SynBio Innovation Ecosystems: Insights from the SYNBEE Project

SYN BEE

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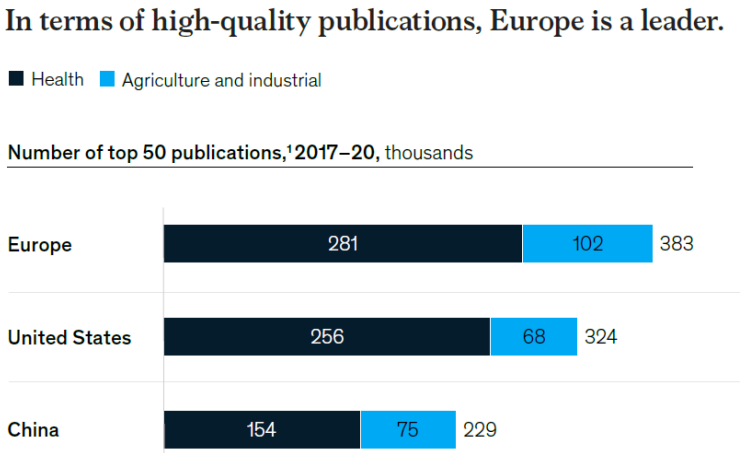
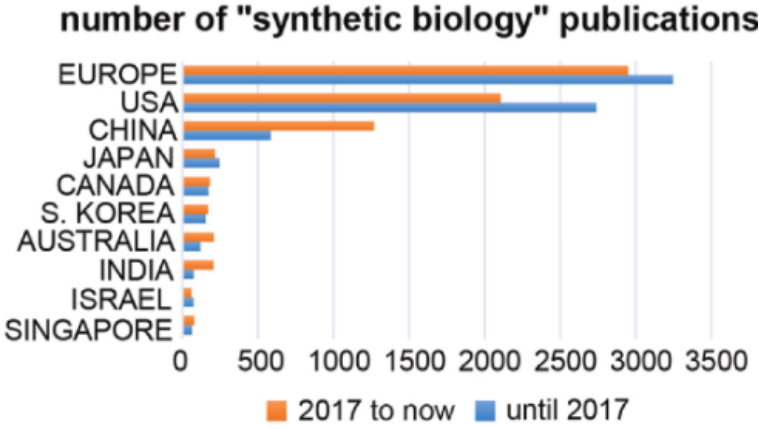
Introduction



Source: McKinsey & Company Reports (2022)



Source: (Donati et al., 2022)

1 Europe has strengths that could make it a leading player in the Bio Revolution, but it risks falling behind

2 Europe is at risk of missing the full potential of the Bio Revolution

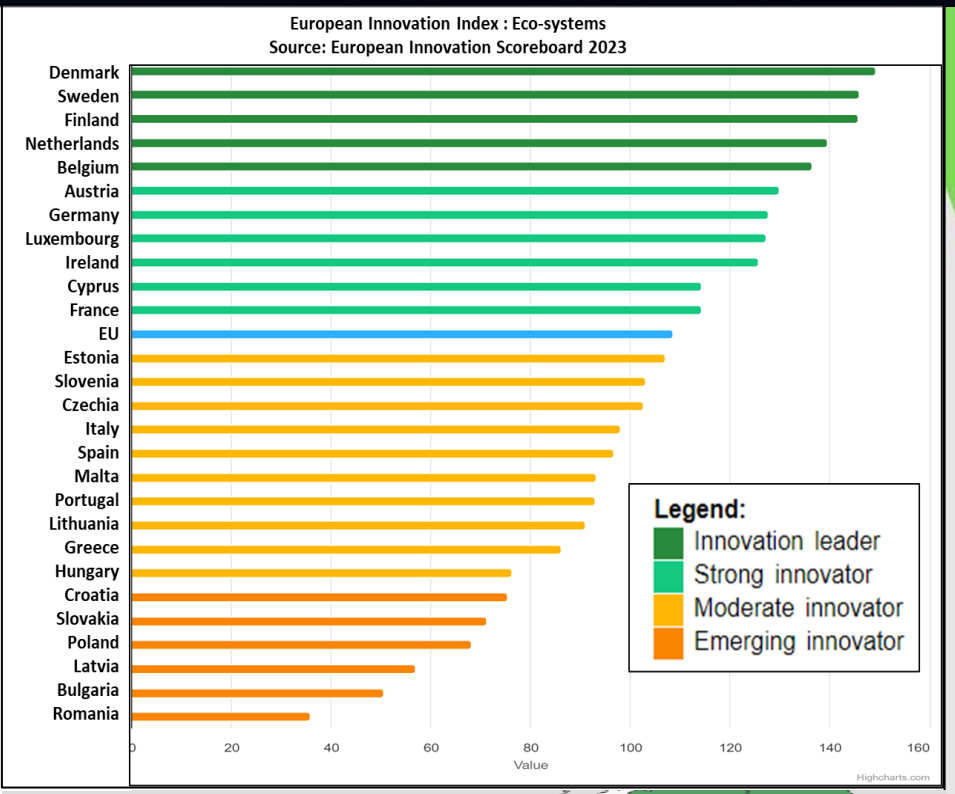
3 The Bio Revolution can make a significant impact on health and sustainability challenges, but Europe needs to do more

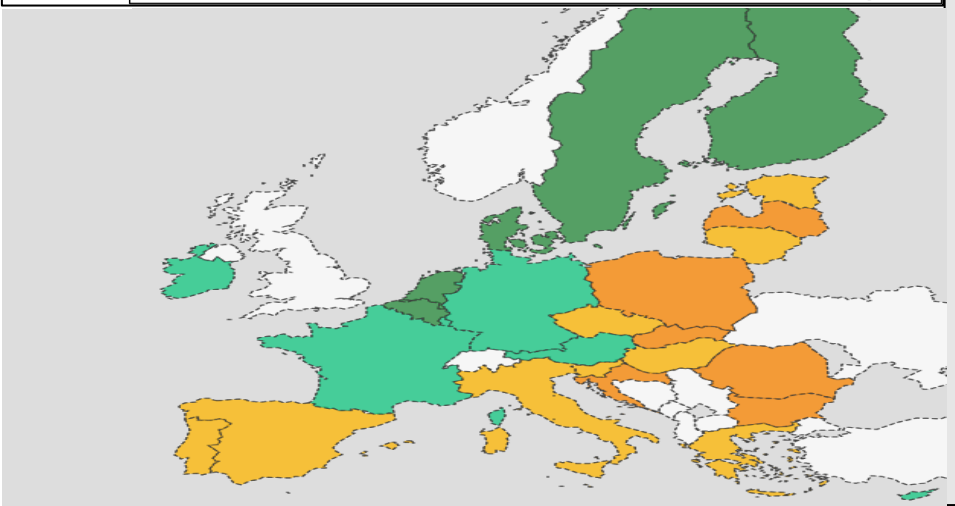
Few Statistics

- Global synthetic biology market to hit $30.7B by 2026, growing at a 26.5% annual rate from $9.5B in 2021.
- Europe lags the US in the Bio Revolution: 4,500 vs. 8,000 companies.
- US companies receiving funding since 2015 more than double Europe's: 3,577 vs. 1,558.

