Università degli Studi di Padova
Dipartimento di Scienze Economiche e Aziendali "Marco Fanno"

LMD Laboratorio Manifattura Digitale

Digital Manufacturing Lab

Second Report
Industry 4.0 in Italian SMEs

Survey 2017 (Released April 2018)

Research goals

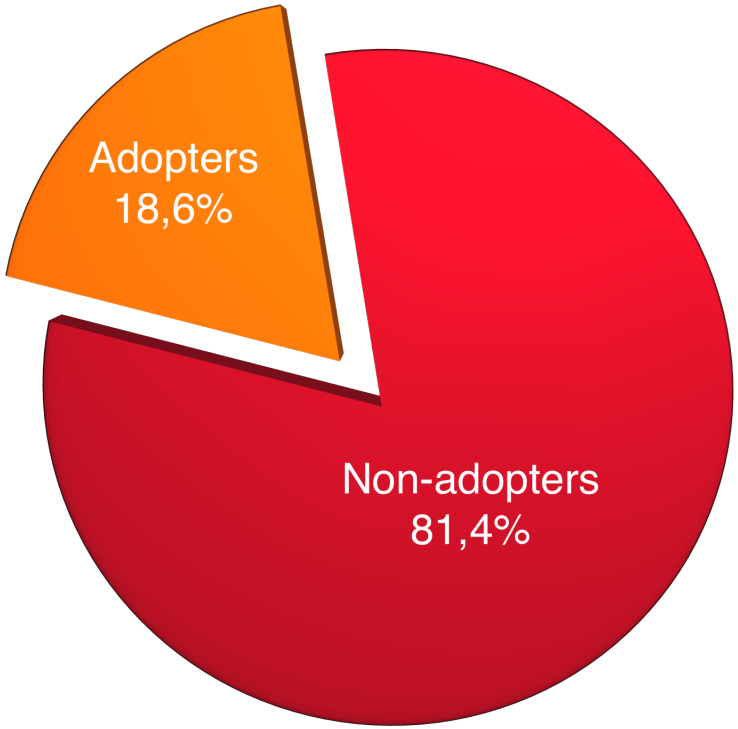
- Fully supported by DSEA funds, the first research promoted by Digital Manufacturing Lab aims at:
  - carrying out a first **map** of degree of Industry 4.0 technological investments
  - understanding **advantages** and **results** achieved in the introduction of such technologies
  - exploring **reasons preventing** firms in the adoption of those technologies
  - deepening analysis on **impacts** concerning **manufacturing organization** at the geographical level (internationalization) as well as in terms of **environmental sustainability**

Methodology

- Research on a sample of **7,293 manufacturing firms** selected as follows (source AIDA database):
  - Made in Italy industries (Home furnishing, Mechanics, **Fashion**)
  - Geographical location: Northern Italy (Piedmont, Lombardy, Veneto, Trentino-Alto Adige, Friuli Venezia Giulia, Emilia-Romagna)
  - Firms with 2015 turnover > 1 Ml € (firms with 2015 turnover < 1Ml € in industries characterized by industrial districts)
- **Mixed method**: CAWI addressing entrepreneurs and Chief Operations Officers (survey) and case studies
- Interviewed firms: **1,020 firms** (**14%** response rate) (May - December 2017)

Adopting firms

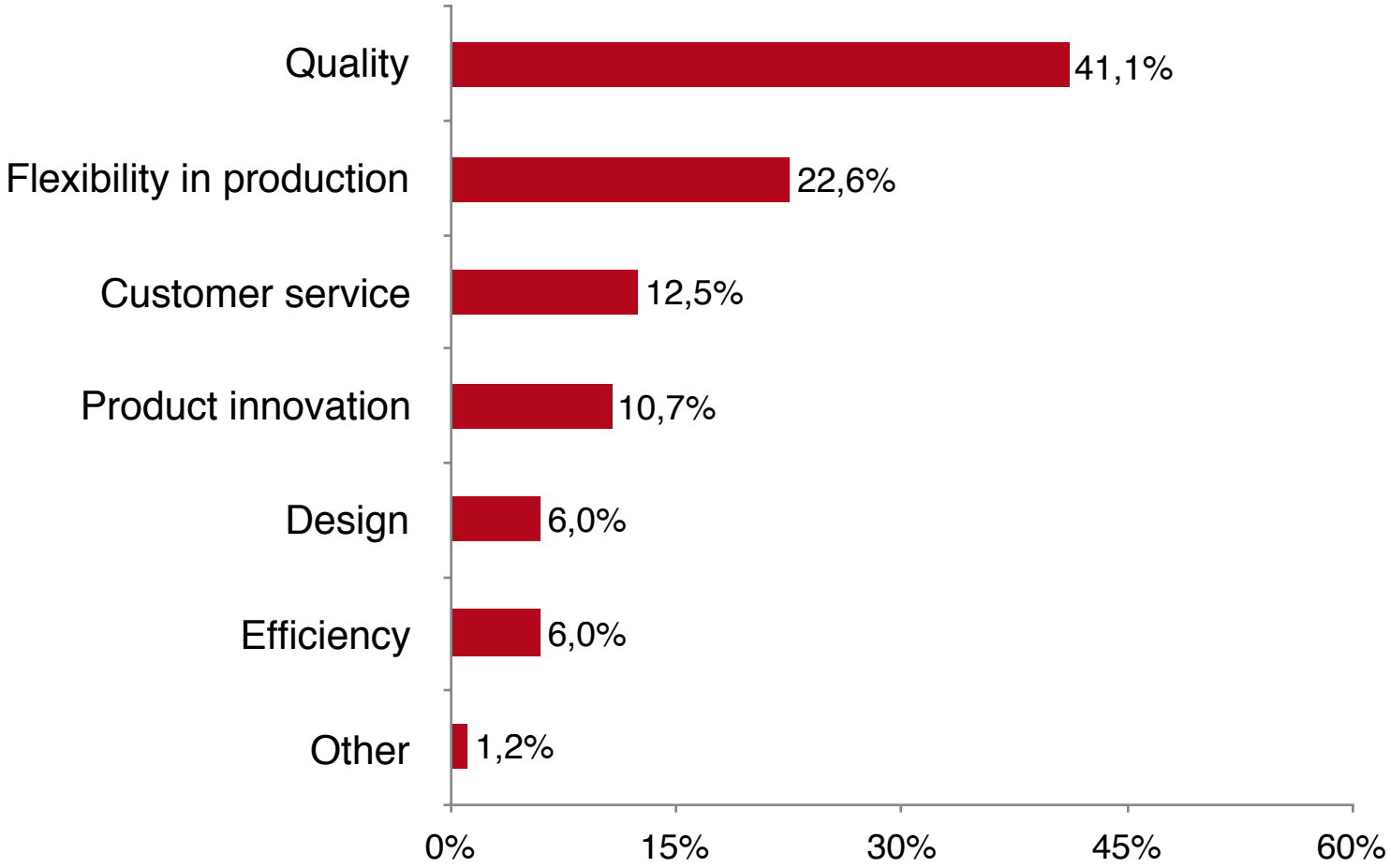
Adoption Industry 4.0



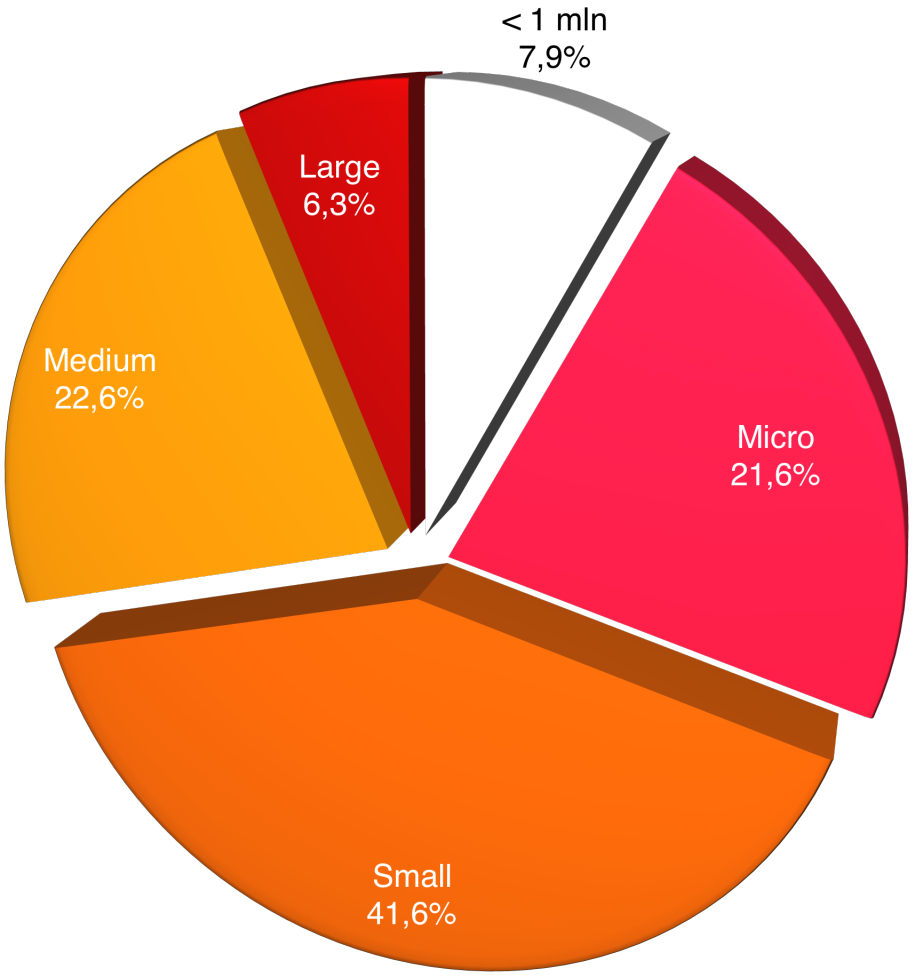
Profile of adopters

Average turnover (2016)	14.8 Ml Euro
Employees (average 2016)	58 total 35.6 in operation 4.6 in R&D 2.5 in marketing
% Export (average 2016)	47% (first market 28.4%)
R&D expenditure (% on turnover)	6%
Main activity	40% B2C – 60% B2B (average weight 1° client on turnover: 28.3%)
Production output	47.7% bespoke products 18.9% customized products 33.4% standard products
Location of manufacturing (value)	63.0% Region 29.0% Italy 8.0% Abroad
Location of suppliers (% on total suppliers)	35.6% Region 47.1% Italy 17.3% Abroad

Adopters: first source of competitive advantage



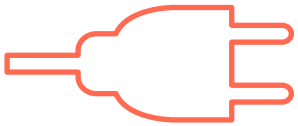
Adoption Industry 4.0 by turnover



Micro firms (< 2 mil €), small firm (2-10 mil €), medium firm (10-50 mil €), large (> 50 mil €)

