

DIGITAL MANUFACTURING: STRATEGIC AND ORGANIZATIONAL CHALLENGES

Giuseppe Padula , M.Eng, MBA Bologna Business School Università degli Studi di Bologna



How can *Germany become the leading factory equipment supplier for Industrie 4.0*? How can Germany further improve its competitiveness as a production location through Industrie 4.0? What role can Germany play in setting standards and how can Industrie 4.0 benefit people in the world of work? Plattform Industrie 4.0 aims to find answers to these questions through dialogue. Together, companies and their employees, trade unions, associations, science and politics want to make a big impact.



The Industrial Internet Consortium (IIC) will enable and accelerate adoption of the Industrial Internet which is essential to growth and competitiveness in key industry sectors, including: manufacturing, transportation, energy, healthcare, buildings, utility infrastructure, defense, and emergency response.



The term 'Industrie 4.0' was for the first time mentioned at Hannover Messe of 2011.

The structure of the platform The platform is steered and led by the federal minister for economic affairs and energy, Brigitte Zypries, the federal minister of education and research, Prof. Johanna Wanka, and high-ranking representatives from industry, science and the trade unions. Experts from business, science, associations and the trade unions develop operational solutions together with representatives from various federal ministries in thematic Sworking groups.

Chair Ministers Zypries, Wanka Representatives of commerce, trade unions, science Technical/practical expertise Policy guidance, society, Activities on the market decision-making muttipliers Steering body Strategy group Industrial consortia (companies) (Government, business, unions, science) Chaired by business representatives, Implementation on the market: participation of Economic Affairs and Chaired by StS Machnig, StS Schütte. test beds, examples of applications Research Ministries · Representatives of steering body Chairs of working groups, other guests/ · Representatives of Federal Chancellery, promoters Interior Ministry · Representatives of the Länder Industrial strategy development, technical coor-· Representatives of associations (BDEW, dination, decision-making and implementation BDI, BITKOM, DIHK, VDA, VDMA, ZVEI) Representatives of trade union (IG Metall). Working groups • Representatives of science (Fraunhofer) Reference architecture, standardisation. Consortia, standardisation

Scientific Advisory Committee

Agenda setting, political steering, multipliers

Secretariat as service provider

and norms

· Legal framework

· Research and innovation · Security of networked systems

· Work, education and training Others as required

Working units with technical/practical

Affairs, Research, Interior, Labour

expertise, participating ministries: Economic

Network coordination, organisation, project management, internal and external communication

and initiatives

International

standardisation

bodies, DKE and others



As the premier digital industrial company, **GE** coined the term Industrial Internet in late 2012. It estimates the Industrial Internet could be a \$225 billion market by 2020, and has made significant investments in the Industrial Internet. It created GE Digital, its software business dedicated to making digital the core foundation of GE's operations. GE is one of the companies that founded the Industrial Internet Consortium_to accelerate the development, adoption, and widespread use of interconnected machines and devices, intelligent S analytics, and people at work.

