



The EU Open Source  
Policy Summit 2021

Friday, February 5 2021

# Final Results

# European Commission

# Open Source Study

(SMART 2019/0011)



# Agenda

13:15 - 13:35

## **Economic Impact**

Knut Blind

13:35 - 13:45

## **Policy Recommendations**

Sachiko Muto

13:45 - 14:15

## **Panel**

Knut Blind

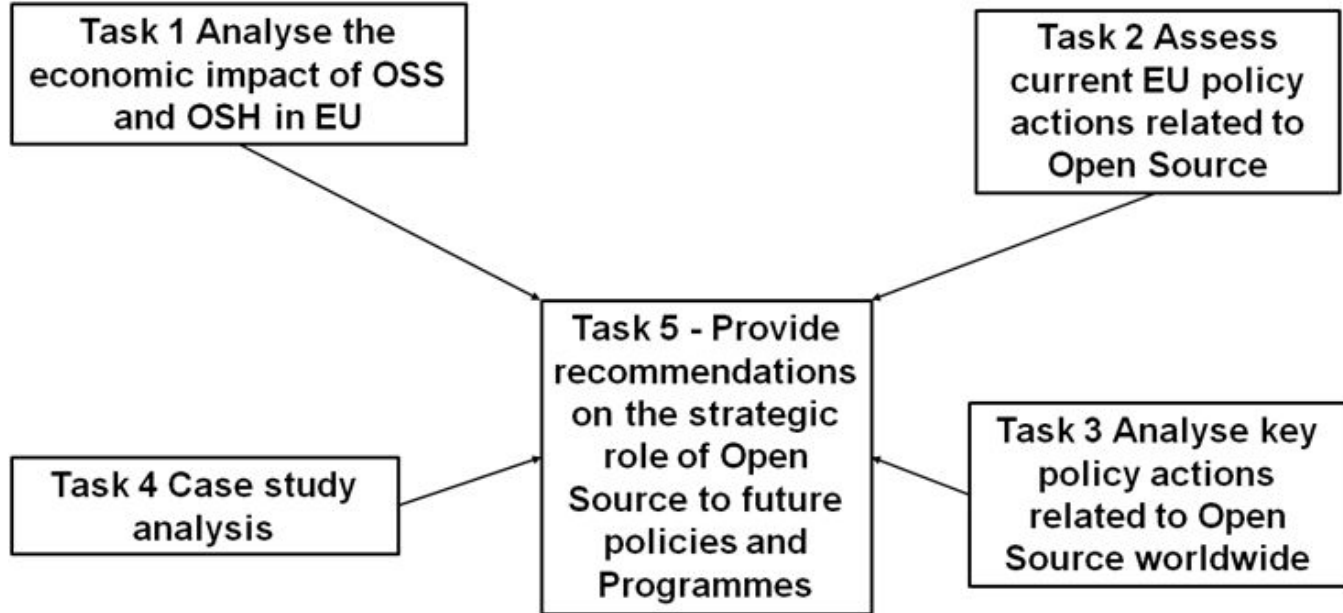
Mirko Boehm

Andrew Katz

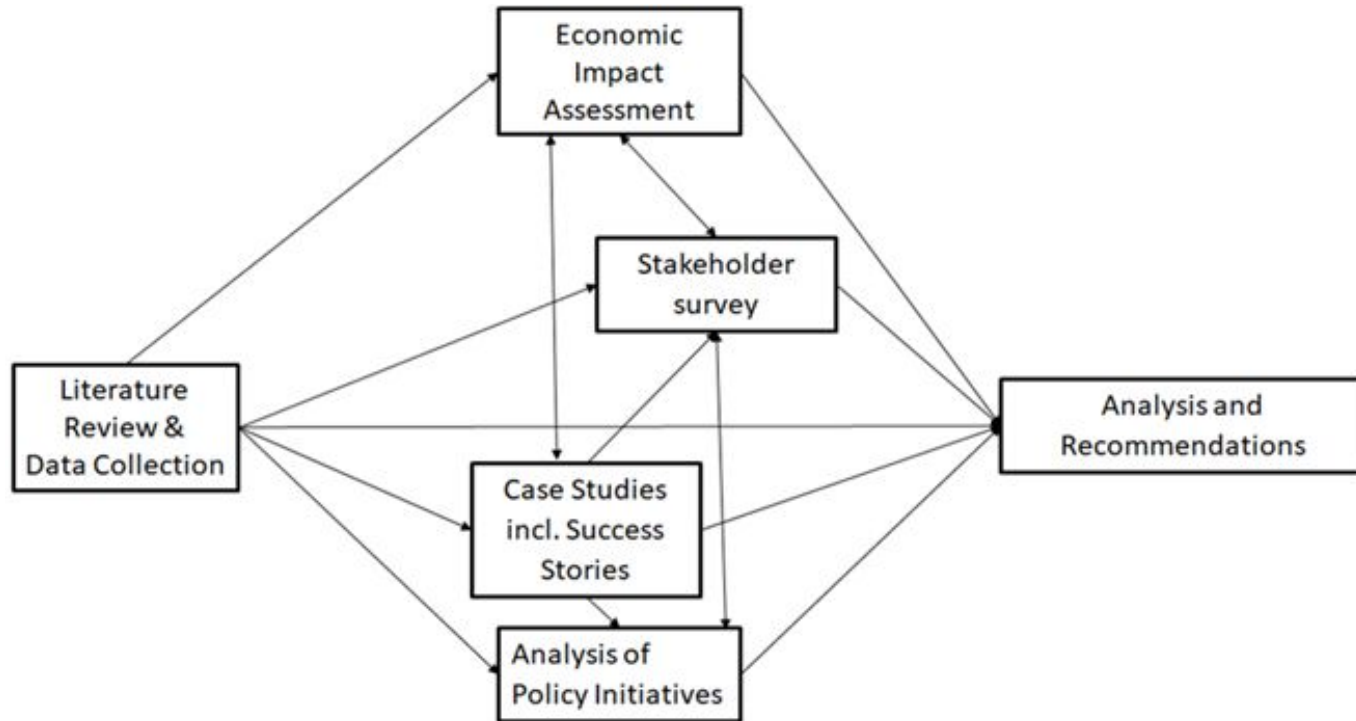
Sachiko Muto

Luc Soete

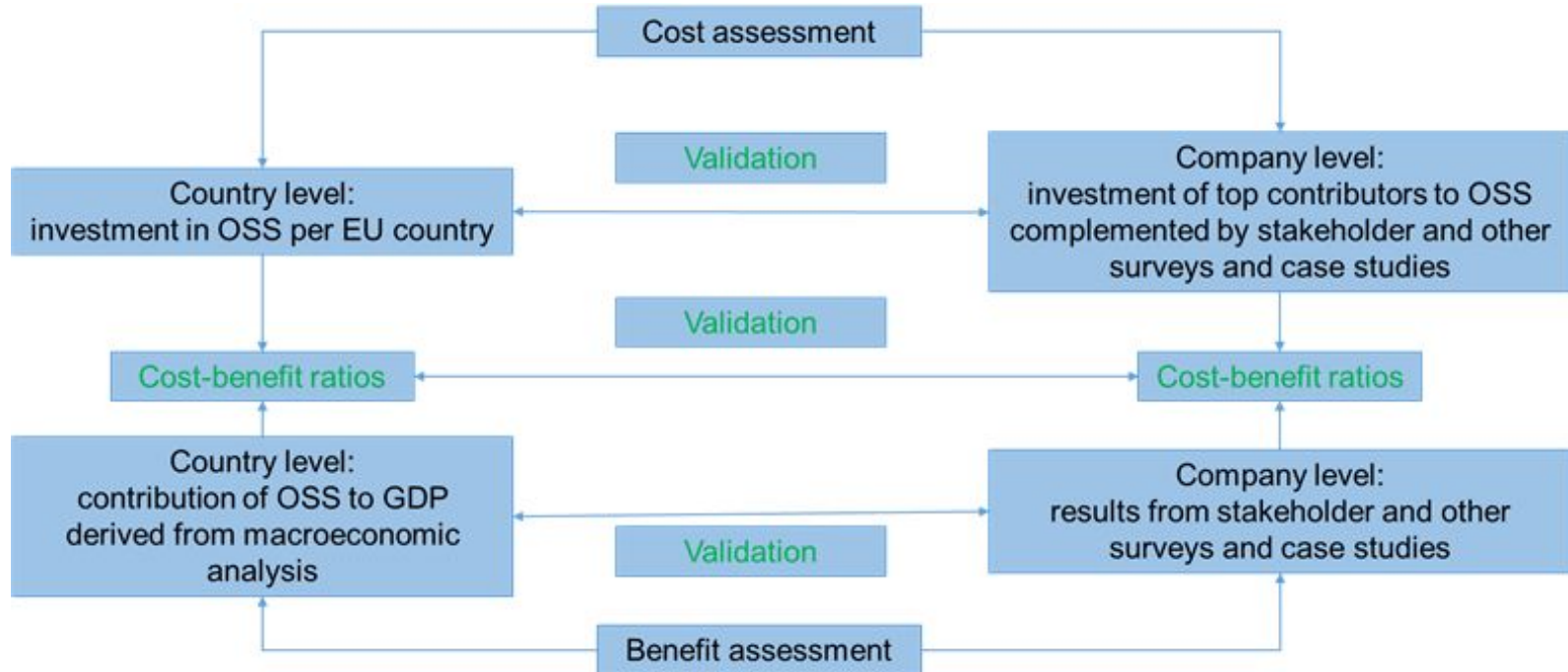
# Tasks and their relations



# Relation of methodological approaches



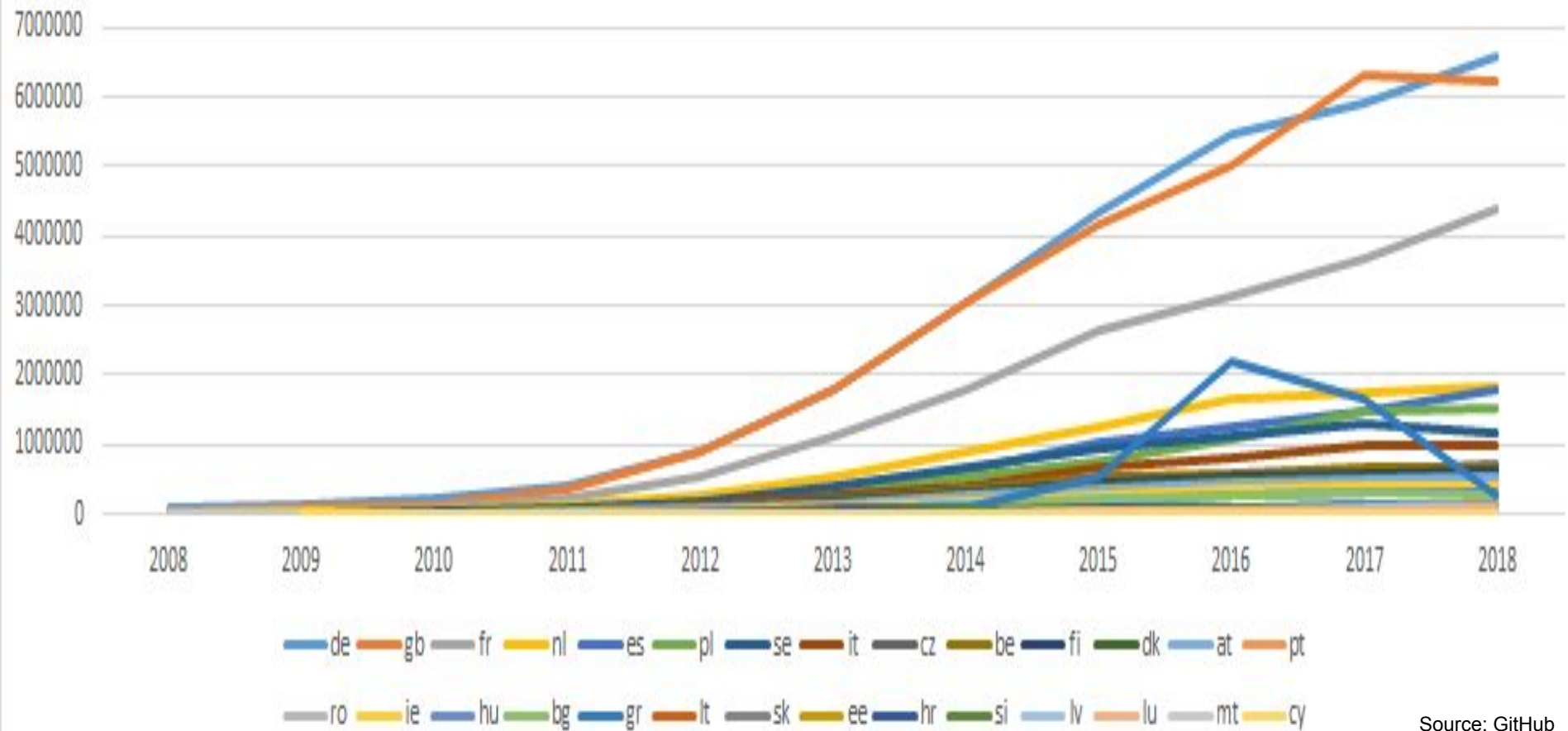
# Overall approach



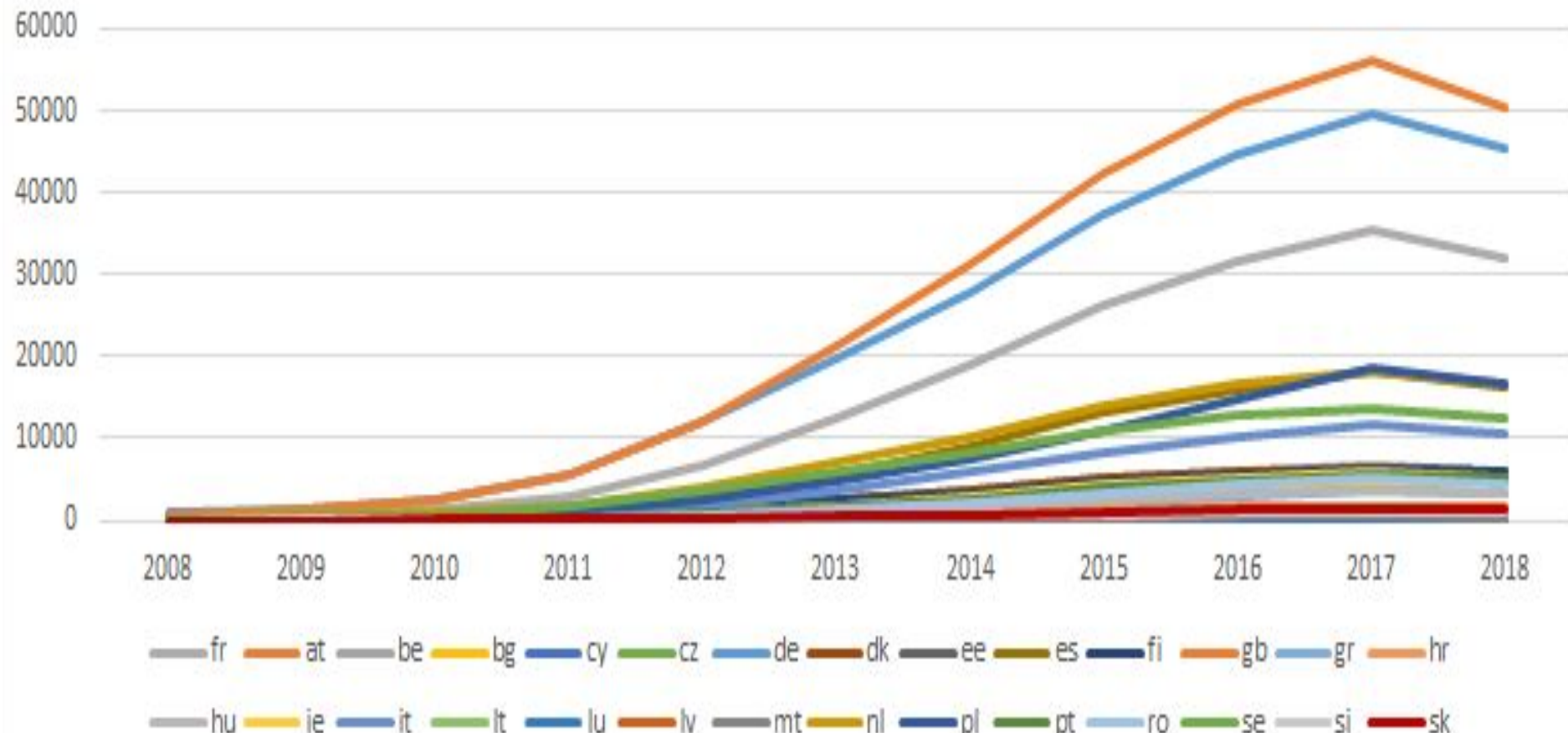
# Data sources

- Open Source Software