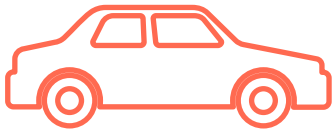
Adopters by industries

16,8%

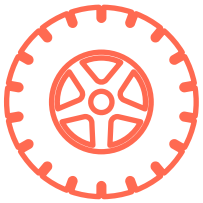


11,1%

9,5%



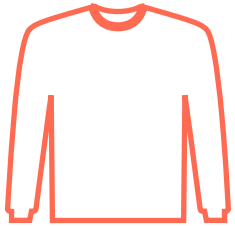
15,8%



7,4%

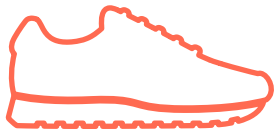
9,5%

5,8%



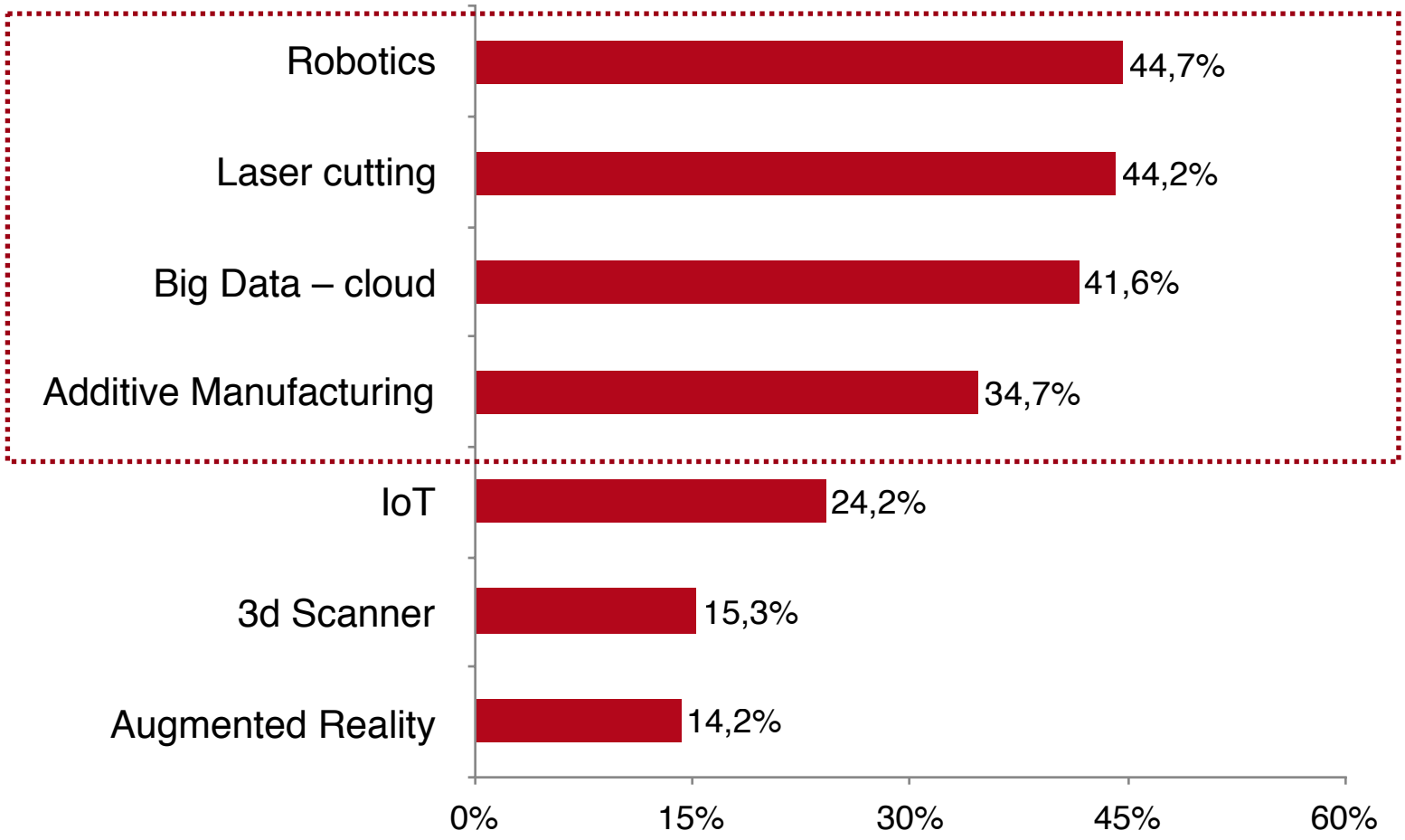
14,2%

8,4%

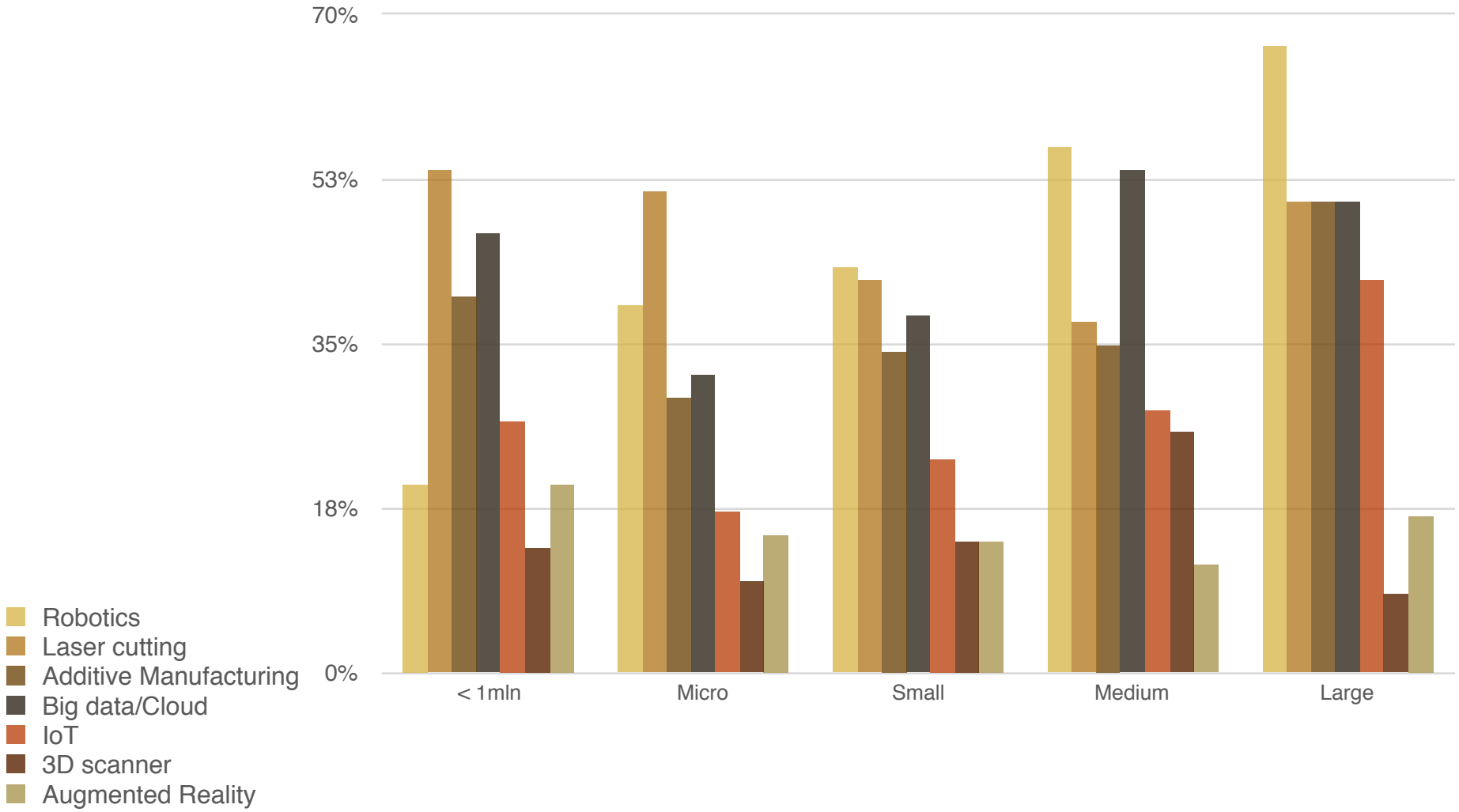


1,6%

Adopters: Industry 4.0 investments



Industry 4.0 by firm size



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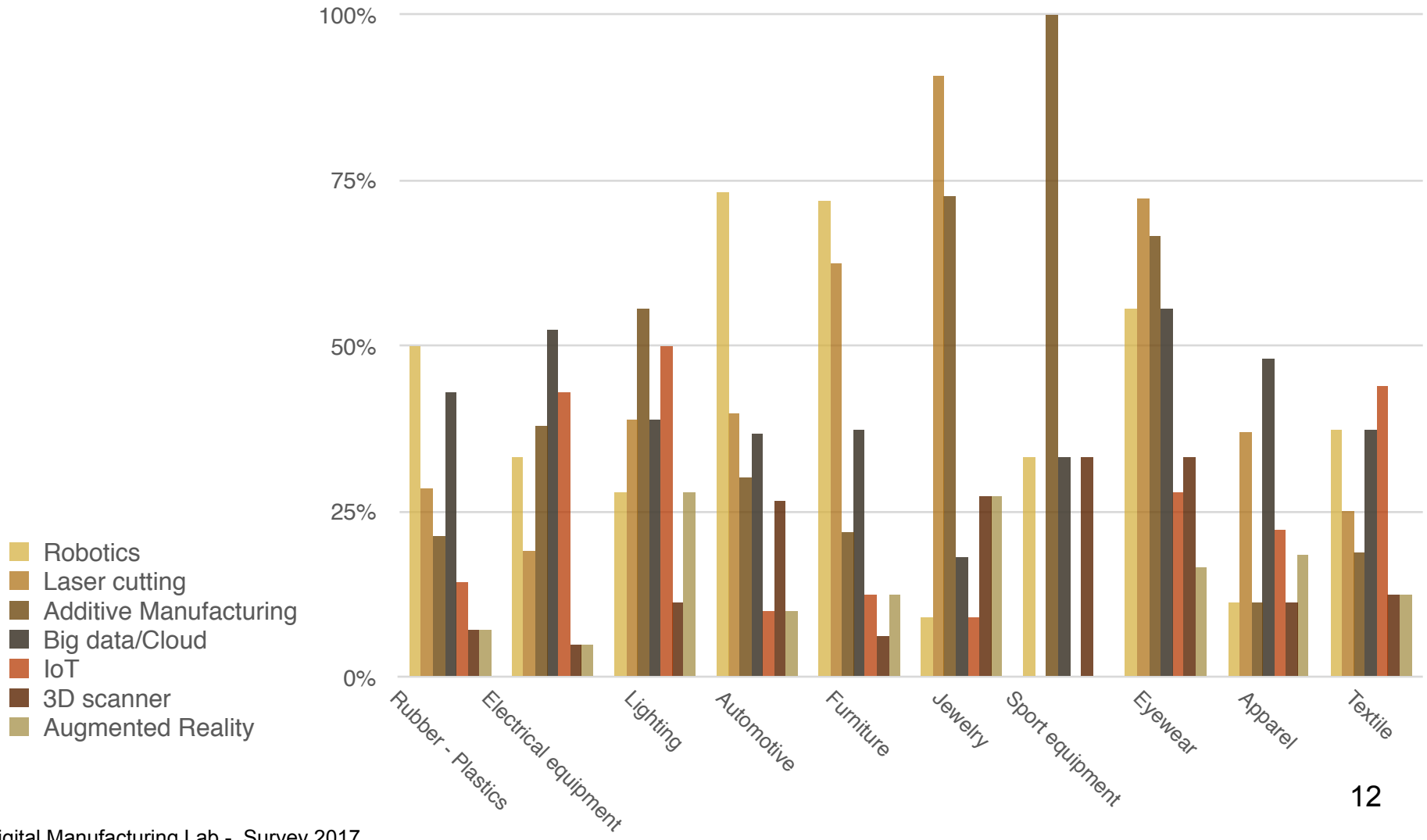
Industry 4.0 by industries