Source:. McKinsey & Company (2023) *Europe's Bio Revolution: Biological innovations for complex problems*.

SYNBEE Objectives





Weaknesses

Identify weakness in the eco-system to create Europe as a leader in synthetic biology

Threats

Pre-determine any threats and place strategy in place.

S W O T

Strengths

Identify strengths from one eco-system to be adapted in another eco-systems in Europe

Opportunities

Define opportunities to explore to reach the full potential of the innovations

Survey Design & Methodology

Survey design: Closed ended questions with multiple choice and option for text input.

Themes: Funding, Education and training, mentorship, industry-academia collaboration etc.

Data Collection and Analysis: Data is presented in non-stacked bar charts across different ecosystems.

SWOT Analysis : Themes Start-up Creation

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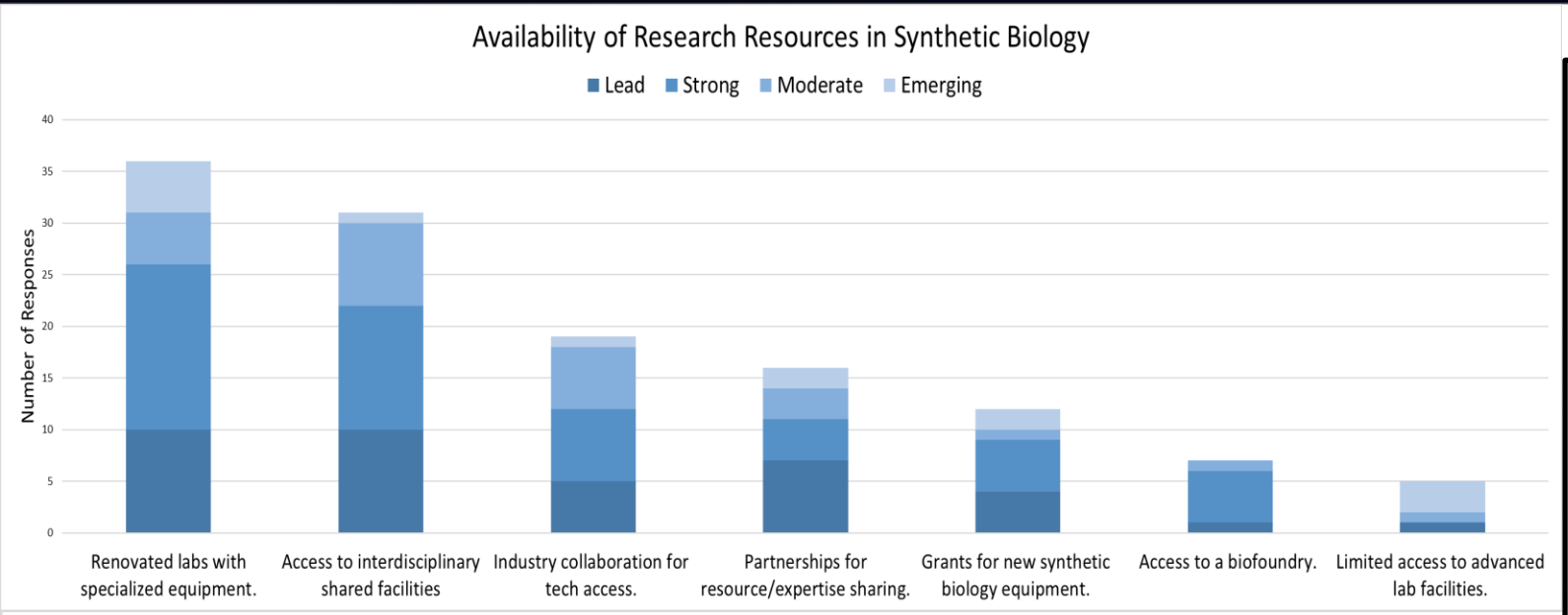
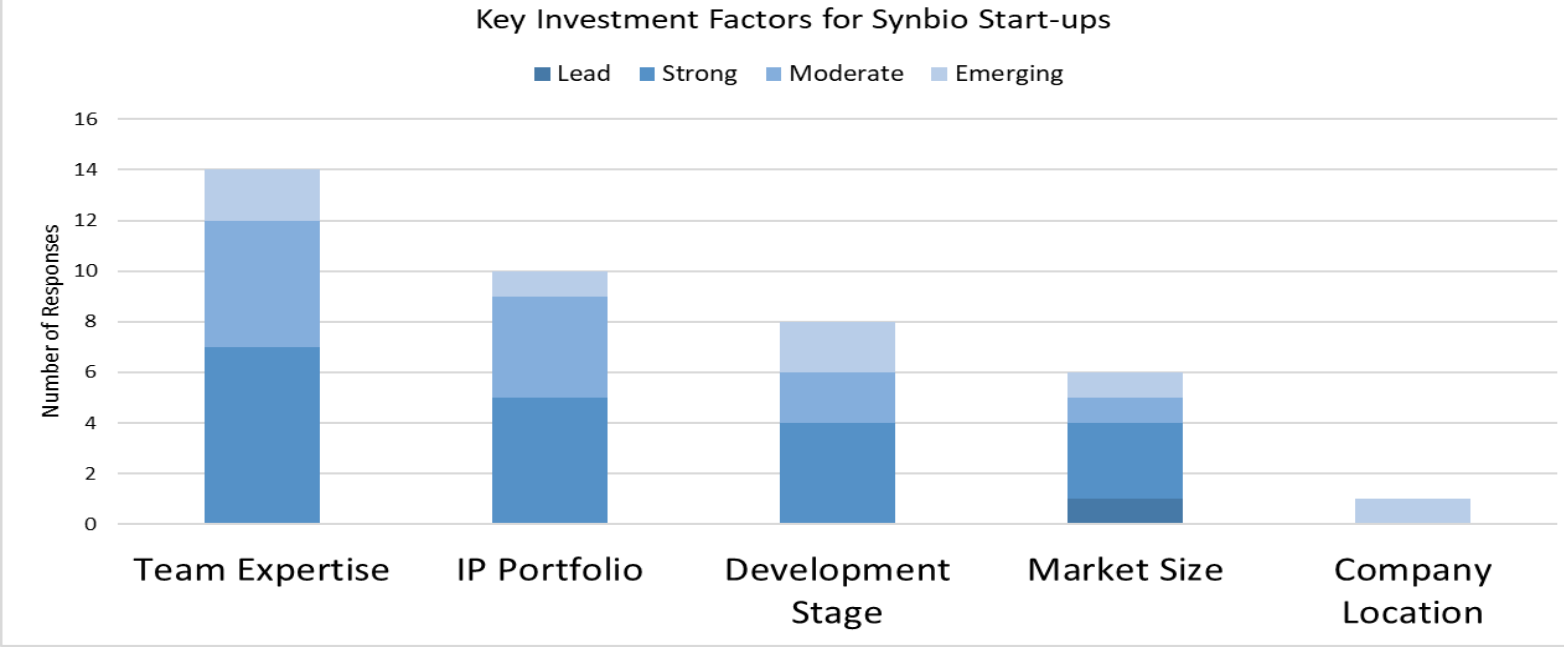
SWOT Insights from Themes : Start-up Creation

