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ADDITIVE MANUFACTURING ACADEMY
TO BOOST TRAINERS' COMPETENCES IN INDUSTRY

Summary

Selection of Parts

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

Course Content

The online course explores possible advantages and limitations of AM in manufacturing in terms of suitability in a production environment and the associated costs.

Comparison of Costs in Conventional Vs Additive Manufacturing

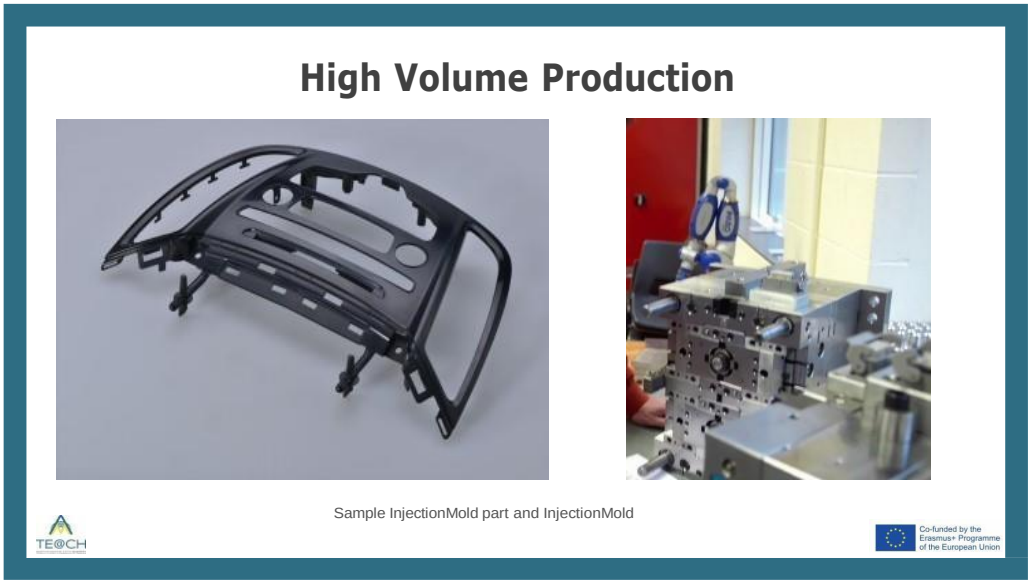
Short Description

Manufacturing industries and investors are always looking to improve their manufacturing processes to lower cost, energy consumption and expand their capability. The rapid growth of AM is bringing to light novel techniques to expand manufacturing capability and reinvent the wheel. Research and industries interest lie in determining where AM can replace or create new manufacturing systems. A leading question in this space is how additive manufacturing compares in terms of costs with conventional manufacturing methods?

