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A Review on 3D Printing Industry and Market

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ABSTRACT

3D printing technology is widely used in industrial manufacturing, medical biology and cultural creativity because of its direct molding. Based on the characteristics and advantages of 3D printing technology, the application of 3D printing technology in the automotive, aerospace and electrical industries is analyzed based on the forming principle and process flow of 3D printing technology. Because of wide use of 3D printing technology some time market flow is quite low because of use of old methods of 3D printing and machine tools. In this case some time market i could be down because industries cannot provide product on time.

In this article we are going write about what are the potential applications and markets for your technology? Are there particular sub-markets and are some more attractive than others at this stage in the development of technology?

What is the size and growth rate of the market? What factors will influence the development of this market?

1.Introduction

The concept of 3D printing is an advanced form of the traditional 2D printing done on a surface. 3D printing creates tangible objects and those that can occupy space.[1,2,3] This is done by the use of computer aided designs and by applying different types of the design software (Lipson & Kurman 11).
The printer builds the object by arranging layers of plastic or special forms of carbomorphs and metallurgies on each other while following a printing signal from the computer. [4,5,6,7]One selects the printing materials depending on the application of the printed object. For instance, if the object serves as an interactive component, there is a need to use a conducting material.
The material will make it possible for one to use sensors to monitor the interactive aspects of the users (Leigh et al 2).[8]The three-dimensional printing technology is a source of existing applications, research on product development and a medium of artistic exploration.
The technology will make the virtual world real.[9,10] The desire to achieve the reality of imaginations and the depth, at which the technology is applied, will determine how fast the technology acquires its commercial significance.[11]

2.Market Analysis in Industry

One can understand the industry of 3D technologies in terms of the software technology, the hardware and the nature of the products.

A). Software technology

3D printing is a function of professional and customized software. The software is used to design the object intended for printing. The software also facilitates the interfacing process that instructs the printer to execute the print command.[11,12,13,14]Different versions of computer aided designers are used depending on the complexity of the object (Leigh, et al 1).
The software allows one to make adjustments on the virtual objects, an aspect that is impossible in the real world.[15,16]At the click of a button, it is possible to change colors, textures and joints. The software makes editing and testing of various features easy, thus helping to attain the best of creativity.Some forms of testing may destroy the object and the material in the physical world. However, the software enhances both testing and modification of the previous designs (Lipson & Kurman 13).

B). The hardware

This comprises of the computer where the design process occurs, the printer and other compatible accessories.[17,18,19]The computers used for the design must be compatible with the printing machine, and the interfacing software ought to be configured in the two systems.[20,41]The Hard Disc memory, the RAM and the processor speeds are vital features of the hardware.
The printer is built from different types of components and materials owing to the fact that it requires the printing substance, the electronic compositions and the physical ergonometrics derived from the shapes and the sizes of the desired objects.[21,22,23,45]The structure of the printer must also consider the safety of the users (Hood-Daniel and Kelly 7).[24]

1. Nature of the products

Initially, certain industries limited the application of 3D technologies to specific products and prototypes in academia.[25,43]Some users engaged in this technology as a hobby. However, the increase in its application has moved from simple, domestic and personal items to complex systems in the manufacturing firms, engineering and aeronautics.[26,27]

Considering it as an emerging technology, its applications keep increasing and, in turn, determine the market share of the technology (Strauss 247). Some of the domestic objects are plastic mugs, teacups, toys and jewelry. Innovations in this technology may allow galvanization and change of color on the printed objects.[28,42,44] They can also be used to create various shapes and aesthetic effects of the buttons.

The technology can also be advanced from the conventional 2D printing, in which the alphabets and numericals are developed to 3D. [29]The systematic development of the 3D letters from the 2D was a major indicator of the shift in the printing technology (Hood-Daniel and Kelly 3; Lipson & Kurman 13).

From the foregoing nature of the products, 3D printing is used in applied arts and sciences. It can also serve in textile industries, in the models for domestic products and scientific prototype development.

The software and the printing components influence the market in three different ways. First, they create the existing regular and natural shapes.[30,33] They also generate abstract shapes, thus, allowing the technology to replicate the physical world in addition to the novel concepts of the mental imagery.[32]The second level of market influence is in the composition of the print-outs. Such may include plastics, asbestos and variations of metal components. The composition increases the range of application.[31]The third influence is in the control of the behavior of the objects (Lipson & Kurman 14). It is observed that conductive materials can help to create sensory aspects of the print-outs.

