EUROPEAN TOOLING FORUM 2019

Tooling 2030

Strategic Roadmap for Industry

Moritz Wollbrink

12th November 2019
BRUSSELS - Belgium

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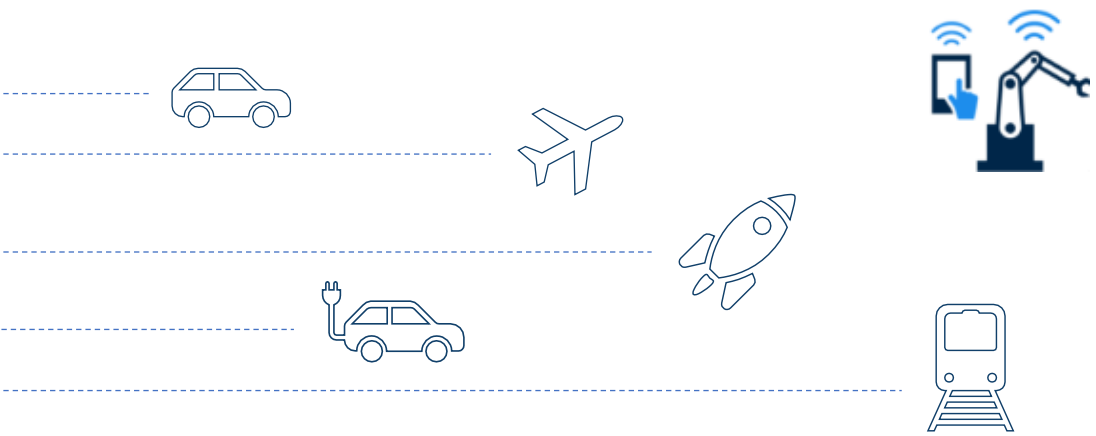
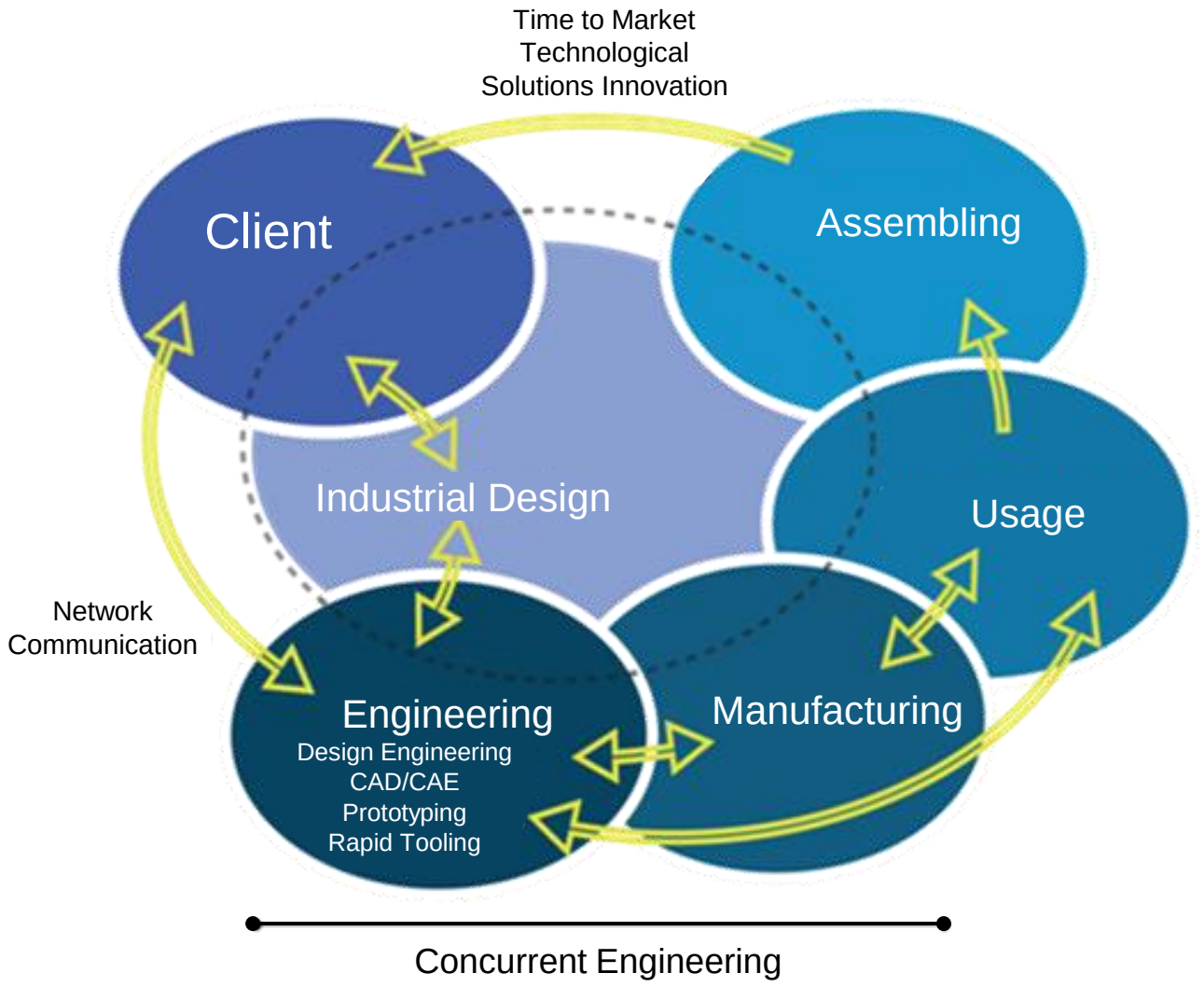
TOOLING: A Critical Infrastructure

Tooling is critical and cross-cutting sector that incorporates key know-ledge, linking product development with production, and innovation with industrialization and competitiveness.





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TOOLING: Facts & Figures

Tooling Industry (moulds, dies and special tools) in Europe

Annual **turnover** of abut **12 billion €** (average)

