Co-funded by
the European Union

TE@CH

ADDITIVE MANUFACTURING ACADEMY
TO BOOST TRAINERS' COMPETENCES IN INDUSTRY

Summary

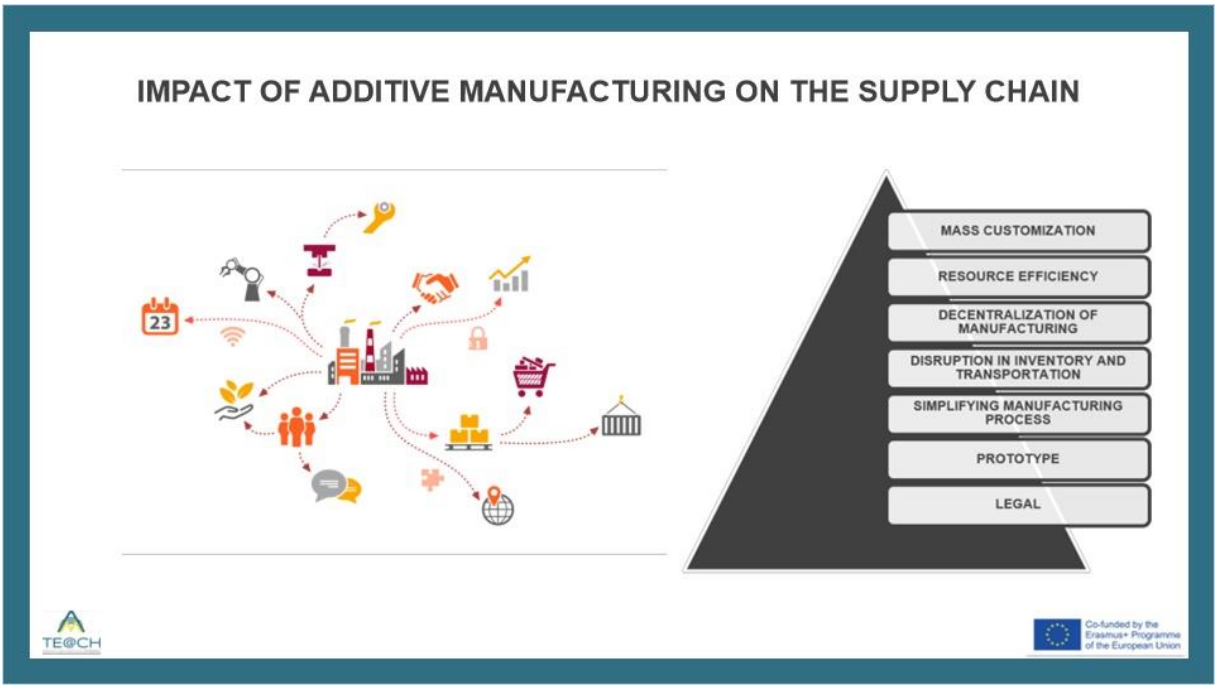
Industrialization of Additive Manufacturing

Project Number: 2021-1-IT01-KA220-VET-000033365

Course Content

The online course provides insights to the industrialization of Additive Manufacturing, delving into the transformation that AM is pushing across the supply chain and the evolution of Additive Manufacturing technologies.

Impact of AM on the supply chain



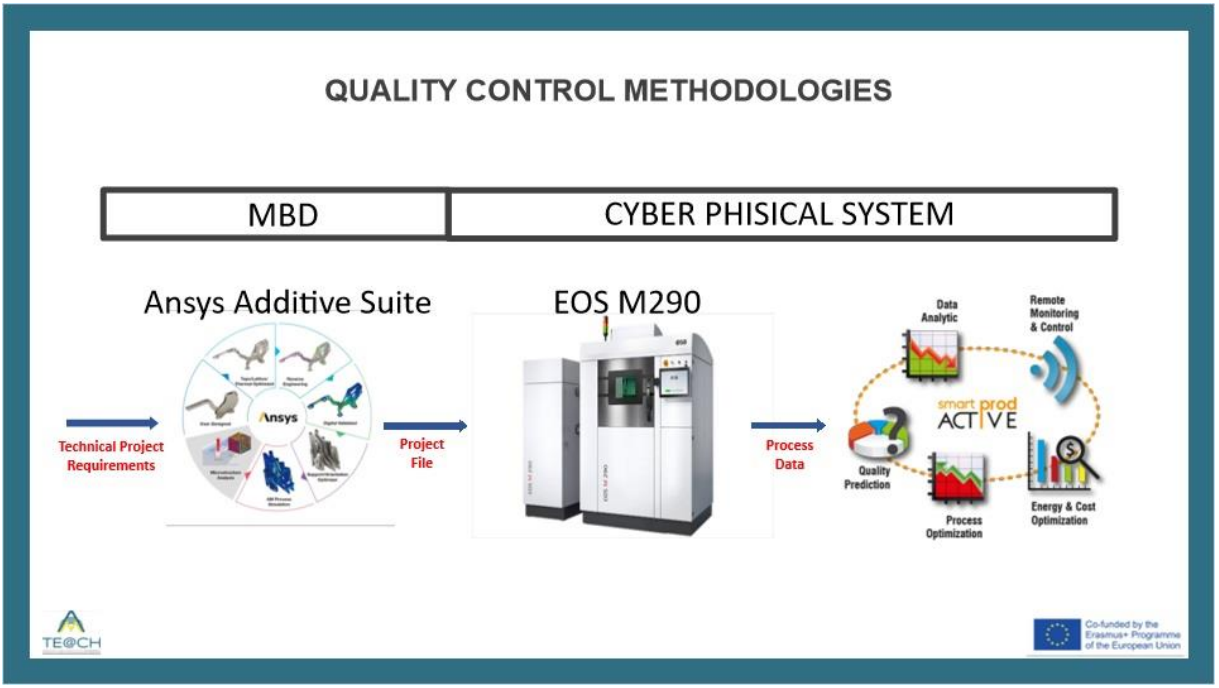
The Additive Manufacturing has the potential to disrupt the supply chain; therefore, the manufacturing industries must be prepared to adapt to a changing environment. In this scenario 7 key areas affected by AM are identified:

