# Additive Manufacturing

Additive Manufacturing promises to radically change the way we live and the economic models of business.

Additive Manufacturing includes processes in which liquid, powder or other material are layered using computer control to create an object. A key element of Additive Manufacturing is 3D printing. It is used both for rapid prototyping and for full scale production of manufactured items.

In conventional machining, material is removed from a base object to form the final object. In Additive Manufacturing, an object is built from a computer data file usually by adding material layer by layer.

There are several processes for Additive Manufacturing including material jetting, powder bed fusion, binder jetting, directed energy deposition, sheet lamination, material extrusion, and vat photopolymerization. Combinations of Additive Manufacturing deposition, growth scaffolds and other elements will be coupled with deep learning (AI) algorithms and large data sets to assemble very powerful Additive Manufacturing systems.

Additive Manufacturing is being applied to mechanical parts, food, clothing, and biological organs. Additive Manufacturing who is applied to prototyping and building of tools that themselves are used in more traditional materials removal or molding manufacturing applications.

Hybrid applications of Additive Manufacturing include producing an initial object with Additive Manufacturing and then finishing it to final specifications with removal machining.

Biological application of Additive Manufacturing build organs with successive layering of living cells in various media such a gels or on scaffolds that support the tissue until it is fully developed.

Additive Manufacturing likely will result in significant economic, legal and social impacts. One concern is that this wave of technologies, more so than previous technology waves, will result in cost reduction through replacement of labor.

Safety standards, intellectual property considerations will be affected as Additive Manufacturing becomes more pervasive. Shipping services may be reconfigured as production becomes more distributed, local and custom. As the ability to generate custom physical objects easily and on-demand, work and personal life may be even more intertwined than they are today.

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