MEMBERS





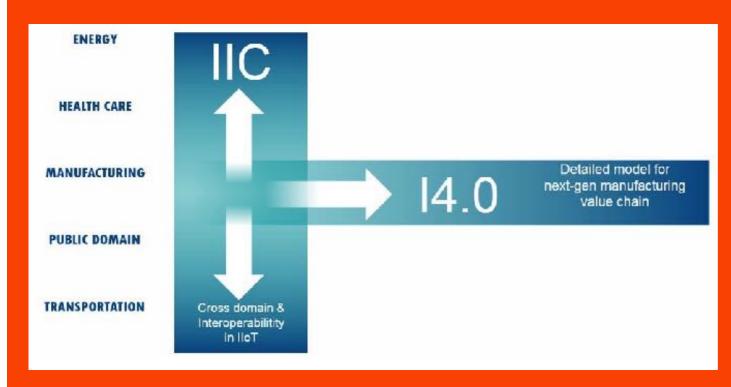












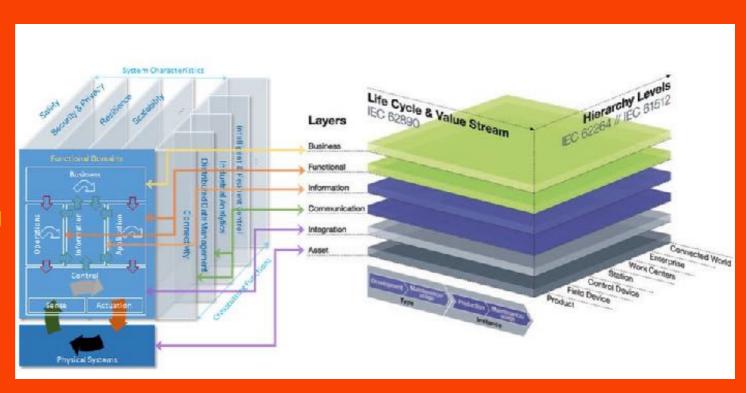




Representatives of Plattform Industrie 4.0 and the Industrial Internet Consortium met in Zurich, Switzerland to explore the potential alignment of their two architecture efforts - respectively, the Reference Architecture Model for Industrie 4.0 (RAMI4.0) and the Industrial Internet Reference Architecture (IIRA). The meeting was a success, with a common recognition of the complementary nature of the two models

Giuseppe Padula.Unibo 2017

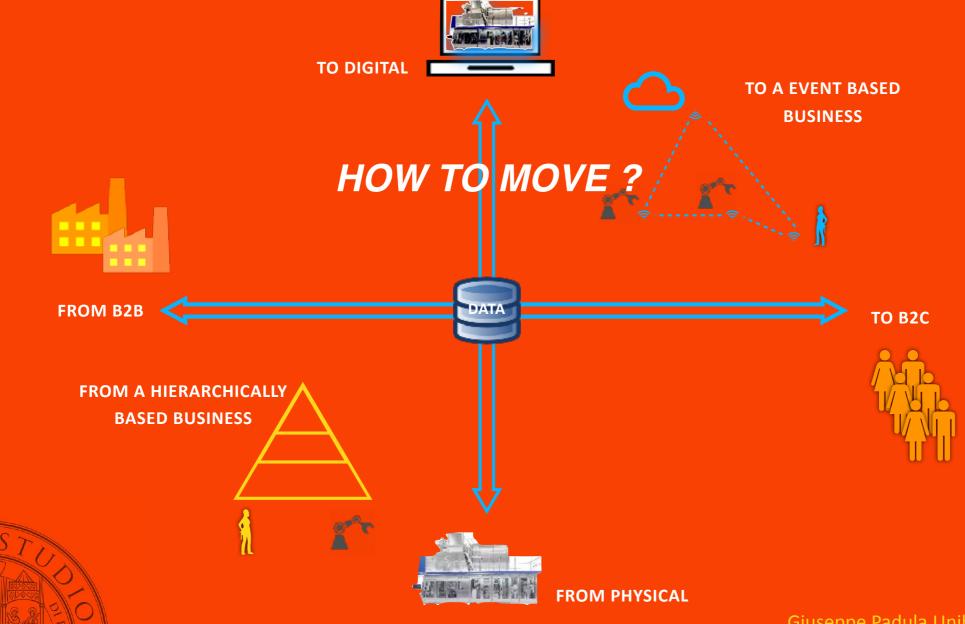
We began looking at the technical issues. With RAMI 4.0, Industrie 4.0 focuses on manufacturing in depth; IIRA crosses multiple application domains. Industry as a whole needs to be able to work across domains; manufactured goods are one of those domains. As a concrete example, an automobile containing multiple manufactured components needs to work together as a single unit (all manufacturing so far). But when it's parked at home charging its batteries overnight, it needs to be able to connect to the smart grid. Clearly, these domains must interoperate.







Shifts in Traditional Business Management

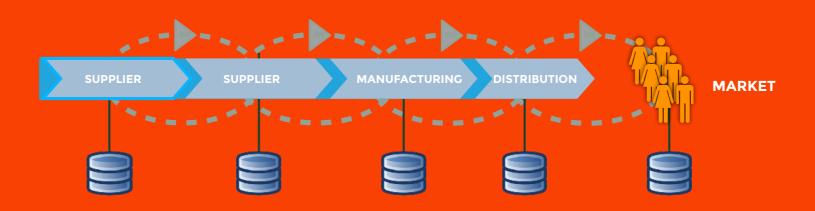


R&D PROCESS: From B2B...

