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Open Source Software And Open Science

Incentives for going open source

- Disseminate research outputs
- Sustain OSS development between project
- Collaborate with partners and scientific community
- Enable reproducibility

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Common challenges for scientific OSS

- Culture, knowledge and organizational support for OSS lacking
  - E.g., license selection, business models, communiy growth…
- Growing sustainable funding for the OSS project's development and maintennace
- Typically very technical and specific knowledge required to contribute
- Narrow groups of end-users
- Parallell academic hiearchy inhibiting open collaboration and governnace

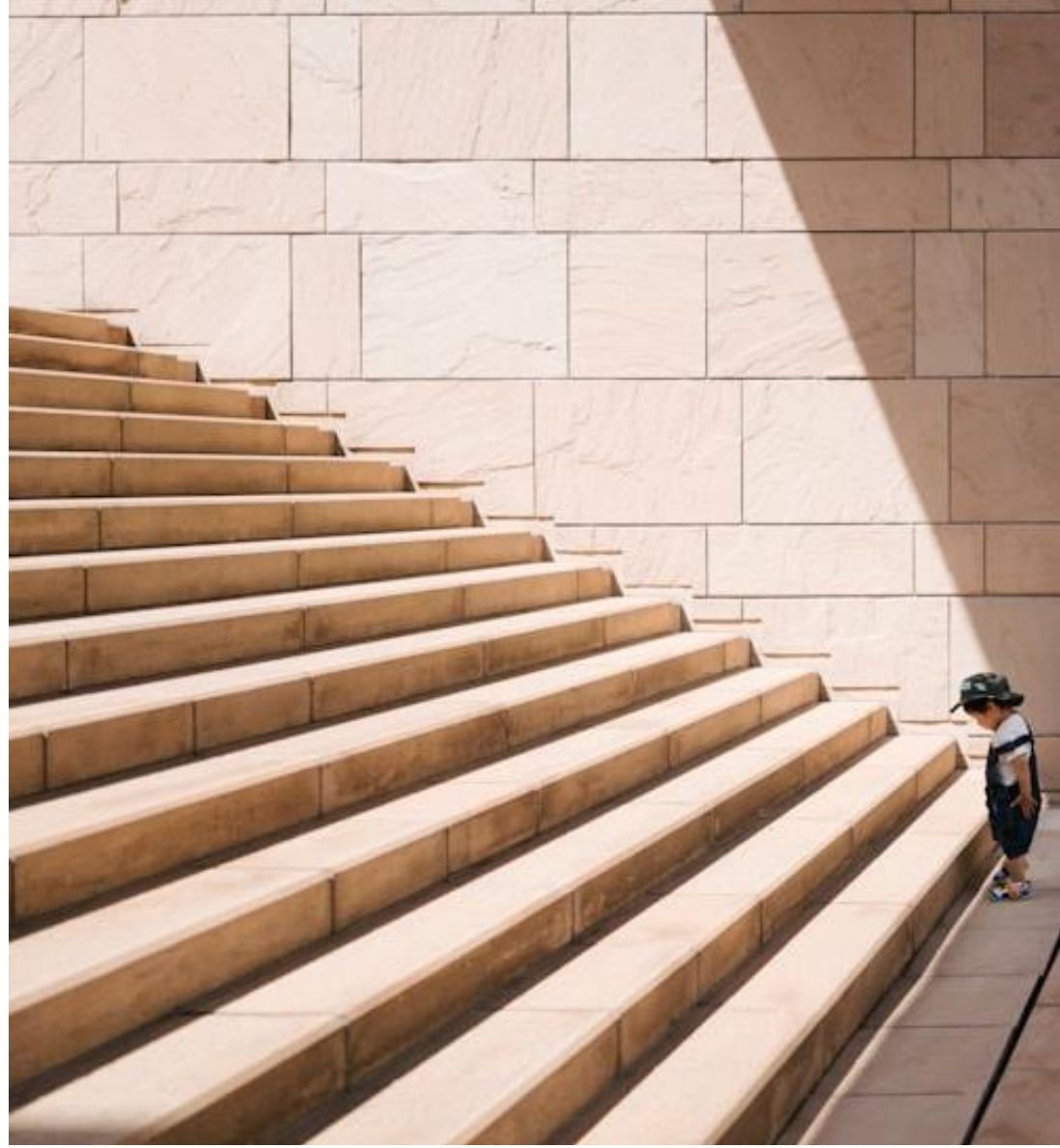
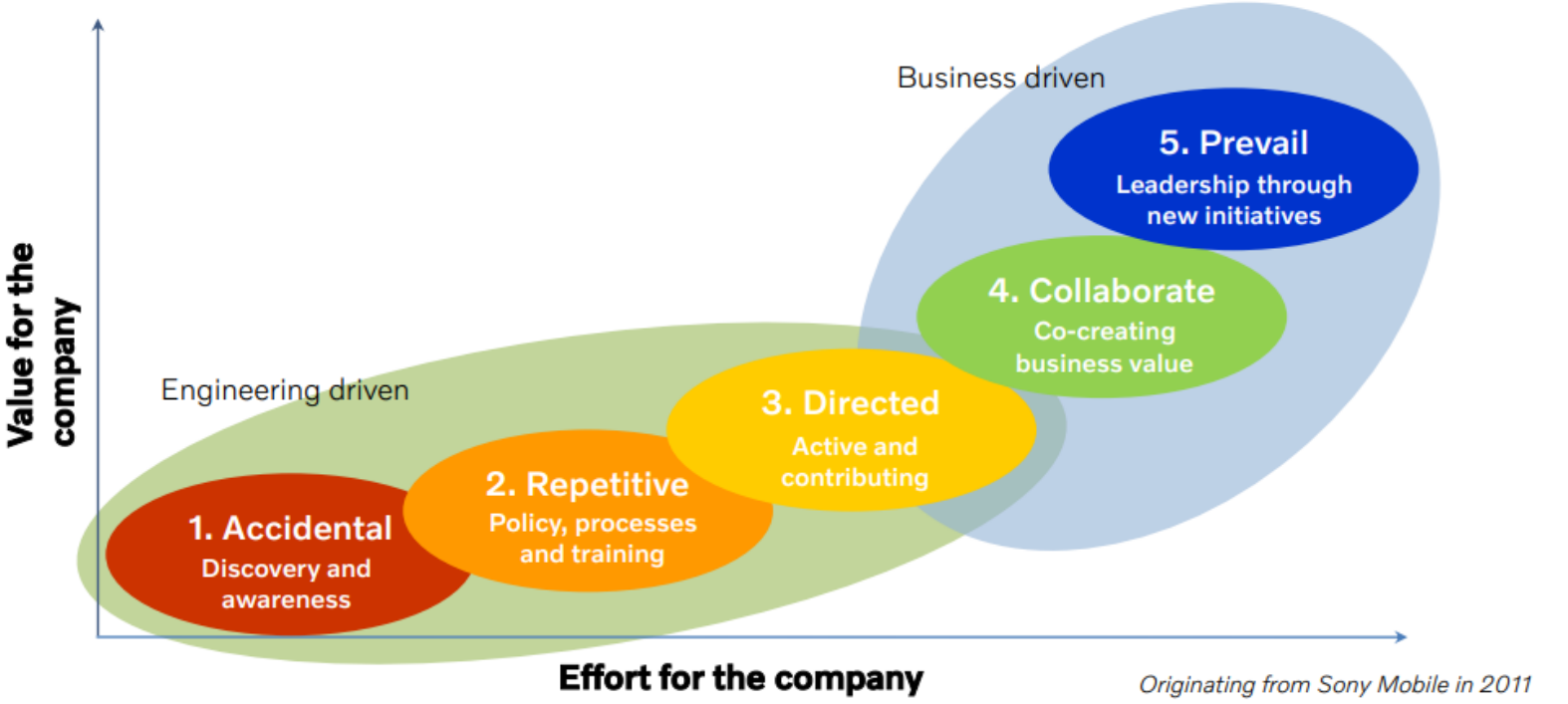


