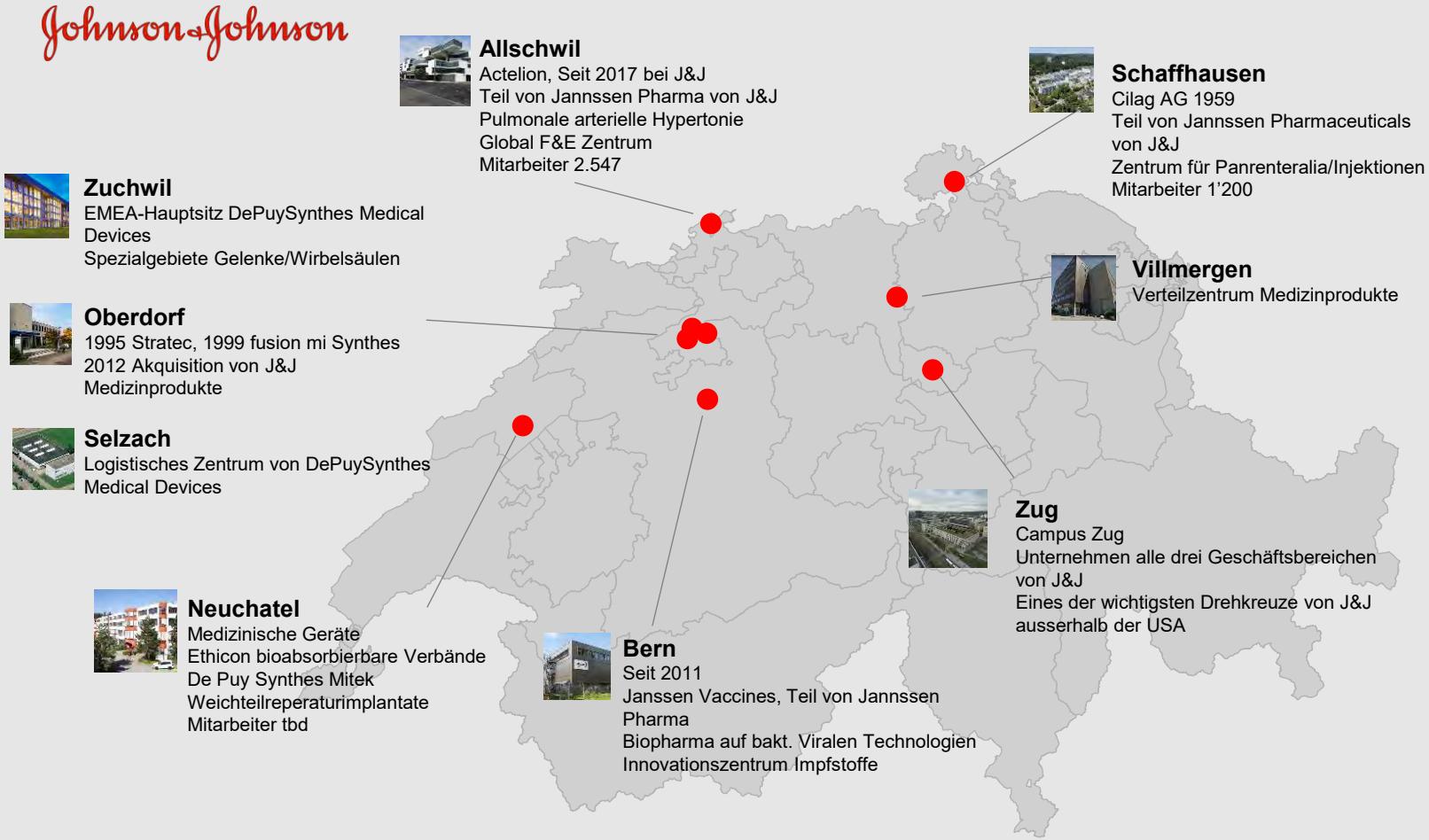
Innovation

- **Private sector investment increase from CHF 10 bn to CHF 33 bn** in ICT between 1996 and 2019
- **Leading digital and innovative companies locate their research centers in Switzerland** – e.g., Google has 4,300 employees in Zurich

Source: Switzerland Global Enterprise, Greater Zurich Area, web research, Bundesamt für Statistik

Value of allocation of companies in ecosystem (1/5)

Over time, companies in ecosystems generate significant value and network effects for the Swiss economy

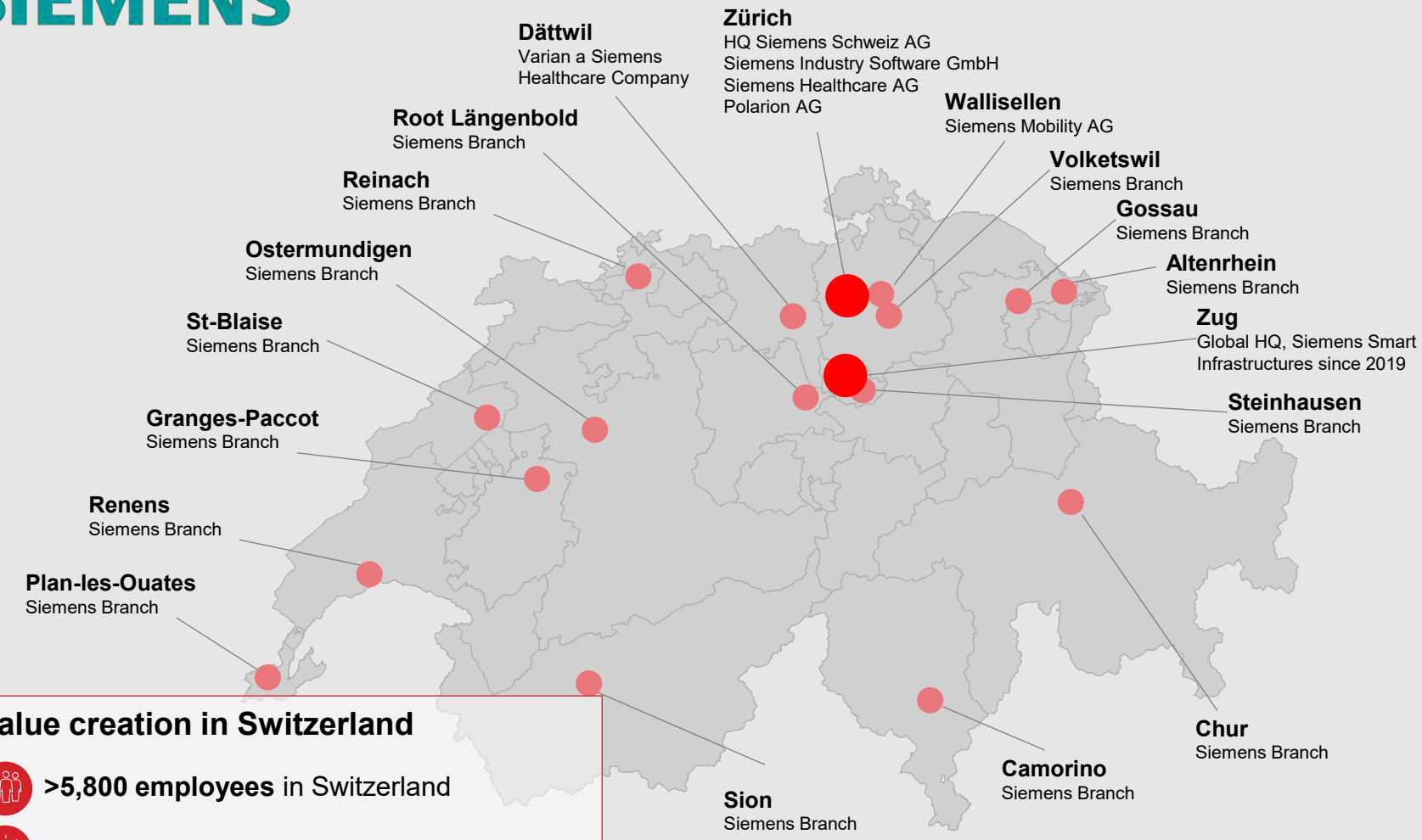


Source: Web research

Value of allocation of companies in ecosystem (2/5)

Over time, Siemens has grown its presence in Switzerland to more than 20 branches across several cantons - most recently in 2019 the global HQ for Siemens Smart Infrastructures was established in Zug

SIEMENS



Value creation in Switzerland

- **>5,800 employees** in Switzerland
- **165 invention and 95 patent filings** in 2021
- **>CHF 2 billion** revenue in 2021

Source: Siemens

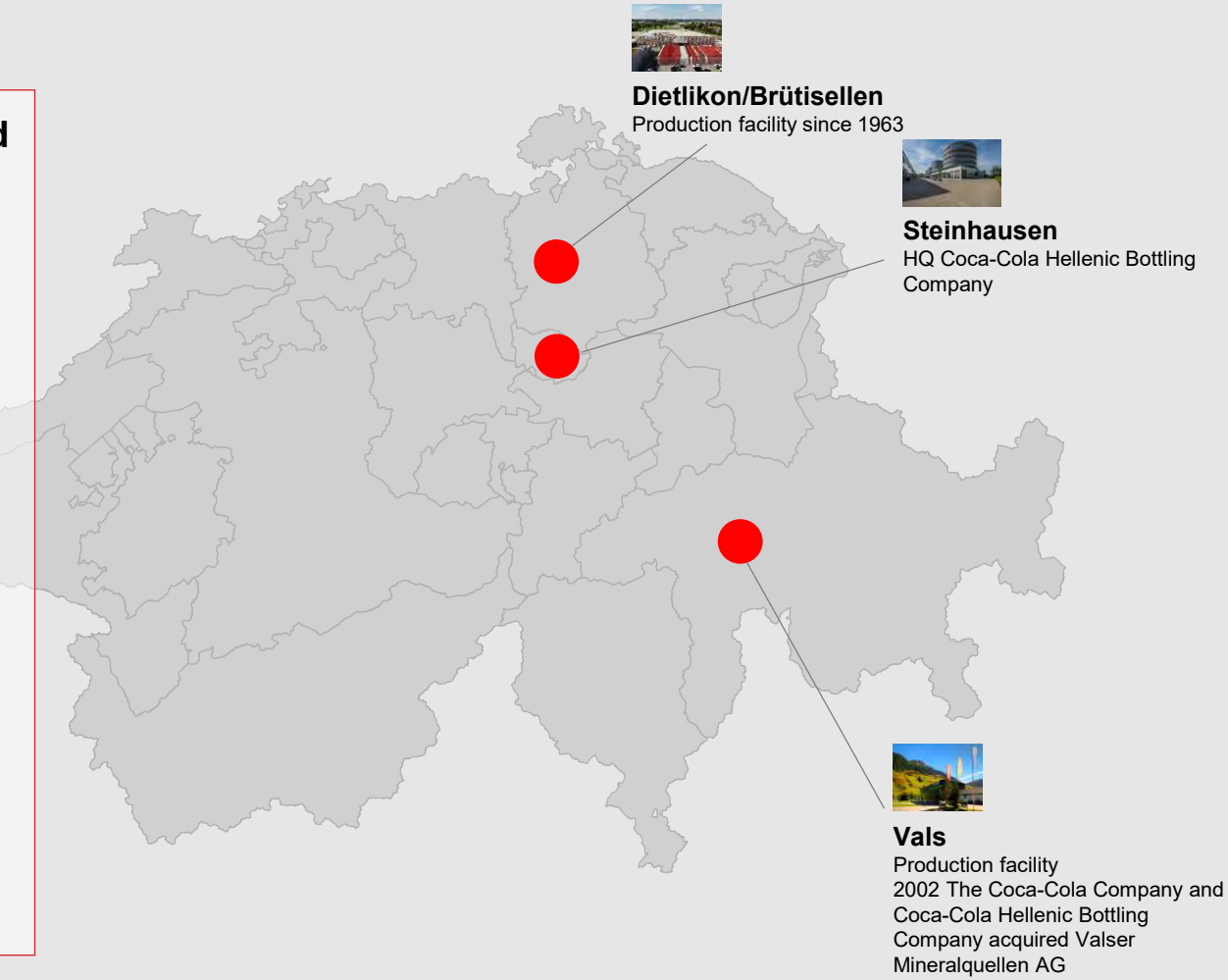
Value of allocation of companies in ecosystem (3/5)

Since its establishment in Switzerland, Coca Cola has added considerable value to the Swiss economy across regions

Coca-Cola HBC CH

Value creation in Switzerland

- **>800 employees** in Switzerland
- **8'600 jobs** are supported throughout the value chain from agriculture to retail
- **80% of products sold in Switzerland are produced locally** and 95% of ingredients are sourced from Swiss suppliers
- **CHF 988 million value add** in Switzerland in 2021
- **74% of sales value** from beverages stay in Swiss market



Source: Coca Cola

Value of allocation of companies in ecosystem (4/5)

Biogen recently invested CHF 1.5 bn into a new high-tech manufacturing site in Solothurn resulting in tremendous economical impact

Biogen

Source: Biogen website, Greater Zurich area

Company profile

- **Biogen is a leading biotech** with HQ for international markets beside the US in Baar, Switzerland
- **Focus is treatment of neurological diseases** like Multiple Sclerosis

Key facts and timeline

- **Biogen established its international headquarters in Zug in 2004**
- **Biogen invested around CHF 1.5 bn in a next-generation manufacturing facility** in 2021 in Solothurn which will create additional 600 Biogen jobs

Enabler and success factors

- **Access to talent** which is well trained and highly diverse
- **Political stability**, predictability and business-friendly environment
- **Central location in Europe** with great access to most important European markets

Impact

- **>450 employees in Switzerland**
- **New manufacturing facility will create additional 2,000 jobs in whole ecosystem** and has the potential to raise cantonal GDP by 1.5 - 2%
- **Biogen is significantly contributing to Swiss society** (main sponsor for the Swiss Science Center Technorama in Winterthur and the Children's University Zurich)

Value of allocation of companies in ecosystem (5/5)

Many leading Tech companies conduct their artificial intelligence research in Switzerland due to outstanding talent

Google research lab in Zurich

Launch: 2004

Employees: 4,300

Fact: Biggest research lab outside the US

IBM research Europe in Zurich

Launch: 1956

Employees: >300

Fact: One of twelve global research labs

HPE IoT lab in Geneva

Launch: 2019

Employees: TBD

Fact: Third IoT center globally

Disney research studios in Zurich

Launch: 2008

Employees: >30

Fact: European location for Disney research

Source: Web research

5 ecosystems for investment promotion (where to play)

WHY are ecosystems important for economies?

WHAT are relevant ecosystems and its drivers?

- **Derivation global ecosystems**
- Major trends driving global ecosystems

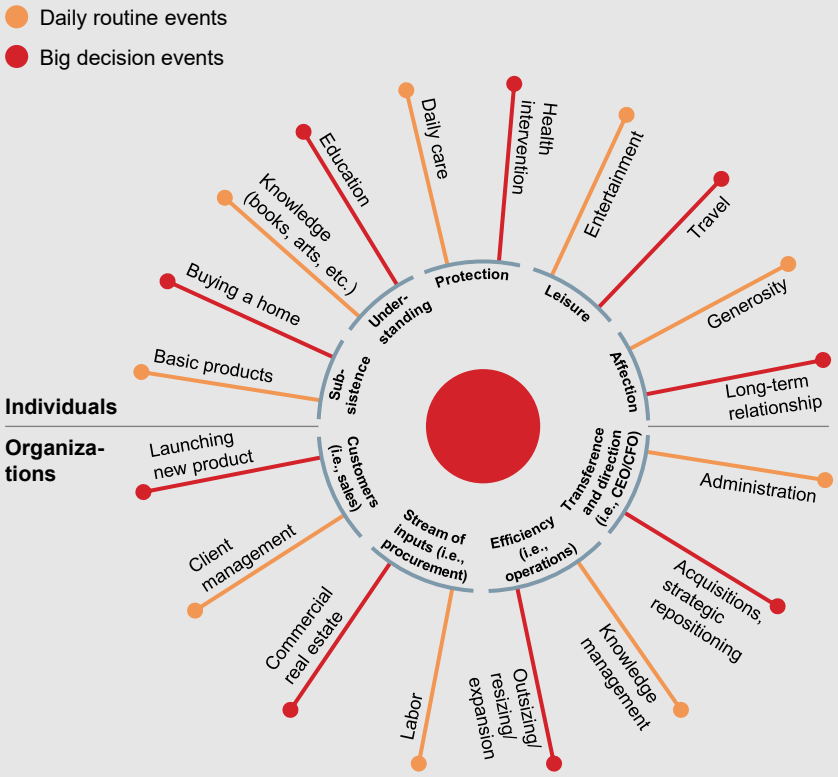
WHERE should Switzerland focus?

NOT EXHAUSTIVE

Global ecosystem industrial perspective (1/3)

The list of ecosystems used in the analysis has been defined based on a 3-step methodology

Based on the basic needs of individuals and companies …

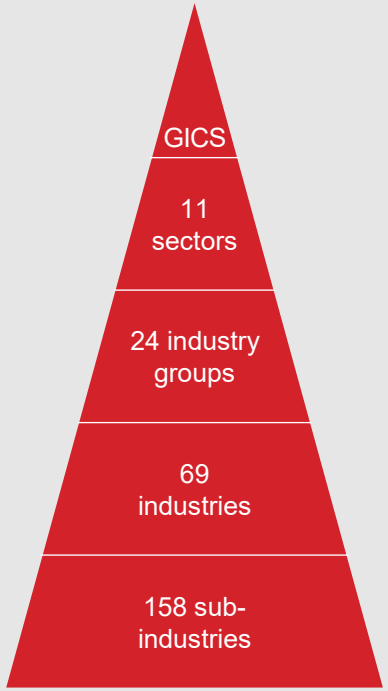


Subset and examples of Max-Neef classification of needs

… ecosystems were defined that are centered around fulfilling customer needs

- **Health & Life Sciences**
- **Digital content & entertain-ment**
- …

Industries and sub-industries were matched to those ecosystems

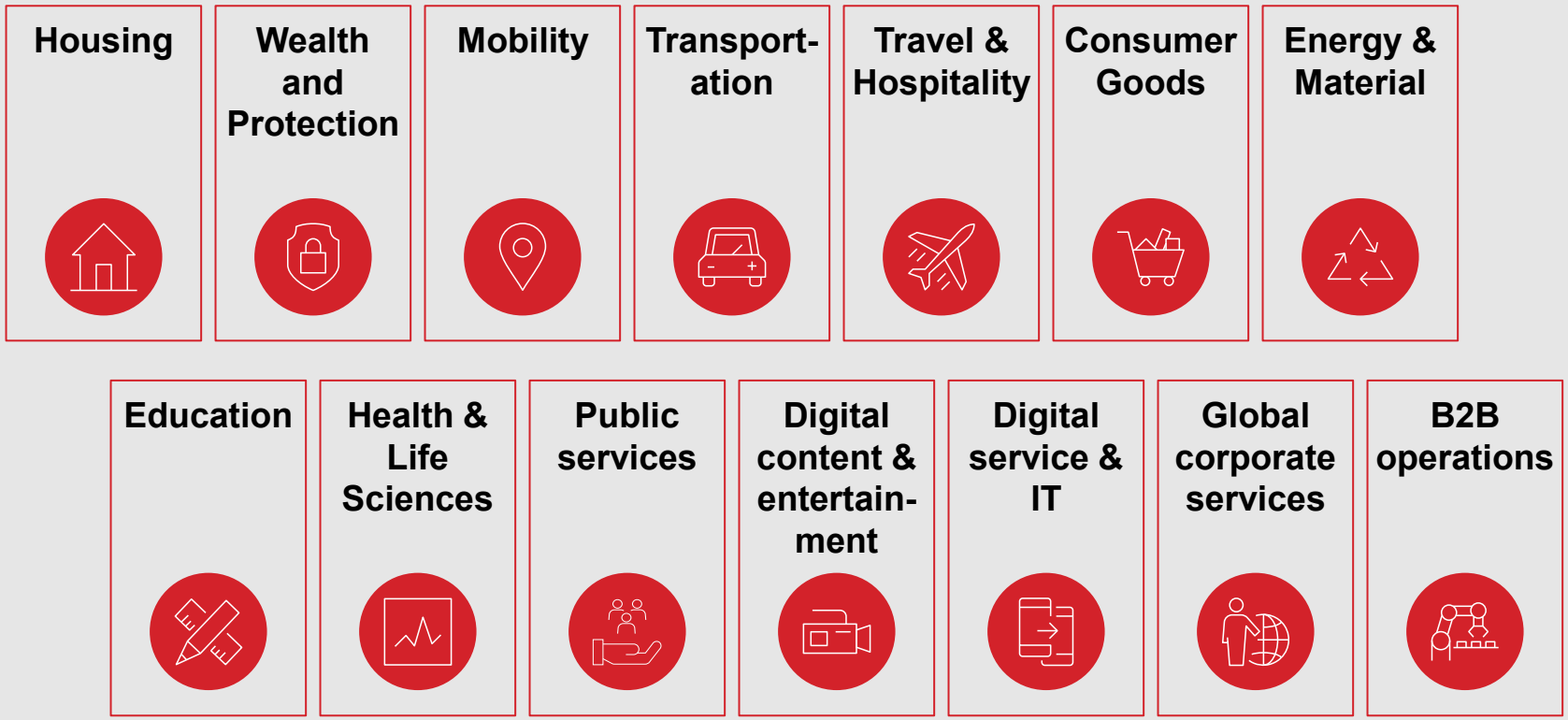


Definition of (sub-)industries was based on the Global Industry Classification Standard (GICS) of MSCI and S&P

Source: MSCI, Human Scale Development by Max-Neef

Global ecosystem industrial perspective (2/3)

Based on the 3-step methodology, a total of 14 global ecosystems are defined centered around overarching customer needs



Global ecosystem industrial perspective (3/3)

Each ecosystem consists of a large number of sub-industries

Housing	Wealth and Protection	Mobility	Transpor-tation	Travel & Hospitality	Consumer Goods	Energy & Material	Educa-tion	Health & Life Sciences	Public services	Digital content & entertain-ment	Digital services & IT	Global corporate services	B2B operations
Home Re-pair & Main-tenance	Wealth & Asset management	Car Rentals	Air Freight & Logistics	Hotels, Restaurants, & Leisure servcies	Apparel & Fashion	Paper & Forest products	Primary	Healthcare equipment (incl. MedTech)	Public Administration	Advertising	IT Infrastructure & Hosting	Corporate financial services	Machinery & Equipment
Rental	Capital markets (incl. Trading)	Car Insurance & Service	Airlines	Travel Arra-ngements & Insurance	Electronics & Appliances	Energy Equipment & Services	Secondary	Pharma & Biotechnology	Social Security And Defense	Broadcasting	Software	Research & Consulting services	Real estate
Purchase	Banking incl. Mortage financing	Auto-mobiles	Marine	Tourism	FMCG	Oil, Gas, & Consumable Fuels	Tertiary Education	Life Science tools & services (incl. CDMO)	Environ-mental & Facilities services	Cable & Satelite	IT Services (incl. Outsourcing, system integration, etc.)	Human Resource & Employment Services	Construction & Engineering
Renova-tion	Insurance	Public transport	Road & Rail		Telco Sales	Electrical equipment[1]	Education services	Digital health	Water Supply, Sewerage	Publishing	Technology Hardware and Storage	Security & Alarm services	Security & defense
Furnishing	Payment	Auto comp-onents			Luxury goods	Independent power and Renawable Electricity Producer		Healthcare facilities		Movies & Entertainment	Electronic equipment & instruments		Building products
					Retail & trade	Chemicals[2]		Healthcare distributors		Interactive Home Entertainment & Media[3]	Semi-conductor		Industrial automation
					Food & Nutrition	Construction Materials		Health insurance			Cybersecurity		Aviation & Space technology
					Tobacco	Utilities (Gas, Electric, Water)		Healthcare services (incl. dialysis centers or lab testing)			Communica-tion equipment		
					Household & Personal products	Containers & packaging					Telecommuni cation services		
					Leisure products	Metals and Mining							

1. Focus on energy storage and distribution technology
2. Focus only on material science and "green" chemical processes including recycling, carbon capture, etc.
3. Including Metaverse

5 ecosystems for investment promotion (where to play)

WHY are ecosystems important for economies?

WHAT are relevant ecosystems and its drivers?

- Derivation global ecosystems
- **Major trends driving global ecosystems**

WHERE should Switzerland focus?

EXCERPT

Trend analysis

Analysis of reputable sources to identify major trends

In addition, multiple regional / local sources leveraged

The futurist consultancy **TREND ONE** prioritizes AI, attention economy, connected world, conscious eating, consumerism 2.0, data era, engineered revolution, exponential industries, future skillsets, health style, intelligent infrastructure, planet centricity, seamless commerce, smart surroundings, urbanization, virtualization, woke culture

The **Future of Humanity Institute at the University of Oxford** focuses on AI capabilities, AI ethics & philosophy of mind, concept capabilities and trends in AI, cooperative principles and institutions, existential risk, grand futures, nanotechnology, philosophical foundations, reducing risk from malevolent humans, sociotechnical information systems, space law, technology and wisdom, transparency and surveillance

The **Stanford Engineering School SoE-Future** emphasizes synergies between humans and engineered systems, engineer living matters, security, energy need and climate stabilization, autonomous systems, increases in IT performance, engineering at atomic scales, cities of the future, as well as effective yet affordable healthcare

The US think tank **Future of Life** addresses AI (China as AI super-power, AI governance), biotech, nuclear/autonomous weapons, and climate change (mitigation, water shortage, acidification of oceans)

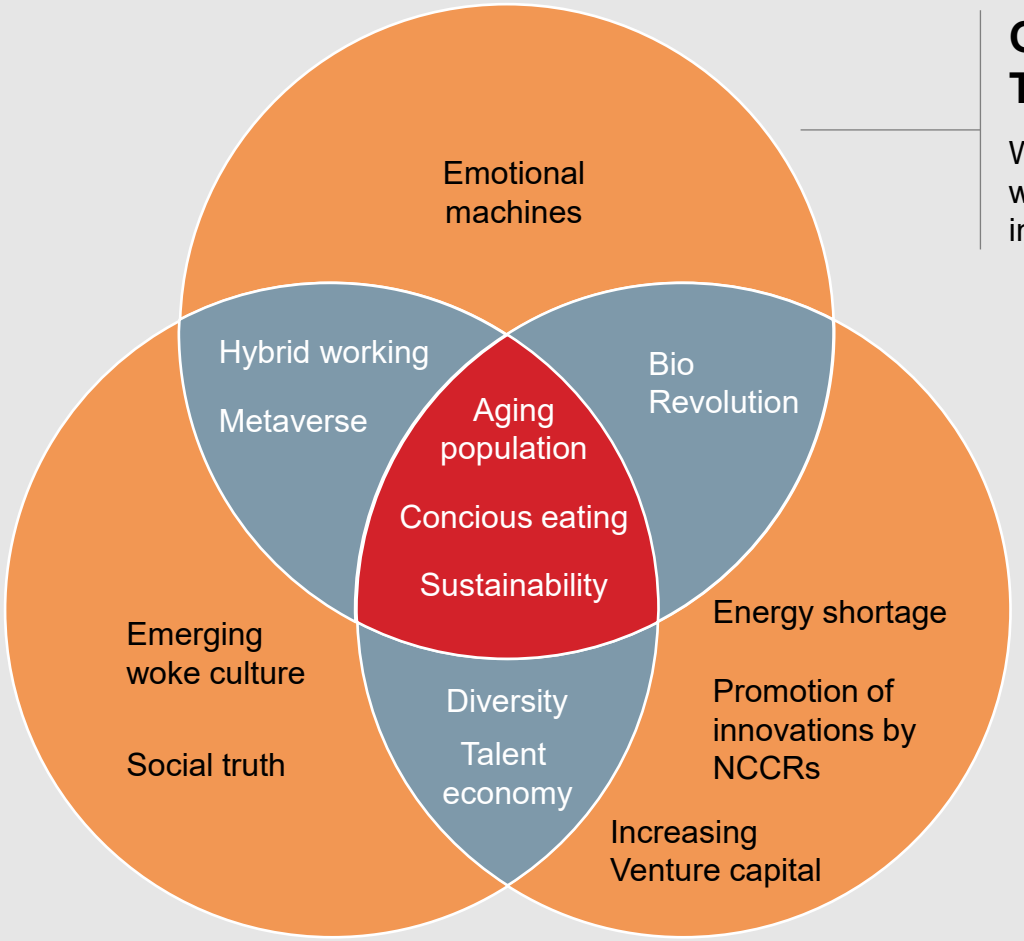
The UK **Global Catastrophic Risk Institute** focuses on risks of AI, nanotech, and nuclear warfare, and is also dedicated to cross-risk evaluation, decision analysis and risk reduction solutions

The NGO **Tellus Institute** scenarios include conventional worlds (creating global governance mechanisms in a world of conventional values), barbarization (break-down of our society) and great transitions (emergence of a sustainable civilization that allows humankind to thrive & prosper)

EXAMPLES

Trend analysis

Application of 3 different lenses in the trend analysis – global macro trends, societal game changers, and CH-specific developments



Global Macro Trends

Where is disruption happening – which trends have a positive impact on Swiss economic growth?

Societal game changers

Which trends are leading to a social change in Switzerland?

Swiss specific developments

Which Swiss specific developments should be considered / leveraged in the investment promotion?

Source: Trend One, leading universities and institutes, web research

SELECTED

Trends analysis – Macro trends

Selected macro trends have significant implications for Switzerland

Detailed next

Trends	Description	Implications for Switzerland
Ageing population	The world populations is progressively getting older. By the end of the century, the share of young children could decline to 5.8 percent, while the proportion of older people is forecast to rise to 22.7 percent	• Could lead to a supply shortage of qualified workers and reduced international competitiveness for some regions • Healthcare spending as a share of the GDP will rise in most advanced countries leading to an increased importance of the Life Science ecosystem
Bio Revolution	Advances in biological science, computing, automation, and artificial intelligence are fueling new innovation which can be grouped into biomolecules, biosystems, biomachines and biocomputing	• Biotech sector will become more important as Bio Revolution could have significant impact on economies and our lives, from health and agriculture to consumer goods, and energy and materials • Successful Biosystems and Biomolecules will be critical for Swiss major BioPharma companies to stay at the top
Metaverse	VR based successor to the internet consisting of shared, 3D virtual spaces where humans as avatars interact with each other and software agents	• Further tech companies could choose Switzerland as their research hub • Potential research focus for ETH / EPFL to increase availability of local talent
Concious eating	Consumers reduce their dietary emissions by choosing regional, organic, plant-based foods aiming to maximize performance / health	• Significant driver for food & nutrition ecosystem • Innovations of FoodTech and AgriTech companies become more relevant
Sustainability	Increasing social awareness of the impact of previous human activities on the planet leading to many new innovations	• Significant driver for many ecosystems due to a change of consumer behavior and new regulations (e.g., “Green” chemicals ecosystem including clean tech design, circular economy, alternative materials, etc.)
Digitalization	Accelerating adaption of digital technologies and information to transform business operations and social interactions	• Increasing availability of data drives ecosystems as Digital Content & Entertainment and Digital Services & IT • Higher security risks drive the importance of Cyber Security

Source: Web research, Trend One

Ageing population

Health systems are facing accelerating cost pressures due to ageing population – Increasing relevance of total Life Science ecosystem

Share of healthcare costs as percentage of GDP, %

< 10 | 10-20 | > 20

	2008	2015	2030	2050	2080
China	3.9	4.7	12.0	17.4	30.1
Spain	7.8	8.9	11.7	19.6	35.2
UK	9.3	10.6	14.0	19.9	35.6
Italy	8.8	10.0	13.2	21.3	38.2
Australia	10.5	10.5	15.8	22.8	40.8
Canada	10.8	12.3	16.2	23.5	42.0
Germany	10.8	12.3	16.2	25.6	45.9
France	11.2	12.7	16.8	26.6	47.6
USA	16.1	18.3	24.2	36.7	65.6

Key Insight

Healthcare costs as a % of GDP are projected to rise in all geographies

By 2050, healthcare costs will be at least ~20% of GDP across developed countries (excluding the US)

By 2080 all markets will spend a higher % than the US does today

1. Assumptions: GDP growth of 2% (OECD-Prognosis 2000 - 50). Healthcare spending grows 1.9 basis points faster (OECD historical rate)

Source: OECD Policy Implications of the New Economy 2000 - 50 (2001); Global Insight WMM 2000 - 37; Espicom: World Pharmaceutical Fact Book 2008; International Monetary Fund. World Economic Outlook Database. October 2009; Espicom: World Pharmaceutical Fact Book 2008

Conscious eating

Consumer trends indicate growing alternative protein demand which drives FoodTech segment and has the potential to shape the entire food & nutrition industry





Eating more protein from a variety of sources

23% of US consumers want more plant-based protein options on shelves

Meat **substitutes** are expected to **grow** at **4%** in **China** through **2023; in the UK,** they **grew 9% from 2013-2018** while **meat** and **poultry declined** 1%

Meat eaters are eating plant-based products, including blended products that are a combination of animal and plant protein (e.g., Raised & Rooted)

Healthy eating

95% of participants identified health as a driver for alternative protein consumption

Vegan and vegetarian

9% of Americans identify as vegetarian, a 2x increase over five years

Flexitarian diets

One-third of all Americans and **37%** of millennials, plan to buy more plant-based products in the next year

16% of the **Asia Pacific** population is flexitarian, supporting continued alternative protein growth

The share of meat consumption in developed countries has **declined 9%** in the last 15 years, while developing countries share has **increased 7%**

Environment & ethics

Animal protein production is **2-5x more emissions-intensive than plant-based** protein production

Animal welfare is the **2nd biggest** reason why 27% of European consumers expect to eat less meat 5 years from now

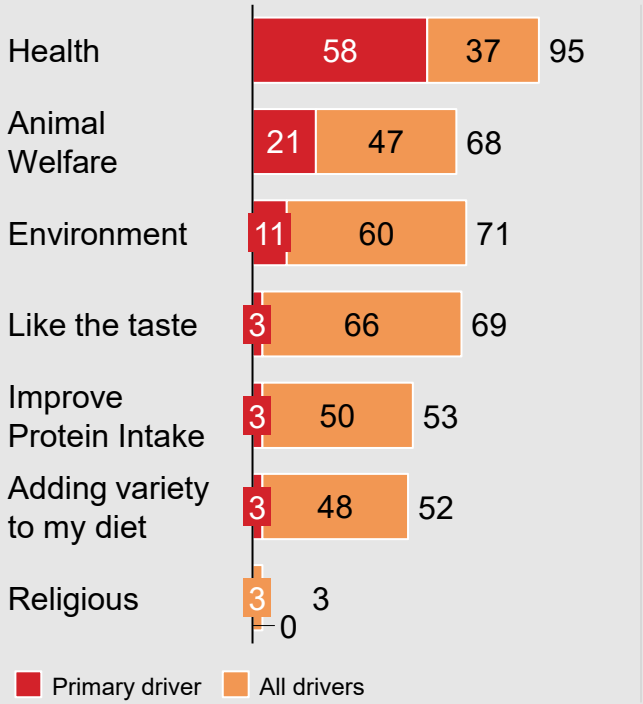
Source: Nielson 2015, (1) Mintel 2014, NMOI 2015 Protein trends & technologies Seminar; 2015 R&D Protein Trends Survey, Global Food Forums; Health Ingredients and Future of Nutrition Summit 2018; FoodNavigator-USA; Cargill “Plant-based protein solutions; 2013-2018 FoodS surveys (Oklahoma State department of Agriculture); Mintels GNDP new product database

Conscious eating

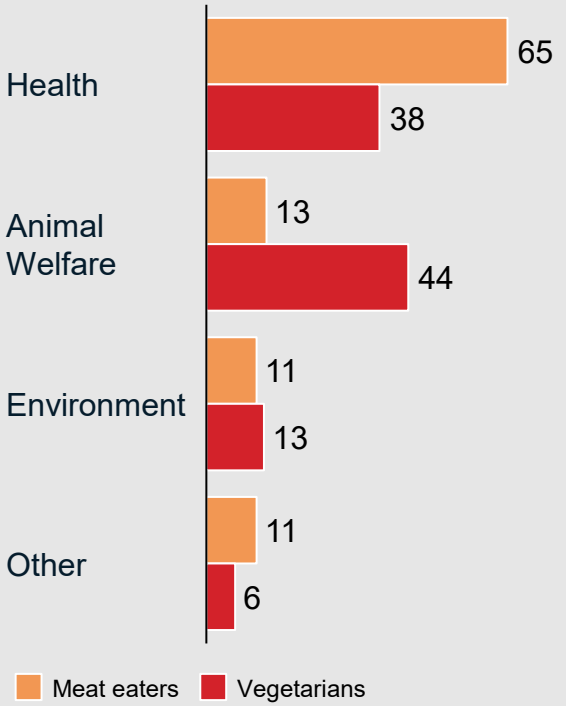
Health is the most important driver of consumption choices

Which of the following are reasons why you would choose to eat non-meat vegetarian protein options vs. real meat? What is the primary reason?[1]

Primary & secondary drivers



Primary reason broken down by meat eaters vs. vegetarians



- ~95% of all participants choose health as a motivation and ~60% choose health as the primary reason
- Vegetarians more likely to cite animal welfare followed by health as the prime reason vs. meat eaters

1. Survey with 60+ plant-based meat respondents to answer key questions about their preferences and buying behaviors. Profiles were selected to represent diversity of backgrounds with a focus on people who had eaten non-meat protein (e.g., beans, plant-based meats) at least twice in the last two weeks including at least one alternative protein source “pretending to be meat”

Source: Digital Diaries, 2019

SELECTED

Trends analysis – Societal game changer

Selected societal game changer will have significant implications for Switzerland

Detailed next

Trends	Description	Implications for Switzerland
Talent economy	Talent is the key enabler for innovation and growth – therefore talent attraction and retainment will become increasingly important	• Ecosystems must meet the requirements of talent to stay competitive in the long term – most important factors are quality of opportunities, income & tax, skills environment, quality of life, future prospects, inclusiveness, family environment, and country accessibility
Social truth	Competing data and opinions make it difficult to understand what is true and what not	• Potential for technical and human systems that reduces the spread of lies and misinformation
Emerging woke culture	Increasing awareness of social injustice among many western societies	• Consumers getting involved and are calling for transparency and change • Companies have the potential to increase diversity and improve the environment for growth
Hybrid-Working	Flexibility in schedule and location of workplace (e.g., part-time home office) in combination with a widespread technology adoption (e.g., communication tools) driven by the Covid-19 pandemic	• Access to a larger talent pool outside the major hubs in peripheral region • Increased collaboration opportunities between and within companies (e.g., conduct of international projects)

Talent economy

Talent measure a country's attractiveness on 8 different indicators

Quality of opportunities

Employment related and study-related pull factors, ease of doing business

Quality of Life

encapsulates indicators as environment, income, etc.

Family environment

Opportunities for family members in terms of entry laws and labor market integration, childcare costs and family benefits

Income and tax

Earnings, cost of living and tax

Future Prospects

Long-term integration and political participation, ease of status change and access to citizenship

Country accessibility

Immigration systems, complexity and duration of Visas and work permit cases

Skills environment

Facilities and infrastructure, R&D, connectivity and English proficiency

Inclusiveness

Degree of diversity, natives' attitudes towards immigration, gender equality

Source: OECD

Talent economy

Each talent profile has different priorities on the dimensions, that need to be fulfilled to attract the talents – most important for highly educated workers are family environment, quality of life, and income & tax

Highly educated workers	Entrepreneurs	Students
1 Family environment	1 Quality of opportunities	1 Skills environment
2 Quality of Life	2 Quality of Life	2 Income and tax
3 Income and tax	3 Family environment	3 Quality of opportunities

1. The dimensions include different profile-specific variables for each migrant profile

Source: OECD

Trends analysis – Swiss specific development

Some trends are specific for the Swiss market and will have significant impact

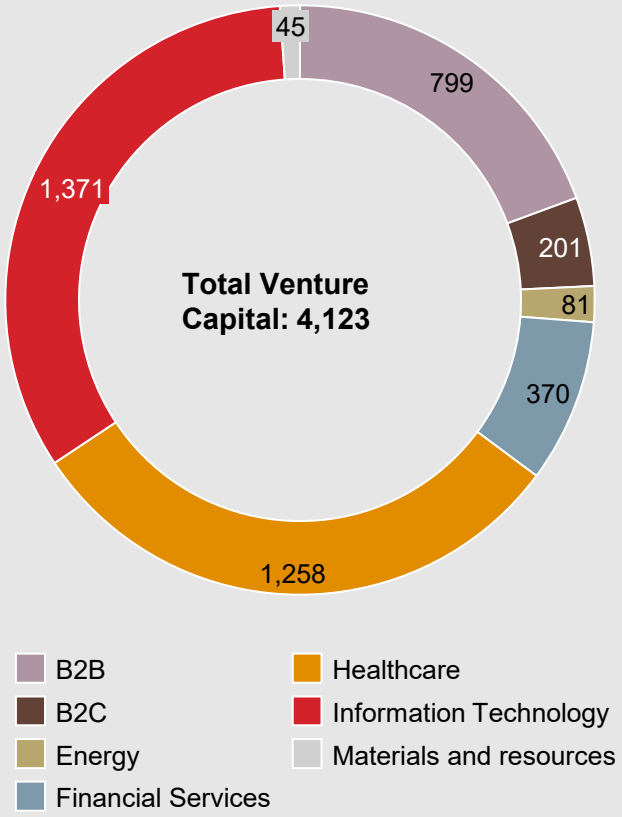
Detailed next

Trends	Description	Implications for Switzerland
Increasing venture capital	Venture capital constantly increased since 2017 – main focus on Information technology and Healthcare	• Capital as a key enabler of ecosystems creates good conditions for further growth in Life Science, Digital Services & IT, and Digital Content ecosystems
Promotion of innovations by NCCRs	The Swiss National Science Foundation launched national centers of competence – Each NCCR is owned by a home and partner institution and funded on average by CHF 3.5 mn funding per year	• Switzerland has the potential to position itself as an innovative leader which could strengthen local ecosystems / industries (e.g., Insights into AntiResist and Microbiomes spur innovation in the Life Science ecosystem)
Energy shortage	Power demand in Switzerland is forecasted to grow about 16% by 2035 and about 46% by 2050 leading to gap of supply and demand which could become apparent as early as 2030	• Switzerland faces four potential pathways: – Increase imports – Build out domestic power supply based on renewables – Reduce expected energy consumption – Build out the grid

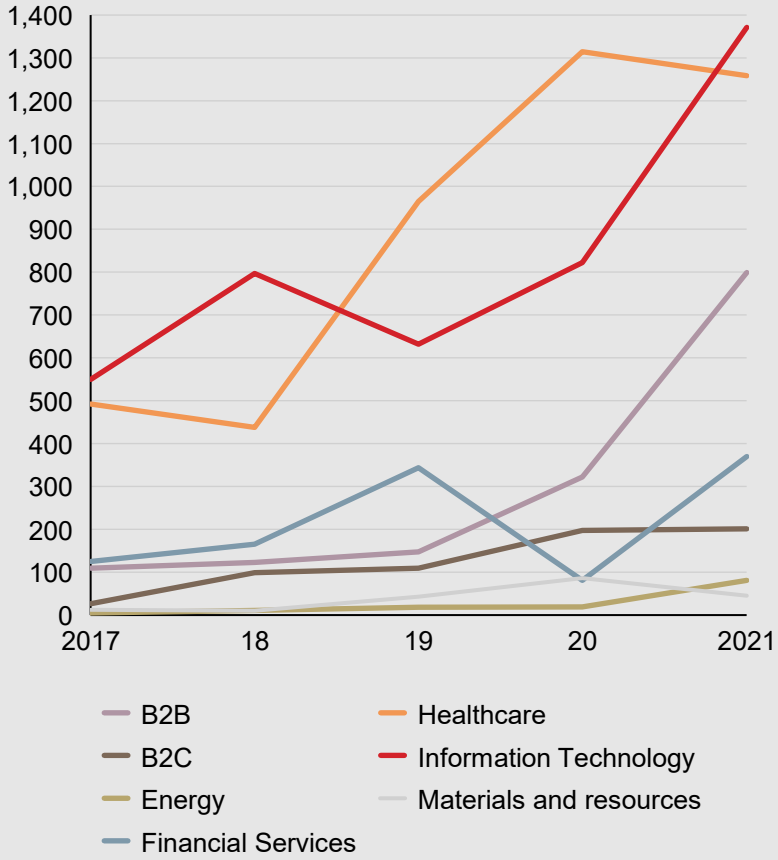
Venture Capital in Switzerland

Venture capitalists in Switzerland are investing primarily in Information Technology and Healthcare sector

Invested capital by sector 2021, in million USD



Invested capital by sector 2017 – 2021, in million USD

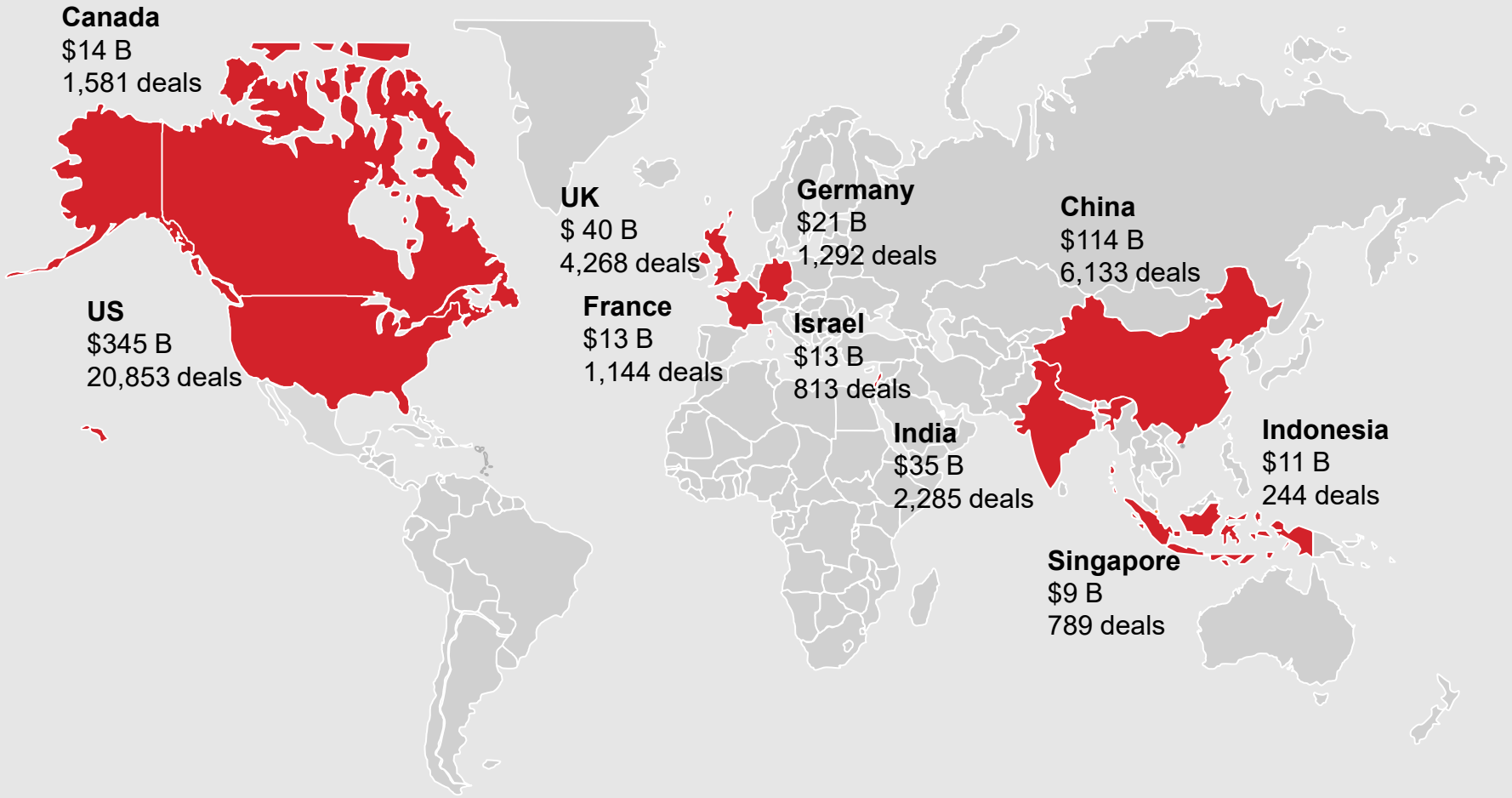


Source: Pitchbook

Global VC Investments

US remains the primary destination for VC investment, representing 49% of global VC (USD 710 bn) funding in 2021

VC investment top-10 countries 2021[1], USD bn, # of deals



1. Including Pre-Seed and Seed investment

Source: Pitchbook

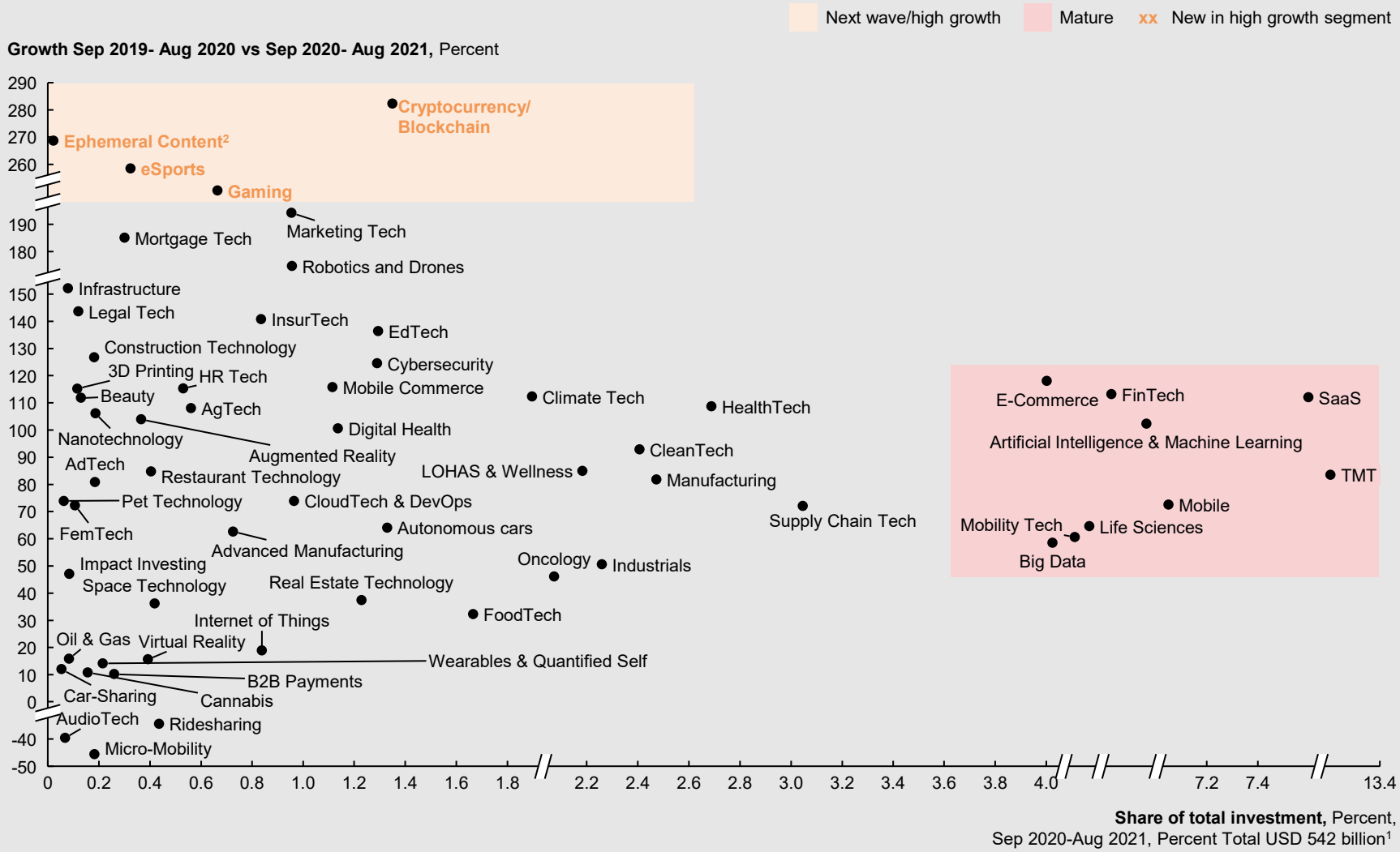
Global VC Investments

All but one of the mature segments are related to digital and tech; high growth segments relate to crypto/blockchain, ephemeral content, eSports and gaming

1. Adjusted by average ratio as Pitchbook counts one deal for one to more clusters inflating results
2. Companies that provide online platforms for the sharing and temporary display of photos, videos, messages, documents. The key aspect is that the content vanishes from the Web after a certain timeframe (usually minutes or hours.)

