ideaport
data . design . digital

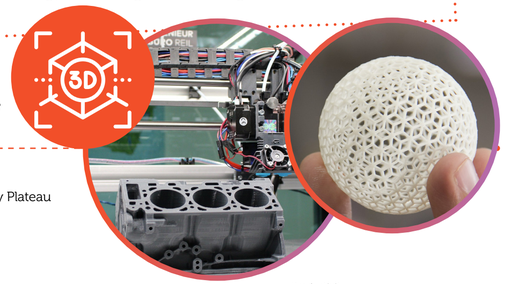
Connect Webinar

Innovative Materials and Processes in Industrial Additive Manufacturing

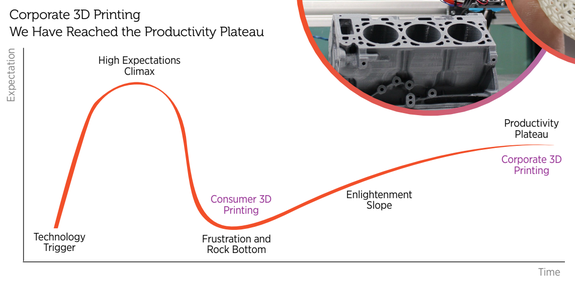
Ideaport is a TGV program.

Definition of 3D Printing

Leading organizations such as ISO and ASTM regulate the international standards and introduce the common standards on additive manufacturing. Likewise, all methods of adding material and shaping material by usually progressing layer by layer through 3D data in PC environment called additive layer manufacturing, according to these organisations.



3D Printing Productivity Plateau(3)



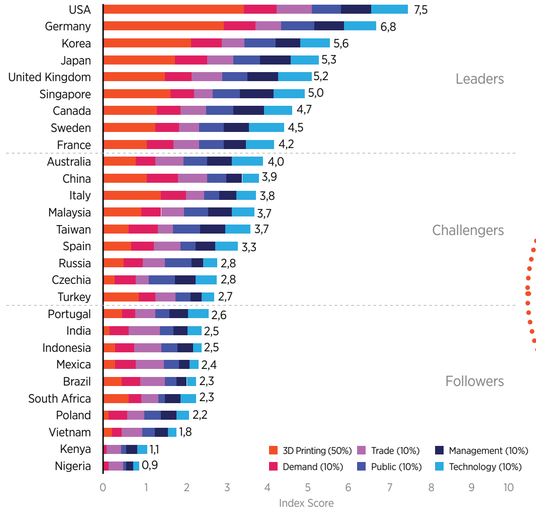
Today's technologies have already come into our lives so quickly. It surely involves some phases from the very first moment we hear about it to our usage to such time it affects our lives. The first phase that starts with the announcement of technology creates huge expectations as it appears on the instruments such as the media, despite very limited scientific resources. At this point, technology has to be used efficiently and quickly. If we were to divide 3D and additive manufacturing into two; what we define as the printers operating on the principle of plug-and-play, which are used at home, are the consumer 3D printers. There are also advance printers developed for industrial use. This is a more complicated system that requires intense human resource, involves broad engineering knowledge and calls for cost esitamations.

All visuals and contents in this infographic were developed by Aydın Yagmur.
The comments and narrations in this infographic are made by using Aydın Yagmur's webinar presentation

References
(1) HP Tehnology Report: 3D Printing: ensuring manufacturing leadership in the 21st century
(2) https://www.airbus.com/newsroom/press-releases/de/2018/09/airbus-helicopters-to-start-large-scale-printing-of-a350-compone.html
(3) Gartner Emerging Technology Hype Cycle (Temmuz 2017)
(4) EOS
(5) A.T Kearney Analysis

3D Printing Index

The Countries Assessed in 6 Aspects.



This ranking is formed by taking into account the existing printer infrastructure of the countries, the demand across the country, trade volume, the people and the approaches of national governments in this respect. When we look at Turkey, it is in the 2nd group following the leading countries. One of the most important factors in this positioning is the human factor.

