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How to Increase the Take Up of Standards in Laboratory Automation:

Insights from the Economics of Technology Diffusion

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Overview

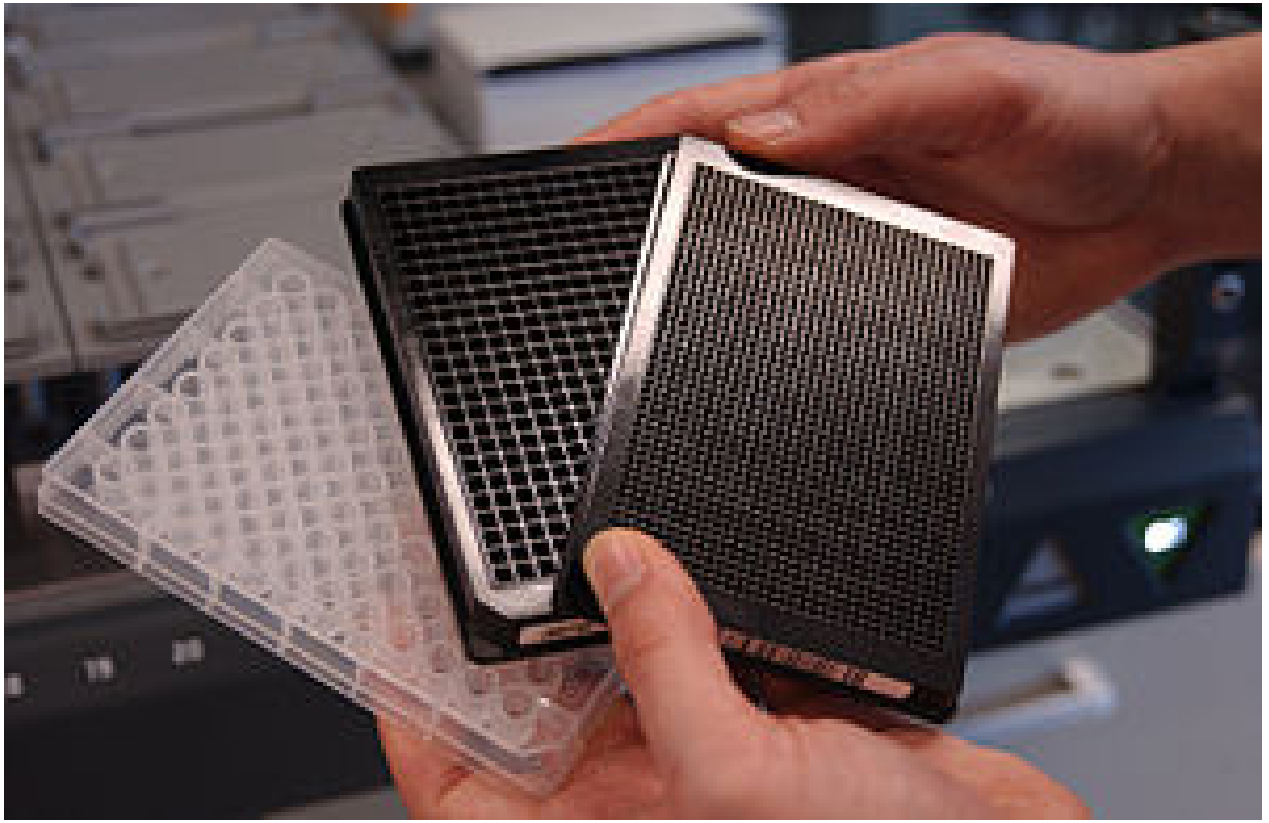
- The mechanics of standards and how best to apply them

- Frameworks
  - Type of standards, economic role and relevance
  - Match to industry structure and relationship to innovation
- Using standards to meet economic goals
  - Stakeholders, their drivers and goals
  - Commercial processes in organisations

- Potential areas for further action

20 years ago in Basel

microtitre plate



1995 – 2004 process from identified need to approval

Note the obvious one-off tooling cost vs apparent ease of changing software

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The shipping container as an interface standard

30 times cheaper per ton than bulk shipping

Source:, wikipedia

1/4) Interface standards

- Interface standards
  - eg VHS/betamax, XBOX/PS, Android/iPhone

- Economic effects
  - Switching costs (learning, exchange)
  - Reduces risks as perceived by producers and customers

- Network effects: Metcalfe's law (value N^2)
  - Direct: eg mobile phones
  - Indirect: eg car parts
  - May be positive or nil

- Relevance to SiLA: positive for users
  especially for collaborations (increase N)

