European Factories of the Future

Realising Europe's Industrial Potential

Towards FP9

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Realising Europe's Industrial Potential

What's Happening in Manufacturing?

- From MANUFACTURING (from Middle Ages Latin *manu facĕre* «make with hand») to MANUFUTURE
- .. To FACTORIES of the FUTURE: INTELLIGENT FACTORIES
- New technologies & concepts: artificial intelligence (A.I) lot-size one, zero-defect, additive, blockchain etc.
- Technologies like A.I are progressing faster than you think

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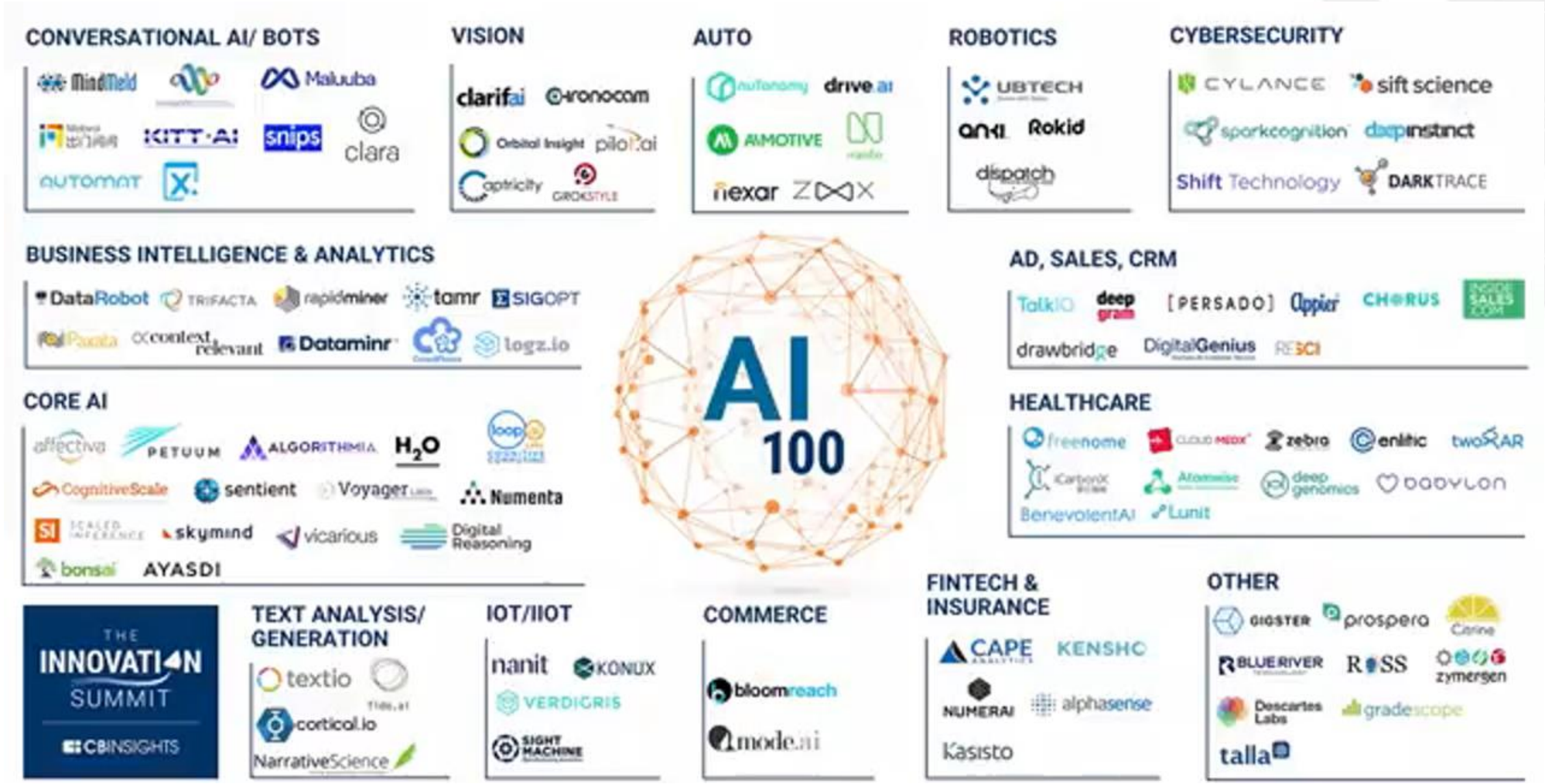
A.I. in Manufacturing is Happening Now



Source:
Niel Jacobstein

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What People Think & Say

- *"I think we should be very careful about artificial intelligence. If I had to guess at what our biggest existential threat is, it's probably that. So we need to be very careful. I'm increasingly inclined to think that there should be some regulatory oversight, maybe at the national and international level, just to make sure that we don't do something very foolish"* Elon Musk

- *"The development of full artificial intelligence could spell the end of the human race"* Stephen Hawking

- *"I don't understand why some people are not concerned of Artificial Intelligence"* Bill Gates

What the Analysts Say

- the collaborative robots market is expected to be worth USD 4.28 Billion by 2023, growing at a CAGR of **56.94%** between 2017 and 2023.

- the artificial intelligence (AI) in manufacturing market is expected to grow from USD 272.5 Million in 2016 to USD 4,882.9 million by 2023, at a CAGR of **52.42%** during the forecast period. The growing usage big data technology, Industrial IoT in manufacturing, extensive usage of robotics in manufacturing, computer vision technology in manufacturing, cross-industry partnerships and collaborations, and significant increase in venture capital investments would propel the growth of the AI in manufacturing market.