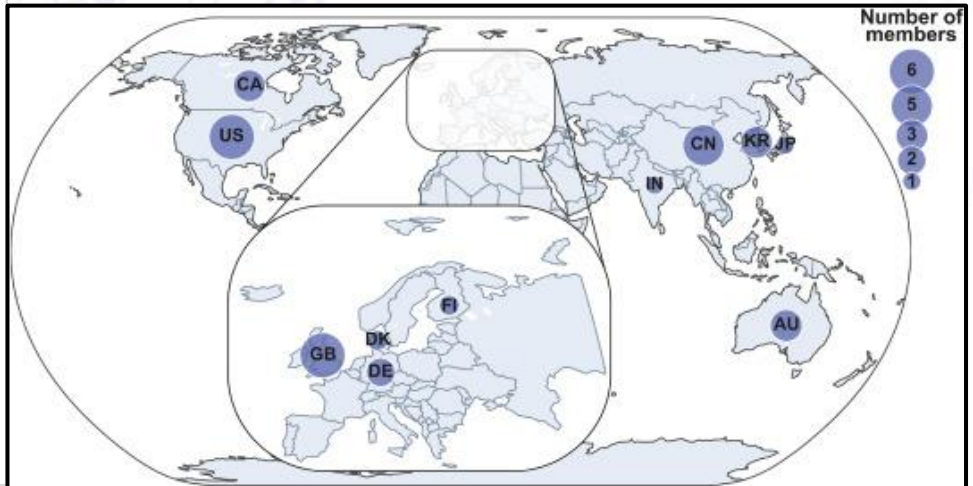




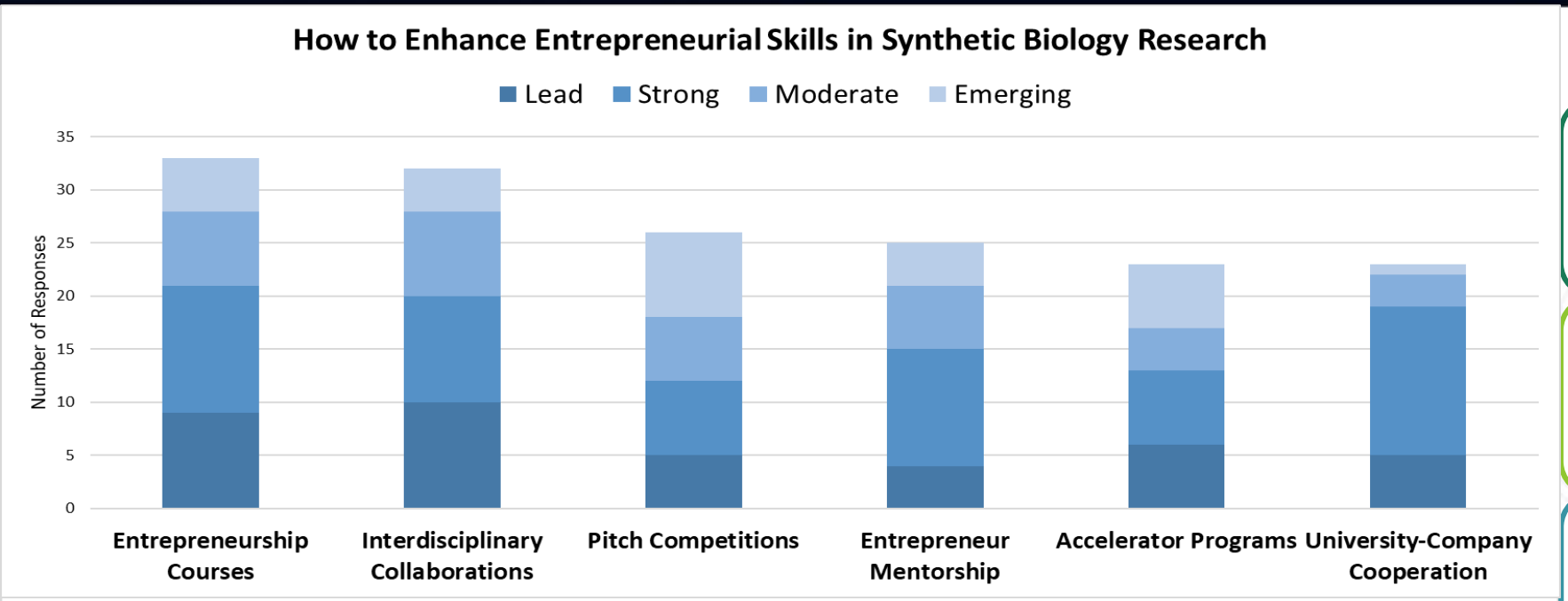
Grant funding for Equipment:

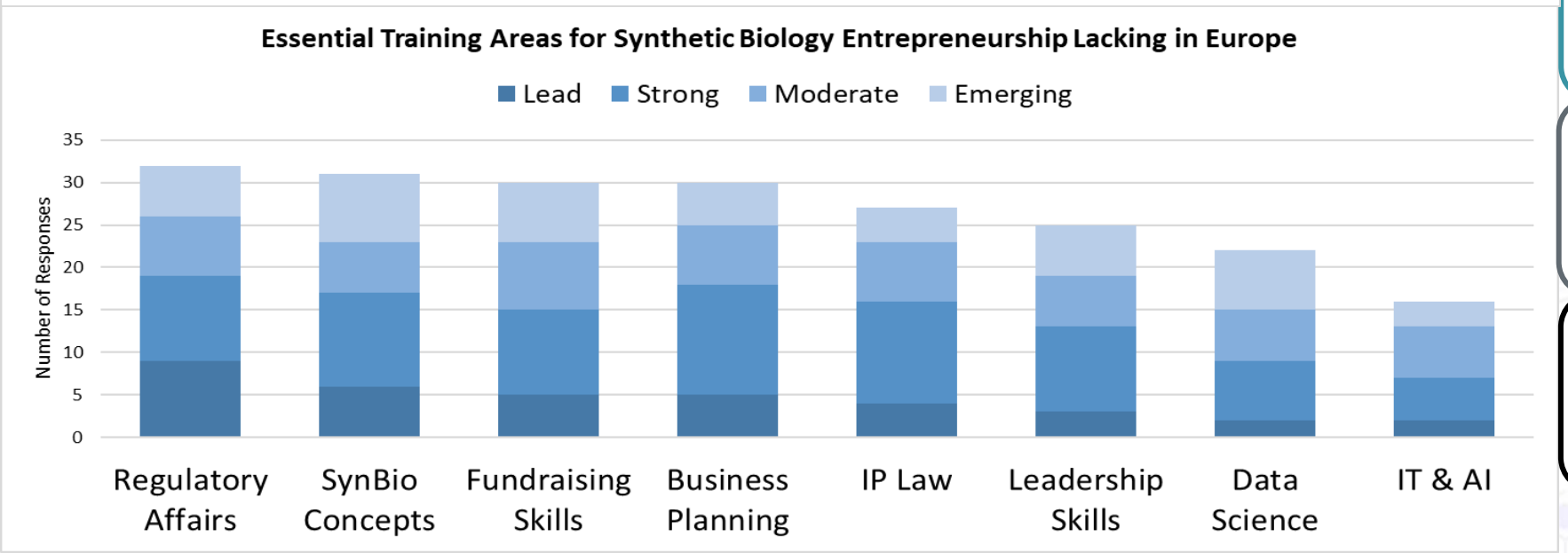
Lead	Strong	Moderate	Emerging
NWO BaSyC European Commission erc fwo Opening new horizons	UK Research and Innovation Biotechnology and Biological Sciences Research Council Bundesministerium für Bildung und Forschung erc DFG Deutsche Forschungsgemeinschaft	HORIZON Estonian Research Council	Vertically Integrated Project

Current members of the Global Biofoundries Alliance (GBA) (Donati et al., 2022)



SWOT Insights from Themes : Start-up Creation





SYNBEE Training program

- Understanding the Biotech market
- Access to public/private funding
- Finding your market
- Intellectual Property
- Understanding gender bias in your career

SWOT Insights from Themes : Start-up Creation

Strengths

Academia-Industry Collaboration: Strong ties in Lead/Strong ecosystems boost start-up innovation.

Skilled Workforce: Supports innovative start-up development in Moderate/Emerging ecosystems.

Access to specialized Equipment – Strong and Lead eco-systems

Weaknesses

Resource Limitations: Limited Infrastructure or availability of clusters/hubs

Funding Uncertainty: Lack of clarity on public funding complicates financial planning**.**

Difficulty in accessing interdisciplinary skills/Team expertise

Opportunities

Training and Mentorship: Enhanced mentorship and training needed to nurture start-up growth.

International Talent Recruitment: Addresses skill shortages, enriching innovation diversity.

Strategic planning and creation of hubs/clusters

Threats

Regulatory and IP Challenges: Compliance and protection issues may hinder investment.

Talent Retention: Difficulty in attracting/retaining professionals impacts start-up development.

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SWOT Analysis : Themes
Regulatory Aspects