Source: Swann, wikipedia

2/4) Minimum Quality standards

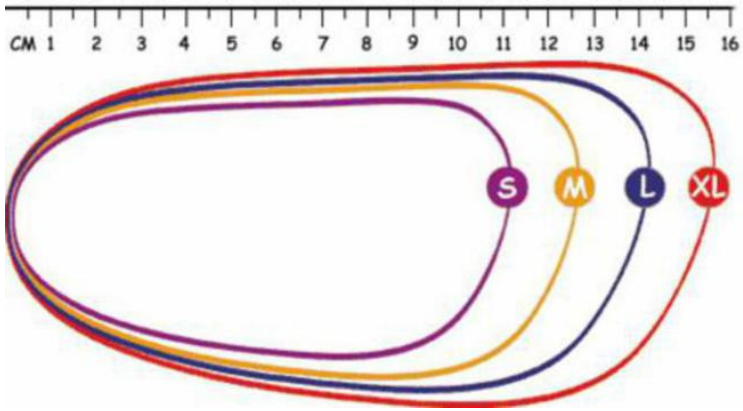
- Minimum quality
  - especially safety
  - legal
  - usability
  - basic functionality

- Economic effects
  - Reduces risks that are hidden/hard to assess
  - Helps to protect a market against Gresham's Law
    “bad drives out good”. The market for lemons
  - Reduces transactions costs between different producers
  - Reduces transactions costs between producers and customers

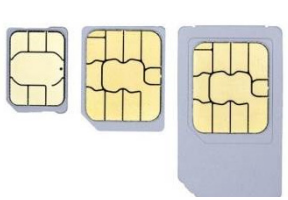
- Not directly applicable to SiLA (but see later…)

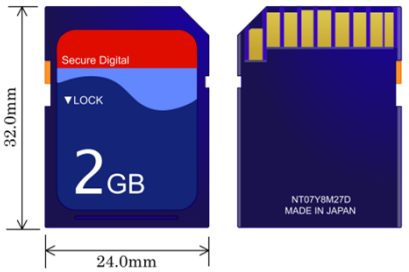
3/4) Variety reduction standards

- Variety reduction
  - eg clothing sizes
  - very applicable to software

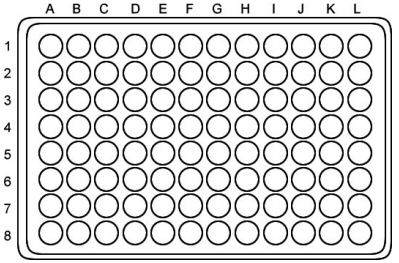


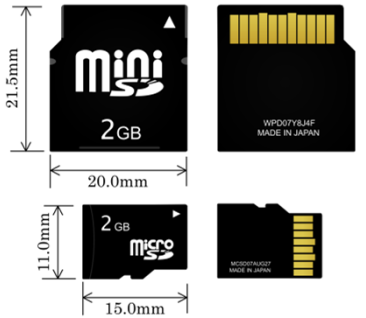
- Economic effects
  - Provides economies of scale for producers and customers
  - Helps to build cohesion and critical mass in the early market stages
  - Avoids wasteful proliferation
  - Can focus technology trajectories





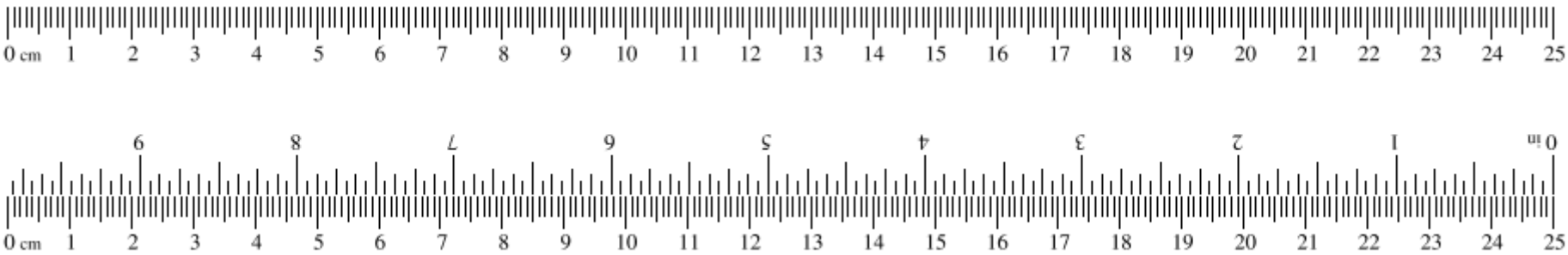
- Applicable to SiLA!





4/4) Measurement standards

- Information/measurement on product description
  - eg screw thread, ppm



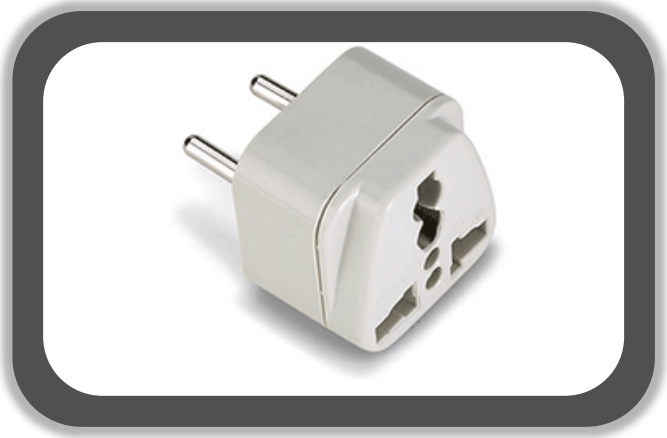
- Economic effects
  - allows innovative producers to demonstrate to the satisfaction of the customer, that products are as innovative as they claim to be
  - role of public bodies: NPL, NIST