Source: Pitchbook, VC deals

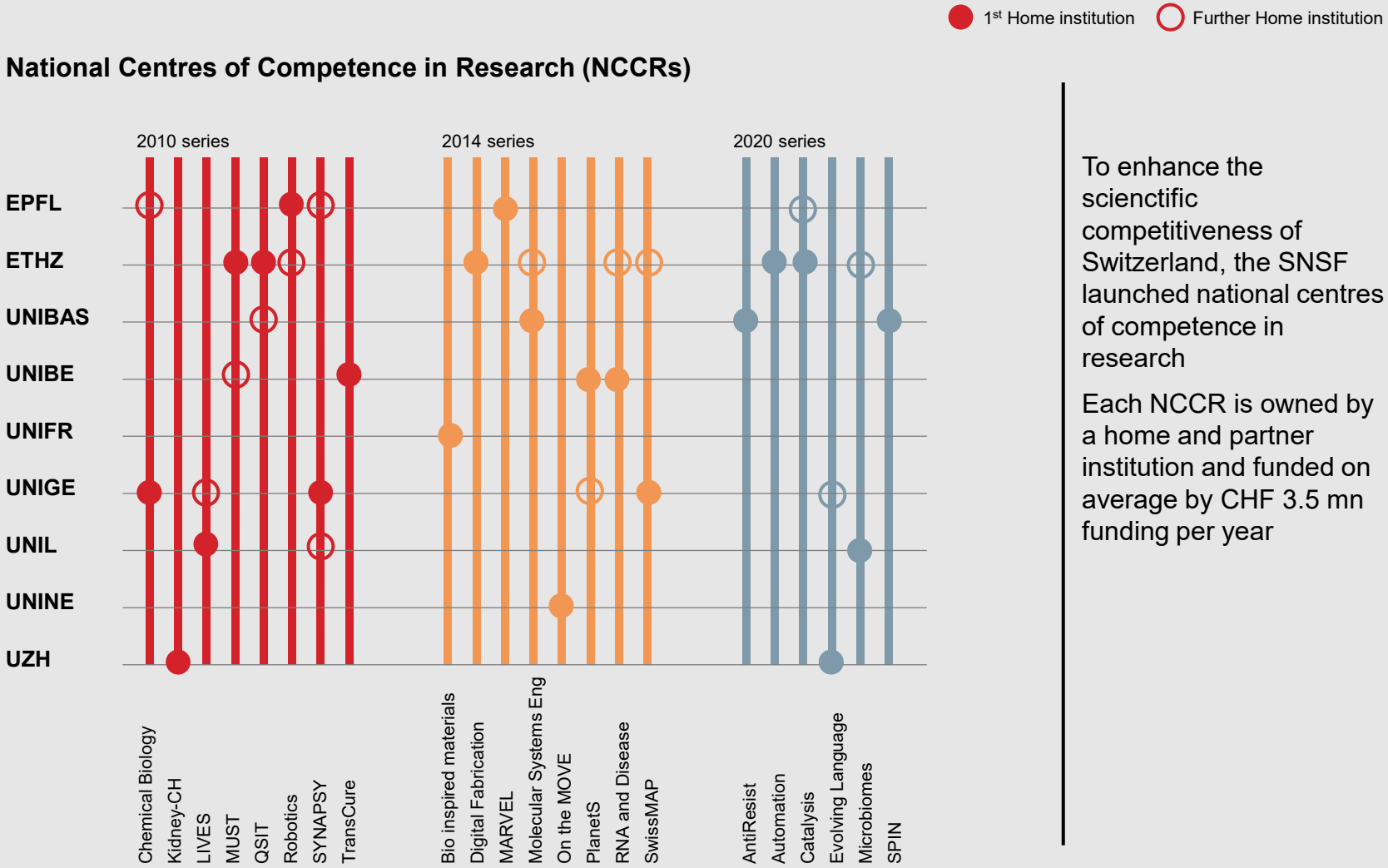
Venture capital investments vs growth



Research – NCCRs

The SNSF launched national centers of competence – latest series focus on AntiResist, Automation, Catalysis, Evolving language, microbiomes, and SPIN

National Centres of Competence in Research (NCCRs)



To enhance the scienctific competitiveness of Switzerland, the SNSF launched national centres of competence in research

Each NCCR is owned by a home and partner institution and funded on average by CHF 3.5 mn funding per year

Source: Swiss National Science Foundation

Research – NCCRs

Description of NCCRs (1/2)

	NCRR	Description
2010 series	**Chemical Biology**	Obtains information about cellular processes thorough innovative new techniques based on small molecules and proteins
	Kidney-CH	Develops new preventative, diagnostic, and therapeutic approaches to treating kidney patients
	QSIT	Utilizes quantum physics and information theory to produce new insights into the fields of quantum computer science and physical basic research
	Robotics	Aims to develop new, human-oriented robotic technology through the generation of new technology, materials, and control mechanisms
	SYNAPSY	Combines neuroscience with psychiatry to discover the neurobiological mechanisms of mental disorders
	TransCure	Creates new medicines through the furthering the understanding of transport proteins and ion channels
	LIVES	Conducts comparative, longitudinal analysis to examine the impact of socio-structural and personal resources on overcoming vulnerability
	MUST	Investigate chemical reactions and energy-transfer processes at the atomic and molecular level to gain a deeper understanding of matter at the microscopic level
2014 series	**Bio-Inspired Materials**	Devises new design strategies and rules to create and assemble macromolecules and nanoparticles to create smart materials
	Digital Fabrication	Uses a multidisciplinary approach to establish digital technology with robotic construction to augment contemporary construction processes
	MARVEL	Applies quantum mechanical simulations to the development of new materials in energy, information and communication technologies of big data

Source: Swiss National Science Foundation

Research – NCCRs

Description of NCCRs (2/2)

	NCRR	Description
2014 series	**Molecular Systems Engineering**	Researches new engineering principles to combine different compound productions into larger molecular production lines
	On the Move	Aims to better understand changing migration and mobility patterns and its implications for Switzerland
	PlanetS	Contributes to a better understanding of planets and how they are formed and evolve through the merging of astronomical observations and theoretical modelling
	RNA & Disease	Brings together different aspects of RNA biology to identify immune responses, allowing the NCCR to identify new therapeutic targets and treatments
	SwissMAP	Aims to combine math and physics to answer the most pressing physics questions today, such as the validity of string theory
2020 series	**AntiResist**	Develops new anti-infectious strategies to fight the rapid spread of antibiotic resistance.
	Automation	Investigates interdisciplinary approaches to controlling complex automated system to ensure their reliability and safety.
	Catalysis	Helps develop technologies to transition the chemical industry towards renewable resources and work towards waste-free chemical production
	Evolving Language	Investigates the evolutionary origins of language to anticipate the impact of digitalisation and artificial intelligence on language development in the future
	Microbiomes	Studies microbiomes, combats pathogens, and promotes useful organisms by bringing experts together across different fields to study microbial communities in humans, animals, and industrial environments
	SPIN	Improves computing through the research and development of a universal quantum computer

Source: Swiss National Science Foundation

Research

Beside being leading house for 10 NCCRs ETH Zurich promotes interdisciplinary research in the form of research centers – focus is on key technologies and innovation in the world

Competence centers of the ETH Zurich

At ETH Zurich

ETH AI CENTER

ETH RISK CENTER

CSFM

Energy Science Center

REHABILITATION ENGINEERING SCIENCE

MaP Competence Center for Materials and Processes

World Food System Center

Shared with other institutions

EXCITE ZURICH IMAGING

C2SM Center for Climate Systems Modeling

CITIZEN SCIENCE CENTER ZURICH

Source: ETH Zurich

5 ecosystems for investment promotion (where to play)

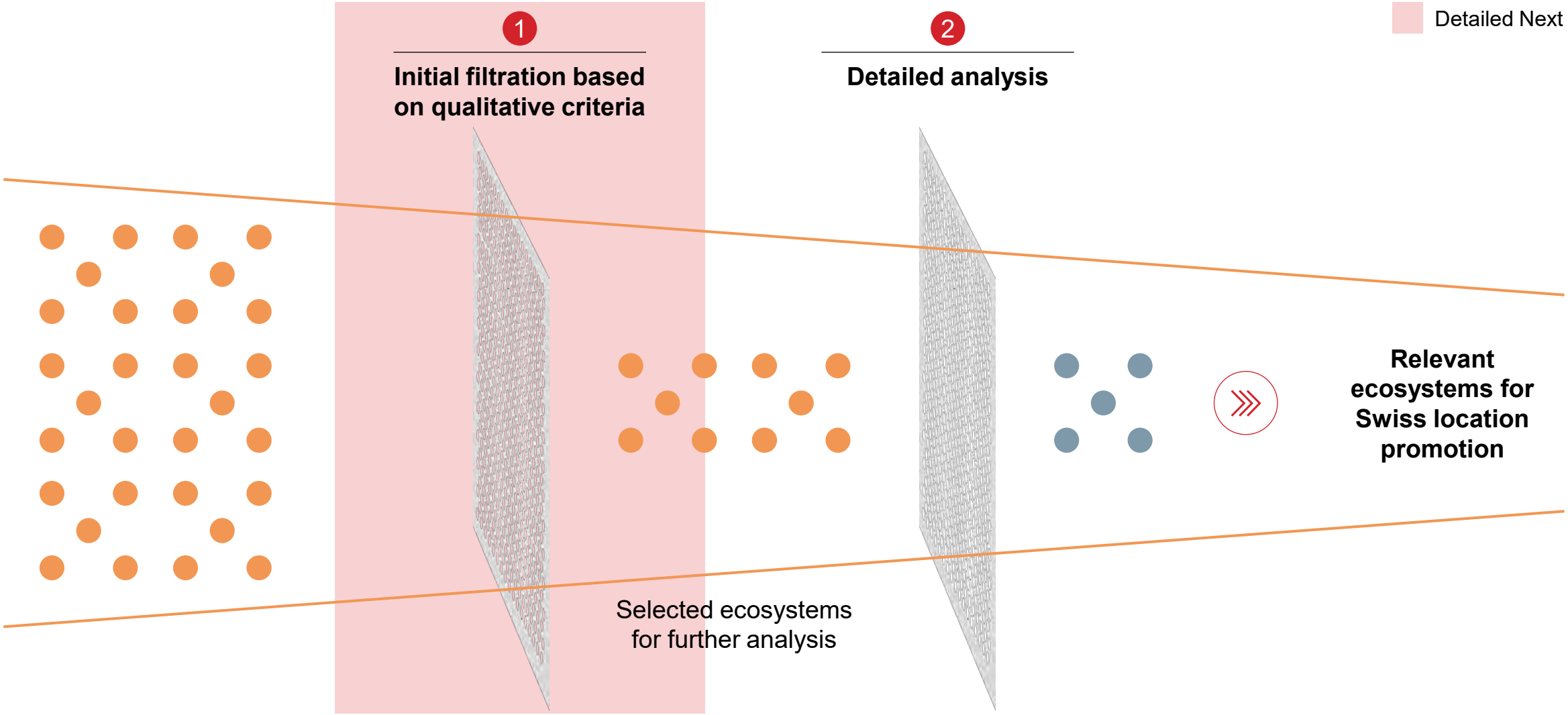
WHY are ecosystems important for economies?

WHAT are relevant ecosystems and its drivers?

WHERE should Switzerland focus?

- **Prioritization of ecosystems**
- Deep Dive of selected ecosystems

The overall list of ecosystems goes through a two-step process to determine which ecosystems are prioritized



Global ecosystem industrial perspective

Switzerland is a high-cost, high-skill economy – thus we shortlist ecosystems with high compatibility

Detailed next

Characteristics of the Swiss economy

- **Second highest per capita GDP in the world** (USD 86,850 in 2020) translating into the **highest median net income per household in Europe** (EUR 42,967 in 2020)
- **Only 4% of companies in Switzerland are multinationals** creating 26% of all Swiss jobs
- **Switzerland spent ~3.2% of GDP on R&D in 2019** (CHF 22.9 bn[1]) which is above the OECD average of ~2.4%
- **Home to leading universities –** Two universities are ranked within the global top 30 and five additional universities ranked among the top 200[2]
- **Application-oriented education and training –** dual education system with focus on professional skills
- **Relatively small land area resulting in high population density –** 219 people live in Switzerland per sq. km compared to 112 in the EU
- **Small domestic market** with significant advantages for testing and prototyping but limited scaling possibilities

Initial criteria for ecosystem selection

Science & technology focus	Focus on research and development intense ecosystems which require a high skill and education level
Sustainable growth	Potential for sustainable long-term economic, social and environmental growth in Switzerland – excluding ecosystems which require significant use of land and energy
Strengthening of existing ecosystems / competencies	Integrative part of Switzerland‘s economy or based on existing competencies
Aligned with Swiss foreign policy	In line with the foreign economic policy of Switzerland

1. Sum of R&D expenditure of private enterprises, higher education institutions, private non-profit institutions and the confederation
2. According to QS World University Rankings 2019

Source: OECD, Eurostat, Swiss Info, Worldbank, Report «Switzerland Wake Up»

There are three pillars of sustainability

Environmental

Energy management and **GHG emissions**

Circularity of products and services

Land use and other **ecological impacts**

Water and **wastewater** management

Social

Fair labor practices (incl. health/ safety, diversity and engagement)

Customer relations (incl. data security and product safety)

Community relations (incl. giveback initiatives)

Aging population and **reskilling** revolution

Economical

Long-term value creation including job creation

Business ethics (i.e., anti bribery and corruption codes)

Global ecosystem industrial perspective

Based on these initial criteria, a few ecosystems with high compatibility can be shortlisted for further assessment

Shortlisted

Housing	Wealth and Protection	Mobility	Transpor-tation	Travel & Hospitality	Consumer Goods	Energy & Material	Educa-tion	Health & Life Sciences	Public services	Digital content & entertain-ment	Digital services & IT	Global corporate services	B2B operations
Home Re-pair & Main-tenance	Wealth & Asset management	Car Rentals	Air Freight & Logistics	Hotels, Restaurants, & Leisure servcies	Apparel & Fashion	Paper & Forest products	Primary	Healthcare equipment (incl. MedTech)	Public Administration	Advertising	IT Infrastructure & Hosting	Corporate financial services	Machinery & Equipment
Rental	Capital markets (incl. Trading)	Car Insurance & Service	Airlines	Travel Arra-ngements & Insurance	Electronics & Appliances	Energy Equipment & Services	Secondary	Pharma & Biotechnology	Social Security And Defense	Broadcasting	Software	Research & Consulting services	Real estate
Purchase	Banking incl. Mortage financing	Auto-mobiles	Marine	Tourism	FMCG	Oil, Gas, & Consumable Fuels	Tertiary Education	Life Science tools & services (incl. CDMO)	Environ-mental & Facilities services	Cable & Satelite	IT Services (incl. Outsourcing, system integration, etc.)	Human Resource & Employment Services	Construction & Engineering
Renova-tion	Insurance	Public transport	Road & Rail		Telco Sales	Electrical equipment[1]	Education services	Digital health	Water Supply, Sewerage	Publishing	Technology Hardware and Storage	Security & Alarm services	Security & defense
Furnishing	Payment	Auto comp-onents			Luxury goods	Independent power and Renawable Electricity Producer		Healthcare facilities		Movies & Entertainment	Electronic equipment & instruments		Building products
					Retail & trade	Chemicals[2]		Healthcare distributors		Interactive Home Entertainment & Media[3]	Semi-conductor		Industrial automation
					Food & Nutrition	Construction Materials		Health insurance			Cybersecurity		Aviation & Space technology
					Tobacco	Utilities (Gas, Electric, Water)		Healthcare services (incl. dialysis centers or lab testing)			Communica-tion equipment		
					Household & Personal products	Containers & packaging					Telecommuni cation services		
					Leisure products	Metals and Mining							

1. Focus on energy storage and distribution technology
2. Focus only on material science and "green" chemical processes including recycling, carbon capture, etc.
3. Including Metaverse

Definitions of short-listed sub-industries (1/3)

Ecosystem	Sub-Industry	Description	Players (examples)
Wealth & Protection	**Wealth & Asset Management**	Financial institutions focused on managing wealth and assets of clients, including FinTech companies	Julius Bär, BlackRock
	Capital markets (incl. Trading)	Financial institutions engaged in investment banking and brokerage services (incl. equity and debt underwriting, mergers and acquisitions, securities lending and advisory services) and diversified capital market activities	J.P.Morgan, Goldman Sachs
	Insurance	Insurance brokers, life insurance, multi-line insurance, property & casualty insurance and reinsurance	Swiss Re, ZURICH
	Payment	Providers of consumer finance services, including personal credit, credit cards and payment technologies	VISA, PayPal
Transportation	**Air Freight & Logistics**	Companies providing air freight transportation, courier and logistics services, including package and mail delivery and customs agents	DHL, KUEHNE+NAGEL
	Road & Rail	Companies providing primarily goods and passenger rail and land transportation, including vehicle rental and taxi companies	SBB CFF FFS, enterprise, ups
Consumer Goods	**Luxury Goods**	Manufacturers of watches	ROLEX, IWC SCHAFFHAUSEN
	Food & Nutrition	Producers of agricultural products and producers of packaged foods and meat (excluding retail) and technologies that innovate the food supply chain	Nestlé, BEYOND MEAT

Source: GICS, Web Research

Definitions of short-listed sub-industries (2/3)

Ecosystem	Sub-Industry	Description	Players (examples)
Energy & Material	**Electrical equipment**	Companies that produce electrical cables and wires, power-generating equipment, power turbines, heavy electrical machinery	
	Green Chemicals	Manufacturers of chemicals with a carbon neutral footprint	
	Construction Materials	Manufacturers of construction materials including sand, clay, gypsum, lime, aggregates, cement, concrete and bricks	
Health & Life Science	**Healthcare equipment (MedTech)**	Manufacturers of healthcare equipment and devices. Includes medical instruments, drug delivery systems, cardiovascular & orthopedic devices, diagnostic equipment, eye care products and hospital supplies	
	Pharma & Biotechnology	Companies engaged in the research, development of production of pharmaceuticals or products based on genetic analysis and engineering	
	Life Science tools & services (incl. CDMO)	Companies enabling the drug discovery, development and production through analytical tools, instruments, consumables and supplies, clinical trial services and contract research services	
	Digital Health	Producers of healthcare related applications, healthcare wearables, electronic health recrods and telemedicine	
Public Services	**Public Administration**	Charities and non-governmental organizations in the public sector	

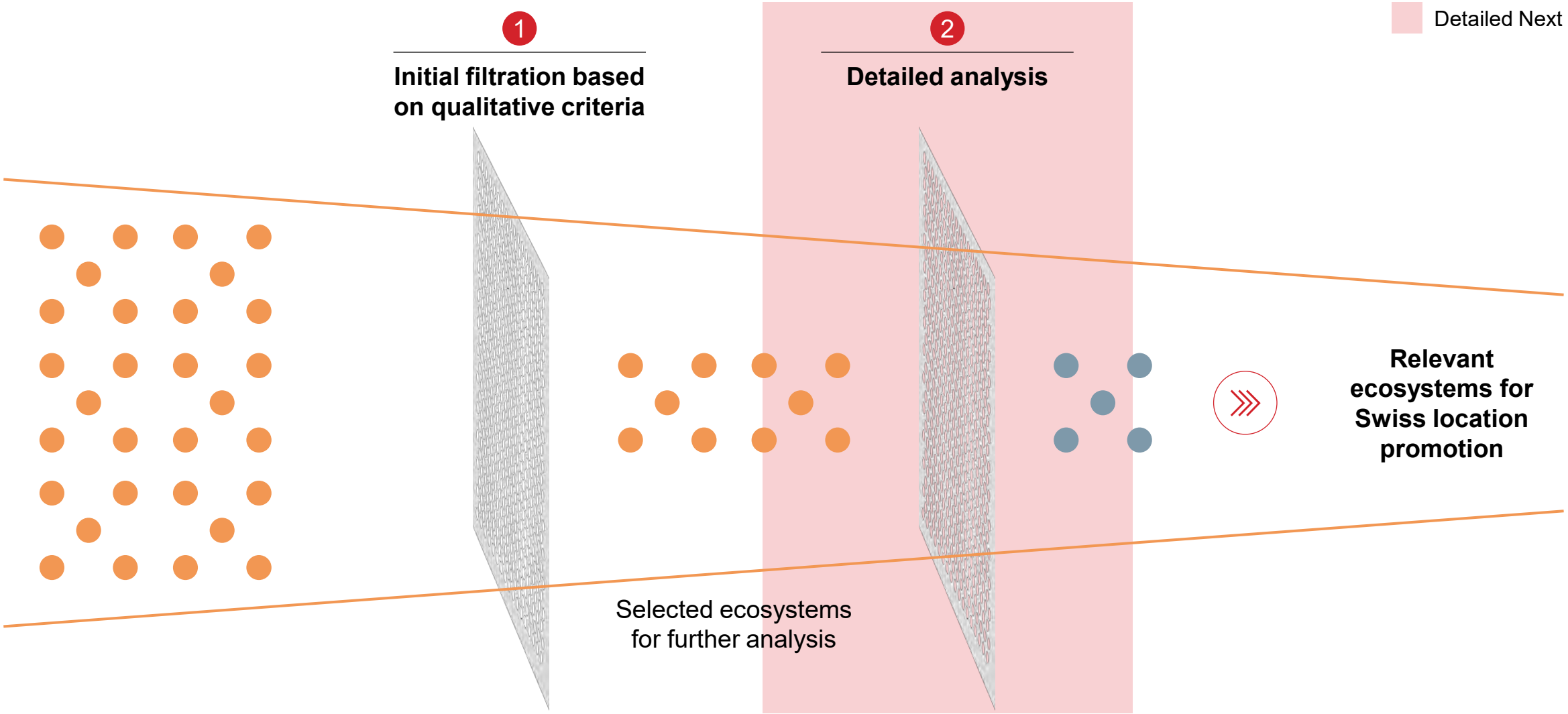
Source: GICS, Web Research

Definitions of short-listed sub-industries (3/3)

Ecosystem	Sub-Industry	Description	Players (examples)
Digital Content & Entertainment	**Interactive Home Entertainment & Media**	Producers of interactive gaming products, content and information creation or distribution through proprietary platforms, including companies in VR sector, search engines and social media	LinkedIn, Snapchat, Activision Blizzard
Digital Services & IT	**Software**	Companies developing and producing software designed for specialized applications as well as companies engaged in producing systems and database management	SAP, Oracle
	Electronic equipments & instruments	Manufacturers of electronic equimpent and instruments including sensors, analytical, electronic test and measurement instruments	Siemens, Emerson
	Cyber Security	Companies developing and providing solutions to protect computer information systems, hardware, network, and data from cyberattacks	paloalto, BlackBerry, McAfee
	Semiconductors	Manufacturers of semiconductors, related products and equipment,	Samsung, intel
B2B operations	**Machinery & Equipment**	Manufacturers of industrial machinery and components as presses, machine tools, compressors, pollution control equipment, elevators, escalators, insulators, pumps and other metal fabriactions	CAT, John Deere
	Industrial automation	Manufacturers focused on developing technologies to automize and control manufacturing processes including robots and drones	Yaskawa, ABB, KUKA, Parrot
	Aviation & Space technology	Companies developing and producing technologies for the aviation and space sector	Airbus, SpaceX

Source: GICS, Web Research

The overall list of ecosystems goes through a two-step process to determine which ecosystems are prioritized



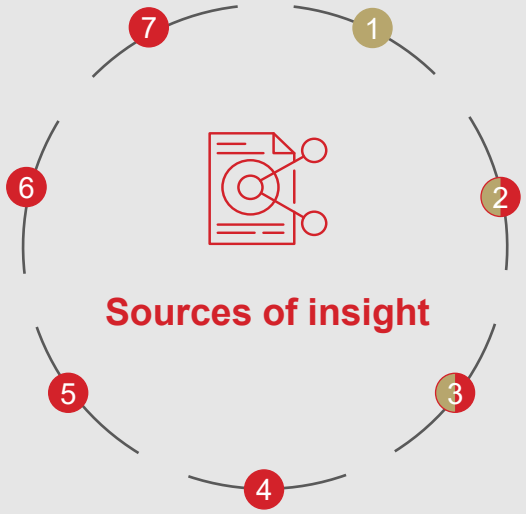
Criteria for prioritization

Prioritization of shortlisted ecosystems is based on attractiveness and strategic fit for Switzerland

Dimension	Criteria	Description
Attractivity	**Value-added 2025 in Switzerland**	Value-added is sales revenue less cost of purchases of inputs and supplies (Operating Expenditures) required for production. It represents the "value-added" contribution of the sector to the economy. Conceptually, the sum across all industries, by definition, equals national GDP
	Growth of gross output (19-25)	Average growth of overall annual revenue from sales of all private and public enterprises within the specified sector from 2019 - 2025
Strategic fit	**High competitiveness**	Switzerland has the potential to stay / become one of the long-term leading players in that ecosystem / sub-industry in Europe characterized by a high differentiation which is based on existing competencies and strengths
	Science & technology focus	Ecosystem / Sub-industry is characterized by a high research and development intensity which requires a high skill & education level
	Positive impact on sustainabilty	Ecosystem / sub-industry is leading in sustainable innovation and has therefore a positive contribution to the environment / society

Sources of insight

The prioritization assessment is based on a wide range of both quantitative and qualitative sources



Attractivity

Strategic fit

1. **IHS data base**
   Leveraged the highly regarded database from IHS which is a leading provider of market information including a triangulation between GICS[1] and ISIC[2] industry classification
2. **Reports**
   Reviewed industry leading reports, analysts reports, and any other relevant publications
3. **Desk research & press search**
   Reviewing articles, annual reports, press announcements, etc.
4. **Industry expert interviews**
   Held interviews with ~10 different industry experts
5. **Interviews with S-GE stakeholder**
   Conducted 6 interviews with S-GE stakeholders (S-GE, Begleitgruppe, SECO, etc.)
6. **Life Sciences Workshop**
   Held specific workshop for Life Science ecosystem to prioritize sub-segments and key technologies
7. **Current Swiss investment promotion strategy**
   Analysis of existing Swiss investment promotion strategy including 5Tech focus

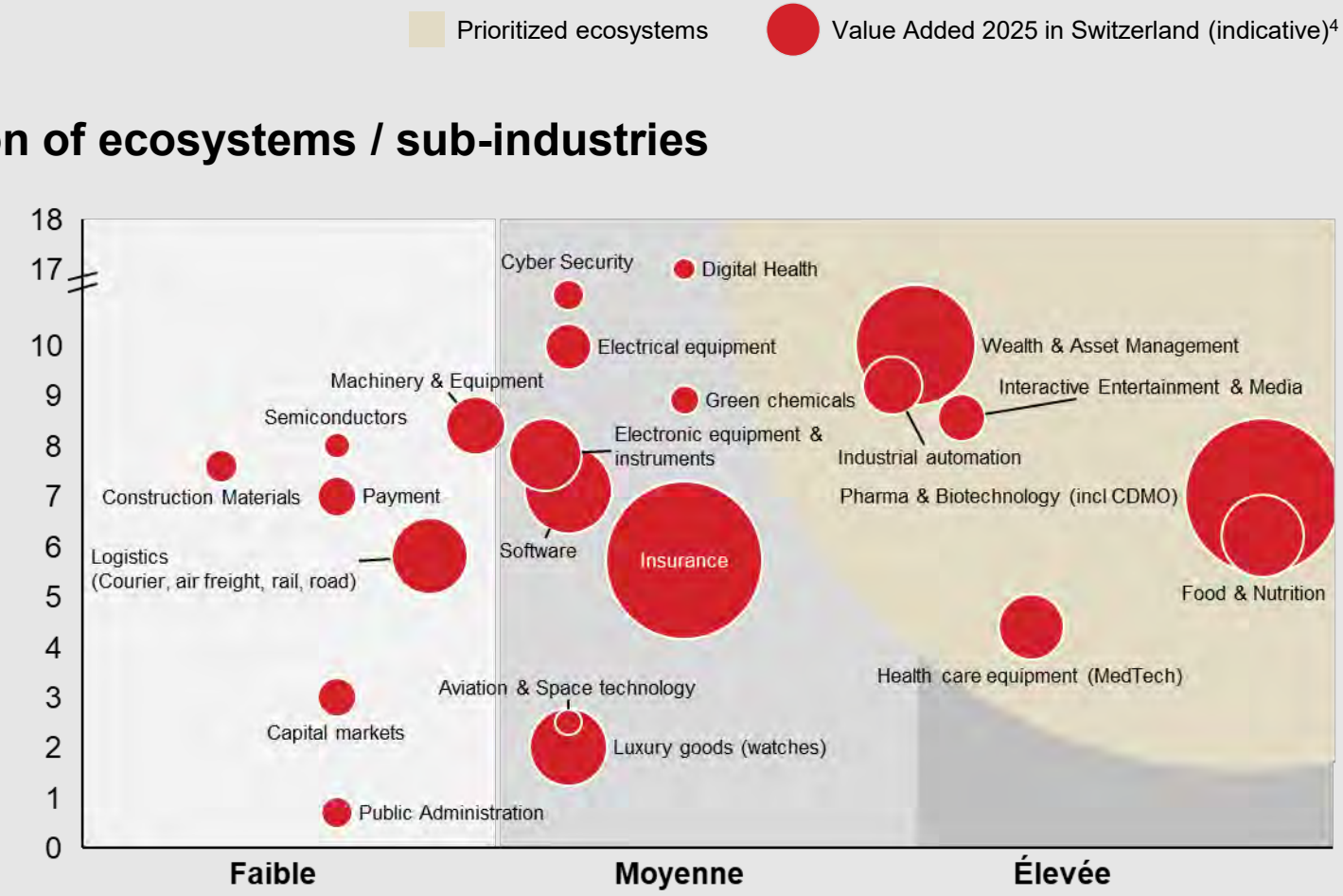
1. Global Industry Classification Standard
2. International Standard Industrial Classification of All Economic

Prioritization of ecosystems

Based on attractiveness and strategic fit, Switzerland should focus on sub-industries Pharma & Biotech (incl. CDMO), Food & Nutrition, Healthcare equipment (MedTech), Interactive Entertainment & Media, Wealth & Asset management, and Industrial Automation

Source: IHS, market research, expert interviews

Prioritization of ecosystems / sub-industries



Strategic fit (qualitative)

- High competitiveness
- Science & technology focus
- Positive impact on sustainability

1. Primary source: IHS
2. Primary source: Market research, Expert interviews
3. Average growth of total annual revenue from sales of all private and public enterprises within the specified sector from 2019 – 2025
4. Value-added is sales revenue less cost of purchases of inputs and supplies (operating expenditures) required for production. The sum across all industries, by definition, equals national GDP

Overview of prioritized ecosystems

Within each ecosystem, focus segments and key players are identified (details on next pages)

XXX «Marketing» name

	Ecosystem	Relevant sub-industries	Focus segments	Key players (HQ outside Switzerland)	Rationale
1 «Life Sciences»	Life Sciences	Pharma & Biotech (incl. CDMO)	Oncology, Immuno-suppressants, Dermatologicals, Vaccines	abbvie, Johnson & Johnson, MERCK, GINKGO BIOWORKS, biosplice, CARIS LIFE SCIENCES	Long history and large footprint across CH; strong science and R&D focus with world-class research facilities; embedded in highly developed CH healthcare system
		Healthcare equipment (MedTech)	In-Vitro-Diagn., Dental, Urology / Neprhology, Endoscopy	Johnson & Johnson, PHILIPS, GE Healthcare, Abbott	
2 «Future of Food»	Consumer goods	Food & Nutrition	FoodScience, AgTech, Consumer Tech	Mondelēz International, AgroFresh, OATLY!, BEYOND MEAT, Cargill, BASF We create chemistry, JBS, FARMERS BUSINESS NETWORK	Strong industry in CH covering whole value chain from farm to fork
3 «Future of Finance»	Wealth and Protection	Wealth & Asset management	Sustainable investing and finance, financial software	BLACKROCK, Amundi ASSET MANAGEMENT, MAMBU, Goldman Sachs, infor, Finxact CORE AS A SERVICE	Combining traditional strengths of CH in financial industry with new capabilities, e.g., software
4 «Industry 4.0»	B2B operations	Industrial automation	Machinery, robotics, & control equip., tooling & sensors, connectivity & software	FANUC, TERADYNE, SIEMENS, Geek+, Horizon Robotics, OMRON, LOCUS	Combining existing MEM footprint with highly attractive future applications in robotics
5 «Digital Tech»	Digital Content	Interactive entertainment & media	Social networking platforms, video games, search engines, streaming platforms	LinkedIn, ACTIVISION BLIZZARD, Tencent, Baidu 百度	Scaling CH ecosystem (e.g., Google) with significant growth potential; research focus of Swiss technical universities

«Life Sciences»

1: Life Sciences – Biotech & Pharma

BioPharma ecosystem is engaged in the research, development of pharmaceuticals or products based on genetic analysis and engineering

Focus segments

Leading production process

Shift from conventional to biotechnology drugs – share of prescription & OTC sales of biotechnology drugs will increase to 35% in 2026

Fast growing therapy areas

1. **Oncology** (12% CAGR)
2. **Immunosuppressants** (15% CAGR)
3. **Dermatologicals** (13% CAGR)
4. **Vaccines** (8% CAGR)

Disrupting technologies

Bio innovations

Use of biomolecules and biosystems innovations (e.g., cell & gene therapy) could potentially have annual direct impact of USD 500 billion to USD 1.2 trillion globally

Data & Analytics (incl. AI)

Data & analytics is leading a paradigm shift in several functions (e.g., R&D or operations)

Small batch production

New manufacturing processes enabling production of small batches / personalized health products (e.g., new type of bio-reactors)

Leading geographies

USA

16 large biopharma players[1] with a HQ in USA, Boston, Bay Area North Carolina and Seattle as key regions

Europe (EU5)

13 large[1] biopharma players in EU5[2] countries – plus high density in Ireland, Switzerland and Medicon Valley

Japan

Most large players have their HQ in Tokyo

China

Shanghai and Shenzhen leading regions

Key players

Foreign players

Incumbents

abbvie, Johnson & Johnson, MERCK, Bristol Myers Squibb, Pfizer, SANOFI, gsk

Unicorns

GINKGO BIOWORKS, CARIS LIFE SCIENCES, biosplice, color

Swiss players

Incumbents

Roche, NOVARTIS, idorsia, Biogen, GALDERMA

Other players

ROIVANT SCIENCES, octapharma, VIFOR PHARMA, basilea PHARMACEUTICA

1. Sales revenue over USD 2bn in 2020
2. Germany, United Kingdom, France, Spain, Italy

Source: Evaluate Pharma 2020, McKinsey Global Institute report “The Bio Revolution”, In Vivo Outlook 2020, Failory, expert interviews, web research

«Life Sciences»

1: Life Sciences – MedTech

MedTech industry includes manufacturers of healthcare equipment and devices

Focus segments

Overall growth

MedTech industry is growing by 4-5% driven by macroeconomic trends and a new wave of innovative technologies

Growth segments

1. **In-Vitro-Diagnostic** (CAGR 7%)
2. **Dental** (CAGR 7%)
3. **Urology / Nephro-logy** (CAGR 6%)
4. **Endoscopy** (CAGR 5%)

Disrupting technologies

Material Science & Engineering

3D printing of customizable implants, replica organs, and on-site device production using materials as polymers, metal alloys, or ceramic composites

Robotics

e.g., Surgical robots

Microtechnology (Miniaturization)

Enabling new clinical applications

Molecular diagnostics:

Novel biochemical technologies, e.g., CRISPR

Connectivity and the cloud

Device and data integration is leading to an explosion of remote monitoring technologies

Data & Analytics (incl. AI)

Key enabler which is deployed across product categories (e.g., for image recognition / computer vision)

Leading geographies

USA

22 large players[1] with a HQ in the USA – leading regions are Bay Area, Minnesota and Boston

Japan

6 large players[1] with a HQ in Japan– leading region is Tokyo

Key players

Foreign players

Johnson & Johnson, Boston Scientific, Philips, B. Braun, Abbott, Zimmer Biomet, GE Healthcare, Baxter, BD, Danaher, Siemens Healthineers, 3M, Cardinal Health, Olympus

Swiss players

Roche, Medtronic, Ypsomed, straumann, sonova, Distalmotion

1. Sales revenue over USD 2bn in 2020

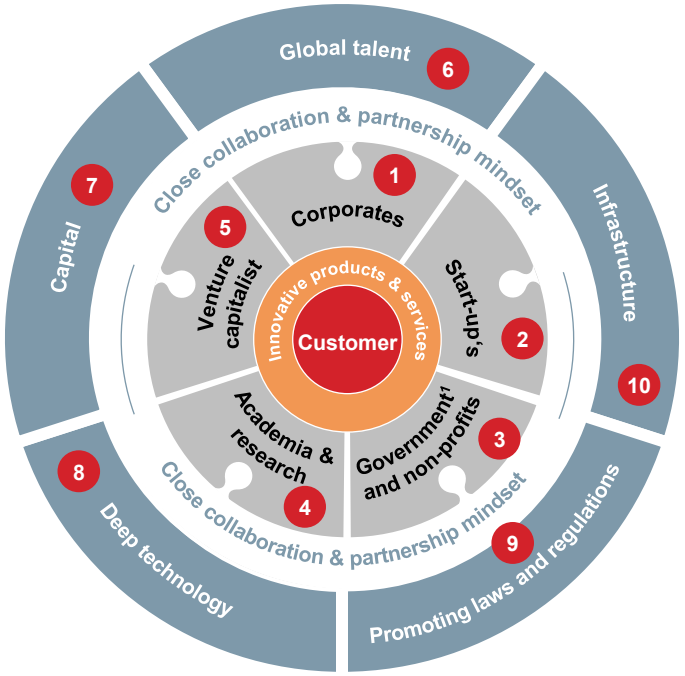
Source: HRI 2006 – 2020 reports, In Vivo Outlook 2020, expert interviews, web research

1: Life Sciences

Overview of ecosystem in Switzerland

NOT EXHAUSTIVE

«Life Sciences»



Stakeholder

1 Corporates

Roche, Biogen, Novartis, idorsia, Galderma, Bayer, Takeda, octapharma, Vifor Pharma, basilea Pharmaceutica, Actelion, Johnson & Johnson, Boehringer Ingelheim, Lonza

2 Start-up's

ROIVANT Sciences, Nagi Bioscience, InteRAx, CUTISS personalized skin, elthera, scailyte, araris, TOLREMO therapeutics, VERSANTIS, Resistell, Volumina Medical

3 Government and non-profits

swissmedic, scienceINDUSTRIES Switzerland, SWISS BIOTECH, LS²

4 Academia & research

Switzerland Innovation Park Basel Area, Universität Basel, Universität Zürich, Université de Genève, EPFL, n|w University of Applied Sciences and Arts Northwestern Switzerland, ETH zürich, zh aw

5 Venture capitalist[1]

4BIO Capital, NF, Roche, PUREOS Bioventures, vi, BB Biotech, red alpine, zühlke ventures, HBM Healthcare Investments

Enabler

6 Global talent

R&D profiles need capabilities in pharmaceuticals, biology, informatics, computation, mathematics and statistics, while market access profiles need sales and regulatory capabilities

7 Capital

Capital intensive sector as the research and development phase takes time. Venture capital is especially important for young companies who want to scale

8 Deep technology

Technology environment based on leading academia and research in the fields of e.g., bio innovation, data analytics, advanced manufacturing, robotics, microtechnology, molecular diagnostics, connectivity and cloud

9 Promoting laws & regulation

Patent regulations (registration process, tax incentives), legislations governing therapeutic products, establishment license, authorization process, tax friendly environment

10 Infrastructure

Switzerland has a strong infrastructure which is considered as a hygiene factor. Proximity to hospitals for research and digital patient record are important

1. Considered only VCs located in Switzerland - Foreign VCs play also an important role in Swiss Life Sciences ecosystem

NON EXHAUSTIVE

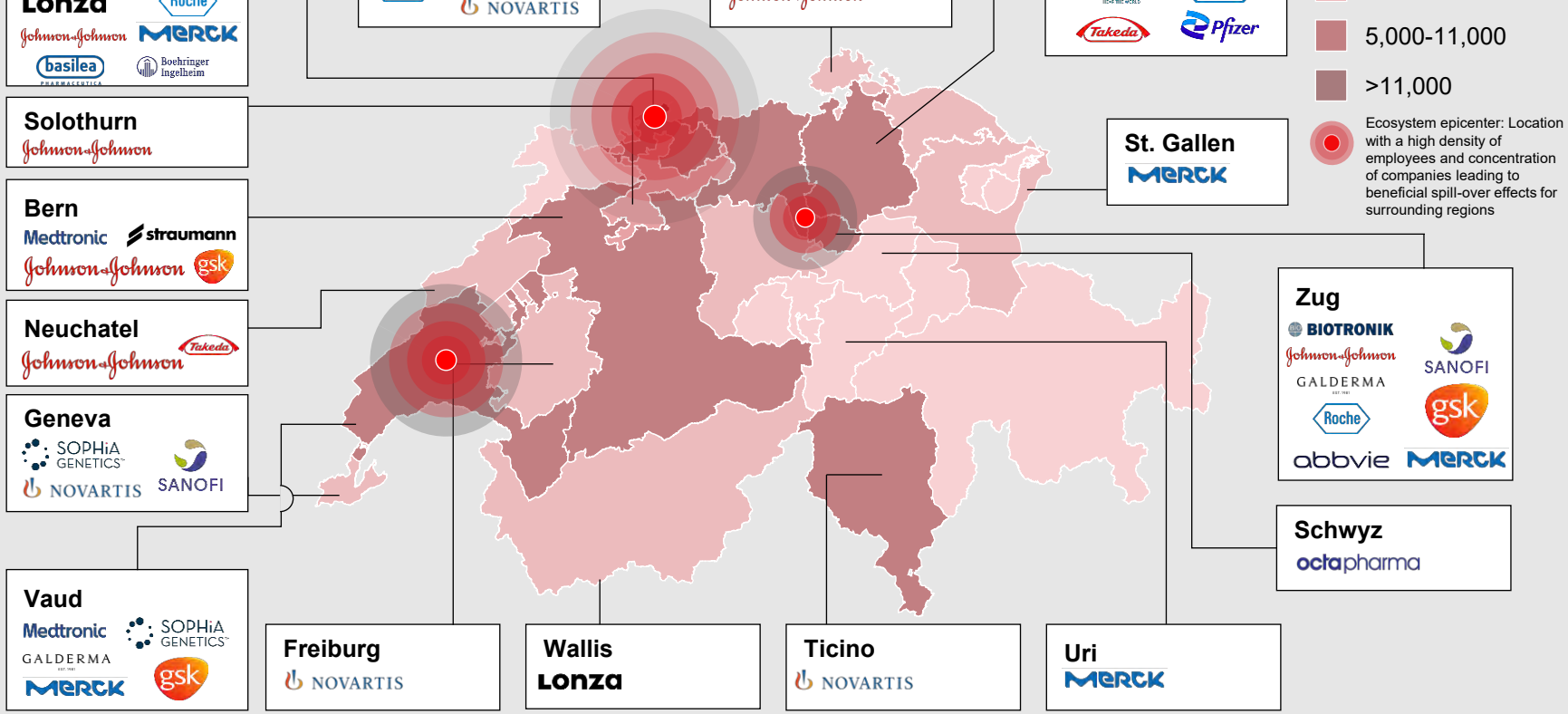
«Life Sciences»

1: Life Sciences – Footprint Switzerland

The Life Science industry in Switzerland employed 95,000 people in 2019 in various regions of Switzerland but especially in the Basel, Espace Lémanique and Zürich – Zug regions

Distribution of employees[1]

Total: 95,000



1. BSF categories: Herstellung von pharmazeutischen Grundstoffen, Herstellung von pharmazeutischen Spezialitäten und sonstigen pharmazeutischen Erzeugnissen, Herstellung von medizinischen und zahnmedizinischen Apparaten und Materialien, Herstellung von orthopädischen und prothetischen Erzeugnissen, Zahntechnische Laboratorien, Forschung und Entwicklung im Bereich Biotechnologie, Grosshandel mit pharmazeutischen Erzeugnissen, Grosshandel mit medizinischen, chirurgischen und orthopädischen Erzeugnissen
2. Includes Basel Land & Basel Stadt

Source: Bundesamt für Statistik 2019

«Future of Food»

2: Food & Nutrition

The Food & Nutrition ecosystems comprises product and process innovations along the food value chain, from farm to fork

Focus segments

Global investments in food technologies were EUR 22.3 bn in 2020 and have grown over 137% since 2017

Growth segments[1]

1. **Food Science**
   Development of new ingredients and food products through new processing technologies (e.g., meat alternatives, supplements)
2. **AgTech**
   Solutions to improve farming output and develop new farm products, next generation farms and urban farming
3. **Consumer Tech**
   Services and devices to help consumers with their nutrition selection
4. **Supply Chain & Retail**
   Solutions improving the food supply chain

Disrupting technologies

Alternative Protein

Development of animal protein substitutes based on plant-based protein, precision fermentation and cell-based meat

Genetic Engineering & Microbiomes

The use of genetic engineering of crop traits and food animal traits, microbiome diagnostics and probiotics and microbial seed and soil treatments could potentially have an annual impact of USD 730 bn globally

Personalized Nutrition

Advances in nutrigenomics enable the development of nutrition forms tailored to each individual's genetic profile

Leading geographies

USA

7 HQs of biggest food corporations, FoodTech Hubs in Bay Area, New York, St. Louis & Boston

China

Second highest nation in terms of FoodTech unicorns and investments in local FoodTech start-ups, hubs in Bejing and Shanghai

Israel

Nearly 40% of FoodTech start-ups around the world are in Israel. FoodTech Innovation center in Kiryat Shmona, various start-ups in Tel Aviv

Europe

Strong hub in London and Food Valley in Wageningen

Key players

Foreign players

Incumbents

Cargill, JBS, Mondelēz International, BASF, AgroFresh, BUNGE, DSM, CORTEVA

Unicorns

FARMERS BUSINESS NETWORK, OATLY!, NXIN, NAYUKI, BEYOND MEAT, indigo, IMPOSSIBLE

Swiss players

Incumbents

syngenta, Nestlé Good food, Good life, Givaudan, BÜHLER, Firmenich

Other players

planted., SwissDeCode, AgroSustain, yamo

1. Based on VC investments and expert interviews

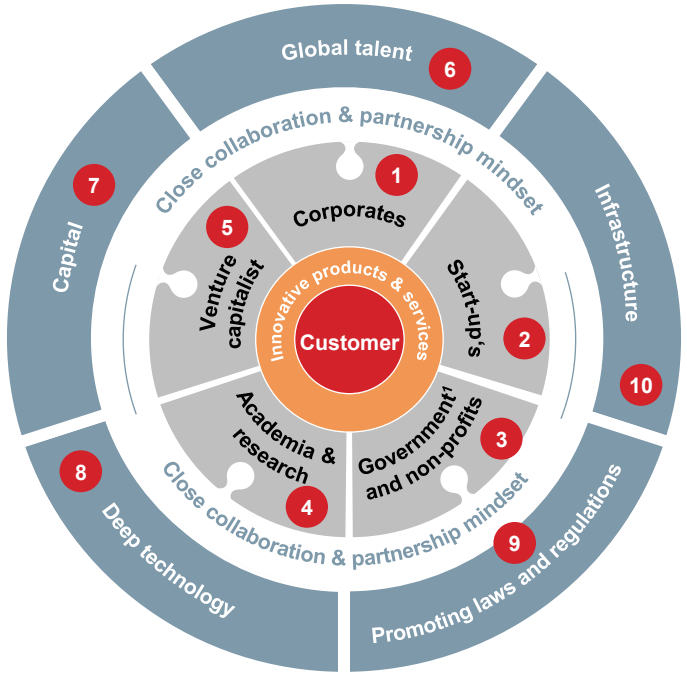
Source: Digital Food Lab, McKinsey Global Institute report "The Bio Revolution", Food Engineering Mag, expert interviews, web search

2: Food & Nutrition

Overview of ecosystem in Switzerland

NOT EXHAUSTIVE

«Future of Food»



Stakeholder

1 Corporates

Nestlé, syngenta, BÜHLER, Emmi Group, Tetra Laval, coop, Givaudan, Lindt & Sprüngli, Ernst Sutter, Bell Food Group, M, Firmenich, ADM, Barry Callebaut, fenaco

2 Start-up's

planted., Agrarpiloten, SwissDeCode, MIRAI FOODS, SmartBreed, farmer connect, Bring!, yamo, GAMAYA, Farmy, Amazentis, DigiMeals, AgroSustain

3 Government and non-profits

INNOVAUD, cluster food & nutrition, Swiss Food & Nutrition Valley, Crowd Foods, schweizer bauernverband, AgriCo

4 Academia & research

EPFL, ETH zürich, Agroscope, FiBL, zh aw, FoodTech Lab

5 Venture capitalist[1]

emerald Technology Ventures, blue horizon ventures, sparrow ventures, QUADIA, VENTURE KICK, BACKBONE VENTURES, Syngenta Group Ventures

Enabler

6 Global talent

R&D profiles need capabilities in biology, biotech and food science. Data & analytics profiles are needed for precision farming and supply chain specialists to reduce waste and increase transparency

7 Capital

Venture capital is especially important for young companies who want to scale (e.g., planted raised CHF 19 million in August 2021 for its international expansion)

8 Deep technology

Alternative proteins, genetic engineering & microbiomes, personalized health (e.g., nutrigenomics), data & analytics (incl. artificial intelligence)

9 Promoting laws & regulation

Simple regulations and well-functioning authorities are important. Product development regulations (e.g., GMO regulated in VGVL) and public perception of regulations

10 Infrastructure

Switzerland has a strong infrastructure which is considered as a hygiene factor. Access to laboratories for start-ups is important

1. Considered only VCs located in Switzerland - Foreign VCs play also an important role in Swiss Future of Food ecosystem

NON EXHAUSTIVE

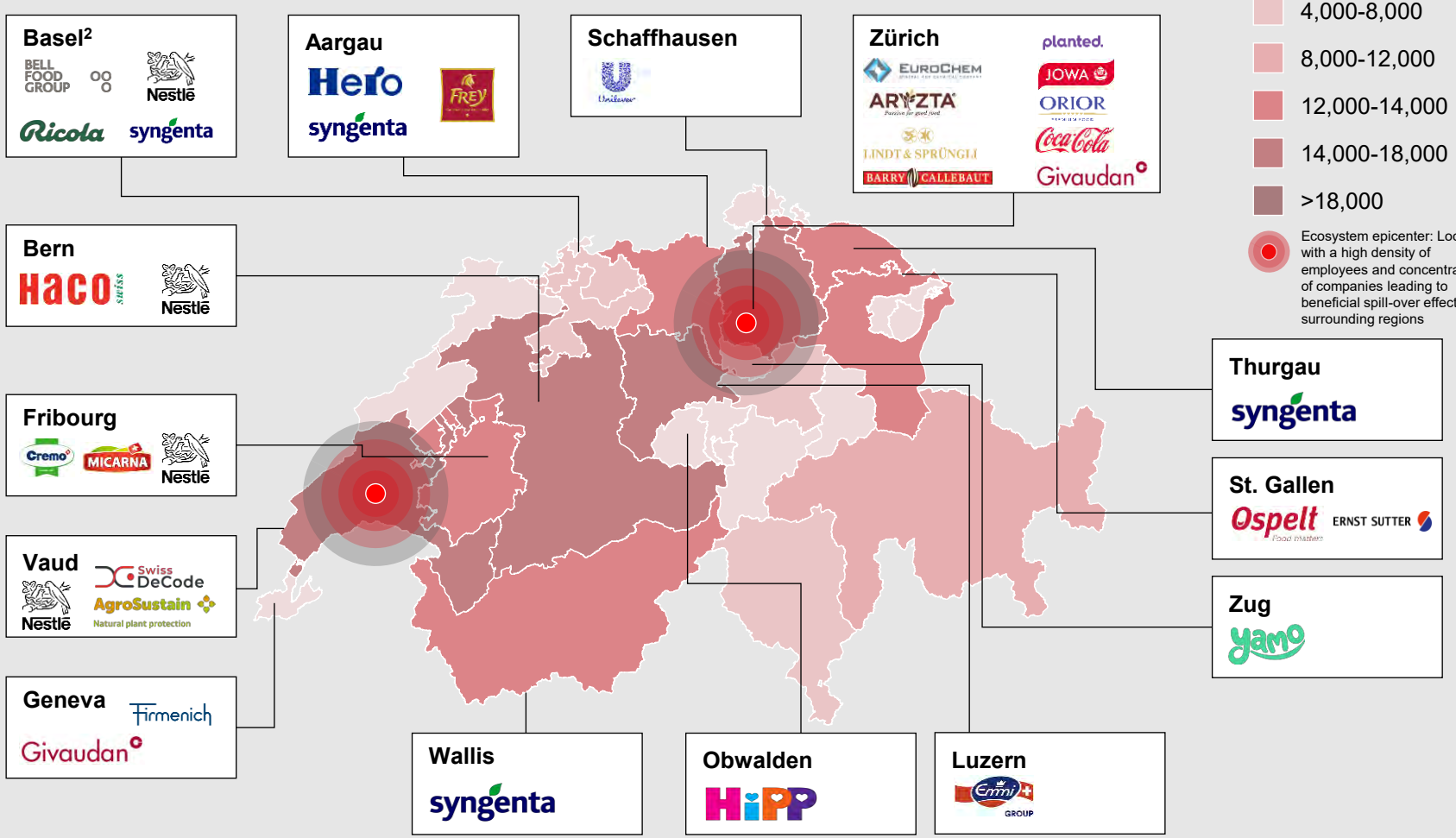
«Future of Food»

2: Food & Nutrition – Footprint Switzerland

The Food industry in Switzerland employed 240,000 people in 2019 in various regions of Switzerland, but there is a strong concentration in the Vaud and Zurich regions

Distribution of employees[1]

Total: 240,000



1. BSF categories: Landwirtschaft, Jagd und damit verbundene Tätigkeiten, Herstellung von Nahrungs- und Futtermitteln, Getränkeherstellung

Source: Bundesamt für Statistik 2019

«Future of Finance»

3: Wealth and Protection

Innovation and technologies with the potential to shape the current financial industry

Focus segments

Switzerland has a very strong footprint in financial service (in particular in wealth & asset management) – The following segments will be essential in the future and can help to achieve further growth:

Growth segments

Sustainable investing and financing

Sustainable investing with high growth (~22% CAGR) – opportunity to establish an environment with deep expertise in sustainability (e.g., data management and instruments)

Financial Software

Core banking software (~8% CAGR[1]), Asset management software, and Data & Analytics software

Digital Assets

Including Non-fungible-tokens and digital currencies

Disrupting technologies

Data & Analytics (incl. AI)

Enabling many automated solutions, e.g., robo advisory, KYC processes

Distributed ledger technology (e.g., Blockchain)

Enabling simultaneous access, validation, and record updating (faster KYC processes, tokenization of assets, etc.)

