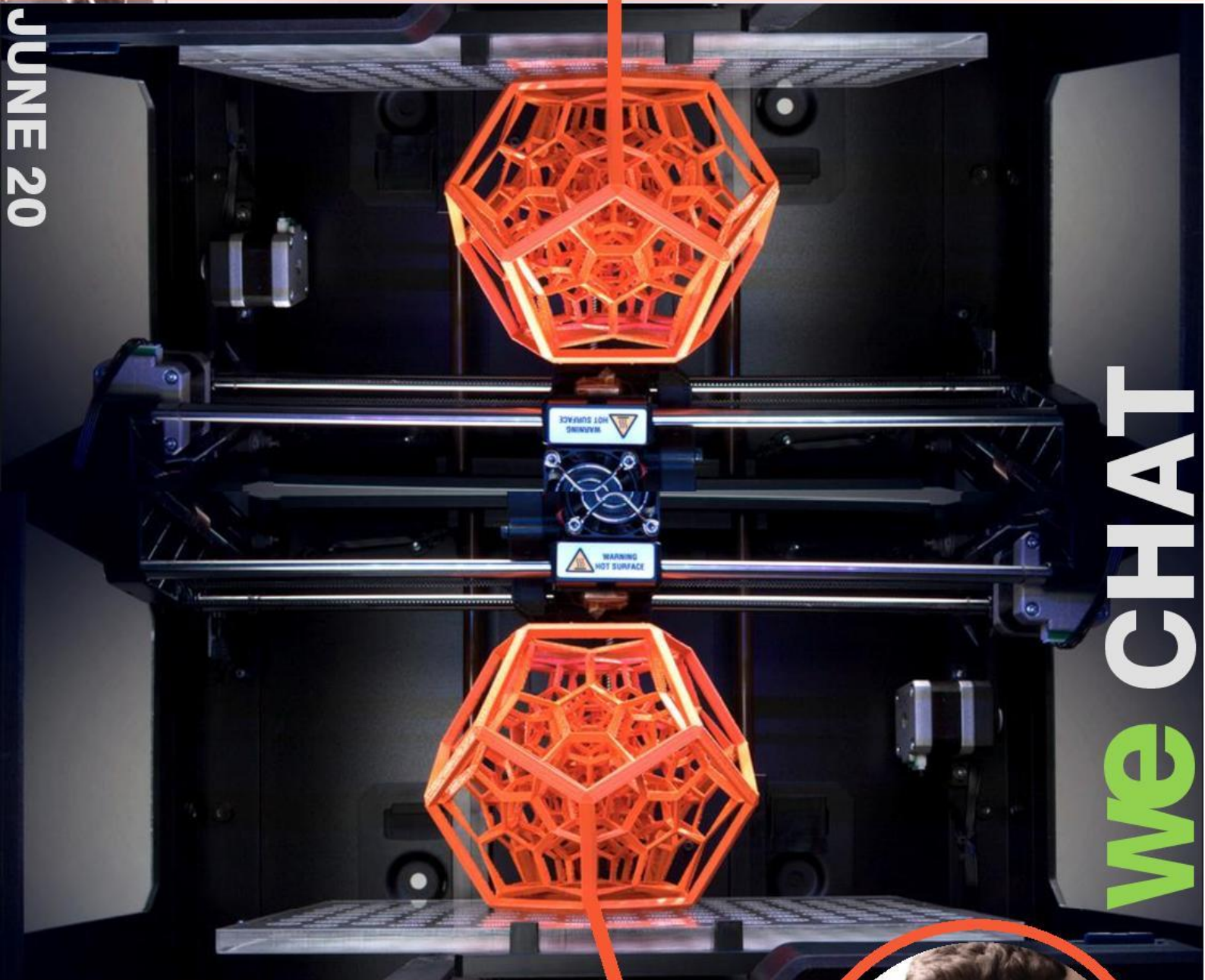




# 3D PRINTING

JUNE 20



we CHAT



**Mr. Rahul Chandalia**  
Founder & Director, WOL3D

# ABOUT US



## OUR VISION

**“To nurture thought leaders and practitioners through inventive education”**

## CORE VALUES

**Breakthrough Thinking and Breakthrough Execution**

**Result Oriented, Process Driven Work Ethic**

**We Link and Care**

**Passion**

*“The illiterate of this century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.” - Alvin Toffler*

At WeSchool, we are deeply inspired by the words of this great American writer and futurist. Undoubtedly, being convinced of the need for a radical change in management education, we decided to tread the path that leads to corporate revolution.

Emerging unarticulated needs and realities require a new approach both in terms of thought as well as action. Cross-disciplinary learning, discovering, scrutinizing, prototyping, learning to create and destroy the mind’s eye needs to be nurtured and differently so.

