

ConnectedFactories Foresight and Recommendations Workshop

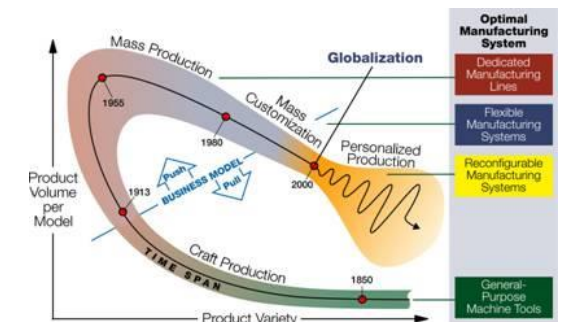
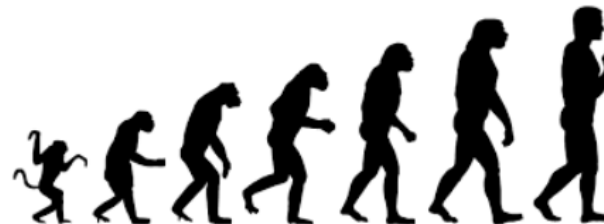
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Project: 4ZDM Cluster (Zero-Defects Manufacturing)

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ConnectedFactories 2

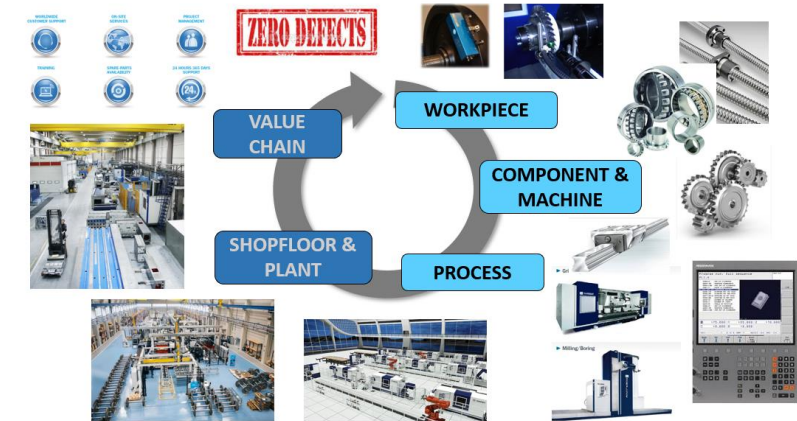
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Significant innovations and achievements associated to digital challenges + Significance of the results for SMEs

- 4ZDM cluster does NOT generate innovations and research results on its own, but in the workframe of the related H2020/HE projects.
- Multi-level ZDM research results at all industrial domains: critical components, manufacturing assets (machines), production process, shopfloor/workshop, value network.
- Awareness creation in SMEs (industrial workshop, sectorial workshops)
- Outreach possibilities through regional/sectorial clusters, industrial associations, chambers of commerce, local innovation agencies...
- Bilateral communication looks crucial to create a real innovation: proactive attitude of industries/SMEs, coming closer to the manufacturing research

Manufacturing domains at factory level for a ZDM/DTI strategy



	Six Sigma	World Class Manufacturing	Future European Zero Defect Manufacturing Strategy
Mfg. Context	 <ul style="list-style-type: none"> • High-volume production • Serial Lines • Single product type 	 <ul style="list-style-type: none"> • High-volume production • Manufacturing and assembly lines. • Few product variants. 	<ul style="list-style-type: none"> • Mass customization and one-of-a-kind production. • Complex and changeable manufacturing contexts.
Level	<ul style="list-style-type: none"> • Single critical resource and process. • Local improvements. 	<ul style="list-style-type: none"> • Single critical process. • Local improvements at cost bottlenecks. • 10 management pillars 	<ul style="list-style-type: none"> • Multi-stage and single stage level. • System-level improvements at shop floor.
Control	<ul style="list-style-type: none"> • Only monitoring by control charts based on product data. • Process capability 	<ul style="list-style-type: none"> • Monitoring and root cause analysis, by cause effect, pareto analysis and control charts. 	<ul style="list-style-type: none"> • Monitoring and control. • Inter-stage correlation. • Multi-sensor information. • Advanced analytics
Action on defects	<ul style="list-style-type: none"> • Scrap. 	<ul style="list-style-type: none"> • Scrap. 	<ul style="list-style-type: none"> • Defect Repair. • In-line rework. • Proactive prevention.