- Relevance to SiLA: low (but important for instruments)

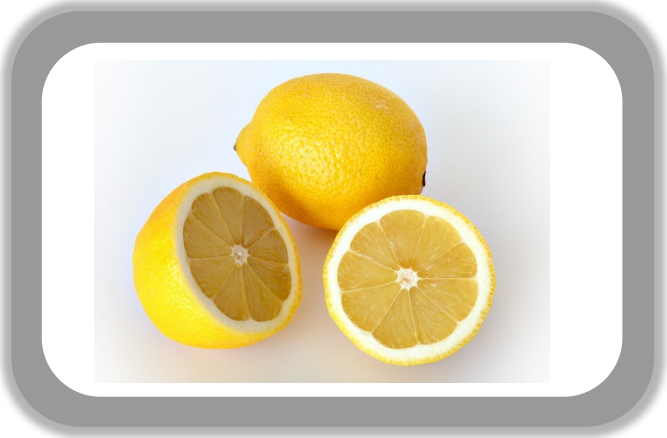
High Low

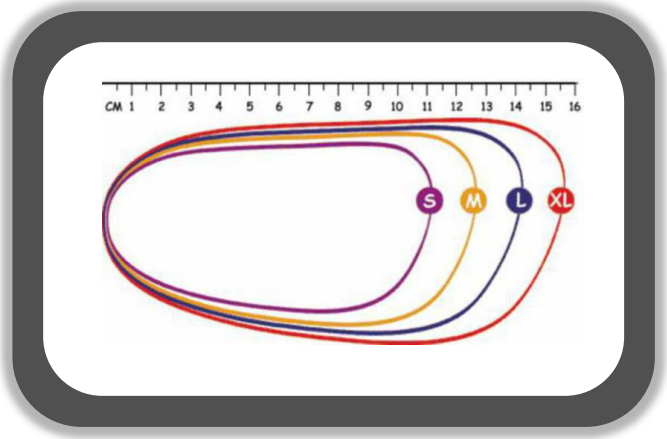
Recap: relevance of types of standard

Interface standards

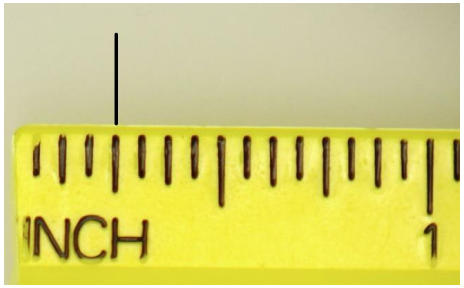


Minimum quality





Variety reduction



Measurement standards

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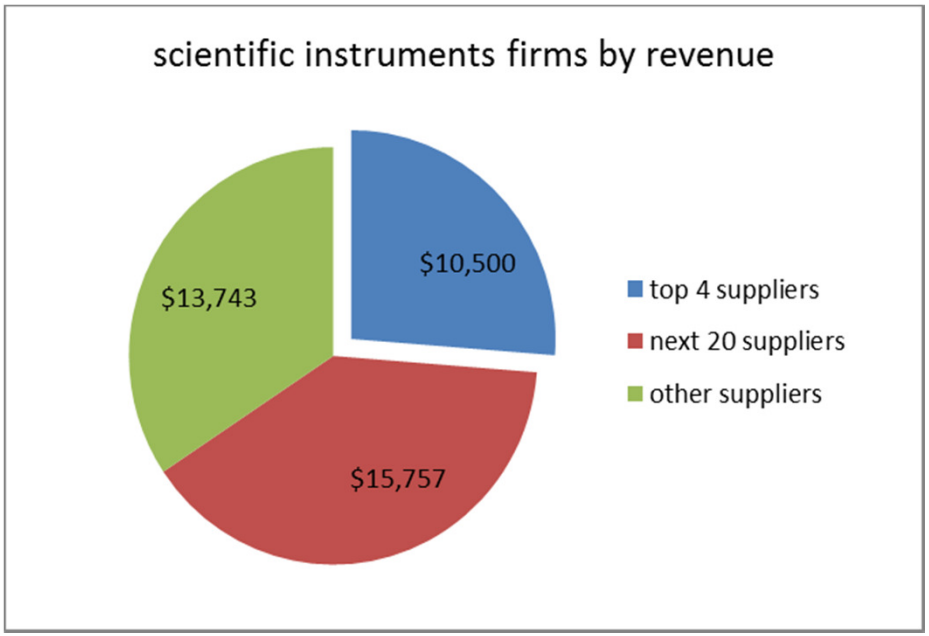
Standards and the role of industry structure

- If the market is concentrated
  - de facto standard; closed or open standard
- If the market is fragmented
  - If innovative: can avoid waste of limited resources
  - If not innovative: doesn't matter
- So how is this relevant to SiLA?