- **Mass customization:** faster time-to-market, increased flexibility and improved quality are some of the benefits that are achieved, along with challenges like slow production speeds and limited material options.
- **Resource efficiency,** in terms of reduced waste, efficient production of complex geometries, on demand production and reduced transportation emissions.
- **Decentralization of manufacturing** in combination with AM can enable production closer to the client, thus lowering transportation cost; also, it's a semi-automated process that does not require the same skills as conventional manufacturing.
- **Disruption in inventory and transportation** facilitate the production on location and on demand, removing the necessity of large warehouses to store

components.

- **Simplifying manufacturing process** by reducing the number of components per assembly and the number of processing steps needed for each component.
- **Prototype** production ease for innovative projects and updates on existing products.

- Legal concerns such as physical injury, intellectual property threat, product liability, product duplication and general security problems.

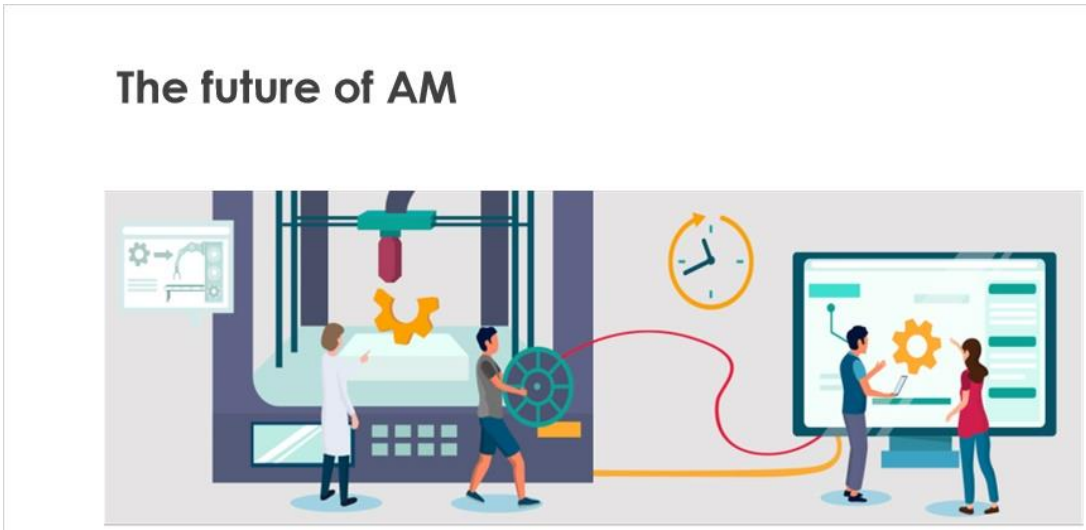


Quality control methodologies

A quality monitoring mechanism is required to boost the AM industry and improve the finished parts grade. Combining a 3D printer (Hardware) with a smart monitoring program (Software), a cyber-physical system is created.

In this way, it is possible to collect data that allow to develop predictive models capable of predicting the density obtained within the printed components.

Implementation of AM



Status and future of AM

As of today, AM finds applications in a broad range of fields of production, enabling all the advantages of the technology to be used. The sectors that benefit the most from AM are:

- **Manufacturing:** enhanced the process by enabling the production of complex parts and prototypes.
- **Aerospace,** where AM is used to produce lightweight and high-performance parts for aviation, defense, and space applications.
- **Healthcare:** AM enabled the production of customized medical devices and prosthetics.
- **Architecture and construction:** structural planes, façade elements and even whole buildings are manufactured in AM.
- **Education:** design, engineering and production skills are taught in schools and universities trough AM.
- **Art and design:** used by designers and artist to produce complex sculptures.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

This document is available under the Creative Commons CC BY-NC-SA 4.0 licence.

You are free to:
Share — copy and redistribute the material in any medium or format

Adapt — remix, transform, and build upon the material

The licensor cannot revoke these freedoms as long as you follow the license terms.
Under the following terms:
Attribution — You must give appropriate credit , provide a link to the license, and indicate if changes were made . You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

NonCommercial — You may not use the material for commercial purposes .

ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.

No additional restrictions — You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.

Notices:
You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation .
No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material.

More information at: https://creativecommons.org/licenses/by-nc-sa/4.0/