8,100+ Tooling companies

95 % of Tooling companies are **SMEs**

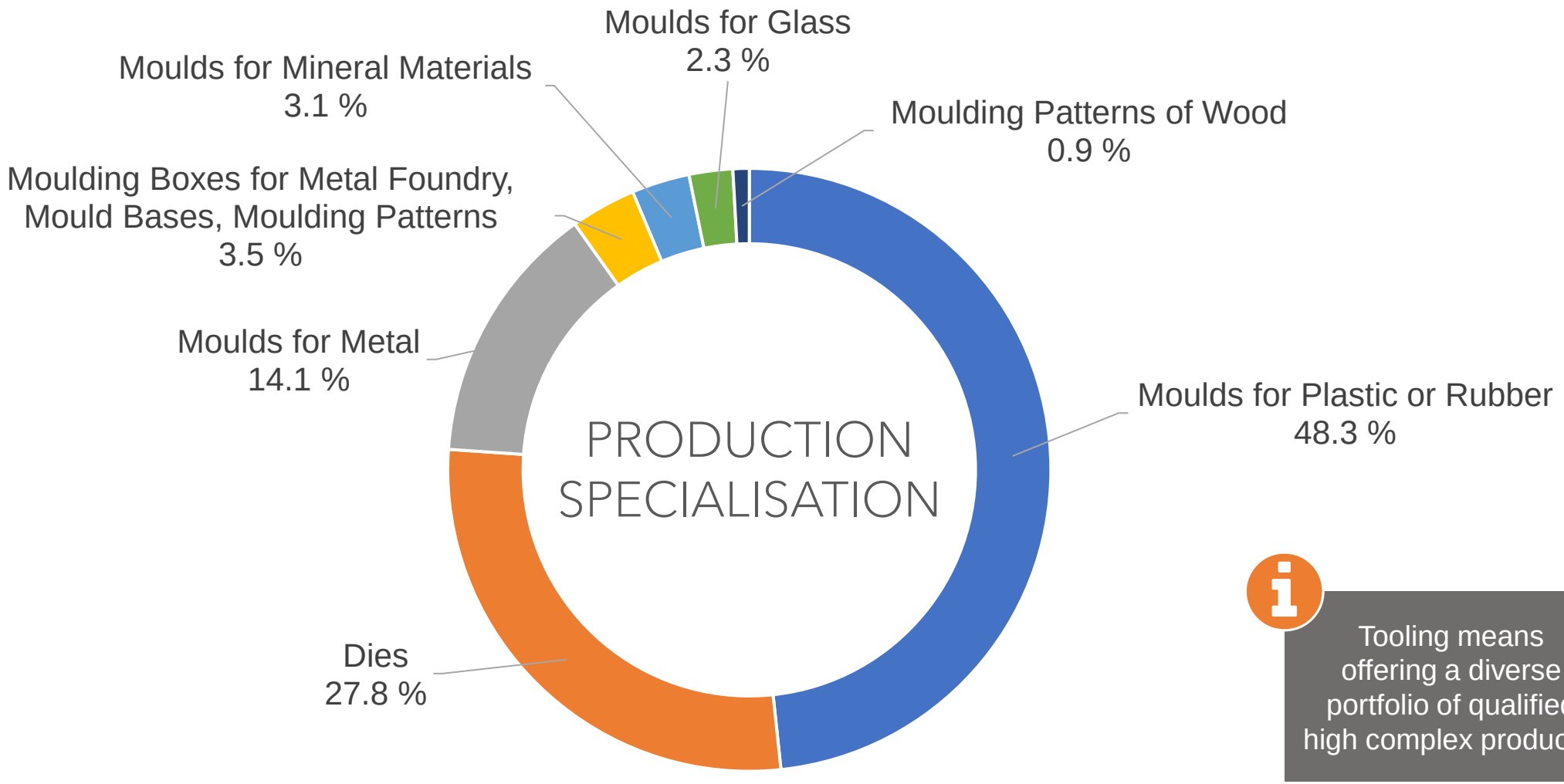
115,000+ workers directly in the sector

Tooling companies have **highly added value workforce**

Tooling companies have remarkable **know-how** in **design engineering** and **manufacturing technology**

TOOLING: Facts & Figures

EUROPEAN TOOLING MARKET



Tooling means offering a diverse portfolio of qualified high complex products.

Source: CEFAMOL 2019

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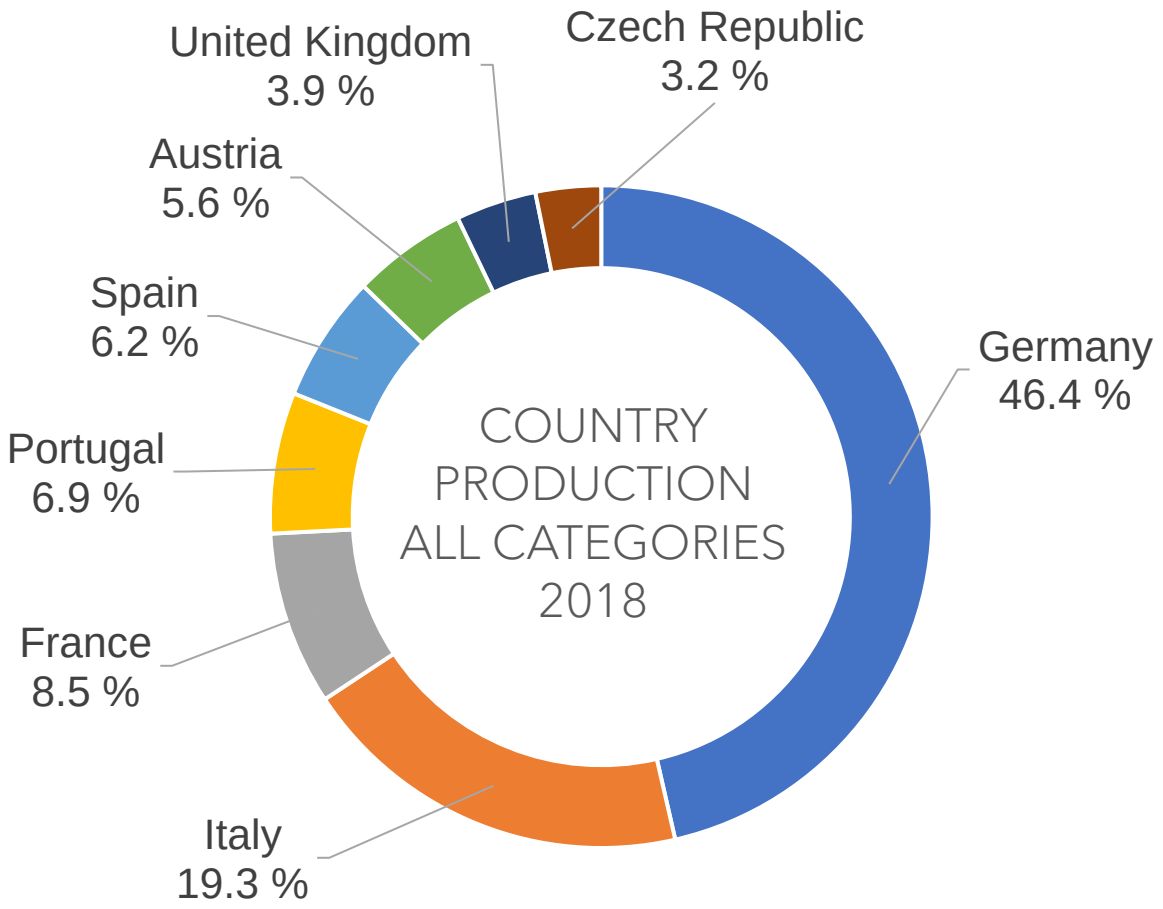
TOOLING: Facts & Figures