  => Could the market support standards

Industry structure affects impact of standards

- Instruments $40bn pa
- Not highly concentrated (though increasingly so)



- Comparisons
  - This is not Microsoft/SAP
  - It's more like Ford, VW
- Situation slightly better (worse) as products are very diverse
- Insight: real potential for SiLA to be of value to suppliers

Source: C&EN Top instrument firms in 2015

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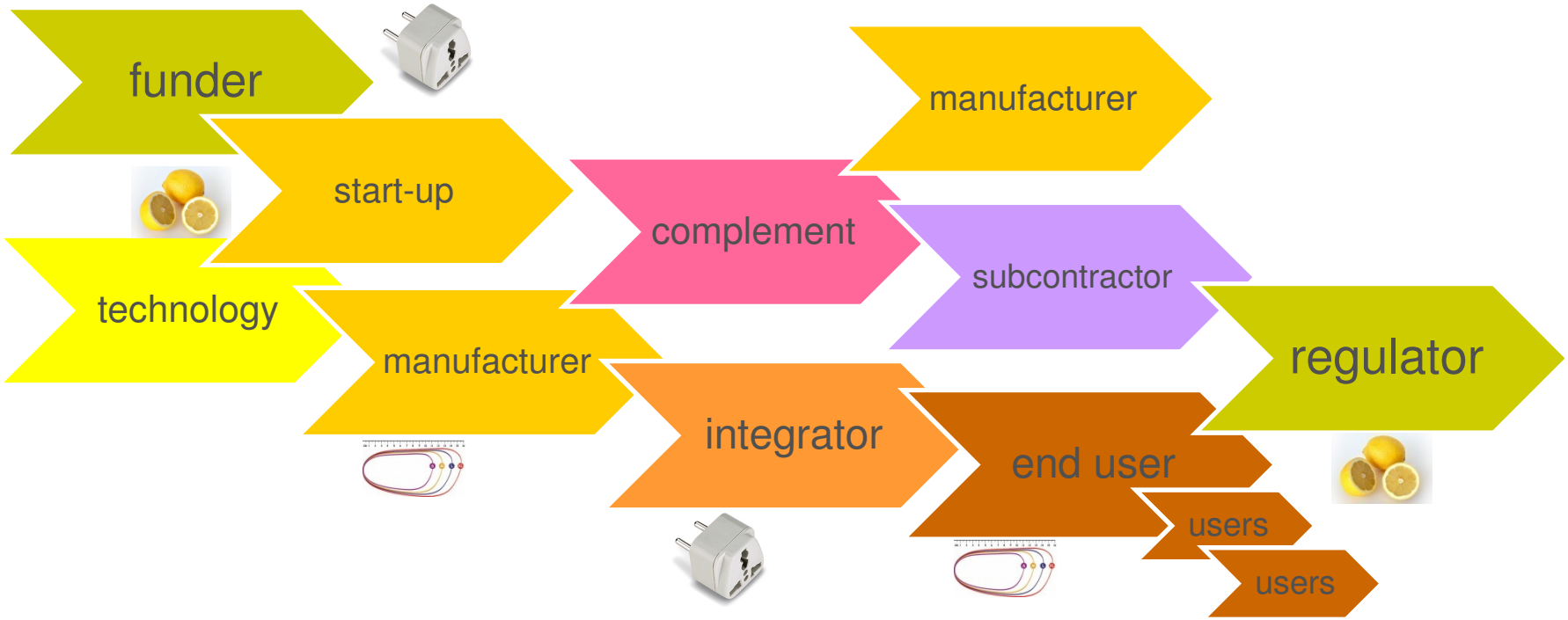
Stakeholders and their drivers: simple model

- Stakeholders:
  - End users types:

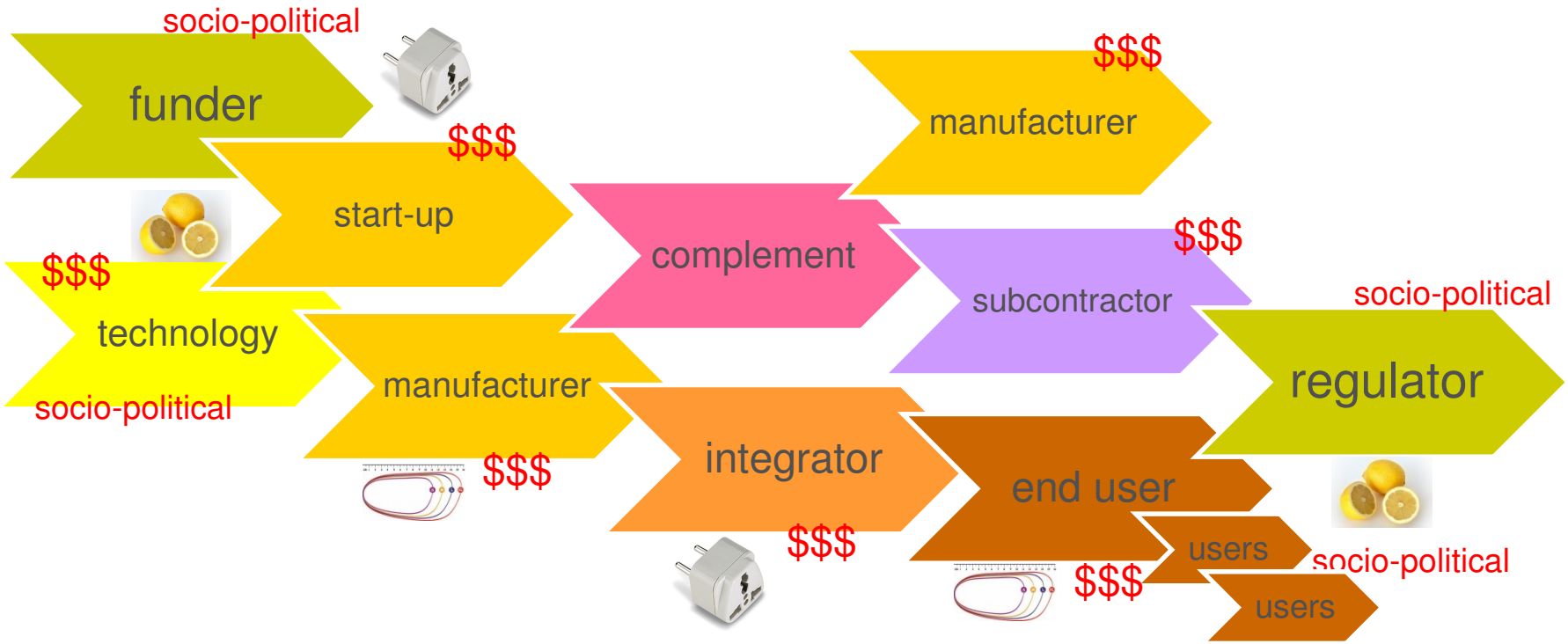
    big pharma/ biotech, govt labs, academic labs, CMO/commercial labs

  - Others - regulators, funders, core facilities
  - Complementary products and services

In reality….with loops, dynamic…



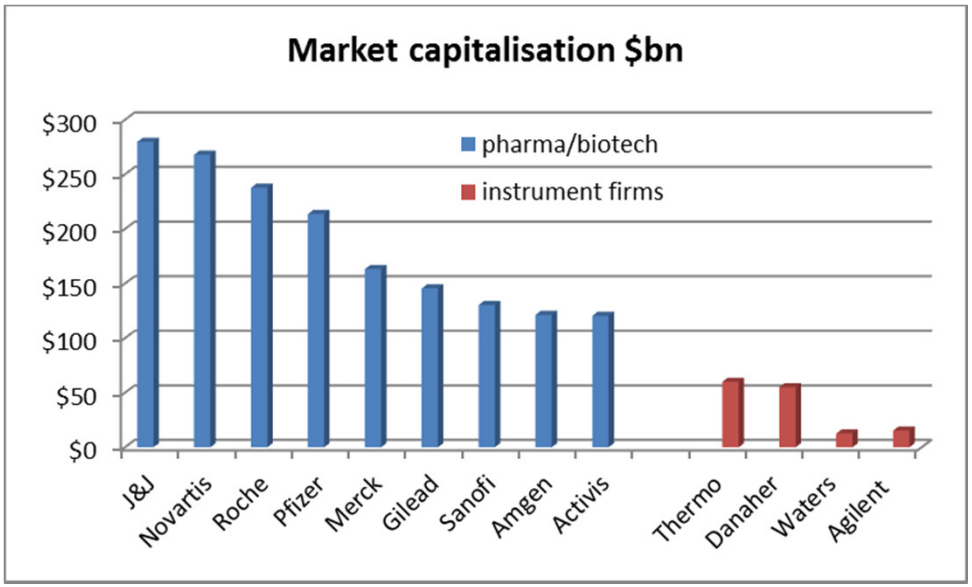
Stakeholders and their drivers: a fuller model



- Drivers are economic (mostly)
  - Economics: sales, market share, profit; do more with less; time to market
  - Socio-political: image, marketing, thought leadership
  - Open science / collaboration, replication issues, kickstarter / hacker space

Industry structure: the power of end users

- Very diverse
  - Research labs
  - Government labs
  - Academic labs
  - Test labs