Data security

Data management technologies to protect financial information e.g., secure cloud computing, encryption solutions

Further technologies

Quantum Computing (e.g., for an increased accuracy of market simulations)

Leading geographies

North America (New York)

Europe (Switzerland, London, Frankfurt, BeNeLux)

Asia (Singapore, Hong Kong, Shanghai, Beijing, Shenzhen, Tokyo)

Key players

Foreign players

Banks and Asset managers

Merrill Lynch, Franklin Templeton, BlackRock, Goldman Sachs, Amundi, Fidelity, generation, Nordea

Software

infor, Oracle FLEXCUBE, Finxact, Finastra, Thought Machine, fiserv., MAMBU, DNA, kraken

Swiss players

Banks and Asset manager

UBS, Credit Suisse, Vontobel, Julius Bär, Lombard Odier, J. Safra Sarasin, Pictet 1805

Software

Temenos, avaloq, finnova, SEBA

1. Excluding US

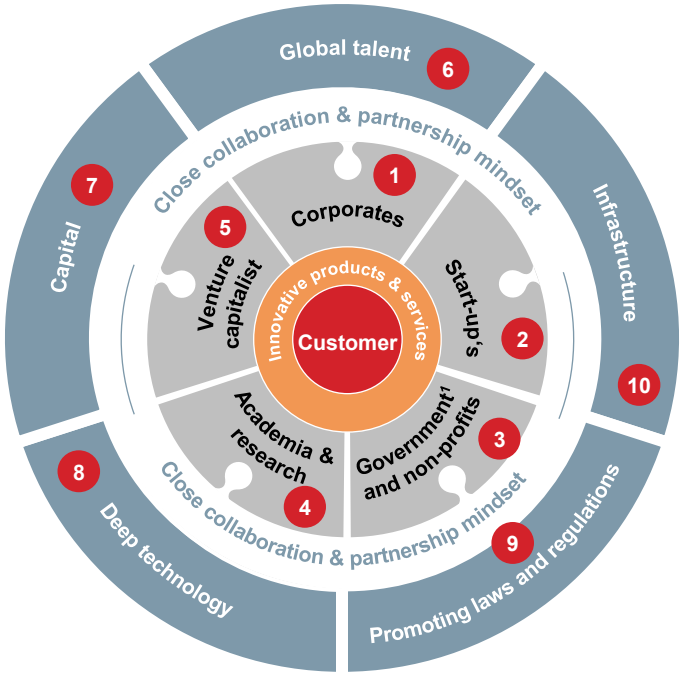
Source: Morningstar Direct, IDC, expert interviews, web research

3: Wealth & Protection

Overview of ecosystem in Switzerland

NOT EXHAUSTIVE

«Future of Finance»



Stakeholder

1 Corporates

Wealth and Asset management

UBS, Credit Suisse, Vontobel, J. Safra Sarasin, Julius Bär, Lombard Odier, Pictet

Software

avaloq, Tindeco, Temenos, finnova, additiv, RepRisk, inrate

2 Start-up's

Wealth and Asset management

inyova, assetmax, VIAC, SEBA, SYGNUM, Kaspar&

Software

ONEPM, integration alpha, TAURUS, APIAX

3 Government and non-profits

finma, SwissBanking, Swiss Sustainable Finance, Schweizerische Nationalbank / Banque nationale suisse / Banca nazionale svizzera / Banca naziunala svizra / Swiss National Bank, VSV ASG, Crypto Valley

4

University of St.Gallen, Universität Zürich, Lucerne University of Applied Sciences and Arts – Hochschule Luzern, EPFL, zh aw, s:fi

5 Venture capitalist[1]

SPICEHAUS PARTNERS, btov, See Ventures, FIO, Venture Kick

Enabler

6 Global talent

Data & analytics are becoming more important in sustainable finance, asset management and client relationships. Also, tech talent in programming, software development, UX/UI and DLT is needed as well as sustainability specialists

7 Capital

Venture capital is especially important for young companies who want to scale (e.g., Inyova raised 11 million for its European expansion)

8 Deep technology

Distributed ledger technology, cloud technology, quantum computing, data & analytics (incl. artificial intelligence), data security

9 Promoting laws & regulation

International regulation of financial markets leaves little room for differentiation by regulator (e.g., FINMA) in traditional asset and wealth management but Switzerland is leading the way in regulation of new digital assets

10 Infrastructure

Switzerland has a strong infrastructure which is considered as a hygiene factor

1. Considered only VCs located in Switzerland - Foreign VCs play also an important role in Swiss Future of Finance ecosystem

Source: venturelab, start-up.ch, Future of Wealth Management – SIX White Paper

NON EXHAUSTIVE

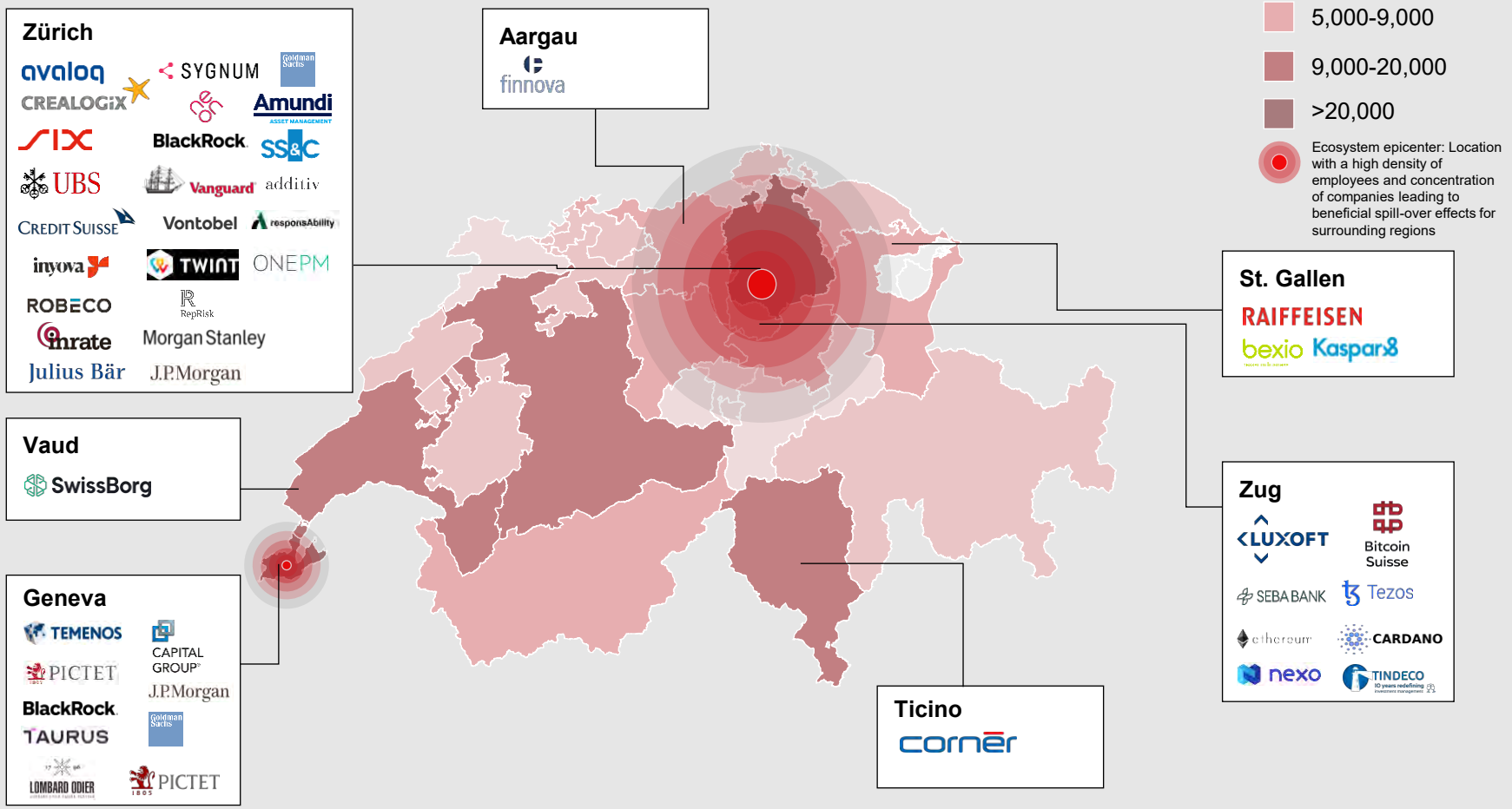
«Future of Finance»

3: Wealth and Protection – Footprint Switzerland

195,000 people worked in financial sector in 2019 in Switzerland – strong hubs in Zurich and Geneva region

Distribution of employees[1]

Total: 195,000



1. BSF categories: Erbringung von Finanzdienstleistungen, mit Finanz- und Versicherungsdienstleistungen verbundene Tätigkeiten

Source: Bundesamt für Statistik 2019

«Industry 4.0»

4: Industrial automation

Industrial automation focuses on the creation and application of technology, such as robots and information technologies, to automize and control manufacturing processes

Focus segments

Industrial automation market is expected to grow at a CAGR of 9.2% until 2028

Growth segments

Value chain perspective:

1. **Machinery, robotics & control equipment**
2. **Tooling, components & sensors**
3. **Connectivity Platforms & Software**

Industry perspective:

Overall robotics market expected to grow by 13% p.a.

Service Robots (OEMs)

Warehousing & Logistics (CAGR 41% until 2023)

Medical (CAGR 24% until 2023)

Agriculture (CAGR 11% until 2023)

Disrupting technologies

Robotics
Advances in collaborative, mobile and autonomous robots are going to drive growth in these fields and enable fleet autonomy

IoT Platforms
Enables advanced use cases for robotics in the automation context, facilitate fleet management and increase data collection

Data & Analytics (incl. AI)
Enables autonomous learning and decision making

Microtechnology
Developing technologies in the nano scale is key for precision manufacturing and miniaturization

Vision & Sensing
Vision systems and sensors allow for better image interpretation and coordination of robots

Material Science & Engineering
Materials innovation enables development of soft robots, which are more adaptable and robust

Leading geographies

Japan

World's largest players in industrial automation, hubs in Tokyo and Osaka

Germany

Bavaria as hub for industrial automation companies

USA

Focus in Boston area, Bay Area and North Carolina

Denmark

Many companies located in Odense hub

China

Shenzhen as key region

Key players

Foreign players

Incumbents

FANUC, TERADYNE, KUKA, SIEMENS, OMRON, SCHUNK, UNIVERSAL ROBOTS, BALYO

Unicorns

Geek+, Horizon Robotics, LOCUS

Swiss players

Incumbents

ABB, STÄUBLI, swisslog (Member of the KUKA Group), Endress+Hauser

Other players

sevensense, AMYbotics, HUMARD, Medacta International

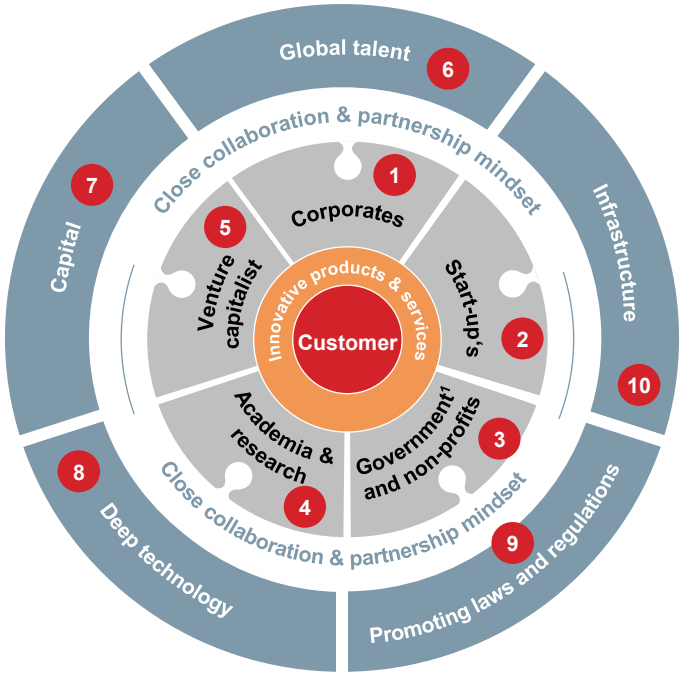
Source: Fortune Business Insights, IHS Industrial Automation Equipment, Interact Analysis, ARC, IFR World Robotics 2013-20, expert interviews, web research

4: Industrial Automation

Overview of ecosystem in Switzerland

NOT EXHAUSTIVE

«Industry 4.0»



Stakeholder

1 Corporates

ABB, Endress+Hauser, Medacta International, SIEMENS, swisslog, STÄUBLI, SENSIRION THE SENSOR COMPANY, HUMARD

2 Start-up's

AMVbotics, sevensense, wingtra, insightness sight for your device, WAYRAY

3 Government and non-profits

SWITZERLAND INNOVATION, SWISSMEM, swissT.net swiss technology network, Industrie :: 2025

4 Academia & research

ETH zürich Autonomous Systems Lab, Computer Vision Lab, Vision for Robotics Lab, cgl, Empa Materials Science and Technology, robotics, SWISS SMART FACTORY, HSLU Hochschule Luzern Institute of Medical Engineering, EPFL, zh aw Robotics & Automation

5 Venture capitalist[1]

CREATHOR VENTURES, emerald Technology Ventures, aravis, PM EQUITY PARTNER, b·to·v

Enabler

6 Global talent

Engineering profiles e.g., critical software engineers, mechanical engineers and electrical engineers are needed as well as data analysts and scientists, computer scientists and cyber security specialists

7 Capital

Capital has low importance for large industrial automation incumbents, but venture capital is key for a complementary start-up landscape (more innovation and talent available)

8 Deep technology

Robotics, IoT Platforms, Data & Analytics (incl. AI), Microtechnology, Vision & Sensing and Material Science & Engineering

9 Promoting laws & regulation

Simple and fast administrative processes are important for testing new technologies as well as data collection regulations that allow to measure development within industrial processes

10 Infrastructure

Switzerland has a strong infrastructure which is considered as a hygiene factor

1. Considered only VCs located in Switzerland - Foreign VCs play also an important role in Swiss Industry 4.0 ecosystem

NON EXHAUSTIVE

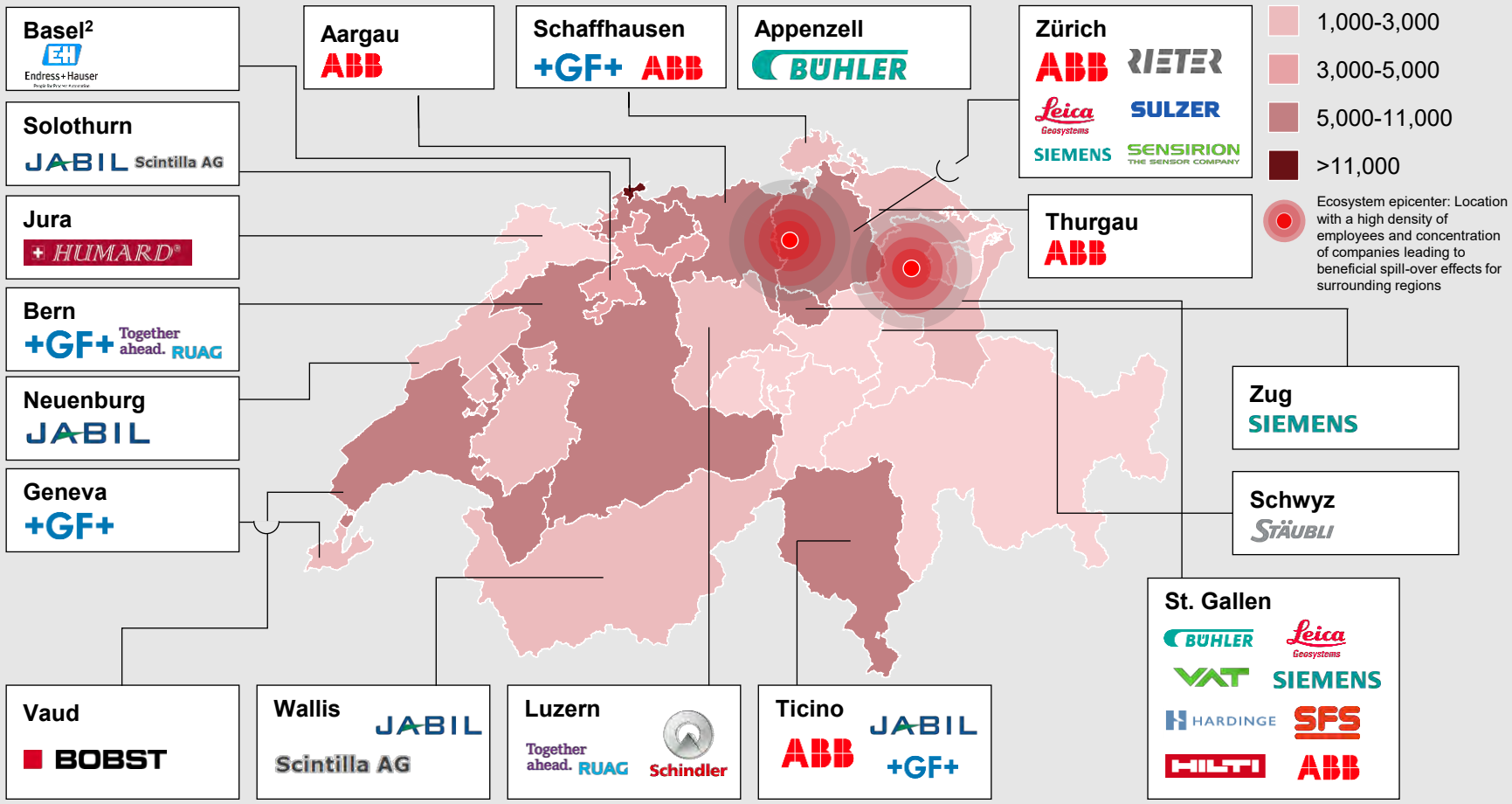
«Industry 4.0»

4: Industrial automation – Footprint Switzerland

Approximately 96,000 people are employed in the industrial automation sector in Switzerland with a strong foothold in the Bern, Zurich and St. Gallen area

Distribution of employees[1]

Total: 96,000



1. BSF categories: Maschinenbau, Reparatur und Installation von Maschinen und Ausrüstungen

Source: Bundesamt für Statistik 2019

«Digital Tech»

5: Digital content

Rising tech companies focusing on the future of digital entertainment

R&D activities in Switzerland

Focus segments

Switzerland has a strong R&D footprint for underlying technologies which will be important across following segments

Growth segments

1. **Social Networking Platforms**
   (10% CAGR until 2025[1])
2. **Video Games**
   (12.9% CAGR until 2025)
3. **Search Engines**
   (8% CAGR until 2025[1])
4. **Streaming Platforms**
   Music streaming (7% CAGR until 2025) and Video streaming (9% CAGR until 2025)

Disrupting technologies

Data & Analytics (incl. AI)
Advancements in AI e.g., natural language processing and image analysis will drive growth across all segments

Metaverse
Collective virtual open space, through convergence of virtually enhanced physical & digital reality

Virtual & Augmented Reality
Creation of digital environment through VR/AR software & hardware to visualize experiences

Data Compression
Enables reductions in storage hardware, data transmission time, and communication bandwidth

Emerging Technologies

Blockchain
Potential for new social networks based on blockchain technology

Leading geographies

USA

Strong tech hubs in greater Bay Area, Seattle and Austin areas

China

Digital technology hubs in Shenzhen, Beijing, Shanghai, Hangzhou

Japan

Strong tech hubs in Tokyo

Israel

Strong tech hub in Israel

Europe

Strong tech hubs in Berlin, Dublin, London and Benelux

Key players

Foreign players
Incumbents

Unicorns

1. Based on advertising revenue

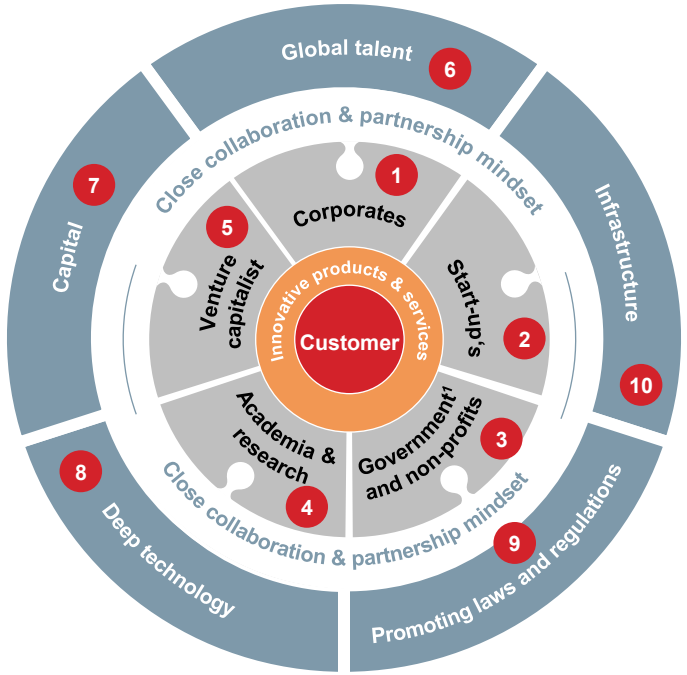
Source: Industry reports, Magna, expert interview, team analysis

5: Digital Content

Overview of ecosystem in Switzerland

NOT EXHAUSTIVE

«Digital Tech»



Stakeholder

1 Corporates

Google, facebook, Doodle, IBM, Magic Leap, Disney Research, ORACLE, Microsoft

2 Start-up's

CREAL, pax.world, animatico, FUNPLUS, GlobalM, IMVERSE, AirConsole, GIANTS SOFTWARE, amplify

3 Government and non-profits

digitalswitzerland, SDSC, IDSIA, csem, ETH AI CENTER

4 Academia & research

EPFL, HSLU Hochschule Luzern, ETH zürich, Immersive realities research lab, Media Technology Center, Computer Vision Lab, University of Zurich, hdk, zhaw, n|w

5 Venture capitalist[1]

Akiden Ventures, daa, CREATHOR VENTURES, red alpine, EuroUS Ventures, swisscom Ventures

Enabler

6 Global talent

Tech talent needed in DevOps, customer experience, cloud, automation, platform and products, data management and cybersecurity and privacy, data & analytics

7 Capital

Capital has low importance for tech giants, but VC is key for the complementary start-up landscape (e.g., Creal raised CHF 6.5m from Swisscom Ventures to develop their AR glasses)

8 Deep technology

Data & Analytics (incl. AI), Metaverse, Virtual & Augmented Reality, Data Compression, Blockchain

9 Promoting laws & regulation

A clear regulatory framework is basis for the ease of doing business. Strong regulatory framework for IP protection is important

10 Infrastructure

Switzerland has a strong infrastructure which is considered as a hygiene factor

1. Considered only VCs located in Switzerland - Foreign VCs play also an important role in Swiss Digital Tech ecosystem

NON EXHAUSTIVE

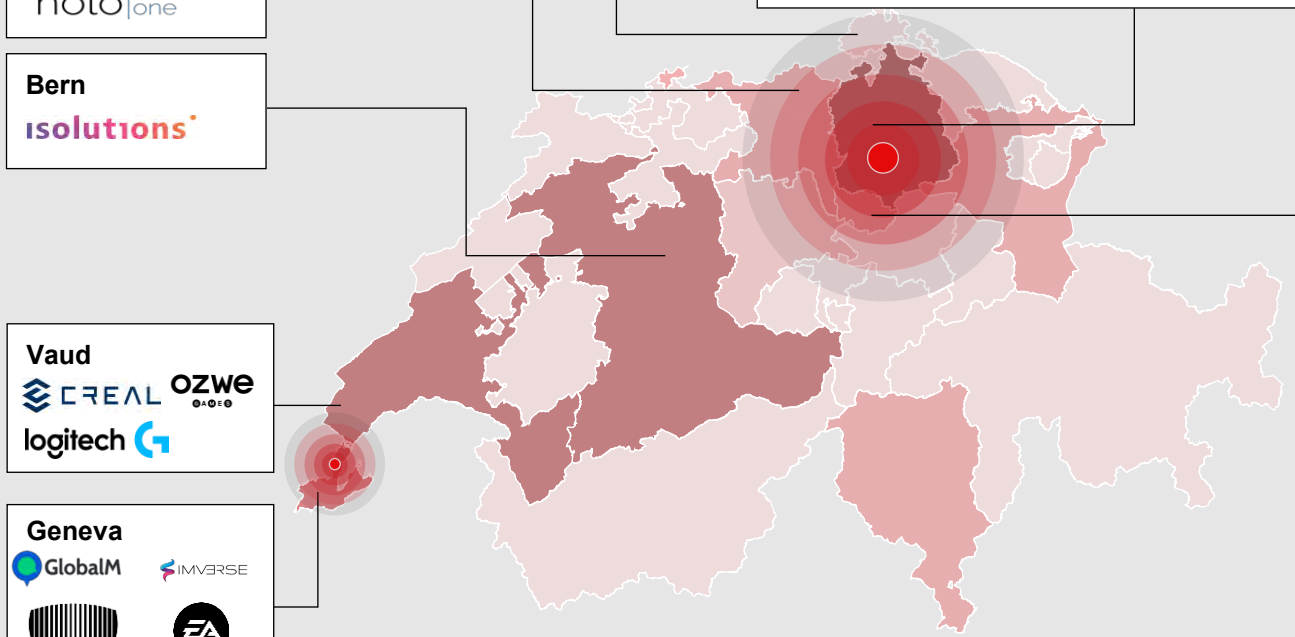
«Digital Tech»

5: Digital content – Footprint Switzerland

The ICT industry in Switzerland employed 120,000 people in 2019 – hubs for Digital Tech companies in Zurich and Geneva region

Distribution of employees[1]

Total: 120,000



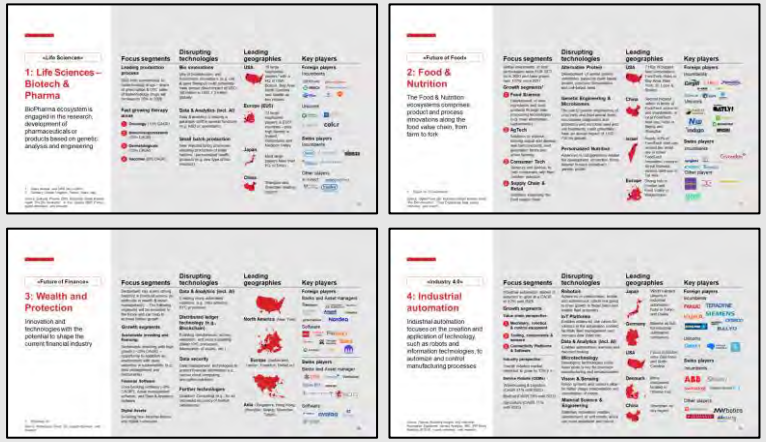
1. BSF categories: Erbringung von Dienstleistungen der Informationstechnologie, Informationsdienstleistungen

Source: Bundesamt für Statistik 2019

Technology focus

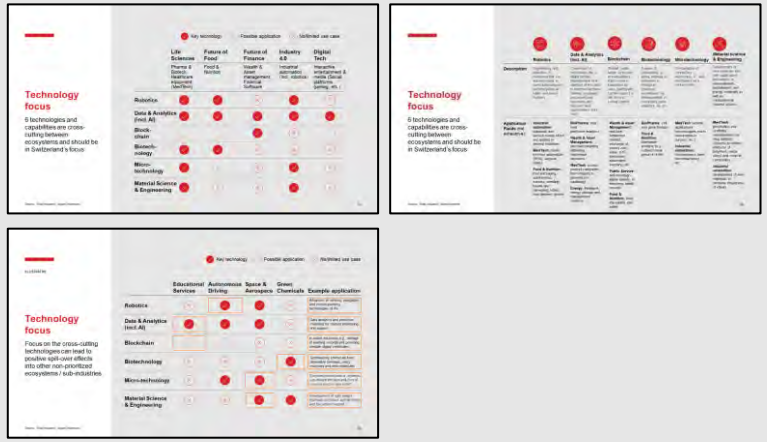
Through a two-step process the ecosystem lens was combined with a technological focus

Analysis of key technologies by ecosystem …



Question: What are disrupting technologies driving the ecosystem with significant innovation potential?

revealed cross-cutting platform technologies



Question: Which technologies are relevant across ecosystems and could promote the attractiveness of the Swiss location?

Technology focus

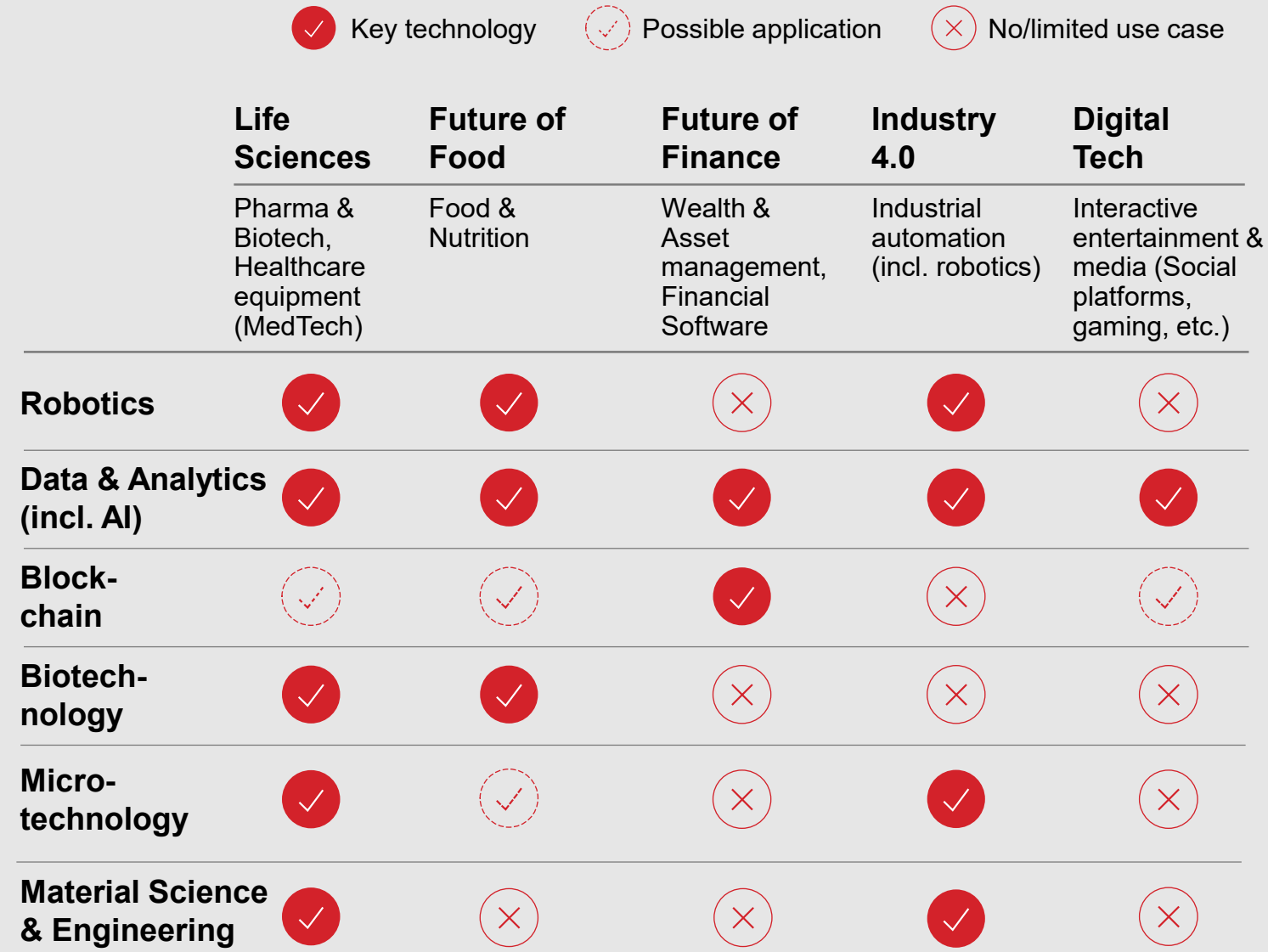
6 technologies and capabilities are cross-cutting between ecosystems and should be in Switzerland's focus

	Robotics	Data & Analytics (incl. AI)	Blockchain	Biotechnology	Microtechnology	Material science & Engineering
Description	Engineering and operation of machines that can autonomously or semi-autonomously perform physical tasks and assist humans	Conversion of information into a digital format. Management and analysis of this data to improve decision-making, business processes and outcomes and discover new opportunities and risks	Shared, public ledger of records or transactions that is open to inspection by every participant but not subject to any form of central control	A wave of innovations is being enabled by advances in biological sciences accelerated by developments in computing, data analytics, AI, etc.	Combination of connecting electronics, IT, and mechanics on a minute scale	Development of new materials and their applications. Innovations in nanomaterials, biomaterials, and energy materials as well as computational material science
Application Fields (not exhaustive)	**Industrial automation**: industrial and service robots which are applied in several industries **MedTech:** robotic process automation (RPA), surgical robots **Food & Nutrition:** food packaging, autonomous tractors, weeding robots and harvesting robots, food delivery drones	**BioPharma**: real time predictive analytics **Wealth & Asset Management:** precision targeting, debiasing investment decisions **MedTech**: across product categories, from imaging to genomics to cardiology **Energy:** intelligent energy storage and management systems	**Wealth & Asset Management**: real-time settlement models, exchange of money and value, KYC processes, automated investing, etc. **Public Service:** self-sovereign digital identity, to electronic health records **Food & Nutrition:** food traceability and safety	**BioPharma**: cell and gene therapy **Food & Nutrition:** Alternative proteins (e.g., cultured meat grown in a lab)	**MedTech**: several applications (microscopes, micro instruments in surgery, etc.) **Industrial automation:** microsensors, laser micromachining, etc.	**MedTech**: prosthetics and scaffolds, nanomaterials for drug delivery systems, prosthetic limbs out of polymers, metal alloys and ceramic composites **Industrial automation:** development of new materials to increase robustness of robots

Source: Web research, Market reports

Technology focus

6 technologies and capabilities are cross-cutting between ecosystems and should be in Switzerland's focus

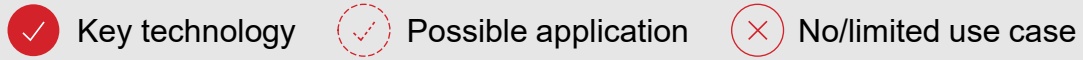


Source: Web research, expert interviews

ILLUSTRATIVE

Technology focus

Focus on the cross-cutting technologies can lead to positive spill-over effects into other non-prioritized ecosystems / sub-industries



	Educational Services	Autonomous Driving	Space & Aerospace	Green Chemicals	Example application
Robotics	✗	✓	✓	✗	Advances in sensing, navigation and motion planning technologies of AV
Data & Analytics (incl. AI)	✓	✓	✓	✗	Data analytics and predictive modeling for student monitoring and support
Blockchain	✓	✓	✗	✗	In online education e.g., storage of learning records and providing credible digital certificates
Biotechnology	✗	✗	✗	✓	Synthesizing chemicals from renewable biomass, using microbes and new molecules
Micro-technology	✗	✓	✓	✗	Microelectromechanical systems can reduce the size and cost of sensors used in spacecraft
Material Science & Engineering	✗	✗	✓	✓	Development of light weight materials to reduce aircraft mass and its carbon footprint

Source: Web research, expert interviews

5 ecosystems for investment promotion (where to play)

WHY are ecosystems important for economies?

WHAT are relevant ecosystems and its drivers?

WHERE should Switzerland focus?

- Prioritization of ecosystems
- **Deep Dive of selected ecosystems**

Life Sciences

Future of Food

Future of Finance

Industry 4.0

Digital Tech

Life Science ecosystem

Demand for healthcare is accelerating globally

Global population is growing

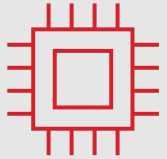
Projected to be over 11 billion by 2100, currently adding over 80 million people per year to global population

Population is aging, albeit healthier

Today, 8.5% of the world's population are aged 65 and over. This number is projected to grow to 17% by 2050

Increasing levels of chronic diseases

Worldwide prevalence of obesity nearly tripled between 1975 and 2016; 39% of adults are overweight, and 13% are obese globally[1]



Science and tech driven Bio Revolution

Breakthroughs in biological sciences enabling a wide array of future impact opportunities

1. As of 2016 (WHO, February 2022)

Source: National Institute on Aging, United Nations, World Health Organization

Key player

Many key player across sub-segments have a significant footprint in Switzerland

BioPharma	Healthcare equipment (MedTech)	Life science tools & services (CDMO)	Digital health
Roche	straumann	Lonza	medi24
NOVARTIS	Medtronic	BACHEM	SOPHiA GENETICS™
VIFOR PHARMA	Johnson & Johnson	Siegfried	OVIVA
GALDERMA	BIOTONICS	CARBOGEN AMCIS A Dishman Group Company	mindmaze
Biogen	Distalmotion	CELONIC	CeQur®
idorsia	stryker	SELEXIS®	HederaDx
	sonova HEAR THE WORLD	solvias	KyanHealth

Life Science ecosystem - overview

The Life Science ecosystem consists of corporates and start-ups from different sub-industries and further stakeholders

Detailed next

Sub-industries

- Healthcare equipment (incl. MedTech)
- **Pharmaceuticals & Biotechnology**
- Life Science tools & services (incl. CDMO)
- Digital health
- Healthcare facilities (incl. Hospitals)
- Healthcare distributors
- Health insurance
- Healthcare services (incl. dialysis centers or lab testing)

Further stakeholder (not exhaustive)

- Venture capital
- Government & Non profits
- Academia & research
- Customer

«Life Sciences»

1: Life Sciences – Biotech & Pharma

BioPharma ecosystem is engaged in the research, development of pharmaceuticals or products based on genetic analysis and engineering

Detailed Next

Focus segments

Leading production process

Shift from conventional to biotechnology drugs – share of prescription & OTC sales of biotechnology drugs will increase to 35% in 2026

Fast growing therapy areas

1. **Oncology** (12% CAGR)
2. **Immunosuppressants** (15% CAGR)
3. **Dermatologicals** (13% CAGR)
4. **Vaccines** (8% CAGR)

Disrupting technologies

Bio innovations

Use of biomolecules and biosystems innovations (e.g., cell & gene therapy) could potentially have annual direct impact of USD 500 billion to USD 1.2 trillion globally

Data & Analytics (incl. AI)

Data & analytics is leading a paradigm shift in several functions (e.g., R&D or operations)

Small batch production

New manufacturing processes enabling production of small batches / personalized health products (e.g., new type of bio-reactors)

Leading geographies

USA

16 large biopharma players[1] with a HQ in USA, Boston, Bay Area North Carolina and Seattle as key regions

Europe (EU5)

13 large[1] biopharma players in EU5[2] countries – plus high density in Ireland, Switzerland and Medicon Valley

Japan

Most large players have their HQ in Tokyo

China

Shanghai and Shenzhen leading regions

Key players

Foreign players

Incumbents

abbvie, Johnson & Johnson, MERCK, Bristol Myers Squibb, Pfizer, SANOFI, gsk

Unicorns

GINKGO BIOWORKS, CARIS LIFE SCIENCES, biosplice, color

Swiss players

Incumbents

Roche, NOVARTIS, idorsia, Biogen, GALDERMA

Other players

ROIVANT SCIENCES, octapharma, VIFOR PHARMA, basilea PHARMACEUTICA

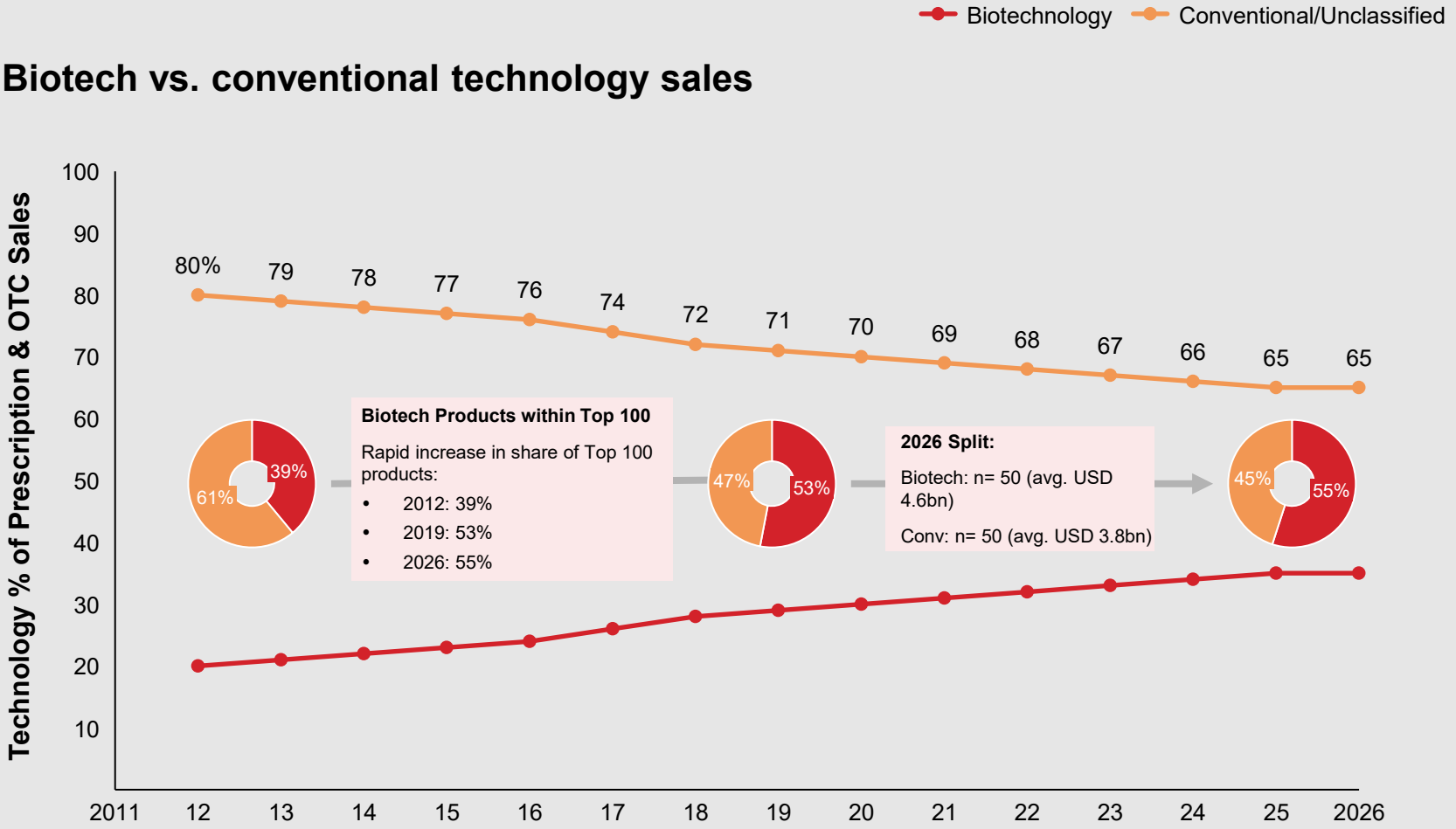
1. Sales revenue over USD 2bn in 2020
2. Germany, United Kingdom, France, Spain, Italy

Source: Evaluate Pharma 2020, McKinsey Global Institute report “The Bio Revolution”, In Vivo Outlook 2020, Failory, expert interviews, web research

Pharma & Biotech – High growth segments

Industry continues to shift from conventional to biotechnology drugs

Biotech vs. conventional technology sales

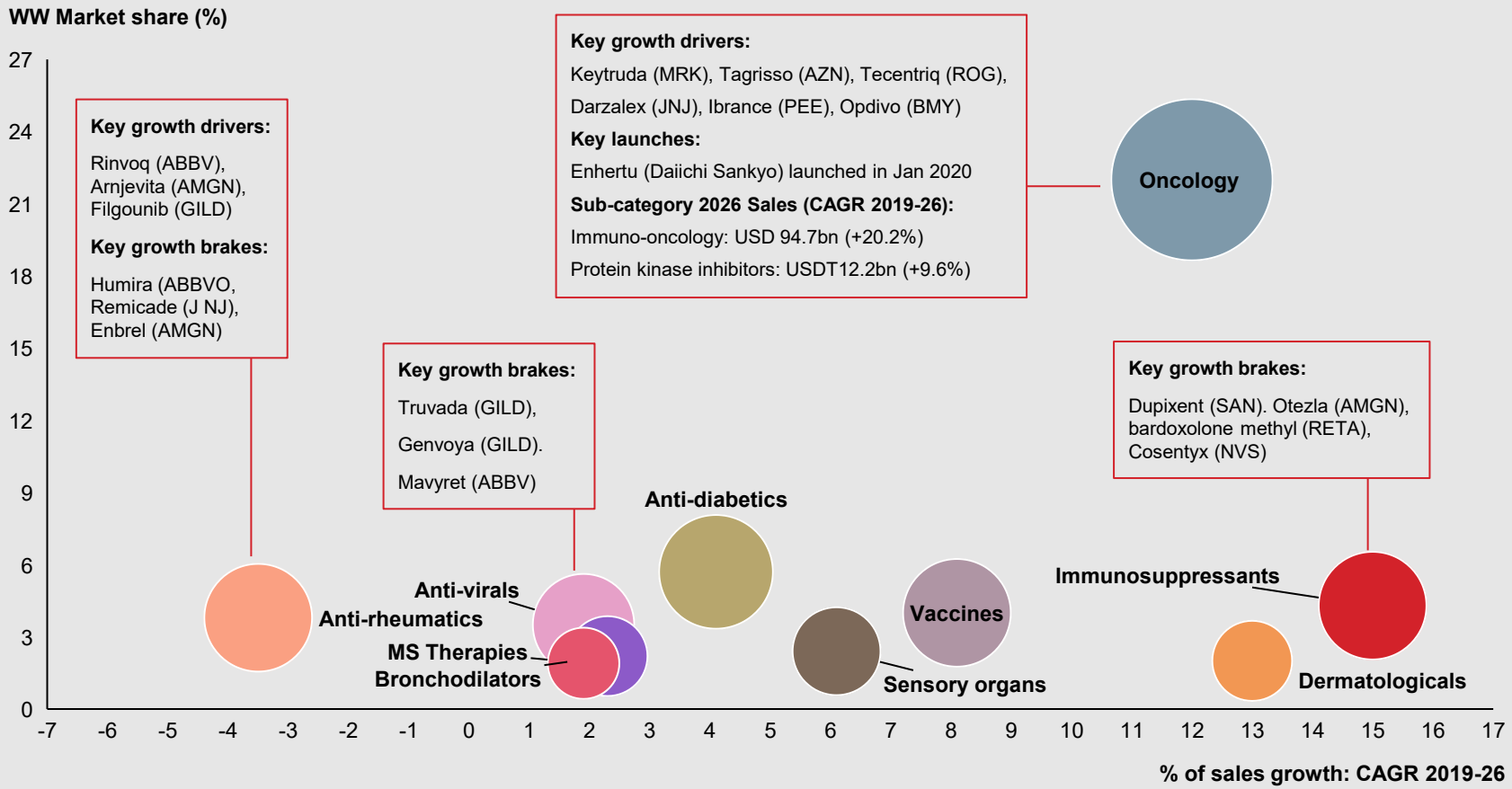


Source: Evaluate Pharma 2020

Pharma & Biotech – High growth segments

Oncology prevails as the leading therapy area in 2026 with a ~22% market share – further areas with significant growth are immunosuppressants, dermatologicals and vaccines

Worldwide prescription drug & OTC sales split by therapy area 2026



Source: Evaluate Pharma 2020

Pharma & Biotech – High growth segments

It is expected that Oncology, immuno-suppressants, and dermatologicals will experience the highest growth in next 5 years

Rank	Theraphy	2019	2026	CAGR % Growth	2019	2026	Chg.(+/-)
1	Oncology	145.4	311.2	11.5	16.0%	21.7%	+5.8pp
2	Anti-diabetics	51	66.9	3.9	5.6%	4.7%	-0.9pp
3	Immunosuppressants	24	61.3	14.3	2.6%	4.3%	+ 1.6pp
4	Vaccines	32.5	56.1	8.1	3.6%	3.9%	+0.3pp
5	Anti-rheumatics	56.9	49.7	-1.9	6.3%	3.5%	-2.8pp
6	Anti-virals	38.8	42.9	1.5	4.3%	3.0%	-1.3pp
7	Sensory Organs	23.8	35.1	5.7	2.6%	2.4%	-0.2pp
8	Bronchodilators	27.8	32.2	2.1	3.1%	2.3%	-0.8pp
9	Dermatologicals	13.8	32	12.7	1.5%	2.2%	+0.7pp
10	MS therapies	22.7	25	1.4	2.5%	1.7%	-0.7pp
11	Anti-hypertensives	23.4	22.4	-0.6	2.6%	1.6%	-1.0pp
12	Anti-coagulants	21.3	22	0.5	2.3%	1.5%	-0.8pp
13	Anti-psychotics	11.2	21	9.5	1.2%	1.5%	+0.2pp
14	Anti-fibrinolytics	13.4	19.7	5.7	1.5%	1.4%	-0.1pp
15	Sera & gammaglobulins	11.5	19.5	7.8	1.3%	1.4%	+0.1pp
	Top 15	517.5	816.9	6.7	56.9%	57.1%	+0.2pp
	Other	392.5	614.6	6.6	43.1%	42.9%	-0.2pp
	Total WW Prescription & OTC Sales	910	1,431.50	6.7	100.0%	100.0%	

Source: Evaluate Pharma 2020

«Life Sciences»

1: Life Sciences – Biotech & Pharma

BioPharma ecosystem is engaged in the research, development of pharmaceuticals or products based on genetic analysis and engineering

Detailed Next

Focus segments

Leading production process

Shift from conventional to biotechnology drugs – share of prescription & OTC sales of biotechnology drugs will increase to 35% in 2026

Fast growing therapy areas

1. **Oncology** (12% CAGR)
2. **Immunosuppressants** (15% CAGR)
3. **Dermatologicals** (13% CAGR)
4. **Vaccines** (8% CAGR)

Disrupting technologies

Bio innovations

Use of biomolecules and biosystems innovations (e.g., cell & gene therapy) could potentially have annual direct impact of USD 500 billion to USD 1.2 trillion globally

Data & Analytics (incl. AI)

Data & analytics is leading a paradigm shift in several functions (e.g., R&D or operations)

Small batch production

New manufacturing processes enabling production of small batches / personalized health products (e.g., new type of bio-reactors)

Leading geographies

USA

16 large biopharma players[1] with a HQ in USA, Boston, Bay Area North Carolina and Seattle as key regions

Europe (EU5)

13 large[1] biopharma players in EU5[2] countries – plus high density in Ireland, Switzerland and Medicon Valley

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Most large players have their HQ in Tokyo

China

Shanghai and Shenzhen leading regions

Key players

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Source: Evaluate Pharma 2020, McKinsey Global Institute report “The Bio Revolution”, In Vivo Outlook 2020, Failory, expert interviews, web research

NOT EXHAUSTIVE

Pharma & Biotech – disrupting technologies

It is expected that bio innovations and data & analytics have the potential to shape the Life Science ecosystem

Detailed next

Bio innovations

Data & Analytics

Small batch production

Bio innovations

Pharma & Biotech – disrupting technologies

Bio innovation is occurring in four key arenas – In particular Biomolecules and Biosystems will have a significant impact on Life Science ecosystem

Significant impact on Life Science ecosystem

	Biomolecules	Biosystems	Biomachine interfaces	Biocomputing
Definitions				
Mapping	Cellular processes and functions via measuring intracellular molecules (eg, DNA, RNA, proteins) in the study of omics	Complex biological organizations and processes, and interactions between cells	The structure and funtion of nervous systems of living organisms	Intracellular pathways or networks of cells to return outputs based on specific conditions (for computation)
Engineering[1]	Intracellular molecules (e.g., via genome editing)	Cells, tissues, and organs, including stem cell technologies and transplantation	Hybrid systems that connect nervous systems of living organisms to machines	Cells and cellular components for computational processes (storing, retrieving, processing data)
Examples	Gene therapy for monogenic diseases	Cultured meat grown in a lab	Neuroprosthetics for motor control (implant or external headset) of human or robotic limb	Data storage in strands of DNA

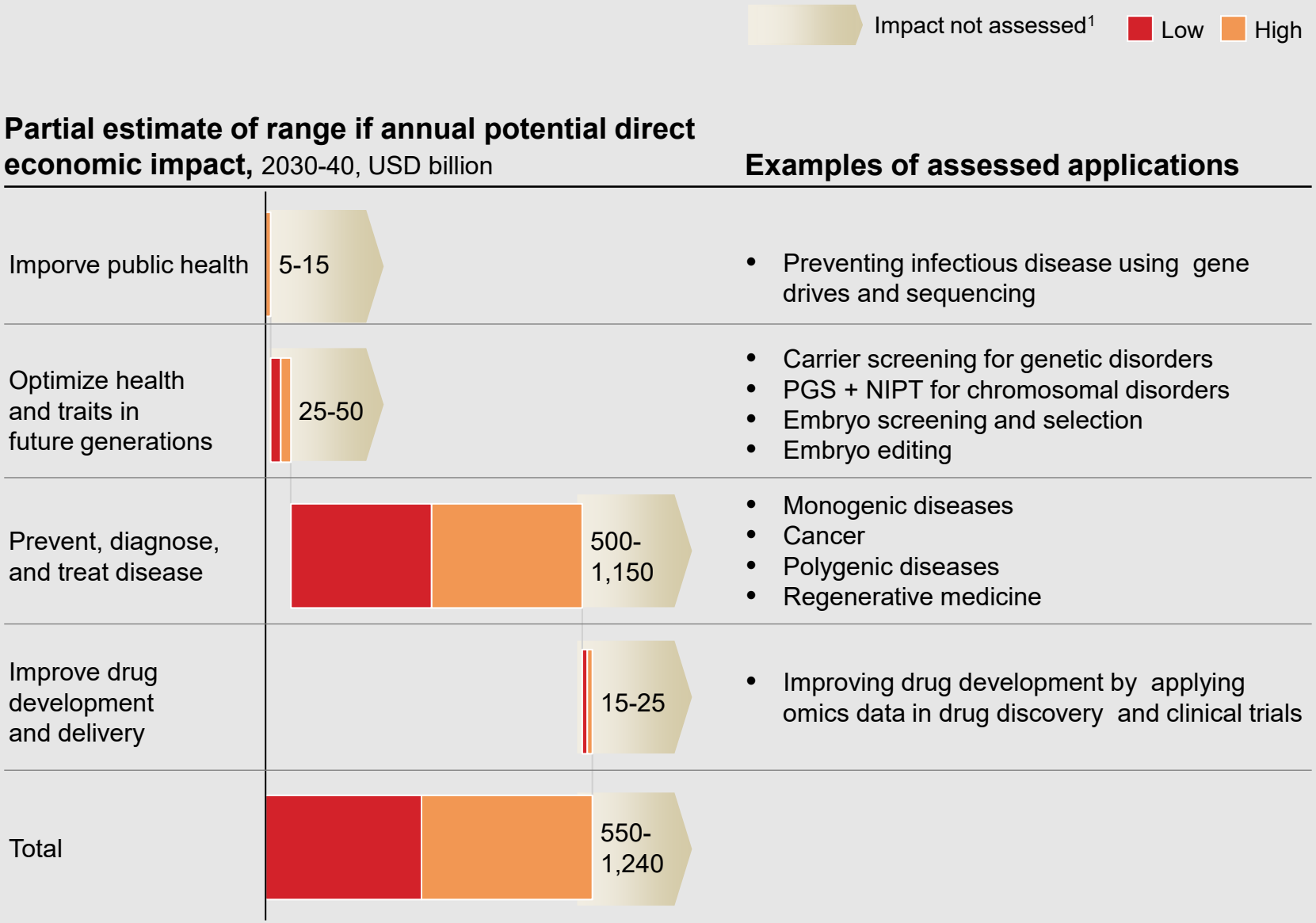
1. Design, de novo synthesis, or modification

Source: McKinsey Global Institute report “The Bio Revolution”

Bio innovations

Pharma & Biotech – disrupting technologies

Use of biomolecules and biosystems innovations in Life Science could potentially have annual direct impact of USD 500 billion to USD 1.2 trillion globally



1. Including, but not limited to, indirect impacts from assessed applications and impacts from unassessed applications.

Note: Figures may not sum to 100% because of rounding. These impact estimates are not comprehensive; they include only potential direct impact of the visible pipeline of applications identified and assessed. Estimates do not represent GDP or market size (revenue), but direct economic impact; broader knock-on economic effects are not included. Estimates are relative to the 2020 economy; they do not include changes in variables such as demographics and inflation.

