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ASIA PACIFIC: A DYNAMIC REGION FOR 3D PRINTING

SOARING POTENTIAL OF MANUFACTURING APPLICATIONS AND MATERIAL ADVANCEMENT

By Todd Grimm, founder and president of T. A. Grimm & Associates Inc.

From digital manufacturing to a diverse range of materials, the power of 3D printing lies in its ability to bring business benefits to organizations, industries and the world. There is a pervasive conversation taking place today about 3D printing, a $3 billion market that includes hardware, software, materials and services. According to Wohlers Report 2013, North America and Europe lead the 3D printing market with 60 percent of the market share; however, it is believed that Asia Pacific region is poised to take the lead in 3D printing in the future.

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There is a pervasive conversation taking place today about 3D printing. From digital manufacturing to a diverse range of materials, the future of 3D printing lies in its ability to create tangible business returns to organizations, industries and the world.

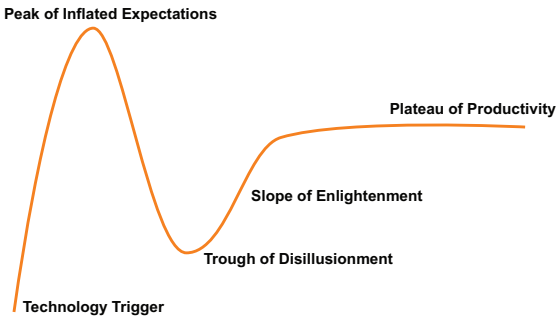
At the same time, one should be consciously realistic about the hype. The industry has experienced two cycles of hype – in the 1990s, claims of rapid prototyping would replace computer numeric control (CNC) manufacturing and in the early 2000s, proclamations that a manufacturing revolution would ensue. Today, CNC is thriving and 10 years after, manufacturing has not been given any game-changing upheaval.

ASIA PACIFIC REGION IS POISED TO TAKE THE LEAD IN 3D PRINTING

According to Wohlers Report released in 2013, 3D printing is a $3 billion market that includes hardware, software, materials and services. This is a relatively small industry but with tremendous potential to grow, and this potential is generating hype.

Hypes are common in technology and may present a negative view by driving expectations to unrealistic levels. However, if one takes a closer look at the inquisitive minds that gathered for Stratasys Asia Pacific 3D printing forum in Japan, each with a desire to uncover the fallacies and drive change.

Gartner's hype cycle presents the maturity and adoption of technologies in a graphical manner. Aided by consumer interests in personal machines, 3D printing is enjoying massive media attention, which might have possibly led to inflated expectations of the hype cycle. When reality sets in the posthype era, practical applications would take over and the technology reach to stable maturity. This is where 3D printing is at today. The visions of the future are possible, but some of them might actualize sooner than the others.



he hype of 3D printing has reached the peak of inflated expectations on the Gartner Hype Cycle.

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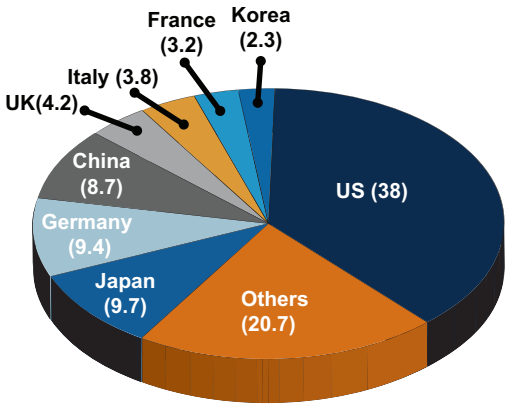
According to Stratasys, the majority of 3D printing applications are in product development while the rest is in manufacturing. Manufacturing does not only refer to finished goods, but also the various tools used in the process.

It is clear that product development is the foundation of 3D printing's focus today, while manufacturing presents a future that is possible for 3D printing industry.



Source: Wohlers Report
Locations of market share for 3D printing

Wohlers Report indicates that North America and Europe lead the 3D printing market with 60 percent of the market share. It is not a surprise as these markets were early adopters of 3D CAD, which provides the necessary fuel for 3D printing; coupled with a fickle market that relishes product innovation accelerating product development.

However, if one takes a closer look, Asia Pacific is the key region for potential 3D printing adoption, primarily dominated by South Korea, China and Japan, which currently contributes to 21 percent of the market share. This growth potential is supported by an extensive industrial base, supportive government policies and funding in research and development those countries provide, while both Japan and China are noteworthy in terms of government initiatives and rapid growth in this field.