- Pharmaceutical/Biotechnology industry end users

- Insight: potential role of standards in the purchase cycle

Source: www.statista.com

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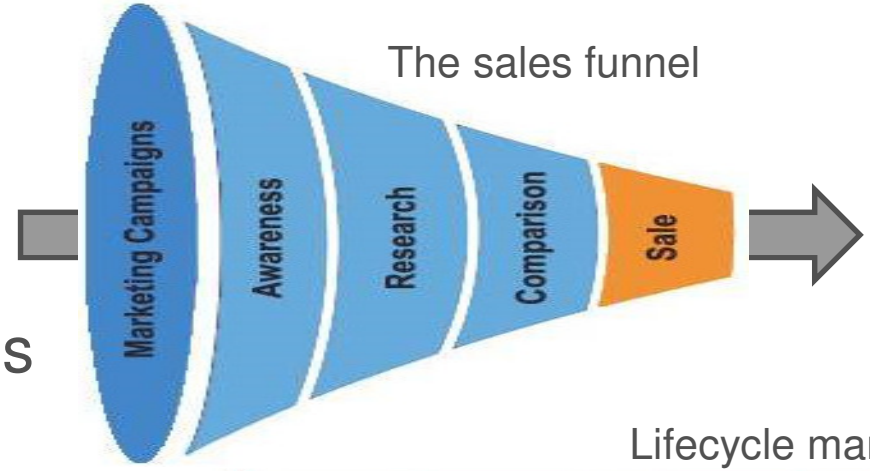
suppliers

Stakeholders and their processes

Sales

The sales funnel



Timescale: weeks
Target: sales

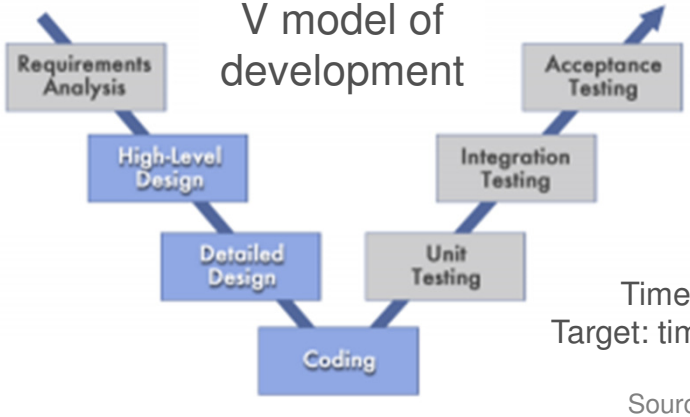
Product management

Lifecycle management

Timescale: months
Target: share/profit

Technology R&D

V model of development



Timescale: years
Target: time to market

Source: AgileSparks

suppliers

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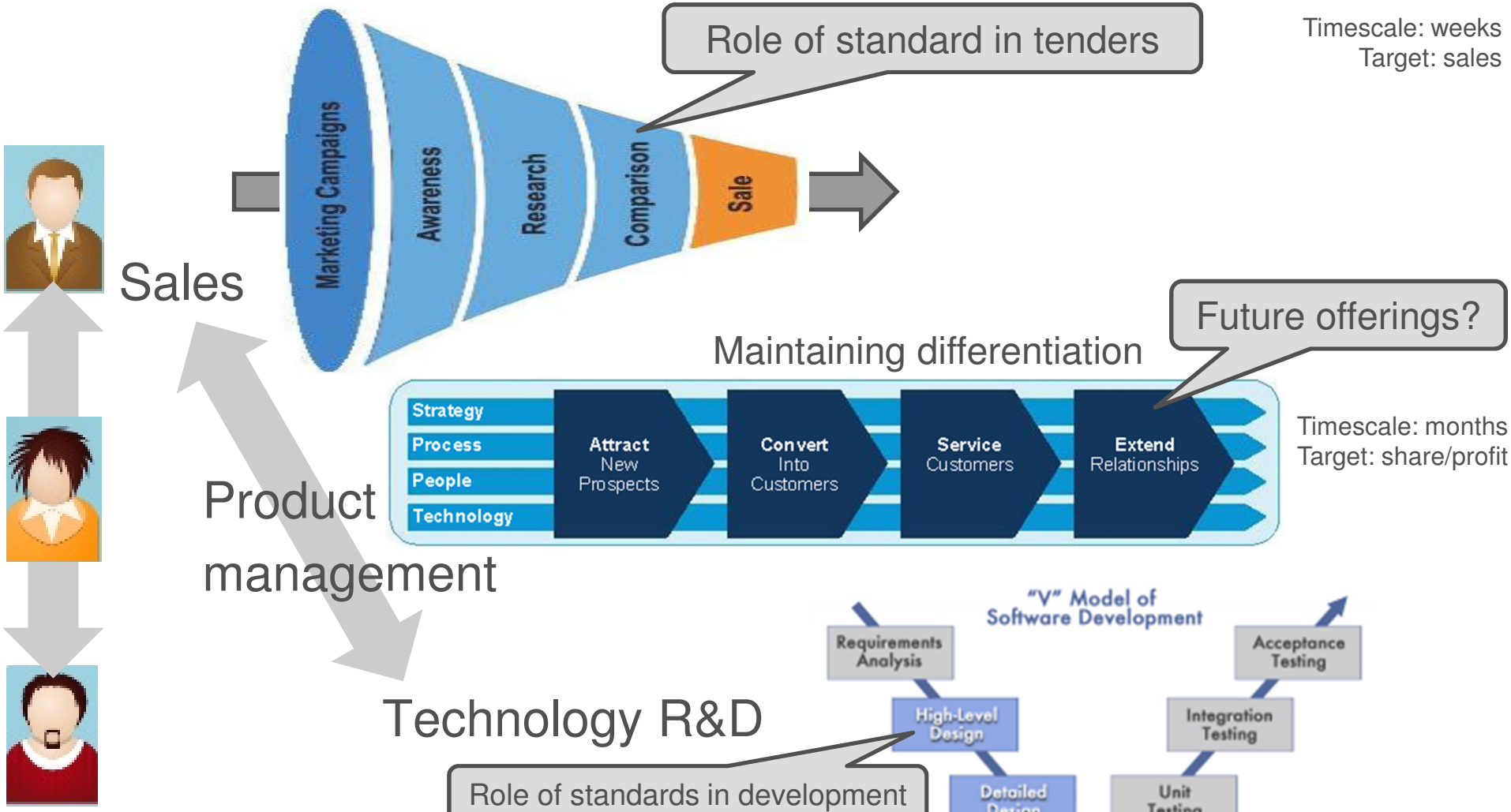
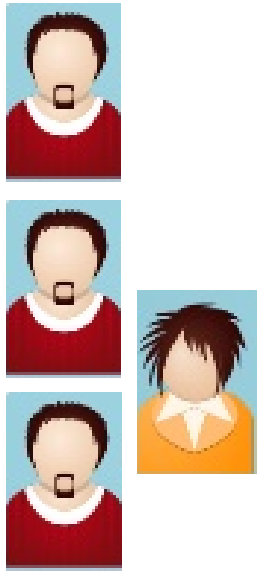


