

Models and tools to support Emilia-Romagna Corporate Academy

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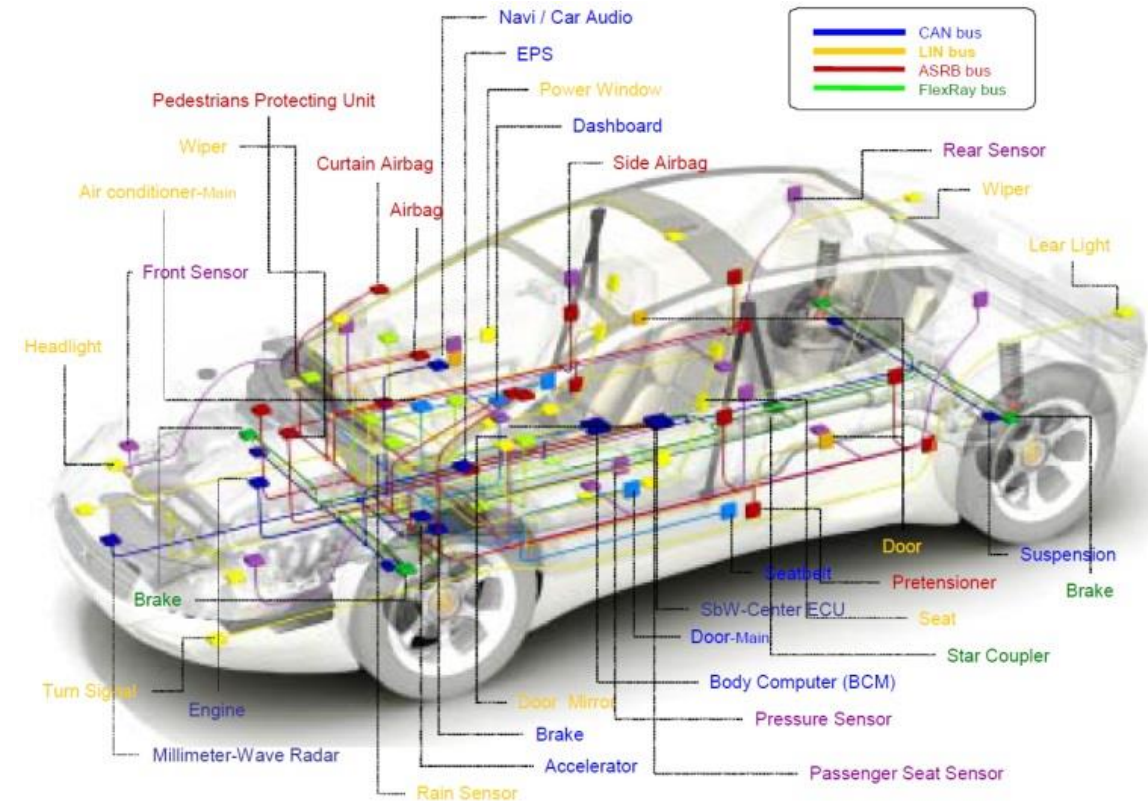


Centro Congressi – CNR Area territoriale di Ricerca di Bologna
December 14th, 2023

Outline



- The perfect storm
- Sailing or sinking
- Crew of talents
- Offer opportunities
- Education, Research and LifeLong Learning: models and tools
- Conclusions



The perfect storm



- **Global trends in Vehicle Engineering**

- Connectivity, IoT and cybersecurity
- Driver empowerment (Autonomous Vehicles)
- Innovation in powertrain and electrification
- Energy management
- Innovation in materials and manufacturing