Key exploitable results

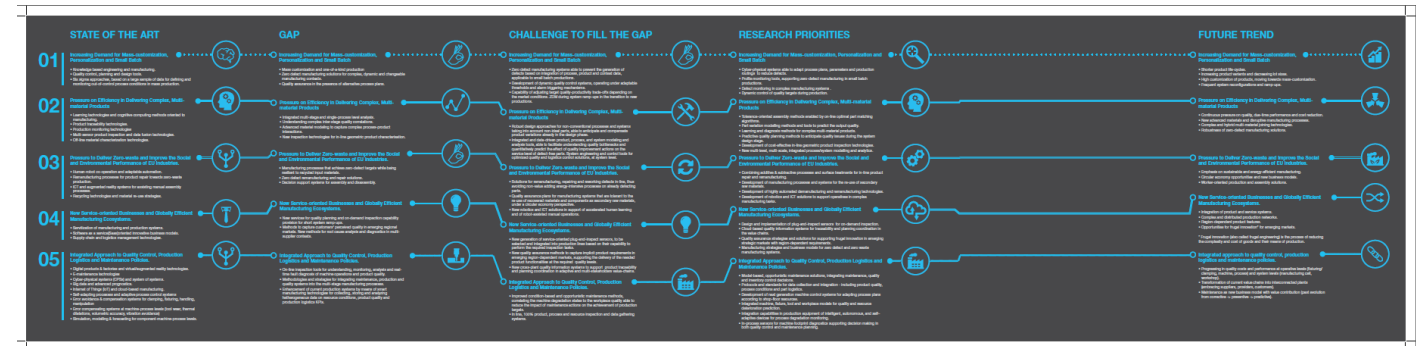
- Most exploitable research results are associated to ZDM projects, more than to the cluster itself.
- The cluster can generate/update ZDM whitepapers & roadmaps, and can give inputs to e.g. EFFRA roadmap updating process.

Results

The FOCUS partners have developed a series of strategic research and innovation roadmaps our areas of research. These roadmaps cover zero defect manufacturing, clean factory, robotics, high precision manufacturing and maintenance & support. The project has also delivered models and associated methodologies for effective cluster creation and the industrial exploitation and take-up of future FoF PPP projects.

All of the findings, recommendations and publications of the FOCUS projects are available for download below:

- FR001 Robotics
- FR002 Clean Manufacturing
- FR003 High Precision Manufacturing
- FR004 Zero Defect Manufacturing
- FR005 Maintenance and Support
- D2.2 Methodology for Industrial Exploitation & Take-Up



Research priorities for ROBOTICS

Research priorities for CLEAN MANUFACTURING

Research priorities for HIGH PRECISION MFG

Research priorities for MAINTENANCE AND SUPPORT

Project Partners

ZERO DEFECT MANUFACTURING

FOCUS

With special thanks to the European Commission, especially:

Andreas Gertler

FOCUS

Gaps and challenges regarding digital technologies for manufacturing that should still be addressed in future work

- ZDM in constant/dynamic evolution (digital, green, zero-waste, zero-X, DTI...)
- It welcomes all digital technologies that help:
 - reduce time/costs
 - increase productivity/quality
 - Improve sustainability/circularity along lifecycle approach
- ZDM motto: “do it right at the first time, and always right”