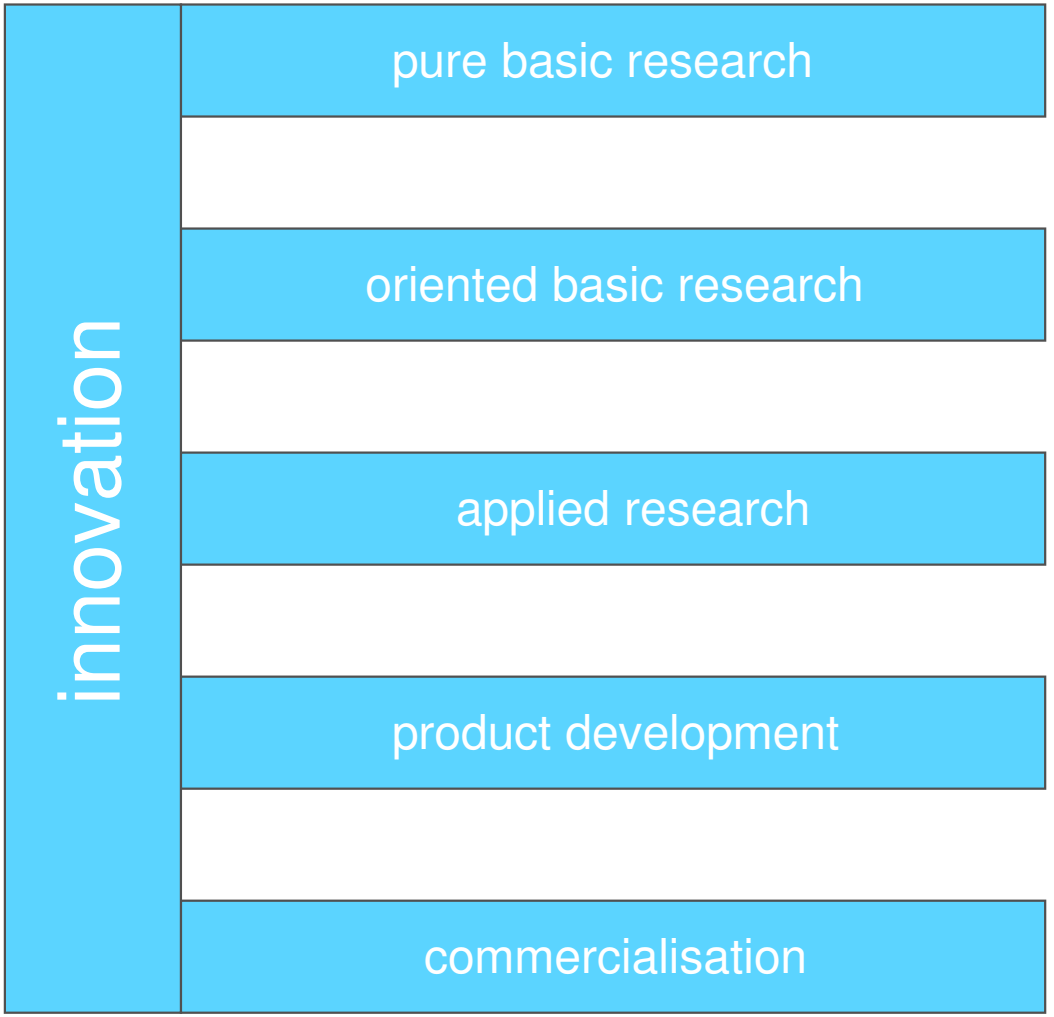
place of startups and innovation
place of industry consolidation