To determine the behavior of objects, one should observe their different responses to the stimuli. An increase in directional speed, change of position, physical conditions in humidity and change in temperature can be linked to the programmed behaviors of the printed objects.[34] The sensors require semiconducting materials that can facilitate piezoresistive characteristics and advanced behaviors that vary with stimuli (Leigh 3).

Against this backdrop, it is evident that 3D printing technologies create avenues for a myriad of demands in the market.[35,48] There is demand for the end products from the technology, for the software and hardware that support the printing.[36] There is also a demand for 3D printing machines and the associated expertise. At the initial stages, there is more demand for the hardware and software related to the technology.

However, the market will determine the nature of products that the technology will focus on. The technology is fast shifting to the specialized commercial use. Therefore, market analysis ought to be done in terms of the diversity of the nature of products and geographical use.[37,38,39]

There is a tremendous growth rate as a result of the reduced cost of both the hardware and printing machines. [40,3]It is approximated that 3D printer's market grew by 18% (Strauss 247).

2. The size, the growth rate and factors that influence the market

The range of applying technology and its demand determines the size of its market. The demand for the technology could be in terms of the software and hardware of the products that the technology generates.[46,14,27] Other than the academic and specialized use of the technology, it is widely used for commercial purposes in engineering and construction of models.

In medicine, the technology is used in bone prototypes and dental specimens. It is also used in customized packaging. This may involve a complete change of the eternal layer of a product by direct printing or by printing the package and putting it on the product. [47]3D printing is used to simplify complex Geo-Information Systems by representing concepts, which are impossible to explain in 2D (Mohamed & Mahmoud 1).

Revenue from the commercial use of the technology grew at an average of 8.8% between 2002 and 2008. The projection of growth rate in 2012 alone was about 20.3%. The general trend of the industry and product use is progressive. The rate of innovation in the industry is 14%.

The growth of the technology in additive manufacturing was equal to 15.6% in 2008, and it was 35.9% in 2013, and the projection of growth is 50.5% in 2018 (Strauss 248). The demand for the products and services of the technology has been increasing for the last 20 years.[48,2,9] The standardization of the products and services depends on the complexity of the software, the hardware and the materials that constitute the product.

Therefore, innovation in this technology will influence the growth of the industry. Innovations are manifested in the accuracy, at which the printer reproduces virtual objects.

Technological advancement in the printing technology relies on the level of the artificial intelligence and the interfacing programs. Artificial intelligence that the computer applies during the printing is replicated in the behavioral aspects of the products (Lipson & Kurman 17).

The other factor that influences the rate of growth of the technology is the cost. The market must find a reason to invest in simulations or prints that would otherwise be generated in alternative means such as carving.[11,38]

The technology must be an affordable, convenient and effective way of delivering products that were earlier on produced by other means. Similarly, the technology must be novel to generate products that did not exist before or generate the products with an additional value. One can see such value in the technological and behavioral characteristics of the print-outs (Lipson & Kurman 13).Diversifying the printing methods will result in both cost reduction and a test of new technologies.[45,1,36] One of such methods is the Digital Light Processing (DLP). This method subjects polymers to controlled light, under which it hardens them to the desired shape. Fused depositing can enhance rapid prototyping. Micro fabrication may apply on smaller objects such as jewels (Mohamed & Mahmoud 113).

Diversity can also apply in the material used in the technology. The material should come in many colors to appeal to more customers and it must be flexible to increase the range of application. It must come in different optical properties, such as opacity and transparency. It should allow the transmission of light at different conditions (Mohamed & Mahmoud 111).

Investing in market to determine the nature of products that the market demands will influence the rate of adoption of the technology. There is also need to publicize the uniqueness of the technology. This will create more interest in the technology from regions where people are unaware of such innovations.

The market will be drawn to facts such as creating 3D without the use of curving tools and the need to learn from conventional printing.[41,43,49] Other factors that influence the market include the weight of the products, the duration, the product generation, availability of the materials, and aspects of material wastage (Strauss 246).

3.Conclusion

In conclusion, it must be highlighted that 3D printing technology has evolved gradually, it has also had numerous impacts on market, and its future looks green with impacts on businesses expected.

The article "Singularity" talks about a great rate of development in technology and that it might lead to technology becoming self-efficient. This is a possibility out of fiction movies such as "Blade Runner" and "Gattaca" and literary works like "Frankenstein".

The article specifies that the development of atom size technology will advance self-evolution of intelligence of machine and eventually, it will become superior to humans and overtake the world. It is clear that technology is starting to become smaller but it is to the benefit of people and with careful control will not evolve into a great evil.

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