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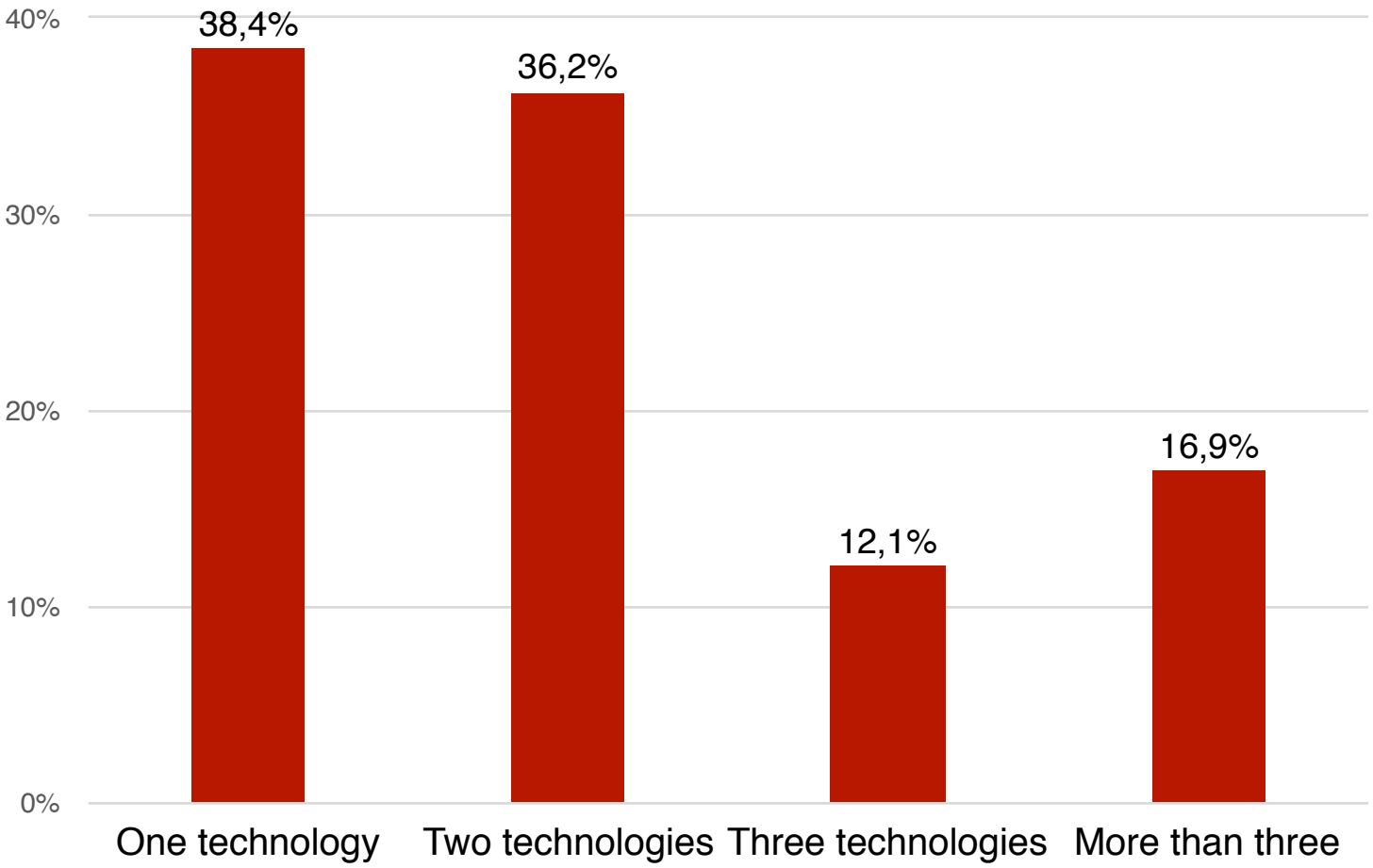
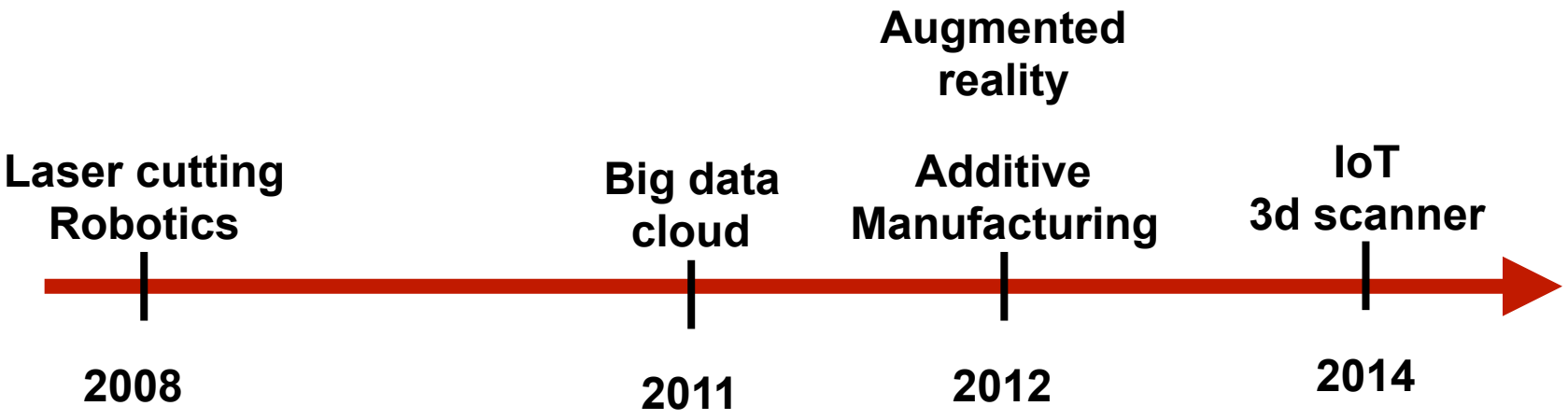
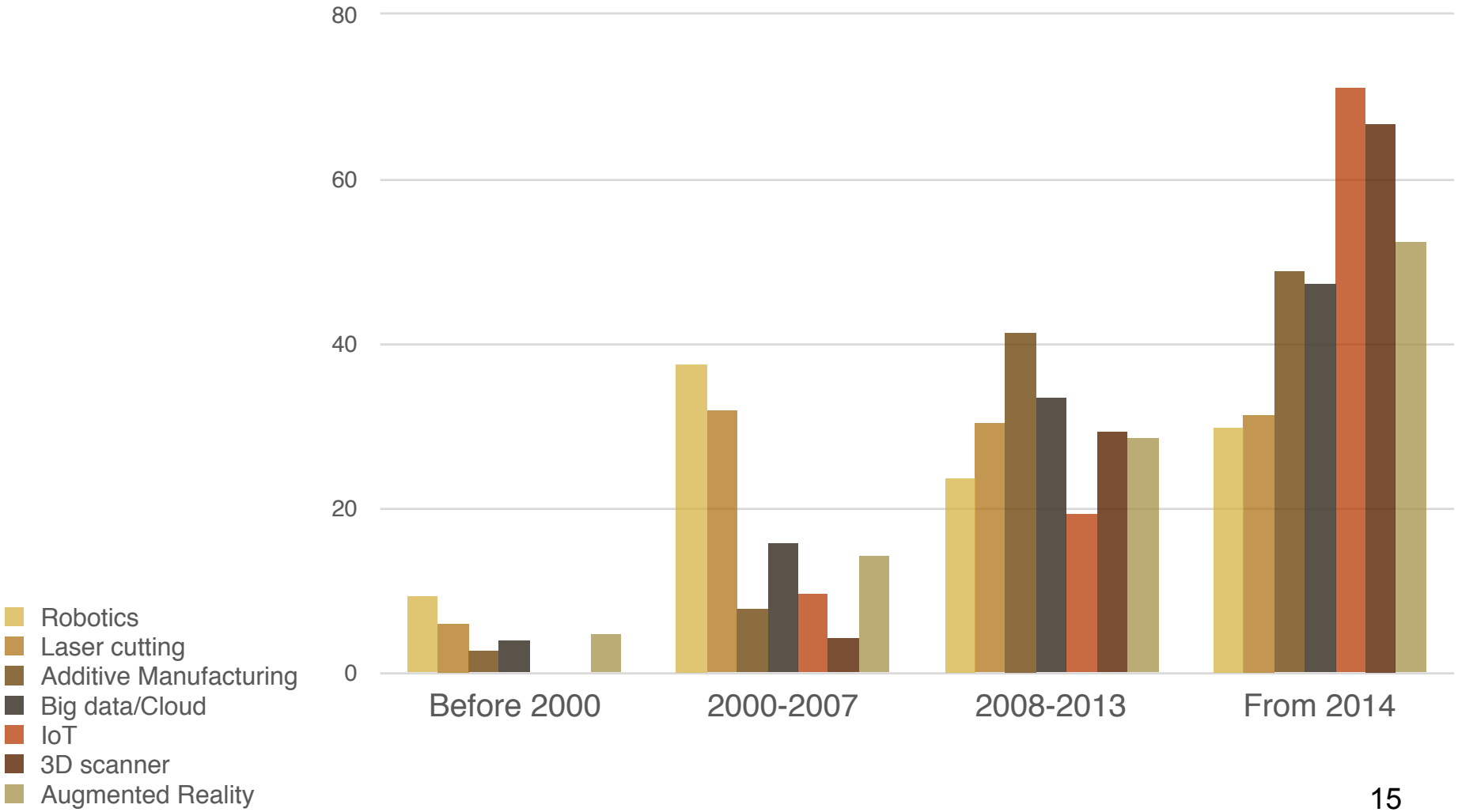
Number of adopted technologies