We school has chosen the ‘design thinking’ approach towards management education. All our efforts and manifestations as a result stem from the integration of design thinking into management education. We dream to create an environment conducive to experiential learning.



## MESSAGE FROM THE DIRECTOR

Dear Readers,

It gives me great pride to introduce SAMVAD's edition every month. Our SAMVAD team's efforts seem to be paying off and our readers seem to be hooked onto our magazine. At WeSchool we try to acquire as much knowledge as we can and we try and share it with everyone.



**Prof. Dr. Uday Salunkhe**  
Group Director

As we begin a new journey with 2019, I sincerely hope that SAMVAD will reach new heights with the unmatched enthusiasm and talent of the entire team.

Here at WeSchool, we believe in the concept of AAA: Acquire Apply and Assimilate. The knowledge that you have acquired over the last couple of months will be applied somewhere down the line. When you carry out a process repeatedly it becomes ingrained in you and eventually tends to come out effortlessly. This is when you have really assimilated all the knowledge that you have gathered.

At WeSchool, we aspire to be the best and to be unique, and we expect nothing but the extraordinary from all those who join our college. From the point of view of our magazine, we look forward to having more readers and having more contributions from our new readers.

SAMVAD is a platform to share and acquire knowledge and develop ourselves into integrative managers. It is our earnest desire to disseminate our knowledge and experience with not only WeSchool students, but also the society at large.

**Prof. Dr. Uday Salunkhe,**  
Group Director

## FROM THE EDITOR'S DESK

Dear Readers,

Welcome to the July Issue of SAMVAD for the year 2020!

SAMVAD is a platform for “*Inspiring Futuristic Ideas*” and we constantly strive to provide articles that are thought provoking and that add value to your management education.

With courses pertaining to all spheres of management at WeSchool, we too aspire to represent every industry by bringing you different themes every month. We have an audacious goal of becoming the most coveted business magazine for B-school students across the country. To help this dream become a reality we invite articles from all spheres of management giving a holistic view and bridge the gap between industry veterans and students through our WeChat section.

The response to SAMVAD has been overwhelming and the support and appreciation that we have received has truly encouraged and motivated us to work towards bringing out a better magazine every month.

We bring to you the June 2020 Issue of SAMVAD which focuses on “**3D Printing**”. Even though 3D Printing is in very early stages in India, it is quickly gaining a lot of momentum; and as management students if we have learned one thing then it's to keep our mind open to new and emerging technologies.

So while there is a lot of ground to cover, we thought we'd begin with what our fellow colleagues think about 3D printing in different domains of management.

We hope you read, share and grow with us!

Hope you have a great time reading SAMVAD!

Best Wishes,

Team SAMVAD.



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# WECHAT

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**Mr. Rahul Chandalia**

**Founder & Director, WOL3D**

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*Team SAMVAD*

**1) Could you please tell us about your journey with 3D Printing? Also, could you tell our audience what 3D printing is in layman terms?**

**Ans:** My journey with 3D Printing started in 2016. At that time, very few people used to know about 3D Printing and 3D Printing was simply considered as paper printing with embossing. The technology was in the nascent stage, with very few involved in 3D Printing. My partner Mr. Pradeep Jain and I visited an exhibition at Mumbai where we saw a 3D printer on display. We were both mesmerized by the machine that built any product from just the design given to it, it didn't need any mold or dye! It was the moment when we realized that this technology was extraordinary, and we decided to venture into our 3D printing startup WOL3D. This is how our journey started.

In layman terms, if I were to explain 3D Printing, you need to imagine a loaf of bread. If you put every slice of bread together in the end, you would have an entire loaf of bread. Every single slice has its height, so if I add together these slices, I get a whole bread loaf. Similarly, in 3D Printing, layer by layer is added one above the other to make a final product. Consider you want to make an Eiffel tower, every segment of a certain height (ranging from 20 microns to 300 microns) is stacked one above the other to finally you get a product-the Eiffel Tower. This is also called additive manufacturing, since layers are added. Initially, traditional manufacturing used subtractive manufacturing, where a more

significant block of raw material was cut and shaped using laser and other cutting methods to get the final product.

For WOL3D, it has been an incredible journey of 3+ years. We started with a small office of 200 sq.ft. in 2016, and today we have expanded to 10 offices pan-India across metro cities like Bangalore, Delhi, Chennai, Dehradun, Kolkata, Pune along with our head-office in Mumbai. We have opted for the franchise model of distribution. WOL3D is more focused on consumer 3D printing, wherein we aim to make 3D Printing so simple that even a child can use it. We desire our 3D printers to reach every home.