GAES 2019, automotive-institute.kpmg.de

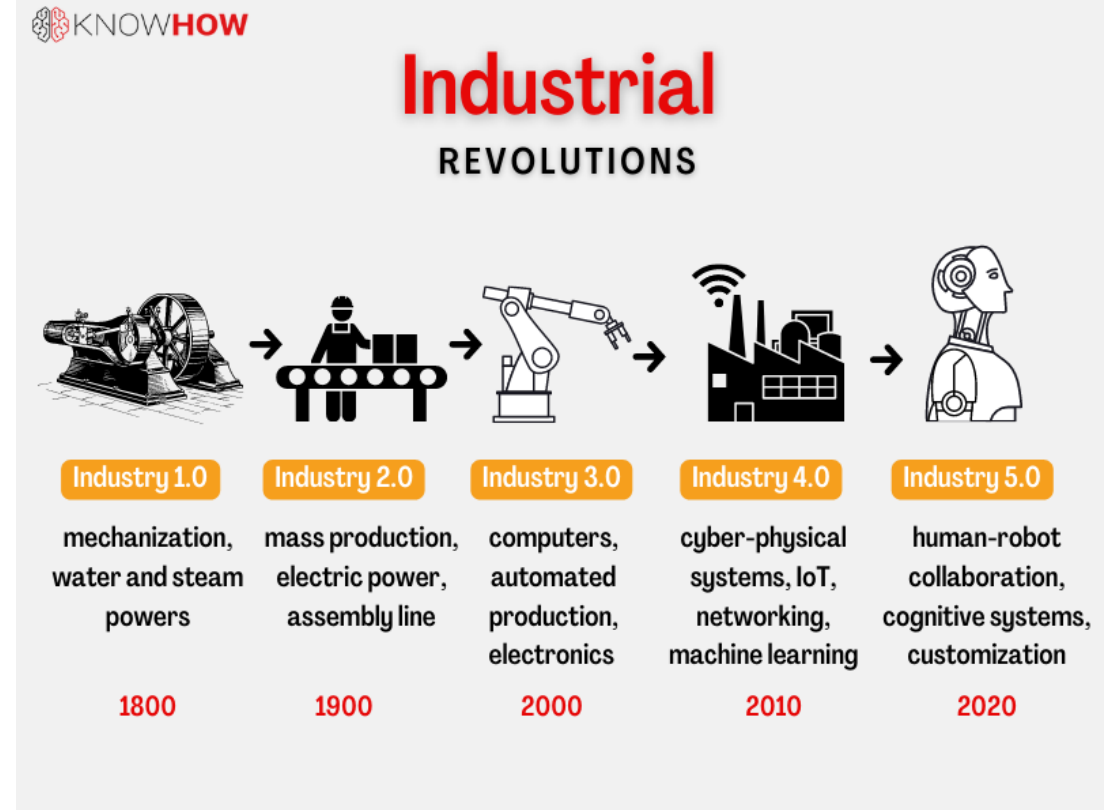
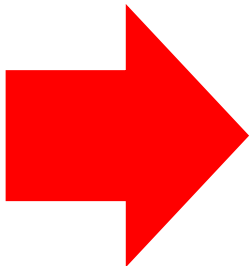
The perfect storm



• Global trends in Vehicle Engineering



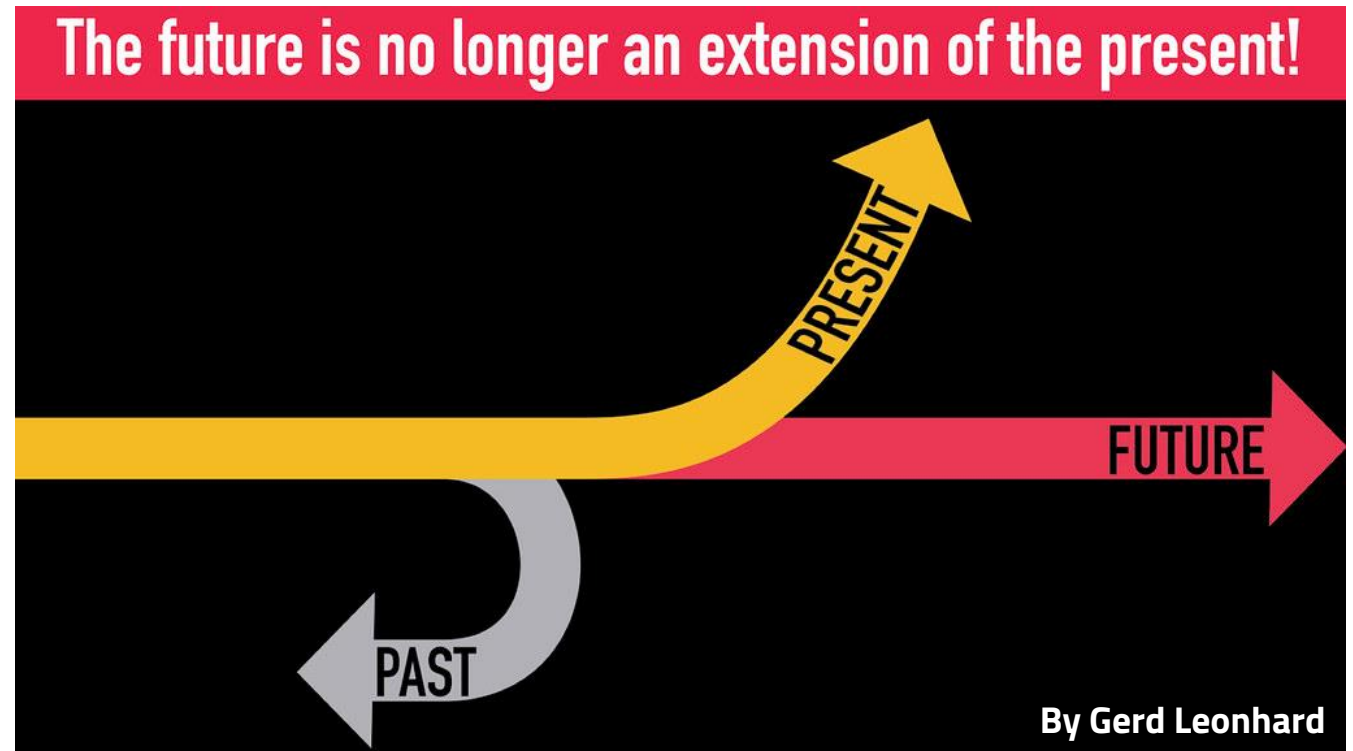
- Industry 5.0 for sustainable, human-centric and resilient industry
 - Adopting a human-centric approach for **digital technologies including artificial intelligence** (Proposal for AI regulation)
 - Modern, resource-efficient and **sustainable industries** and transition to a circular economy (Green Deal)
 - A globally competitive and world-leading industry, speeding up **investment in research and innovation**
 - **Up-skilling and re-skilling European workers**, particularly digital skills (Skills Agenda and Digital Education Action plan)