Production Volumes

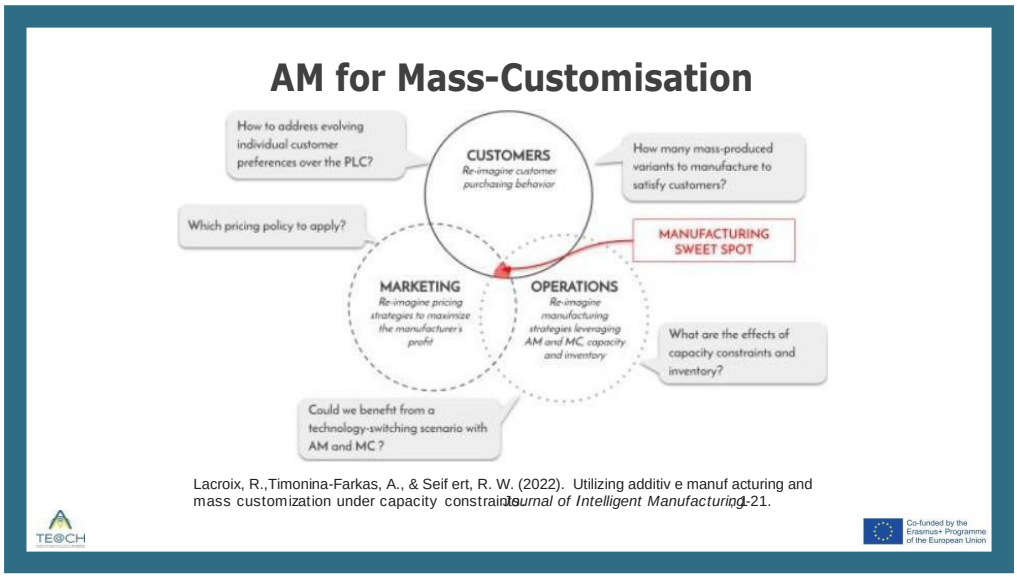
High Volume Production

Comparing traditional manufacturing methods such as molding, in which large quantities of identical goods are produced, with additive manufacturing capabilities in high volume production.



Mass Customisation

In terms of customisation, industry are increasingly recognizing additive manufacturing as a valuable addition to existing manufacturing technologies and solutions, driving operational efficiency, customer satisfaction, and profit.



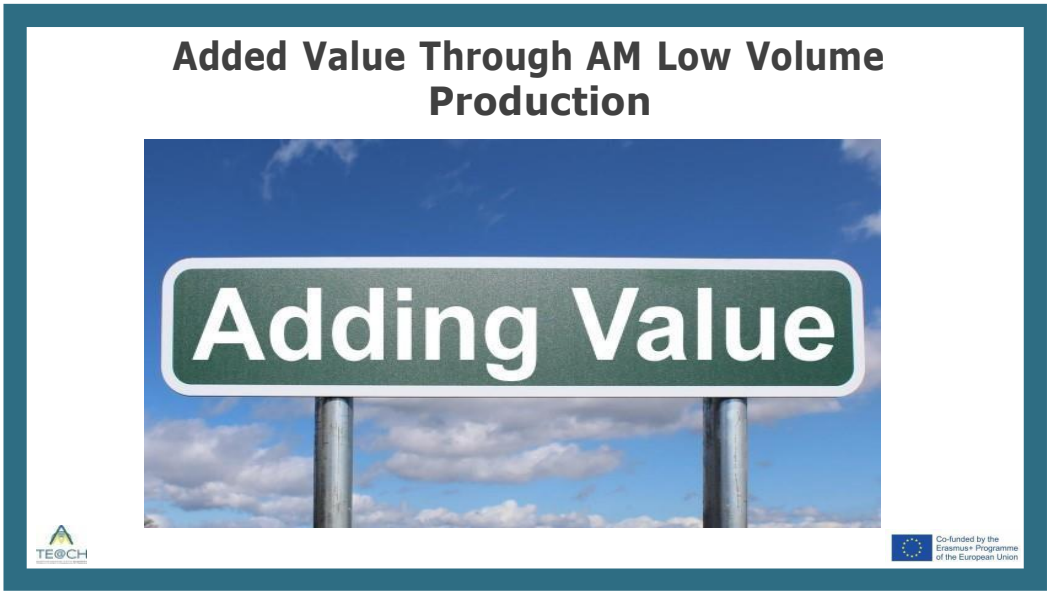
Notes

Mass Complexity

The complexity advantage offered by additive manufacturing is providing opportunities to essentially ‘hit two birds with one stone’, with the ability to eliminate forging, and joining process by printing complete parts in one print. Most high-volume applications of AM produce parts that are not impossible if made conventionally but add process complexity if done so: Complexity of producing multiple unique parts in a single build, complexity of producing unique builds consecutively, and similarly the complexity of tuning the entire value-chain to deal with unique parts at scale.

Added Value Through AM Low Volume Production

The recent advancements in AM have enabled engineers to create parts with complex geometries and unique design features without creating molds, in many ways economizing low-volume production and adding value. Companies have already started embracing the perks of additive manufacturing processes within their Maintenance, Repair, and Overhaul operations as viable alternatives to conventional methods.