Source: McKinsey Global Institute report "The Bio Revolution"

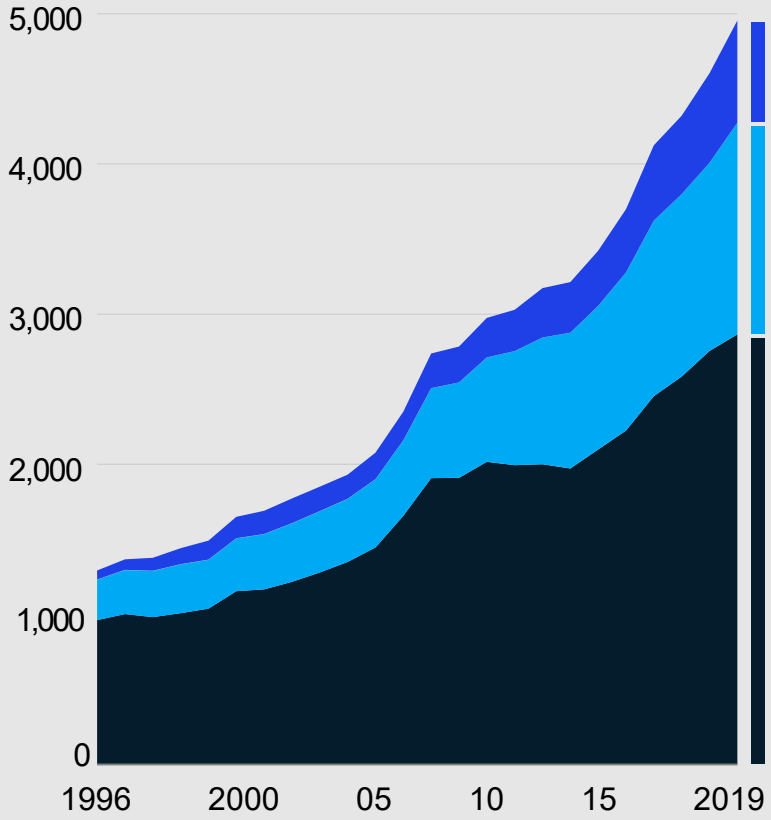
Bio innovations

Pharma & Biotech – disrupting technologies

A new wave of innovation in healthcare is developing

NOT EXHAUSTIVE

Pharma pipeline composition, Number of products, from Phase I to III[1]



Third wave of innovation (in the scope of the Bio Revolution)[2]
- CAR T-cell therapy
- Stem cell therapy
- Gene therapy
- RNA-based therapeutics

Second wave of innovation
- Peptides
- Monoclonal antibodies
- Recombinant proteins

First wave of innovation
- Small molecules
- Nonrecombinant vaccines
- Natural extracts

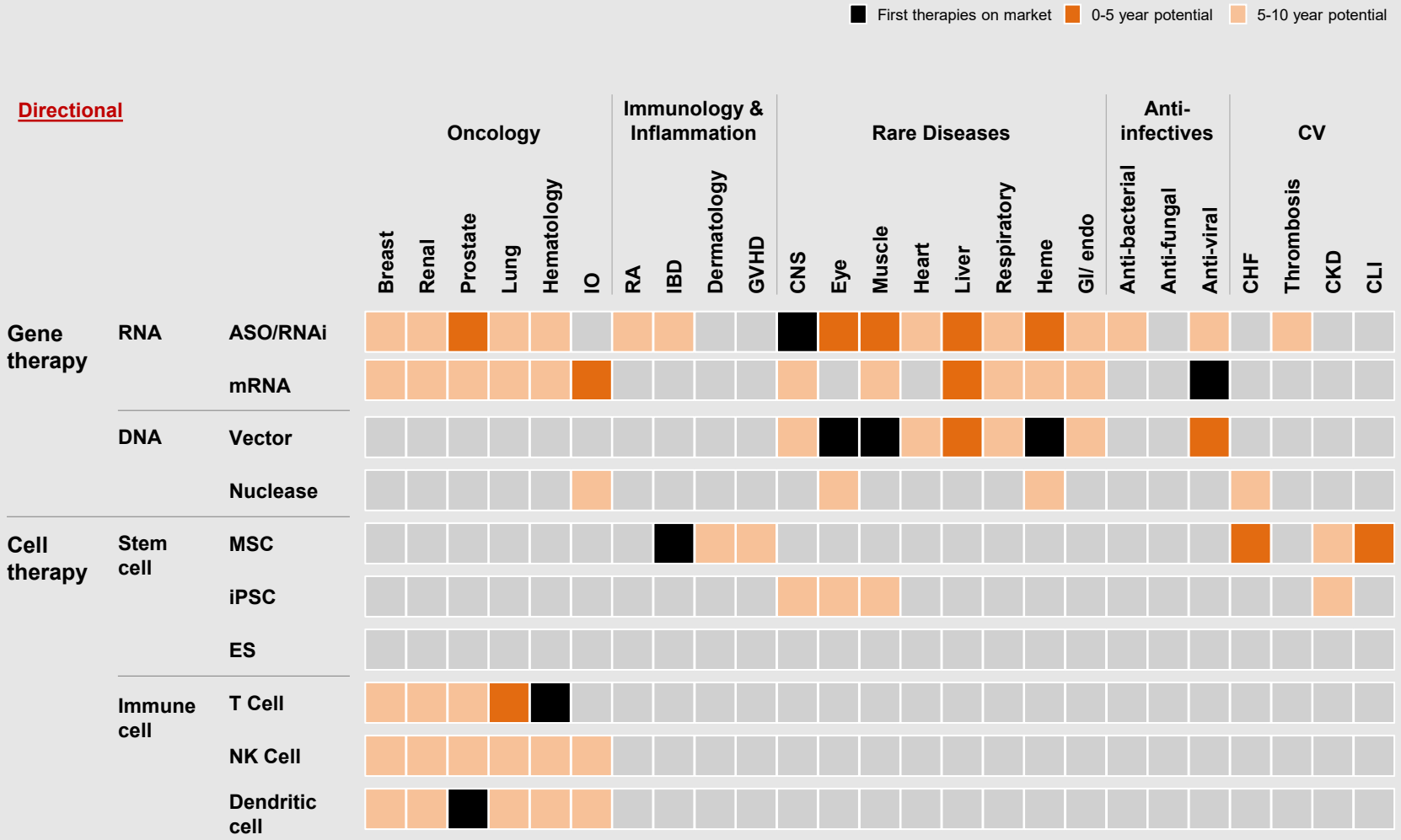
1. Innovative drugs only, excluding reformulations and biosimilars; snapshot as of June each year with missing phases not approximated; phase based on most progressed indication.
2. Third wave of innovation includes many innovative therapeutics enabled by the Bio Revolution in improving human health. However, examples are not exhaustive and do not include applications of the Bio Revolution in other domains such as agriculture, consumer, etc.

Source: McKinsey Global Institute report "The Bio Revolution", Evaluate 2019

Bio innovations

Pharma & Biotech – disrupting technologies

In the next 10 years, Cell and Gene therapy will likely expand from niche oncology and rare diseases into broad therapeutic and disease areas

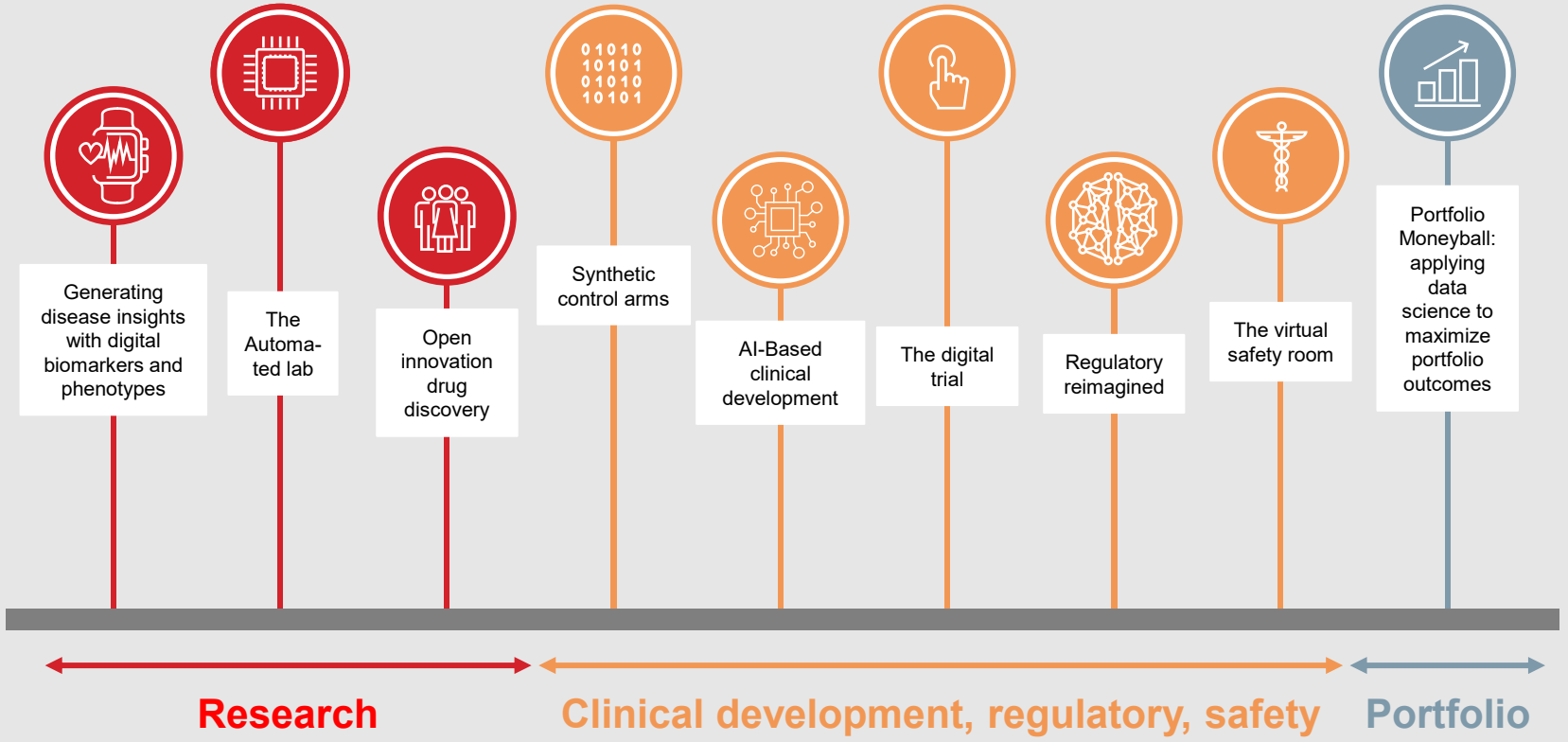


Source: EvaluatePharma, expert interviews

Data & Analytics

Pharma & Biotech – disrupting technologies

Advanced analytics will reshape the innovation paradigm until 2030

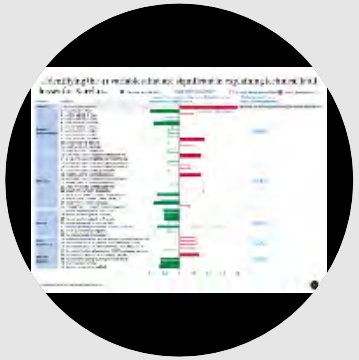


The convergence of biology and technology will play an increasingly important role across the biopharma innovation value chain

Pharma & Biotech – disrupting technologies

Digital & Advanced analytics is also driving a paradigm shift in pharmaceutical operations

X Example impact from selected reference cases

Real time Predictive Analytics	E2E Digital Twin Simulation & Optimization	Advanced Product & Process Mastery	Digital & Automation led Ops assistance
			
6 sigma	Autonomous planning	Real-time release	All-star team
+ 40%	+ 50%	-80%	+ 50%
Capacity	Agility & Speed	Deviations	Productivity

«Life Sciences»

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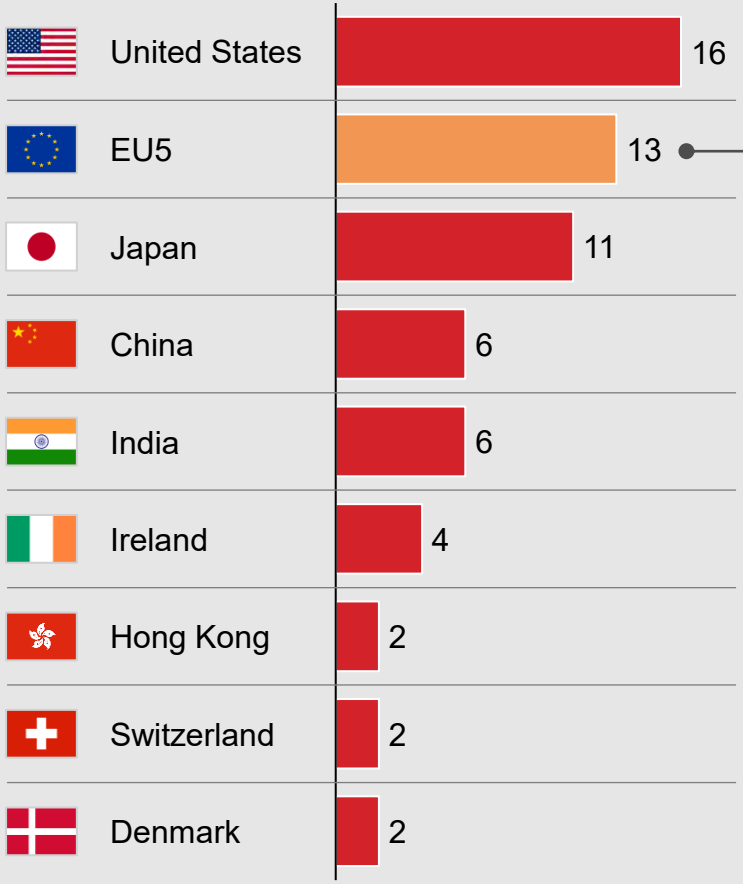
Source: Evaluate Pharma 2020, McKinsey Global Institute report “The Bio Revolution”, In Vivo Outlook 2020, Failory, expert interviews, web research

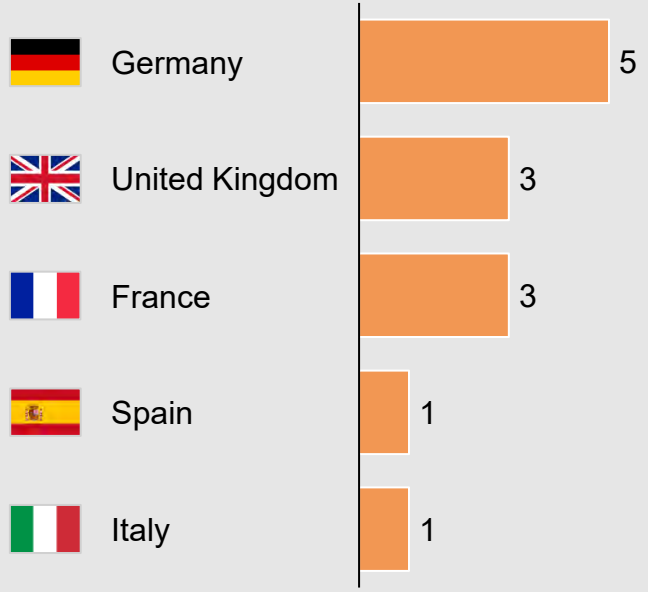
Deep Dive Bio/Pharma – leading geographies and player

USA, EU5 and Japan have the highest presence of global HQ of the top 100 largest bio-pharma companies

HQ location of BioPharma companies with sales over USD 2bn split by country[1],



Distribution



1. Only shown top 11 countries with at least 2 global HQ

Source: In Vivo Outlook 2020

Deep Dive Bio/Pharma – leading geographies and player

Novartis, Roche, and Abbvie are the largest biopharmaceutical companies in 2020

Top 50 global Pharma companies

Global pharma sales[1] 2020 (USD mn)

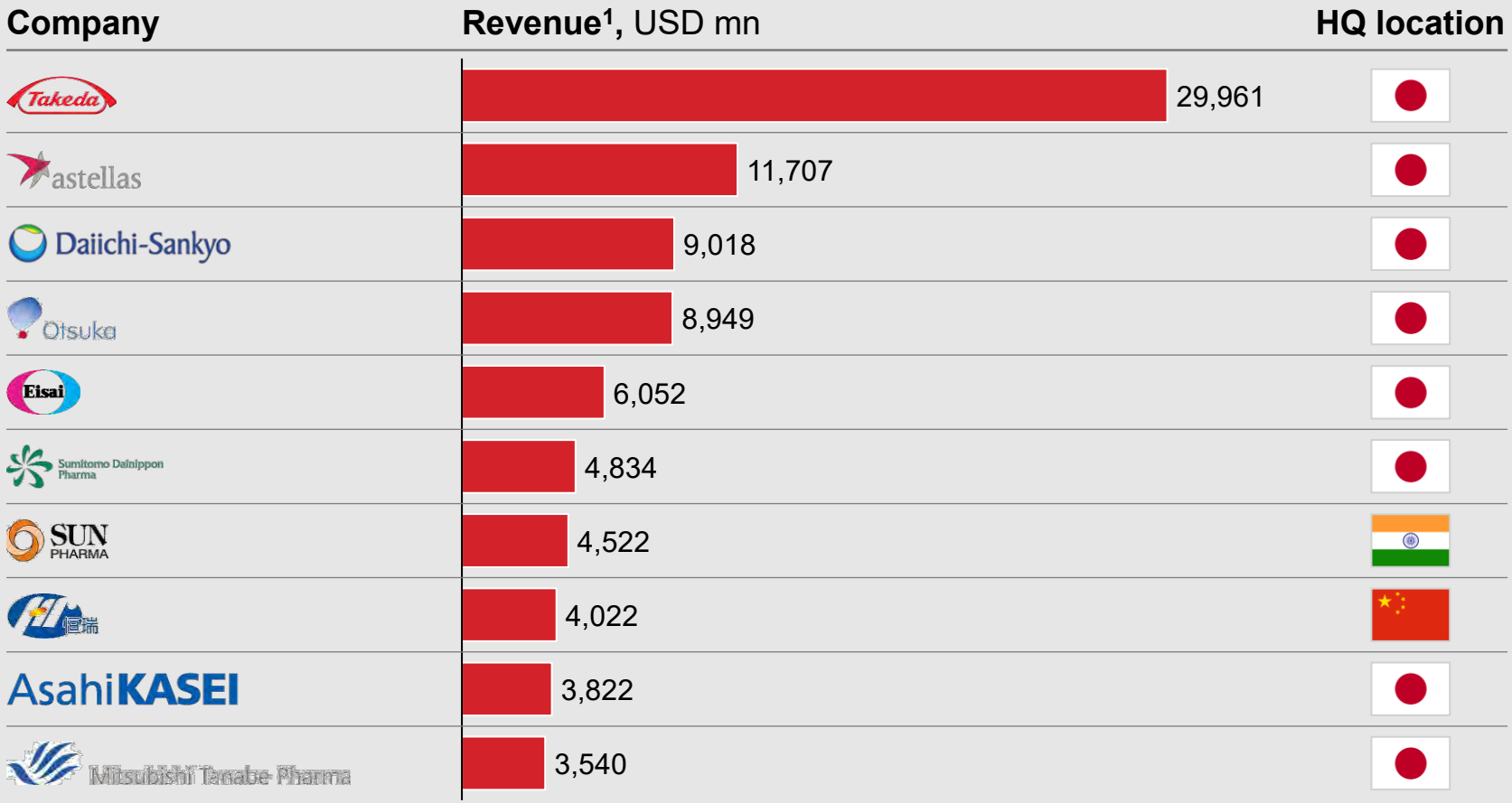
1. Only revenues from pharmaceutical segments

Source: In Vivo Outlook 2020

Deep Dive Bio/Pharma – leading geographies and player

In particular Japan has a high number of multinational pharmaceutical companies

Top 10 Asian (bio-)pharmaceutical companies in 2020



1. Only revenues from pharmaceutical segments

Source: In Vivo Outlook 2020

Deep Dive Bio/Pharma – leading geographies and player

Investors see great potential in many Biotech / Pharma start-ups and – most unicorns are based in the US

Start-up	Description	Valuation, USD bn[1]	Location
GINKGO BIOWORKS	Specializes in genetically engineering bacteria with industrial applications	15.00	
biosplice	Creates pharmaceutical products through a method known as alternative pre-mRNA splicing	12.60	
CARIS LIFE SCIENCES	Precision oncology testing company that uses molecular information and AI	7.83	
ROIVANT SCIENCES	Treats a variety of different diseases using techniques such as cell therapy through its subsidiary companies	7.30	
color	Genetic testing focused on genetic markers indicating risk for various diseases	4.60	
Biocon	Finds new ways to treat Diabetes, Cancer, and Autoimmune disorders	4.17	
Intarcia	Develops pharmaceuticals focused on long-duration treatment of chronic diseases	3.80	
23andMe	Provides direct-to consumer genetic testing for ancestry and predisposition to diseases	3.50	
atai LIFE SCIENCES	Uses psychedelics to treat various mental health issues such as depression or schizophrenia	2.60	
XtalPi	Uses AI, machine learning, and artificial intelligence to create drug compounds that are more effective and cheaper	2.00	
Brii Biosciences	Focused on infectious disease treatments and Central Nervous Disease treatments	1.50	
ALZHEON	Develops therapies for brain function, memory, and aging	1.31	
EQRx	Aims to reduce the cost of medicine through development of generic, low cost drugs to treat diseases	1.23	
prime medicine	Uses gene editing to restore normal gene function to treat diseases	1.20	
Lyell	Treats cancer using a special type of cell produced by the Thymus gland	1.16	

1. Based on latest information / funding information from July 2021

Source: Failory

Life Science ecosystem - overview

The Life Science ecosystem consists of corporates and start-ups from different sub-industries and further stakeholders

Detailed next

Sub-industries

- Healthcare equipment (incl. MedTech)
- Pharmaceuticals & Biotechnology
- Life Science tools & services (incl. CDMO)
- Digital health
- Healthcare facilities (incl. Hospitals)
- Healthcare distributors
- Health insurance
- Healthcare services (incl. dialysis centers or lab testing)

Further stakeholder (not exhaustive)

- Venture capital
- Government & Non profits
- Academia & research
- Customer

Detailed Next

«Life Sciences»

1: Life Sciences – MedTech

MedTech industry includes manufacturers of healthcare equipment and devices

Focus segments

Overall growth

MedTech industry is growing by 4-5% driven by macroeconomic trends and a new wave of innovative technologies

Growth segments

1. **In-Vitro-Diagnostic** (CAGR 7%)
2. **Dental** (CAGR 7%)
3. **Urology / Nephro-logy** (CAGR 6%)
4. **Endoscopy** (CAGR 5%)

Disrupting technologies

Material Science & Engineering

3D printing of customizable implants, replica organs, and on-site device production using materials as polymers, metal alloys, or ceramic composites

Robotics

e.g., Surgical robots

Microtechnology (Miniaturization)

Enabling new clinical applications

Molecular diagnostics:

Novel biochemical technologies, e.g., CRISPR

Connectivity and the cloud

Device and data integration is leading to an explosion of remote monitoring technologies

Data & Analytics (incl. AI)

Key enabler which is deployed across product categories (e.g., for image recognition / computer vision)

Leading geographies

USA

22 large players[1] with a HQ in the USA – leading regions are Bay Area, Minnesota and Boston

Japan

6 large players[1] with a HQ in Japan– leading region is Tokyo

Key players

Foreign players

Johnson & Johnson, Boston Scientific, Philips, B. Braun, Abbott, Zimmer Biomet, GE Healthcare, Baxter, BD, Danaher, Siemens Healthineers, 3M, Cardinal Health, Olympus

Swiss players

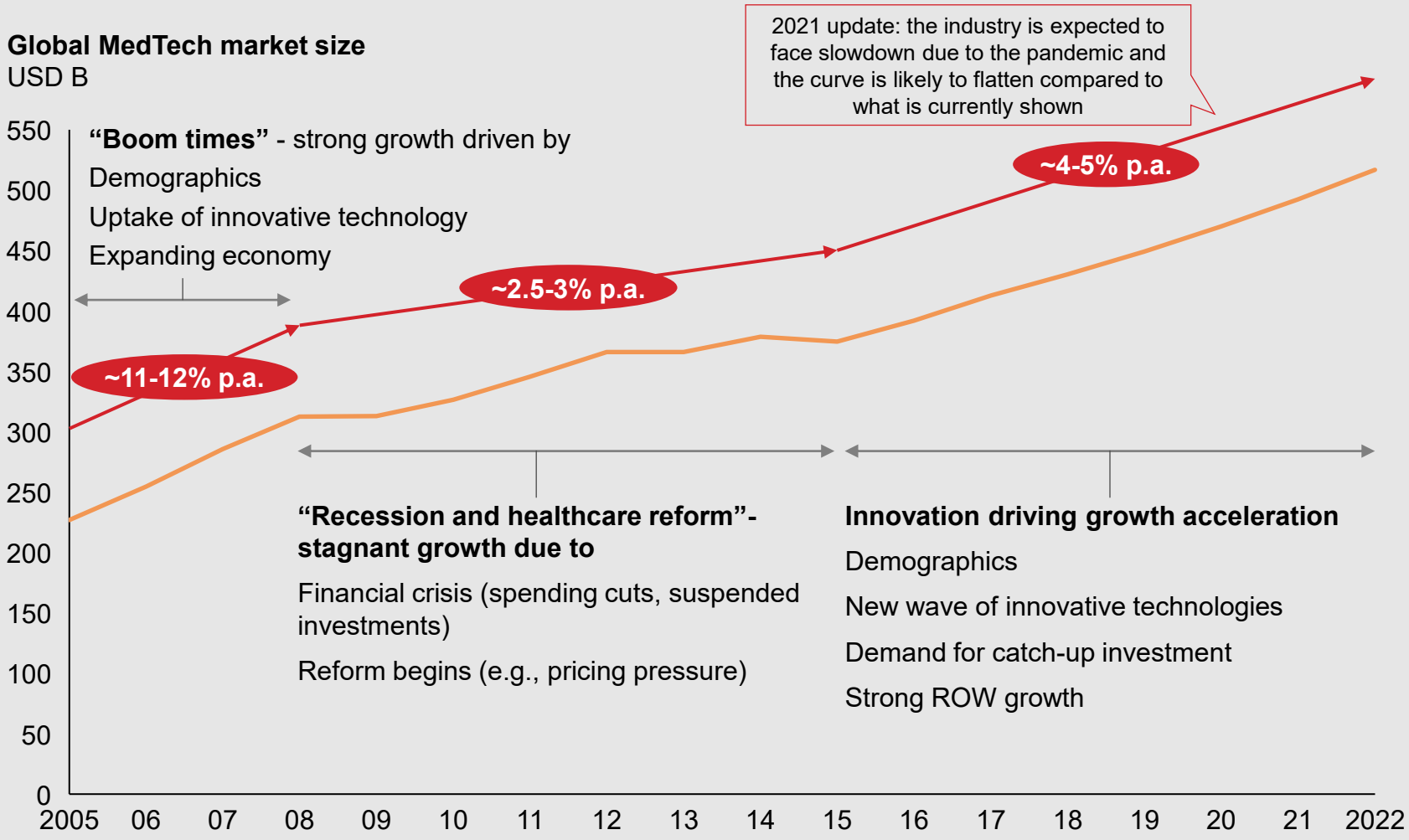
Roche, Medtronic, Ypsomed, straumann, sonova, Distalmotion

1. Sales revenue over USD 2bn in 2020

Source: HRI 2006 – 2020 reports, In Vivo Outlook 2020, expert interviews, web research

Deep Dive MedTech – Focus segments

MedTech market growth historically strong and expected to continue accelerating over the next three years



Source: HRI 2006 – 2018 reports

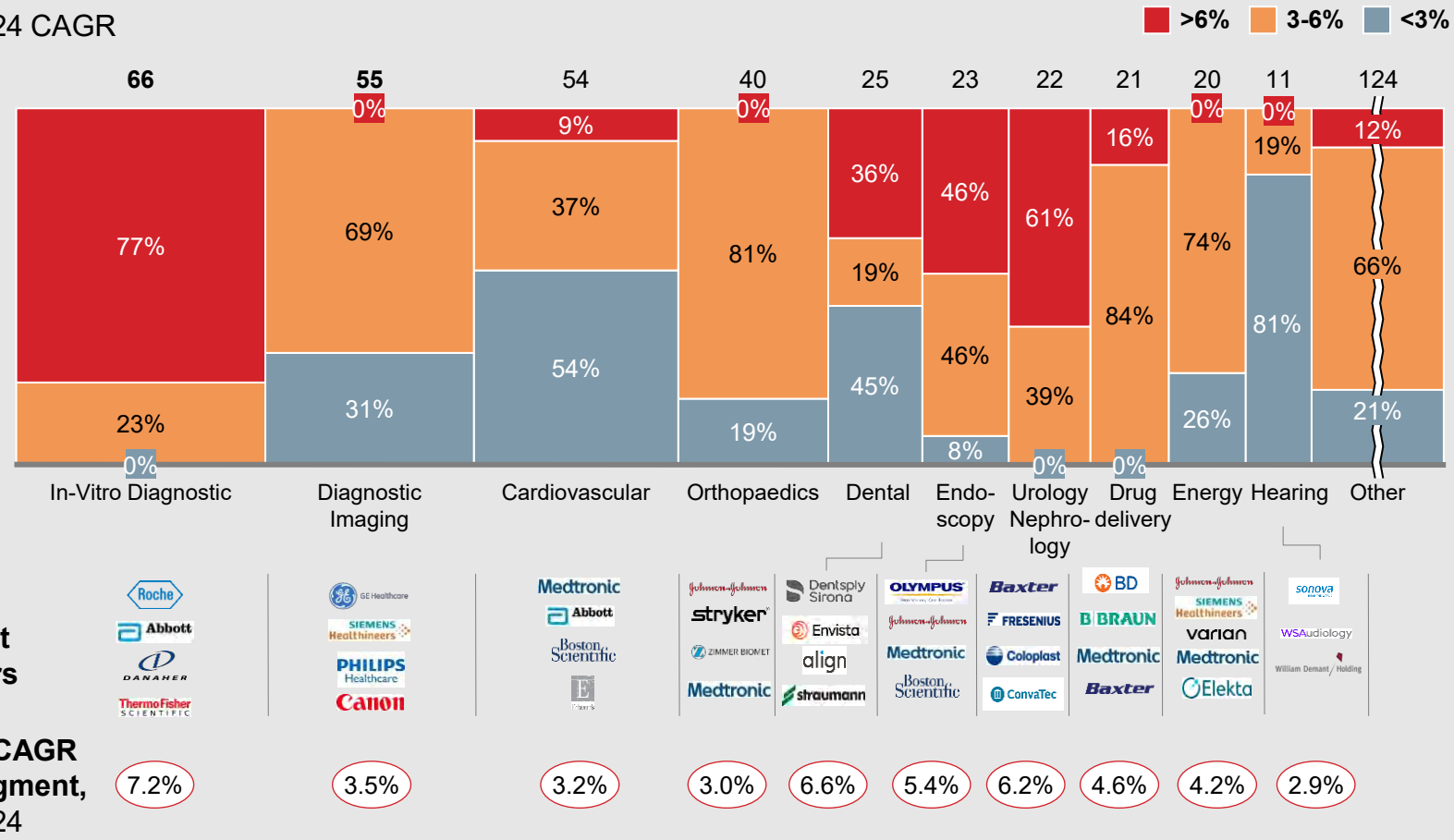
Deep Dive MedTech – Focus segments

Anatomy of the USD 400B+ MedTech market today – High growth segments are IVD, Urology, Nephrology, and Dental

2019 Market revenue and growth by segment (USD bn)

Total 2019 revenues by segment/subsegment

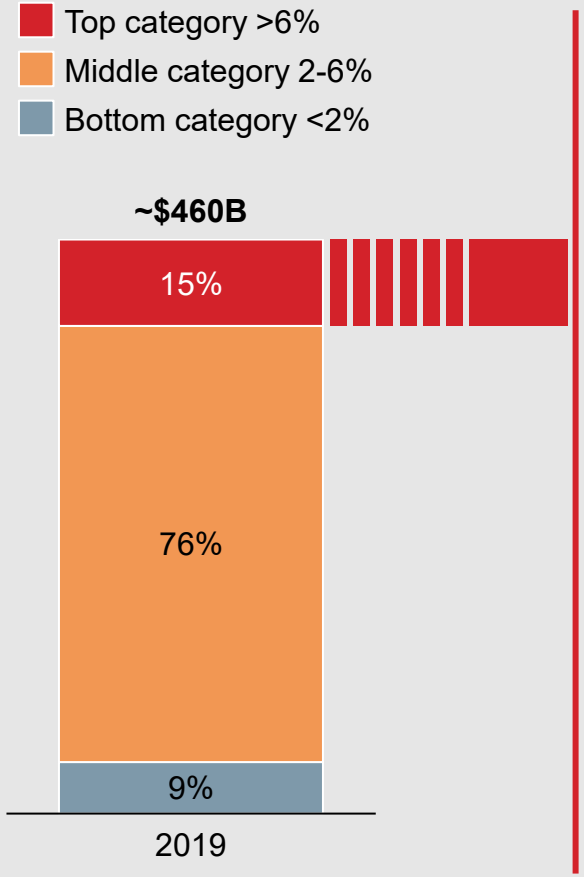
2019-24 CAGR



Source: HRI 2020

Deep Dive MedTech – Focus segments

Future growth is driven especially by Neuro stimulation, IVD, Robotics and Dental technologies



Technology segments	High-growth (6%+) segments > USD 0.3B	2019 market size (USD B)	CAGR, '19-'24
Neuro stimulation	Sacral Nerve (Incontinence)	0.7	11%
	External Transcranial Magnetic Stimulation (ExTMS)	0.4	35%
IVD	Centralized Diagnostics	22.0	7%
	Diabetes Care	9.7	8%
	Molecular Diagnostics	7.8	15%
	Professional Point-of-Care	6.9	8%
Robotics	Laparoscopic	4.5	8%
	Orthopedic	0.7	10%
Dental	Specialty	10.0	8%
Other	Medical Nonwovens ex Surgical	4.9	8%

Source: HRI 2020

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Deep Dive MedTech – Disrupting technologies

7 key technologies have the potential to shape the MedTech sector in coming years

Technology / Innovation	Description
 **3D printing**	Delivers both clinical and operational benefits, enabling customizable implants, replica organs, and on-site device production at lower costs, while reducing stock requirements for suppliers and customers
 **Robotics**	Surgical robotics is being deployed in an increasing number of procedural settings, with new, lower cost entrants increasing affordability and customer choice, while enhanced operational robotics continue to streamline manufacturing processes
 **Miniaturisation**	Continued miniaturization of a wide variety of medical devices (through both electronic and mechanical components) is enabling new clinical applications in new settings of care e.g., patch pumps, cardiac and neurological implants, at-home molecular testing, portable MRI
 **Molecular diagnostics**	Novel biochemical technologies such as nanopore sequencing and CRISPR are being increasingly deployed in clinical settings, driven by COVID-19, providing increasingly detailed diagnostic information
 **Connectivity and the cloud**	Device and data integration is leading to an explosion of remote monitoring technologies that increase patient satisfaction while maintaining or improving clinical care e.g., real-time cardiac monitoring, closed-loop diabetes management, teleradiology
 **Advanced analytics**	Advanced analytics, artificial intelligence and machine learning are being deployed across product categories, from imaging to genomics to cardiology, to uncover new clinically actionable insights, and streamline existing diagnostic and therapeutic paradigms
 **Patient Engagement**	Tools as patient portals, virtual care, telehealth, smart home or smart hospital devices, and artificial intelligence (AI) for targeted data analytics allow patients to interact with the health system and manage their own care

Source: Expert interviews

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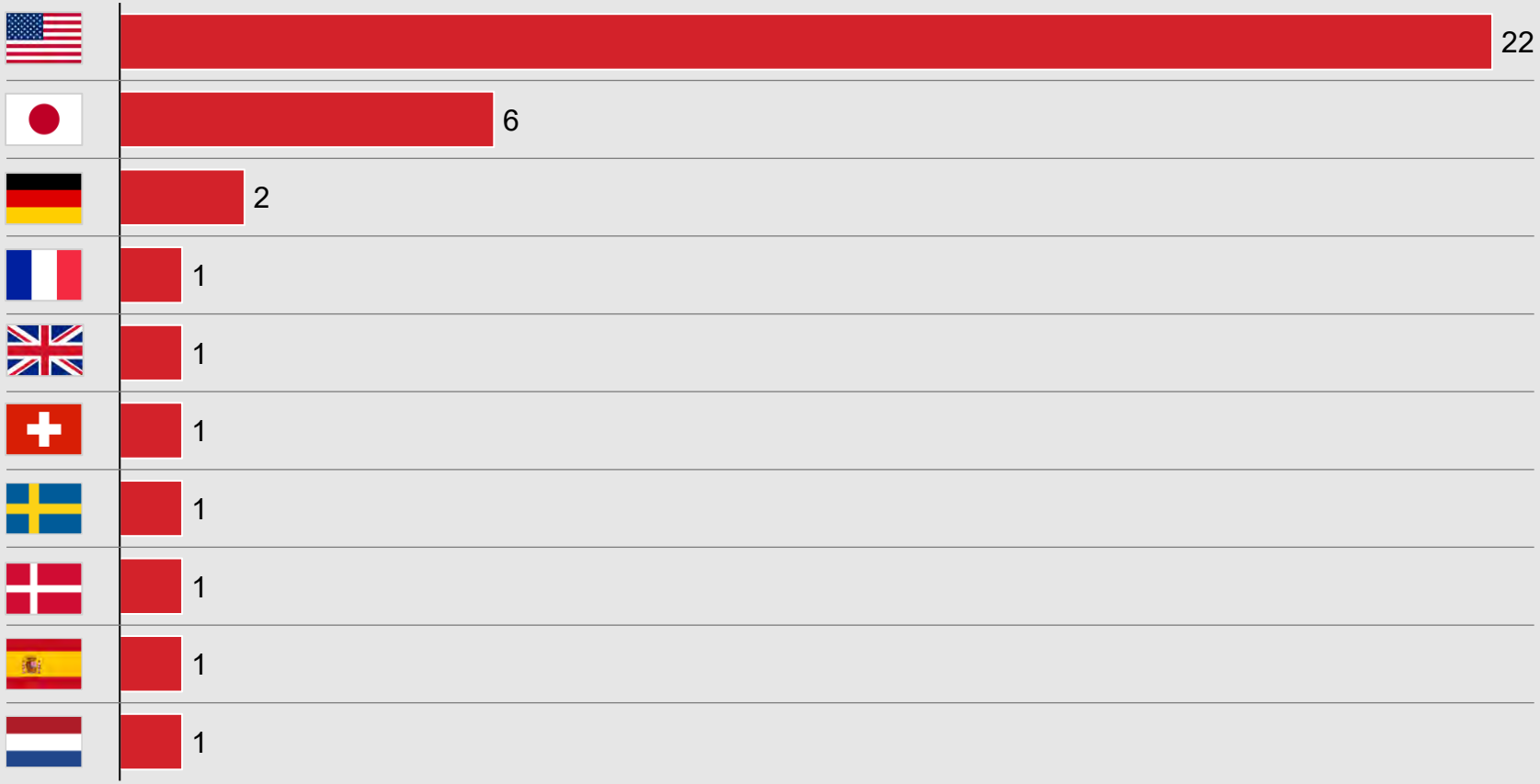
Deep Dive MedTech – leading geographies and player

There were 39 MedTech companies with revenue over USD 2bn in 2020, with half of them based in the US, followed by Japan and Germany

HQ location of MedTech companies with sales over USD 2bn in 2020 split by country, #



Source: In Vivo Outlook 2020

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Top 50 global medical device companies
Global medical device sales 2020 (USD bn)

Source: In Vivo Outlook 2020

5 ecosystems for investment promotion (where to play)

WHY are ecosystems important for economies?

WHAT are relevant ecosystems and its drivers?

WHERE should Switzerland focus?