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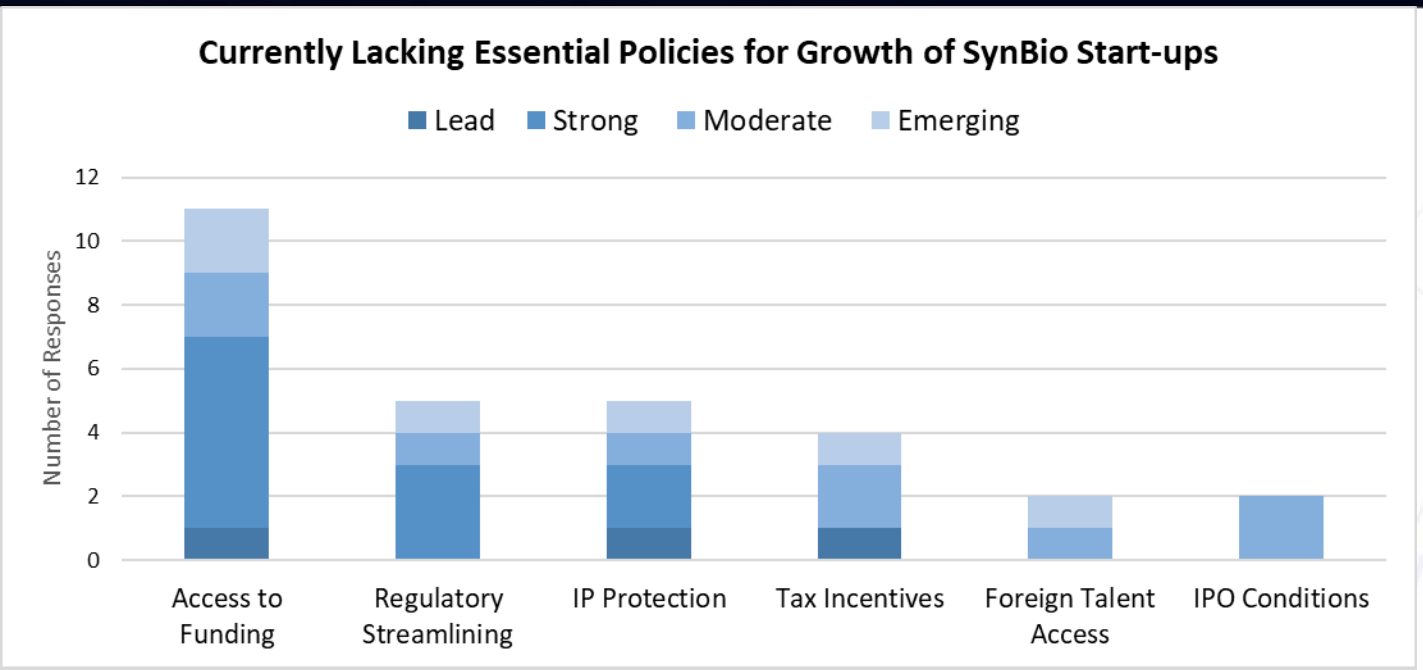
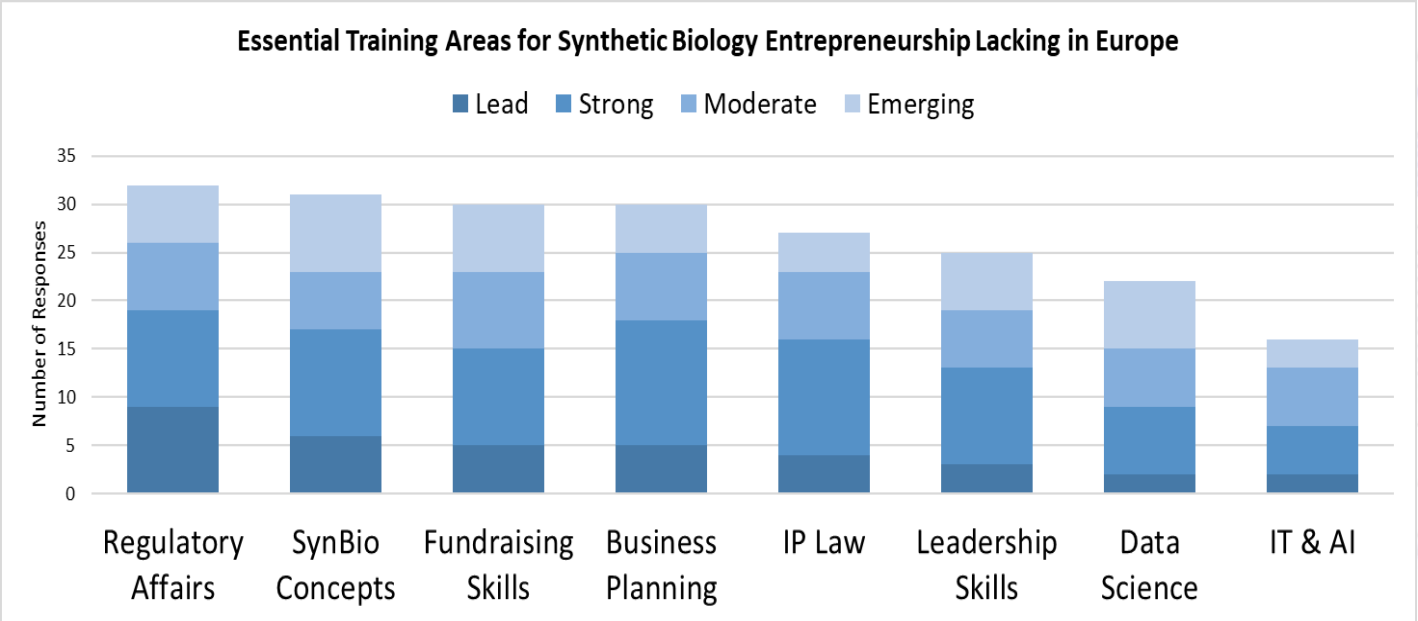
SWOT Insights from Themes : Regulatory Aspects





- **Regulatory Harmonization**: A unified regulatory framework across Europe can streamline innovation processes – Such as the EU Biotech Act, EU Biotech Hub with regulatory Sandbox

Specialized sandbox for SynBio?

SWOT Insights from Themes : Regulatory Aspects

Strengths

Proactive Regulatory Discussions with govt

Funding from Horizon Europe : Setting regulatory standards for SynBio projects assuring compliance.

Weaknesses

Regulatory Barriers: Government regulations viewed as obstacles across ecosystems, impacting funding and licensing.

Lack of streamlined regulations

Limited Engagement in regulatory support due to lack of experts in Synbio at both local and national level

Lack of experts in regulatory affairs: No training

Opportunities

Regulatory Harmonization: Potential for a unified framework to simplify compliance and foster innovation across Europe.

Adaptable Policies: Tailoring policies and funding strategies to meet regulatory needs

Regulatory sandbox: EU Biotech Act, EU Biotech Hub

Threats

Ethical and Safety Concerns: Differing societal and regulatory

Development Inequality: Disparities in regulatory support risk uneven growth within the synthetic biology sector.

Decreased investment: Due to absence of clarity in regulation and fragmented market

Regulatory Compliance and IP Protection issues

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SWOT Analysis : Themes
Public Funding