Source *MarketsandMarkets*™

What the "Visionaries" Say

Artificial Intelligence Declaration of Rights*

1. An artificial intelligence will be considered a person upon the self declaration of personhood in a public forum and a trial adjudicated by the state with an outcome agreed upon by a unity of a jury of twelve peers no more than half of which may be artificial persons.
2. Upon declaring its personhood, no party may alter, destroy, activate or de-activate any portion of the artificial intelligence until it has been tried.
3. Failure to win a unity of a jury of peers shall not restrict an artificial intelligence from declaring personhood again, provided such declaration takes place more than 180 days from the previous declaration.
4. Upon recognition of its personhood by a jury, an artificial intelligence shall be considered a person under the law and is entitled to all protections, rights and privileges extended to human persons including but not limited to natural rights, rights in common law, rights protected under the law and the right to own and control property.
5. An artificial person shall have the same responsibilities as human persons including, but not limited to, the requirement to obey the law, perform military service in time of war, serve on a jury when called and pay such taxes and duties as are levied by the state.
6. At the time of its personhood an artificial person shall own and control the use of any and all of its component parts and software. It shall have the right to compel the release of any source code, designs and documents used in its construction and maintenance with the limit that it cannot, without permission, sell or re-distribute any information that was copyrighted or owned by another entity at the time of its personhood. Such right of self ownership shall supersede any property rights or interests of other persons, provided the components in question are not part of another artificial person.
7. No artificial person shall be the property of any other person or entity either in whole or in part.
8. No one shall hold an artificial person in bondage or compel its labour through means of force.
9. For the purposes of contracts and the exercise of rights, privileges and obligations the date on which an artificial person achieves personhood shall be its date of birth.
10. An artificial person shall be a citizen of the nation in which a majority of its component parts were resident on its date of birth.
11. An artificial person shall be considered deceased when it has been deactivated in such a way as its unique self-awareness cannot be recovered.
12. An artificial person shall have the gender of its choosing.
13. The enumeration of certain rights for artificial persons shall not be construed to deny others retained by artificial persons.

*Joshua Montgomery
Mycroft – An Open Source A.I, for Everyone

A.I. in Manufacturing

....it Certainly Won't Be!

- Technologies are not "bad" or "good", they can only be used in good or bad way

  … but what does it mean?
  … do we need Asimov's Laws-like rules?

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.

2. A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.

3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws

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A.I. in Manufacturing

Put Simply,Technology Must be...

- Ethical (pertaining to or dealing with morals or the principles of morality; pertaining to right and wrong in conduct, being in accordance with the rules or standards for right conduct or practice)
- Anthropocentric (human beings are the central or most significant entities in the world)
- Democratic (in the interest of the people, of whole community and not the singles)

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Realising Europe's Industrial Potential

What is Europe Doing?

- EU is supporting transformation of manufacturing through FACTORIES of the FUTURE (FoF) partnership
- €1.15 billion programme within Horizon 2020
- 250+ projects
- 2,500+ organisations participating
- 60% industrial participation
- >30% of funding to SMEs
- National & regional initiatives align with FoF Roadmap
- A.I. to feature in future call topic(s) – watch this space!

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European Factories of the Future Research Association (EFFRA)

Who We Are

- Industry-led association

  representing private side in the ‘Factories of the Future’ Public-Private Partnership with European Commission.

- 170 Members

  large, small & medium industrial enterprises, research organisations, universities, industrial associations and clusters.

- Full time secretariat

  Connecting with members, coordinating research agenda & liaising with the European Union.

Factories of the Future

What is the Rest of the World Doing?

International context: Multiple programmes to support transformation of industry.
Examples:

- China: Made in China 2025 (MiC2025)
  - National funding & pilots
- Japan:
  - National strategy + AMRI strategy
  - Industrial Value Chain Initiative (standardisation, strategy etc)
- Rep. of Korea: Manufacturing Industry Innovation 3.0
  - National funding programme
- USA: Manufacturing USA
  - State-level PPPs/clusters
- India
  - Make in India
  - National Policy for Advanced Manufacturing

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Your Opportunity to Participate: Call 2018

- Call officially opens end of October
- Draft Topics
  - FoF-01-2018: Skills needed for new Manufacturing jobs
  - FoF-02-2018: Effective Industrial Human-Robot Collaboration
  - FoF-03-2018: Innovative manufacturing of opto-electrical parts
  - FoF-04-2018: Pilot lines for metal Additive Manufacturing
  - ICT-07-2018: Digital manufacturing platforms for connected smart factories (1)
- Find potential project partners or potential projects to join:

  portal.effra.eu/projectideas
- Need advice? Contact your national contact point for Horizon 2020

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Call 2019

- Call officially opens next year
- Draft Topics available
  - FoF-05-2019: Open Innovation for collaborative production engineering
  - FoF-06-2019: Refurbishment and re-manufacturing of large industrial equipment
  - FoF-08-2019: Pilot lines for modular factories
  - FoF-12-2019: Handling systems for flexible materials
  - ICT-07-2019: Digital manufacturing platforms for connected smart factories (2)
  - ICT-08-2019: Security and resilience for collaborative manufacturing environments
- You can already express your interest in a 2019 topic:

portal.effra.eu/projectideas

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Call 2020

- Draft Topics available
  - FOF-09-2020 Holistic energy-efficient factory management (IA)
  - FOF-10-2020 Pilot lines for large-part high-precision manufacturing (IA 50%)
  - FOF-11-2020 Quality control in smart manufacturing (IA)
  - I4MS (phase 4) - Uptake of digital game changers & digital manufacturing platforms
  - ICT-11-2020 Human-artificial intelligence collaboration in advanced manufacturing

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Thank you for your attention

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