EUROPEAN TOOLING MARKET



Source: CEFAMOL 2019

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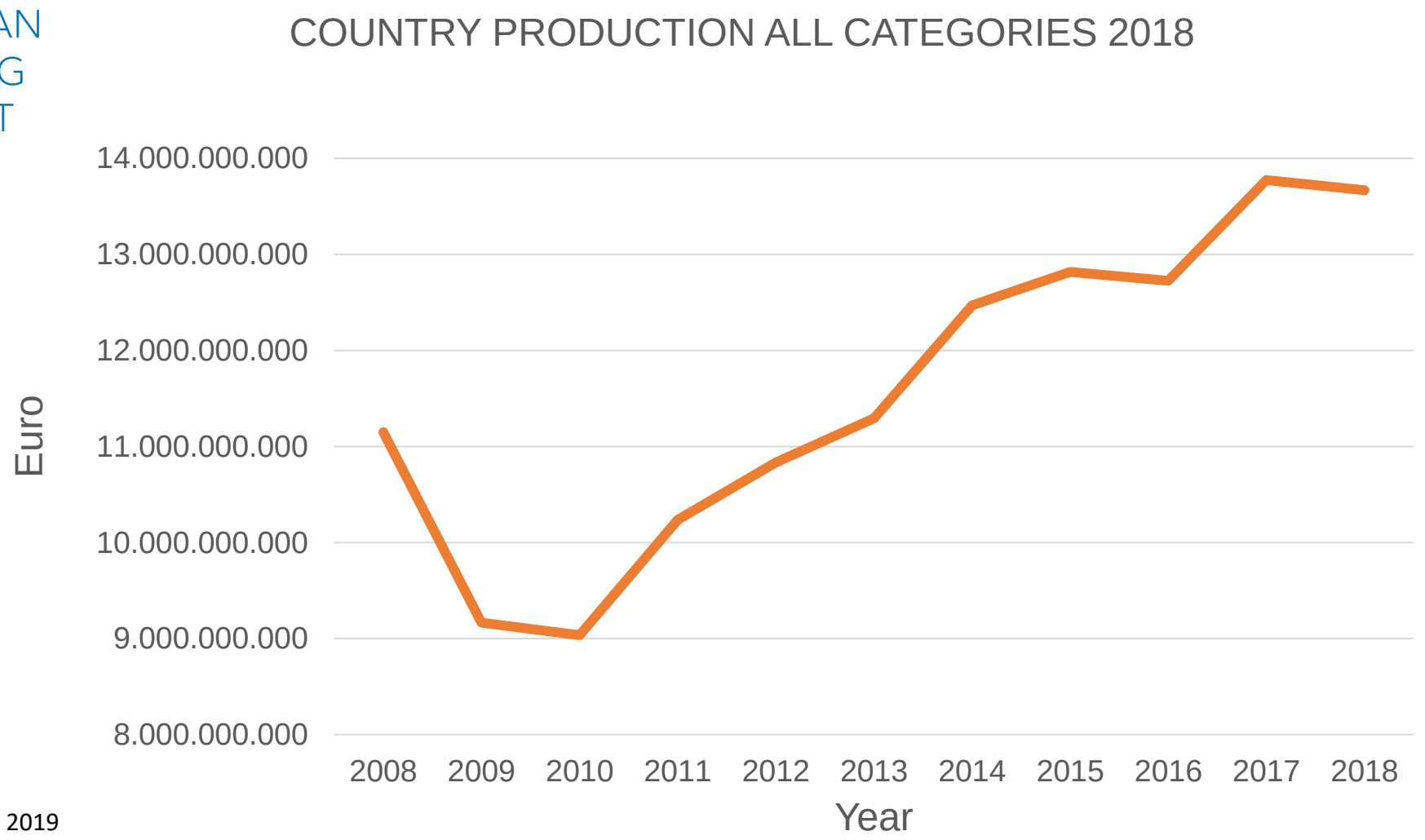
TOOLING: Facts & Figures

EUROPEAN TOOLING MARKET



Tooling sector is directly dependent from general production technology.

Source: CEFAMOL 2019

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TOOLING: EUROPEAN INFRASTRUCTURE

- ✓ **Tooling Industry is a European Infrastructure** supporting Product Development
- ✓ **INNOVATION** is the key point on Tooling to support Customers in global Markets
- ✓ Highly **QUALIFIED JOBS** are promoted continuously in the Tooling Companies
- ✓ **Continuous training** is essential to maintain technological leadership in design engineering and manufacturing technologies
- ✓ New **ENTERPRENEURSHIPS** are rising from Tooling Front Edge main areas (*Micro Manufacturing, Robotics, Handling, Virtual Design, Clean Tech, etc.*)
- ✓ **TOOLING** is a **NETWORK INDUSTRY** involving Suppliers, Customers and Academia
- ✓ **RESEARCH / DEVELOPMENT / PILOT LINES** are fundamental to reinforce the ***European Tooling Competitiveness***

MULTIDISCIPLINARY

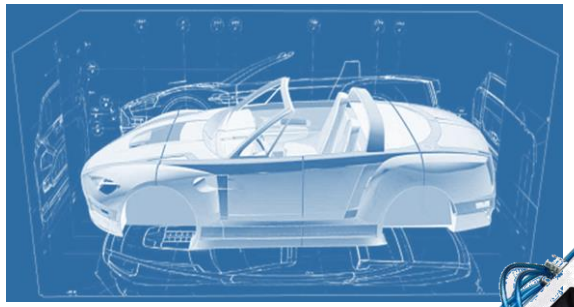
- Product Development & Engineering
- CAD/CAM/CAE
- Reverse Engineering
- Additive Manufacturing
- Processes Reengineering
- High Speed Milling
- Micro Manufacturing
- Management & Planning
- IT Security
- Knowledge Management
- Environment, Health & Safety Work
- Metrology
- Fixtures, Jigs & Measurement Systems
- Polymer Injection
- Die Casting Tools
- Powder Injection Moulding (PIM, MIM, CIM)
- Bi-Injection
- Reactive Injection Moulding (RIM)
- In-Mould Assembling, Labeling, Coating

