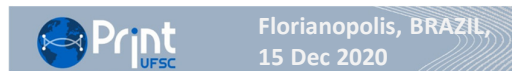# Role of academia in Industry 4.0 in terms of human resources
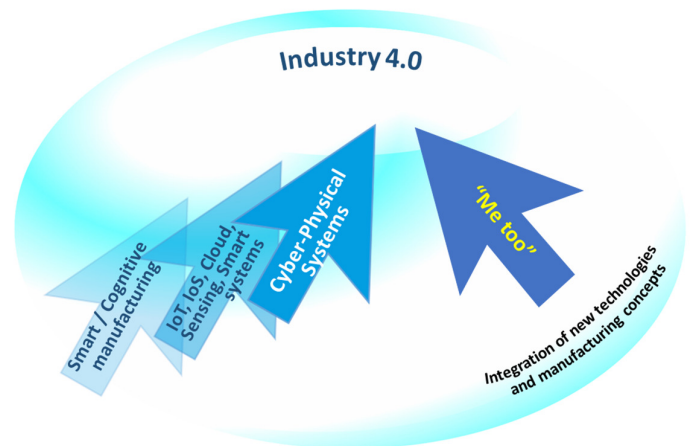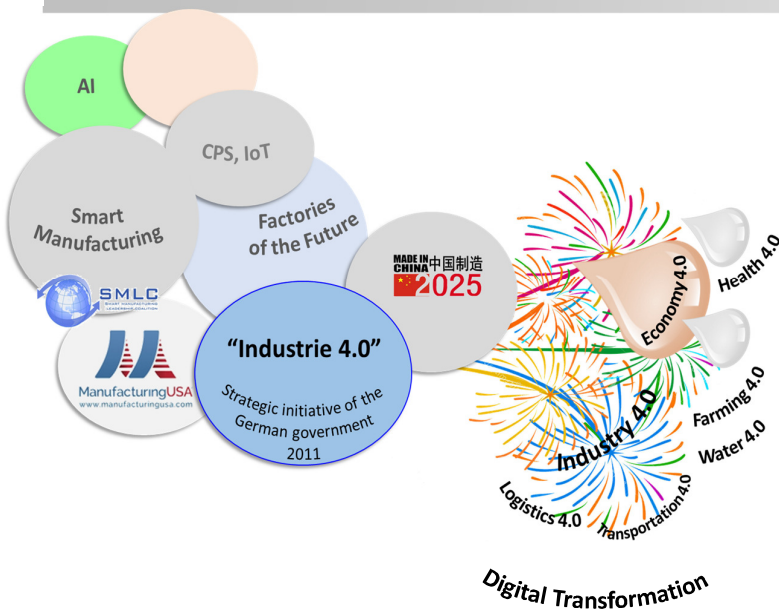
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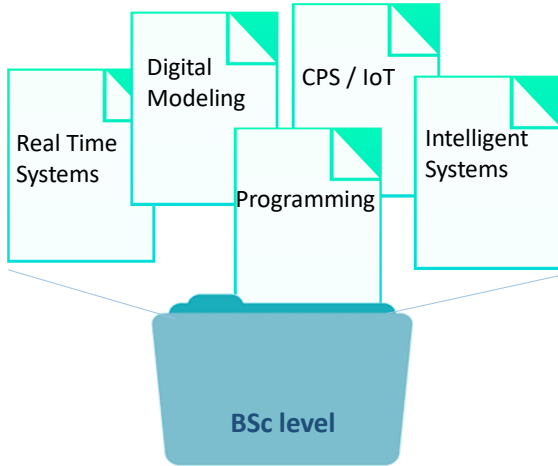Print UFSC

Florianopolis, BRAZIL,
15 Dec 2020

NEED FOR A SOLID BASIS

Academia: which skills are current / future engineers required to acquire for Industry 4.0 and Digital Transformation ?

... requires a good background in Computer Engineering

Digital Modeling

CPS / IoT

Real Time Systems

Programming

Intelligent Systems

BSc level

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The introduction of these subjects might imply a **"fight"** with traditional engineering programs

Traditional Mechanical Engineering

Traditional Electrical Engineering

Traditional Industrial Engineering
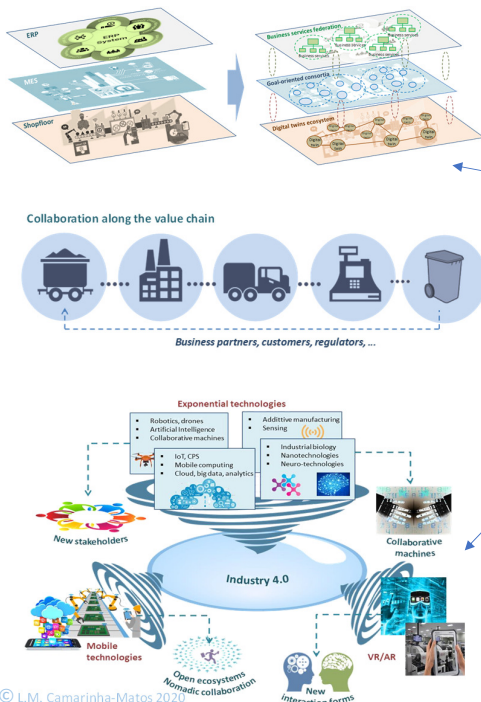
Traditional Automation Engineering