- Prioritization of ecosystems
- **Deep Dive of selected ecosystems**

Life Sciences

Future of Food

Future of Finance

Industry 4.0

Digital Tech

Food & Nutrition ecosystem

Three main consumer trends are shaping the development of the food & nutrition industry, increasing the need for innovative products and technologies

Climate Change & Pollution

Customers are increasingly aware of the consequences of their consumption choices and expect sustainable alternative sources for protein

Health Focus & Simplicity

Shift towards a more holistic approach to health where consumers consider the quality of ingredients, nutritional value and expect transparency and traceability of the ingredients

Convenience

Consumers expect to be able to access their food in a simple and fast manner, which strengthens the shift to online operating models

Source: Web research

«Future of Food»

2: Food & Nutrition

The Food & Nutrition ecosystems comprises product and process innovations along the food value chain, from farm to fork

Focus segments

Global investments in food technologies were EUR 22.3 bn in 2020 and have grown over 137% since 2017

Growth segments[1]

1. **Food Science**
   Development of new ingredients and food products through new processing technologies (e.g., meat alternatives, supplements)
2. **AgTech**
   Solutions to improve farming output and develop new farm products, next generation farms and urban farming
3. **Consumer Tech**
   Services and devices to help consumers with their nutrition selection
4. **Supply Chain & Retail**
   Solutions improving the food supply chain

Disrupting technologies

Alternative Protein

Development of animal protein substitutes based on plant-based protein, precision fermentation and cell-based meat

Genetic Engineering & Microbiomes

The use of genetic engineering of crop traits and food animal traits, microbiome diagnostics and probiotics and microbial seed and soil treatments could potentially have an annual impact of USD 730 bn globally

Personalized Nutrition

Advances in nutrigenomics enable the development of nutrition forms tailored to each individual's genetic profile

Leading geographies

USA

7 HQs of biggest food corporations, FoodTech Hubs in Bay Area, New York, St. Louis & Boston

China

Second highest nation in terms of FoodTech unicorns and investments in local FoodTech start-ups, hubs in Bejing and Shanghai

Israel

Nearly 40% of FoodTech start-ups around the world are in Israel. FoodTech Innovation center in Kiryat Shmona, various start-ups in Tel Aviv

Europe

Strong hub in London and Food Valley in Wageningen

Key players

Foreign players

Incumbents

Cargill, JBS, Mondelēz International, BASF, AgroFresh, BUNGE, DSM, CORTEVA

Unicorns

FARMERS BUSINESS NETWORK, OATLY!, NXIN, NAYUKI, BEYOND MEAT, indigo, IMPOSSIBLE

Swiss players

Incumbents

syngenta, Nestlé Good food, Good life, Givaudan, BÜHLER, Firmenich

Other players

planted., SwissDeCode, AgroSustain, yamo

1. Based on VC investments and expert interviews

Source: Digital Food Lab, McKinsey Global Institute report "The Bio Revolution", Food Engineering Mag, expert interviews, web search

Deep Dive FoodTech - Focus Segments

The food industry can be divided into six sub-industries that incorporate different technologies to advance the food ecosystem

Sub-Industries

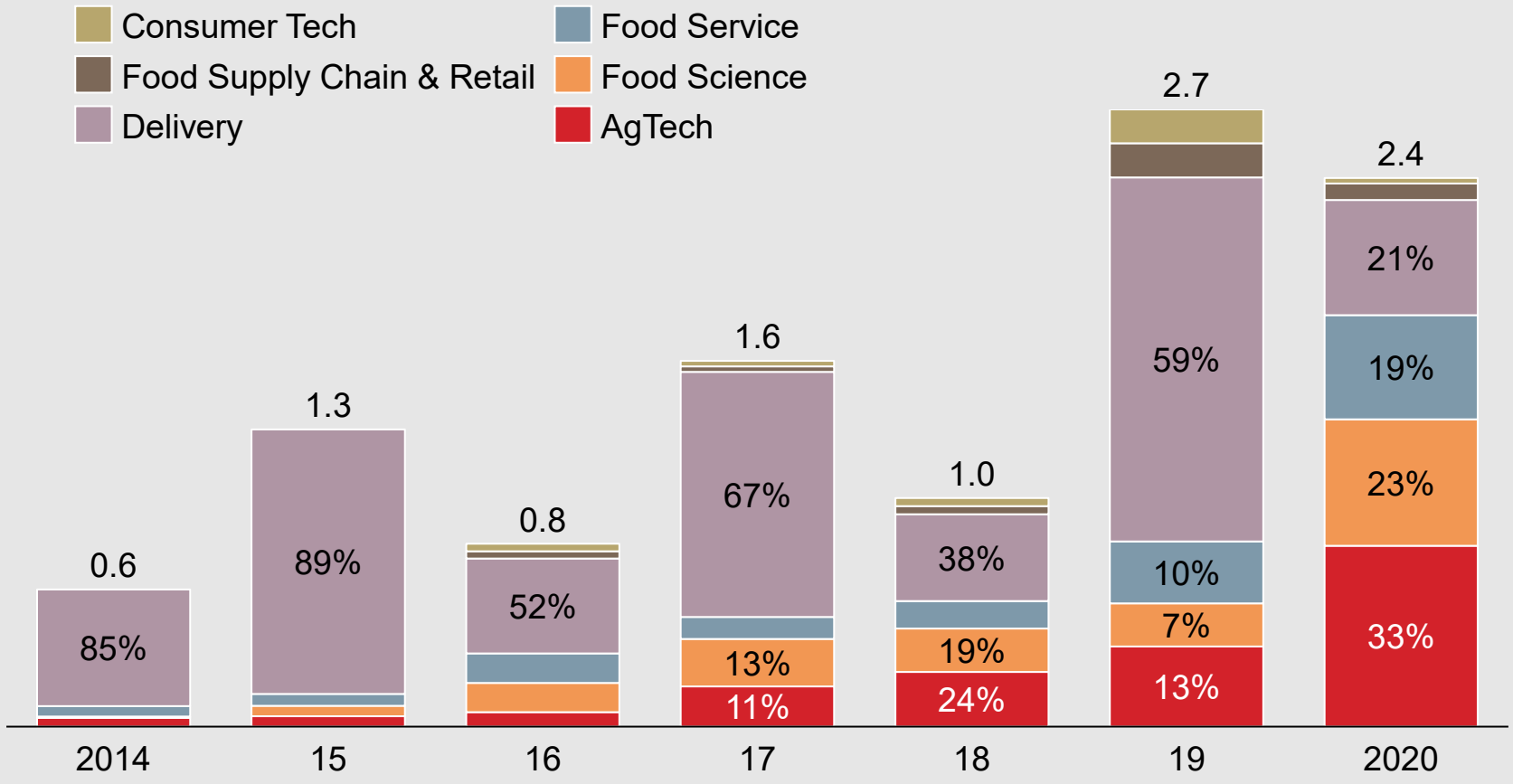
AgTech	Solutions to improve farming output and quality and develop new farm products, next generation farms and urban farming
Food Science	Development of new ingredients and food products, that leverage new processing technologies and reflect consumer needs
Delivery	Companies developing services to order and deliver groceries and meals direct to consumer and on-demand for online retail and restaurants
Food Service	Solution to improve the way out-of-home businesses are managed today and to reinvent the hospitality industry trough robotics and cloud kitchens
Food Supply Chain & Retail	Solutions improving the food supply chain and food retail industry, from digitalization to automation
Consumer Tech	New services focusing on achieving individual health goals through a personalized experience with food selection, consumption, and education

Deep Dive Food Tech - Investments by Sub-Industry

AgTech, Food Science & Food Service investments show the biggest growth since 2019 reflecting the growing consumer demand for more sustainable food sources and the focus on production advancements

Trends

Investments by category in Europe, EUR bn



Source: Digital Food Lab

«Future of Food»

2: Food & Nutrition

The Food & Nutrition ecosystems comprises product and process innovations along the food value chain, from farm to fork

Focus segments

Global investments in food technologies were EUR 22.3 bn in 2020 and have grown over 137% since 2017

Growth segments[1]

1. **Food Science**
   Development of new ingredients and food products through new processing technologies (e.g., meat alternatives, supplements)
2. **AgTech**
   Solutions to improve farming output and develop new farm products, next generation farms and urban farming
3. **Consumer Tech**
   Services and devices to help consumers with their nutrition selection
4. **Supply Chain & Retail**
   Solutions improving the food supply chain

Disrupting technologies

Alternative Protein

Development of animal protein substitutes based on plant-based protein, precision fermentation and cell-based meat

Genetic Engineering & Microbiomes

The use of genetic engineering of crop traits and food animal traits, microbiome diagnostics and probiotics and microbial seed and soil treatments could potentially have an annual impact of USD 730 bn globally

Personalized Nutrition

Advances in nutrigenomics enable the development of nutrition forms tailored to each individual's genetic profile

Leading geographies

USA

7 HQs of biggest food corporations, FoodTech Hubs in Bay Area, New York, St. Louis & Boston

China

Second highest nation in terms of FoodTech unicorns and investments in local FoodTech start-ups, hubs in Bejing and Shanghai

Israel

Nearly 40% of FoodTech start-ups around the world are in Israel. FoodTech Innovation center in Kiryat Shmona, various start-ups in Tel Aviv

Europe

Strong hub in London and Food Valley in Wageningen

Key players

Foreign players

Incumbents

Cargill, JBS, Mondelēz International, BASF, AgroFresh, BUNGE, DSM, CORTEVA

Unicorns

FARMERS BUSINESS NETWORK, OATLY!, NXIN, NAYUKI, BEYOND MEAT, indigo, IMPOSSIBLE

Swiss players

Incumbents

syngenta, Nestlé Good food, Good life, Givaudan, BÜHLER, Firmenich

Other players

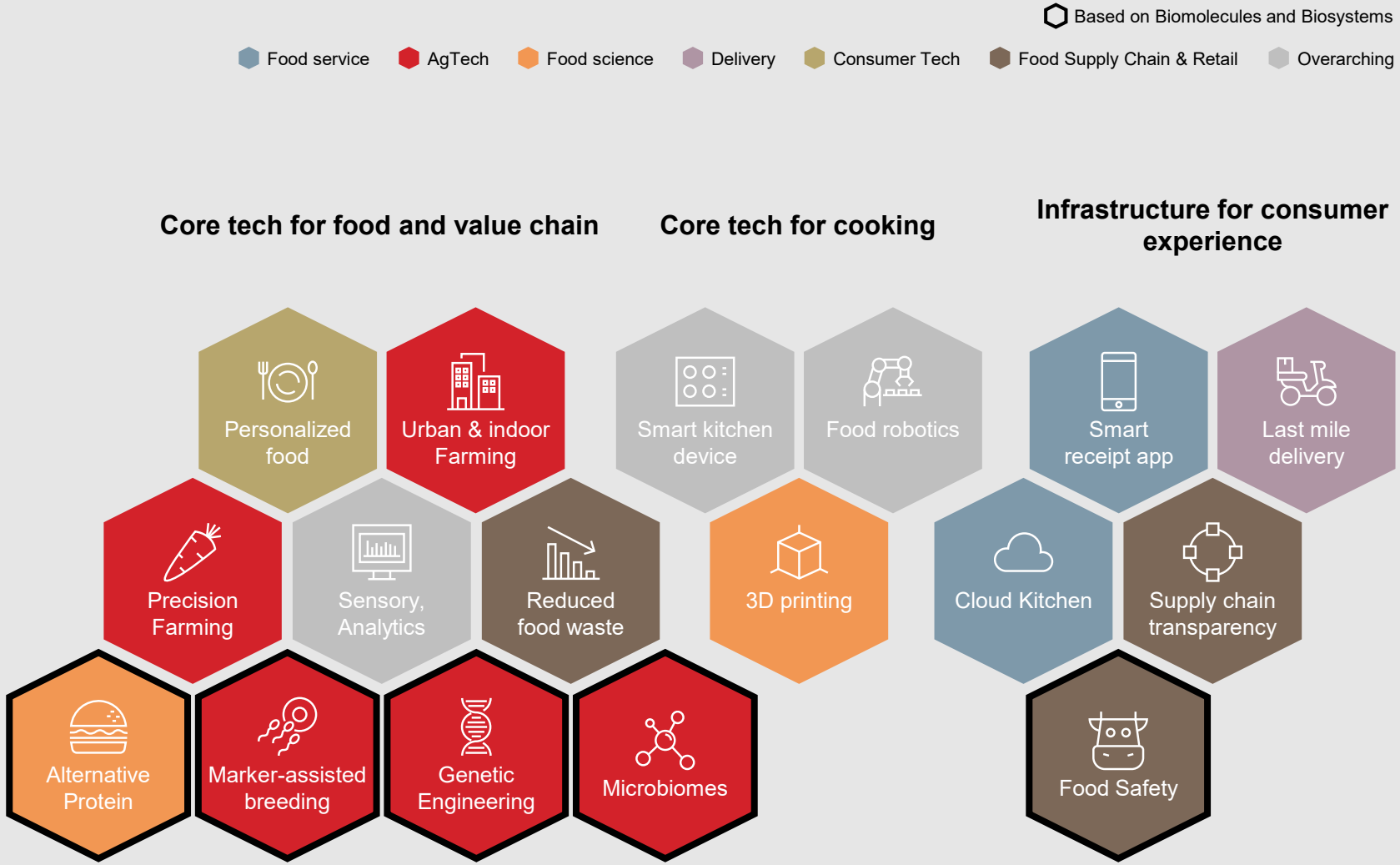
planted., SwissDeCode, AgroSustain, yamo

1. Based on VC investments and expert interviews

Source: Digital Food Lab, McKinsey Global Institute report "The Bio Revolution", Food Engineering Mag, expert interviews, web search

Deep Dive FoodTech - Overview of Technologies & Innovations

The disrupting technologies & innovations are spread over the different stages of the food value chain



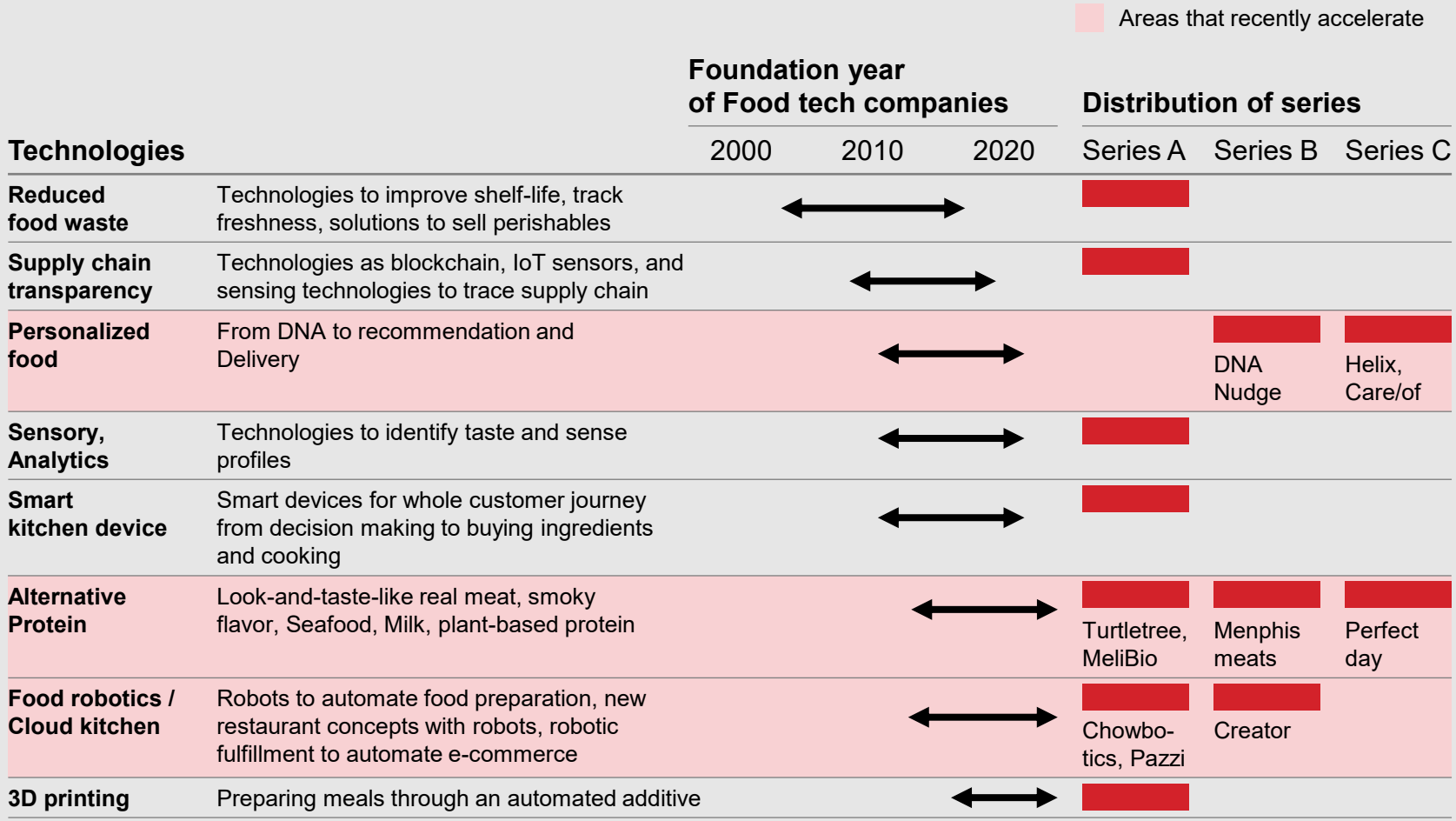
1. Includes Cultivated meat, insect-based protein etc.

Source: Expert interviews, market research

SELECTIVE

Deep Dive Food Tech - Major accelerations in Food tech

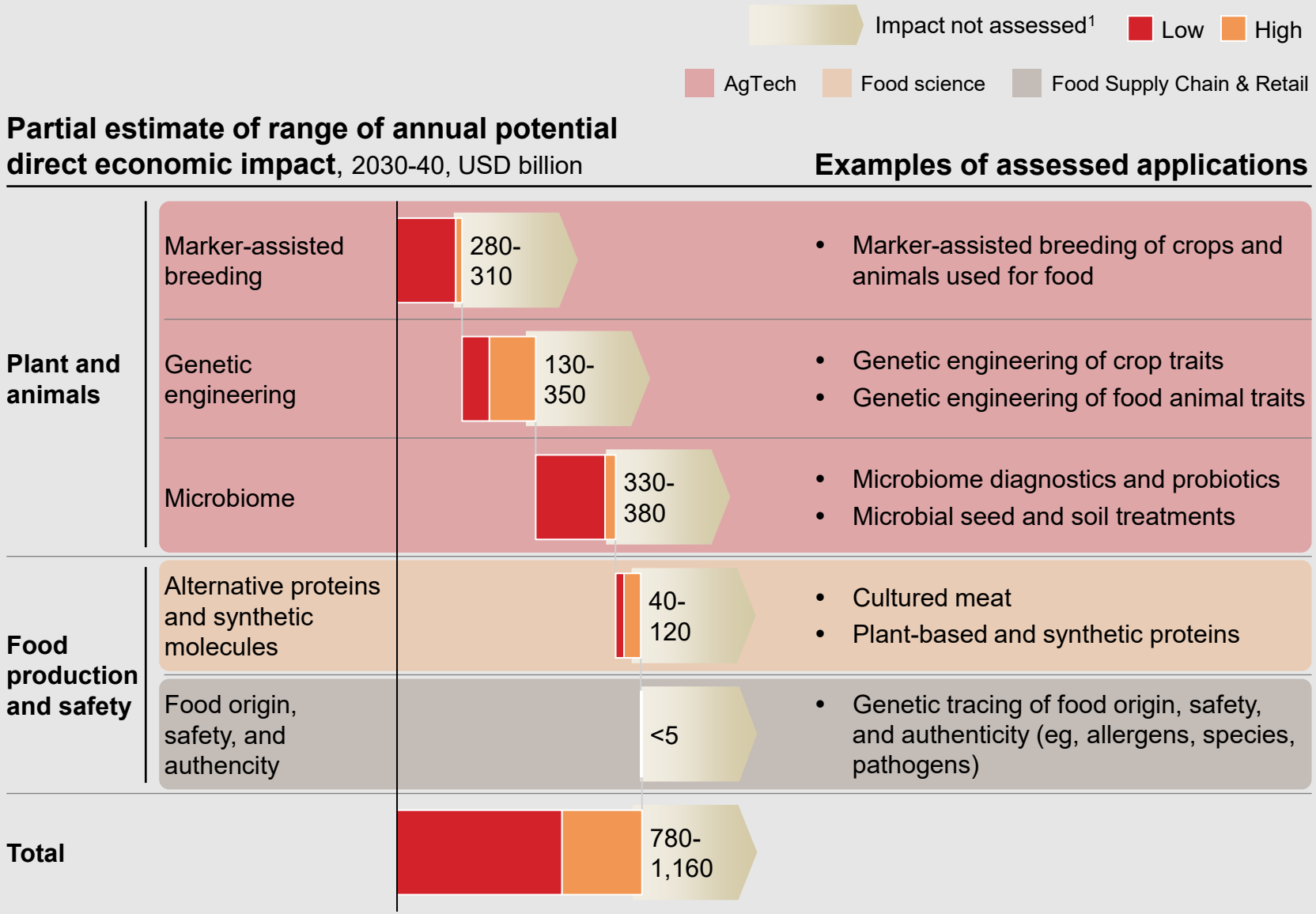
The currently accelerating areas in food tech include personalized food, next gen food and Food Robotics/Cloud Kitchens



Source: Expert interviews, market research

Deep Dive FoodTech – Biomolecules & Biosystems

Advances from biomolecules and biosystems impact several FoodTech sectors and could amount to 1.2 trillion globally in the next 10 to 20 years



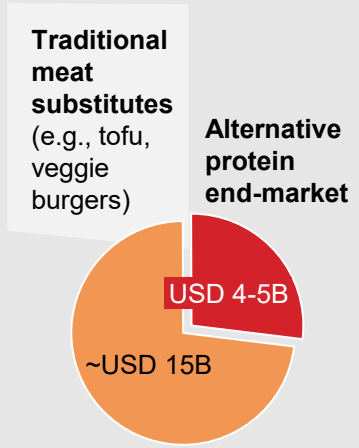
1. Including, but not limited to, indirect impacts from assessed applications and impacts from unassessed applications

Source: McKinsey Global Institute report "The Bio Revolution"

Deep Dive FoodTech – Alternative Proteins

Plant-based meat accounts for 90%+ of alternative meat protein end-market, whereas fermentation-based and cell-based are less commercialized and leave more room for new players

Meat substitute end-market, 2020 USD bn



Highly commercialized | Not yet commercialized

Protein sources	Overview	Commercialization	Size[1]	Example players
Plant-based	Proteins derived from **plant sources** **Examples**: Soy and Pea based meat substitutes (meatless burgers)	Hundreds of brands currently selling products	~$3.5-4.5B	Beyond Meat, Livekindly, Nestlé, Impossible
Fermentation-based	Proteins derived from **live micro-organisms** (e.g., Yeast, Bacteria or Algae) Within space range of player types including bulk protein (e.g., mycoprotein) and specialized ingredients (e.g., heme) **Examples**: Mycoprotein frozen foods, fermented whey	**Bulk protein** (e.g., Mycoprotein): tens of players - Quorn only player at scale	~$300M	Quorn
		Specialized ingredients: tens of players – most in early stages of commercialization	<$10M	Perfect Day, Clara Foods
Cell-based (lab grown / cultivated)	Proteins derived from **lab-grown (cultured) meat** or different types of insects **Examples**: Lab-grown beef or chicken	Leading players currently building pilot plants to test ability to produce at scale	N/A	Memphis Meats, BlueNalu, mosa meat

1. Includes retail and foodservice
2. 2018 to 2019

Source: Euromonitor, expert interviews

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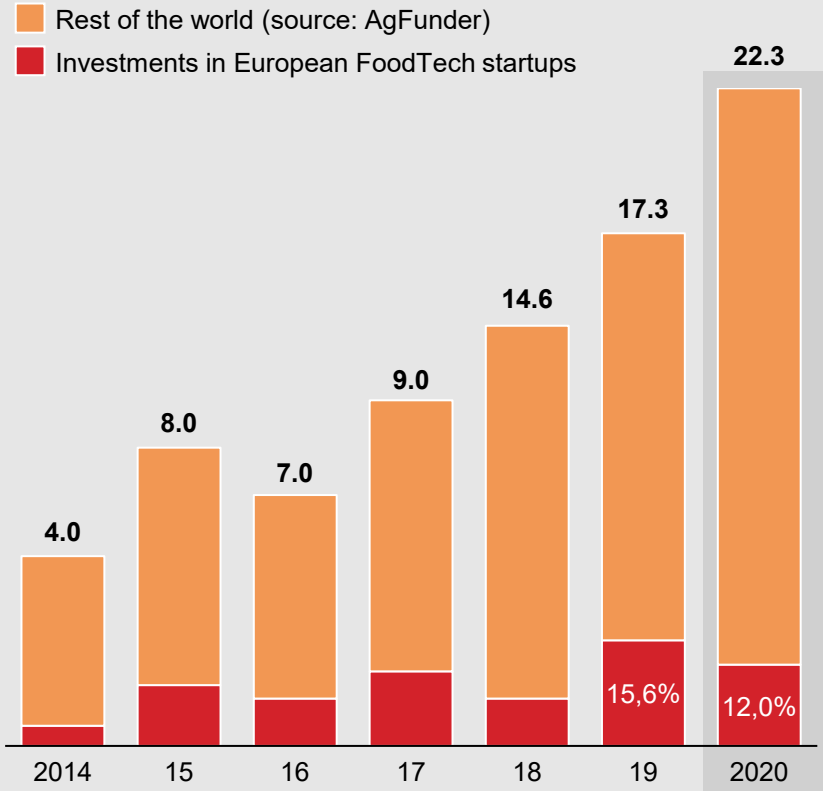
1. Based on VC investments and expert interviews

Source: Digital Food Lab, McKinsey Global Institute report "The Bio Revolution", Food Engineering Mag, expert interviews, web search

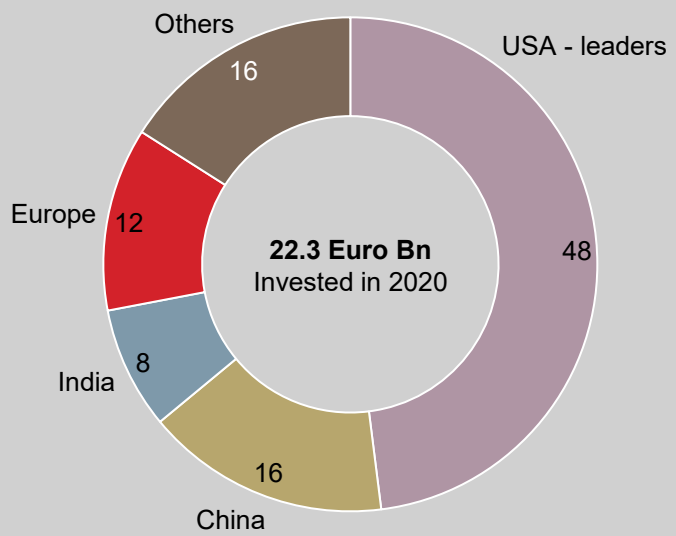
Deep Dive FoodTech – Global Investments

The investments in food technologies have grown over 137% since 2017, almost half of the investment are done in the US

Total investments in FoodTech market
Percent; totals in EUR bn



Investments by geography
Percent

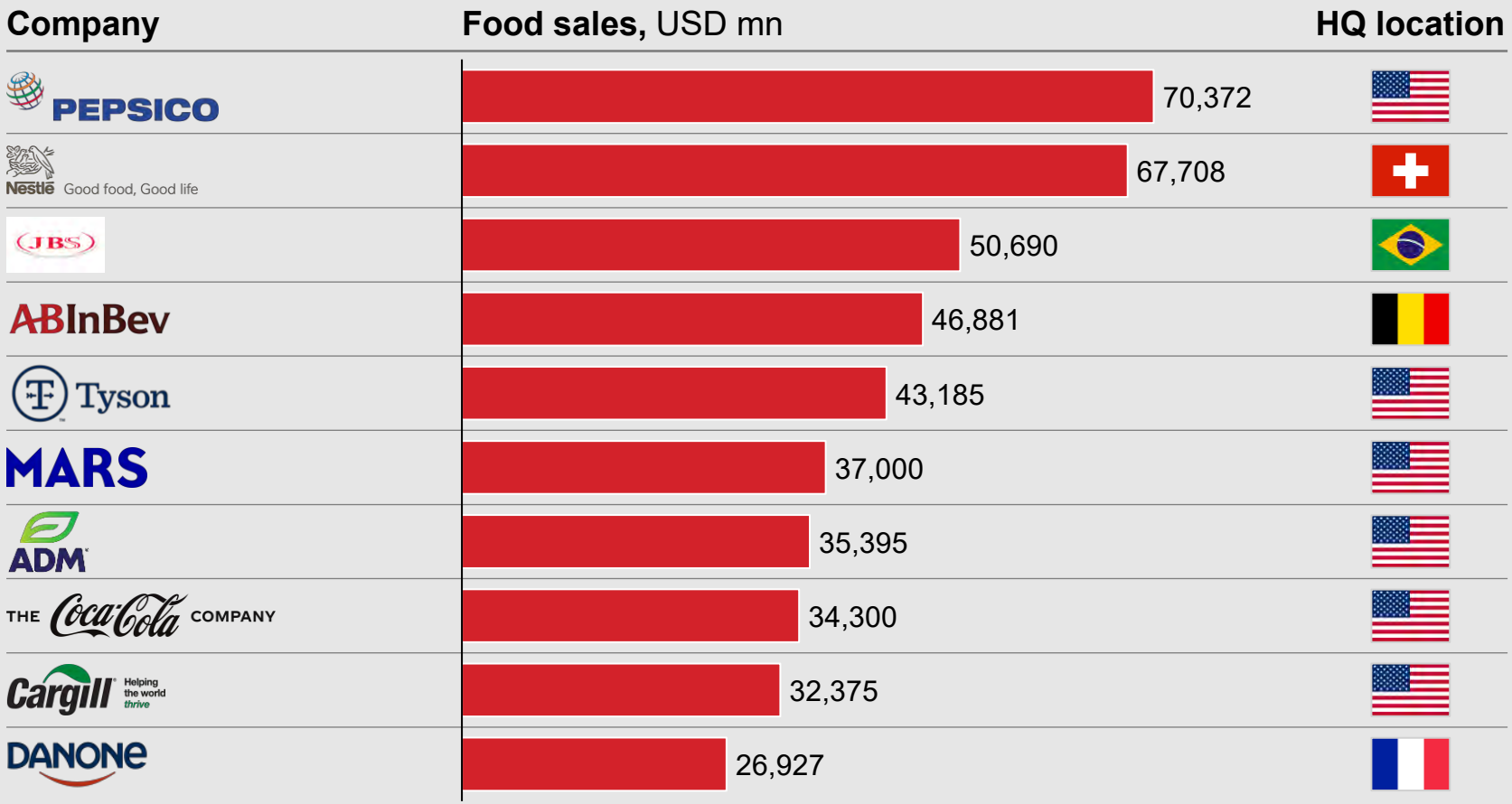


Source: Digital Food Lab

Deep Dive FoodTech – Key Players in Food sector

Most of the key players have their HQs in the US

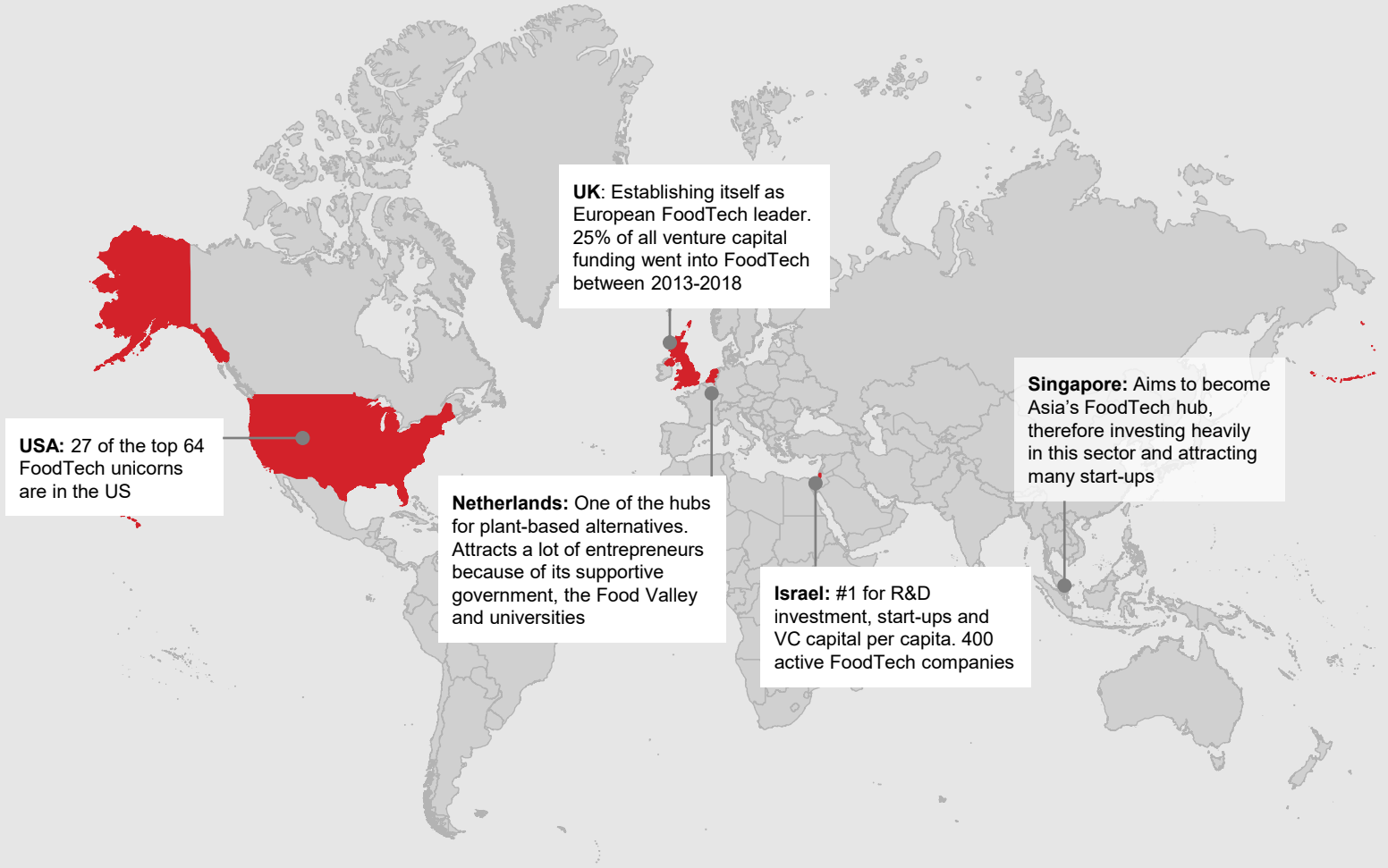
Top 10 Food Companies based on yearly sales



Source: Food Engineering Mag

Deep dive FoodTech - Global FoodTech Hubs

The US, UK, Netherlands, Israel and Singapore have established themselves as important geographies in the Food ecosystem



Source: Accenture

Deep Dive FoodTech – Key Players in FoodTech

Most of the FoodTech unicorns are in the delivery and grocery segment

FoodTech Unicorns 2021

Source: Digital FoodLab

5 ecosystems for investment promotion (where to play)

WHY are ecosystems important for economies?

WHAT are relevant ecosystems and its drivers?

WHERE should Switzerland focus?

- Prioritization of ecosystems
- **Deep Dive of selected ecosystems**

  Life Sciences

  Future of Food

  Future of Finance

  Industry 4.0

  Digital Tech

«Future of Finance»

3: Wealth and Protection

Innovation and technologies with the potential to shape the current financial industry

Detailed Next

Focus segments

Switzerland has a very strong footprint in financial service (in particular in wealth & asset management) – The following segments will be essential in the future and can help to achieve further growth:

Growth segments

Sustainable investing and financing

Sustainable investing with high growth (~22% CAGR) – opportunity to establish an environment with deep expertise in sustainability (e.g., data management and instruments)

Financial Software

Core banking software (~8% CAGR[1]), Asset management software, and Data & Analytics software

Digital Assets

Including Non-fungible-tokens and digital currencies

Disrupting technologies

Data & Analytics (incl. AI)

Enabling many automated solutions, e.g., robo advisory, KYC processes

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Quantum Computing (e.g., for an increased accuracy of market simulations)

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Software

infor, Oracle FLEXCUBE, Finxact, Finastra, Thought Machine, fiserv., MAMBU, DNA, kraken

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1. Excluding US

Source: Morningstar Direct, IDC, expert interviews, web research

NON-EXHAUSTIVE

Deep Dive Sustainable Investing & Finance – Trends

Increasing environmental challenges and new regulations are driving the shift to a sustainable investment focus

1 Overarching challenges of mankind

Climate change challenges amplifying

Water scarcity issues driven by population growth

Increasing debate about ethnic diversity in boards

2 Regulation/ "Self-Regulation" reasons

European Commission: Green deal with ambition to mobilize EUR 1 trillion investments by 2030

Task Force on Climate-Related Financial Disclosure (TCFD): Developing **climate related reporting guidelines**

3 Fund & corporate investors demand

A Enhancing returns

B Strengthen risk management and avoid risk incidents

C Align with stakeholders' values and be a **"good citizen"**

D Relevant for AMs as Corporate: Reduce cost of capital

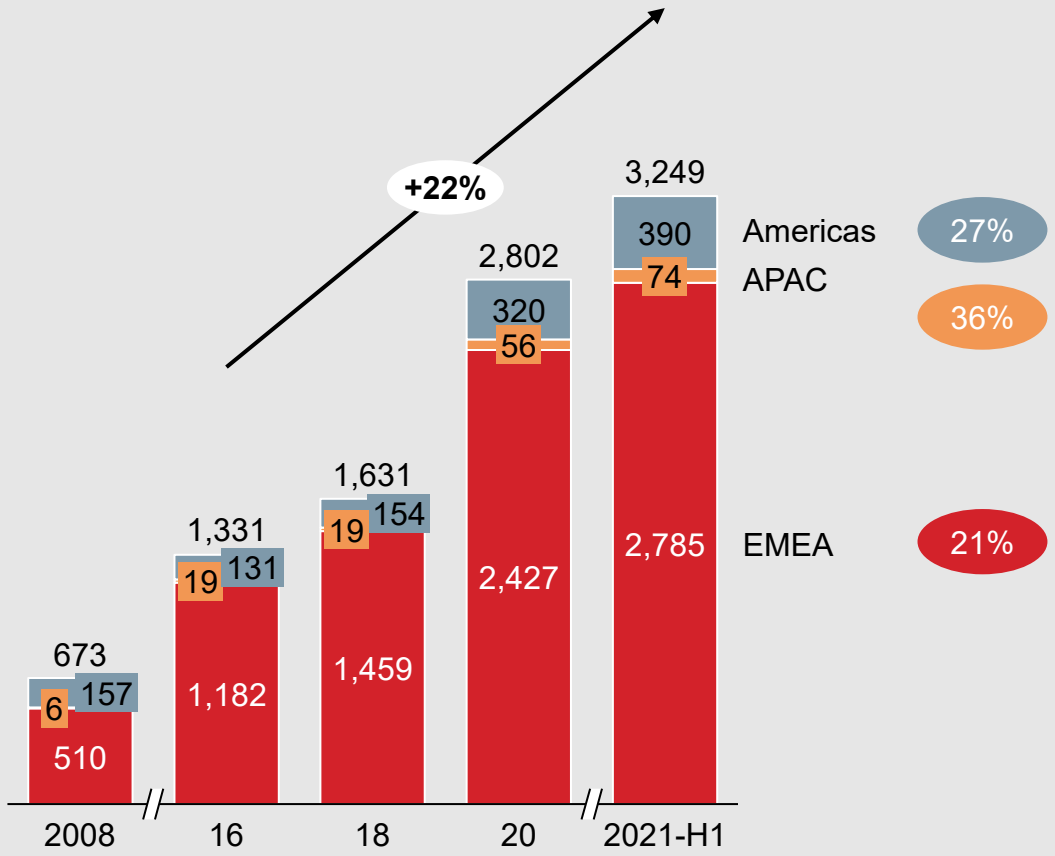
Source: Expert Interviews

Deep Dive Sustainable Investing & Finance – Assets under Management

ESG has been growing at remarkable levels north of 20% per annum

Total assets under management in sustainable funds[1] by region in USD bn

CAGR, 2016-21 H1



While Europe remaining by far largest market for ESG investments, other regions with even higher relative momentum

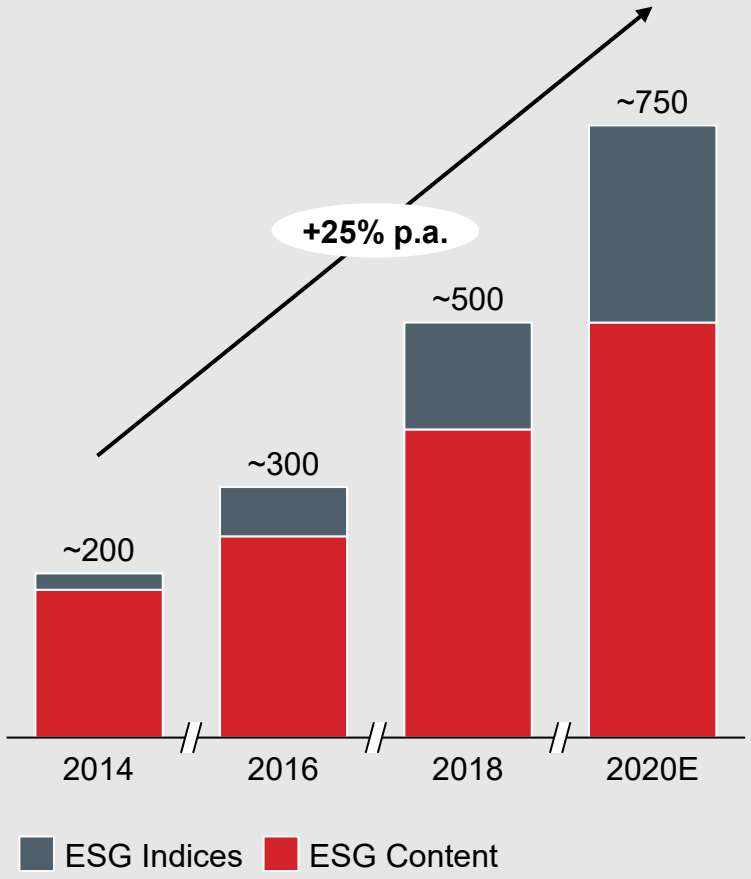
1. Sustainable funds based on Morningstar's label "Sustainable Investment overall" indicating an incorporation of a positive investment approach. Historic data can deviate due to reclassifications by Morningstar

Source: Morningstar Direct [All Rights Reserved. The information contained herein: (1) may not be copied or distributed; and (2) is not warranted to be accurate, complete or timely]

Deep Dive Sustainable Investing & Finance – ESG Data market

ESG data is a fast-growing market, reaching ~0.8 USD bn in 2020

Estimated global addressable market size for ESG information business[1], USD mn



CAGR 2018-20E

~35%

~15%

Key observations

ESG information market is largely dominated by handful of players falling into two categories

- **Traditional data providers** that have created/partnered/acquired ESG data capabilities (e.g., MSCI, Bloomberg, Thomson)
- **ESG specialists'** data providers with strong expertise in the domain (e.g., Sustainalytics, RepRisk, Arabesque)

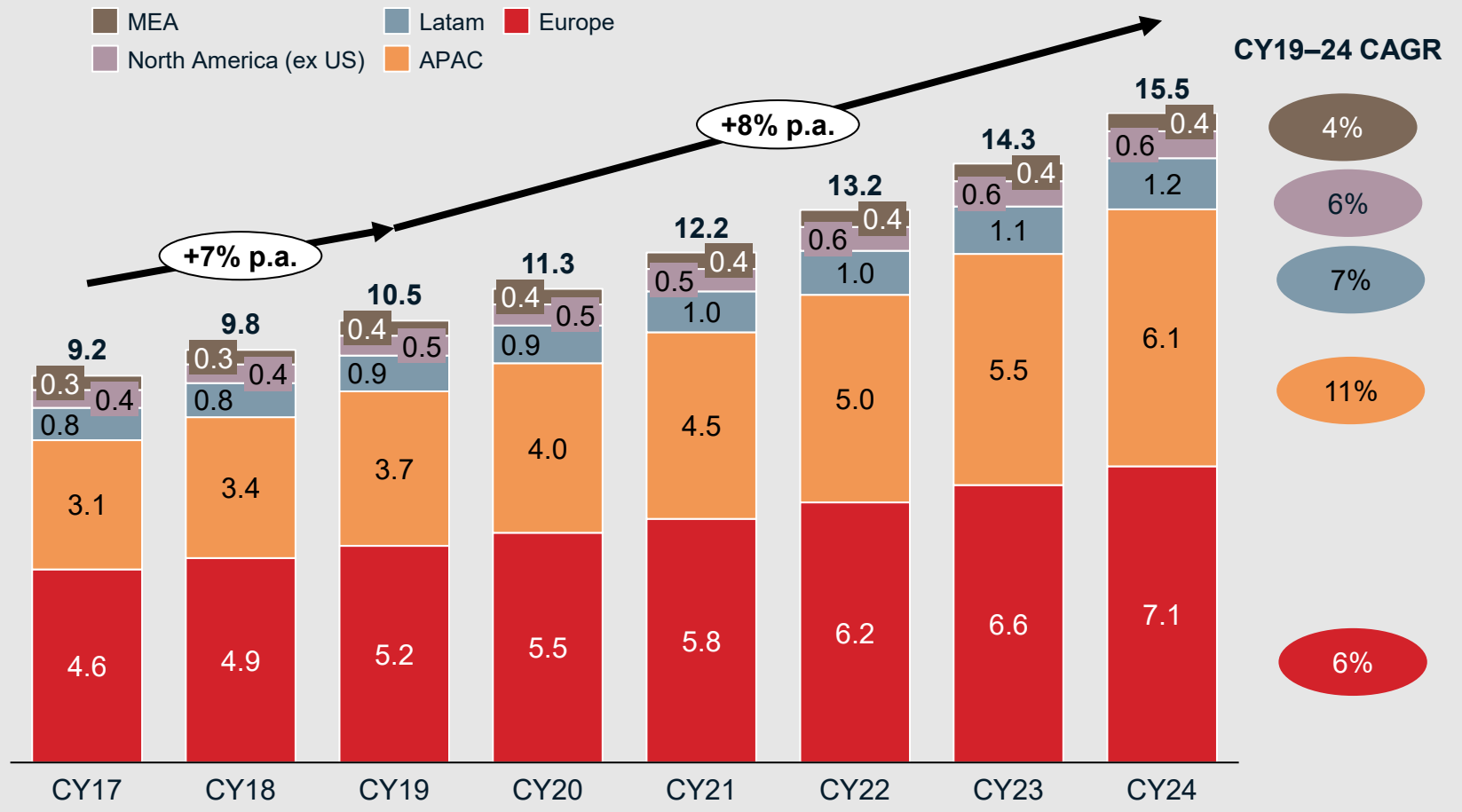
1. Includes research, ratings and indices

Source: Global Sustainable Investment Alliance, company public annual reports; MSCI Annual report, Opimas

Deep Dive Financial Software – Core banking software spend

Core banking software market ex-US is forecasted to grow at 8% CAGR until 2024, strongly driven by APAC which will grow 11% in this period

International Retail core banking software spend development, by geography[1] USD bn



1. CY23 and CY24 growth rates are based on the CY22 growth rate

Source: IDC (2018)

«Future of Finance»

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Innovation and technologies with the potential to shape the current financial industry

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1. Excluding US

Source: Morningstar Direct, IDC, expert interviews, web research

Deep Dive Future of Finance – Data & Analytics

Data and Analytics offer multiple use cases and growth opportunities for the financial sector

1. **Market analytics platform** including third party **data sources across asset classes**
2. **Flow prediction** with advanced AA propensity analyses to match fund houses and distributors
3. **Qualitative newsfeed** based on Big data to collect real-time updates on markets (engagement tool)
4. **Client/ RM profiling and behavioral segmentation** both for FH and distributors
5. **Competitive intelligence survey/benchmarking**
6. **Advanced market insights** through the aggregation of large amounts of unstructured and external data
7. **Low/No-code analytics solutions** ready to plug-in Connect
8. **ESG portfolio analysis tools** to generate ESG insights for portfolio management and reporting

Source: Expert interviews & team analysis

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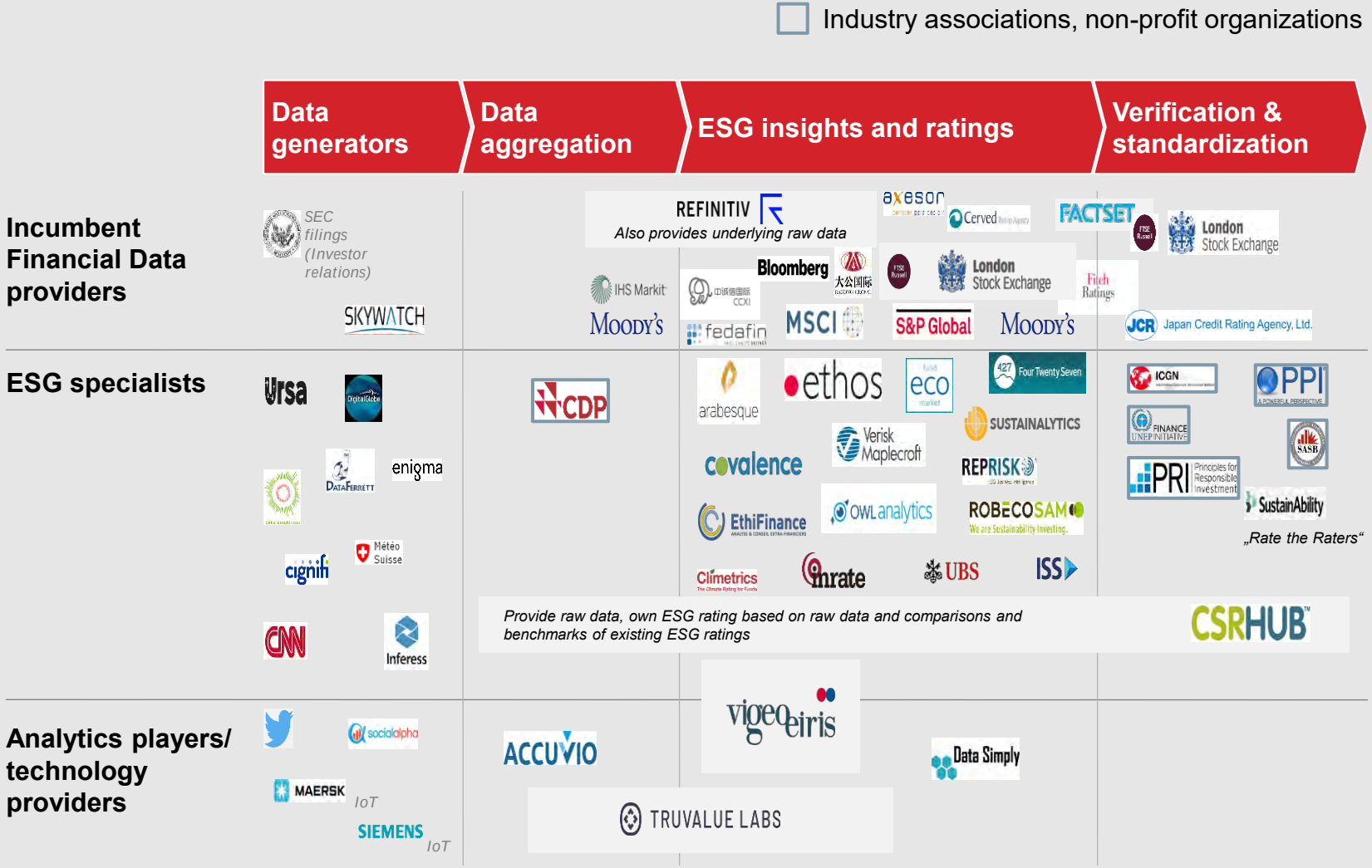
Deep Dive Sustainable Investing & Finance – ESG data value chain

ESG data sector is quite fragmented, however 3 top players hold 40% of market share



Source: Web research

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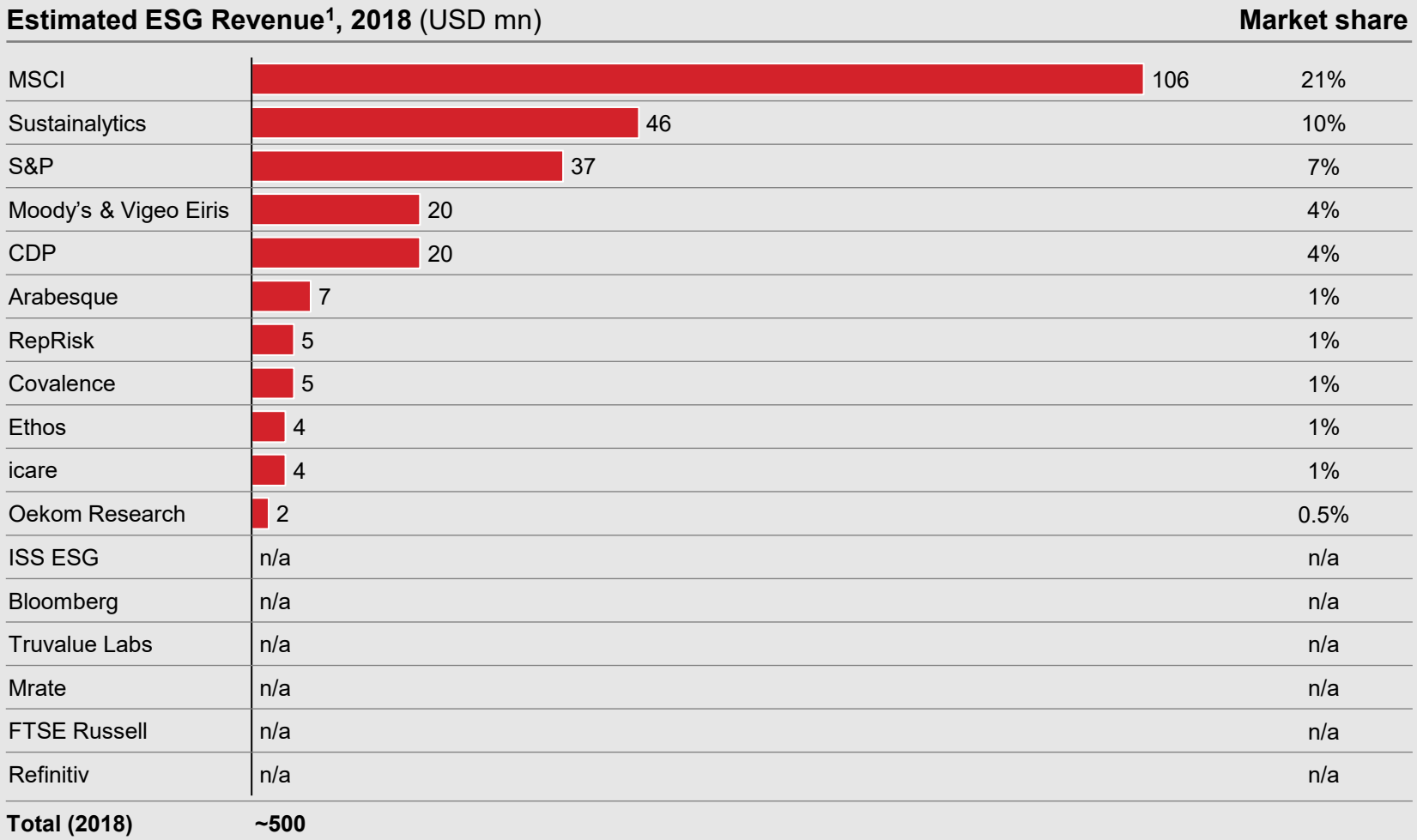


1. Players sorted by est. Revenue where available, otherwise by employee number

Source: Journal of Environmental Investing, websites, press search, Annual reports, ORBIS, Crunchbase

Deep Dive Financial Software – Financial institutions

There are a wide range of software vendors across the value chain

NOT EXHAUSTIVE

Core functions

Support functions

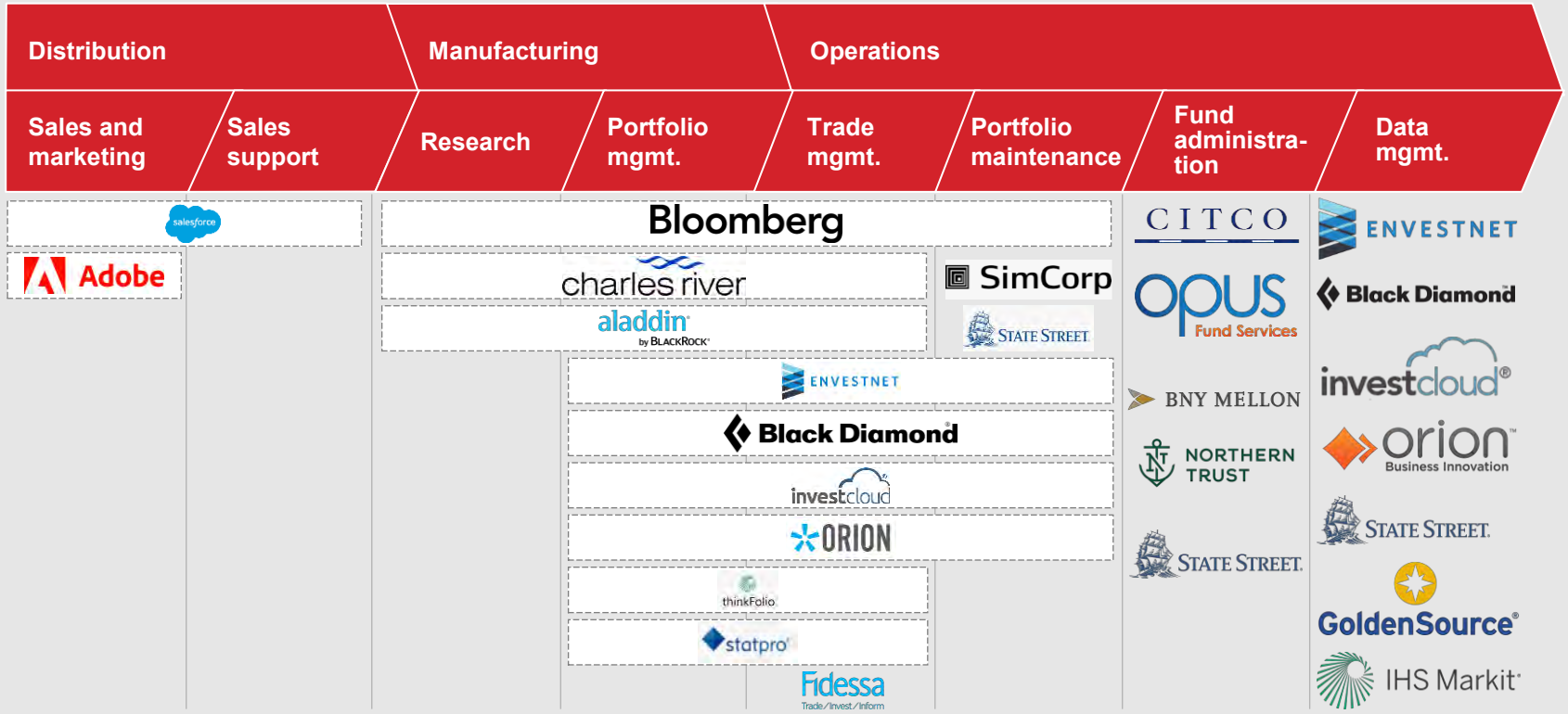
Source: Market scan

Deep Dive Financial Software – Security & Investments

Software providers for Asset Management tend to specialize by asset class for manufacturing

NOT EXHAUSTIVE

Core functions



Support functions

IT	Risk management (2nd line of defense)	Compliance/ Audit (3rd line of defense)	Finance	Other (HR, Legal)
		charles river SimCorp		

Source: Market scan

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  Digital Tech

Detailed Next

«Industry 4.0»

4: Industrial automation

Industrial automation focuses on the creation and application of technology, such as robots and information technologies, to automize and control manufacturing processes

Focus segments

Industrial automation market is expected to grow at a CAGR of 9.2% until 2028

Growth segments

Value chain perspective:

1. **Machinery, robotics & control equipment**
2. **Tooling, components & sensors**
3. **Connectivity Platforms & Software**

Industry perspective:

Overall robotics market expected to grow by 13% p.a.