The perfect storm



- Innovation and rate of technological progress
- Regulatory mandates
- Ownership and business models
- Re-allocation of funds and conversion of production
- Black swan(s)



Sailing or sinking



- Engineering Bachelor's in Italy (2022)
 - Graduated in Industrial Engineering: about 12.000/year; ER: about 1.000/year
 - Graduated in ICT Engineering: about 7.000/year; ER: about 700/year
- Engineering Master's
 - STEM graduates
 - IT and ICT technologies: 1,720
 - Industrial and information engineering 14,820
 - Scientific: 13,503
 - STEM graduates in Engineering
 - Mechanical Eng.: 3.124
 - Computer engineering: 2,192
 - IT: 1,180
 - Electronics Eng.: 849
 - Automation Eng.: 712
 - Telecommunications Eng.: 499
 - Electrical Eng.: 389
- Ph.D (MUR, 09/2022)
 - -40% between 2008-2019,
 - 20% went abroad
- Decrease of resident population in Italy: -2.5‰ average 2021-2030 (Istat, 09/2022)
- Ratio between working age population (15-64 years) and not (0-14 and 65 years and over) will decrease from about 3 to 2 in 2021 to about 1 to 1 in 2050 (Istat, 09/2022)
- Increase of NEET (Not in Education, Employment or Training): 23.1% of population aged 15-29 in 2021 (Eurostat, 06/2022)
- Gender (un)balance in engineering: 85% - 15% (max)
- 33% of Italian companies complain difficulty in recruiting while 31% of people up to 24 unemployed (MUR, 09/2022)



Sailing or sinking



DISTRIBUZIONE IMPRESE PER FORMA GIURIDICA

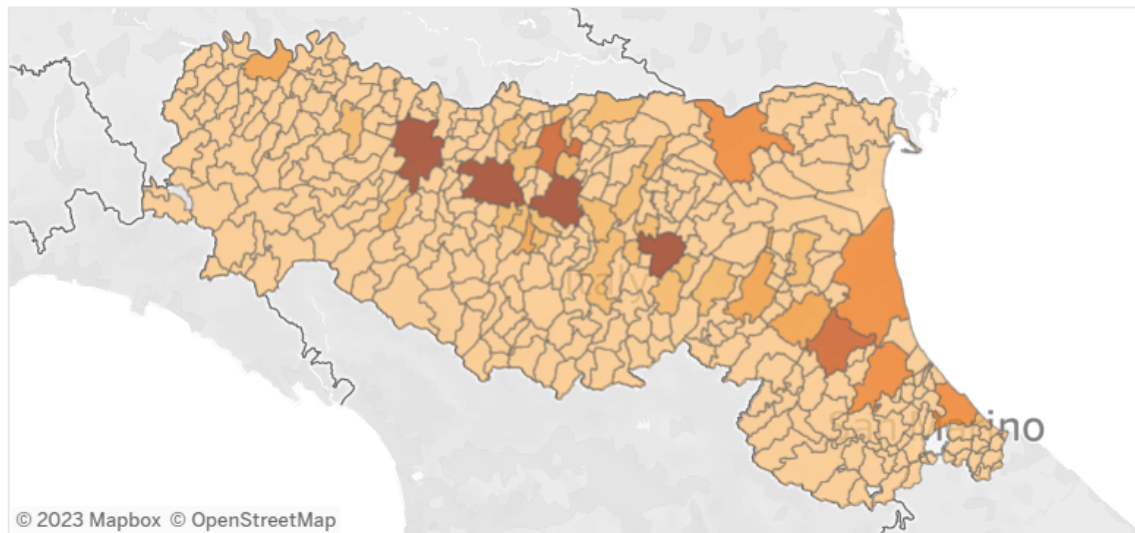
ALTRO	COOP E CONSORZI	PROFESSIONISTI E IM..	SOC. DI CAPITALI	SOC. DI PERSONE
0,08%	1,35%	35,28%	42,00%	21,28%