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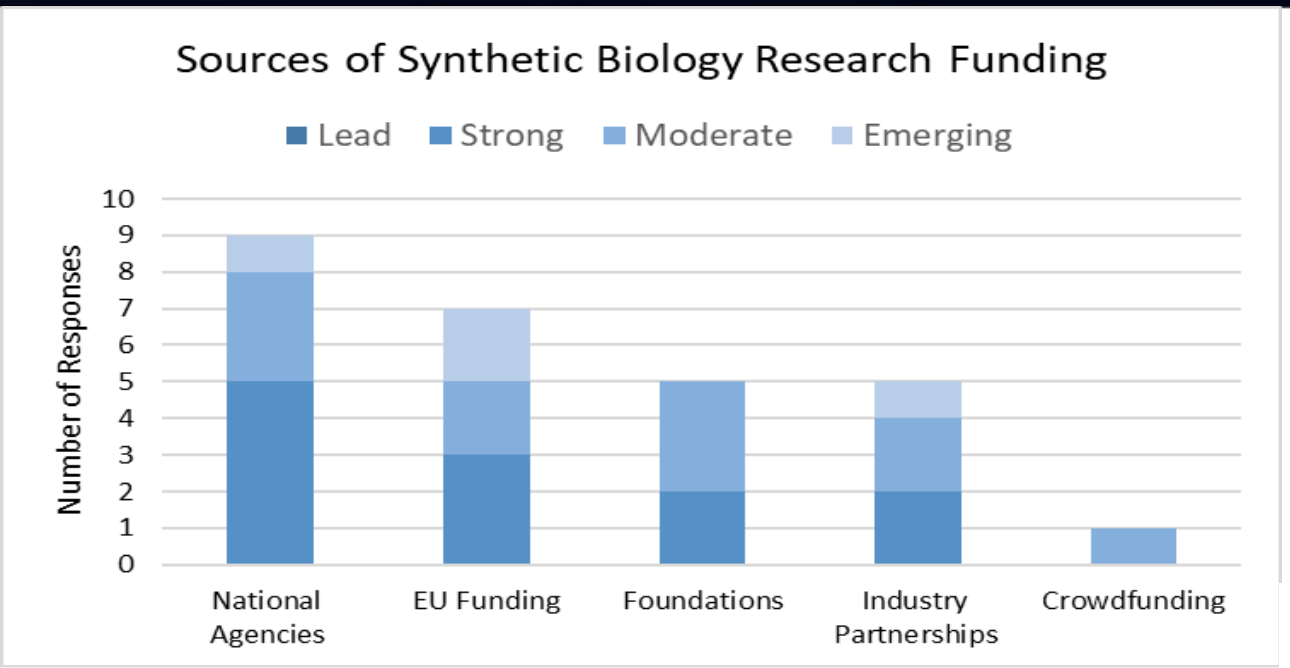
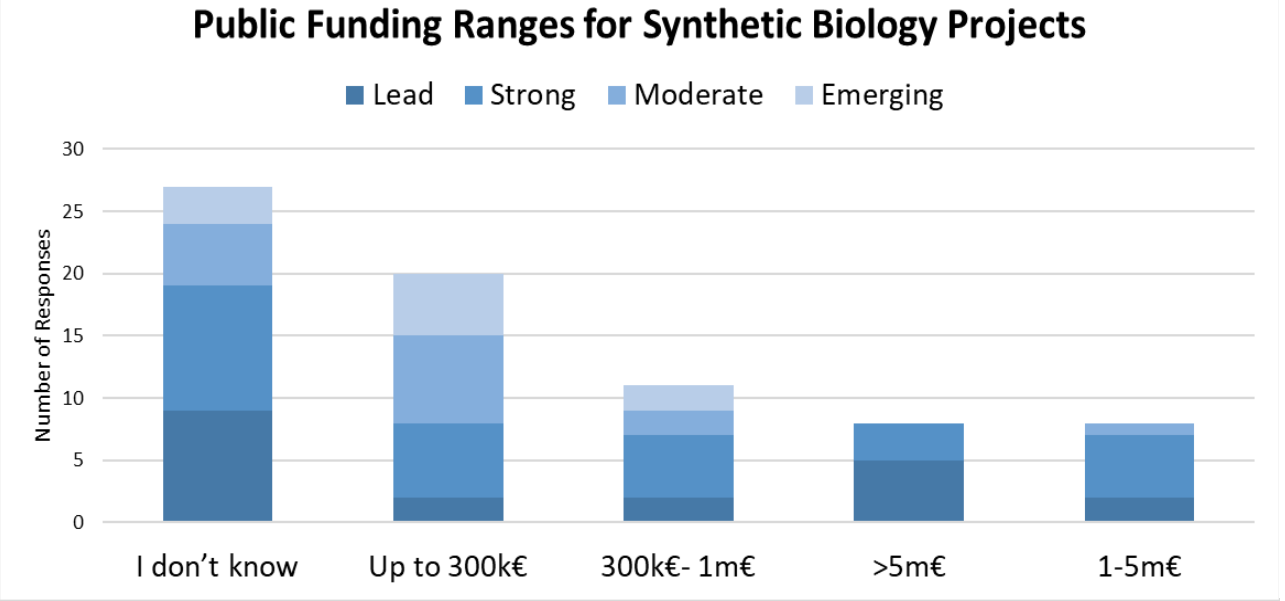
SWOT Insights from Themes : Public Funding





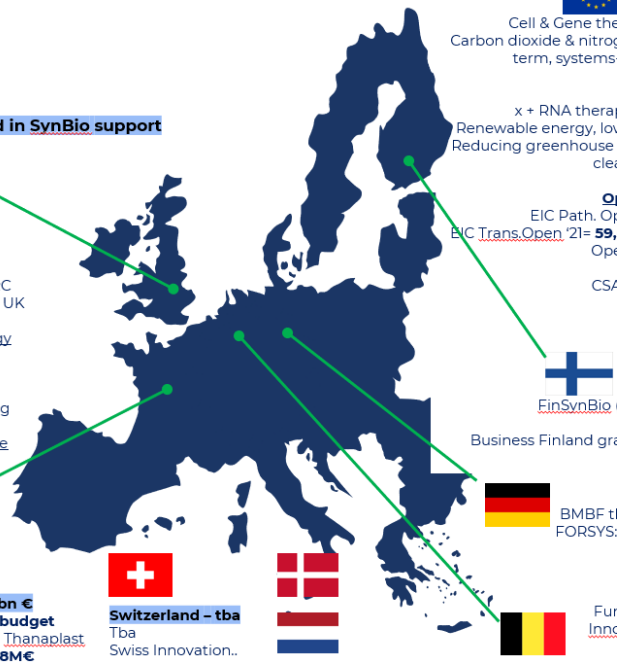
National Agencies

European Union
European Regional Development Fund

Industry Partnerships

tecnalia
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Non-dilutive funding: synthetic biology landscape in Europe



UK champion track – record in SynBio support

UK RI=> Synthetic Biology for Growth Programme, Synthetic Biology Leadership Council => **50M£** government capital investment back in 2012 + Since – regular support
1,37M£ capital invest - BBSRC
50,5M£ main funding bodies: BBSRC, EPSRC and MRC for academic research + Innovate UK for private (**Up to 10M£**)
70,5M£: 6 Multidisciplinary Synthetic Biology Research Centres (SBRCs) in Bristol, Nottingham
18M£ - focused on DNA synthesis
2M£ investments in targeted synbio training (Bristol, Oxford, Warwick, UCL)
10M£ capital fund - SynBio Seed Fund (since 2013)
20M£ - UK Research and Innovation (UKRI) and the Defense Science and Technology Laboratory allocate funds for Engineering biology

France – ambitious France 2030 Plan = 34bn €
Biotherapies & Biomanufacturing - **800M€ budget**
Ex. previously funded SynBio: TWB – **27M€** , Thanaplast – **22M€**, SYNTHACS – **8M€**, BIOIMPULSE – **28M€**

Switzerland – tba
Tba
Swiss Innovation..