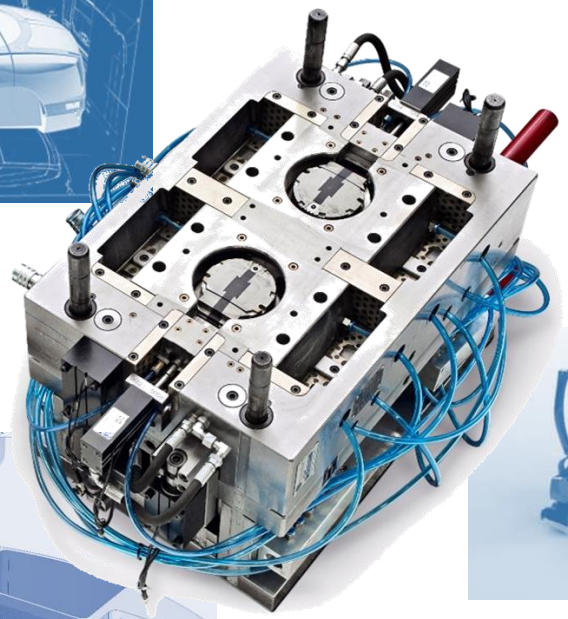
TECHNOLOGY & INNOVATION

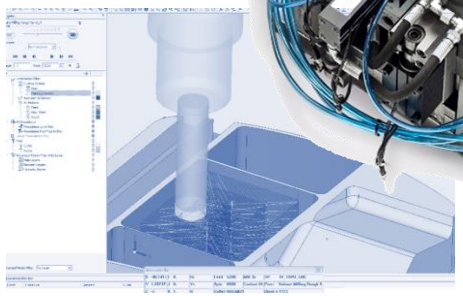
KNOW-HOW & CONTINUOUS TRAINING

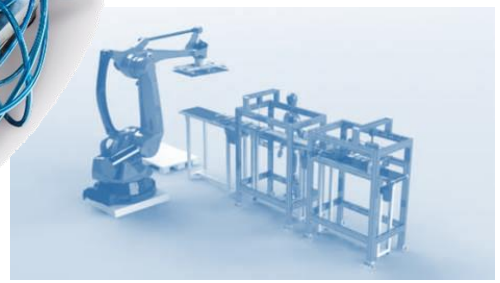
NETWORKING

COMPETITIVENESS









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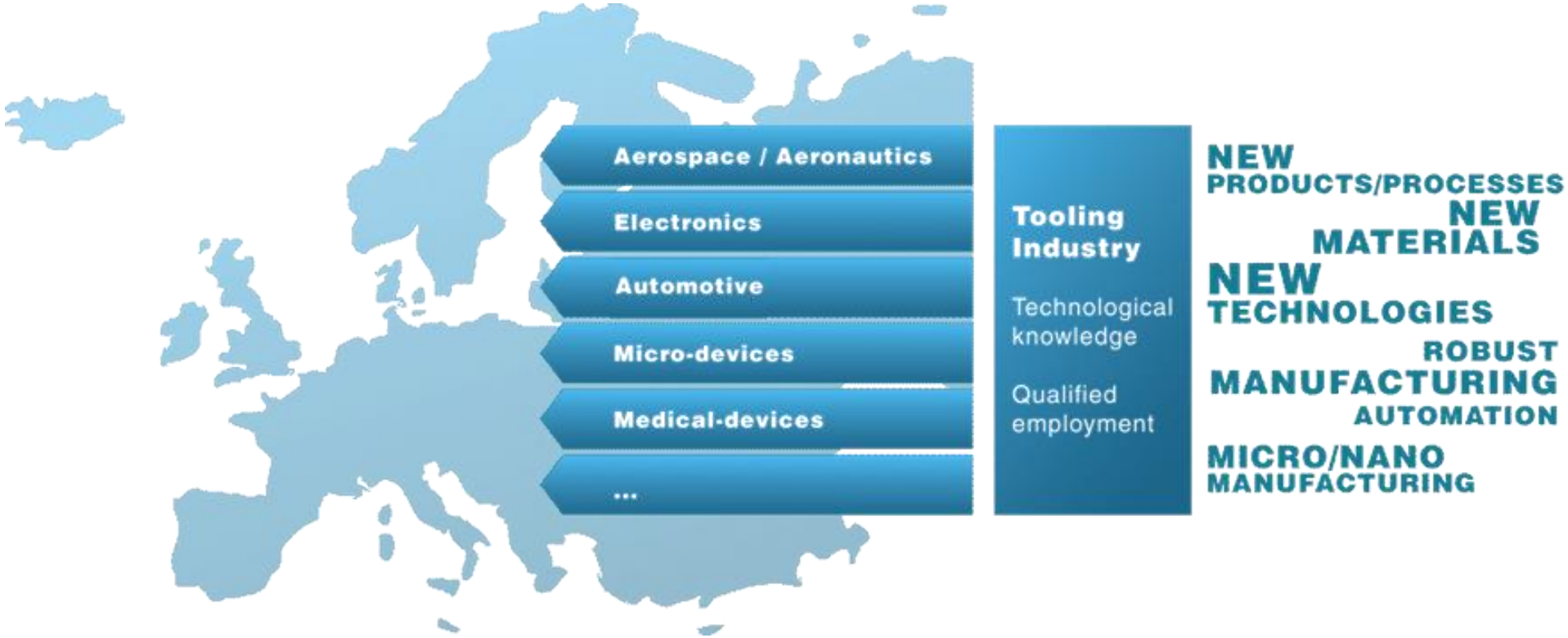
TOOLING: MULTISECTORAL IMPACT

Tooling Industry is in the critical Path of Product Development



A multi-disciplinary industry assuming a **key position** in global value systems, **instrumental to the deployment of product-service systems**, providing **"infrastructural" support** to economy**.**

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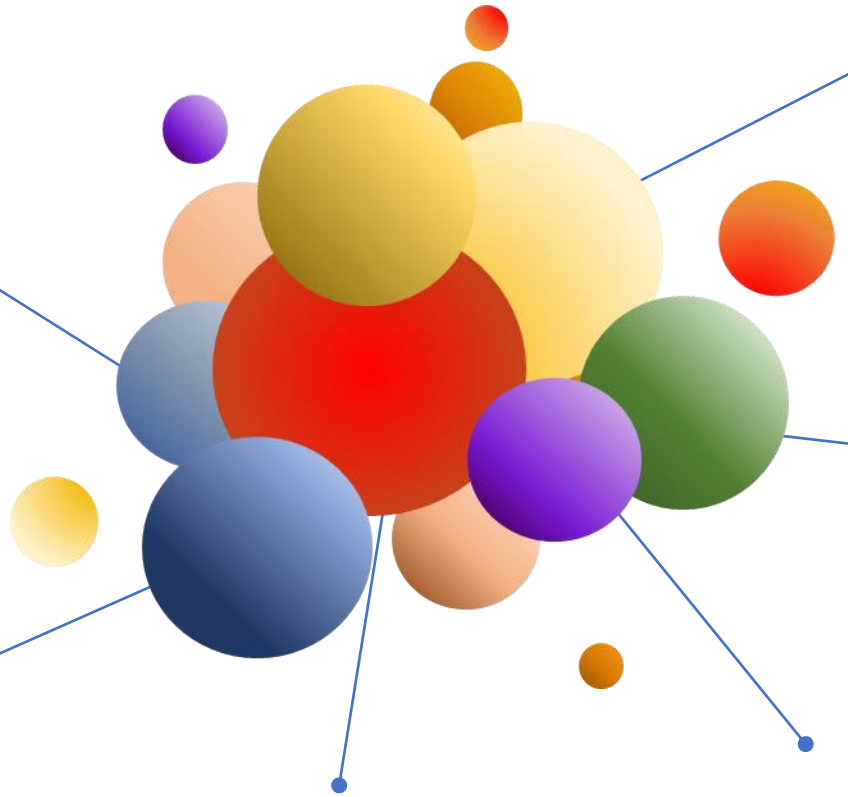
TOOLING: STRATEGIC MARKETS



HEALTH
Sector Growth,
Innovation Opportunities,
Highly regulated,
Focus on Quality

ELECTRONICS
Sales Channel,
Miniaturization,
Function Integration

ENERGY & ENVIRONMENT
Sector growth,
Innovation Opportunities,
Public Support

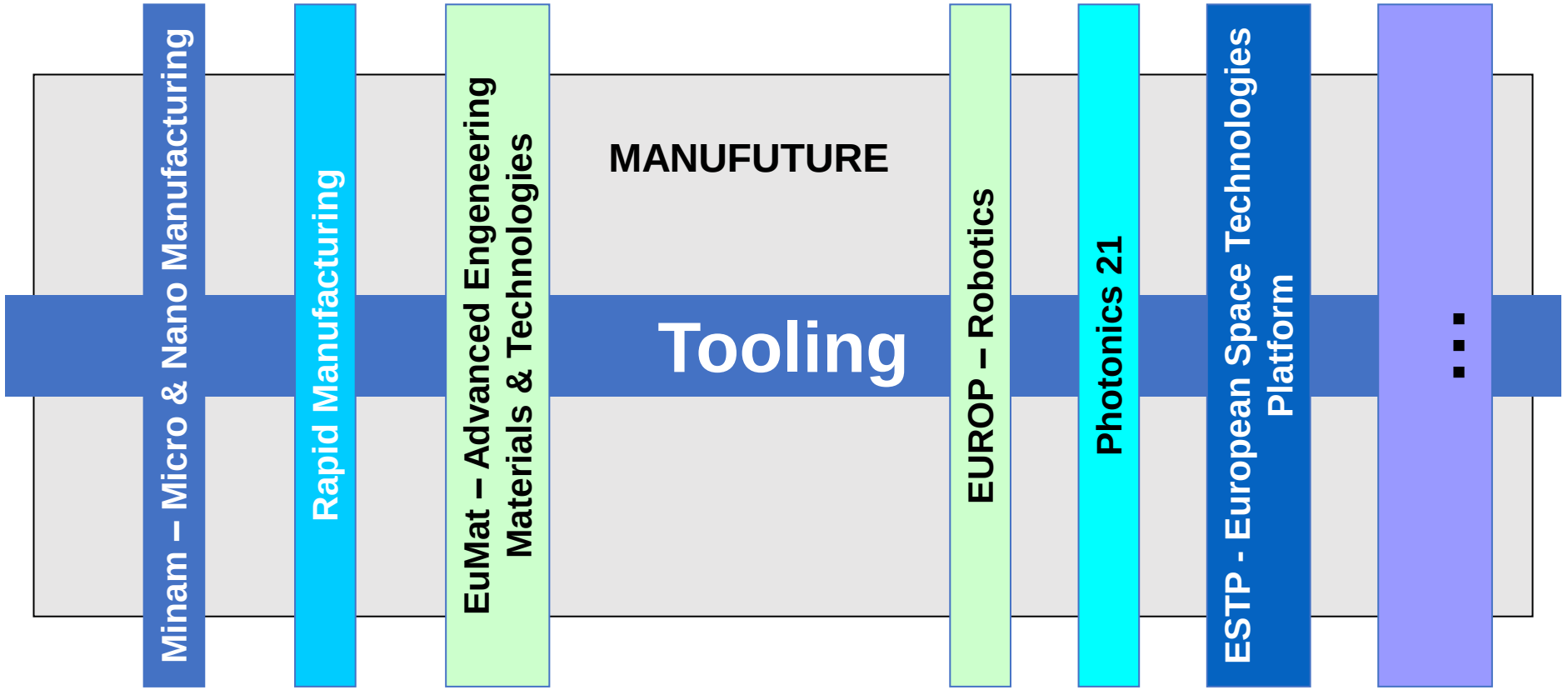
AERONAUTICS
Innovation Opportunities,
Highly regulated