Service Robots (OEMs)

Warehousing & Logistics (CAGR 41% until 2023)

Medical (CAGR 24% until 2023)

Agriculture (CAGR 11% until 2023)

Disrupting technologies

Robotics
Advances in collaborative, mobile and autonomous robots are going to drive growth in these fields and enable fleet autonomy

IoT Platforms
Enables advanced use cases for robotics in the automation context, facilitate fleet management and increase data collection

Data & Analytics (incl. AI)
Enables autonomous learning and decision making

Microtechnology
Developing technologies in the nano scale is key for precision manufacturing and miniaturization

Vision & Sensing
Vision systems and sensors allow for better image interpretation and coordination of robots

Material Science & Engineering
Materials innovation enables development of soft robots, which are more adaptable and robust

Leading geographies

Japan

World's largest players in industrial automation, hubs in Tokyo and Osaka

Germany

Bavaria as hub for industrial automation companies

USA

Focus in Boston area, Bay Area and North Carolina

Denmark

Many companies located in Odense hub

China

Shenzhen as key region

Key players

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Incumbents

FANUC, TERADYNE, KUKA, SIEMENS, OMRON, SCHUNK, UNIVERSAL ROBOTS, BALYO

Unicorns

Geek+, Horizon Robotics, LOCUS

Swiss players

Incumbents

ABB, STÄUBLI, swisslog (Member of the KUKA Group), Endress+Hauser

Other players

sevensense, AMYbotics, HUMARD, Medacta International

Source: Fortune Business Insights, IHS Industrial Automation Equipment, Interact Analysis, ARC, IFR World Robotics 2013-20, expert interviews, web research

Industrial automation value chain

Industrial automation industry is growing, interesting segments are Tooling, Components & Sensors, Machinery, robotics & control equipment, and Connectivity Platforms & Software

0-10 | 10-15 | >15 | Growth trajectory until 2025 | >9% | 7-9% | <7% | Robotics detailed next

Value chain step	Technology	Sub-technology	Market size 2020, USD bn	Avg. EBIT margin	Growth outlook
Tooling, Components & Sensors	Sensors	Image sensors	~2	5-10%	↗
		Position/distance sensors	~1	5-10%	↗
		Other sensor types	~2	5-10%	↗
	Other components	Motion control	30-35	~5%	→
		Actuators	40-45	5-10%	→
		Power laser components	1-2	10-20%	→
	Joining technology	Mechanical (fastening)	2-5	5-10%	→
		Chemical (dispensing)	4-6	15-20%	↗
		Thermal	6-8	5-10%	→
	Other end of arm technologies	Grippers	1-3	10-15%	↗
		Automatic tool changers	0.1-0.3	5-15%	→
	Machine vision	Machine vision system	~10	10-20%	↗
	AMR accessories	AMR accessories, e.g., conveyor top	<1	10-15%	↗
	Other tooling	Parts feeding	1-4	15-20%	→
Machinery, robotics, & control equipment	Robotics	Traditional Industrial robots	10-15	5-15%	→
		Collaborative Industrial robots	<1	10-25%	↗
		Mobile robots (AGVs & AMRs)	2-3	10-25%	↗
	Other material & parts handling	Conveyor belts	5-10	15-20%	↗
		Vacuum conveyors	0.2-0.5	0-10%	→
		Storage system (ASRS)	10-15	5-15%	→
		Auto pallet load / unload cranes	2-4	5-10%	→
		Ergonomic handling	<1	10-20%	↗

Value chain step	Technology	Sub-technology	Market size 2020, USD bn	Avg. EBIT margin	Growth outlook
Machinery, robotics, & control equipment	Machinery	Additive manufacturing machines (3D printer)	10-15	10-20%	↗
		CNC tool	80-85	<10%	→
		Labelling & Packaging machinery	45-50	10-20%	→
		PCB assembly equipment	3-4	10-20%	→
		Pattern generation machinery	<1	10-20%	→
	Control equipment	PLC(programmable logic controller)	20-25	5-15%	→
	Robot & machine related hardware	Barriers, safety equipment	1-2	<10%	→
		Railing and other axes	<1	<10%	→
System integration	Design & integration	Cell & process design	1-3	5-15%	→
		Line integration	1-3	5-10%	→
		Other integration services	3-4	5-10%	→
	Manufacturing software	MES	1-3	5-10%	→
		Work planning	5-10	5-15%	→
		Program planning	1-4	5-15%	→
	Enterprise software	Digital twin & engineering software	1-2	>30%	→
		Other enterprise software (e.g.,SCP)	0.1-0.3	5-10%	→
Connectivity Platforms & Software	Connectivity equipment	Connectivity equipment	5-10	5-15%	↗
		RFID	5-10	5-20%	↗
	Platform and applications	IoT platform	<5	10-20%	↗
		IoT applications	~5	10-20%	↗
		Security HW & SW	<1	15-25%	↗

Source: IHS Industrial Automation Equipment, IFR, Interact Analysis, ARC, Expert interviews

Deep Dive Robotics - Trends

The robotics industry is experiencing a shift towards service robots and cobots, AGVs and mobile robots

Rise of service robots

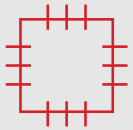
Use of robots in services taking off with broader use cases and widespread adoption – responsible for almost all growth ’19-’23

Continued cost pressure

Average robot **prices are expected to continue to decline** – sophisticated robots become available at higher scale and customers see low prices as key criteria for automation

Shift to AGVs & Cobots

Shift from traditional fixed robots to more versatile cobots and growth in **AGVs/mobile robots** as logistics and service demand surges



Ecosystem beyond robot hardware

The **ecosystem beyond robots is growing – software / IoT** to control intelligent robots and **sensors** are becoming **critical differentiators**

China-led growth

China to account for 80-90% of industrial and 30-40% of service robot market growth until 2023 – local players will gain relevance

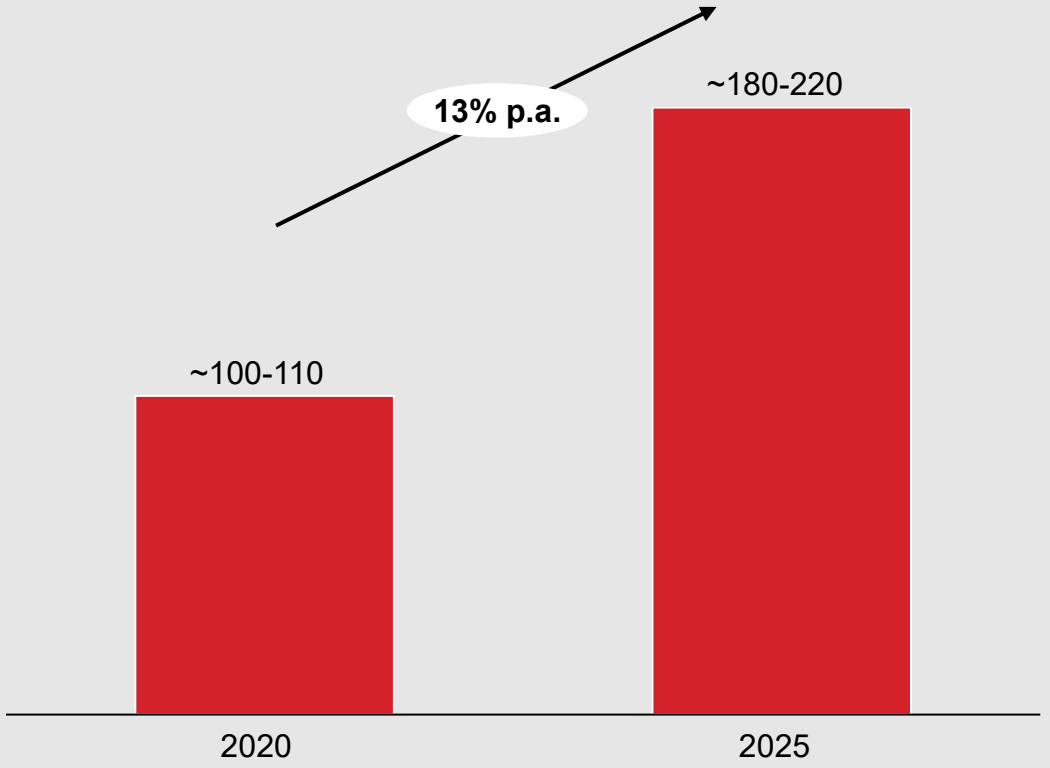
Source: Expert Interviews

HIGH LEVEL ESTIMATE

Deep Dive Robotics – Market Growth

Global robotics market expected to reach ~USD 180-220bn by 2025, with software growing in line with hardware

Global robotics market size (hardware and software) USD bn



Overall market expected to grow given strong underlying demand for new robotics hardware and shortening replacement cycles

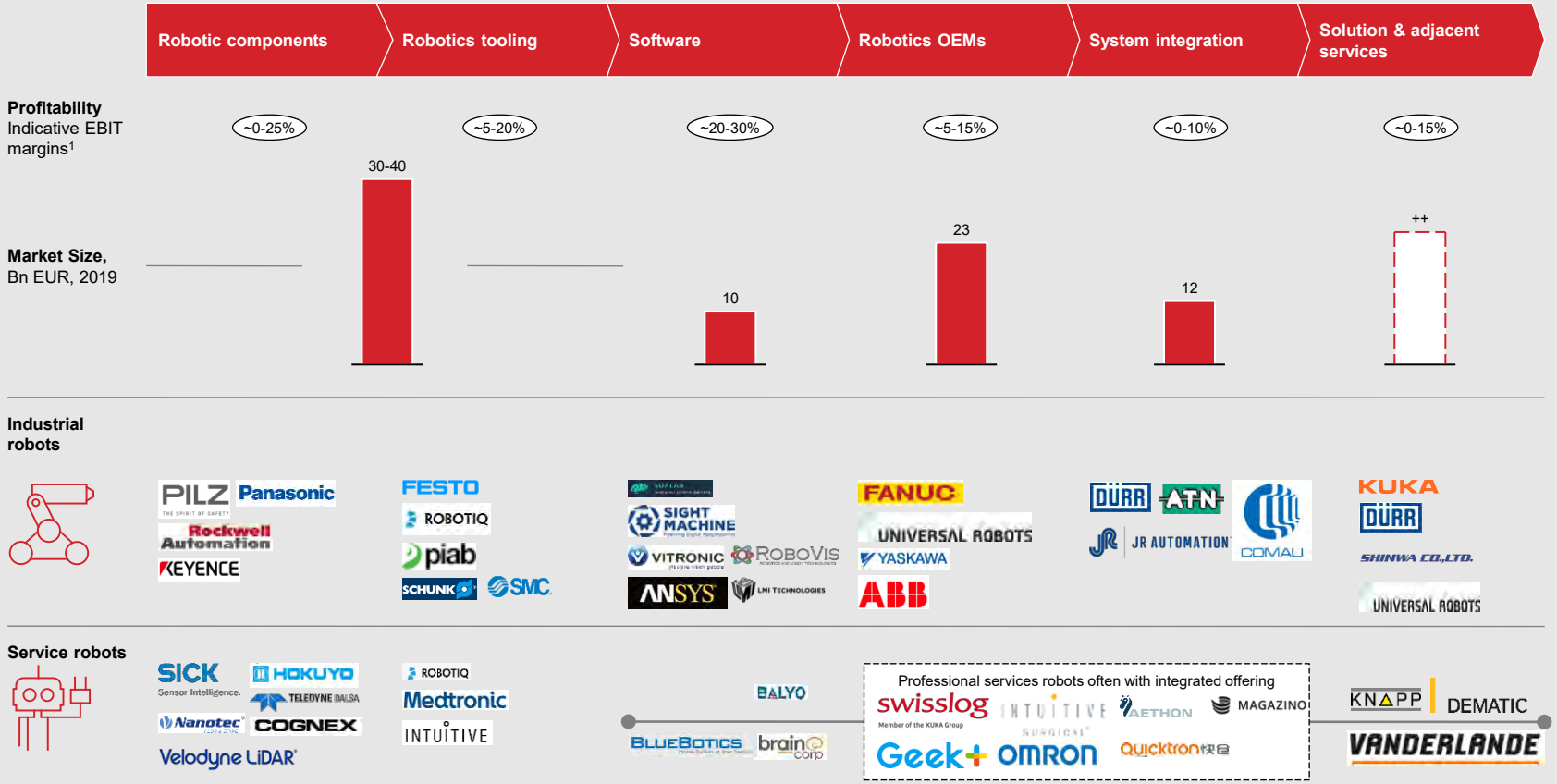
Software and system integration for robotics is expected to grow in line with robotics hardware between 2020 and 2025

Source: IFR World Robotics 2013-19, Loop Ventures, expert interviews

EXEMPLARY PLAYERS

Deep Dive Robotics – Value chain

Value beyond robot OEMs is growing across value chain, with software & arm components becoming critical differentiators



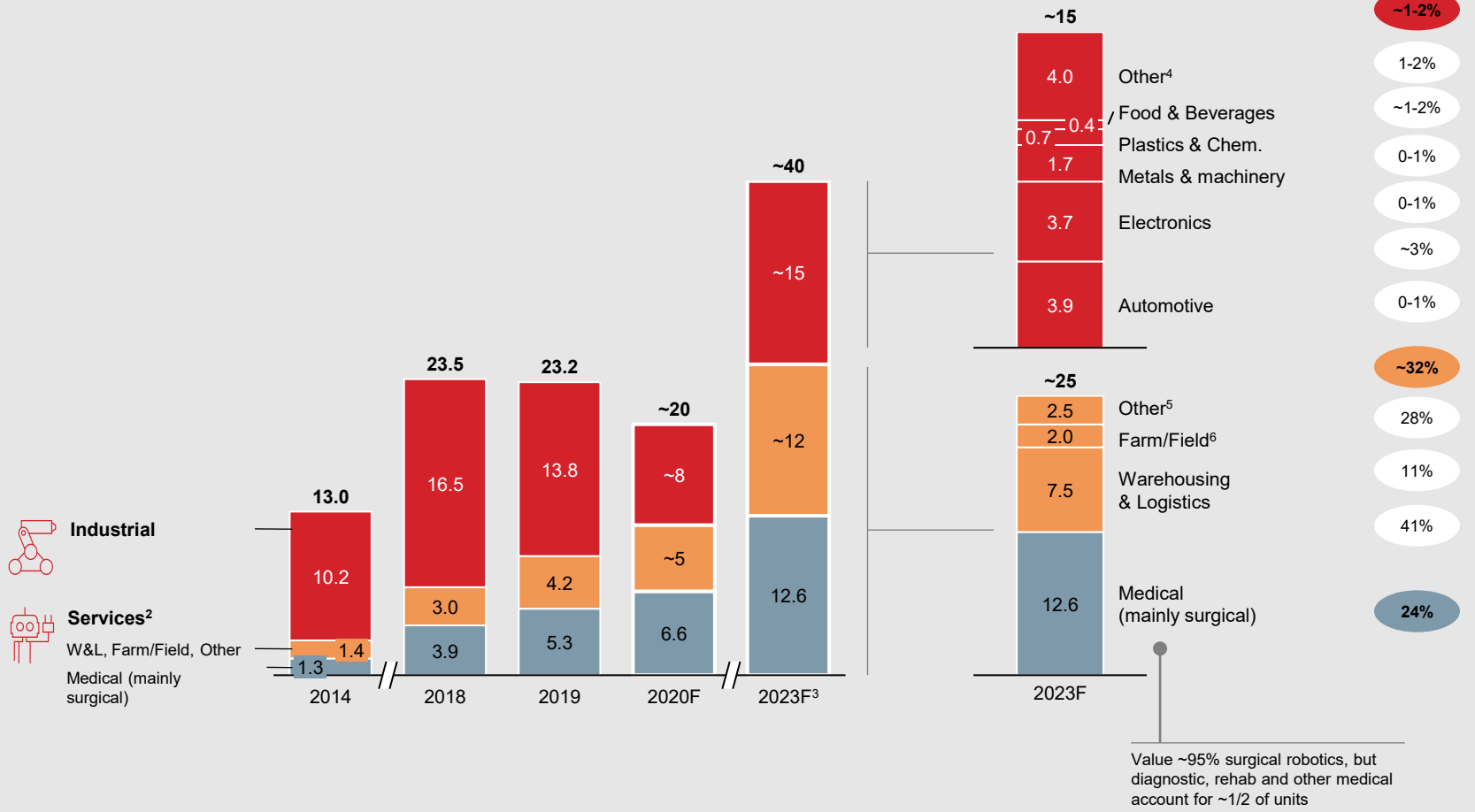
1. Based on a selection of different players along each value chain step

Source: IFR, company websites and filings, Avention, Loupventures, CapIQ, Hoover's, expert interviews, press clippings

Deep Dive Robotics – Market growth per segment

Service robotics are driving industry growth in past years and going forward

Robotics OEM's market size[1] USD bn



1.Incl. value of the robots, excl. software, peripherals/accessories, and systems engineering
2.Excl. military applications; based on IFR survey with +750 service robot OEMs, due to nascent state of industry might not be holistic
3.Assuming "swoosh-shaped" recovery in industrial robots, reaching pre-crisis peak # units shipped in 2023 again, albeit at ~7% lower prices; 2020 forecast based on IFR projection
4.Other Industrial incl. Glass, ceramic & mineral, paper, wood & furniture, agriculture, forestry, fishing, mining, construction, textiles
5.Other Services incl. professional cleaning, inspection & maintenance, exoskeletons, hospitality (~57m), public service, mobile guidance, information & telepresence
6.Farm/Field incl. mainly dairy/livestock farming (~75%), agriculture and mining

Source: IFR World Robotics 2014-20, Expert interviews

«Industry 4.0»

4: Industrial automation

Industrial automation focuses on the creation and application of technology, such as robots and information technologies, to automize and control manufacturing processes

Detailed Next

Focus segments

Industrial automation market is expected to grow at a CAGR of 9.2% until 2028

Growth segments

Value chain perspective:

1. **Machinery, robotics & control equipment**
2. **Tooling, components & sensors**
3. **Connectivity Platforms & Software**

Industry perspective:

Overall robotics market expected to grow by 13% p.a.

Service Robots (OEMs)

Warehousing & Logistics (CAGR 41% until 2023)

Medical (CAGR 24% until 2023)

Agriculture (CAGR 11% until 2023)

Disrupting technologies

Robotics
Advances in collaborative, mobile and autonomous robots are going to drive growth in these fields and enable fleet autonomy

IoT Platforms
Enables advanced use cases for robotics in the automation context, facilitate fleet management and increase data collection

Data & Analytics (incl. AI)
Enables autonomous learning and decision making

Microtechnology
Developing technologies in the nano scale is key for precision manufacturing and miniaturization

Vision & Sensing
Vision systems and sensors allow for better image interpretation and coordination of robots

Material Science & Engineering
Materials innovation enables development of soft robots, which are more adaptable and robust

Leading geographies

Japan

World's largest players in industrial automation, hubs in Tokyo and Osaka

Germany

Bavaria as hub for industrial automation companies

USA

Focus in Boston area, Bay Area and North Carolina

Denmark

Many companies located in Odense hub

China

Shenzhen as key region

Key players

Foreign players

Incumbents

FANUC, TERADYNE, KUKA, SIEMENS, OMRON, SCHUNK, UNIVERSAL ROBOTS, BALYO

Unicorns

Geek+, Horizon Robotics, LOCUS

Swiss players

Incumbents

ABB, STÄUBLI, swisslog (Member of the KUKA Group), Endress+Hauser

Other players

sevensense, AMYbotics, HUMARD, Medacta International

Source: Fortune Business Insights, IHS Industrial Automation Equipment, Interact Analysis, ARC, IFR World Robotics 2013-20, expert interviews, web research

Deep Dive Industrial Automation – Disrupting technologies

6 key technologies will shape the Robotics sector in coming years

Technology / Innovation	Rationale
Collaborative & mobile robots	Robots are becoming more intelligent and start to replace human tasks, especially in final assembly, working close next to humans which needs increased flexibility, intelligence and being able to react in-real time drives growth of mobile robots
Connectivity and IoT	Increased connectivity and intelligence creates need for platform for data management that gathers data from sensors and devices and conforms to more standard format to enable storage and analysis, also driving demand for applications to run analysis on the conformed data (e.g., monitoring board) and connectivity equipment
Data & Analytics (incl. AI)	Robotic tasks require advances in AI as unsupervised learning and fast decision making using data and forecasting abilities, natural semantic recognition in open environment, enabling effective communication, and in the long-run human emotion identification
Microtech-nology	The ability to develop technologies in the nano scale is key for precision manufacturing and miniaturization
Vision and Sensing	Robots and machines becoming more intelligent and development of 5G enables data to be processed in real time, driving need to navigate, analyze and act based on its' surroundings, driving growth of machine vison systems. Additionally, robots located closer to humans, increase need for image sensors to be able to detect human presence and slow down when human is near
Material Science & Engineering	Robots and machines are taking over human tasks, which requires them to be more adaptable. Use of new materials enables the further development of new types of robots, e.g., soft robot which are more robust and can adapt better to their surroundings

Source: Expert interviews, web research

5 ecosystems for investment promotion (where to play)

WHY are ecosystems important for economies?

WHAT are relevant ecosystems and its drivers?

WHERE should Switzerland focus?

- Prioritization of ecosystems
- **Deep Dive of selected ecosystems**

  Life Sciences

  Future of Food

  Future of Finance

  Industry 4.0

  Digital Tech

«Digital Tech»

5: Digital content

Rising tech companies focusing on the future of digital entertainment

Detailed Next

R&D activities in Switzerland

Focus segments

Switzerland has a strong R&D footprint for underlying technologies which will be important across following segments

Growth segments

1. **Social Networking Platforms**
   (10% CAGR until 2025[1])
2. **Video Games**
   (12.9% CAGR until 2025)
3. **Search Engines**
   (8% CAGR until 2025[1])
4. **Streaming Platforms**
   Music streaming (7% CAGR until 2025) and Video streaming (9% CAGR until 2025)

Disrupting technologies

Data & Analytics (incl. AI)
Advancements in AI e.g., natural language processing and image analysis will drive growth across all segments

Metaverse
Collective virtual open space, trough convergence of virtually enhanced physical & digital reality

Virtual & Augmented Reality
Creation of digital environment through VR/AR Software & Hardware, to visualize experiences

Data Compression
Enables reductions in storage hardware, data transmission time, and communication bandwidth

Emerging Technologies

Blockchain
Potential for new social networks based on blockchain technology

Leading geographies

USA

Strong tech hubs in greater Bay Area, Seattle and Austin areas

China

Digital technology hubs in Shenzhen, Beijing, Shanghai, Hangzhou

Japan

Strong tech hubs in Tokyo

Israel

Strong tech hub in Israel

Europe

Strong tech hubs in Berlin, Dublin, London and Benelux

Key players

Foreign players
Incumbents

Unicorns

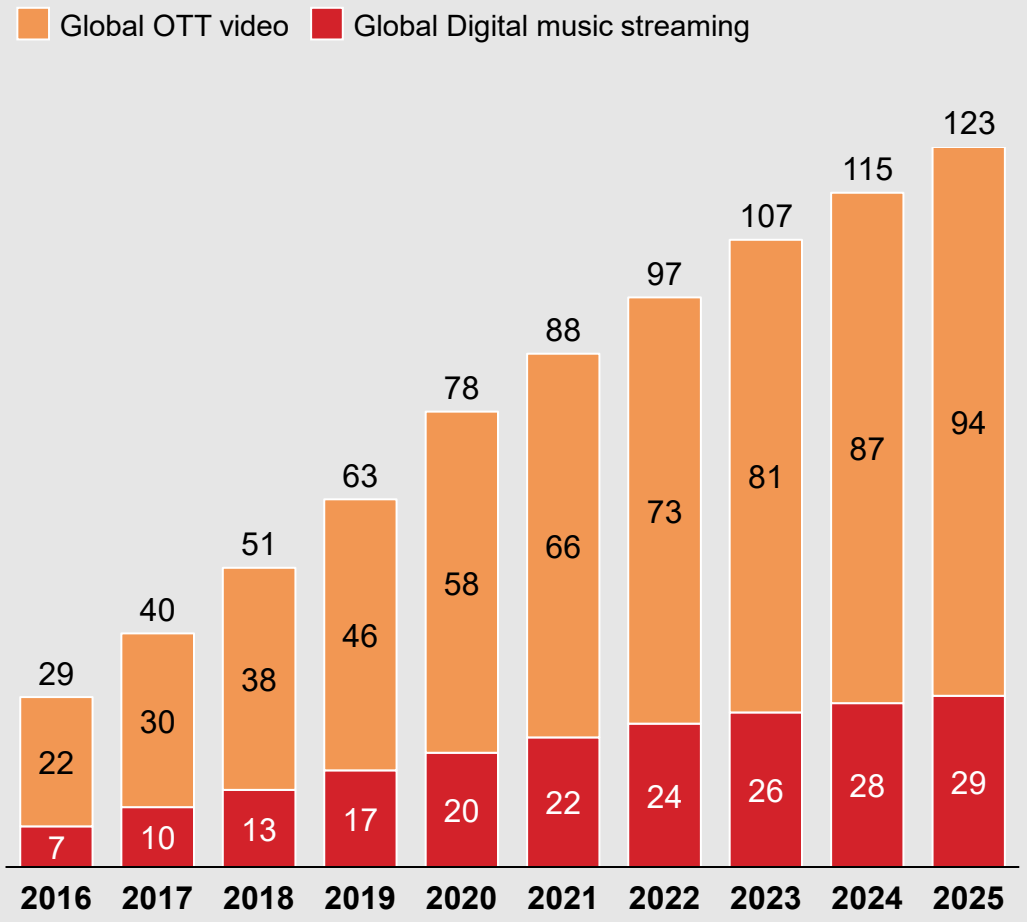
1. Based on advertising revenue

Source: Industry reports, Magna, expert interview, team analysis

Deep Dive
Digital content

Both streaming segments – video and music – are experiencing fast growth until 2025

Market Sizes, USD bn



CAGR 21-25

9.4%

7.2%

Value Chain segmentation

Content Creation

Production of digital content for each segment

Underlying technologies

Technologies that are relevant for production and distribution of the content across the different segments

Source: Industry reports, expert interview, team analysis

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facebook, YouTube, LinkedIn, Snapchat, Apple, Tencent, Google, Baidu 百度, SONY, ROBLOX, Nintendo, Activision Blizzard, Tencent Games, Spotify, NETFLIX, hulu, Magic Leap

Unicorns

nextdoor, IMPROBABLE, Rec Room, oculus, NIANTIC

1. Based on advertising revenue

Source: Industry reports, Magna, expert interview, team analysis

Deep Dive Digital content – Disrupting Technologies

Metaverse, VR, AR, Data & Analytics, data compression and Blockchain will disrupt the digital sphere in the future

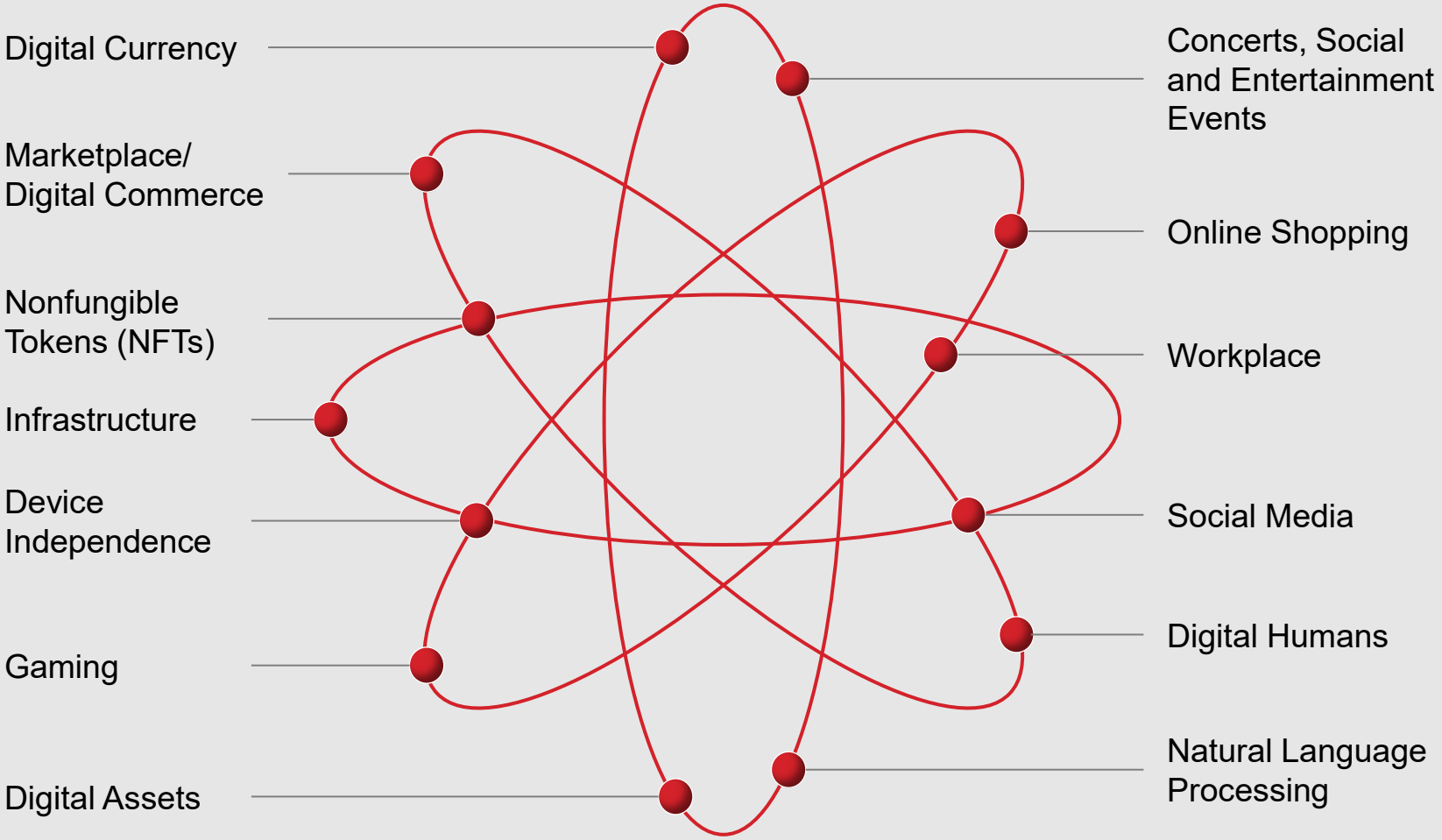
Technology/Innovation	Rationale
Metaverse	Metaverse is a collective virtual open space, created by the convergence of virtually enhanced physical and digital reality. It is physically persistent and provides enhanced immersive experiences
Virtual Reality	VR aims to replace the real world and create an entirely digital experience that mimics real-world situations. VR puts users inside virtual worlds, where visual sensation is controlled by the system
Augmented Reality	AR aims to supplement the real world and runs interactively in both 3D and real time. It is open and partly immersive as the user holds the sense of presence in the real world with digital “overlay
Data & Analytics (incl. AI)	Advancements in AI e.g., natural language processing and image analysis will drive growth across all focus segments
Data Compression	With a rising number of data points, data compression technologies becomes increasingly important to mitigate storage capacity concerns, which is especially important for audio and video files. These technologies allow for cost saving and productivity increases based on reduction of storage space and faster transfers while using less bandwidth
Blockchain	Blockchain platforms can help decrease intellectual property infringement in media and entertainment industry, reduce the use of intermediaries by enabling peer to peer sales and content distribution, streamline royalty payments and allow usage-based billing models for paid content

Source: Expert interviews, web search

Deep Dive Digital content - Metaverse

A metaverse could lead to a radical reallocation of our economy from “real” life into “virtual” life (e.g., consumer spending shifting to virtual cosmetics instead of “real” world fashion)

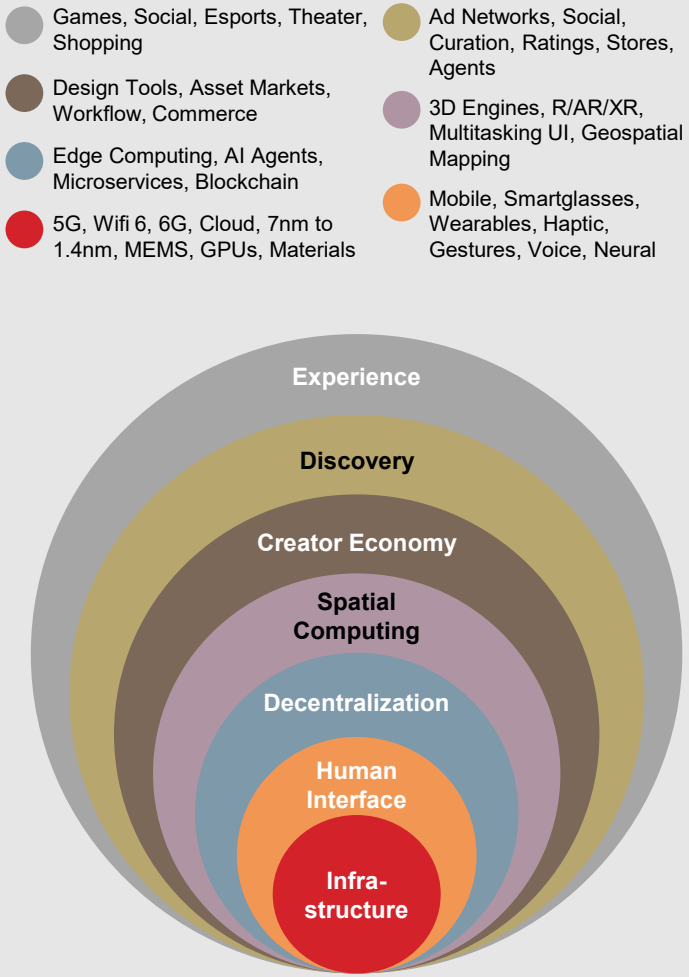
Elements of a Metaverse



Source: Press Search

Deep Dive Digital content - Metaverse

The metaverse consists of 7 different layers, that require different capabilities and technologies



- Experience is what we actually engage with: games, social experiences, live music, etc.
- Discovery is how people learn that an experience exists
- The Creator Economy is everything that helps creators make and monetize things for the metaverse: design tools, animation systems, graphics tools, monetization technologies, etc.
- Spatial Computing refers to the software that brings objects into 3D, computing into objects in the world, and allow us to interact with them. It includes 3D engines, gesture recognition, spatial mapping, and AI to support it
- Decentralization is everything that is moving more of the ecosystem to a permissionless, distributed and more democratized structure
- Human Interface refers to the hardware that helps us access the metaverse — everything from mobile devices to VR headsets to future technologies like advanced haptics and smart glasses
- Infrastructure is the semiconductors, material science, cloud computing and telecommunications networks that make it possible to construct any of the higher layers

Source: Press Search

Deep Dive Digital Content – VR/AR

AR/VR share similar technologies, but AR is more advanced in display, GPU, HMI, and has better prospect due to strong HMI feature

Superior technology requirement by AR compared to VR

		Virtual Reality (VR) 	Augmented Reality (AR) 
Technical definition		• Simulate the reality and **fully replace real world** with virtual information technology	• Technology that recognizes actual environment and provide augmented reality by **combining virtual object and information with reality**
Differential technology	**Display**	• **3D display technology**: Display 3D image lenses	• **Holographic display technology**: Use advanced optical projection systems to display on the holographic lenses the holographic images featuring high pixels and slow delay
	Image processing	• **High-performance GPU**[1]: Process high pixel images	• **Special GPU**: With holographic image processing units
	Human-computer interaction	• **External perception program**: Prevent users from colliding with external objects while wearing the helmet and protect user's safety • **Controller:** Tools for interactions in the virtual world such as handles	• **External perception program:** Obtain data from external environment and understand external reality world • **HMI**[2]: Rely on helmet to perceive user's posture, voice, and eye ball movement, without controller
Shared technology		• **Micro preceptor**: Track user's head movements • **Battery cells**: Power helmet and other hardware equipment • **3D sound effect:** Provide immersive sound effect experience for users wearing helmets • **Wireless connection:** Get connected to other equipment through wireless network and bluetooth • **Video camera**: Capture information on external environment • **Memory:** Store and process information	
Main product categories		• Independent VR helmet • Wire VR helmet • Mobile phone-based VR equipment	• Mobile phone-based AR • AR helmet/glasses • AR equipment for fixed space

1. Graphic Processing Unit
2. Human Machine Interface

Source: Expert interview, Analyst Report, team analysis

«Digital Tech»

5: Digital content

Rising tech companies focusing on the future of digital entertainment

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Key players

Foreign players
Incumbents

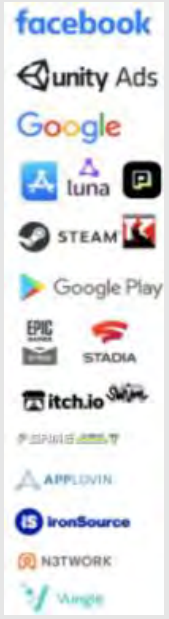
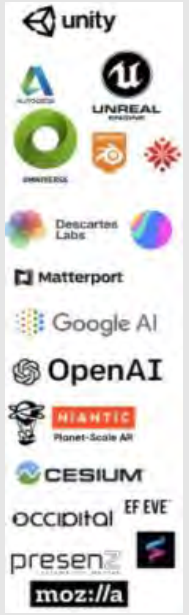
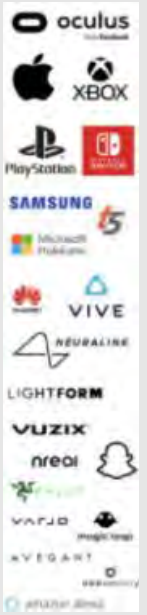
Unicorns

1. Based on advertising revenue

Source: Industry reports, Magna, expert interview, team analysis

Deep Dive
Digital content - Metaverse

Different players are active across the 7 layers of metaverse

Experience	Discovery	Creator Economy	Spatial Computing	Decentra-lize	Human Interface	Infrastructure
						

Source: Press Search

Deep Dive Digital Content – VR/AR

The VR/AR technology stack is crowded in the hardware space and software is currently concentrated among big tech players

Tech stack		Description	Impact of VR/AR	Example Providers
Content and Applications	**Content**	Rich media and programming designed for VR/AR	Will allow for new enterprise workflows and consumer engagement in a more rich, immersive medium	
	Applications	Program designed to manage AR/VR functionality		
Front-end software	**Operating System**	Layer that runs VR/AR specific applications	The software layer that end users will see must integrate fully into the user's reality and allow for environment changes and creation	
	Developer Tools	APIs and SDKs designed for VR/AR use		
Infra-structure Software	**API management**	Enable integration and with 3rd party solutions	Infrastructure plays the critical role of integrating the data from reality capture and ensuring real-time processing This layer serves as a glue between hardware and software and is important for minimizing latency	
	Data Processing	Management of data ingestion and real-time processing		
	Data Storage	Storage infrastructure to manage inbound data		
	Data Transferring	Transfer of data from device to cloud/edge		
Reality Capture	**Head mounted devices**	Links board components and display components for integrated experience	Several elements of hardware and software are needed to capture and/or recreate elements of reality Ultimately, this will include components of all 5 senses, primarily audio, touch, and sight	
	3D Audio	Provide immersive sound effect		
	Haptics	Provide life-like touch to end users		
	Display	3D Lenses and projected images into environment		
	Motion Sensors	Tracks user and environment movement and integrates into "reality"		
Components	**Memory**	DRAM/SSD focused on spatial memory of objects	Significant computing and memory power is needed to store virtual and augmented reality experiences and provide real-time rendering and compute	
	Processors	Special designed processors with emphasis on efficient color and video rendering		
	Graphics	Low latency graphics rendering		

Source: Industry reports; expert interviews

Content

Executive Summary – How to win

Shift in value creation	• **International companies increasingly rely on globalized R&D strategies** involving open innovation and geographically distributed activities in order to find the next “big wins” • **Approach of open innovation leads to an opportunity for Switzerland** to position itself as leading R&D platform with outstanding talent pool
Process to identify new corporate location	• **International companies commonly select or adjust their location footprint based on two steps:** 1) **Creating an initial set of options** for further consideration which is based on a high-level (qualitative) assessment – often locations that are top of mind of the executives in their respective industry 2) **In-depth analysis of options in consideration set based on attractiveness factors** which are often assessed quantitatively and with the support of experts (externally and internally) • **Therefore, becoming part of the consideration set within prioritized ecosystems and continuously (re)evaluating attractiveness factors** based on an exchange with executives is important for Switzerland
Needs of multinational companies and global perception Switzerland	• **There are nine factors which are important to attract international companies:** 1) Talent availability 2) Quality of life 3) Promoting laws & regulation 4) Access to capital (incl. venture capital) 5) Collaboration with leading universities 6) Presence of industry leaders and existing ecosystem 7) Tax environment 8) Access to market 9) Infrastructure • **Relevance of attractiveness factors varies between ecosystems** – talent availability has been identified as a game changer across ecosystems • **The main strengths of Switzerland** perceived by global organizations are a high quality of life, a favorable tax environment in international comparison, regulatory reliability (e.g., strong IP protection), collaboration with leading universities (particularly ETH/EPFL as globally known lighthouse cases) and existing presence of ecosystems – however, external awareness of ecosystems varies significantly (very high awareness in Life Sciences and wealth & asset management vs. low awareness in Digital Tech and Future of Food). Switzerland can improve its global perception by increasing awareness of existing strengths • **Major development areas of Switzerland** perceived by global organizations are challenges in talent availability (driven by complex inbound mobility and low absolute # of STEM graduates) and lack of access to capital, esp. venture capital for start-ups. Switzerland needs to define targeted actions to close gaps – especially talent availability is critical due to its very high relevance for foreign companies in selecting locations
Key regions in prioritized ecosystems	• **Some global regions are characterized by a high density of foreign innovation companies** (multinationals, SME’s and fast growing start-ups) with a potential to establish their headquarters, R&D center or high-tech production in Europe/CH • **Switzerland could potentially increase its presence in such key regions** which are Boston, Tokyo, Medicon Valley, Israel, Benelux, China (Shanghai, Shenzen, Beijing, etc.), Bay area, Seattle, Bavaria, New York, London, and Hong Kong (not exhaustive)

Sources of insight

Insights of phase *'How to win'* were developed through expert interviews, case studies, and desk & press research

Sources of insights

Expert interviews

25 deep-dive interviews with global industry experts were conducted – experts have significant knowledge and experience in the prioritized ecosystems across Europe, North America and Asia

- Life Sciences: 5 interviews
- Digital Tech: 4 interviews
- Future of Food: 6 interviews
- Future of Finance: 4 interviews
- Industry 4.0: 6 interviews

Case studies

Case studies of international companies answering the following questions were included:

- How does the location selection process look like?
- How does the process of innovation and value creation shift in recent years?

Desk & press research

Desk & press research were conducted to validate and support statements of industry experts (e.g., public rankings for quality of life, company websites to analyze R&D relocation moves, etc.)