THE MAIN ISSUE FOR R&D IS:

ARE WE ABLE TO TECHNICALLY SATISFY THE PRODUCT SPECIFICATIONS COMING FROM THE CUSTOMER?

WE KNOW-HOW: DOMINANCE OF PRODUCT-CENTRIC MODEL



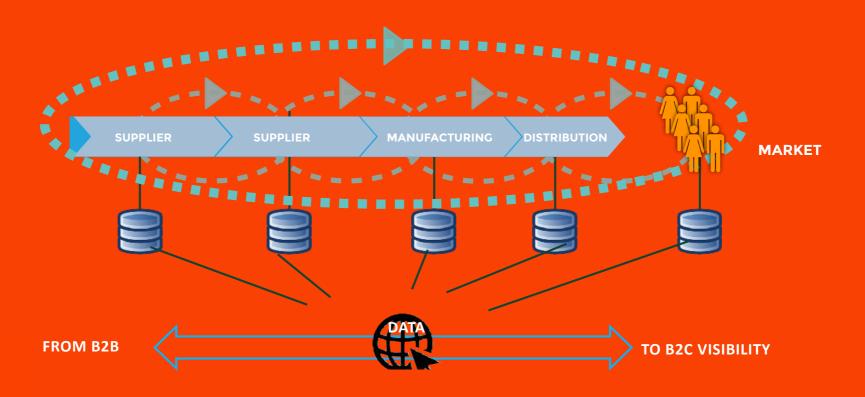
B2B VISIBILITY



..to B2C.

THE MAIN ISSUE FOR R&D IS: ARE WE ABLE TO UNDERSTAND AND INTERACT WITH OUR CUSTOMER'S VALUE CHAIN?

WE KNOW-WHY: EMERGING OF SERVICE-CENTRIC MODEL





PRODUCT: from Digital Twin

DIGITAL TWIN



IT LINKS SEQUENCIALLY THE PHYSICAL PRODUCT WITH THE DIGITAL IMAGE



..to Bi-Modal Product

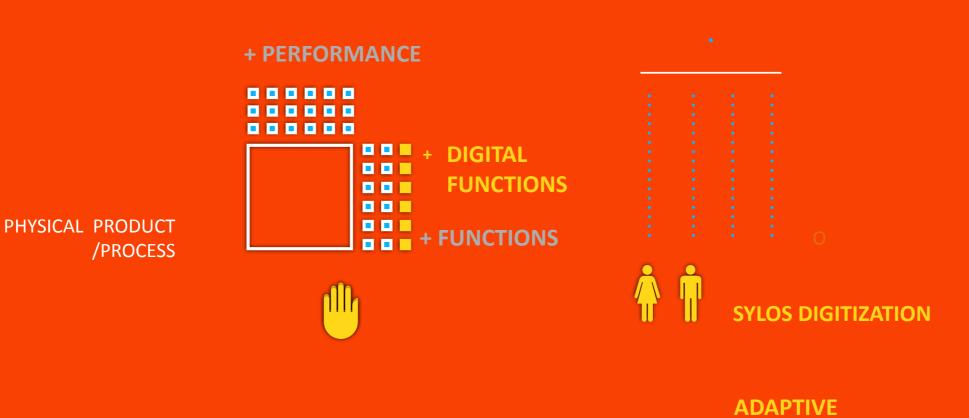
BI-MODAL PRODUCT



WE WILL DESIGN A PRODUCT STARTING FROM ITS SIMULTANEOUS BI -MODAL STRUCTURE



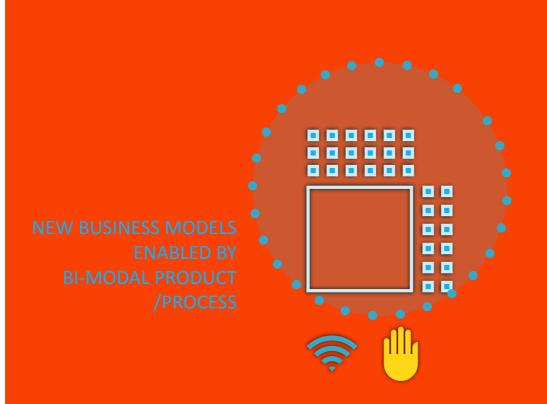
Digital Transformation: Managing Incremental Innovation