AUTOMOTIVE
Sales Channel,
Innovation Opportunities,
Public Support

PACKAGING
Sector Growth,
Innovation Opportunities,
Public Support

MULTISECTORAL IMPACT / EUROPEAN PLATFORMS

PRODUCTS | EMPLOYMENT | INNOVATION | COMPETITIVENESS



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EU KETs

EUROPE 2020: Factories of the Future (Roadmap)

The KETs – Key Enabling Technologies

- Advanced Manufacturing Processes → **TOOLING** Key enabling Industry!
- Mechatronics for Advanced Manufacturing Systems
- Environmental Sustainability of Manufacturing
- ICT for Manufacturing Enterprises
- Manufacturing Strategies
- Modelling, Simulations and Forecasting Methods and Tools
- Knowledge-Workers

Tooling Industry is in the critical Path of Product Development and Production!

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THE EUROPEAN TOOLING PLATFORM

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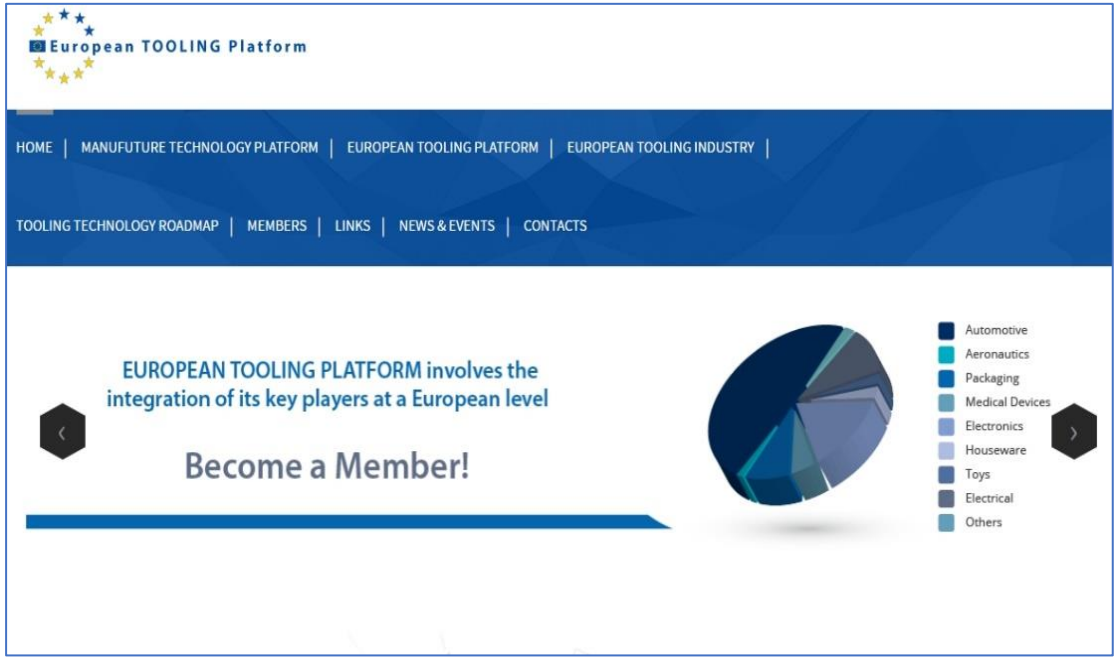
THE EUROPEAN TOOLING PLATFORM

European TOOLING Platform

The European Tooling Platform is officially recognised as a MANU*FUTURE*'s Sub-Platform being of key strategic relevance to support the implementation of a coordinated Action Plan at European level.



http://toolingplatform.manufuturenet.eu

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THE EUROPEAN TOOLING PLATFORM

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The European Tooling Platform is the Tooling focal point for Research & Development at European level

- *Sub-Platform of the MANUFUTURE Technology Platform*
- *Proposal, development and implementation of R&D activities*
- *Increase competitiveness and leadership*
- *European high added value engineering*
- *Competitive differentiation*

THE EUROPEAN TOOLING PLATFORM: MEMBERSHIP

Official Members from…

- Portugal
- France
- Germany
- Spain
- Italy
- Slovenia
- Poland
- Belgium
- Sweden
- Finland
- Czech Republic
- Estonia
- Hungary
- Switzerland
- Turkey
- South Africa
- Great Britain

Type of Members…

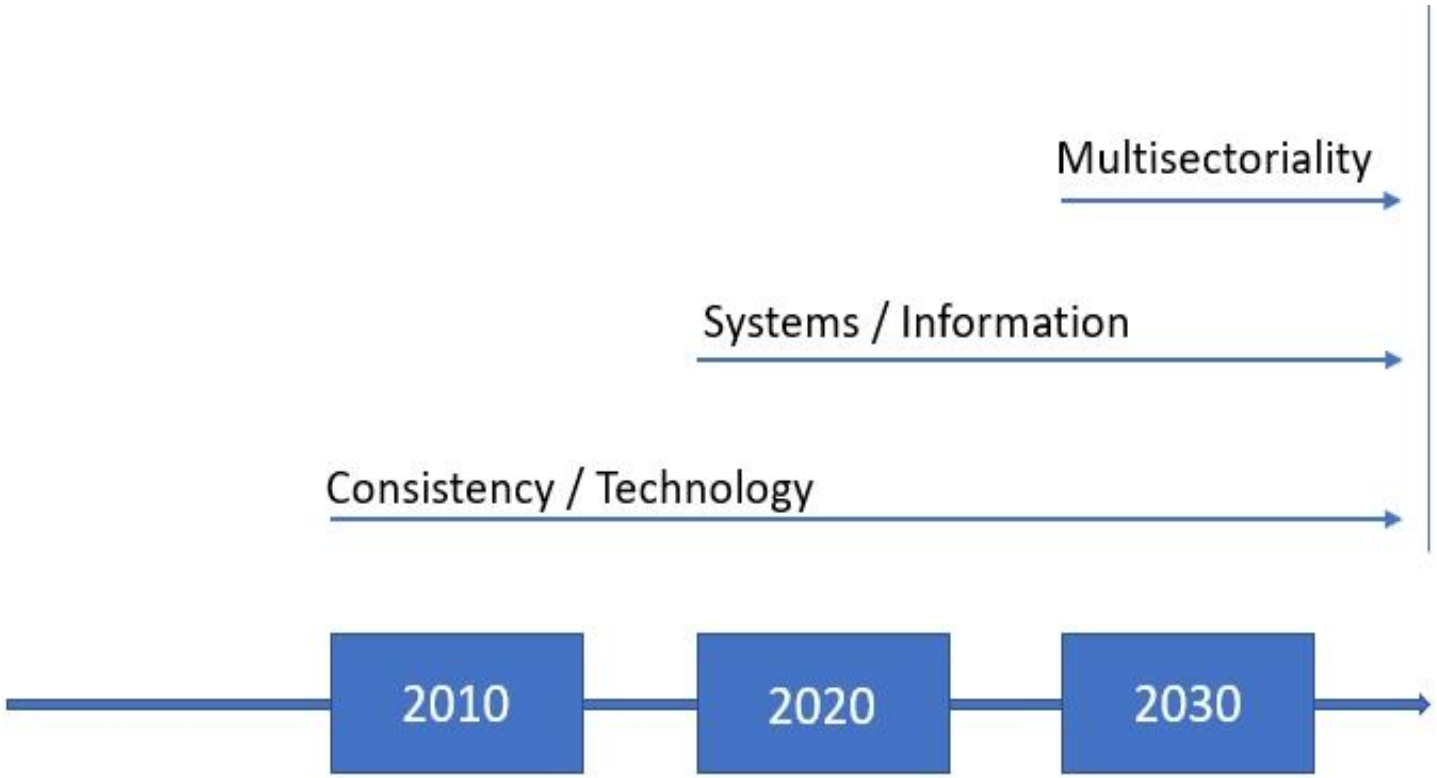
- ❑ Companies
- ❑ Universities
- ❑ Research Centers
- ❑ Industry Associations