  - 1.3 billion commits at GitHub
  - 32 million users at GitHub with 1.5 million organisational affiliations and 2.5 million country codes
  - almost 700,000 organizations
- Economic Data
  - OECD
  - Eurostat
  - European Patent Office
  - Crunchbase, Amadeus, Worldbank, ILO, ...

# Commits by EU Member States



## Contributors by EU Member States





# Cost-based impact assessment

- Two cost-based impact assessments to generate baseline of economic impact of OSS based on two pillars:
  - efforts by the Member States of the EU
  - efforts by the most active companies located in the EU Member States
- Findings only present lower bound of economic impact
- Basic assumption beyond this approach is that benefits, i.e. OSS in the public domain, derived from these investments will at least outweigh invested costs

# The cost of investing in OSS in the EU: the Member State level

- more than **3 millions employees** in computer programming in the EU
- in 2018 more than **260,000 contributors to GitHub**, i.e. on EU average **8.2%** of employees in computer programming
- average personnel cost of all contributors based on full time equivalents of more than **Euro 14 billion** in 2018
- in 2018 more than **30 million commits** to GitHub representing an effort of more than **16,000 FTEs** based on Constructive Cost Model
- **almost Euro 1 billion** invested personnel cost in the EU in 2018

# The cost of investing in OSS in the EU: the company perspective

- **most active companies** in GitHub in 2018 responsible for >12% of contributors and one third of commits **employing > 1 million employees**
- high share of **small companies among most active companies participating in OSS**, i.e. > 75% have < 100 employees
- **the smaller the companies, the more contributors** are listed, **the more commits they provide**, i.e. almost 50% by companies < 50 employees, **and the more efforts they invest**, e.g. those between 11 and 100 employees invest > 5% of their FTEs
- **validity of company and Member State based cost-based approach confirmed**

# Quantification of economic benefit based on European growth model

- elasticity of 0.04, i.e. the **10% increase of commits** as from 2017 to 2018 contributed to GitHub is **contributing 0.4% of GDP** in the EU
- in 2018, 0.4% of the total GDP of Euro 15,900 billion in the EU is a contribution of more than **Euro 63 billion** per year
- an **10% increase in the number of contributors** would increase EU GDP by 0.6%, i.e. **Euro 95 billion** per year
- in summary, EU economy is significantly benefiting from global pool of OSS
- if EU can increase in the future both of them only marginally, additional GDP of **> Euro 100 billion per year** in the EU is possible in the future