Industry 4.0 by year of adoption



Industry 4.0 by year of adoption (2)



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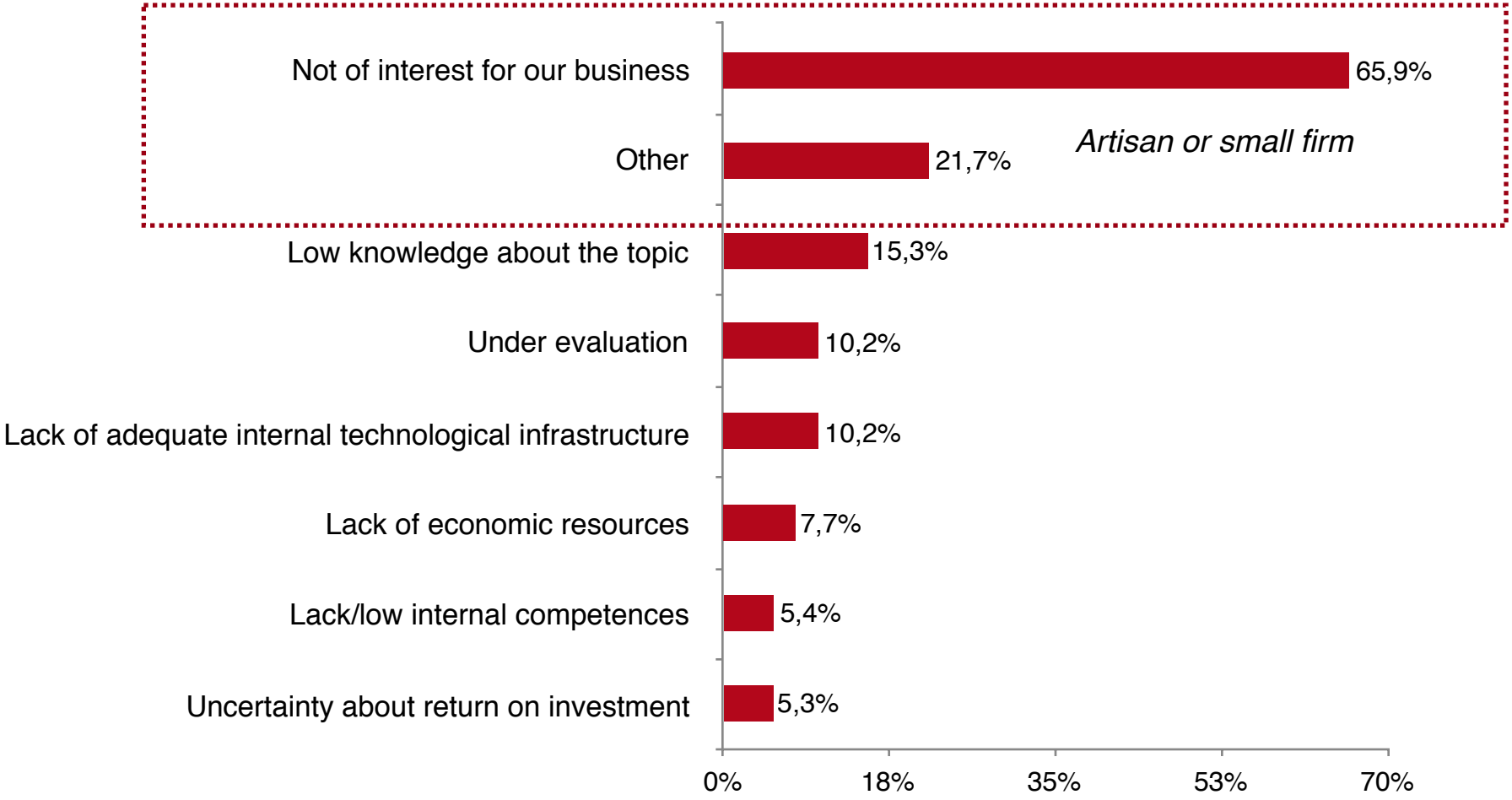
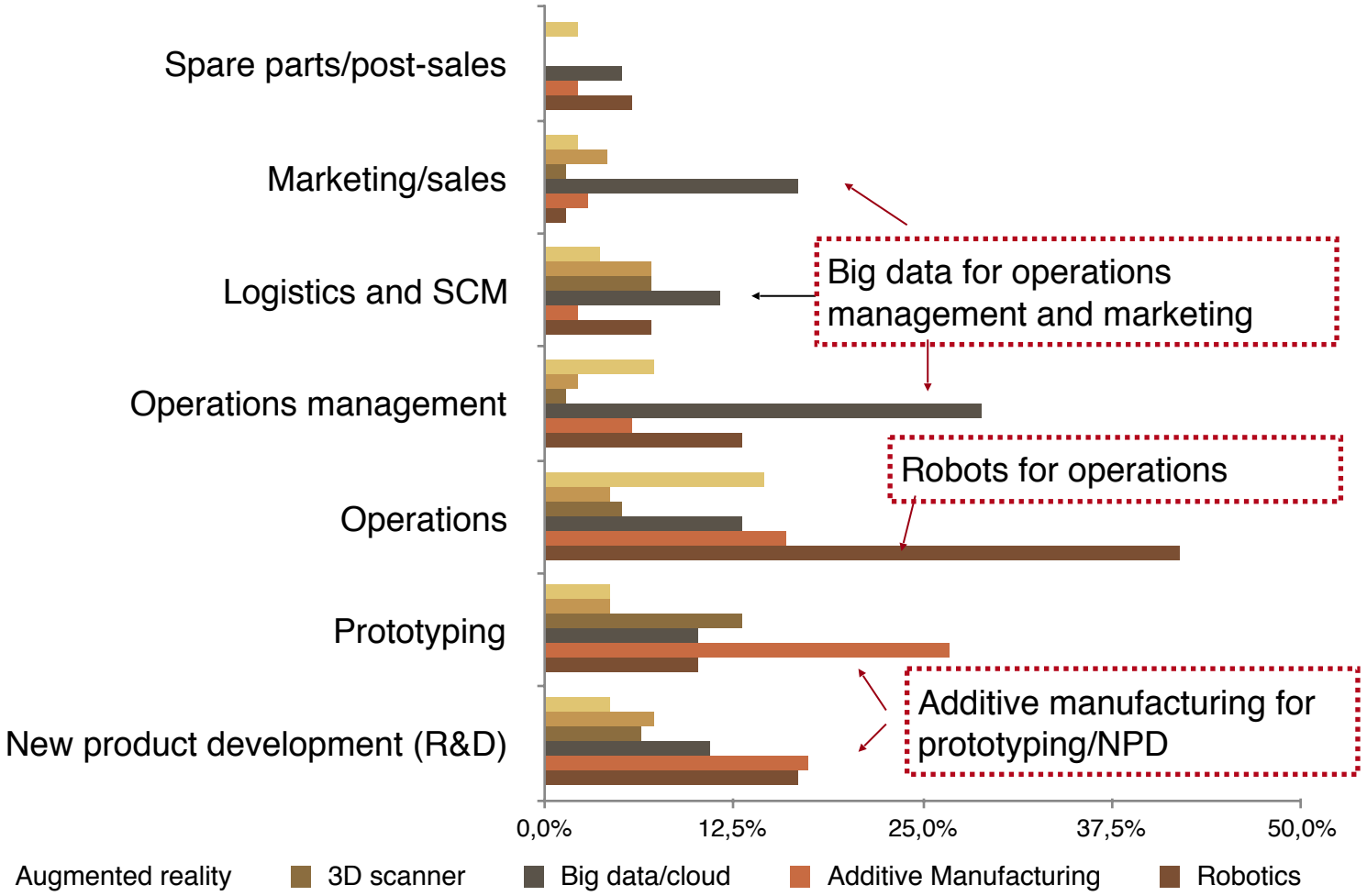
Non-adopting firms