DISTRIBUZIONE IMPRESE PER DIMENSIONE

MICRO	PICCOLA	MEDIA	GRANDE
77,11%	18,87%	3,38%	0,64%

DISTRIBUZIONE IMPRESE PER PROVINCIA

BO	MO	RE	PR	FC	RA	RN	PC	FE
21%	21%	15%	11%	9%	6%	6%	6%	5%



© 2023 Mapbox © OpenStreetMap

Sezione	Imprese	Addetti
Totale complessivo	365.765	1.588.506
COMMERCIO ALL'INGROSSO E AL DETTAGLIO; RIPARAZIONE DI AUTOVEICOLI E MOTOCICLI	77.147	277.593
ATTIVITÀ PROFESSIONALI, SCIENTIFICHE E TECNICHE	64.296	110.829
COSTRUZIONI	44.243	113.131
ATTIVITÀ MANIFATTURIERE	33.805	446.816
ATTIVITÀ IMMOBILIARI	26.534	34.475
ATTIVITÀ DEI SERVIZI DI ALLOGGIO E DI RISTORAZIONE	25.843	140.798
SANITA' E ASSISTENZA SOCIALE	25.433	91.731
ALTRE ATTIVITÀ DI SERVIZI	17.078	42.488
NOLEGGIO, AGENZIE DI VIAGGIO, SERVIZI DI SUPPORTO ALLE IMPRESE	11.730	112.258
TRASPORTO E MAGAZZINAGGIO	11.693	82.229
SERVIZI DI INFORMAZIONE E COMUNICAZIONE	9.211	41.136
ATTIVITÀ FINANZIARIE E ASSICURATIVE	8.123	51.691
ATTIVITÀ ARTISTICHE, SPORTIVE, DI INTRATTENIMENTO E DIVERTIMENTO	5.896	14.864
ISTRUZIONE	3.004	8.868
FORNITURA DI ENERGIA ELETTRICA, GAS, VAPORE E ARIA CONDIZIONATA	932	3.268
FORNITURA DI ACQUA; RETI FOGNARIE, ATTIVITÀ DI GESTIONE DEI RIFIUTI E RISANAMENTO	693	15.385
ESTRAZIONE DI MINERALI DA CAVE E MINIERE	104	946

Crew of talents



TARGET JOB PROFILE

- STEM background
- Solid fundamentals
- Applied specialization in multiple disciplines
- System vision
- Detail awareness
- Soft skills
- (low cost in training and salary)

Crew of talents

- Do talents simply explode from time to time or does each of us have an own talent that can be educated and trained?



Offer opportunities



POLYTECHNIC NETWORK

Technology to grow

Training paths providing to young and adults technical and scientific skills required by enterprises

HIGHER EDUCATION AND RESEARCH

Knowledge networks

Post-graduate courses training experts who can transfer knowledge and innovation to manufacturing system

EDUCATION AND VOCATIONAL TRAINING

More future

After junior high school, job-oriented courses to achieve a vocational qualification or a vocational diploma

EMPLOYMENT AND SKILLS

New skills for new jobs

Active policies supporting people to access the labour market and find a new job



- Scuola Secondaria Superiore (non solo liceo)
- IFTS
- ITS
- Laurea professionalizzante
- Laurea triennale
- Master I livello
- Laurea Magistrale
- Master II livello
- Dottorato di Ricerca Industriale
- Dottorato di Ricerca

Offer opportunities



Chi sa, fa.

Chi non sa, insegna.

[Proverbial phrase]

...nessuno di noi è solo uno, nessuno è uno solo uno, io sono fili e non dati, fili, fili...

[Marco Paolini, gli antenati]

Progettare automobili da competizione è una professione bellissima che ti costringe al confronto, ti impone il riconoscimento del valore dei tuoi concorrenti, ti stimola a migliorarti in caso di sconfitta.

Ti dà il piacere di continuare a imparare.

[Giampaolo Dallara]