Source: AgileSparks

suppliers

Standards in the product development lifecycle

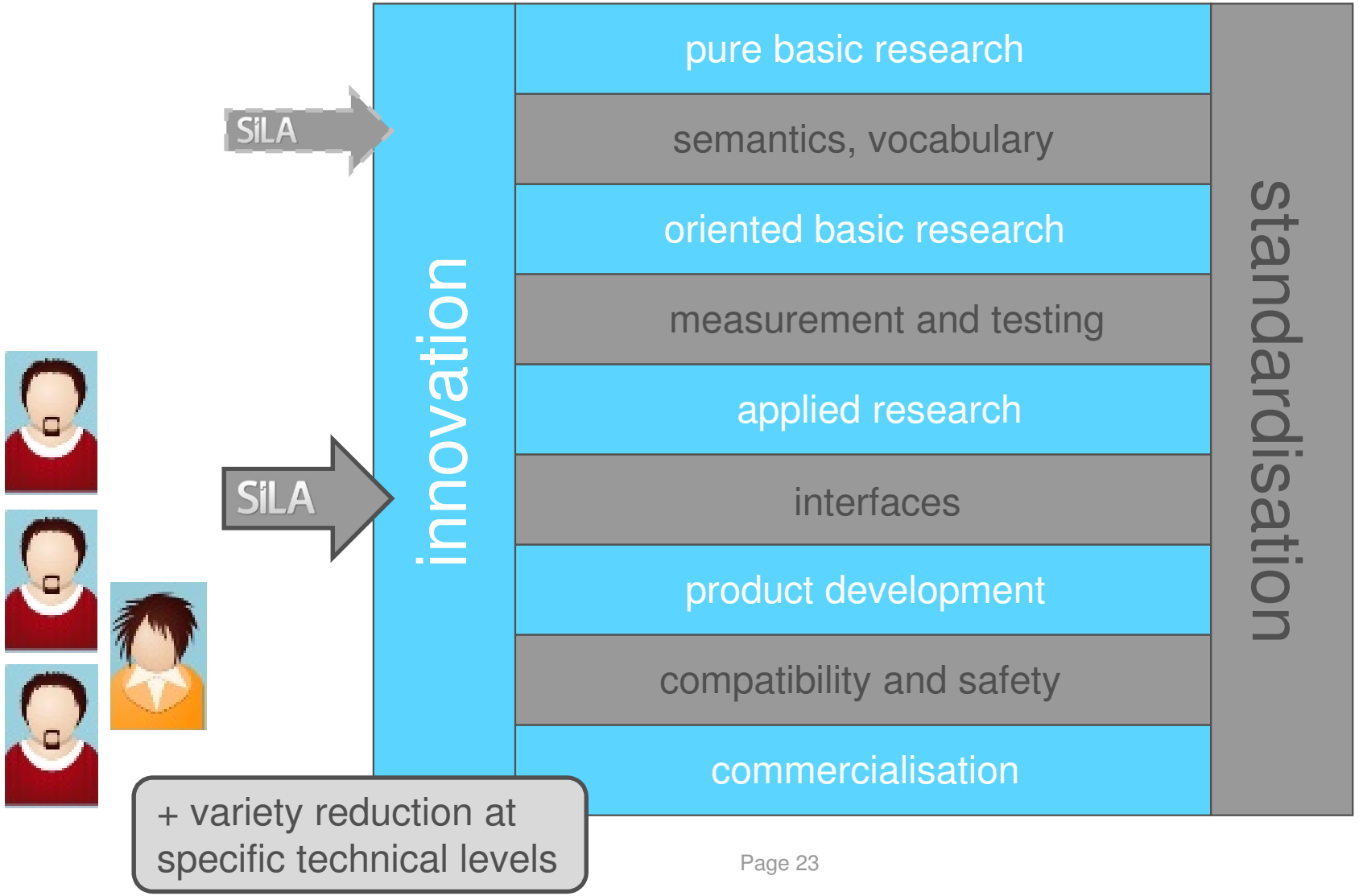




Source: Hatto

suppliers

Standards in the product development lifecycle



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Conclusions: potential next steps

- Segment target positioning of stakeholders:
  - especially end-users and startups
    - SiLA in tender documents: link to business case
    - Provide a startup kit: show value
  - Poll of members

- Continue promoting, meeting, sharing experiences, fora
  - Make network effects direct: collaborative science as a pull; N↑
- Case studies:
  - Role of regulation: as a push or pull? Possible? Desired?
- Identify and target not-so-visible stakeholders


ANY
QUESTIONS?

Laboratory Robotics Topic Group

- a less visible sector, a European strength ~€3bn pa
- with valid business models, enables many industries

Life sciences **Physical sciences**