Photo by Jukan Tateisi | https://unsplash.com/photos/toddlers-standing-in-front-of-beige-concrete-stair-bJhT_8nbUA0

Maturing from consumption to leadership



Originating from Sony Mobile in 2011
/ Adapted by Carl-Eric Mols 2023

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Open Source Program Offices (OSPOs)

- Center of competency and support
- Drives organizational readiness and maturity forward on open source
- Designs and executes an organization's overarching open source strategy
- Provides voice of reason and objectivity on the benefits, risks, and costs of open source and how to balance between
- Supports use, development, and collaboration on open source

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Case: Trinity College Dublin

- Small team within the Technology Transfer Office with a business developer and legal expert
- Focused on supporting researchers in using OSS as part of a business model through the commercialization of research outputs
- Supports grant writing and IPR management in research consortiums
- Provides education and training to researchers and under grad students (to various degrees)

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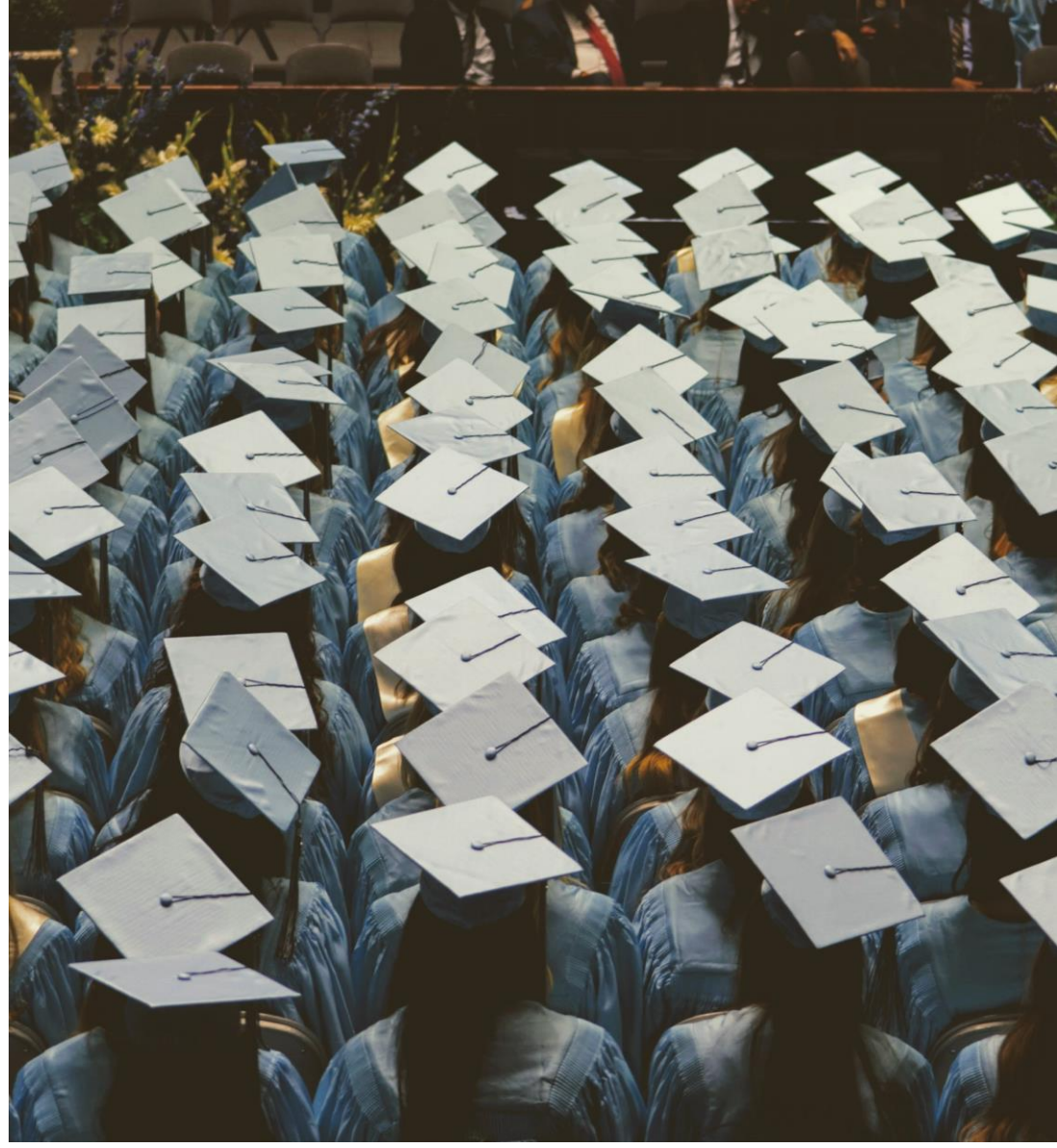
Case: LERO

- Constituted by an internal community of subject matter experts
- Supports and trains researchers in how to develop, collaborate and disseminate software-based research-outputs as open source
- Considers open source as an instrument for open science, with a broadening interest for other areas within
- Ambition of extending the OSPO and open source as an instrument to the Technology Transfer Office, similar as to Trinity College Dublin



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Case@RISE: Hopsworks

- An open source data platform for Machine Learning (ML) with a Python-centric Feature Store and MLOps capabilities
- Created in 2016
- 2500 users on the free serverless version on app.hopsworks.ai. 923 stars on GitHub.
- All code is developed by employees of Hopsworks AB
- AGPL 3.0

- Grew from an EU-funded research project aimed at integrating Apache Hadoop. A data science layer was added on top and labeled Hopsworks.
- The software outputs were released as OSS, and eventually, a startup was spun out with the involved researchers.
- Venture capital was initially challenging to attain, given the initial focus why the startup pivoted to focus on the data science layer today, still known as Hopsworks.

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Case@RISE: OpenModelica

- Framework for modeling, simulation, optimization and debugging of cyber-physical systems based on the Modelica open-standard.
- Created in 1997
- ~8000 downloads / month
- 72 unique committers
- https://github.com/OpenModelica
- Dual AGPL and OSMC-PL

- Supported via funding by companies and universities via the Open Source Modelica Consortium since 2007.
- Creating a non-profit association may help to ensure the long term survival and maintenance of your open-source project via membership fees or direct funding development.

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Case@RISE: ContikiNG

- IoT operating system with support for IPv6-based mesh networking with support for many IoT application protocols (CoAP, LwM2M, HTTP, MQTT).
- Created in 2002 (Contiki) 2017 Contiki-NG
- Several commercial products use Contiki or Contiki-NG. Widely used in academia for low-power IoT research
- 229 contributors (GitHub)
- BSD License
- Project funding – VINNOVA, EU, ITEA, and some directly funded projects
- Several R&D projects have helped to sustain the project
- Forked from the Contiki project after internal disagreements in the community when founders left the project. Separation successful attributed detailed planning.

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