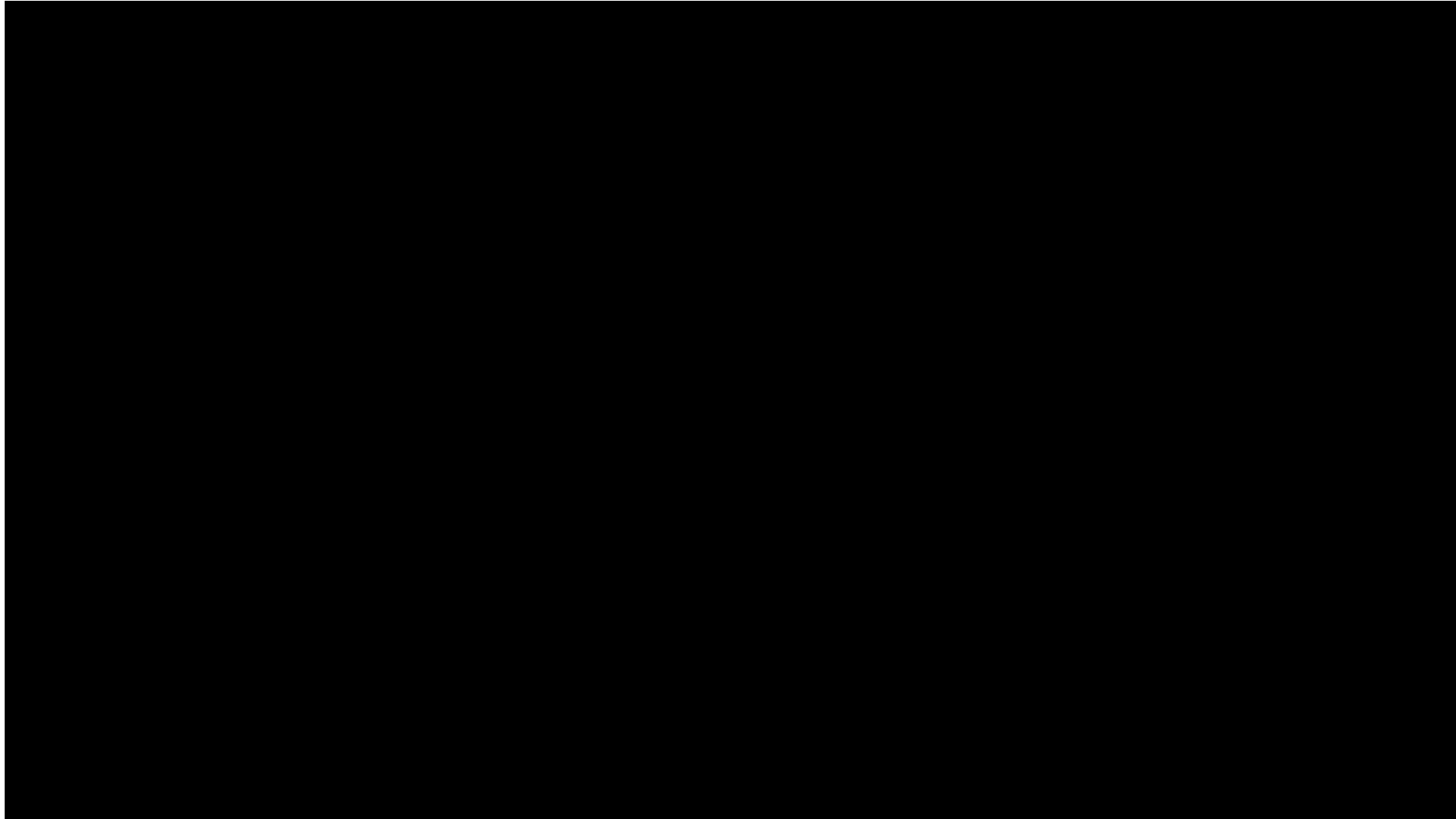


Education, Research and LifeLong Learning: models and tools



MOTORVEHICLE
UNIVERSITY OF
EMILIA-ROMAGNA

<https://motorvehicleuniversity.com/>



4 Universities



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA



Università
degli Studi
di Ferrara



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA



UNIVERSITÀ
DI PARMA

18 Top Brands

8 Highly Specialized Professional Profiles



MOTORVEHICLE
UNIVERSITY OF
EMILIA-ROMAGNA

Founding Partners



dallara



HPECOXA



SCUDERIA
ALPHATAURI

Regular Partners



BOSCH



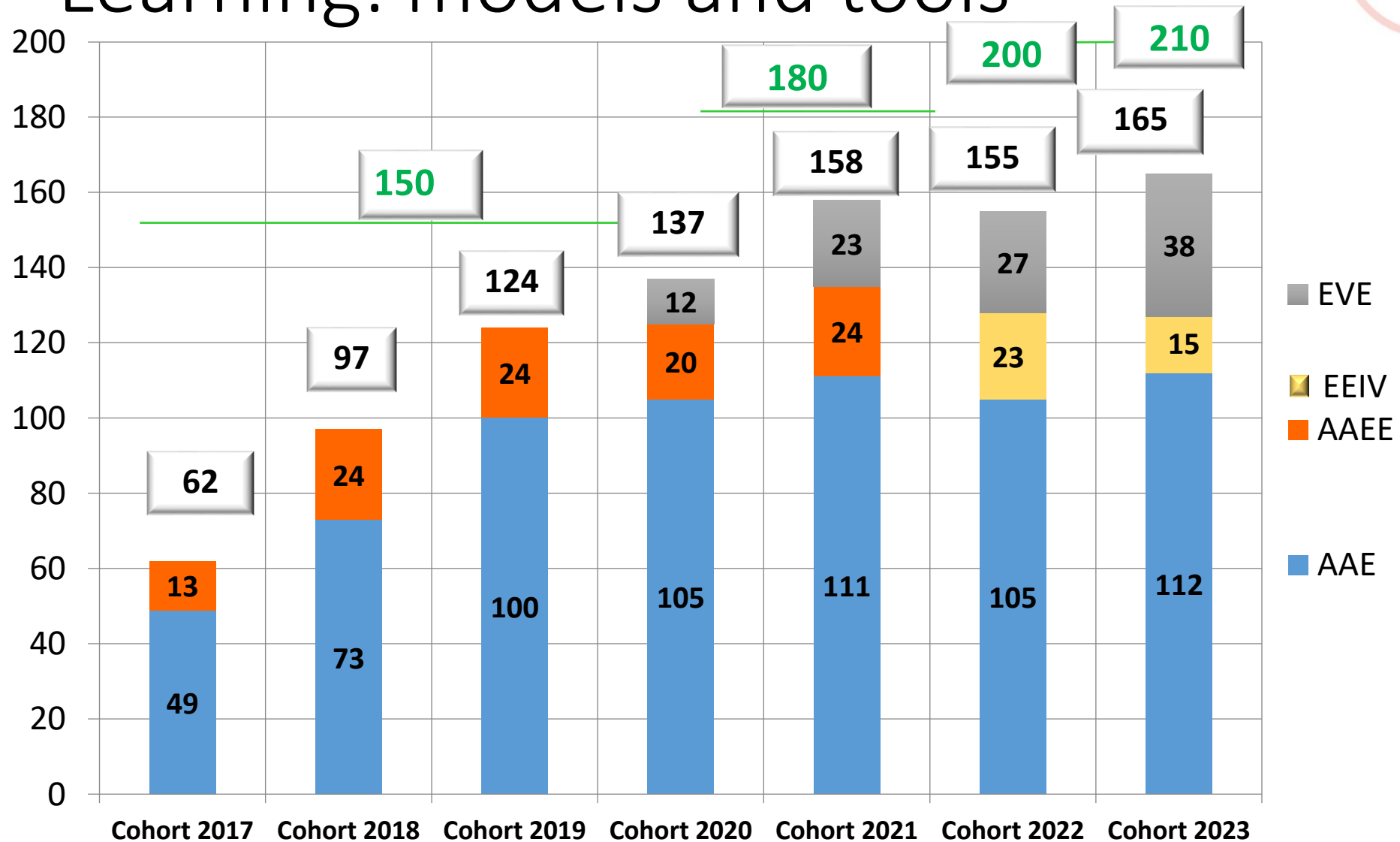
MAHLE

Sponsoring



Engineering-focused scholarships for underrepresented students

Education, Research and LifeLong Learning: models and tools



- More than 260 interviews
- 20% not Italian students