Approach investment promotion Switzerland (how to win)

Shift in value creation of international companies

Swiss location attractiveness

- Process of location selection
- Attractiviness factors
- Global perspection of Switzerland
- Deep dive: Headquarters

Key regions by ecosystem

Change in Value Chain – R&D and Innovation

Global R&D and innovation activities of multinational companies are changing significantly from closed to open innovation – significant opportunity for Switzerland

From the past…

Isolated and inhouse R&D functions: research is often not close enough to customers to understand their needs and little internal collaboration with other departments

Strong geographical home base: many companies spend most of their R&D budget in their home country

…to today and the future

Open / external innovation & co-creation: involving outside resources in innovation process 1

- Collaboration with universities
- Strategic innovation and R&D partnerships with other players or suppliers in ecosystems e.g., in form of joint innovation hubs
- Incorporating customers through co-creation
- Buying access to innovation through M&A of companies/start-ups

Building in-house accelerators: building up innovative start-ups and ideas in an entrepreneurial environment by giving them mentorship and resources

Increased outsourcing: complete outsourcing of R&D to other partners

Global innovation unit footprint: building research centers outside of home country to increase proximity to manufacturing sites, customers, and to access talent & expertise 2

Opportunity for Switzerland: International companies increasingly rely on globalized R&D strategies involving open innovation and geographically distributed activities in order to find the next “big wins” – great opportunity for Switzerland to position as leading R&D platform with outstanding talent

Source: Market research, expert interviews

1: Open Innovation & Co-creation

Innovation hubs to capture innovation opportunities and talents from the external world, with multiple approaches

Open challenge

Public engagement of external stakeholders (e.g., start-ups, research, students) to identify innovative solutions to tackle strategic topics

Venture investment

Equity investments in innovative start-ups and technology companies, often in high growth areas, to get early access to innovation with lower risk

Brand building

Launch of new brands, to address emerging consumer trends leveraging agile methodologies to accelerate time-to-market

Mondelez SnackFutures is an innovation labs focused on next generation snacks and working with three models: **"start-up engagement"** (CoLab program) focused on mentorship and capability building support; "venture" to invest in emerging brands and early-stage entrepreneurs; **"invention and reinvention"** to launch new brands in strategic categories or reposition existing ones

Nestlé R&D Accelerator besides launching **new brands and products** with an agile innovation model (e.g., Wunda, Vuna), promotes **open challenges** on strategic business opportunities for Nestlé (e.g., plant-based liquid meals, craft beverages, kitchenware 2.0, microbiome) to engage external stakeholders to develop innovative solutions

Inventages Venture Capital is Nestlé's corporate VC selectively investing on healthcare and food start-ups

P&G Venture Studio is an innovation hub **accelerating and investing** early-stage start-ups, openly sharing the innovation agenda of strategic topics and promoting **innovation challenges**; it also promotes the development of **new solutions and brands** to address such challenges (e.g., chronic skincare, non-toxic insect control)

Mars Companion and **Unilever Ventures** are corporate VC arms playing a central role in the growth strategy into new categories (e.g., pet care)

Core open innovation components

Often part of open innovation hubs and run with agile innovation methodologies

Source: Company websites, annual reports, press releases, web search

AS OF AUGUST 2021

1: Open Innovation & Co-creation

Nestlé R&D Accelerator operates 12 locations and undertook 80+ projects in the last 3 years

Nestlé R&D Accelerator is a **network of innovation hubs** that brings together Nestlé scientists, students, recent graduates and start-ups to **accelerate the development of innovative products and systems** in the food and beverage sectors. The approach is applied to both **acquire external innovations** as well as to **accelerate disruptive innovations within the existing brand portfolio**

Source: company website, annual reports, press releases, web search

AS OF JULY 2021

1: Open Innovation & Co-creation

M&A is an innovation lever to rapidly bridge portfolio gaps – often this can lead to further anchoring in the respective country (e.g. Facebook in Zurich with the acquisition of Zurich Eye in 2019)

acquisitions 2016-2021[1]

Unilever	33
Nestlé	32
MARS	28
Coca-Cola	18
PEPSICO	14
Mondelēz International	9
DANONE	7
KraftHeinz	6
P&G	6
HERSHEY'S	5

Selected acquisition

Unilever	Beauty and personal care (11)	DOLLAR SHAVE CLUB, PAULA'S CHOICE SKINCARE, welly
	Food, snacks and ice cream (8)	THE VEGETARIAN BUTCHER, mãe terra, BETTY ICE
	Homecare and fabric care (6)	Quala, Blueair
	Healthcare and nutrition (5)	OLLY, LIQUID I.V., SMARTY PANTS vitamins
Nestlé	Healthcare and nutrition (14)	aimmune, persona, nuun
	Food, snacks and ice cream (7)	SWEET EARTH, TERRAFER, GREEN & BLACK'S
	Beverage (5)	BLUE BOTTLE COFFEE, CHAMELEON COLD-BREW, essentia
	E-commerce (3)	freshly, Simply Cook, Mindful Chef
MARS	Petcare (25)	VCA, BLACKS VETS, pethospice
	Nutrition and snacks (3)	foodspring, KIND, NATURE'S BAKERY

1. As of July 2021

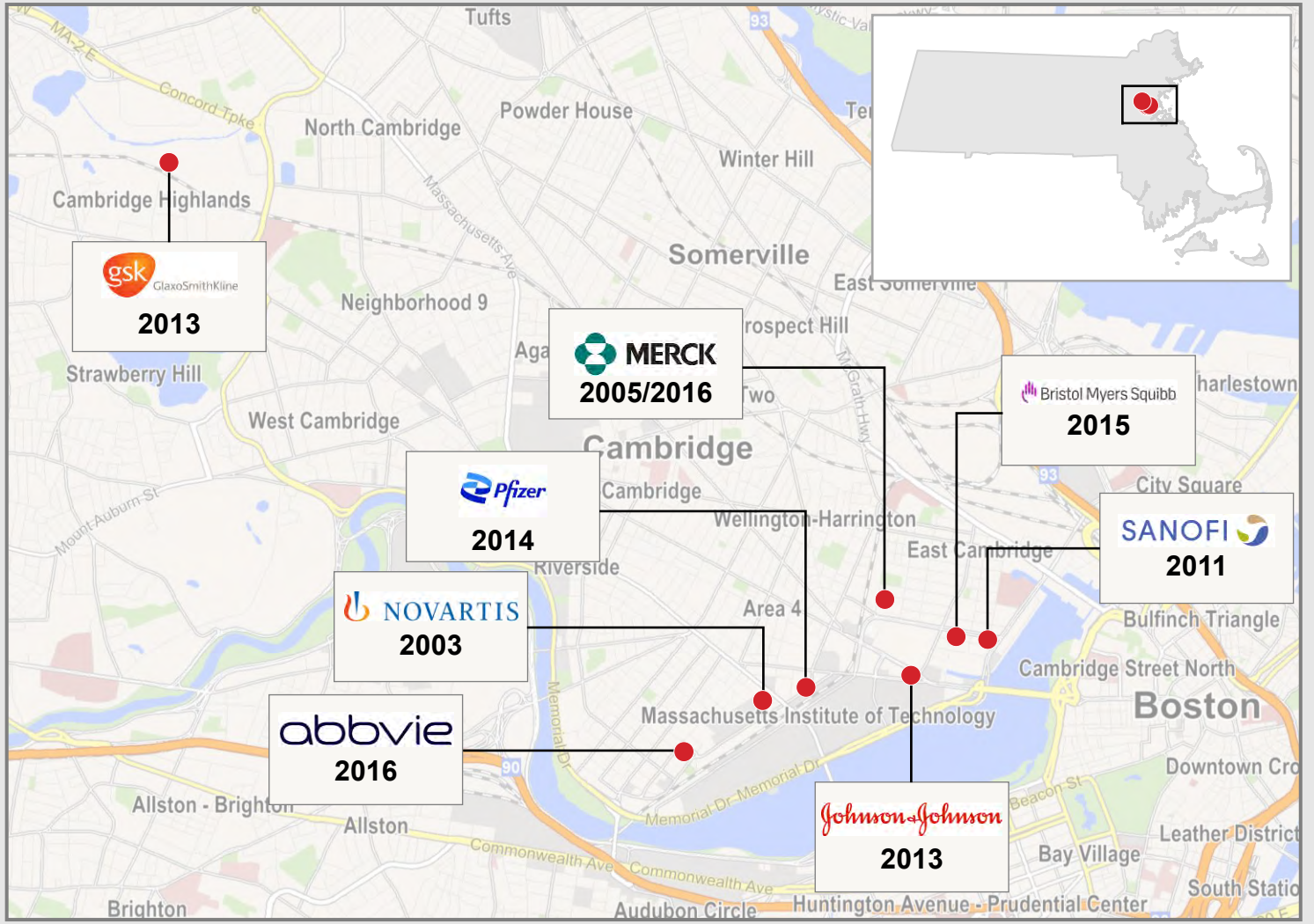
Source: company website, annual reports, press releases, web search

NOT EXHAUSTIVE

2. Global innovation unit footprint

Top pharma companies continuously increase their global innovation footprint by actively choosing locations with highest density of talent and leading universities – location selection is often outside their “home” country

XXX Year moved



Approach investment promotion Switzerland (how to win)

Shift in value creation of international companies

Swiss location attractiveness

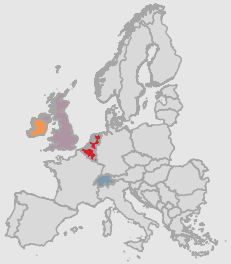
- **Process of location selection**
- Attractiviness factors
- Global perspection of Switzerland
- Deep dive: Headquarters

Key regions by ecosystem

Process to identify new corporate location

International companies commonly select or adjust their location footprint based on two steps

Creating a consideration set



First step: creating an initial set of options for further consideration which is based on a high-level (qualitative) assessment – **often locations that are top of mind** of the executives in their respective industry

Being top of mind of executives is highly important – Switzerland needs to become part of the consideration set within the prioritized ecosystems

In-depth analysis based on attractiveness factors

Second step: in-depth analysis of option in consideration set based on attractiveness factors which are often **assessed quantitatively** and with the support of **experts** (externally and internally)

Switzerland must continuously seek exchange with the executives from international companies to evaluate which factors are important along the ecosystems

ANONYMIZED CASE EXAMPLE

Process to identify new corporate location – Case example HQ

International Biotech company conducted the following process to identify a European HQ

1 Creating a consideration set

Benchmark industry peers and identify **European commercial office locations** of selected biotech companies in Europe

2 In-depth analysis based on attractiveness factors

Assess most popular locations for commercial office along important **factors of attractiveness**

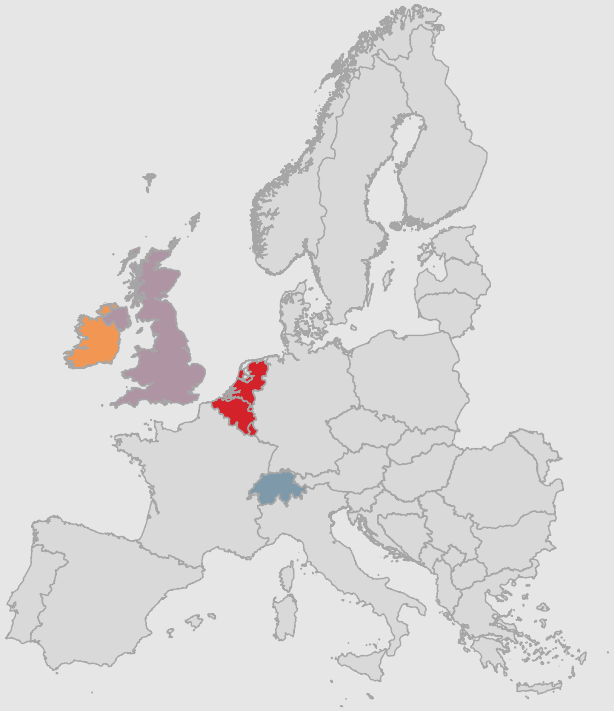
Review most important **selection criteria for COMPANY** against eligible options

ANONYMIZED CASE EXAMPLE

1. Benchmark of industry peers

Benchmark industry peers and identify European commercial office locations of selected biotech companies in Europe

European commercial office[1] locations of selected biotech companies[2]



United Kingdom

Intercept, Amicus Therapeutics, VERTEX, GILEAD

Ireland

BIOMARIN, REGENERON science to medicine

BeNeLux

argenx, OXURION, Galápagos, Kiadis pharma

Switzerland

Zurich/Zug

ALEXION, Shire, AMGEN, agios, Alnylam, bluebirdbio, ATARA BIO, Biogen, Kuros Biosciences, MOLECULAR partners

Basel

ACTELION, basilea PHARMACEUTICA, VectivBio, idorsia

Other

ADC THERAPEUTICS, AC Immune

1 Or first move location for Europe expansion | 2 Not exhaustive

Source: Report «Switzerland Wake Up», Capital IQ, web search

ANONYMIZED CASE EXAMPLE

2. Attractivity Assessment

Assess most popular locations for commercial office along important factors of attractiveness

Ireland Switzerland UK Netherlands Luxembourg

Assessment of most popular locations along attractiveness factors for commercial offices

Attractiveness factor	Overall performance factors					Source
	Best				*Worst*	
Talent availability	CH	UK	NL	IE	LU	Interviews, eurostat
Infrastructure	CH	NL	UK	LU	IE	WORLD ECONOMIC FORUM
Quality of life	CH	NL	LU	UK	IE	Expat Insider The InterNations Survey
European market access	IE	NL	LU	CH	UK	Interviews
Labor cost / salary level	UK	IE	NL	CH	LU	OECD

Note: Assessment conducted before Brexit

ANONYMIZED CASE EXAMPLE

2. Review eligible options for decision making

Review most important selection criteria against eligible options

Key considerations for COMPANY's HQ locations		COUNTRY 1	COUNTRY 2	Assessment
Infrastructure	**Leverage existing infrastructure** and COMPANY facility / network	✗	✓	**Global headquarters located in COUNTRY 2** with existing infrastructure and facilities **Headquarters functions** such as finance, TechOps **located in COUNTRY 2**
Speed	Aim for **fast establishment of commercial HQ** to ensure successful accelerated roll-out	✓	✓	**Legal entity established** in both jurisdictions with tax and payroll functions set up in both countries
Talent	Have access to valuable talent pool and offer environment with high quality of lifestyle for employees to **retain and attract top talent**	✓	✗	Large talent pool available **in COUNTRY 1** due to • High **density of biotechs** in close proximity • Presence of **HQs of Pharma companies** • Access to university graduates of leading universities • Potentially higher talent attrition due to outside options
Local language capabilities	Ensure **seamless communication** with priority countries	✓	✗	COUNTRY 1 located amidst Europe with **multilingual talent**
Geographic location	Aim for geographic and economic proximity to priority countries to **maximize travel efficiency**	✓	✗	**COUNTRY 1 with central location** and short distance to key markets offering great logistics access and **good ground transportation connection** to adjacent countries
Tax implications				Detailed assessment to be made based on legal entity structure of company

ANONYMIZED CASE EXAMPLE

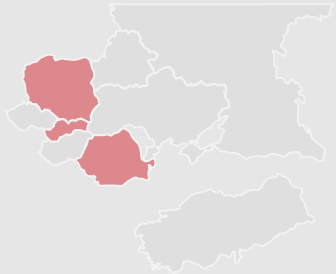
Process to identify new corporate location – Case example software center

Central European software company was looking for a new location in order to source new talent

1

Creating a consideration set

I. Country selection

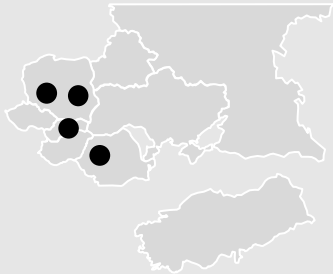


- Define target for the expansion of global footprint (regional focus, cost cutting, talent acquisition, etc.)
- Create a considerations set for expansion based on high-level (qualitative analysis) or executive brainstorming

2 *Detailed next*

In-depth analysis based on attractiveness factors

II. Scan locations



- Specific list of criteria and weighting factor for country selection
- Application of knock-out criteria, esp. regarding political stability and deeply rooted corruption
- Identify long-list of potential locations for further in-depth review

III. Prioritize locations

- Conduct in-depth review of locations (e.g., desk research, country specific data, interaction with local chambers, …)
- Prioritize locations based on company specific evaluation criteria, e.g.,
  - Availability of experienced talent
  - Proximity to customers/ research

Prepare decision making

ANONYMIZED CASE EXAMPLE

2. In-depth analysis of specific locations (1/2)

Analysis of relevant criteria to identify talent availability, existing ecosystem and start-up activity

	Software talent		Presence of big technology players		Overall start-up Scene	Presence of cloud late stage players	
City, Country	Number of stack overflow users with high reputation	Number of top engineering universities	Number of local engineers at top tech companies	Number of SaaS companies that have a HQ in the city	Number of start-ups founded after 2007	Number of Forbes top 100 rising world cloud companies	Score
Munich, Germany	81	4	3,500	81	943	1	4.1
Berlin, Germany	251	7	2,000	211	3,447	0	4.0
Amsterdam, Netherlands	94	2	5,000	107	3,649	0	3.8
Warsaw, Poland	64	2	1,000	47	663	0	3.0
Prague, Czech Republic	69	2	1,000	29	500	0	2.8
Vienna, Austria	59	1	565	36	707	0	2.5
Frankfurt, Germany	28	1	2,500	24	370	0	2.4
Budapest, Hungary	42	1	1,000	13	649	0	2.2
Athens, Greece	33	3	265	15	367	0	2.0
Cologne, Germany	24	2	712	20	297	0	2.0
Stuttgart, Germany	19	8	990	9	246	0	1.9
Bratislava, Slovakia	15	0	465	8	261	0	1.0
Dusseldorf, Germany	1	0	458	11	227	0	0.9

ANONYMIZED CASE EXAMPLE

2. In-depth analysis of specific locations (2/2)

Analysis of relevant infrastructure details, availability of potential employees and economic indicators to evaluate feasibility and fit of the location

Bucharest – region profile

Positive | Neutral | Negative

Remarks

- Indication from chamber of commerce that generally, talent availability is very limited in Bucharest and other regions

Logistics & Infrastructure	**Direct flights available**	**Travel time from City 1**	**Flight City 1 >OTP**	**Best connection to OTP**	
	Yes	2h	34 flights weekly	Frequent connections	
	Road transport time	**Internet speed**	**Flight OTP>City 1**	**Best connection to OTP**	
	32h 30m	119 Mbps	34 flights weekly	Frequent connections	
HR market	**Unemployment rate,** 2017	**People living in the regions,** T	**Number of technical universities**		
	1, 4%	1.800	2		
	Labor cost	**Unskilled**	**Skilled**	**Engineer**	**University graduates in engineering**
	€/h, 2017	4,3	5,7	9,5	~2.400
Industrial base	**Global players present,** not exhaustive		**Manufacturing part of GDP** (Country level)		
	Company 1, Company 2, Company 3		22%		
	Top recent investments, not exhaustive		**Share of relevant manufacturing categories of total GDP,** % (Country level)		
	No significant investment identified in press search		6,2 %		

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Key regions by ecosystem

NOT EXHAUSTIVE

Needs of multinational companies

The following factors are important to attract companies

Talent availability	Strong local labor market with sizeable pool of highly qualified talents, particularly with a science and technology focused education
Quality of life	Degree of general well-being of citizens and society, including factors such as life satisfaction, physical health, etc.
Promoting laws & regulation	Supporting policies established by the government to foster the growth of companies
Access to capital (incl. venture capital)	Ease of access to funding opportunities to finance growth of early-stage companies and spin-offs
Collaboration with leading universities	Strong academic research environment to fuel R&D partnerships and external innovation networks
Presence of industry leaders and existing ecosystem	Proximity of leading companies and other relevant stakeholders that enable industry partnerships, knowledge spillovers, and an increase in turnover
Tax environment	Favorable tax conditions and financial incentives provided to companies
Access to market	Large market size in terms of maximum total sales / customers for relevant business of company
Infrastructure	Basic national/local facilities, technologies and institutions required as prerequisites for the operation of a company (e.g., power supplies, 5G connection, fiber optic network, digitalized administration, hospitals with clinical trial capabilities, etc.)

Further factors can be included in assessment e.g. diversity and inclusion, trust in institutions, political tolerance and stability, labor costs and salary levels

Needs of multinational companies – focus R&D / Innovation

The significance of the locational attractiveness factors depends on the ecosystem

Detailed next

Low importance | Somewhat important | Important | Very important | Game changer

	Life Sciences[2]	Future of Food	Future of Finance	Industry 4.0[2]	Digital Tech
	Pharma & Bio-tech, MedTech, CDMO, Digital Health	Food science, AgTech, Consumer Tech, etc.	Sustainable investing, financial SW, digital assets	Machinery, robotics & control equipm., tooling & sensors, etc.	Social platforms, gaming, search engines, streaming platforms
Talent availability	Game changer	Game changer	Game changer	Game changer	Game changer
Quality of life	Very important	Very imporant	Very important	Very important	Very important
Promoting laws & regulation	Important	Very important	Game changer	Low importance	Very important
Access to capital (incl. venture capital)	Game changer	Important[1]	Somewhat important[1]	Important[1]	Somewhat important[1]
Collaboration with leading universities	Important	Very important	Somewhat important	Very important	Important
Presence of industry leaders and existing ecosystem	Very important	Important	Important	Somewhat important	Somewhat important
Tax environment	Important	Somewhat important	Very important	Somewhat important	Somewhat important
Access to market	Somewhat important	Low importance	Important	Somewhat important	Low importance
Infrastructure	Hygiene factor	Hygiene factor	Hygiene factor	Hygiene factor	Hygiene factor

1. Only important for start-ups
2. Differences for a production facility: Subsidies (tax incentives), infrastructure (strong supply chain) and access to market / customers are more important while collaboration with leading universities loses relevance

Source: Expert interviews

NOT EXHAUSTIVE

Deep dive talent availability – 6 factors

Companies consider graduates in selected fields, university rankings, educational attainment, availability of occupations and industries as well as talent mobility when evaluating talent availability

Factors	Definition
Number of graduates in selected fields	# of graduates on various levels (Bachelor's, Master's, PhD) in specific fields (e.g. robotics, STEM)
Educational attainment	Percent population 18+ years of age that have an advanced degree (Bachelor's, Master's, PhD)
Universities rank	Number of universities that rank among the best universities (globally or in Europe)
Employment in selected occupations	Employment in selected occupations (e.g. mechanical engineers) – absolute and as percentage of population
Employment in selected industry	Employment in selected industry (e.g. financial and business services sector) – absolute and as percentage of population
Talent mobility	Ability to attract and retain talent from abroad (e.g. a company would like to move own talent from the US to a new established innovation center)

Switzerland needs to ensure good data availability and quality in those dimensions because they are essential for companies to assess the attractiveness of talent availability

Source: Market research, expert interviews

NOT EXHAUSTIVE

Deep dive – quality of life

Companies consider the following factors when assessing the quality of life of a region – however, often companies directly rely on provided rankings

Factors	Definition
Cost of living	Cost indices for various expenditure categories, including e.g., food & retail expenditures, housing, utilities, transportation, vehicle insurance
Health	Life expectancy, health status (e.g. healthy life years, BMI) of population, percentage of population with some type of health insurance, access to healthcare
Leisure activities and social interactions	Number of restaurants, bars, museum and historical sites, performing arts and sports attractions
Mean travel time to work	Average time to travel to work location
Safety	Protection from any situation that puts a person's physical security at risk, such as crime, accidents or natural disasters
Natural and Living Environment	Degree of pollution, access to green and recreation areas

Switzerland needs to ensure good data availability and awareness in those dimensions because they are essential for companies to assess the attractiveness of quality of life

Source: Eurostat, internal reports

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Key regions by ecosystem

Global perception of Switzerland - strengths

Summary of major strengths based on expert interviews

Quality of life	**Quality of life in Switzerland is viewed very positively** by executives and older talent with family which is a very important attractiveness factor (e.g. quality of life is increasing attractiveness of Austin as a leading US Digital Tech ecosystem)
Tax environment	**Favorable tax environment in international comparison** with an average of 15% across cantons – however high uncertainty how the global minimum tax rate will affect Switzerland and its attractiveness
Promoting laws & regulation	**Regulatory reliability is perceived as one of Switzerland's strengths** (e.g. very strong IP protection), however it appears to be eroding given uncertainties about international agreements (e.g. relationship with the EU)
Presence of industry leaders and existing ecosystem	**Switzerland has a strong presence in all prioritized ecosystems which vary in degree** – however awareness global awareness differs significantly (very high awareness in Life Sciences and wealth & asset management vs. low awareness in Digital Tech and Future of Food)
Collaboration with universities	**Switzerland is home to leading universities –** ETH and EPFL are ranked within the global top universities and are known to collaborate closely with companies (e.g. "RobotX" - partnership between ABB and ETH in robotics)

Switzerland needs to improve its global perception by highlighting Swiss strengths

Global perception of Switzerland – development areas

Summary of major development areas based on expert interviews

Talent availability	**Inbound mobility of critical Non-EU talent is very complex** lowering total talent availability and increasing bureaucratic burden for companies to setup projects with an international footprint **Absolute number of STEM graduates is low** (graduates per annum: ~21,000 from CH vs. ~ 200,000 from UK[2]) and cost of talent is high compared to other European markets – STEM talent pool is very critical given high demand in all prioritized ecosystems **Transparency of critical data (esp. on talent availability) is key in location selection process** since international companies rely on international databases and easily accessible information – bad data transparency can lead to exclusion of Switzerland in further consideration)
Access to capital	**Start-ups have higher funding challenges due to limited venture capital compared to other locations** (e.g. Silicon Valley, Boston, Tel Aviv) – start-ups in the US have much more later stage funding and exit options (IPO, direct listing, SPACs, etc.) combined with a better ratio of later stage to seed & early stage investments[1]
Market access *Less important*	**Access to other markets within Europe is often complex** due to the necessity to deal with multiple regulations (EU and Switzerland)

Switzerland needs to define targeted actions to close gaps in development areas

1. Ratio from later stage to seed & early stage investments higher in the US according to Pitchbook data from 2021 (USD 105 bn seed & early stage vs. USD 237 bn later stage in the USA; USD 2 bn seed & early stage USD 2 bn later stage in Switzerland)
2. Source: Eurostat - Figures used by "Wake up Switzerland" report

NOT EXHAUSTIVE

Deep dive talent availability – Swiss assessment

Switzerland has a comparatively low number of STEM graduates and depends on pre-defined quotas by the Federal Council to allow non-EU citizens access to its labor market

Development areas

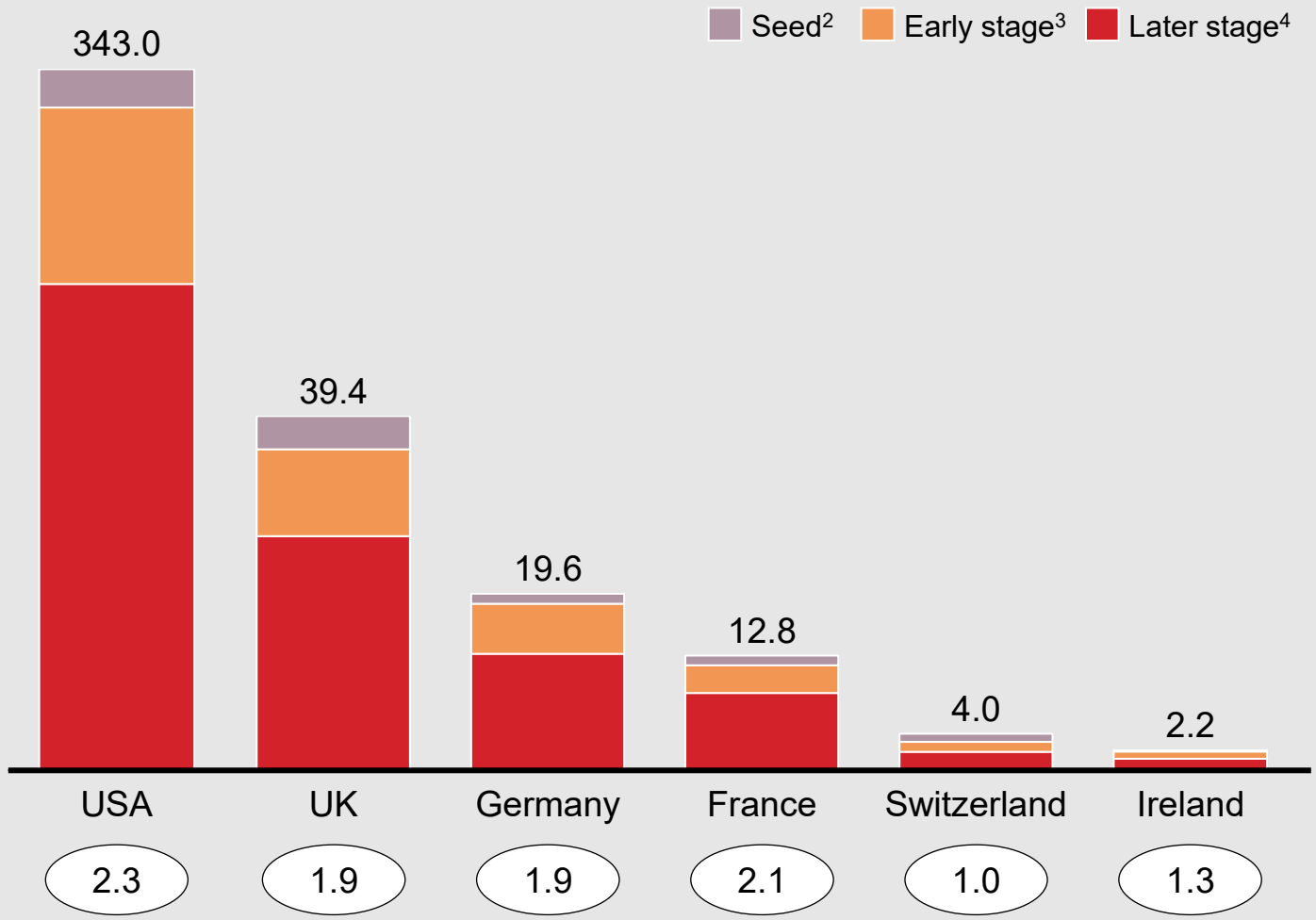
Factors	Definition	Switzerland's performance
Number of graduates in selected fields	# of graduates on various levels (Bachelor's, Master's, PhD) in specific fields (e.g. robotics, STEM)	• **Relatively low number of STEM graduates** - 21,000 in Switzerland vs. 200,000 in the UK per year • **25% of tertiary graduates in Switzerland in 2019 were STEM-students**, compared to 36% in Germany
Educational attainment	Percent population 18+ years of age that have an advanced degree (Bachelor's, Master's, PhD)	• **45% of 25-64 year-olds in Switzerland have a tertiary attainment in 2020** (22% hold a bachelor's degree, 20% a master's degree and 3% a PHD), ranking on 11th place according to OECD and excelling the OECD average of 40% and EU average of 37%
Universities rank	Number of universities that rank among the best universities (globally or in Europe)	• **2 universities (ETH and EPFL) in top 15** of global universities • 5 universities (ETH, EPFL, University of Zurich, University of Geneva and University of Bern) in top 50 of Europe
Employment in selected occupations	Employment in selected occupations (e.g. mechanical engineers) – absolute and as percentage of population	• 95,000 FTEs in Life Science sector in 2019, 1.8% of employed population • 240,000 jobs in food and nutrition sector, 4.5% of employed population • 195,000 FTEs in Financial Services sector, 3.7% of employed population • 96,000 jobs in Mechanical Engineering, 1.8% of employed population • 120,000 FTEs in ICT sector, 2.3% of employed population
Employment in selected industry	Employment in selected industry (e.g. financial and business services sector) – absolute and as percentage of population	
Talent mobility	Ability to attract and retain talent from abroad (e.g. a company would like to move own talent from the US to a new established innovation center)	• Set annual quotas by the Federal Council for immigration of non-EU citizens lead to bureaucratic and time-consuming process in which **companies must prove that they cannot find a suitable employee in local labor market** for the concerning position

Source: UNESCO, Eurostat - Figures used by "Wake up Switzerland" report, OECD, QS World University Rankings 2022, Staatssekretariat für Migration

Deep Dive – access to capital

The ratio of late stage to seed & early stage stage is more pronounced in other countries than in Switzerland, suggesting that capital is more accessible for late-stage companies there

Venture Capital investments[1] in 2021 in USD billion



1. Excluding Restart angel, Restart Early Stage VC, Restart Later Stage VC, Grants
2. Including Pre/Accelerator/Incubator
3. Usually a Series A to Series B financing deal and occurred within 5 years of the company's founding date
4. Usually Series B to Series Z+ rounds and/or occurred more than 5 years after the company's founding date

Source: Pitchbook

Global perception of Switzerland

Talent availability and access to capital need to be improved while strong performances in quality of life, tax environment, promoting laws & regulations, and collaborations with universities need to be promoted

Development areas | Communication areas | Importance for ecosystems ○○○ | Swiss Performance ●●○

	Swiss performance	Rationale
Talent availability	●●●●○	• Leading universities are present and develop highly skilled global talent, but absolute number of STEM graduates compared to other European markets is low • Switzerland is perceived to be very attractive for external talent because of its high quality of life, income level and diversity of career paths available • Inbound mobility of critical Non-EU talent is very complex, reducing talent availability • High childcare costs prevent female talent from pursuing own career options
Quality of life	●●●●	• Switzerland ranks among the best places to live in the world (e.g. Numbeo ranks Switzerland as #1 and usnews ranks Switzerland as #5 globally)
Tax environment	●●○	• Favorable tax environment in international comparison with an average of 15% across cantons – increasing uncertainty how the global minimum tax rate will affect Switzerland and its attractiveness • Patent box offers companies subject to Swiss taxes an attractive option to receive privileged tax treatments on income from Swiss or foreign patents when conducting R&D activities in Switzerland
Promoting laws & regulation	●●●○	• Regulatory reliability is perceived as one of Switzerland's strengths, however it appears to be eroding given uncertainties about international agreements (e.g. relationship with the EU) • Strict immigration policies hinder international projects and reduce attractiveness
Access to capital (incl. venture capital)	●○○	• Switzerland is not perceived as a start-up hot spot despite leading universities • Start-ups have higher funding challenges compared to other locations (e.g. Silicon Valley, Boston, Tel Aviv) due to limited venture capital – especially later stage investments are critical
Presence of industry leaders and existing ecosystem	●●○	• Switzerland is known to be the home base of an extraordinary number of multinational companies • Ecosystem between academia and business is strong but presence of venture capital and integration of young companies into ecosystem often limited
Collaboration with universities	●●●	• Switzerland perceived as great place for multinational companies to collaborate with leading universities – in particular ETH and EPFL are well-known for many partnerships and outstanding research
Infrastructure	Hygiene factor	• Very well-developed infrastructure in Switzerland – e.g. Switzerland is with its central European position well connected to strategic locations making it easy for international companies to sustain close ties
Access to market	●○	• Switzerland is a rather small market due to its geographical size and its number of inhabitants • Access to other markets within Europe is good but there is often an increased complexity due to the necessity to deal with multiple regulations (EU and Switzerland)
Awareness of Switzerland	**Medium**	• Switzerland is very prominent for Life Sciences, Wealth & Asset management, and partially Industry 4.0 – however, it has significant awareness opportunities for Digital Tech and Future of Food

Source: Web research, Expert interviews

Global perception of Switzerland – Life Sciences

Switzerland has a strong position in Life Science through strong presence of businesses and academia but has potential to improve in support for young innovative companies

Development areas | Communication areas | Importance for ecosystems ○○○ | Swiss Performance ●●○

	Swiss performance	Rationale
Talent availability	●●●●●	• Switzerland has very good local talent availability due to strong universities for Life Science (ETH, EPFL, University of Zurich, Bern, Basel and Lausanne) • Only Boston ecosystem is perceived as stronger in an international comparison
Tax environment	●●●	• Tax incentives are important, although not the key consideration factor in Life Sciences • Overall, Switzerland is perceived as very tax friendly – e.g. patent box is an effective measure to promote existing R&D activities in Switzerland (overarching across ecosystems)
Promoting laws & regulation	●●○	• Switzerland is on par with other European countries with a good regulatory environment for Life Science (e.g. strong IP protection) regulated by swissmedic and FOPH who are internationally renowned authorities • Compared to other Life Science hot spots regulations are sometimes stricter and lead to bureaucratic hurdles (e.g. digital health regulation in Israel is more sophisticated)
Access to capital (incl. venture capital)	●●○○○	• High importance of funding only for innovative young companies • Significant opportunity to transfer Switzerland into a global Biotech hub. Important enabler to achieve this is access to capital for young innovative companies – other hubs (e.g. Boston, Tel Aviv) have significantly better funding opportunities
Presence of industry leaders and existing ecosystem	●●●○	• Switzerland has good presence of industry leaders in Life Science through headquarters of many of the biggest Life Science companies (e.g. Novartis and Roche) and is highly growing (e.g. Biogen expansion in Solothurn) • Presence of venture capital firms and start-up ecosystem is limited and much less well-known as other hubs with a less risk-averse culture (e.g. Tel Aviv)
Collaboration with universities	●●●	• Collaboration with universities is important for the development of new products and Switzerland has good universities with strong ties to the economy (e.g. Novartis Next Generation Scientist program together with the University of Basel)
Infrastructure	Hygiene factor	• Strong general infrastructure considered as hygiene factor (e.g. flight connections) • Strong Life Science specific infrastructure (e.g. labs with air flow systems, hospitals with clinical trial capabilities, testing facilities, etc.)
Access to market	●○	• Access to market for R&D is less important because in many cases production can be handled by another company at another location
Awareness of Switzerland	Very High	• Global awareness of Switzerland as a Life Science hub is strong due to quantity of global pharmaceutical companies, R&D activities and leading universities

Source: Web research, Expert interviews

Global perception of Switzerland – Future of Food

Switzerland has good talent driven by outstanding universities and presence of globally leading companies like Nestlé – however, global awareness is very low compared to hubs like Netherlands and Israel

Development areas | Communication areas | Importance for ecosystems ○○○ | Swiss Performance ●●○

	Swiss performance	Rationale
Talent availability	●●●●○	• Talent is the key factor due to a growing specialization in strategic areas (e.g., AI, advanced analytics as well as chemistry and biotechnology) • Switzerland has a very good quality and quantity of talent available in the Future of Food area • However, Switzerland is perceived less attractive in comparison to Dutch food ecosystem which is driven by the cluster around Wageningen-Ede and its leading Wageningen university specialized on food science
Tax environment	●●	• Tax incentives are not the key consideration factor in the Future of Food ecosystem • Overall, Switzerland is perceived as very tax friendly – e.g. patent box is an effective measure to promote existing R&D activities in Switzerland (overarching across ecosystems)
Promoting laws & regulation	●●●○	• Simple regulations and well-functioning authorities are an important factor • Regulations are perceived to be very similar to other European countries but stricter than in the US or Asia (especially related to GMO topics)
Access to capital (incl. venture capital)	●○	• Access to capital is less important for large companies but significant for start-ups • Switzerland has large pool of capital available, however, access to early-stage risk capital from venture capital firms, the expertise of global funds and the availability of accelerators is limited compared to Israel or the US
Presence of industry leaders and existing ecosystem	●●○	• Switzerland has a good network of large companies with leading R&D facilities in Switzerland (e.g., Nestlé and Syngenta) • Netherlands and Israel have a stronger ecosystem for start-ups and open innovation in the field of FoodTech
Collaboration with universities	●●●○	• Switzerland has good ties between academia and business in Future of Food areas (Nestlé is collaborating with many universities, most notable University Lausanne, EPFL, and ETH) • However, Netherlands with its university campus (dedicated to food science) including several large and medium sized companies is stronger compared to Switzerland
Infrastructure	Hygiene factor	• Switzerland has a strong infrastructure (e.g. flight connections) which is considered as a hygiene factor • Furthermore, access to laboratories is very important for start-ups
Access to market	○	• Access to market is only a secondary factor
Awareness of Switzerland	Low	• Global awareness of a rising ecosystem is overshadowed by other locations like Netherlands and Israel that have specialized integrated ecosystem from early-stage start-ups to global companies

Source: Web research, Expert interviews

Global perception of Switzerland – Future of Finance

Switzerland is strong in important factors and well-known for general wealth and asset management
but has significant development potential in sustainable investing

Development areas | Communication areas | Importance for ecosystems | Swiss Performance

	Swiss performance	Rationale
Talent availability	●●●●○	• Switzerland is one of the leading hot spots for financial services particularly in asset & wealth management in the world (next to London, New York, etc.) • Increasing need for tech talent in finance to evaluate sustainability, technology and digital assets
Tax environment	●●●○	• Tax environment in Switzerland is very competitive (e.g., tax-free capital gains for private investors and patent box for development of financial software) with certain exceptions (e.g., "Stempelsteuer")
Promoting laws & regulation	●●●●○	• The legal and regulatory landscape in Switzerland is very good but it is difficult to differentiate in traditional wealth and asset management regulatory environment because of international regulations • Switzerland is the leading regulatory authority on digital assets which has been the game changer for the "Crypto Valley"
Access to capital (incl. venture capital)	●○	• Despite Switzerland being the biggest offshore wealth manager in the world, access to early stage, high risk capital is limited • Access to funding for start-ups in sustainable finance (e.g. data analytics), digital assets and software (incl. FinTech) is critical to promote the ecosystem
Presence of industry leaders and existing ecosystems	●●○	• There is a good presence of industry leaders (large asset and wealth managers) – however, there is a lack of key players in sustainability (e.g. Generation). A lot of the innovation is also driven by large asset managers from the US (e.g. Parnassus, BlackRock, Vanguard, etc.). • Switzerland has leading presence in digital assets space with the "Crypto Valley" which is self-reinforcing the local ecosystem • With Avaloq and Temenos Switzerland also has a leading ecosystem for private banking software
Collaboration with universities	●○	• The collaboration with universities is only partially relevant for wealth and asset management but there are good ties between leading universities and the industry (e.g. University of St. Gallen, University of Zurich, IMD) • For digital assets, software and sustainability more technical expertise is needed and collaboration can help bridge the gap between academia and business
Infrastructure	Hygiene factor	• Switzerland has a strong infrastructure (e.g. flight connections) which is considered as a hygiene factor
Access to market	●●●	• Access to market is important for Future of Finance – very good in Switzerland through large volumes that are managed in Switzerland and good access to financial markets • A lot of wealth is generated in the US and in Asia - it is important to continue ensuring access to these growth markets to keep position as leading offshore wealth management location
Awareness of Switzerland	**High**	• Global awareness of Switzerland as a Future of Finance hub especially in general wealth and asset management and digital assets with the "Crypto Valley", however it is still behind some of the other financial centers (e.g. London, New York)

Source: Web research, Expert interviews

Global perception of Switzerland – Industry 4.0

Switzerland has outstanding talent and universities, but other hot spots outshine Switzerland in terms of quantity of available talent

Development areas | Communication areas | Importance for ecosystems ○○○ | Swiss Performance ●●○

	Swiss performance	Rationale
Talent availability	●●●●○	• Switzerland has very good talent available with graduates from leading universities in relevant fields (e.g., ETH in robotics) • In terms of volume, it is lagging behind other industry 4.0 hot spots (e.g., US West Coast, Bavaria or Japan) especially in experienced professionals caused by smaller industry footprint
Tax environment	●●	• Tax incentives are not the key consideration factor in industry 4.0 ecosystem • Overall, Switzerland is perceived as very tax friendly – e.g., patent box is an effective measure to promote existing R&D activities in Switzerland (overarching across ecosystems)
Promoting laws & regulation	●	• Switzerland's regulations and laws are perceived to be less strict than in some European countries (e.g., Germany or France) where strong unions and regulations on data collection restrict ability to measure and analyze data for some industrial processes • However, other global locations (e.g., US) have even less bureaucratic processes when it comes to testing
Access to capital (incl. venture capital)	●○○	• Access to capital has low importance for large industrial automation incumbents • However, venture capital is key for a complementary start-up landscape (more innovation and talent available) – e.g., ZAPI acquired BlueBotics (EPFL spin-off) or ABB partnership with Sevensense (ETH spin-off) • Switzerland is behind other locations (e.g., Boston, Silicon Valley) in terms of access to venture capital
Presence of industry leaders and existing ecosystem	●●	• Switzerland is perceived well for presence of industry leaders with leading R&D facilities and innovative companies for industry 4.0 (e.g., Siemens Building Technologies R&D, ABB, Sensirion, Stöckli Medical, etc.) and leading universities (e.g., ETH, EPFL). • However, the increasing focus on software and intelligence in industry 4.0 provides an opportunity in this field and possibility to create synergies with strong Digital Tech ecosystem in Switzerland (e.g., Google, Amazon)
Collaboration with universities	●●●●	• Switzerland has very good opportunities for collaboration with universities which is important for R&D in fields such as robotics (e.g., "RobotX" - partnership between ABB and ETH in robotics)
Infrastructure	Hygiene factor	• Switzerland has a strong infrastructure (e.g., 5G connection, flight connections) which is considered as a hygiene factor
Access to market	●○	• Switzerland has a good access to market and good connection / proximity to specialized manufacturing (e.g., pharma) which is important for some R&D activities – however, industrial manufacturing (e.g., automotive) is more present in Germany
Awareness of Switzerland	Medium	• Global awareness is good but behind very strong international visibility of German industry 4.0 hot spot in Bavaria and international technology hot spots (e.g., Silicon Valley, Japan)

Source: Web research, Expert interviews

Global perception of Switzerland – Digital Tech

Switzerland has very strong performance in the most important factors but has a very low visibility as Digital Tech hot spot

Development areas | Communication areas | Importance for ecosystems ○○○ | Swiss Performance ●●○

	Swiss performance	Rationale
Talent availability	●●●●○	• Talent availability is the key factor and Switzerland has very strong, international and highly skilled software talent available due to leading universities (e.g., ETH, EPFL) – only challenged by London and Berlin in terms of costs and quantity • Additionally, Switzerland has a growing pool of experienced professionals through an increasing number of tech players based in Switzerland which are also driving other ecosystems (e.g., software in industry 4.0) • Globally, Switzerland faces strong competition by bigger talent hubs (e.g., Silicon Valley, Boston, Tel Aviv, etc.)
Tax environment	●●	• Tax environment usually not key but significant tax incentives can be deciding factor to establish R&D centers • Many tech players have already set up strong presence in Switzerland (e.g., Google, Facebook) which makes further investment attractive
Promoting laws & regulation	●●●○	• A clear regulatory framework is basis for the ease of doing business – e.g., processing of customer data is a key factor in product development because it depends to a large extend on ability to collect, analyze and commercialize data. However, the more research driven the activities are, the less important become regulations • The Federal Act on Data Protection is largely based on GDPR, therefore, relatively strict compared to non-European countries (e.g., US) – However, it is perceived often less formalistic and specific than GDPR • Switzerland has a strong regulatory framework for IP protection which is important for R&D location choice for Digital Tech companies
Access to capital (incl. venture capital)	●○	• Access to capital has low importance for tech giants • However, venture capital is key for a complementary start-up landscape (more innovation and talent available) – Switzerland is behind other locations (e.g., Silicon Valley, Berlin and London) when it comes to university or corporate spin-offs due to underfunding and lack of venture capital firms
Presence of industry leaders and existing ecosystem	●●	• Switzerland has a strong presence of tech companies in the European context (e.g., Google, Facebook, Amazon) – global awareness is very low compared to London and Berlin • Global leaders are ecosystems like Silicon Valley, Boston, and Tel Aviv
Collaboration with universities	●●●	• Digital media R&D is involved with academic research in some areas (e.g., specific AI, ML applications) • More importantly, the talent pool surrounding academic institutions is crucial for Digital Tech
Infrastructure	Hygiene factor	• Switzerland has a strong infrastructure (e.g., flight connections) which is considered as a hygiene factor
Access to market	○	• Market access is relatively unimportant for R&D functions in Digital Tech environment
Awareness of Switzerland	**Very low**	• Despite a rising number of tech players which continuously increasing their footprint in Switzerland (e.g., Google with >4,000 employees), there is only very limited awareness of Switzerland as a Digital Tech hot spot

Source: Web research, Expert interviews

Approach investment promotion Switzerland (how to win)

Shift in value creation of international companies

Swiss location attractiveness

- Process of location selection
- Attractiviness factors
- Global perspection of Switzerland
- **Deep dive: Headquarters**

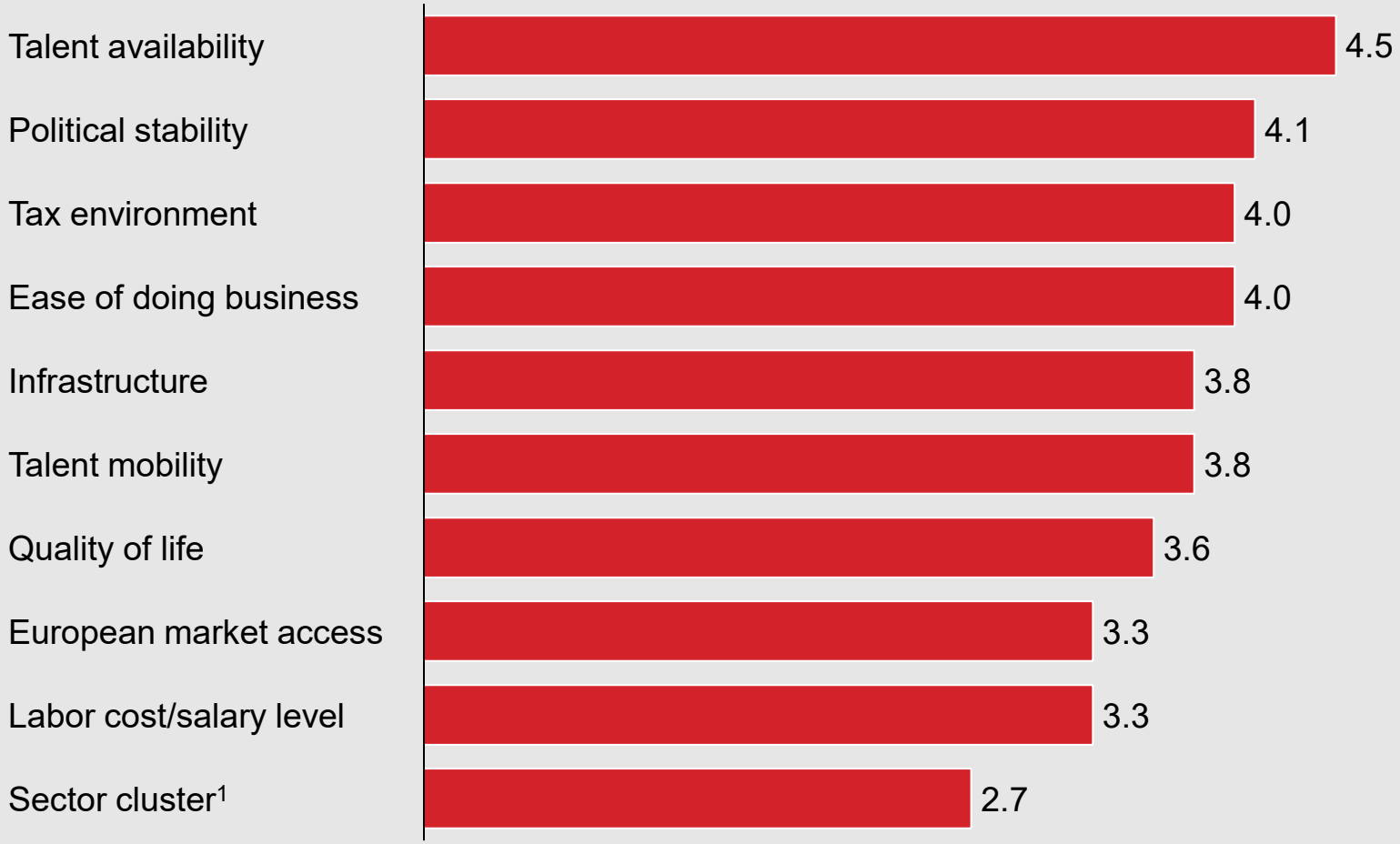
Key regions by ecosystem

Recap: “Switzerland Wake up” - report

Needs of multinational companies – focus HQ

Key factors for HQ location selections are talent availability, political stability, the tax environment and ease of doing business (regulatory framework) – Especially tax environment is more important compared to R&D / innovation centers

Relative importance of attractiveness factors



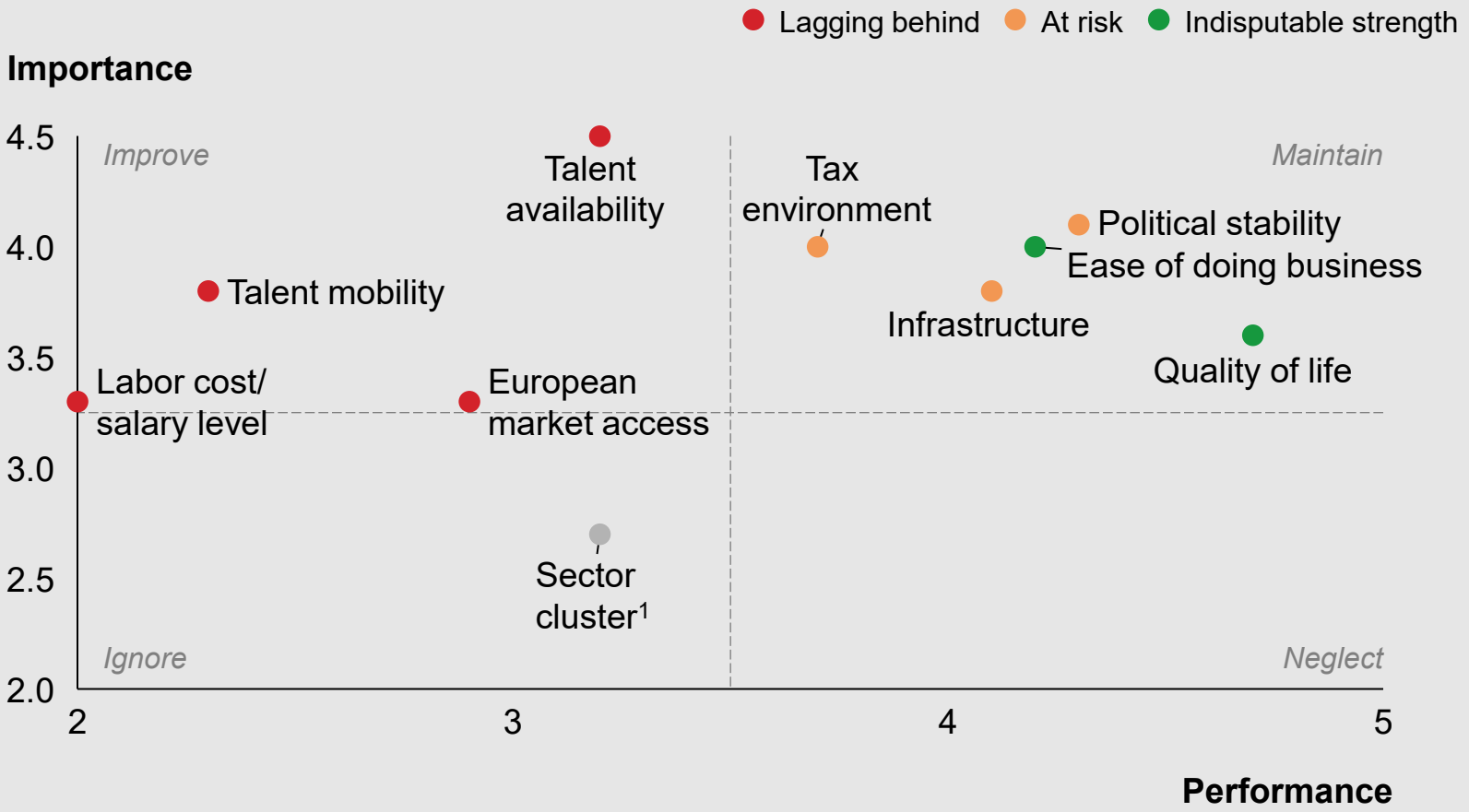
1. Importance depending on sector – e.g. highly relevant for pharma and watch makers

Source: “Wake up Switzerland” Report which is based on company interviews

Recap: “Switzerland Wake up” - report

Global perception of Switzerland – Focus HQ

Development areas are in talent availability including talent mobility – strengths to be communicated are in particular quality of life, political stability, and ease of doing business



1. Depending on industry; highly relevant for pharma and watch makers

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Approach investment promotion Switzerland (how to win)

Shift in value creation of international companies

Swiss location attractiveness

- Process of location selection
- Attractiviness factors
- Global perspection of Switzerland
- Deep dive: Headquarters

Key regions by ecosystem

The key regions for the prioritized ecosystems span across Europe, the US and Asia

Top 3 regions by ecosystem

Definition: Key regions are characterized by a high density of foreign innovation companies (multinationals, SME's and fast growing start-ups) with a potential to establish their headquarters, R&D center or high-tech production in Europe/CH

Life Sciences	Future of Food	Digital Tech	Industry 4.0	Future of Finance
				
Dublin	BeNeLux	Dublin	Bavaria	London
London	London	Berlin	Odense	Frankfurt
Benelux		London		BeNeLux
Paris		BeNeLux		
Hamburg				
Medicon Valley				
Berlin				
				
Boston	Bay Area[1]	Bay Area	Boston	New York
Bay Area	St. Louis	Austin	North Carolina	
North Carolina	New York	Seattle	Bay Area	
Minnesota	Boston			
Seattle				
				
Tokyo	Israel	China (Shenzhen, Beijing, Shanghai & Hangzhou)	Tokyo	Hong Kong
Israel	China (Beijing & Shanghai)	Israel	Seoul	Singapore
China (Shenzhen, Shanghai)		Tokyo	Shenzhen	Shanghai
Singapore	Singapore		Osaka	Beijing
Seoul				Shenzhen
Mumbai				Tokyo

1. Including Davis

Source: Expert interviews, desk & press research

Venture capital investments in key regions for ecosystems

Life Science

Bay Area	52,521	820
Boston[2]	40,039	394
Shanghai	19,135	268
Seattle[3]	5,947	121
Shenzhen	4,430	110
London	4,399	163
Switzerland	3,916	204
Israel	3,898	196
North Carolina	3,245	142
Seoul	2,736	136
Paris	2,002	90
Medicon[4]	1,637	78
Singapore	1,414	57
Dublin	1,406	39
Minnesota	1,332	71
Berlin	991	41
Tokyo	980	82
Benelux[5]	792	28
Mumbai	608	17
Hamburg	514	11

Food

Bay Area	27,900	550
Singapore	13,221	101
Shanghai	9,360	124
Bejing	6,454	160
New York	5,908	380
Boston[2]	4,597	70
London	3,325	290
Benelux[6]	2,444	56
Israel	2,142	163
Saint Louis	655	19
Switzerland	249	67

Digital Tech

Bejing	36,557	495
Bay Area	27,985	966
Shanghai	11,250	263
Hangzhou	8,552	110
London	4,769	555
Austin	3,687	147
Dublin	2,467	47
Israel	1,631	194
Tokyo	1,448	210
Berlin	944	131
Shenzhen	870	141
Seattle	555	93
Benelux[7]	525	73
Switzerland	476	69