# Cost-benefit ratio at the macro level

- Contributions of OSS to GDP based on current and historical code
- Considering additionally hardware costs
- Overall, we derive **cost-benefit ratio of at least 1:4**
- Cost of one FTE to contributing to OSS generates additional GDP of four times the cost
- Result consistent with similar studies on ICT hardware and innovation expenditure

# Stakeholder Survey

- Objectives
  - Gather and analyse views of stakeholders on impact of OSS and OSH
  - Complement insights from literature, data base and case studies to assess impact of OSS and OSH
  - Create robust empirical representation of opinions and issues at stake
- All together, this whole body of empirical evidence used to derive policy recommendations
- Response
  - Wide distribution supported by EC and several Open Source organisations
  - Feedback: more than 900 responses, who at least partly answered the questionnaire

# Stakeholder Survey: Main Results

- Incentives
  - most important are **finding technical solutions** being linked to **carrying forward the state of the art of technology** ranked on third position
  - **avoiding vendor lock-in** of second relevance
  - on the fourth position of relevance **knowledge seeking** ahead of **knowledge creation**
- Benefits
  - highest benefits in the form of **supporting open standards and interoperability**
  - improved **access to source code**
  - independence from proprietary providers of software
- Costs
  - **overall less relevant**
  - **assuring stability and reducing error susceptibility** followed by **cost for skilled labour**
- Cost-benefit ratio
  - 80% perceive at least high benefits and only medium cost related to OSS and OSH
  - **mode of estimated cost-benefit ratio 1:10**, a similar ratio calculated for the macro level

# Summary of results about impacts of OSS

- **Significant investment** by EU countries and EU located companies into Open Source of **Euro 1 billion in 2018** at minimum only for labour costs
- **Significant contribution of OSS to GDP** of the EU, i.e. an increase of 10% would generate **additional Euro 100 billion in EU GDP per year** in the future
- Significant contribution of OSS to foundation of start-ups, i.e. an increase of 10% would generate around **additional 1,000 ICT start-ups per year**
- **Savings in Total Cost of Ownership in the public sector**, but more important **avoidance of vendor lock-in** and **contributing to digital autonomy**
- **Further benefits** of Open Source mainly **related to openness, incl. standards** and **independence**, and **labour cost savings**, but less to additional revenue