- 15% extra EU students
- 10% females

Education, Research and LifeLong Learning: models and tools



MOTORVEHICLE
UNIVERSITY OF
EMILIA-ROMAGNA

Activities of graduates	Number of students	% on graduates (341)
Hired graduated	235	69%
Graduates involved in research activities, PhD or postgraduation internship	57	16%
Total academic and professional activities	292	85%
New graduates searching job (April & July graduates)	17	5%
Unknown (not communicated)- still collecting data	32	10%
Total graduates	341	100%

Working at	Total	%
MUNER Companies	126	54%
Non- MUNER Companies	109	46%
Total Hired	235	100%

Education, Research and LifeLong Learning: models and tools



Training for Automotive Companies Creation

START AND RUN YOUR BUSINESS



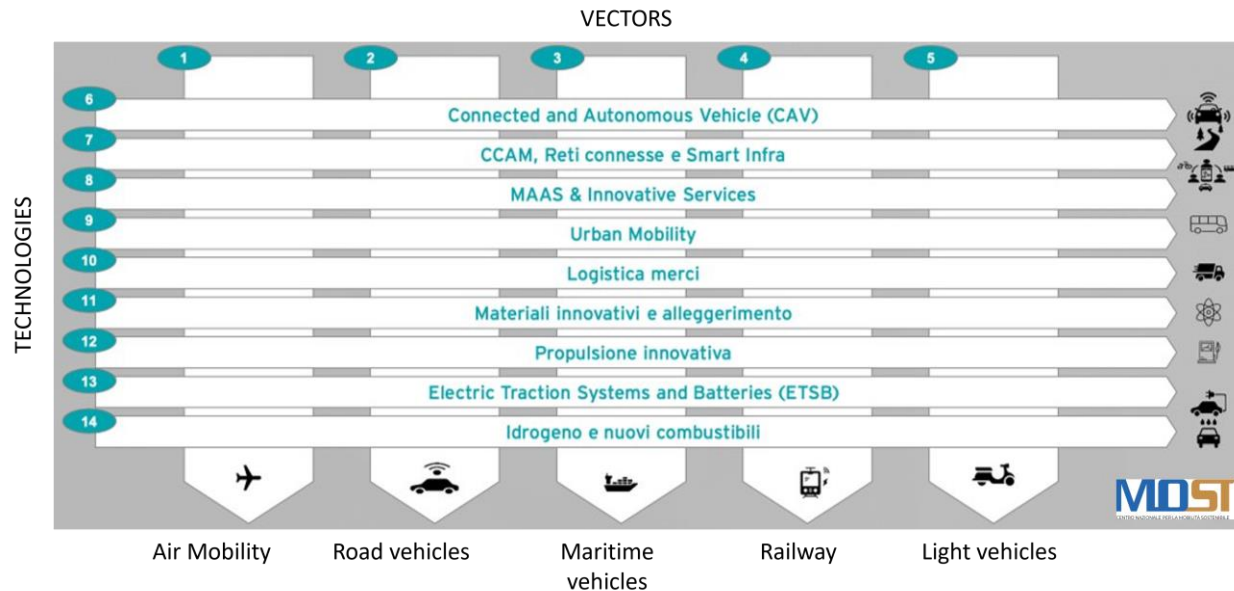
Education, Research and LifeLong Learning: models and tools