European Tooling Platform is in line with *ISTMA Europe* which represents 17 Countries.

THE EUROPEAN TOOLING PLATFORM

Vision

Tooling, Mould and Die Making companies are infrastructure strategic players towards the development, sustainability and **digitising** of the European Industry, **promoting the Circular Economy**.



THE EUROPEAN TOOLING PLATFORM

Strategic Actions

- ***Promote an active participation of stakeholders*** towards the definition and implementation of a ***Tooling Industry Strategic Research Agenda***;
- ***Propose, develop and implement Research and Innovation activities*** to promote the competitiveness and differentiation of the Tooling companies;
- ***Development of Strategic Roadmaps*** for the Tooling Industry;
- ***Creation of Specific Working Groups*** in specific disciplines and domains towards the definition, implementation and continuous evaluation of the Strategic Research Agenda priorities and objectives.

THE EUROPEAN TOOLING PLATFORM

Working Groups

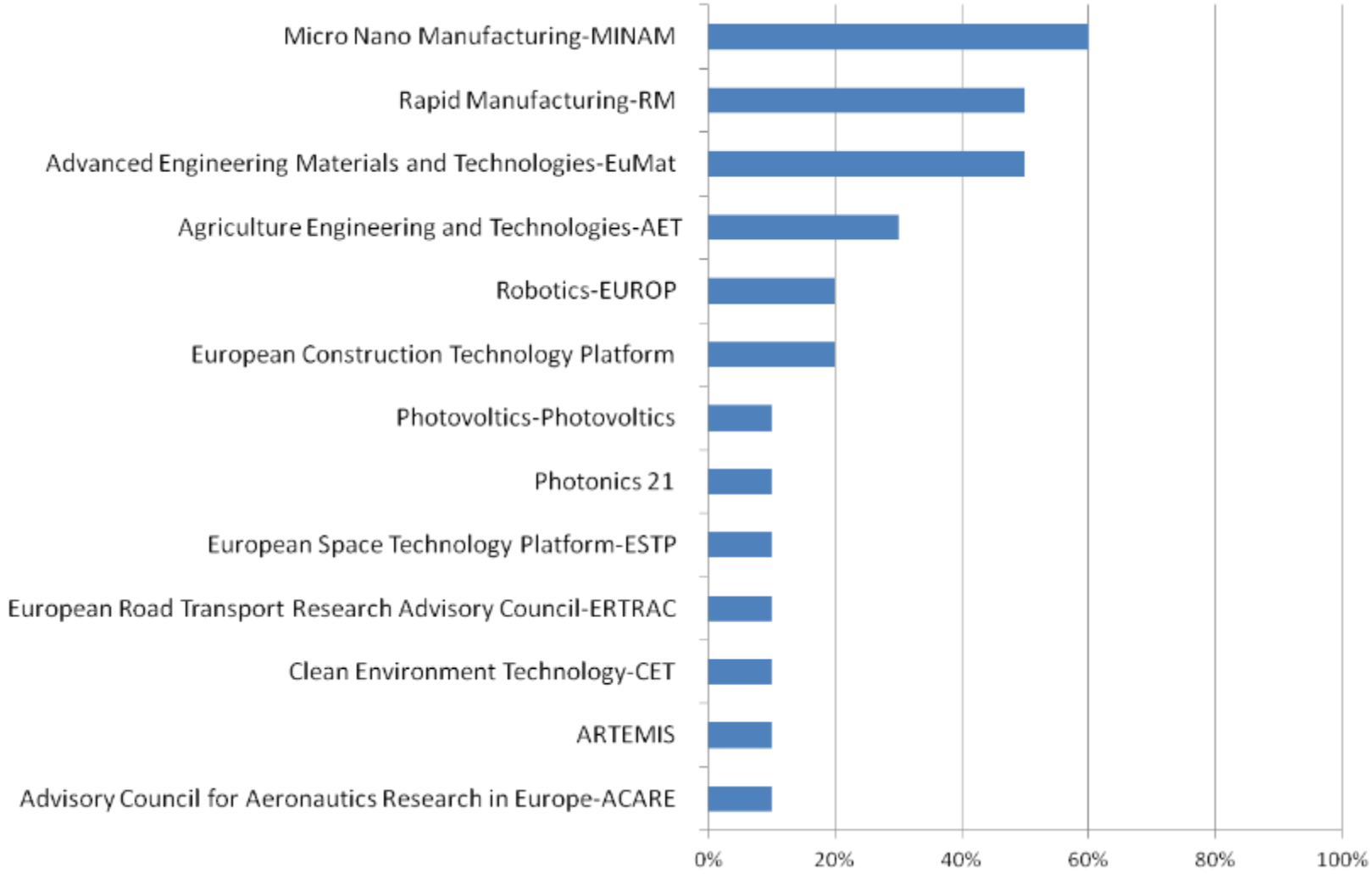
- INNOVATION

  Objective
  Support the European Commission (EC) in defining research topics for Tooling Industry in the next competitive calls

- QUALIFICATION

  Objective
  Promote the European Tooling Training Network linking the needs of the Industry and training programs (Universities, Technical Schools, etc.)

