

Strategic real options view to additive manufacturing

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Abstract

Additive manufacturing is commonly known as 3D-printing and is a highly flexible digital manufacturing process usable, e.g., in the production of parts with highly complex geometries. Additive manufacturing has gained academic interest mostly in the manufacturing technology literature, but lately also the business aspects of additive manufacturing have come under scrutiny. An additive manufacturing unit is substantially a "universal production machine" capable of producing any geometry within its limits. This means that the owner of the machine has flexibility to decide what to produce - flexibility that a single purpose machine does not carry. When a fleet of additive manufacturing machines is used a company can flexibly and with a relatively low cost associated with changes optimize production dynamically and according to demand. This allows flexible manufacturing companies to become very robust in terms of having the ability to fit their production to demand in an unprecedented way, making them resilient when hard times hit. There is no necessity to concentrate the physical location of the fleet, but the fleet can be a network of nodes operating in multiple places managed and optimized centrally. This allows a modern take on what we understand as a factory - the future factory is a network of manufacturing nodes working in concert. This changes the business architecture of manufacturing to a digitally managed flexible resilient fleet of machines that can operate both as independent single nodes and in concert with others. We take a strategic real options view on these issues.

Keywords: strategic real options, additive manufacturing, network, resilience, risk management