Reasons for not investing in Industry 4.0



Industry 4.0 and areas of application

Value chain activity and industry 4.0



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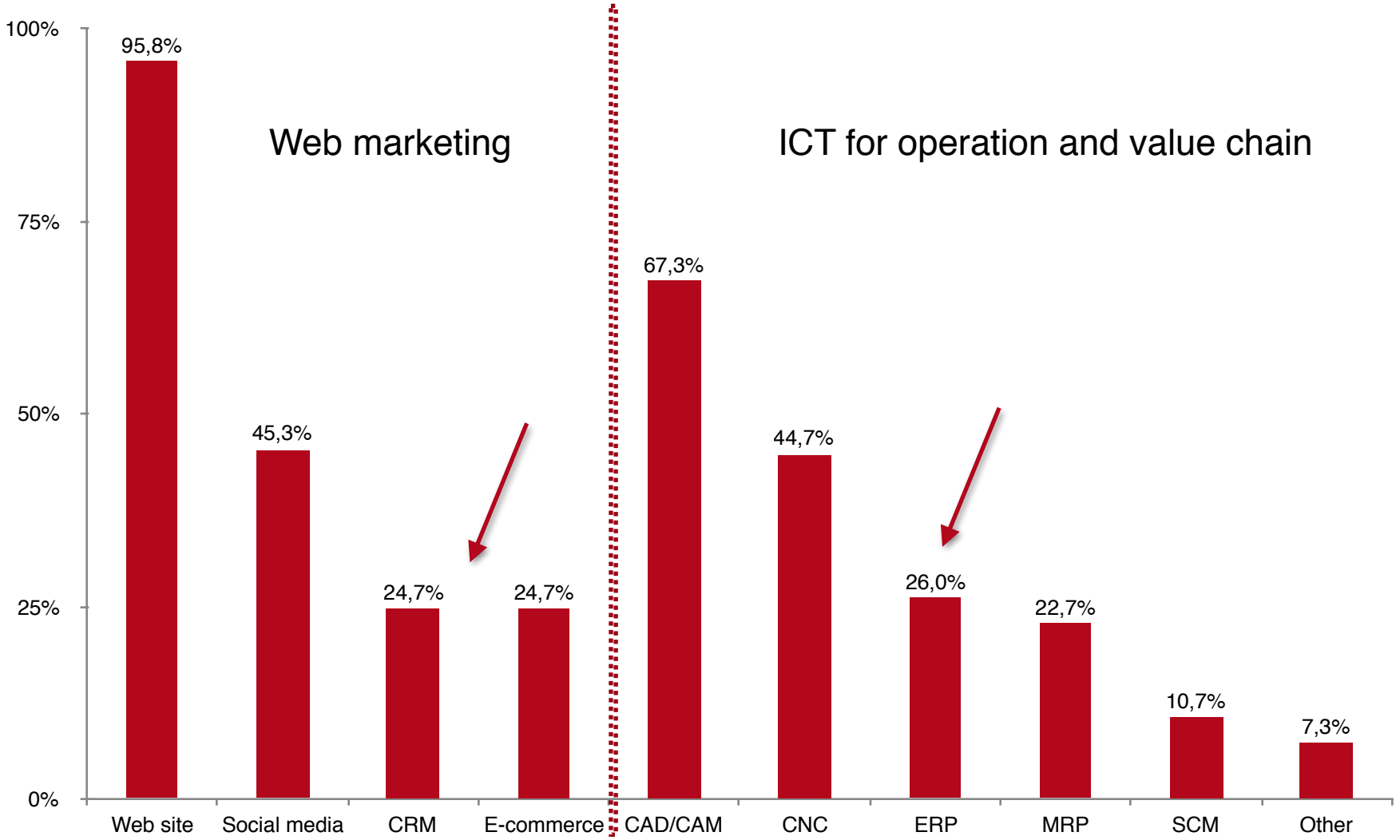
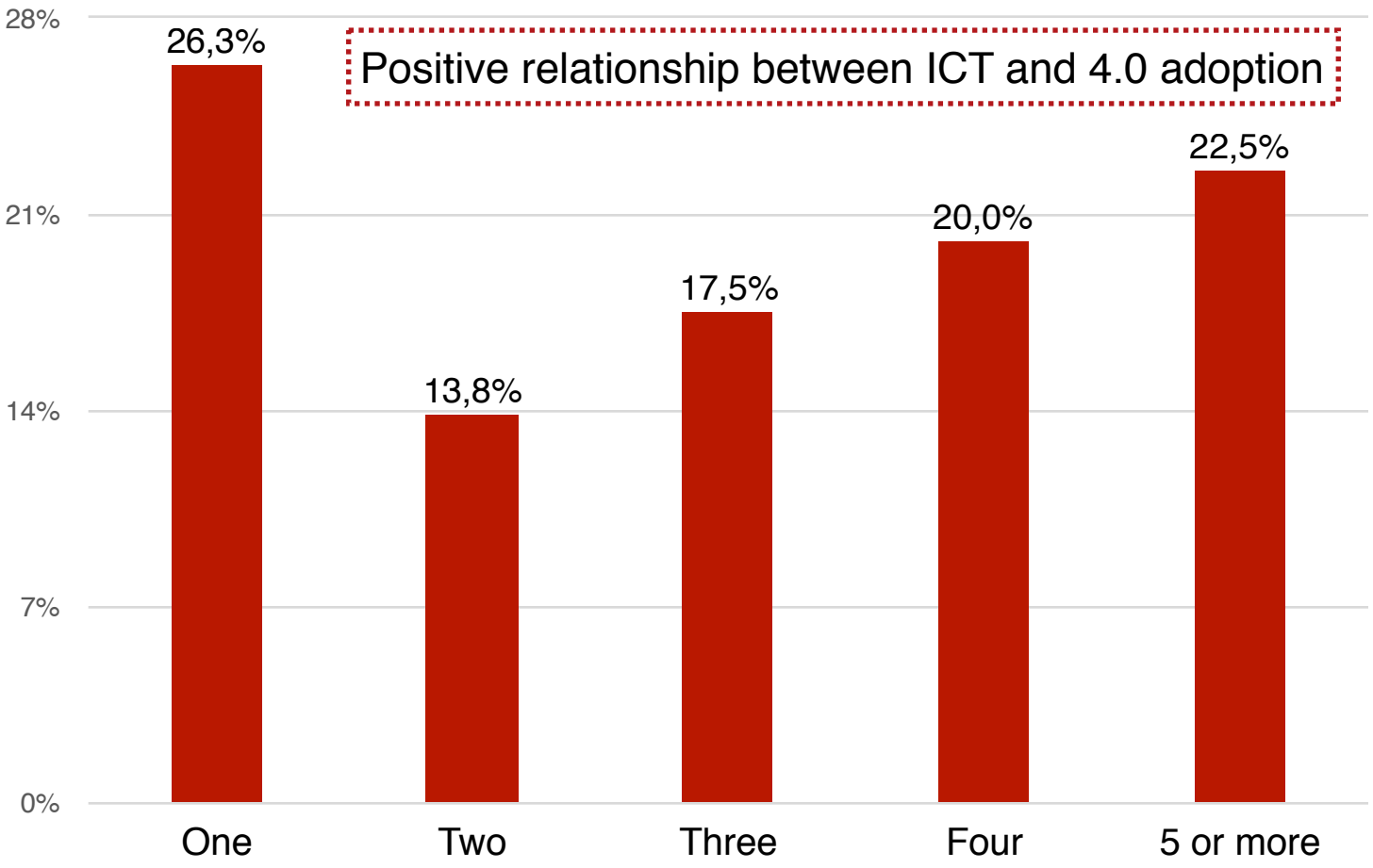
ICT adoption



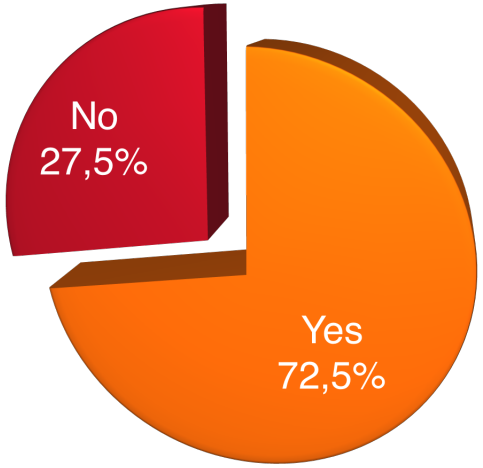
Number of ICT technologies adopted



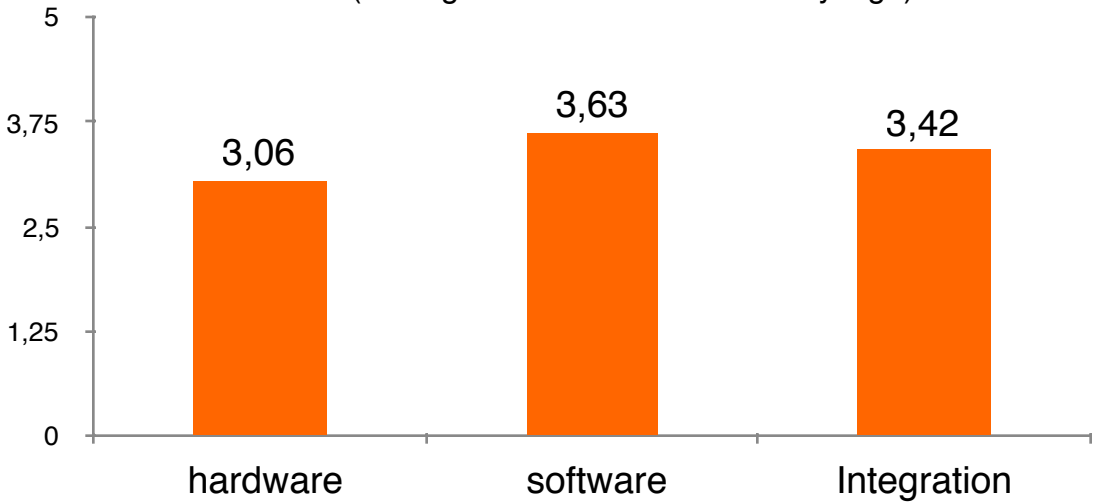
Management of Industry 4.0 projects

Industry 4.0 projects

Customization Industry 4.0 Investments

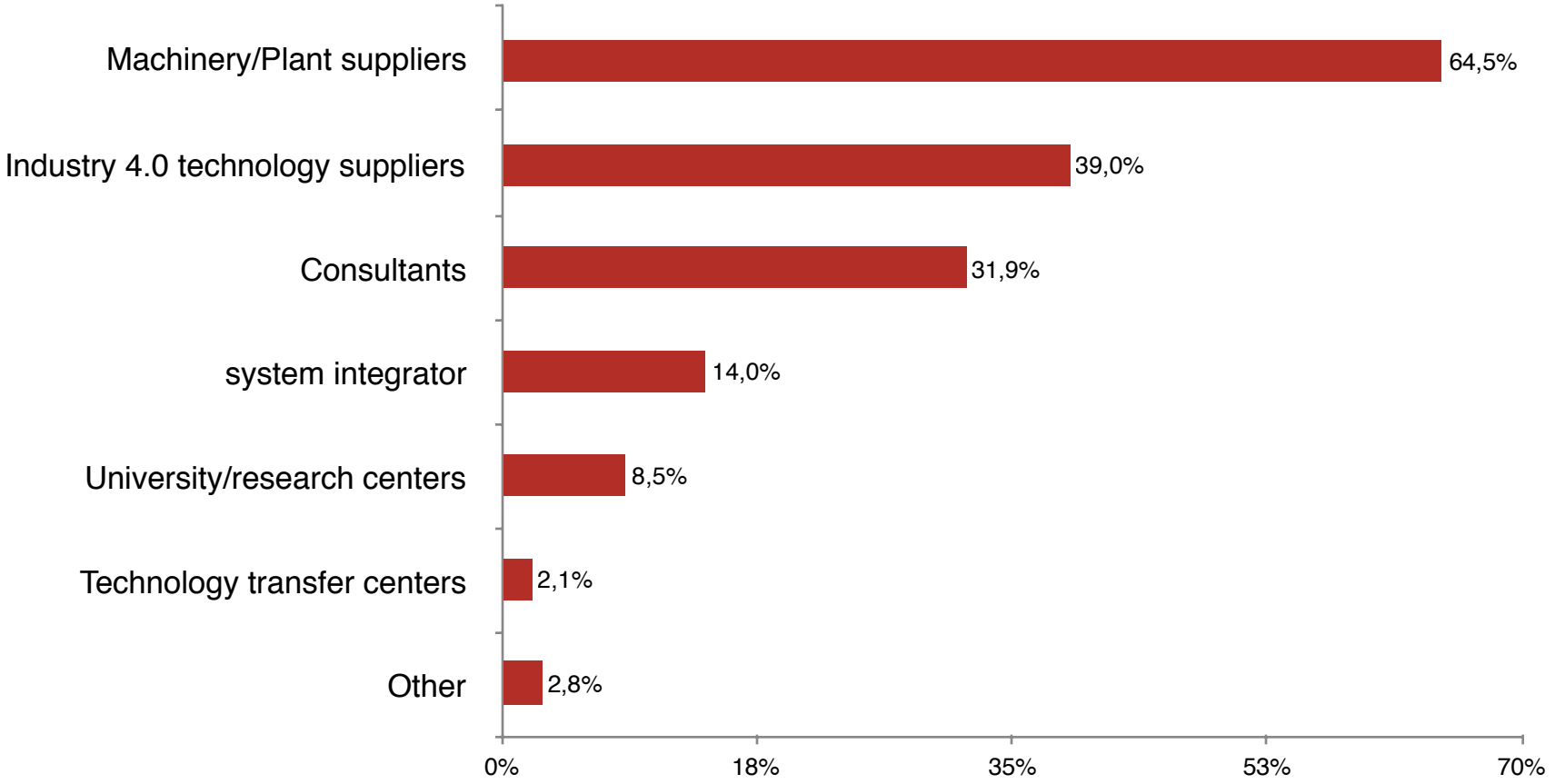


Domain of customization
(average value - 1 not at all/5 very high)