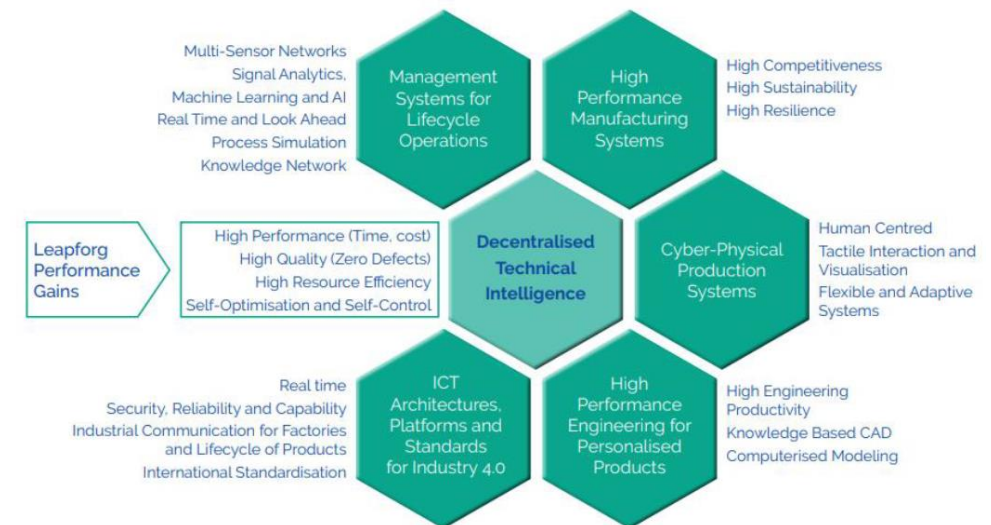
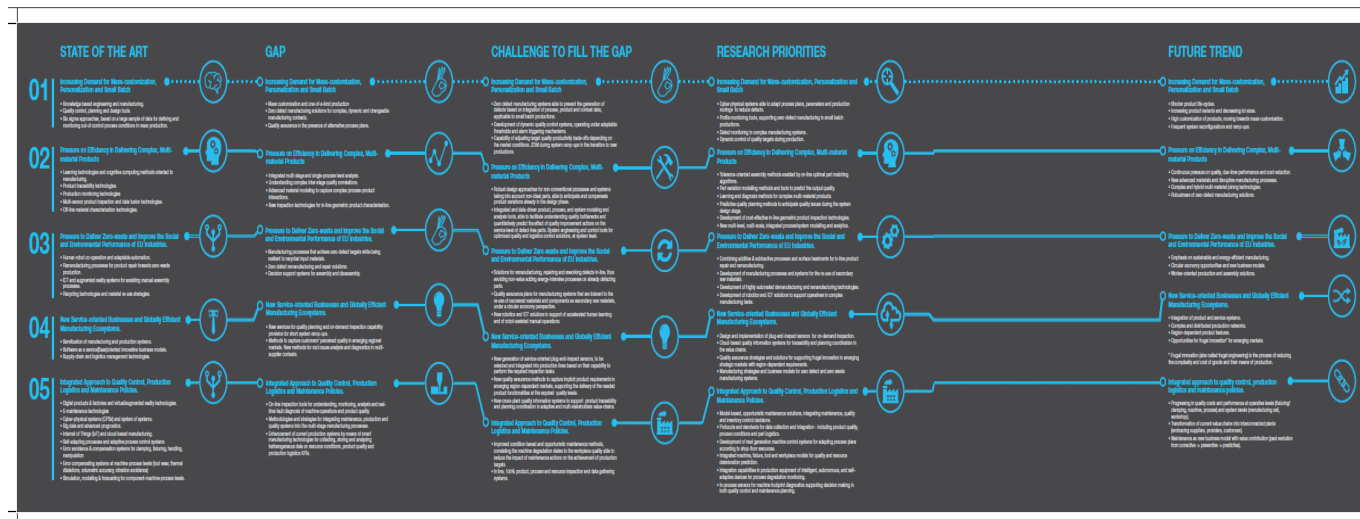


Figure 2: Manufacturing system with Decentralized Technical Intelligence ([ManuFuture SRIA 2030](https://www.manufuture.eu/manufuture-sria-2030))