**Learning
by doing
projects**



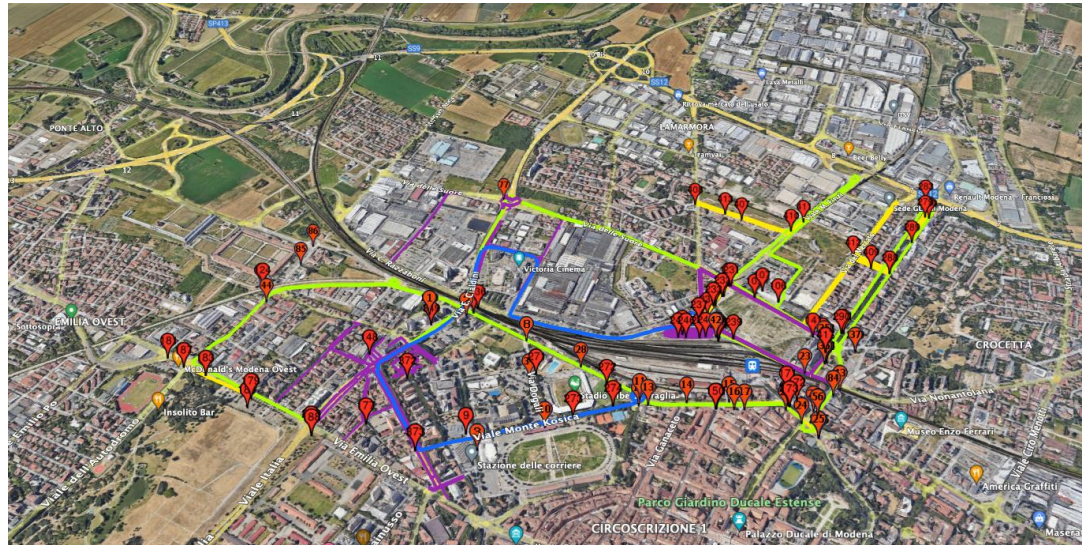
Education, **Research** and LifeLong Learning: models and tools



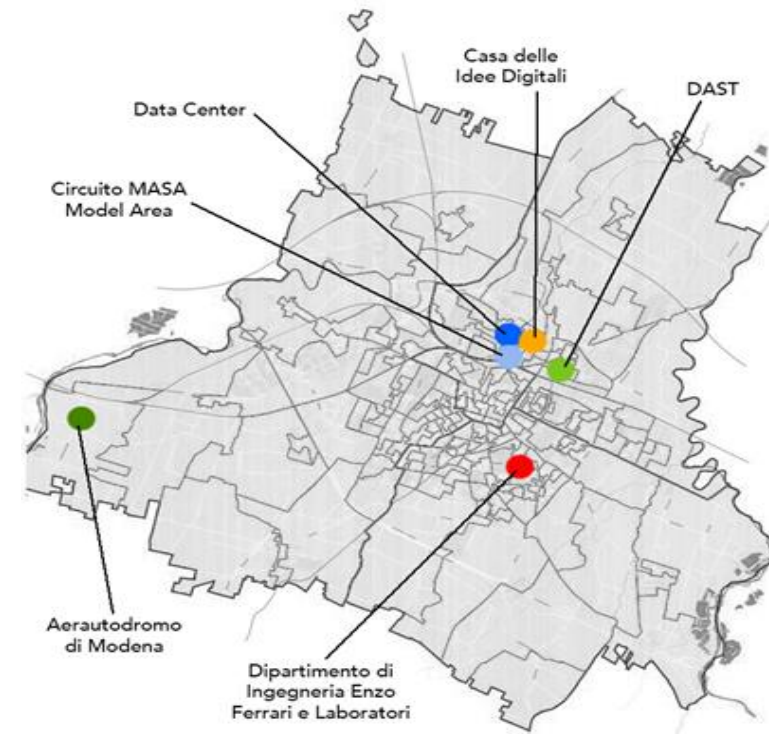
- AN INVESTMENT OF 378 MILLION EUROS FOR THE FIRST 3 YEARS
- 696 DEDICATED RESEARCHERS
- 574 PERSONNEL TO BE HIRED

- The National Centres – or “national samples” of Research and Development – are networks of private and public actors engaged in highly qualified research activities, and which develop infrastructure, plans and solutions immediately useful and highly adaptable to the entire social context

Education, **Research** and LifeLong Learning: models and tools



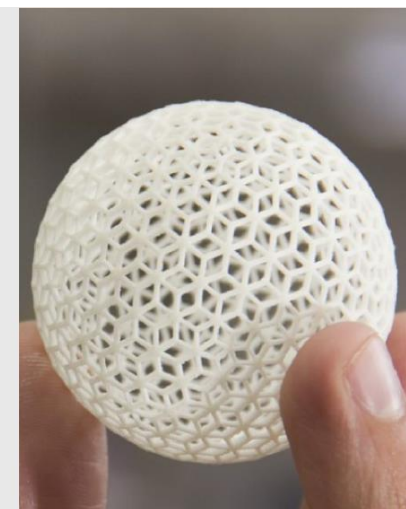
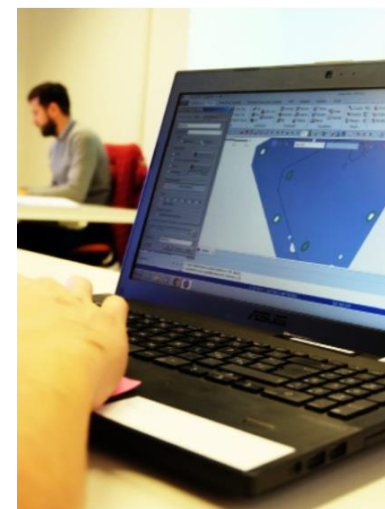
Living Lab MOST - MASA