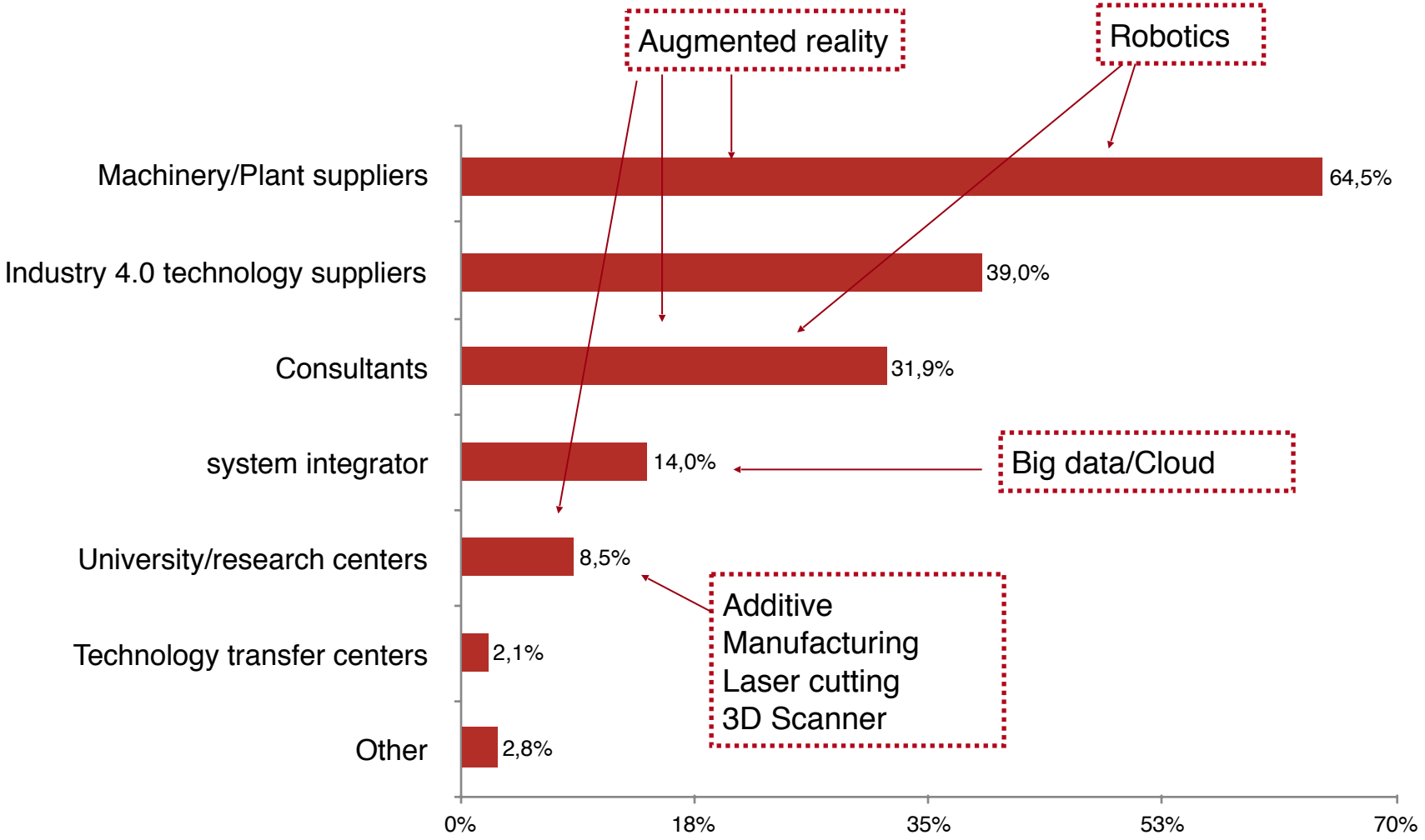


Investments in industry 4.0 projects (% on turnover): 10.5%

Partners to select and develop Industry 4.0 projects

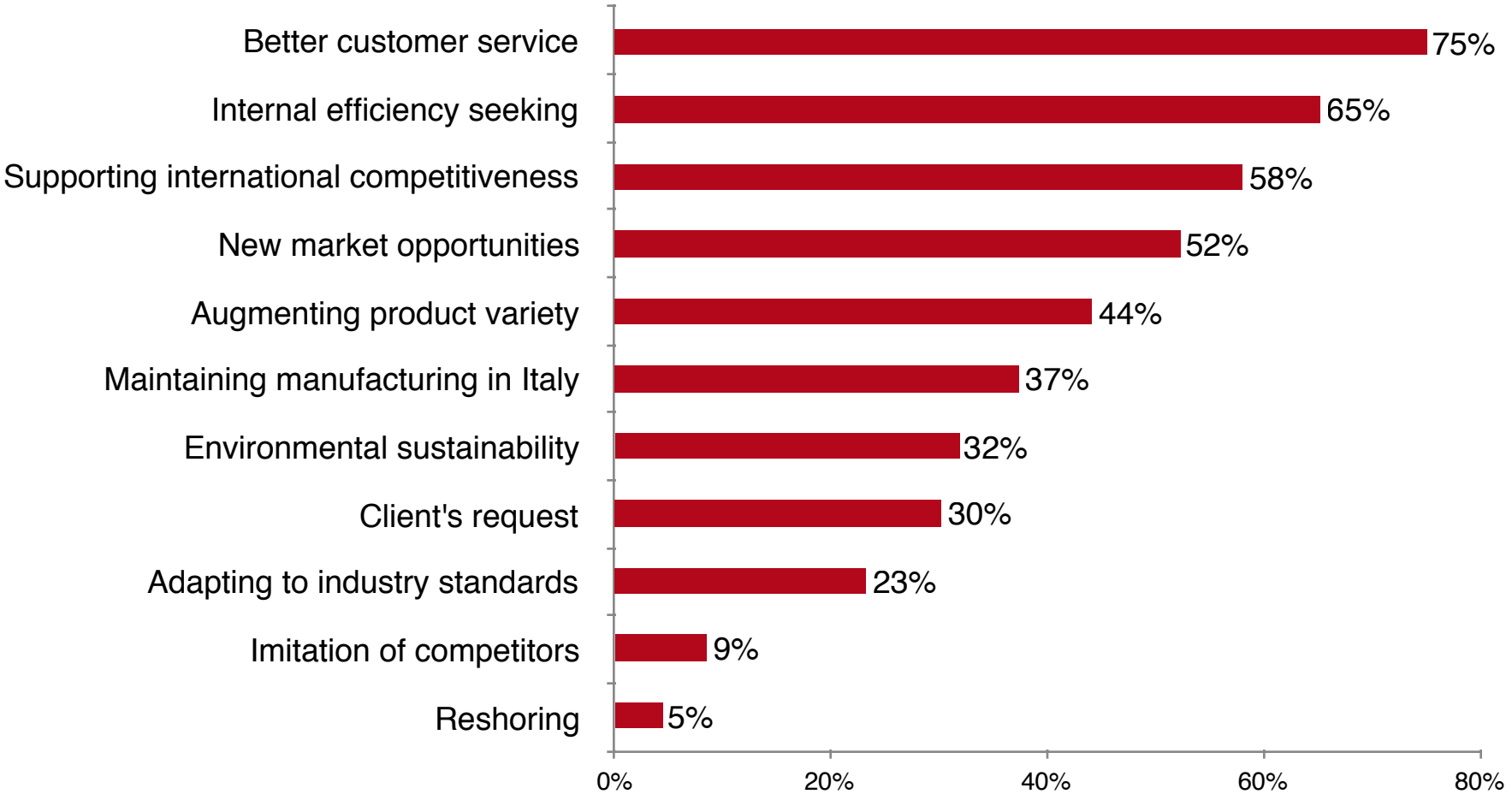


Partners to select and develop Industry 4.0 projects



Reasons for investments and results achieved

Reasons investments in Industry 4.0