The key challenge is "transformation"
Not a "blank **canvas**" to design a new program

SYSTEMIC, NETWORKED & COLLABORATIVE VIEW

Collaborative Networks is a key pillar of Digital Transformation

	Dimension
Infra-structure 1	Vertical integration or networking of smart production systems
Infra-structure 2	Horizontal integration through global value chain networks
Product 3	Through-engineering across the entire value chain
Infra-structure 4	Acceleration of manufacturing
Product 5	Digitalization of products and services
Product 6	New business models and customer access

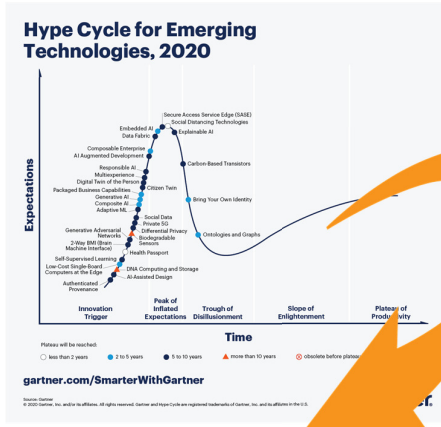© L.M. Camarinha-Matos 2020
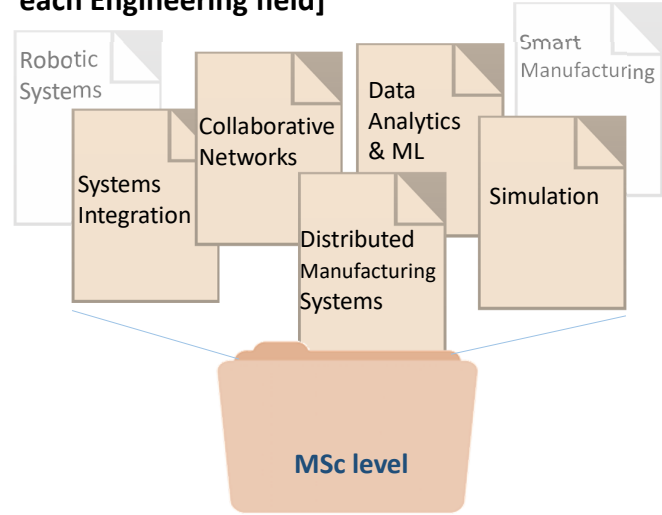
"TECHNOLOGY FASHION" TRAP

Avoid falling in the trap of adding new "technology courses" for each fashion

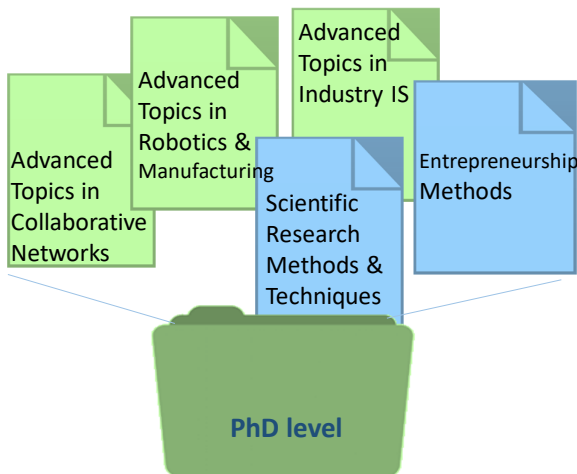**Examples of additional training in Computer Engineering**
[in addition to the "traditional subjects" of each Engineering field]

Students need to understand the cycle of evolution of technologies

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PhD & YOUNG RESEARCHERS

Examples of additional training
[in addition to the research work]

Training of post-docs - examples

- Project proposal preparation

- Industry-academia project management

- Team management & leadership

- Roadmapping techniques

- Technology assessment

- Technology transfer & Intellectual Property

- Career management

➤ **Formal training plan**

Marie Curie program

OTHER NON-TECHNICAL SKILLS

Engineering & research ethics

Responsible Research & Innovation (RRI)

Awareness of societal challenges

Communication

Internationalization

Collaboration culture

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SOME REFERENCES

L. M. Camarinha-Matos, J. Goes, L. Gomes, P. Pereira (2020). **Soft and Transferable Skills Acquisition through Organizing a Doctoral Conference**. *Education Sciences* 10(9), 235. DOI: https://doi.org/10.3390/educsci10090235 [open access]

L. M. Camarinha-Matos, R. Fornasiero, J. Ramezani, F. Ferrada (2019). **Collaborative Networks: A Pillar of Digital Transformation**. *Applied Sciences*, 2019, 9(24), 5431; https://doi.org/10.3390/app9245431 [open access]

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