Notes

3D Printing Spare Parts on Demand

Investigating spare parts management issues in manufacturing and how additive manufacturing can overcome some of these issues. Additive manufacturing makes it possible to produce spare parts in small quantities, even single items, at a very low cost leading towards less inventory and as a result, less storage space issues and associated costs. Parts can also be printed locally, which saves transportation time and costs. Additive manufacturing of spare parts can offer manufacturing flexibility and contributing to a sustainable approach, can also help further reduce waste.

Challenges associated with 3D Printing Spare Parts

The advantages of 3D printing need to be balanced against the risks, including that spare parts 3D printed by third parties could be of insufficient quality and subject to legality constraints.

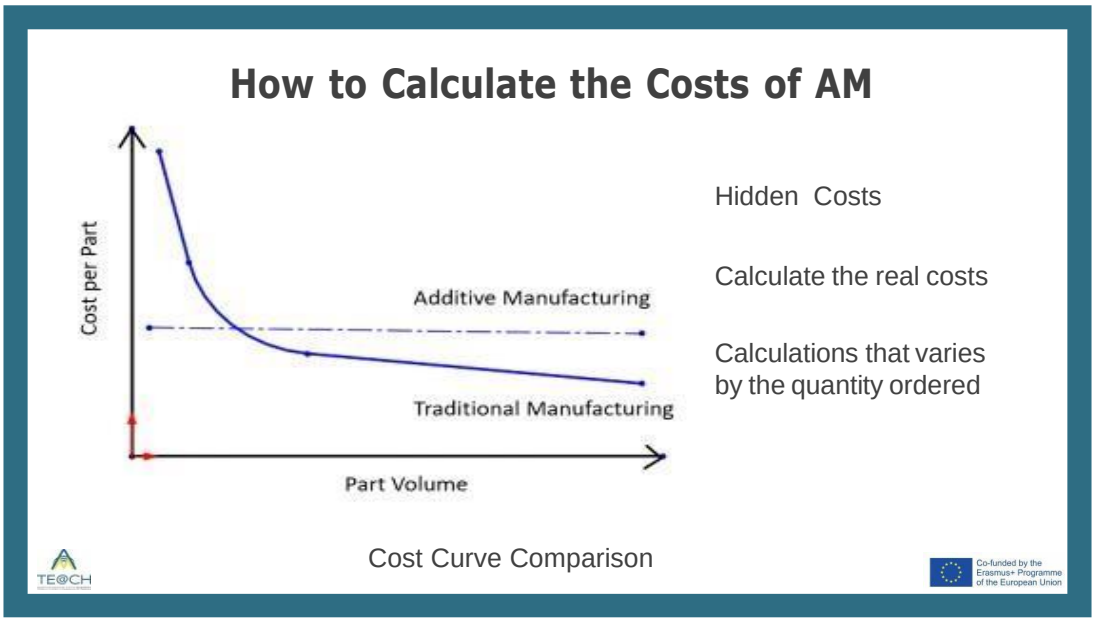
Hybrid Manufacturing

Additive manufacturing and subtractive machining are often considered as competitors but combining additive manufacturing with traditional manufacturing may solve many of the market's demands, in the form of Hybrid Manufacturing.

Notes

How to Calculate the Costs of AM

To uncover the hidden costs and calculate the real cost of additive and conventionally manufactured items per unit, calculations that varies by the quantity ordered and applies to their unique circumstances should be used, similar to what an additive manufacturing cost curve model illustrates.



These form of cost curves are ideal tools for highlighting the difference between any two technologies, but it is vital in the decision making process that the data supporting the chart must be accurate and comprehensive, considering time, labour and all associated costs, including direct and indirect costs.

For further information please

Contact us via the Faculty of Engineering & Technology, ATU Donegal.

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