Presently, the United States is the global leader in 3D printing owing to the fact that the country adopted the layer manufacturing early and thanks to its historic leadership in the conventional manufacturing. Nevertheless, it is seen that the countries such as Germany, Korea, Italy and UK have picked up speed, according to Kearney's 2017 3D Printing Index.(1)

3D Printing Market(3)

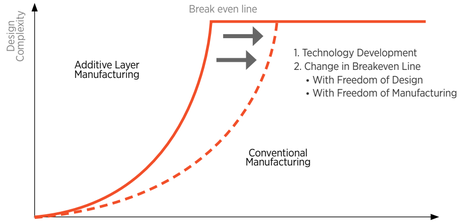
It is anticipated to increase four-fold in the next 5 years.

While the size of the sector was around $7 billion in 2017, it is expected to rise up to $26 billion in 2022. The potential that can be attained by the entire industry is estimated to reach $650 billion. Compared to the current situation, it is fair to say, "this just the beginning". It is seen that there are significant opportunities especially for Turkey and other developing countries.

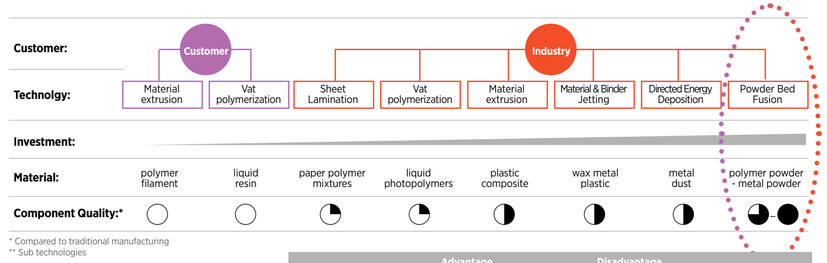
3D Printing - Understanding the Additive Layer Manufacturing Opportunities(4)

Businesses invest in technology in an effort to reduce their costs and increase their efficiency. If we look at the picture today, layer manufacturing is a practice that enables the production of complex parts in low quantities. When the quantity increases and the integral complexity reduces, the traditional methods what we call forging, casting, milling, machining, etc. can be resorted as a more practical option. On the other hand, the innovative aspect of additive layer manufacturing is that, by making some modifications in your workpiece, the cost or applicability can be improved.

The Leverage Effect of the Potential of Additive Manufacturing Technologies can help change the Breakeven Line.



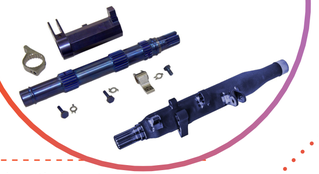
It is important to know that 3D Printing covers a wide range of technologies and applications.

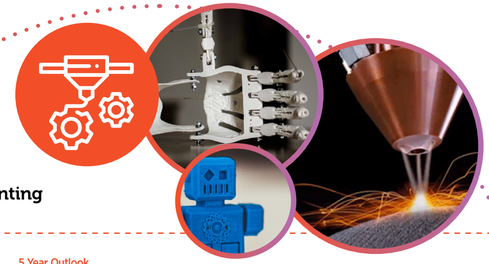


* Compared to traditional manufacturing
** Sub technologies

	Advantage	Disadvantage
Material & Binder Jetting	Fast and low-cost processing Color printing option	Poor mechanical properties Excessive post-milling processes
Stereolitgraphy	A fully developed process	Poor mechanical properties Fragility after a certain period of time
Fusion Deposition Modeling	A fully developed process	Poor mechanical properties Fragility after a certain period of time
Powder Bed Fusion	High mechanical properties High resolution	Limited printing space High cost
Directed Energy Deposition	Applicability on previously existing items	Additional treatment required for surface finishing Limited use of materials
Electron beam Melting	High density standard metals can be used	Slow and expensive process Less accuracy as against DMLS

A component used for the doors by Airbus helicopter company has been developed as a project for a massive weight reduction along with a cost reduction.(2)





Trends in 3D Printing Technology(5)