European Commission 2021-2022:
Top-down calls, targeting SynBio:
Cell & Gene therapy (EIC Path.2021) + 1-2 challenges: **132M€.**
Carbon dioxide & nitrogen management and valorisation, mid-long term, systems-integrated energy storage, cardiogenomics, healthcare continuum technologies,
DNA data storage (EIC Path.'22) = **167M€**
x + RNA therapies and diagnostics (EIC Trans.'22) = **60.5M€**
Renewable energy, low carbon, en. storage (EIC Accel '21) = **495M€**
Reducing greenhouse emission, carbon removals, climate, energy / clean electricity, sustainable aviation, cars, ships (EIC Accel.2022) = **537M€**
Open (bottom-up) calls, available for SynBio:
EIC Path. Open '21 = **168M€** / EIC Path. Open '22 = **183M€**
EIC Trans.Open '21= **59,6M€** / EIC Trans. Open '22 = **131M€** EIC Accel. Open '21 = **592M€** / EIC Accel. Open '22 = **623M€**
2017 – 2022: Infrastructure IBISBA - **5M€**
CSA SUPERBIO – **3,8M€**. IPM-4-CITRUS – **0,8M€**
9 ITNs MSCA in SynBio = **36M€**
100 ERC "SynBio" ~**305M€**
Breakthrough Energy Catalyst – **400M€**

Finland – SynBio Powerhouse
FinSynBio (Academy of Finland) call / year – **10M€+2M€**
VTT gouv, funding: - **85M€/year**
Business Finland grants (2020) bottom-up/focus on biomaterials, carbon neutral tech : **653M€**

Germany – GASB – German Asso of SynBio
BMBF thematic calls HepatoSys, QuantPro, SysMO + FORSYS: 4 excellence centers in SynBio, + RI – **158M€**
BMBF - ERASysBio bi-lateral calls

Belgium – BeSynBio
Funding track: mainly bottom-up funding from Innoviris, Wallonia Region (**up to 1M€**). Strategic focus on cell/gene therapy

SWOT Insights from Themes : Public Funding

Strengths

National and EU Funding: Strong/Lead ecosystems benefit from consistent funding, boosting synthetic biology innovation.

Diverse Public Funding Sources: Reliance on various national and EU sources ensures support across ecosystems.

Weaknesses

Funding Uncertainty: Lack of clarity on funding amounts and conditions complicates project planning across all ecosystems.

Limited Resources: Emerging ecosystems struggle with accessing sufficient public funding, affecting project progression.

Opportunities

Interdisciplinary Collaborations: Existing public funding could enhance collaborations, driving innovation in synthetic biology.

Curriculum Development: Utilize funding to develop educational programs, building a skilled talent pool.

SynBio specific calls for Low TRL ideas to bridge between research and innovation

Threats

Perceived Insufficient Benefit: Some ecosystems feel current public funding doesn't adequately support research or startups.

Talent Attraction and Retention: Uncertainty in funding could result in talent migration to more stable environments.

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SWOT Analysis : Themes
Private Funding

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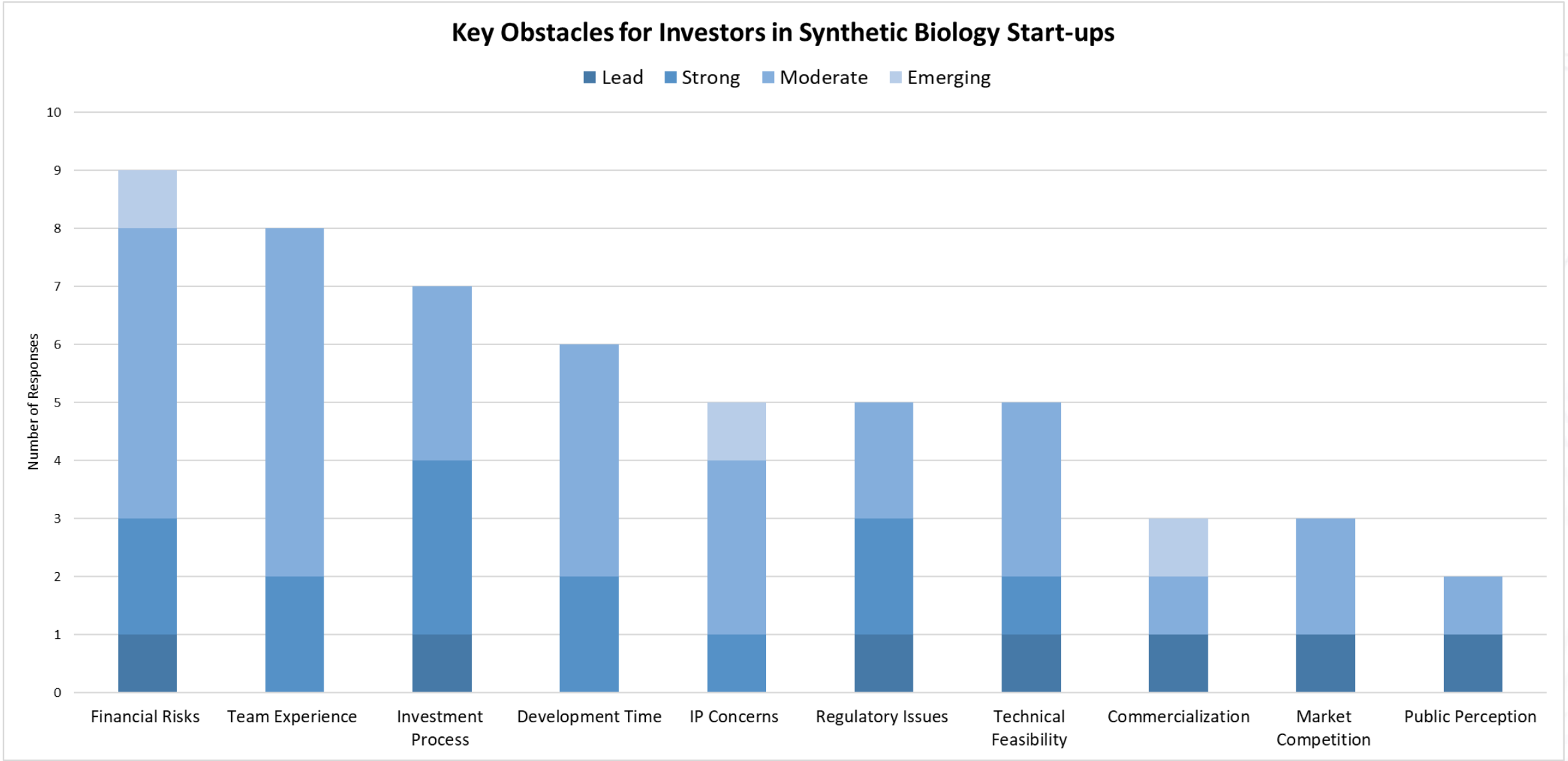
SWOT Insights from Themes : Private Funding