MULTI-PLATFORMS INTERACTION



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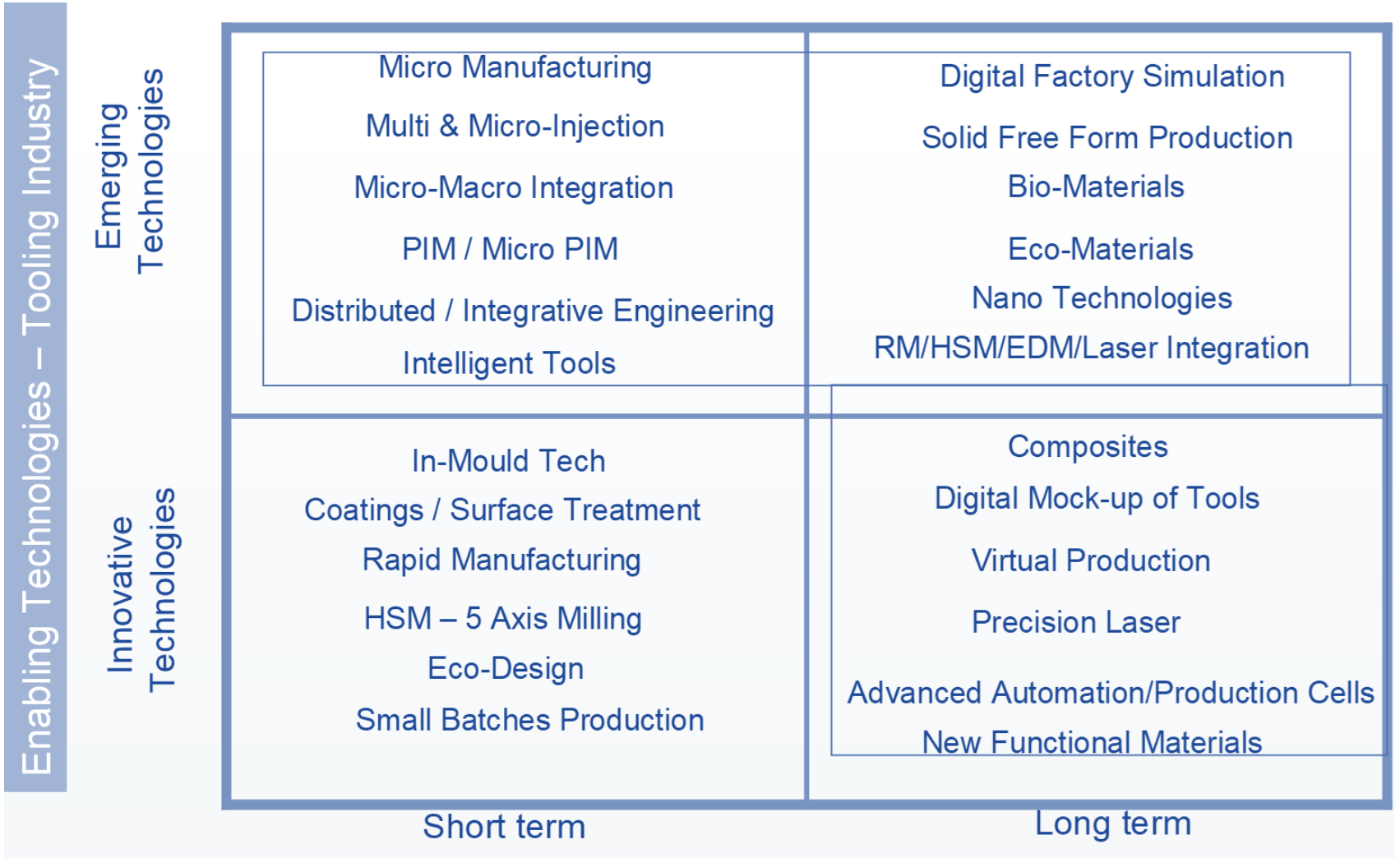
MULTI-PLATFORMS INTERACTION (COOPERATION AREAS)

European Platforms	Areas of Articulation
Advanced Engineering Materials and Technologies-EuMat	Bio polymers
	Innovative materials and joint work with non-plastic experts (hybrid mat.)
	Functional materials
Advisory Council for Aeronautics Research in Europe-ACARE	Efficient production for Small Series
	New materials for Aeronautics
European Road Transport Research Advisory Council-ERTRAC	For the development of light cars and the necessary tools that have to be jointly developed
Micro Nano Manufacturing-MINAM	Design for micro production
	For the development of spart plastic products
	Micro assembling
	Micro forming
	Micro handling
	Micro injection moulding
	Micro manufacturing
	Production of micro Tools
Rapid Manufacturing-RM	Better surface finish
	Materials for RM
	New materials for RM
	Prototypes on the micro scale
	Small series
Robotics-EUROP	Helping operators in the moulding industry doing physically hard manual work by collaborative robots (cobots).

Tooling Technology Roadmap

Development of the European Tooling Roadmap 2020-2030

ENABLING TECHNOLOGIES



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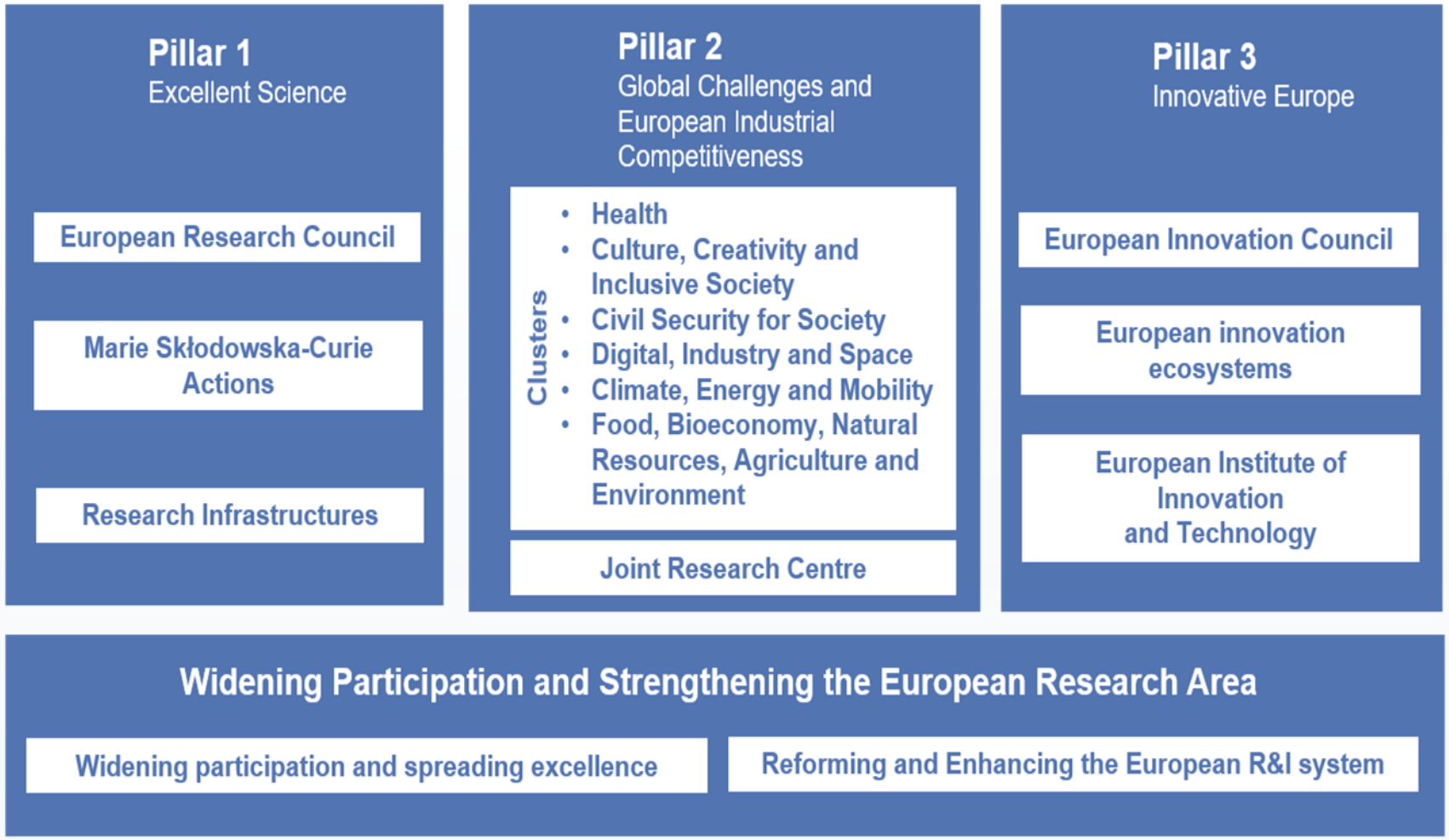
EUROPEAN ROADMAP (2014-2020)