Education, Research and **LifeLong Learning**: models and tools



- Innovation Farm is a structured form of collaboration between Technical and Professional Schools, Training Bodies and local companies, which aims to create an Education and Training System with High Professional and Technological Specialization



Education, Research and **LifeLong Learning**: models and tools



- MEKANÉ (μηχανή from ancient Greek means “machine”, “engine”), the High Education Engineering High School
- Collaboration with Alma Mater Studiorum University of Bologna and University of Modena and Reggio Emilia
- The objective is to guarantee the process of increasing the skills of engineers through the provision of advanced specialist post-graduate training:
 - tutorship on the job
 - classroom training with specific modules and extremely qualifying for a duration of 100 hours each.
- Over 60 highly specialized engineers have been trained from 2018 to today with more than 270 hours of training provided by over 40 teachers from the universities involved in the project.



Education, Research and **LifeLong Learning**: models and tools



- Maserati Product Development Training
 - Academy/Industry Steering Committee (Coordinator: CTO Maserati/Alfa Romeo)
 - Department of Engineering «Enzo Ferrari»
 - 200 hours of lectures
 - 8 strategic topics
 - Teachers from 5 universities (UNIBO, UNIMORE, UNIPI, POLITO, POLIMI)
 - 50 students (engineers, under 32)
 - 10 design projects

• **TOPICS**

- Electronics
- Internal Combustion Engines
- Electric machines
- Engine control and testing
- Vehicle Chassis
- Aerodynamics
- HMI
- Vehicle Dynamics



Education, Research and **LifeLong Learning**: models and tools



- Encouraged by «**Women in Transport-EU Platform for Change**», European Commission platform created to strengthen women's employment and equal opportunities for women and men in the transport sector.
- **WOMEN IN TRANSPORT SUMMER SCHOOL**
 - Activities: lectures and workshops held by female MUNER Professors and professionals from companies of the transport sector.
 - Objective: offer a full immersion in the automotive sector in order to raise awareness among young women and approach them to the transport sector, overcoming gender stereotypes; promote automotive programmes offered by MUNER



Education, Research and **LifeLong Learning**: models and tools



- Advanced training course:
Critical Process Equipment
Expert



Title:	Critical Process Equipment Expert
Organizers:	BELLELI ENERGY CPE SRL – WALTER TOSTO SPA – WALTER TOSTO WTB SRL UNIMORE – Università degli Studi di Modena e Reggio Emilia FUM – Fondazione UniverMantova
Teaching staff:	UNIMORE – Università degli Studi di Modena e Reggio Emilia UNIVAQ – Università degli Studi dell'Aquila UPB – Universitatea Politehnica di Bucuresti IIS – Istituto Italiano di Saldatura
Learning objectives:	Training a technical professional experienced in the design and manufacture of pressure metal components. The course will include specific modules for the acquisition of the title of International Welding Engineer (IWE)
Position profile:	Design & Project Engineer / Welding Engineer / Quality Control Engineer / Research & Development Engineer / Proposal / Sales Engineer / Project Manager / Production Engineer
Eligibility requirements:	Preferably Master's Degree in: Mechanical / Industrial Engineering Chemical Engineering Management Engineering Other degrees in industrial fields Minimum requirement: Bachelor Degree (three-year degree) in the same fields
Admission application:	Titles evaluation and interview. Graduation mark Knowledge of English language
Duration:	11 September 2023 to 18 March 2024 (6 months – 900 hours of training + internship)
Participants:	Max. 30 trainees

Education, Research and LifeLong Learning: models and tools



- The International PhD Academy is an intensive training opportunity open to PhD students, Industrial PhD students, post-docs, and junior researchers from the member institutions.
- A PhD is the highest diploma awarded by universities in the world, and PhDs are naturally expected to take on major responsibilities in their professional life. Apart from the disciplinary scientific skills acquired during doctoral study and research, it is the ability to respond to the requirements of creativity, innovation and project management, and in addition the ability to step aside, that produce the significant added value of a doctoral degree.
- An opportunity to attract international talents (for the same salary)

Conclusions



- Continuous transitional, fast changing, unpredictable scenario
- Continuous upskilled HR as key enabling technologies
- Continuous education engaging public and private competences
- Learning-by-doing as synthesis between Education, Research and LifeLong Learning
- New models and tools

Models and tools to support Emilia-Romagna Corporate Academy

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