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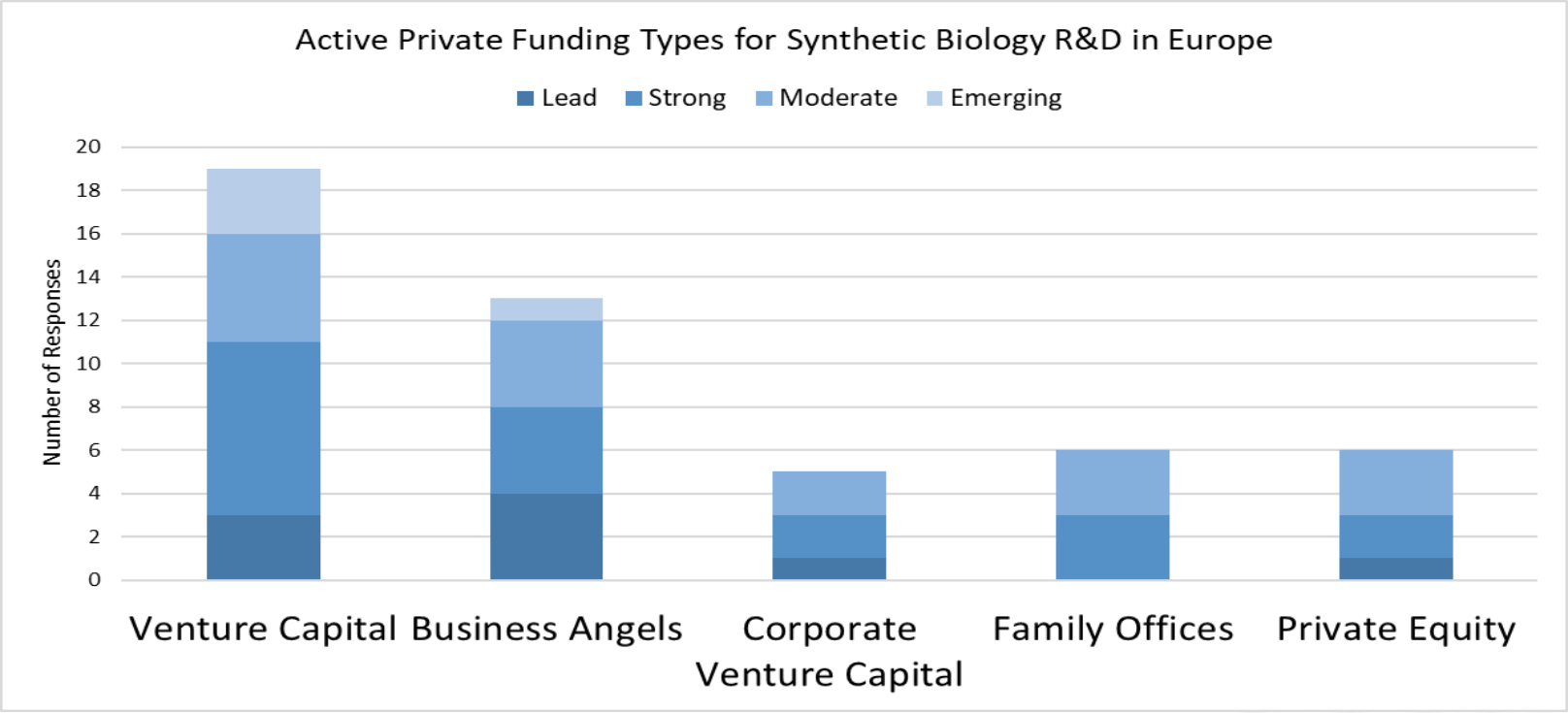

Other Private Funding Options

Lead	Strong	Moderate	Emerging
Business Finland Corporate collaborations		Clever Capital	Innovation Grants Company charity donation

Most respondents weren't aware of any other private funding opportunities.

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SWOT : Insights from Themes : Private Funding

Strengths

Diverse Funding Sources: Lead ecosystem enjoys broad public and active private funding, fostering a thriving startup environment.

Public perception: Public seem to be more aware of the benefits of SYNBIO products

Weaknesses

Risk adverse Investors: financial risk seen as key obstacle in invest in Synbio

Limited Private Funding: Strong ecosystems face challenges in accessing private capital, potentially restricting growth.

Lack of Knowledge about investors and the process

Opportunities

Mentorship and Skill Development: To prepare startups in Emerging/Moderate ecosystems for successful funding.

Expanding Private Funding: Potential in Strong ecosystems to diversify and enhance access to private capital.

Threats

Regulatory and IP Challenges: Across ecosystems, compliance and protection issues may slow innovation and deter investors.

Ecosystem Development Variations: Disparities in maturity can skew access to private funding, disadvantaging emerging ecosystems.

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Thank You

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