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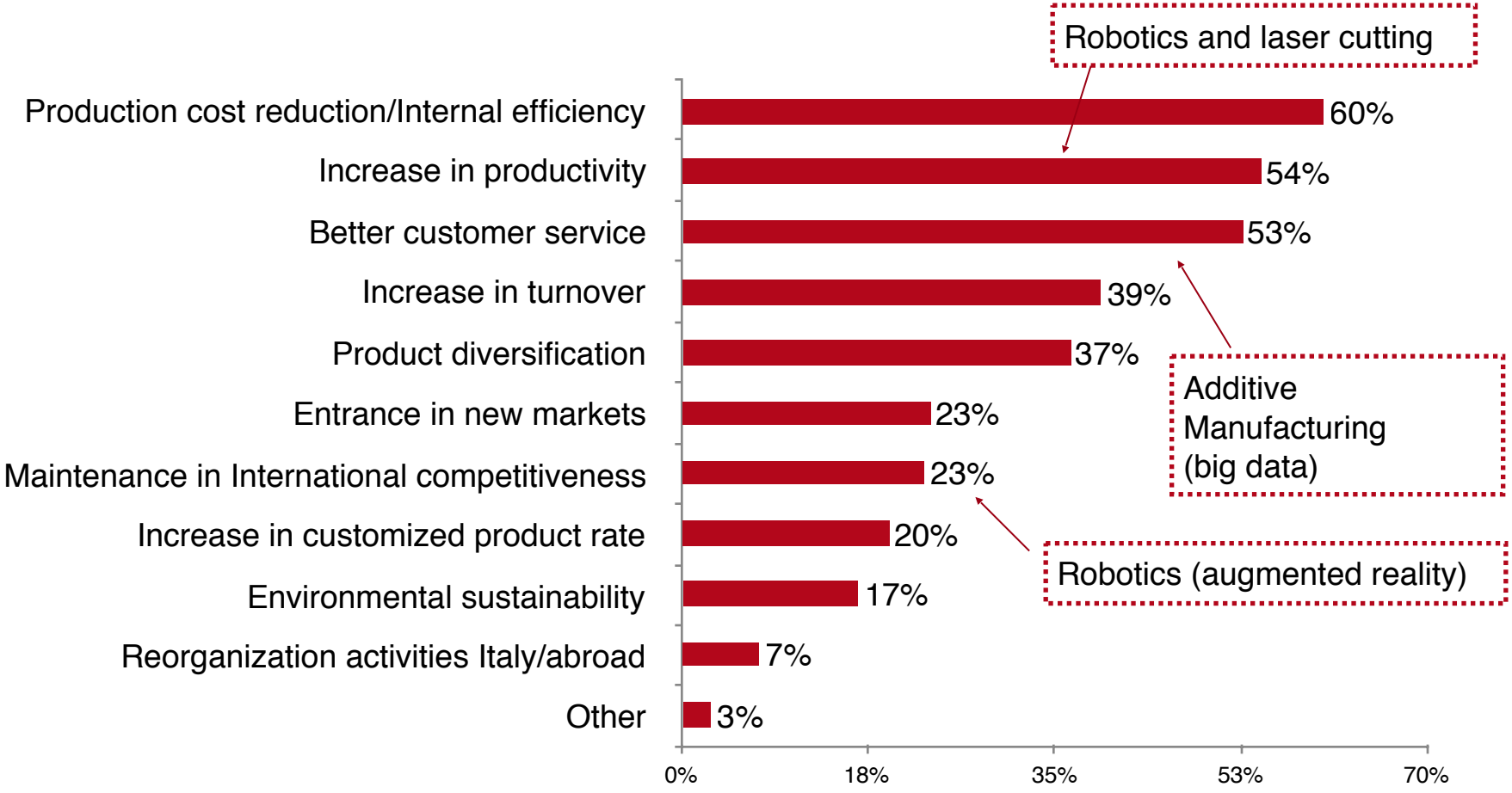
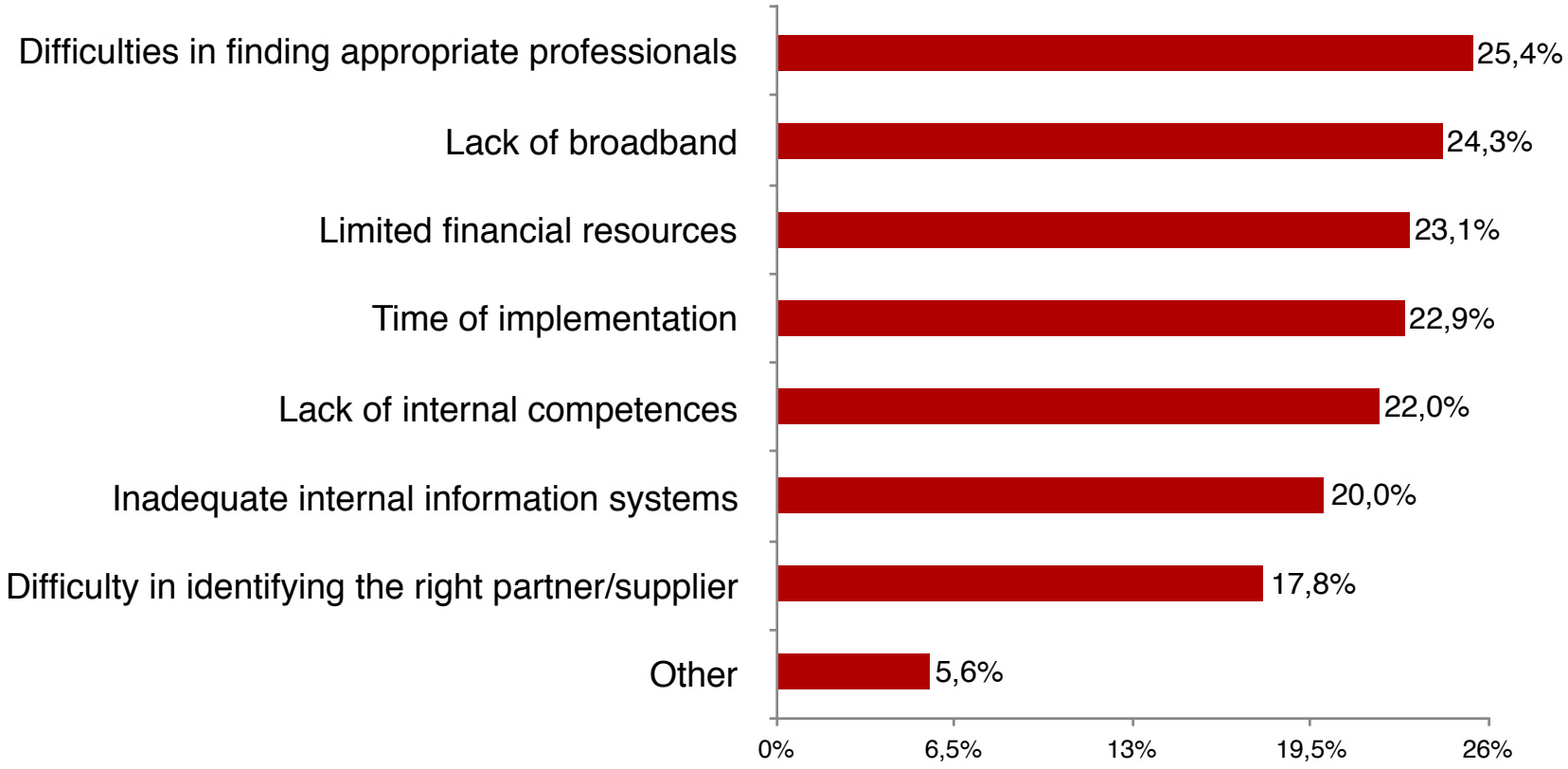
Impacts of investments in Industry 4.0

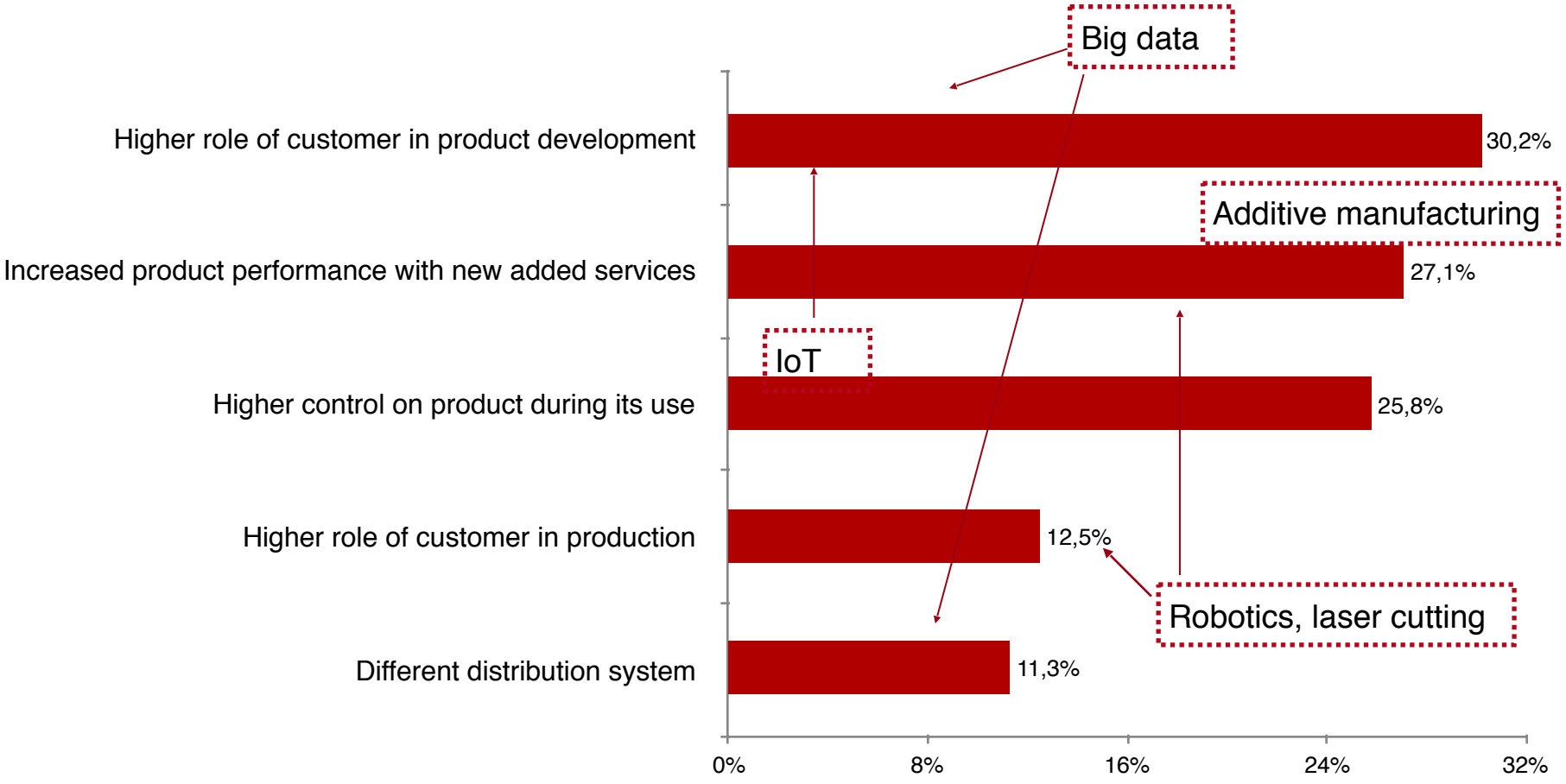


Difficulties in adoption of Industry 4.0 technologies



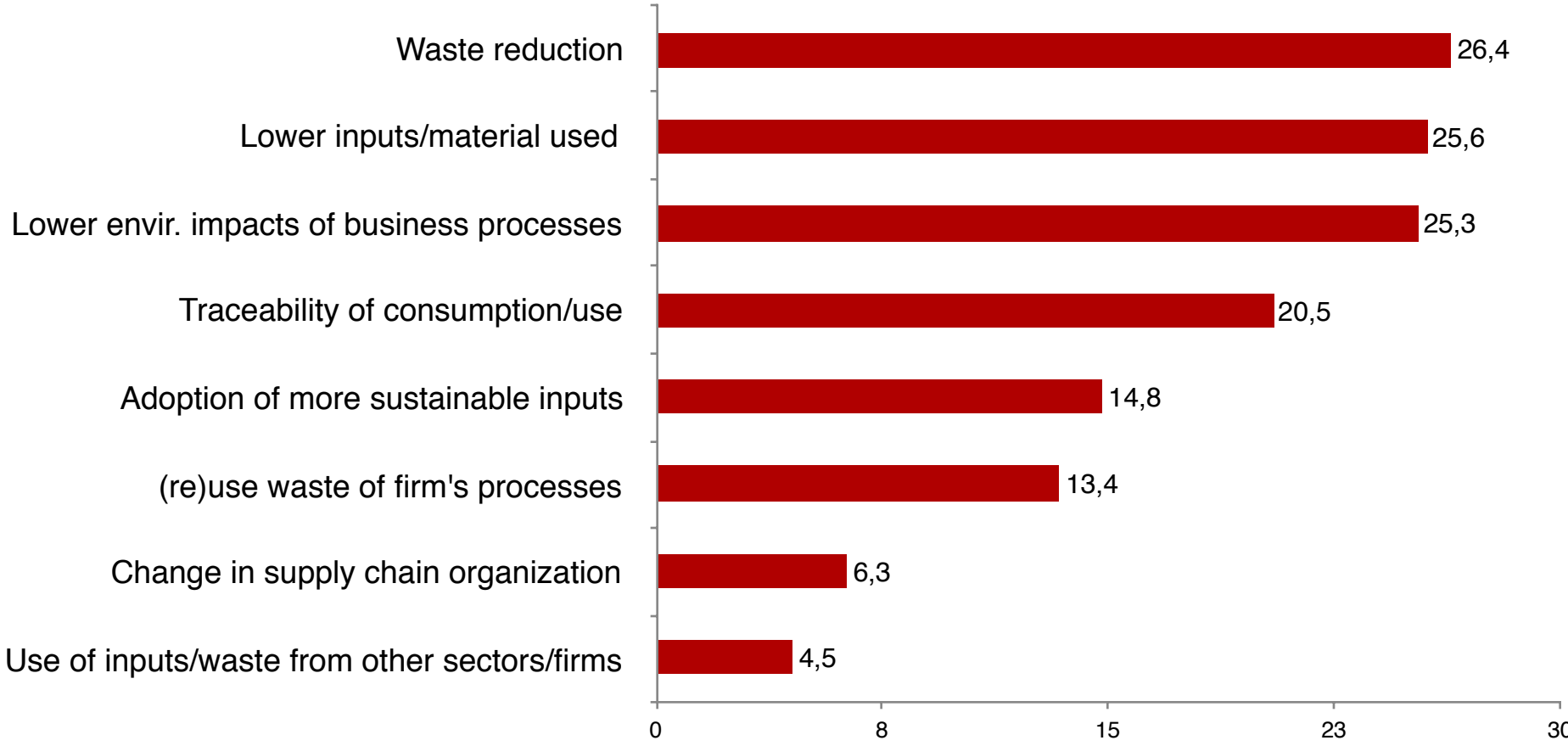
% firms with value 4-5 (high/very high)
(relevance of motivation - scale 1 - 5)

