

## **4D Printing Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2023-2028**

Market Report | 2023-05-29 | 144 pages | IMARC Group

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### **Report description:**

The global 4D Printing market size reached US\$ 112.0 Million in 2022. Looking forward, IMARC Group expects the market to reach US\$ 711.8 Million by 2028, exhibiting a growth rate (CAGR) of 34.9% during 2023-2028.

4D printing, also known as 4-dimensional printing, refers to a technology that combines 3-dimensional (3D) printing techniques with advanced software, material science and engineering. It adds the fourth dimension of time and provides 3D printed objects with the ability to change their shape. These printed objects can transform into various forms due to external stimuli, including heat, water, light, electricity, magnetic field, chemical substances and other environmental factors. In recent years, 4D printing has rapidly gained traction as it offers improved efficiency, quality and performance capabilities than traditional manufacturing techniques. However, the 4D printing technology is still in its nascent stage, and several key players are engaged in research and development (R&D) activities to explore its potential applications across various industries.

### **4D Printing Market Trends:**

The escalating demand for innovation in numerous 3D printing applications represents the primary factor driving the market growth. Due to their self-transforming capabilities, 4D printed objects can maximize the use of limited resources, thereby reducing the manufacturing, transportation and handling costs while saving time, efforts and resources. As a result, the growing need to minimize the overall operational costs and improve business efficiency and the increasing emphasis on ensuring a sustainable environment are augmenting the demand for 4D printing. Besides this, technological advancements, such as the development of carbon fiber, printed wood grain, custom textile composites, and other innovative materials that offer superior self-transformation, programmable actuation and sensing capabilities, are propelling the market growth. Additionally, the emerging applications of 4D printing technology in various industries are contributing to the market growth. For instance, in the healthcare sector, doctors are utilizing self-transforming 4D printed components to place inside the patient's body to minimize the procedures involved in a surgery. Furthermore, the rising focus on product innovations, heavy investments in research and development (R&D) projects, and the emergence of Industry 5.0 are some of the other factors creating a positive market outlook.

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#### Key Market Segmentation:

IMARC Group provides an analysis of the key trends in each sub-segment of the global 4D printing market report, along with forecasts at the global, regional and country level from 2023-2028. Our report has categorized the market based on printing technology, type of programmable material and end use industry.

#### Breakup by Printing Technology:

- Fused-deposition Modeling (FDM)
- Powder Bed and Inkjet Head 3D Printing (PBP)
- Stereolithography (SLA)
- Others

#### Breakup by Type of Programmable Material:

- Programmable Carbon Fiber
- Programmable Textiles
- Programmable Wood Grain

#### Breakup by End Use Industry:

- Military and Defense
- Textile
- Aerospace
- Automotive
- Healthcare
- Others

#### Breakup by Region:

- North America
  - United States
  - Canada
- Asia-Pacific
  - China
  - Japan
  - India
  - South Korea
  - Australia
  - Indonesia
  - Others
- Europe
  - Germany
  - France
  - United Kingdom
  - Italy
  - Spain

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Russia  
Others  
Latin America  
Brazil  
Mexico  
Others  
Middle East and Africa

#### Competitive Landscape:

The competitive landscape of the industry has also been examined along with the profiles of the key players being ABB Ltd, Autodesk Inc., CT CoreTechnologie Group, EnvisionTEC Inc. (Desktop Metal Inc.), HP Development Company L.P, Materialise NV, Merck KGaA, Sculpteo (BASF SE), Stratasys Ltd. and Self-Assembly Laboratory.

#### Key Questions Answered in This Report:

How has the global 4D printing market performed so far and how will it perform in the coming years?  
What has been the impact of COVID-19 on the global 4D printing market?  
What are the key regional markets?  
What is the breakup of the market based on the printing technology?  
What is the breakup of the market based on the programmable material?  
What is the breakup of the market based on the end use industry?  
What are the various stages in the value chain of the industry?  
What are the key driving factors and challenges in the industry?  
What is the structure of the global 4D printing market and who are the key players?  
What is the degree of competition in the industry?

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