# Policy Recommendations



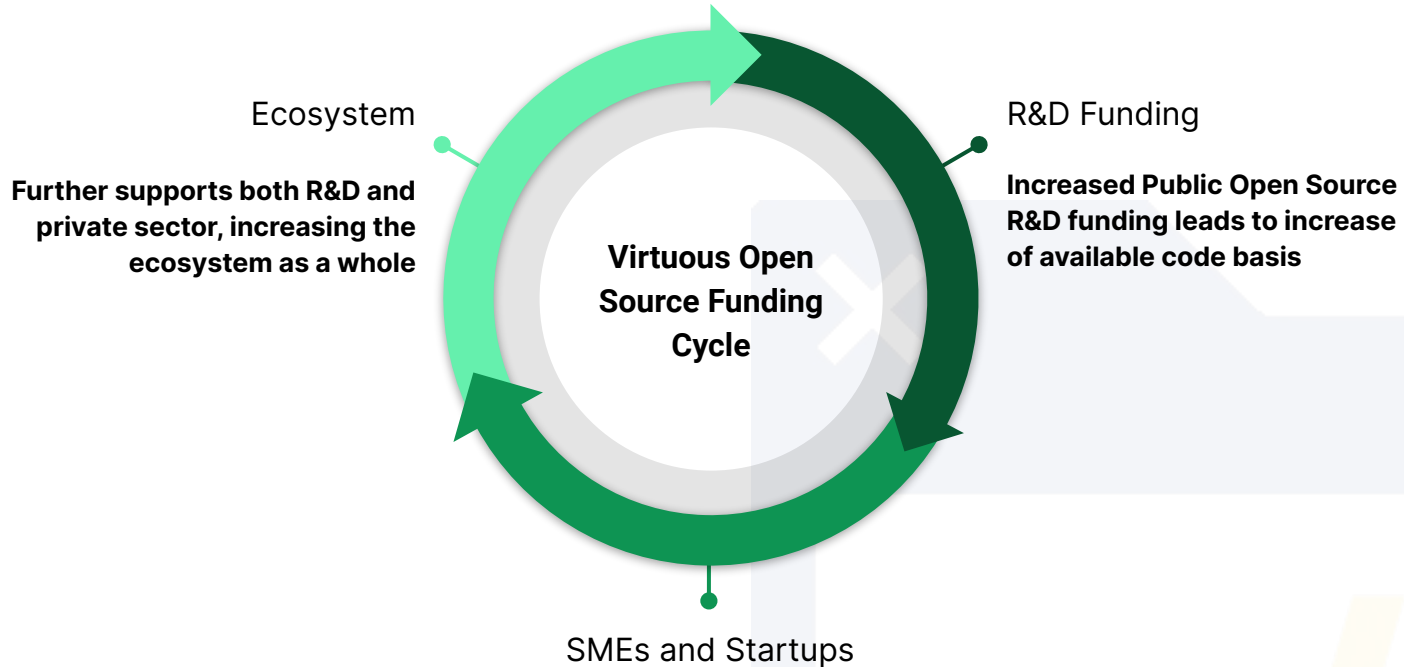
# Policy Recommendations

- 1. Building Institutional Capacity**
- 2. Knowledge Creation**
3. Knowledge Diffusion and Networking
4. Entrepreneurial Activities
5. Financial Capital Development
- 6. Regulatory Environment**
7. Market Creation
- 8. Creation of Legitimacy**
- 9. Human Capital Development**
10. Strategic Intelligence
11. Domain-specific recommendations
  - a. Open Source Hardware recommendations
  - b. AI, HPC, software defined infrastructures, sustainability

# Building institutional capacity

- Economic value of Open Source ➤ European institutional capacity
- Leverage the Commission's unique position as guide and coordinator
- **Recommendation:** EC OSPO to facilitate a European OSPO Network
  1. Giving the EC OSPO an external networking component
  2. Encouraging and building 20 OSPOs through funding programme
  3. Creating and funding a semi-formal network of these OSPOs (share best practices, processes, work toward common policy goals)
  4. Fostering a European Open Source culture enabled by the EC OSPO

# Knowledge Creation: Research & Startup funding



# Human Capital Development

- Lack of skilled labour prevents companies from using and contributing to OSS
- Development of software skills important factor in long term development and performance
- **Recommendation:** Open Source in curricula and professional training programs by academia and local software industry, Open Source in the European Qualifications Framework (EQF)
- **Recommendation:** Entrepreneurial skills and diversity for Open Source companies

# Creation of Legitimacy

- Legitimacy is fundamental for the breakthrough of an emerging technological system
- **Recommendation:** elaborate role of open technologies in achieving digital autonomy
- **Recommendation:** Integrate OSS and communities in European research and innovation policies and into general policy frameworks, such as European Green Deal and European industrial strategy - similar to SDOs

# Regulatory Environment

- Liability risks of OSS components hamper innovation: clarify liability of developer while protecting users
- **Recommendation:** Support funding/incentives for security of OSS components
- **Recommendation:** Consider OSS in future revision of European public procurement directive

# Summary

- Today, large economic impact of OSS and potential impact of emerging OSH
- Utilise public policy to further scale and incentivise production of OSS for the benefit of the European economy
- Comprehensive and coordinated policy approach needed based on institutional capacity in the various layers of the public sector





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# Thank You