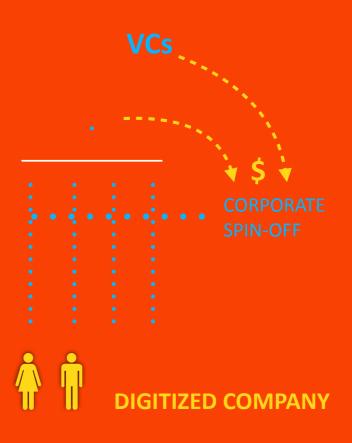




STRATEGY

Digital Transformation: Managing Radical Innovation

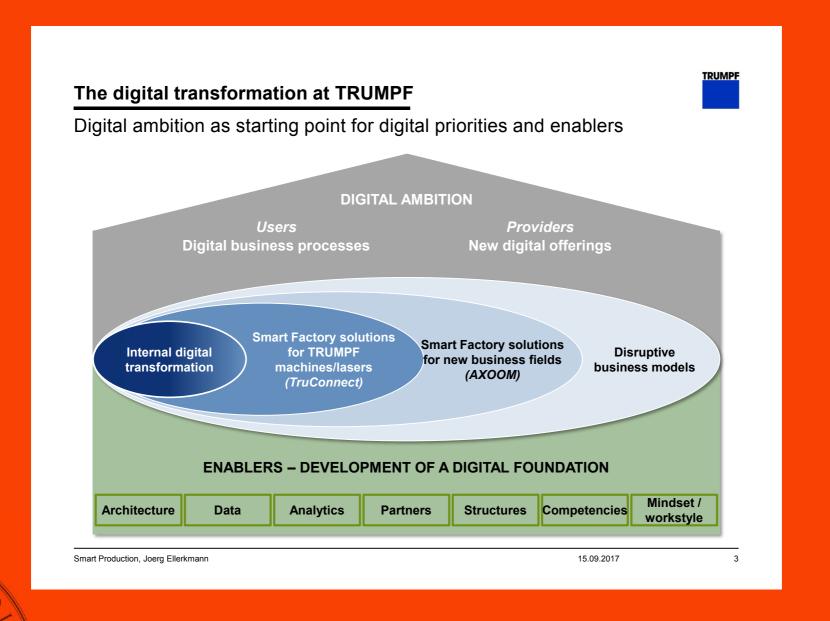




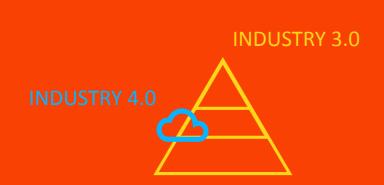
DISRUPTIVE STRATEGY



Managing Radical Innovation: AXOOM and TRUMPF



Managing Organization





FORMAL POSITION

TEAM CREATION

TEAM UPSKILLING

DIGITAL STRATEGY

·low term

-medium term

SPECIFIC BUDGET

BUSINESS MODEL DESIGN



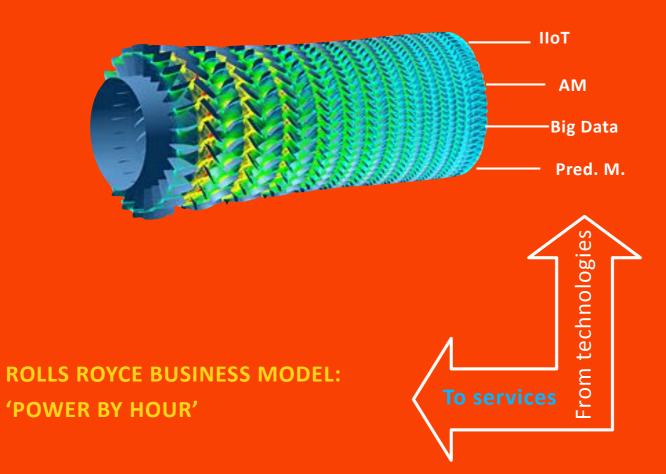
Executive Master at Bologna Business School

Developing and empowering skills for Digital Business Transformation





Managing Business Model Innovation: Servitization



From Capital to Operative Expenditures

giuseppe.padula4@unibo.it