Impacts on the product



% firms with value 4-5 (high/very high)
(relevance of motivation - scale 1 - 5)

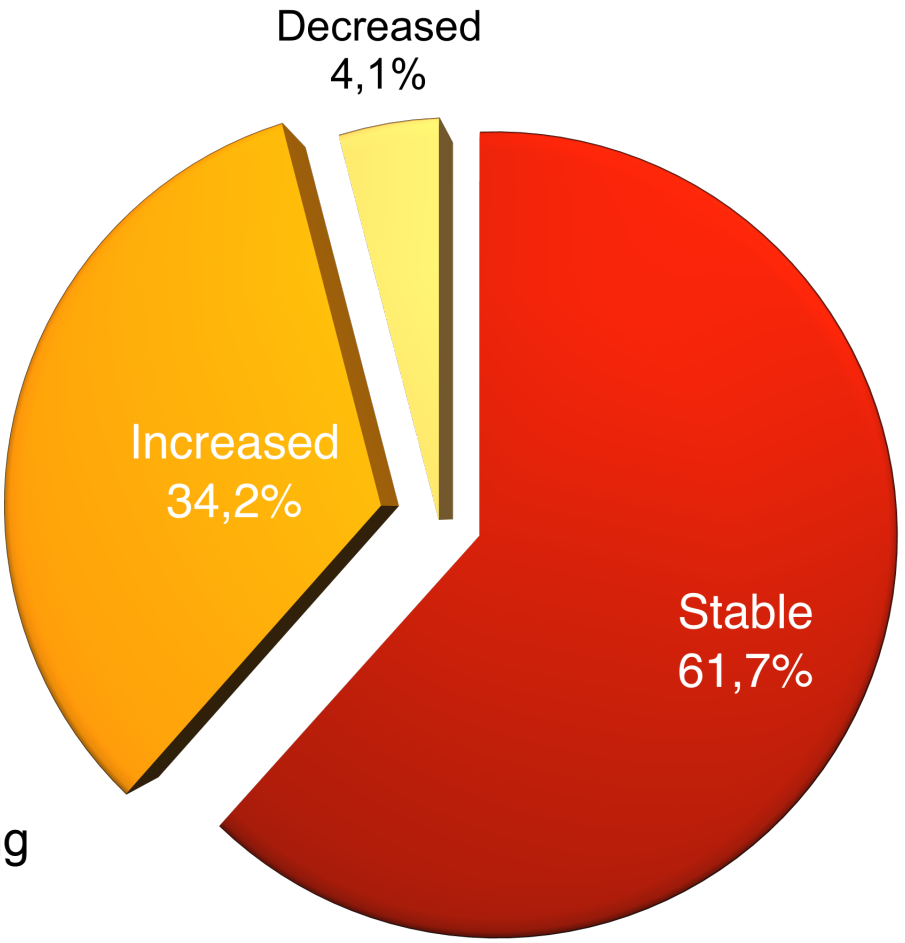
Industry 4.0 and sustainability



% firms with value 4-5 (high/very high)
(relevance of motivation - scale 1 - 5)

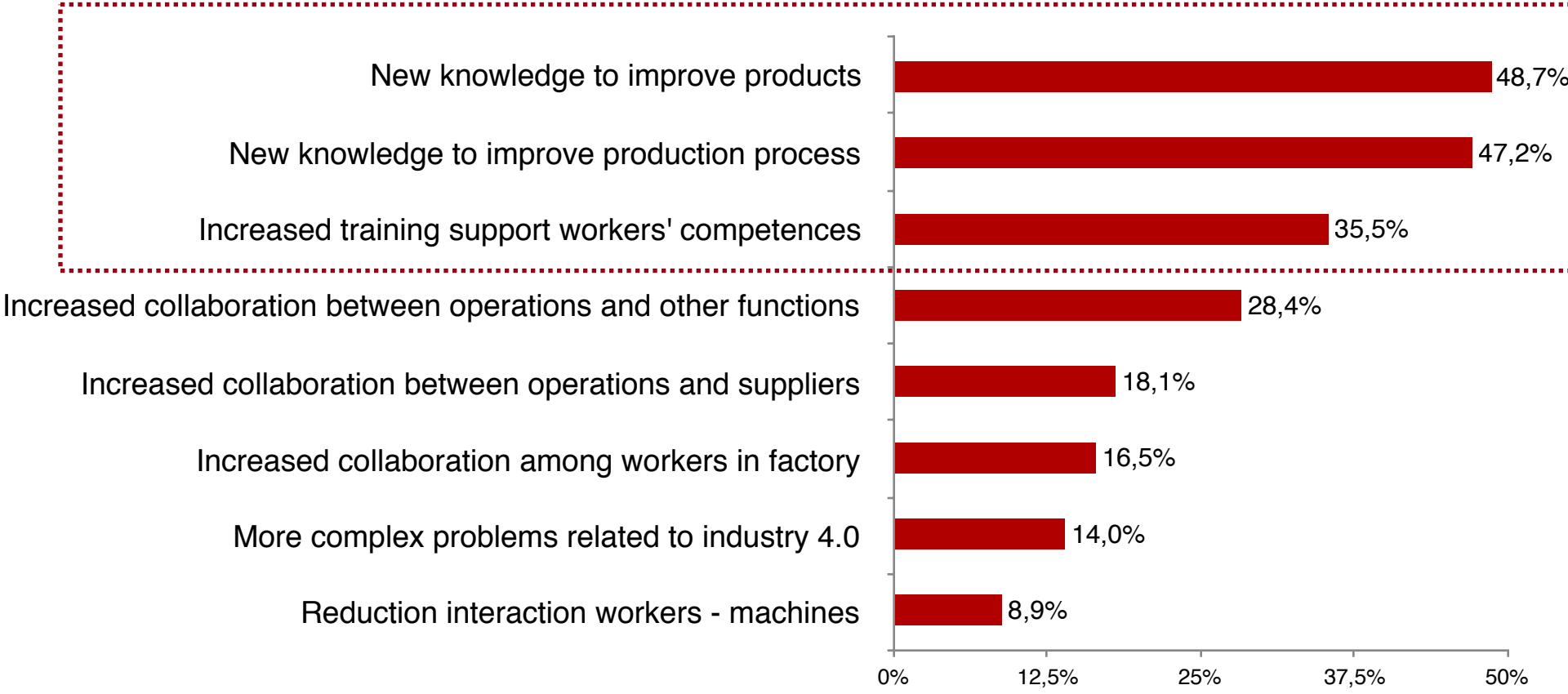
Employment

Investments in Industry 4.0: impacts on employment



No significant differences among firms by size

Industry 4.0 and changes in factory work



% firms with value 4-5 (high/very high)
(relevance of motivation - scale 1 - 5)

Industry 4.0 and business performance

Investimenti industria 4.0 e performance

- **Positive** impacts of industry 4.0 investments on business performance (analysis on average **EBIDTA/ sales** and **Sales growth 2014-2016** between **adopters and non-adopters**)
- In particular positive impact refers only to the adoption of **1 or 2 technologies** (not significant for higher number of technologies)

Executive summary

Executive summary 1

- Results on more than 1,000 imprese (including textile and apparel) confirm a **process of adoption**
  - **still limited (about 19%)**
  - that involve also **small firms (more than 40% of adopters)**
  - **implemented for a long time (average years of adoption between 2008 and 2014)**
  - with **industry variety (industry of specialization impacts on this process)**
  - **market-driven** (first reason: better customer service)
- **Adopters are innovative firms,** often with already implemented **ICT investments**

Executive summary 2

- Technologies are applied **differently within the firm:** 3D printing mainly in prototyping and new product development, robots in operations, big data for operations management and marketing.
- Industry 4.0 technologies are adopted mainly to product **customized** products. 66.6% of adopters produce bespoke or customized products, while only 33.4% of them standard products.
- Investments in Industry 4.0 technologies/projects have increased firm's **innovation capabilities.**

Executive summary 3

- Impact-wise, firms mention three main results achieved: **efficiency** (60%), increase in **productivity** (54%),increase in quality of **customer service** (53%), with a different role played by different technologies.
- **Increased value related to product** in terms of customization (co-design), related services and traceability/control on product, and **environmental sustainability**
- **Positive relation** with **employment (more than 61%** of adopters have maintained stable employment, while **34% has increased it**), with an impact on **work within the factory** mainly on knowledge management (**new knowledge to improve products or processes or development of competences through training**)
- Positive impacts on **performance (EBIDTA/sales and sales growth) in particular with 1 or 2 technologies,** where the selection of technologies is aligned with business **strategy** (quality more than quantity, selection based on business goals

Executive summary 4

- Those technologies require **ad hoc 4.0 projects of implementations (72% of adopters)**, they are not *off-the-shelf* technologies ready to be used immediately. **Accompanying activities** are essential and the primary partners are firm's technological suppliers (even though a **variety of partners** emerges and it is linked to different technologies adopted)
- A **positive** relation with investments on **ICT technologies**
- Three main difficulties in the adoption process: **lack of internal/ external competences, broadband and time of implementation**
- The main motivation for not-adopting firms is linked to **business strategy** and culture (more than 65% declare that those technologies are **not of interest for their business) rather than financial motivation**. This result is confirmed by the second motivation: being a **small firm/artisan**.

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http://www.economia.unipd.it/en/DML/Digital-Manufacturing-Lab