Future of Finance

New York	46,846	944
London	41,418	1082
Singapore	19,240	582
Shanghai	9,918	242
Beijing	9,681	393
Tokyo	4,097	187
Shenzhen	3,836	161
Benelux[7]	3,386	140
Hong Kong	3,332	206
Switzerland	2,822	256
Frankfurt	217	27

Industry 4.0

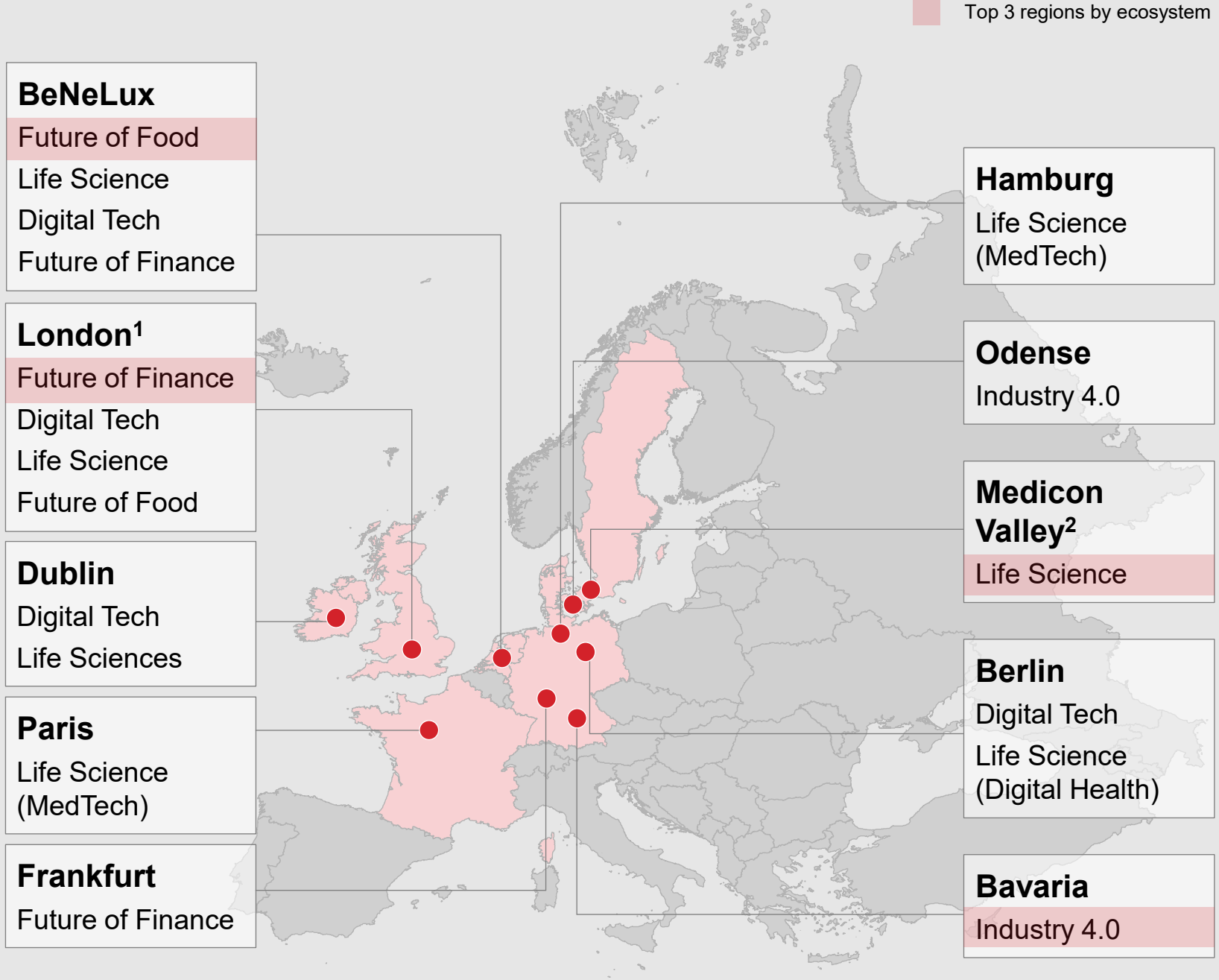
Bay Area	41,201	811
Tokyo	13,738	155
Shenzhen	6,453	209
Boston[2]	2,481	112
Munich	1,876	37
Switzerland	1,219	104
North Carolina	1,205	58
Seoul	492	14
Odense	136	4
Osaka	5	35

1. Companies that received venture capital funding in the last 5 years 2. incl. Cambridge 3. incl. Washington Area 4. Based on Copenhagen, Lund & Malmö 5. Based on Amsterdam 6. Based on Amsterdam, Rotterdam & Wageningen 7. Based on Amsterdam, Brussels and Luxembourg

Source: Pitchbook; Search Criteria: LifeScience: LifeScience; Future of Food: Food Products, AgTech, FoodTech for Future of Food; Future of Finance: FinTech, Cryptocurrency/Blockchain, Impact Investing, Financial Software; Digital Tech: Social/Platform Software, Entertainment Software, e-sports, Gaming, Social Content, Search engine; Industry 4.0: Robotics, Industrial robots, Industrial Automation, process automation, automation technology, automation/workflow software, Robotics & Drones

Key regions by ecosystem - Europe

Benelux, London, Medicon Valley, and Bavaria are key regions for the prioritized ecosystems in Europe

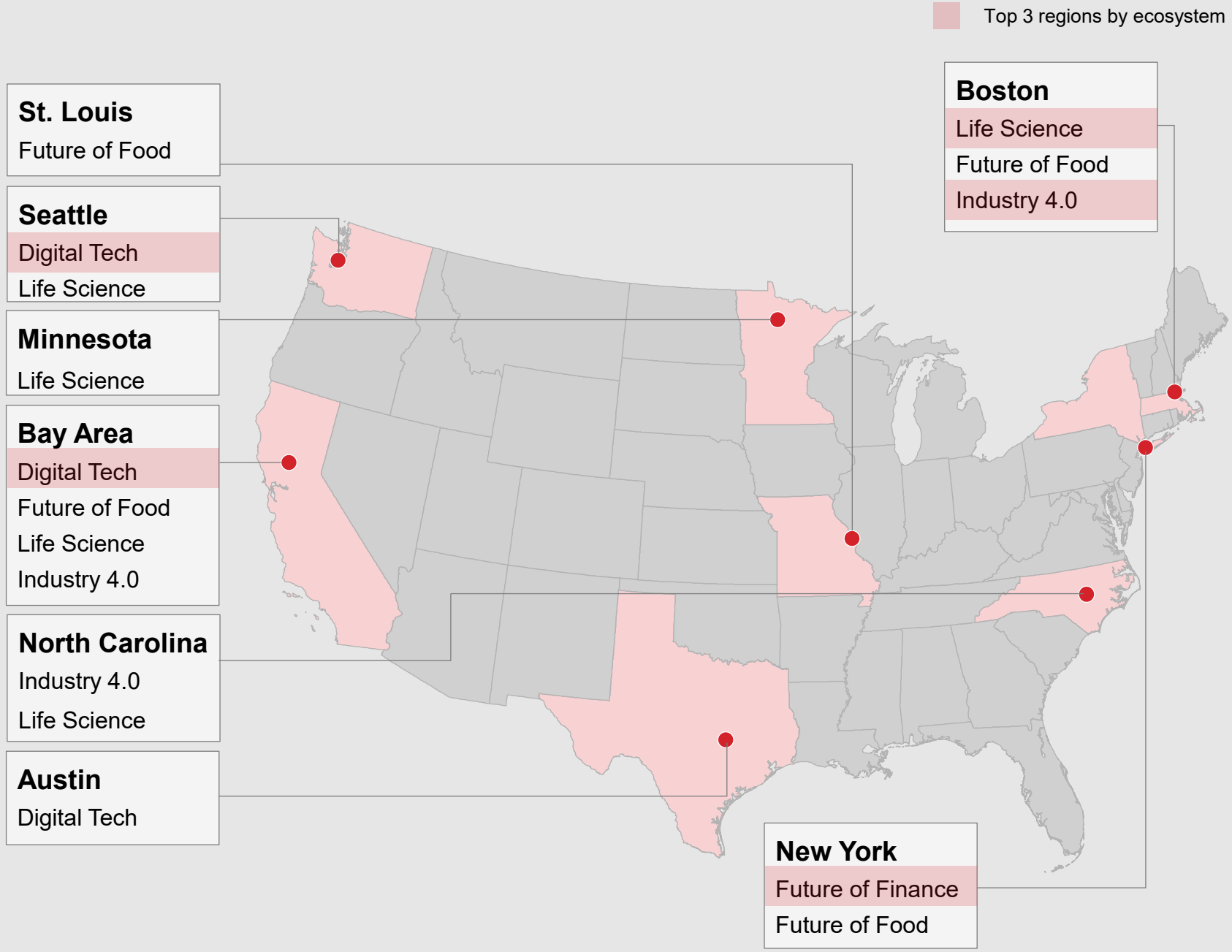


1. Including golden triangle: London, Oxford and Cambridge
2. Copenhagen, Malmö and Lund

Source: Expert interviews, desk & press research

Key regions by ecosystem - USA

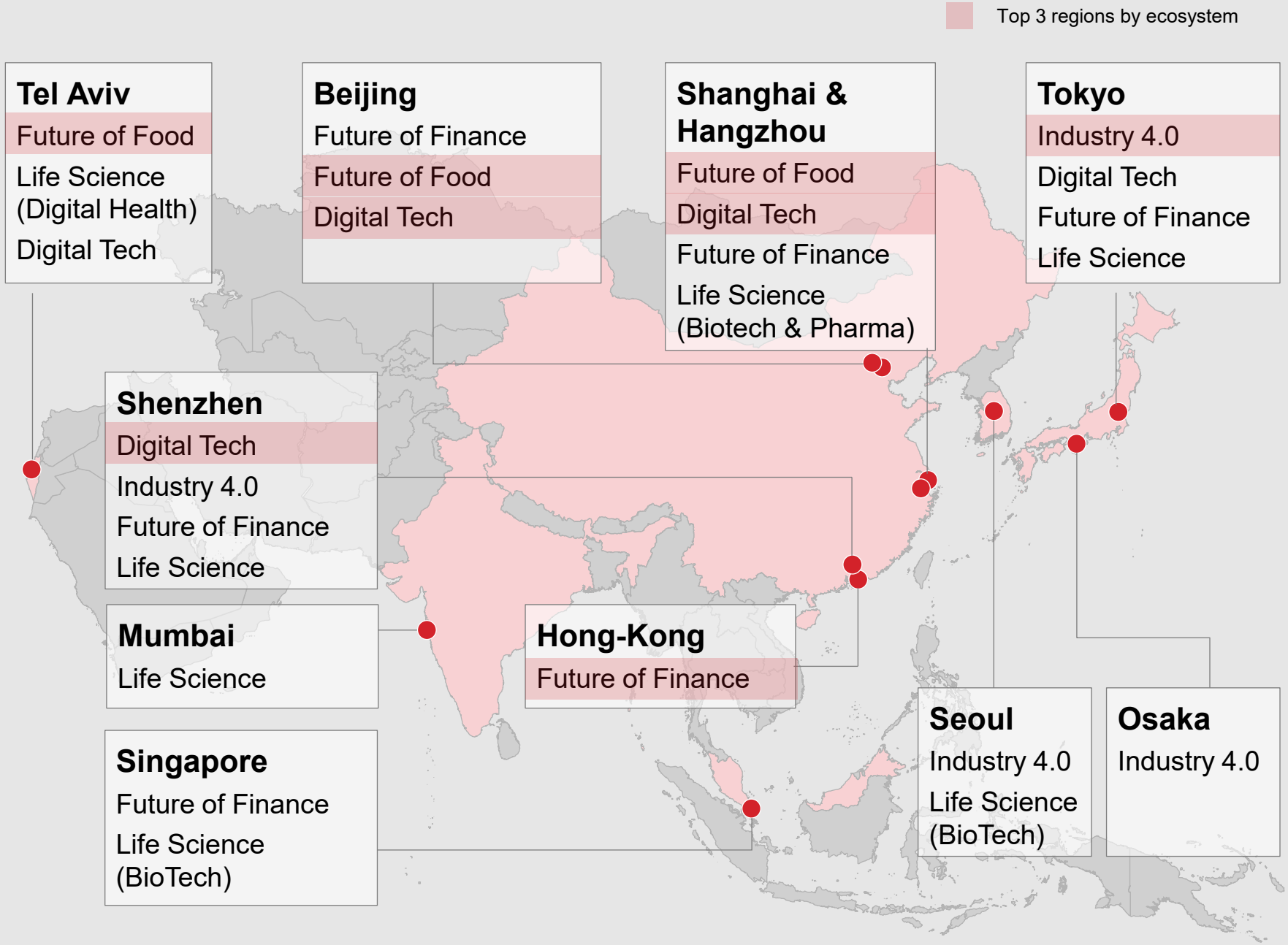
Bay area, Boston, Seattle, and New York are key regions for the prioritized ecosystems in the US



Source: Expert interviews, desk & press research

Key regions by ecosystem – Asia and Middle East

China (south-east coast), Japan (Tokyo), Hong-Kong, and Israel (Tel Aviv) are most important countries in Asia / Middle East



Source: Expert interviews, desk & press research

Content

Executive Summary – Phase 3 (Make it happen)

Requirements for a successful implementation

- **Three key factors enable a successful implementation:**
  - **(1) Committed stakeholders – Act as one**: All stakeholders across cantons and government agencies (including S-GE, regions, cantons, Swissnex, Switzerland Innovation, Presence Switzerland, Innosuisse, etc.) need to be aligned and committed to the direction and consequently coordinate their actions
  - **(2) Pro-active approach and implementation**: An overarching roadmap has been developed to support and speed up the implementation. This includes a clear timeline of actions as well as roles and responsibilities
  - **(3) Pilot before scale-up**: Roll-out of ecosystem approach in selected pilot markets (e.g., US market), before rolling it out globally

Pro-active approach and implementation – Long-term Implementation roadmap

- **An overarching roadmap has been developed to support and speed up the implementation –** Most critical in the implementation are:
  - **Stakeholder alignment on ecosystems:** Alignment and refinement with all stakeholders on the direction to focus on the prioritized five ecosystems is critical. Furthermore, an overarching vision and mission statement reflecting the core values needs to be defined
  - **Operating model and governance:** Definition and refinement of collaboration model between stakeholders (S-GE, Swiss Business Hubs, cantons, regions, Swissnex, Switzerland Innovation, Presence Switzerland, Innosuisse, etc.), review of global footprint based on ecosystem approach, assessment and further development of the governance model and measurable goals / KPIs
  - **Detailed investment promotion plan:** The investment promotion plan needs to include the initiatives to implement the strategy. Those initiatives include (1) developing a concrete marketing and communication plan for each ecosystem reflecting the respective strength of Switzerland (e.g., creation of knowledge material, definition of media channels, organization of events, etc.), (2) setting-up an action plan to address development areas such as talent availability and access to capital - either implement actions directly (e.g., promote Switzerland to international venture capital firms) or raise awareness and ensure actions are being addressed by relevant stakeholders (e.g., highlight shortage of STEM talents to responsible authorities), (3) creating a target list and assessing their individual needs (4) scouting for potential partners (e.g. associations, incubators, media, etc.) that can support in marketing and lead generation, and (5) strengthening digital tools and assets to increase the efficiency and effectiveness of marketing processes
  - **Resource and budget allocation:** Resource and budget allocation should reflect the strategic focus on the five ecosystems, regarding the respective international presence in the key regions and hotspots as well as capability and know how building in those ecosystems

Requirements for a successful implementation

3 key factors enable a successful implementation of the ecosystem approach

Detailed next

Strategic direction

3 key factors enabling a successful implementation

Vision & Strategy

Consistent and compelling vision is in place which acts as the “north star”

Strategic pillars of how to achieve vision are derived (which ecosystems needs to be prioritized and what are factors to be successful in those ecosystems)

Committed stakeholders – Act as one

All stakeholders across cantons and government agencies are aligned and 100% committed to the strategy

Clearly-articulated story which is widely understood and communicated (e.g., all cantons “speak the same language”)

Pro-active approach and implementation

Masterplan with a clear timeline of actions / milestones and roles / responsibilities established

Dedicated team in charge to conduct the implementation

Clear governance body to assess progress and overcome barriers (e.g., regular meetings with Steering committee “Landesmarketing”)

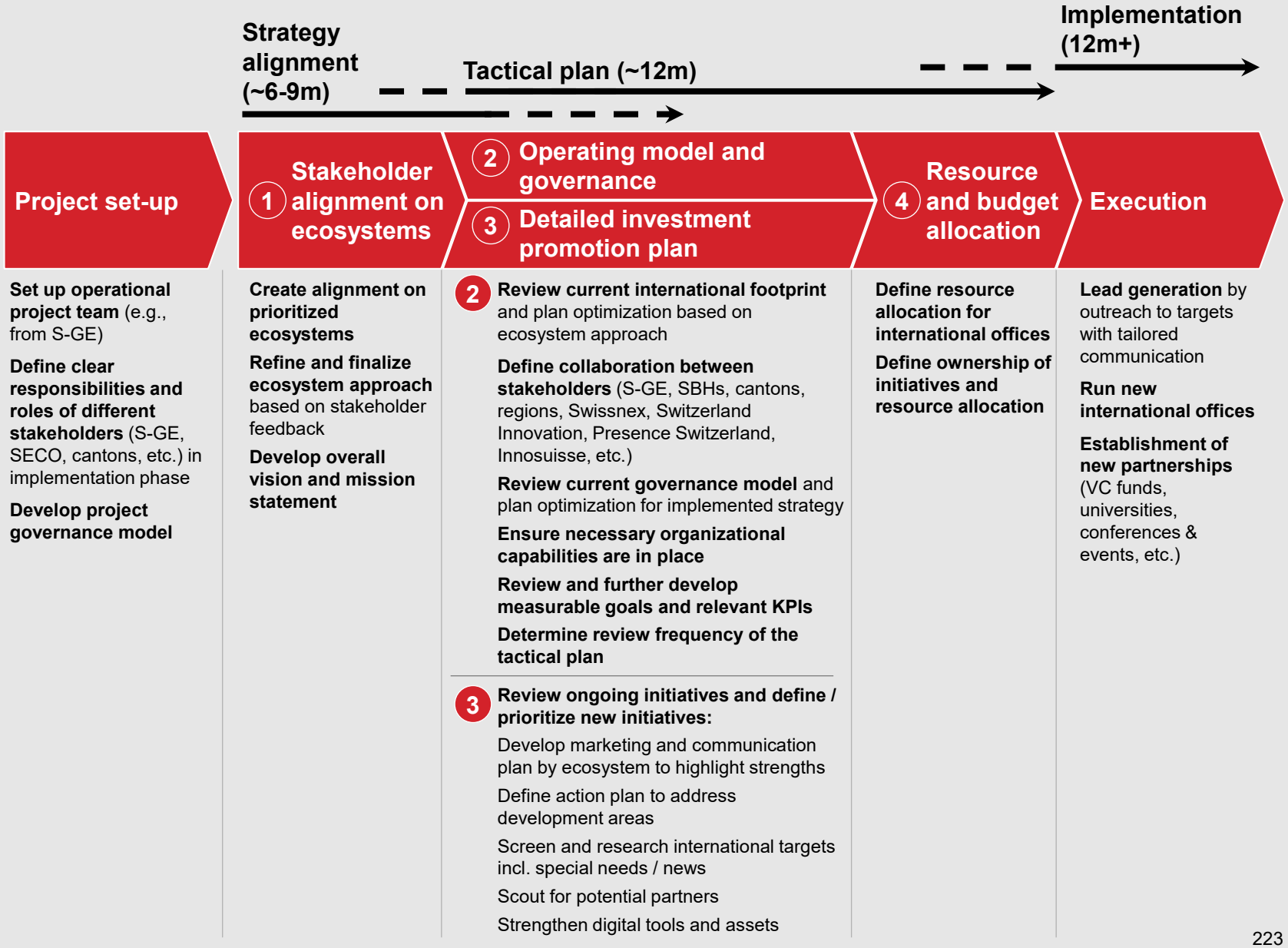
Pilot before scale-up

Roll-out of ecosystem approach in selected pilot markets (e.g., US market)

Global scale up based on lessons learned in a second step

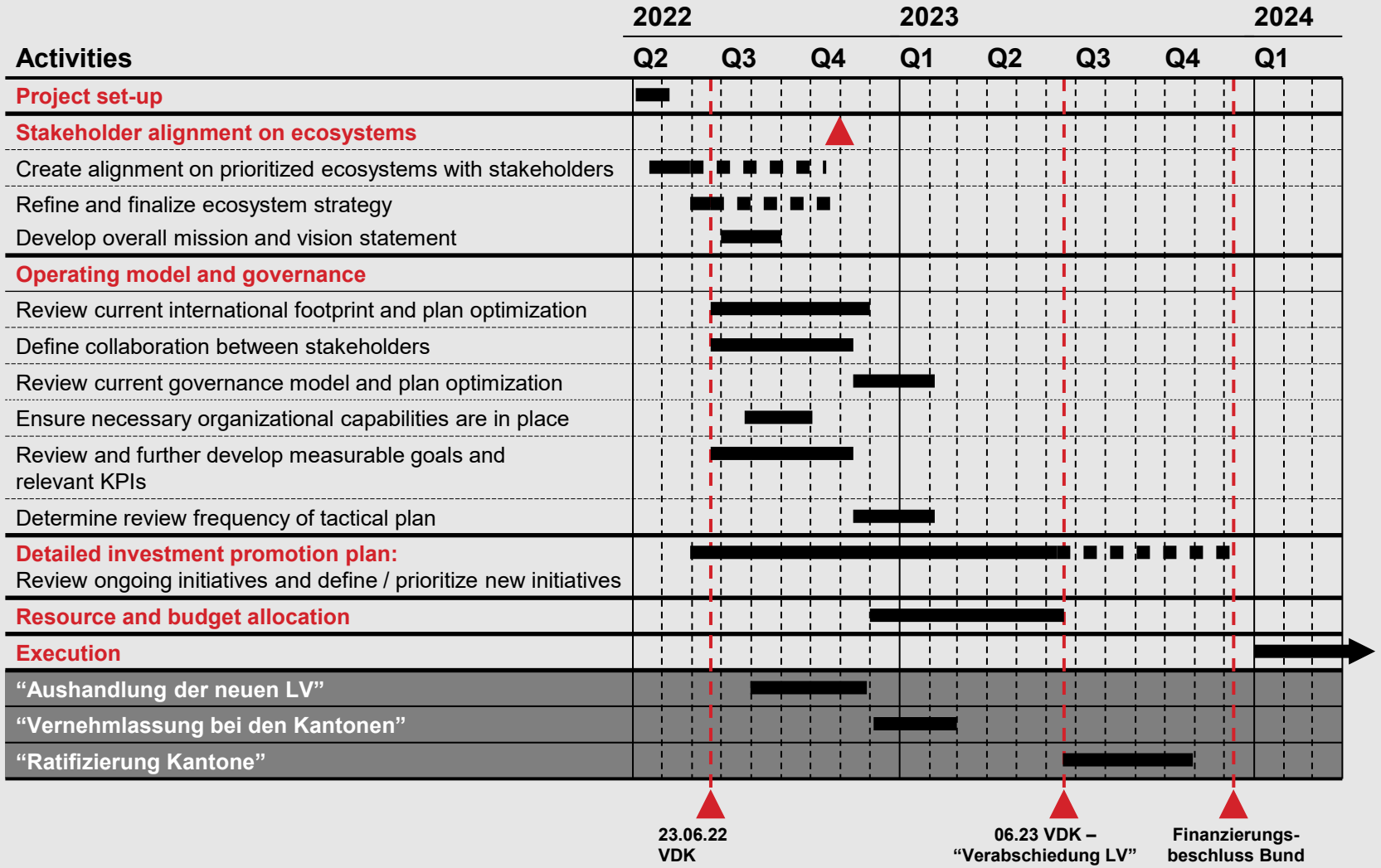
Long-term Implementation roadmap

Roadmap until Go-Live in 2024



Draft to be refined with stakeholders

Implementation roadmap – timeline



Not exhaustive

Long-term implementation roadmap – details (1/4)

Deliverables can be separated by implementation phases

Phase	Deliverables	Activity
Project set-up	**Project team set-up**	**Set up operational project team** (e.g., from S-GE) • Define project team members to support and speed up implementation phase based on capabilities and capacities – members are from S-GE but could also be enhanced by further stakeholders (e.g., representatives from cantons) • In addition to traditional project management office (PMO) project team is also responsible to co-develop the tactical plan including initiatives
	Responsibility assignments	**Define clear responsibilities and roles of different stakeholders** (S-GE, SECO, cantons, etc.) in implementation phase • Align on time allocation of each participant in project • Ensure sufficient project team capacity to plan / drive ecosystem initiatives
	Project governance model	**Develop project governance model** • Define governance body (leadership and participants responsible for different meetings) to execute and track progress of the implementation • Decide on cadence for different governance meeting types (e.g., operational meeting every month)
Stake-holder alignment on eco-systems	**Consensus on prioritized ecosystems** with stakeholders	**Create alignment on prioritized ecosystems** • Discuss and align on ecosystem approach as a development of the 5Tech focus with stakeholders (S-GE, SBHs, cantons, regions, Swissnex, Switzerland Innovation, Presence Switzerland, Innosuisse, etc.) as basis to set up tactical plan including initiatives and implementation roadmap • Develop compelling story line which can be widely used and is easy to understand
	Finalized ecosystem approach	**Refine and finalize ecosystem approach** based on stakeholder feedback • Take feedback of stakeholders into account and adjust ecosystem approach and its strategic pillars accordingly (if necessary) – this can include conducting further expert interviews and analyses
	Mission and vision statement	**Develop overall vision and mission statement** • Define vision (What will be achieved over the next 5+ years?) and mission (What is the reason for the endeavor?) which is also reflecting core values

Not exhaustive

Long-term implementation roadmap – details (2/4)

Deliverables can be separated by implementation phases

Phase	Deliverables	Activity
Operating model and governance	**Plan of international footprint in target state**	**Review current international footprint** and plan optimization based on ecosystem approach • Analyze key regions of ecosystems and their potential for Switzerland • Refine current global office footprint – definition of offices which need to be strengthened and locations where S-GE should expand its footprint due to a strong local ecosystem • Plan takes into account that a coherent level of quality can be ensured at all international offices
	Collaboration guidelines between stakeholders (S-GE, SBHs, cantons, regions, etc.)	**Define collaboration between stakeholders** (S-GE, SECO, cantons, Swissnex, Switzerland Innovation, Presence Switzerland, Innosuisse, etc.) • Assign roles clearly – Who is responsible for which investment promotion activity? (e.g., responsibility of outbound company targeting) • Define operating model between SBHs and international offices of cantons and regions to improve collaboration • Review collaboration model of S-GE Switzerland and SBHs along the customer journey including roles and responsibilities • Assess how further stakeholders (e.g., Swissnex, Switzerland Innovation, Presence Switzerland, Innosuisse) can support the ecosystem approach most effectively
	Governance model	**Review current governance model** and plan optimization for implemented strategy • Define governance body (leadership and participants responsible for different meetings) to execute, track progress, and reassess the implemented strategy / tactical plan • Decide on cadence for different governance meeting types (e.g., operational meeting every month)
	Internal talent attraction and retention model	**Ensure necessary organizational capabilities are in place** • Identify critical roles for execution of ecosystem approach • Establish clear understanding and rigorous approach to long-term workforce planning • Develop view of which skills will matter and clear plan and approach to build those skills • Define clear career path and succession plan for current and future critical roles
	List of objectives and KPIs	**Review and further develop measurable goals and relevant KPIs** • Review and further develop measurable, specific, time-bound goals and relevant KPIs as a basis to measure success of initiatives • Distinct between strategic goals (e.g., XX jobs created) and operational goals (e.g., generation of XX high-quality settlement projects in prioritized ecosystems)
	Review cycle of tactical plan	**Determine review frequency of the tactical plan** • Define who is operationally responsible for next tactical review cycle (which team/person within S-GE) • Determine frequency how often tactical plan and its initiatives (e.g., marketing and communication plan), implementation roadmap and budget need to be reviewed and updated

Not exhaustive

Long-term implementation roadmap – details (3/4)

Deliverables can be separated by implementation phases

Overarching activity in step "Detailed investment promotion plan"

Phase	Deliverables	Activity
Detailed investment promotion plan	**List of prioritized initiatives on a timeline**	**Review ongoing initiatives and define / prioritize new initiatives** • Assess contribution of ongoing initiatives to overall strategy – decision which initiatives can be stopped to free up capacities • Develop coherent set of new initiatives with expected impact and critical activities/ requirements • Prioritize initiatives based on expected impact and required resources
	Detailed marketing and communication plan per ecosystem	**Develop marketing and communication plan by ecosystem to highlight strengths** • Create knowledge and communication material on each individual ecosystem with dedicated pitches for Switzerland • Design continental campaigns including pitch events which can be duplicated in different markets • Organize events and visit relevant industry fairs • Define media channels for promotion by ecosystem and develop content guidelines (e.g., social media post suggestions for SBH • Coordinate and set up search engine marketing campaigns • Determine how collected knowledge from marketing activities can be interpreted in a structured manner • Review customer relationship management to improve how data and insights from customers can be collected and interpreted in a structured manner • Ensure data availability of attractiveness factors which are required of international companies to assess Switzerland as a potential location ! **It is recommended to conduct a pilot phase in selected regions before a global roll-out**
	Detailed list of action items to address development areas	**Define action plan to address development areas (e.g., talent availability)** • Conduct ideation session (S-GE internally but also with stakeholders) about opportunities to improve development areas • Setting-up an action plan to address development areas such as talent availability and access to capital - either implement actions directly (e.g., promote Switzerland to international venture capital firms) or raise awareness and ensure actions are being addressed by relevant stakeholders (e.g., highlight shortage of STEM talents to responsible authorities) • Align on compelling storyline for political process ! **Not all development areas can be directly impacted by investment promotion agencies**

Not exhaustive

Long-term implementation roadmap – details (4/4)

Deliverables can be separated by implementation phases

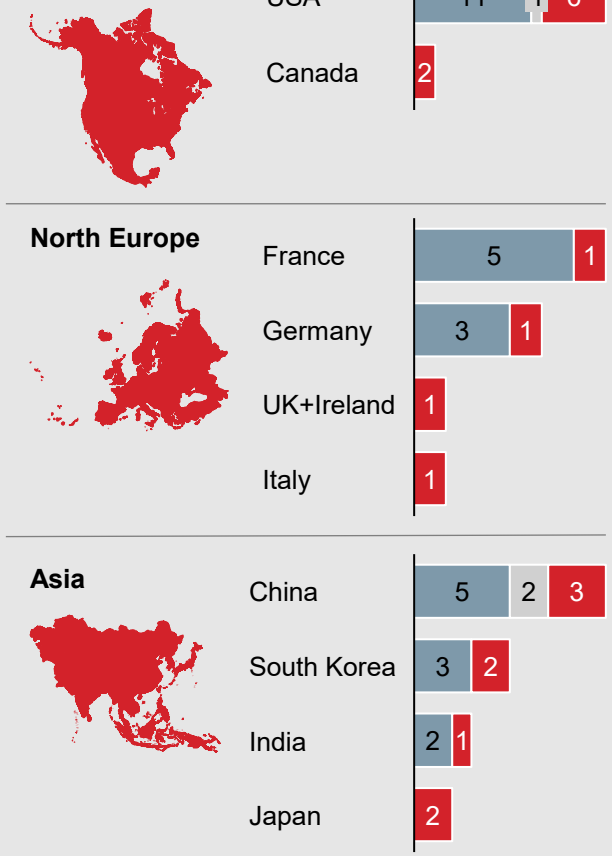
Phase	Deliverables	Activity
Detailed investment promotion plan (continued)	**List of target companies**	**Screen and research international targets incl. special needs / news** • Create list of targets with the potential to establish their HQ, R&D center, or high-tech production in Europe / CH supported by relevant data bases (Pitchbook, CB insights, etc.) • Prioritize target list based on desk research, expert interviews and workshops with partners – prioritization aspects can include level of innovation, announcements of a concrete project (e.g., any news that the company plans to expand in the near-term), etc.
	List of potential partners	**Scout for potential partners** for investment promotion • Create a list of potential partners (associations, chambers, governmental bodies, media, incubators, VCs, etc.) which can support S-GE in marketing and lead generation – scouting should be focused on Switzerland and key regions • Define initial concept on how the cooperation can proceed
	Running digital tools and assets	**Strengthen digital tools and assets** • Ensure operation of IT systems and infrastructure is stable and characterized by high security and performance • Include digital tools systematically in customer journey / consulting process • Promote data analytics to increase efficiency and effectiveness of marketing processes
Resource and budget allocation	**Resource and budget plan for international offices**	**Define resource allocation for international offices** • Establish decision criteria for resource allocation • Allocate resources to international offices
	Resource and budget plan for initiatives	**Define ownership of initiatives and resource allocation** • Allocate available resources to prioritized initiatives led systematically by a governance body - each initiative has a clear owner who is responsible for its execution • Ensure high transparency on process with all involved teams

4. Resource and budget allocation – international offices

S-GE needs to adjust its geographic footprint based on the key regions for the prioritized ecosystems

SBH (without Heads of SBH) Cantons Regions

Review of current footprint: FTEs per region



Adjustments based on ecosystem approach

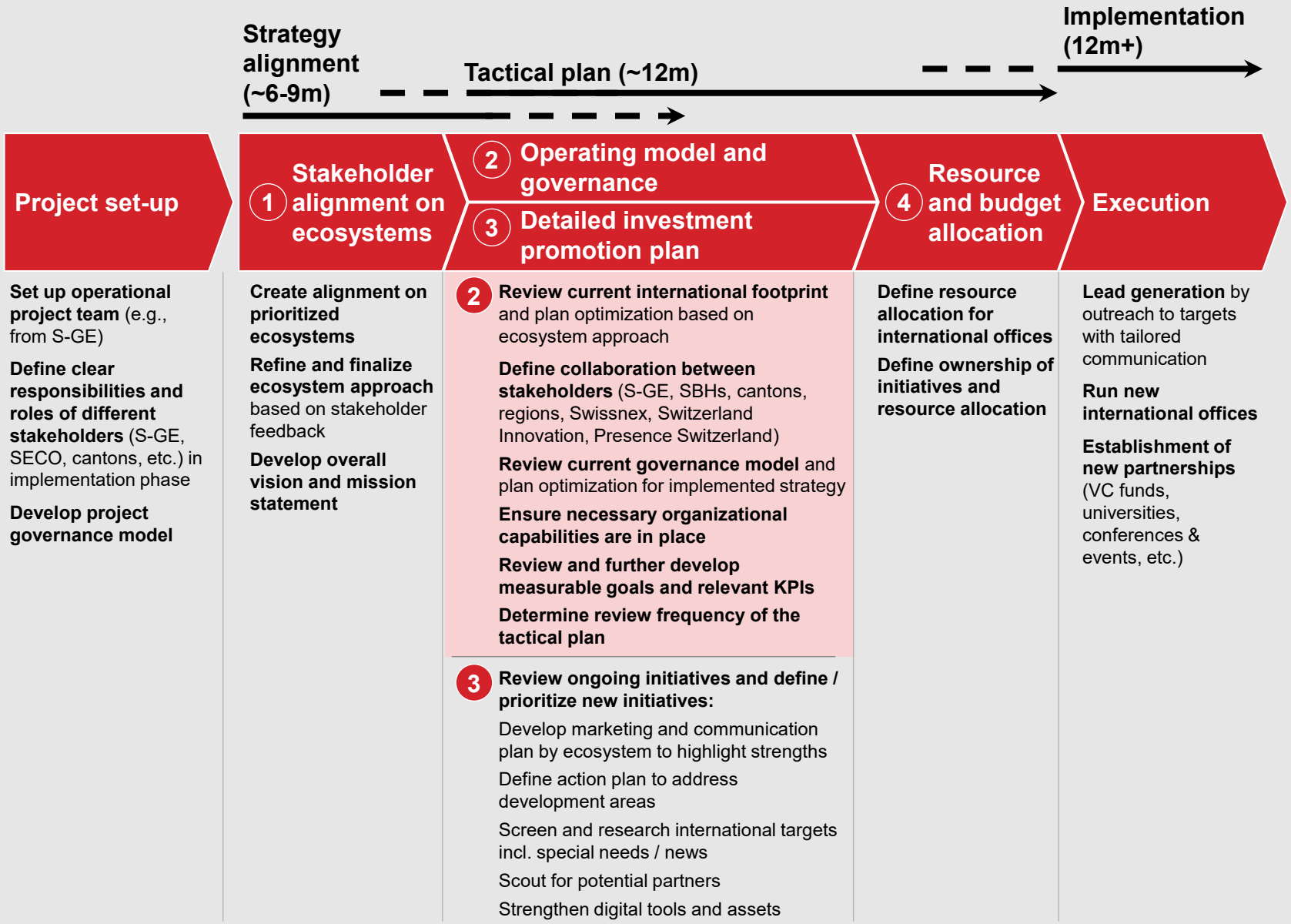
	Life Science	Future of Food	Future of Finance	Industry 4.0	Digital Tech
Bay Area	✓	✓		✓	✓
Boston	✓	✓		✓	
New York		✓	✓		
Seattle	✓				✓
London	✓	✓	✓		
Benelux	✓	✓	✓		
Medicon Valley	✓				
Munich				✓	
Israel	✓				✓
Tokyo			✓	✓	✓
Shanghai	✓	✓	✓		✓
Bejing		✓	✓		✓
Shenzhen	✓		✓	✓	✓
Hangzhou					✓
Hong Kong			✓		

Illustrative

To be well positioned within the prioritized ecosystems, S-GE needs to analyze its current geographic footprint as well as the number of employees within each location and align it with the key regions of the ecosystems by moving FTEs into the most promising geographies to be present on the ground

Long-term Implementation roadmap

Roadmap until Go-Live in 2024



AS OF 2020

2. International presence

Leading IPAs operate 10+ global offices that represent them in key markets and enable profile and brand building – most IPAs focus strongly on USA, China, central Europe, and Japan/Korea

Own Offices

Ireland

IDA Ireland is Ireland's IPA. It runs 21 international offices in the following locations:

- USA (7)
- China (3)
- India
- Germany
- France
- Russia
- Japan
- Korea
- UK
- Brazil
- Singapore
- Australia
- Canada

Singapore

EDB Singapore is Singapore's IPA. It runs 19 international offices in the following locations:

- USA (5)
- China (3)
- India
- Germany
- France
- Japan
- Korea
- UK
- Brazil
- Indonesia
- Netherlands
- Sweden
- Switzerland

Based in Consulates

France

Business France is France's IPA. It runs 92 international offices in the following locations:

- USA (7)
- China (7)
- India (5)
- Saudi Arabia (2)
- Japan (2)
- Brazil (2)
- Germany
- Korea
- UK
- Hong Kong
- Russia
- Turkey
- IPA Country
- …

Outsourced

Bahrain

EDB Bahrain is Bahrain's IPA. It runs 14 international offices in the following locations:

- USA
- China
- India
- Germany
- France
- Japan
- Korea
- UK
- Hong Kong
- Saudi Arabia
- GCC
- Turkey
- IPA Country

Turkey

Presidency of the Republic of Turkey Investment Office is Turkey's IPA. It runs 10 international offices in the following locations:

- Germany
- Italy
- Japan
- Qatar
- Saudi Arabia
- Singapore
- South Korea
- Spain
- IPA Country
- UK

2. Review cycle of tactical plan (1/2)

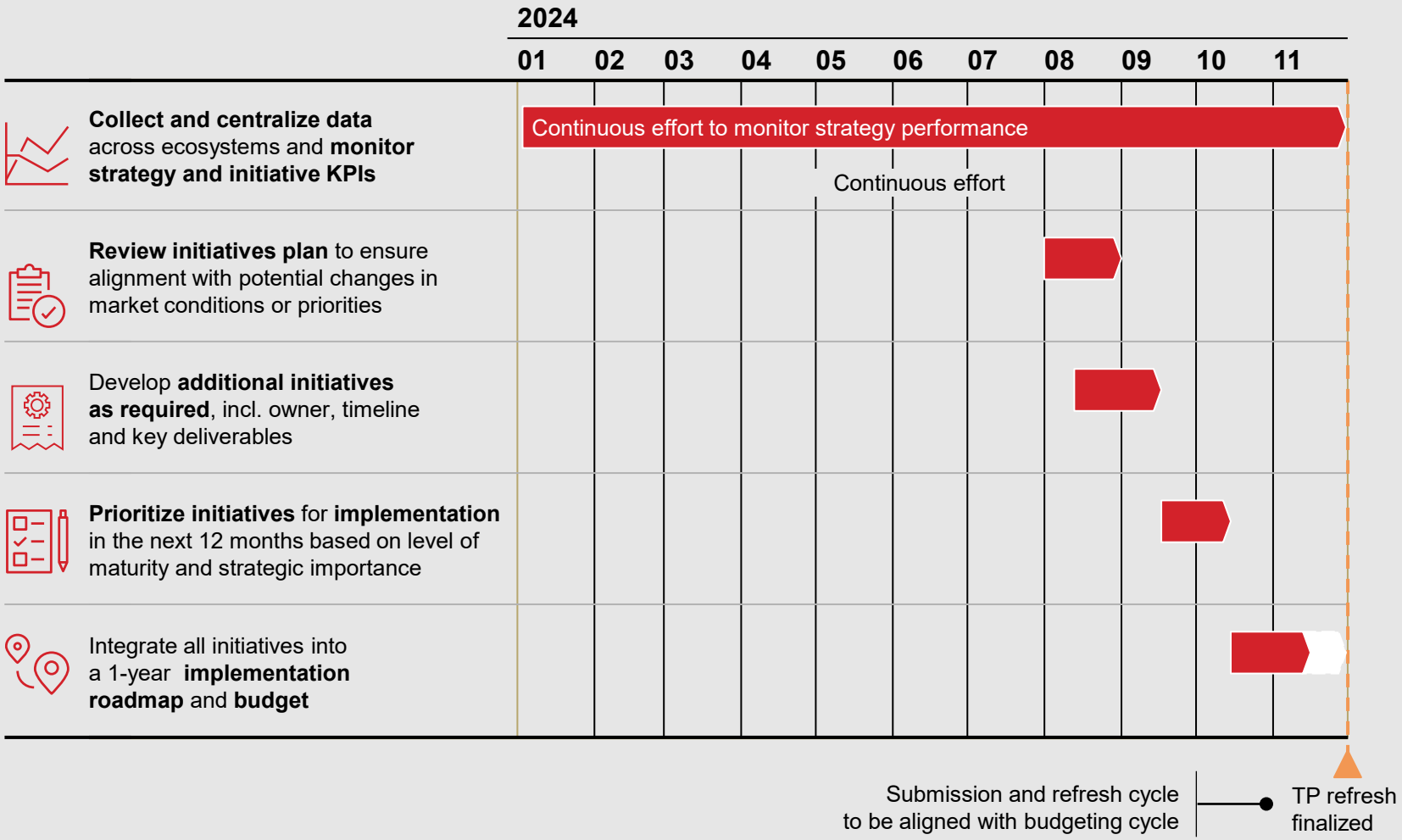
There are 3 review cycles for the strategy: major review, tactical plan refresh and trigger-based review

Detailed next

	 **Major review and strategy definition**	 **Refresh of tactical plan (initiatives and budget)**	 **Trigger-based review**
Update frequency	Every 3 to 5 years	Every year (interim years of major reviews)	As needed
Objectives	(Re)**evaluate strategic choices and integrated postures adopted** in the context of the strategy (Re)assess **prioritization of strategic objectives/ trade-offs made** based on recent developments and strategy performance	Review initiative prioritization and develop **yearly implementation roadmap/ budget** Update **KPIs with data collected**	**Ad-hoc strategy review** requiring immediate strategic decision making outside of the regular review cycle (major review or yearly refresh)

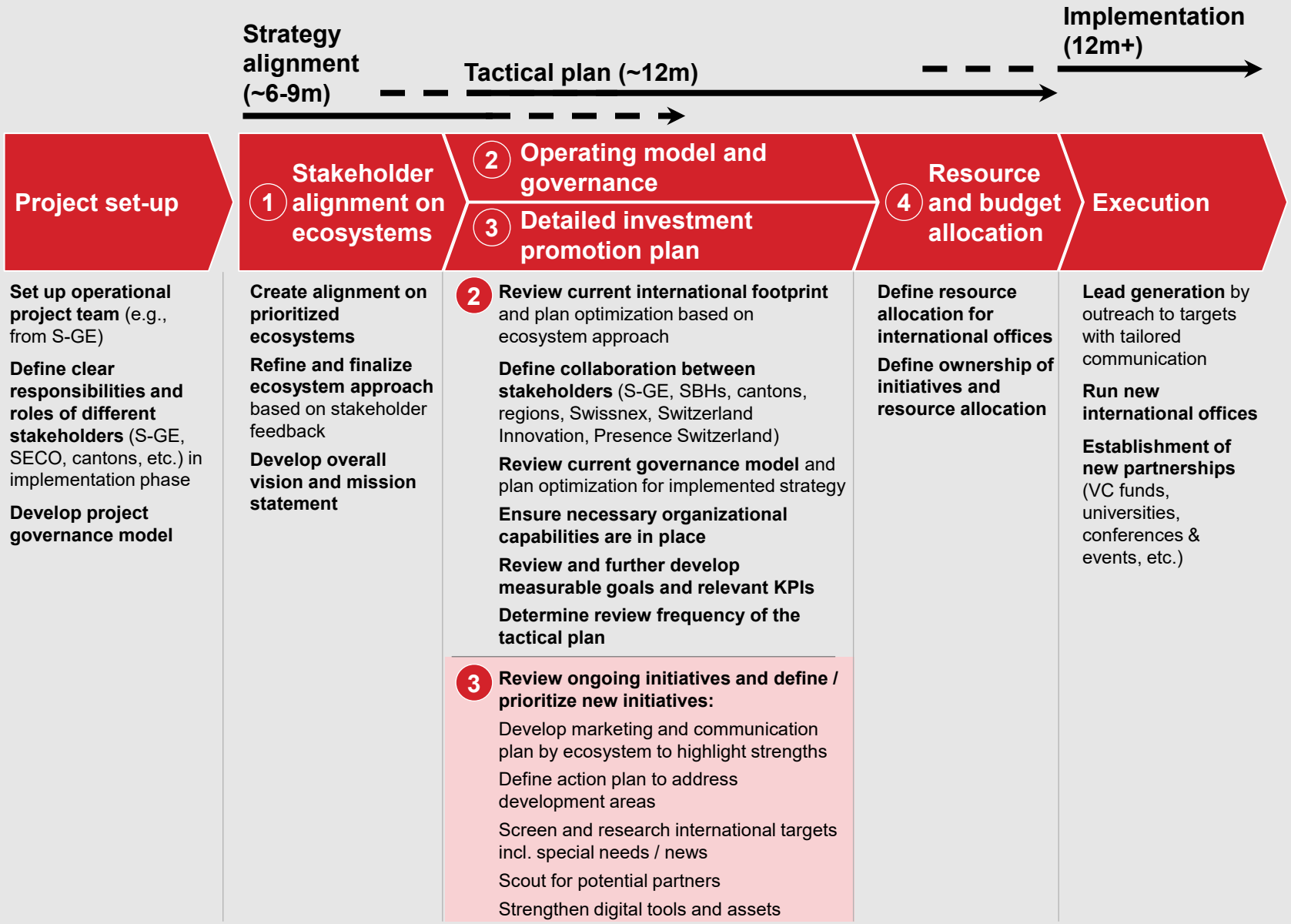
2. Review cycle of tactical plan (2/2)

The yearly refresh of the tactical plan (TP) focuses on initiatives, implementation roadmap and budget definition



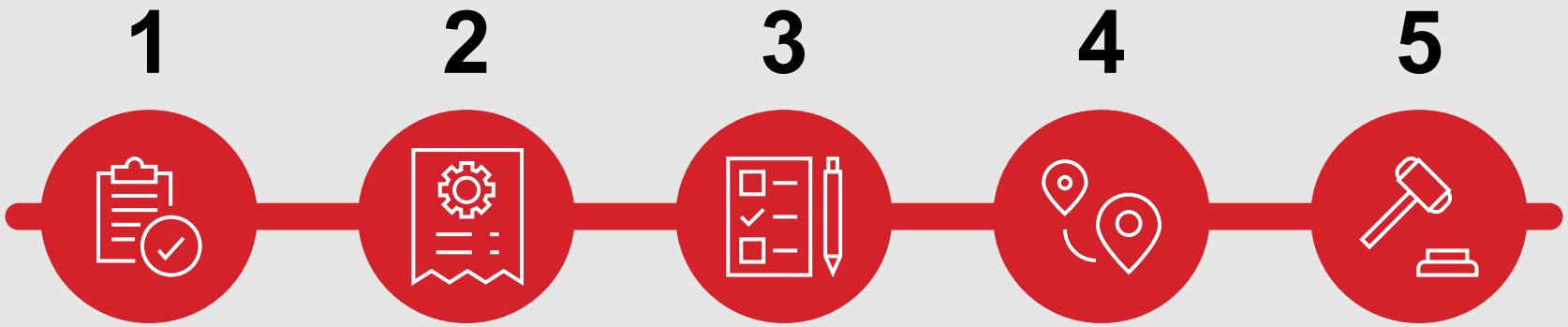
Long-term Implementation roadmap

Roadmap until Go-Live in 2024



3. Detailed investment promotion plan – Definition initiatives

Moving from strategy definition to initiatives and implementation planning is a 5-step process



Review ongoing initiatives and define additional initiatives to support the delivery of the strategic choices

Develop **coherent set of initiatives** with clear owners, expected impact and critical activities/ requirements

Prioritize initiatives for **implement-ation** and sequence over a specific time horizon

Develop an implement-ation roadmap for the immediate term

Assign ownership and define supporting **governance model** to execute, track progress and reassess the initiatives

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3. Detailed investment promotion plan – partnerships (1/2)

Collaboration with media entities, universities, and conferences & events are a significant tool to increase awareness

Purpose	Type of Partners		
	A Media Entities	B Universities	C Conferences & Events
1 **Branding & Marke-ting** 	 EDB Singapore partners with Edelman to **research and develop new approaches to communications and marketing** using predictive and intelligent technologies	 In the UK, the Department for International Trade works with Birmingham University on a business module to **engage with students and strengthen its association with leading universities**	 Dubai FDI collaborates with the Web Summit to **organize workshops, gatherings and special events to promote Dubai** as an investment and entrepreneurship destination of choice
	 Dubai FDI **collaborates with the Wall Street Journal on marketing and promotion initiatives** to North American and European audiences, during the Dubai Investment Week	 EDB Singapore works with Nanyang Technological University to **fund non-bonded scholarships named after EDB** for PhD research students to promote EDB Singapore's branding	 IDA Ireland **co-hosts, with the Financial Times, the European Financial Forum in Dublin** that attracts international and Irish business leaders and policymakers and promotes Ireland's branding in global business community

Source: Web research

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3. Detailed investment promotion plan – partnerships (2/2)

Collaborations with accelerators & incubators, VC funds, and universities can lead to better access to capital and talent availability

Purpose	Type of Partners			
	A Accelerators & Incubators	B VC Funds	C Universities	D Government Entities
2 Lead Generation	IDA Ireland works with Citi to **provide mentorship and office space** for FinTech start-ups in Dublin	The Saudi Arabian General Investment Authority (SAGIA) **launches a VC network with leading VC funds, such as Dubai Angel Investors**, to support the latter's portfolio start-ups to enter Saudi Arabia	SAGIA collaborates with King Abdulla University of Science and Technology to **build a hi-tech entrepreneurial network to attract investors and start-ups** in and outside of Saudi Arabia	EDB Bahrain partners with Digital Jersey, a Jersey Island's initiative, to **drive digital innovation** across both jurisdictions, and to **assist entrepreneurs to create** digital businesses, products and services
	EDB Singapore works with BCG Digital Ventures to **open an Innovation Center that accelerates innovation** across Southeast Asia and establish Singapore as a hub in global start-up ecosystem	EDB Bahrain, MSA and Al Salam Bank are to **collaborate on a VC partnership** of $50 m to **advance Chinese technologies and business models** to the Middle East markets	IDA Ireland works with Enterprise Ireland and leading Irish universities to **operate a Learnovate Center**, a leading center of excellence for innovation and research, to enable Irish industry **to access Ireland's research community**	EDB Singapore agrees on a partnership with ST Engineering, Singapore's national defense manufacturer, to **build globally competitive industry ecosystems for targeted industries**, such as robotics, mobility, health tech, where Singapore could have advantages

Source: Web research