	Short Term	Medium Term	Long Term
Micro Manufacturing	20%	70%	10%
Micro Moulding	10%	80%	10%
Micro Assembling	10%	50%	40%
Micro Forming	20%	60%	20%
Distributed / Integrative Engineering	40%	40%	20%
In-Mould Technology	20%	70%	10%
Coatings and Surface Technologies	70%	20%	10%
Rapid Manufacturing and Prototyping	60%	20%	20%
Small Batches Production	60%	30%	10%
New Design and Engineering Techniques (Eco-Design)	40%	60%	0%
Advanced Automation, Remote Control and Production Cells	40%	50%	10%
Advanced Technologies for Micro Tools	30%	60%	10%
New Functional Materials	20%	70%	10%
Innovative Materials (Bio-Materials, Eco-Materials)	30%	30%	40%
Nano Technologies	0%	60%	40%
Production of structural composites parts	40%	40%	20%
Simulation Methods and Tools for Knowledge Services	60%	40%	0%
Environmental Friendly Fabrication Processes	56%	33%	11%

ALIGNMENT WITH HORIZON EUROPE



Source: European Commission Official Website 2019

ALIGNMENT WITH MANUFUTURE VISION 2030

- Agile manufacturing systems design and management
- Manufacturing technology and processes
- Robotics and flexible automation
- Customer driven manufacturing
- Human centered manufacturing
- Digitalization, Artificial Intelligence and Cybersecurity
- Nano-technology and new materials
- Circular economy, resource and energy efficiency
- Biotech transformation of products and processes
- Fundamental Research and Social sciences and Humanities

Source: European Commission Official Website 2019

EUROPEAN ROADMAP (2020-2030)

DEVELOPMENT OF THE EUROPEAN TOOLING ROADMAP 2020-2030

(In course involving all the Tooling Community and other Platforms)

	Short Term	Medium Term	Long Term
Micro Manufacturing	20%	70%	10%
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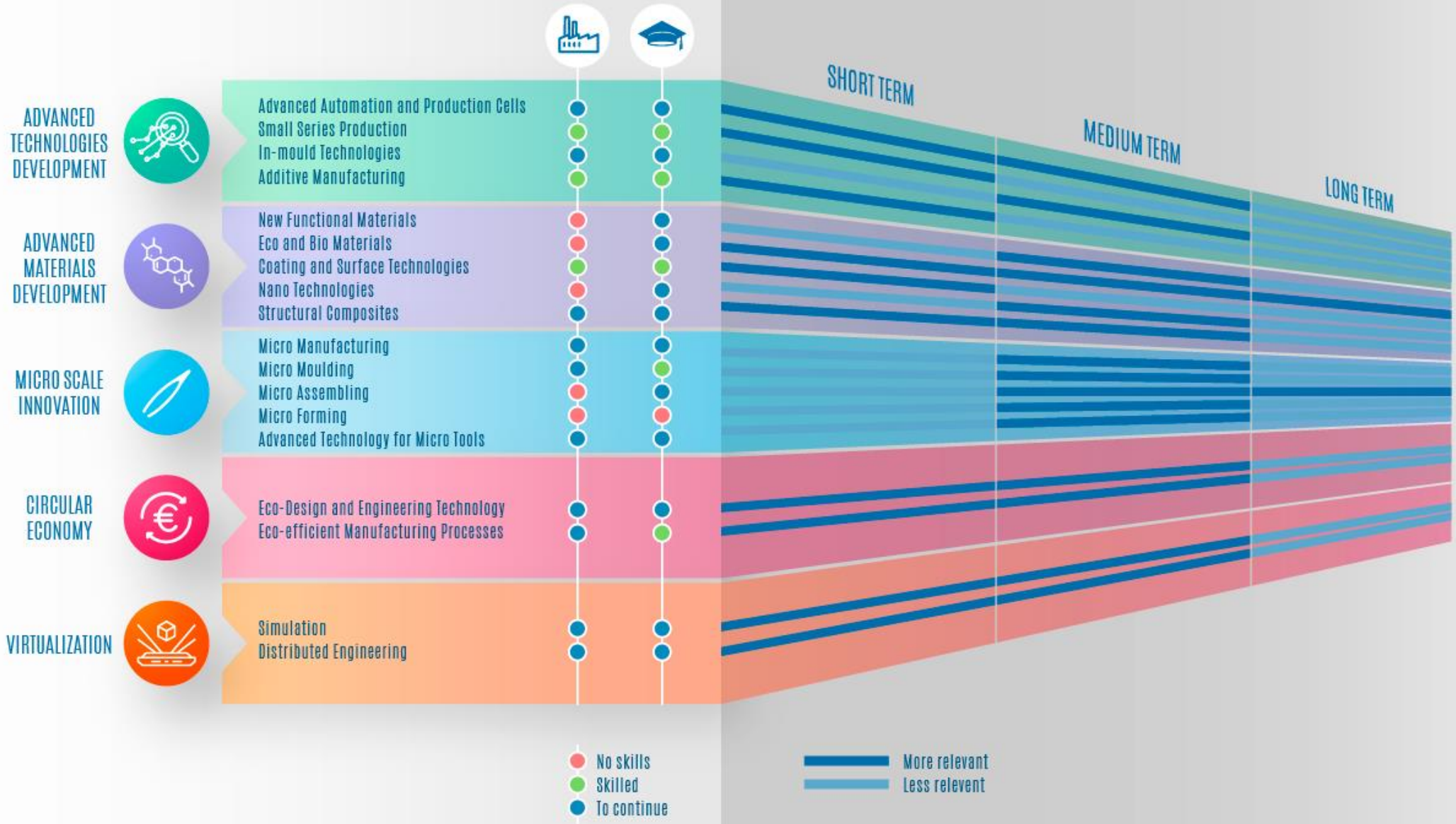
EUROPEAN TOOLING ROADMAP 2020-2030



CHALLENGES & FUTURE

- **New functional materials** (new tooling and manufacturing concepts; hybrid processes for transforming new lightweight materials)
- **Coatings and Surface Technologies** (new tooling concepts for nano-structured surfaces; new coating technology for sensors embedded in tool surfaces, molds and products)

- **Advanced Automation and Production Cells** (developments in collaborative robotics and advanced control systems; new sensor technologies)
- **Small Series Production** (potential of additive manufacturing technologies)
- **In-Mould Technologies** (perform over-moulding with increased productivity; protect the over-moulded device from being damaged, new materials to functional layers)
- **Additive Manufacturing** (new materials; better surface quality; repeatability and accuracy)

- **Micro Machining** (developments in CAM, CAE, materials, cutting tools, equipment, etc.)
- **Micro Injection Molding** (micro-mold making; micro-surface finishing; micro-additive manufacturing)
- **Micro Assembling** (improve reliability of the handling process; vision systems; highly sensitive manipulation systems; Artificial Intelligence (AI))

CHALLENGES & FUTURE

- **New Design and Engineering Techniques** (analyze all impacts over the entire product life cycle; incorporate the philosophies of circular economy)
- **Eco-Efficient Manufacturing Processes** (research on process management, mechanical engineering and materials engineering)

- **Simulation Methods and Tools** (integrate the tooling as a relevant element; advanced real time process simulation systems to build the product digital twin; develop tooling-specific AI applications; specific algorithms to improve the design and manufacturing processes)
- **Distributed / Integrative Engineering** (IoT adapted to tooling to enable an active network tooling integration; tooling geopositioning; pay per use tools; tooling licensing per number of produced parts, tools knowledge exchange)

European TOOLING Platform

The European Tooling sector plays a strategic role in the rejuvenation and development of the European industrial activity and economy.

Believing in the future we will continue to reinforce the sector competiveness through investing on skilled workforce and high technology, supported by research, innovation and networking!

Thank you!

Moritz Wollbrink
European Tooling Platform