Japan accounts for 9.7 percent of the market as it was an early entrant in the 3D printing market. Today, Japan is a global leader in metal sintering, which is a hybrid platform for milling and additive manufacturing. Through Technology Research Association for Future Additive Manufacturing (TRAFAM), Japan's focused efforts in research and development coupled by commercial

3D printed injection molds and prototype

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initiatives driving for 3D printing adoption among small and medium enterprises, the country has a definite opportunity to take leadership in 3D printing.

COMPLEMENTARY MANUFACTURING SOLUTION

3D printing is not here to upset or replace existing technologies. Rather, it serves as a value-added complementary solution to existing methodologies. 3D printing revolutionizes the manufacturing landscape by changing the ways things are made, in a faster and more cost-effective approach. The key is to set different goals and expectations.

Prototyping is an exceptional example on how 3D printing has provided alternatives. 3D printing has not replaced CNC but the level of prototyping work has lifted the production volume driving overall growth.

3D printed hand rest for aircraft seats

This evolution will continue, producing impressive growth and rewarding gains. Consider the current 3D printing market of $3 billion with the assumption that $1.5 billion is in hardware. With a 25 percent year-on-year growth, the industry will reach $15 billion by 2022 – this is a very sizable and attractive market.

The progress of the machine tools industry is a microcosm of the future of 3D printing. The industry of machine tools is evolving with a diversity of tools. Costs will not plummet and in fact, costs will remain the same in certain classes. Today's dynamics in 3D printing will mimic the evolution of the machine tools industry.

The market opportunities and promising potential have expanded the 3D printing technology by attracting new entrants, representing different technologies providing an impressive array of solutions. This is a typical hourglass shape where it balloons outward as research labs, start-ups explode onto the scene. Naturally not all these technologies will stand the test of time and soon, market contraction begins and only the most robust of technologies will survive, presenting the best characteristics to most companies.

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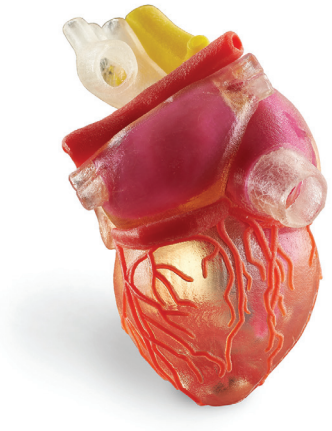
It's easy to be distracted by new technologies but there are practical sound solutions such as those offered by the 3D printing industry. As the industry moves forward, there will be advancements in throughput, quality, more balanced systems with a blend of quality and performance. There is no single answer to every issue, and there will be a need to combine different solutions and leverage hybrid platforms emerging to address the plethora of requirements.

Applications are usages; Stratasys offers 3D printing solutions suitable for different industries and applications, such as aerospace and medical industries. As the industry continues to mature, 3D printers will follow, offering technologies unique to each industry for varied applications.

MATERIAL ADVANCEMENT IS KEY GOAL

The key to success for 3D printing is material advancement, for this is the top request from all users. Customers have demanded a broader range of materials, and the industry has produced advancements in both the quantity and quality of materials. For example, Stratasys offers a comprehensive range of FDM® and PolyJet™ printing materials with different texture, agility, tensile strength, hardness and opacity, plus a palette of colors.

No other class of technology processes such a broad range of materials. Envision a future that leverages additive manufacturing processes to make parts with materials that cannot be processed in any other way. With these new materials, additive manufacturing will not be a substitute. Instead, it will be an alternative with its own set of rules. Revolution and disruption will happen at that point in time when there are materials of superior quality that can only be found on 3D printers. While phenomenal developments will occur, there are already examples on the power of additive manufacturing in the area of



3D medical model printed with PolyJet materials

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materials. Connex™ technology can print parts with more than one material, but while these 3D printers can do gradient colors, there is no CAD tool nor the Finite Element Analysis (FEA) capability to keep up.

The key area of 3D printing that is most exciting is surely in education and knowledge. The claims are that 3D printing can produce anything, but the majority of users do not know how to leverage the technology. It is experiential-based learning, on-the job training, which makes a huge barrier blocking the adoption of 3D printing.

Also, the quest for lighter, stronger materials with the least cost will happen. Just step aside and look at technology in a different light; don't chase after cost and time for a single part, but start afresh to find out addictive manufacturing's unique qualities.

Note: Figures stated in this article are quoted from Wohlers Report 2013 unless otherwise specified.

BMW 3D printed this tool using FDM technology.

CHANGE IS NECESSARY

“Doing differently” is the operative phrase in 3D printing. The key to make 3D printing successful is to be conservatively aggressive in planning for today, and act for tomorrow. Keep an inquisitive mind and gather what is applicable today.

Change could be challenging, changing the rules or the objectives to make additive manufacturing a superior alternative means that there are some risks to fulfil its potential. With this, the industry will see 20 to 40 percent year-on-year growth, especially in Asia Pacific and Japan.

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