The journey so far has been tremendous, and we are looking forward to better things to happen now!

**2) What has been the proudest moment of your career?**

**Ans:** For any start-up, when your work receives an acknowledgment, you feel proud! I fondly remember when my start-up was in its initial phase, as a Welingkar Alumni, I was invited as a speaker for an event in the institute. Such a moment does add a lot of value as I can give back to my alma mater, showcase my work to the students, and motivate them.

Since its inception, WOL3D has received media coverage for our work, like distributing face-shields amidst the COVID-19 pandemic, making

figurines of celebrities, donation drives, and so on. In October 2019, we successfully organized a WOL3D meet where we invited all the 10 pan-India offices to Mumbai to align with the company vision and know each other better. This is an achievement for any start-up, and it makes me feel very proud that we were able to achieve it.

On a personal front, currently, I am the Vice-President of Indian Additive Manufacturing Forum, an association for getting together the people and companies involved in 3D Printing to foster growth and help each other by this community initiative. Looking back, these moments do make me feel proud!

**3) Amidst the Covid-19 pandemic, 3D manufacturing is slowly gaining momentum as we see medical gears being manufactured using this technology. How are 3D printing companies tackling the situation?**

**Ans:** Initially, there was a shortage of ventilator splitter and protective gear, that's when 3D printers came to rescue! The 3D printers at home could easily print face shields to cater to the needs of the community.

If we were to wait for the traditional manufacturing process, a mold would have to be developed first, and then the manufacturing would begin. This process did take some days to get an output. But using 3D Printing, it was just a matter of a few hours to get a design ready, and then the output was obtained in a shorter amount of time. So for the first few days, we can say it was 3D Printing that supported the industry.

WOL3D shared our 3D face shields design on our website, so a lot of 3D printer owners took the initiative to print them and distribute it among their family and local residents. Everyone

did their bit in contributing to society.

Also, during the lockdown, people have started exploring different uses of 3D printers. Recently, a WOL3D printer owner shared with me that they created more than 60 wall arts, while another used it for printing new toys for his son to cure his boredom. Thus, there has been an increase in the usage of 3D Printing for personal in-house purposes.

**4) Does that mean 3D Printing disrupting business?**

**Ans:** 3D Printing is meant to disrupt a lot of sectors, making it easy to innovate and encourages start-up culture. Globally, there has been the adoption of 3D Printing in medical applications for printing organs and bio cells. Most of the manufacturing companies today have started procuring 3D printers. Most of any companies' time and money investments go into R&D and new product designing. Using 3D Printing, the design can be actualized in a shorter time, thus reducing the cost to the company. So 3D printing is a disruptive technology right now, which is improving the time to market for products.

**5) According to you, what are the significant challenges with 3D Printing is facing today?**

**Ans:** Currently, 3D Printing is in a nascent stage. When we started WOL3D, there was a lack of awareness about this technology. However, now due to the Covid-19 pandemic, people have become more aware of 3D Printing and its usage by means of social media coverage.

Another challenge for 3D Printing is the slow speed of production. The traditional mass manufacturing is cheaper and faster in comparison. This can be overcome as and when

the technology matures in the future.

The Government does not recognize the 3D printing industry, so no incentives or promotions are being provided to companies and start-ups in this space. A push from the Government will provide a necessary impetus for the growth of the industry.

**6) WOL3D has quite a young team, could you elaborate on how the work dynamics are different while working with young professionals.**

**Ans:** I have always believed in investing young people as they are the drivers of growth. The average age of my team is just 24-25 years with some team members as young as 19, while a few experienced ones around 35 are also a part of the team. A more inexperienced team is more dynamic and easy to mould.

The idea generation, passion for work, and energy levels are higher for the younger groups. Since they have limited or no prior experience, they have fresh perspectives and are always welcoming to new ideas and thoughts with zeal and enthusiasm. Today's young people are tech-savvy, and this is what businesses need - social media, digital marketing becomes much easier. For us, communication within a young team is easier, and we are now a family. So my recommendation is always to invest in young blood.

**7) How can 3D Printing help in businesses become more sustainable? Is it possible for 3D Printing to replace traditional manufacturing methods?**

**Ans:** Talking about sustainability, additive manufacturing is more suitable as there is less wastage, also, any change can be done easily and

quickly. Thus, inventory and storage costs are not as high as traditional methods.

Technology is improving day by day, but it is complicated to say if 3D Printing will take over traditional manufacturing methods. The conventional manufacturing methods may not be replaced, but there is a possibility that 3D Printing will grow at a faster pace and become better than what it is today.

Consider the process of making 100 face shield masks. Using traditional manufacturing, the cost of making the mould in itself is very high, and when needed for less number i.e. 100 masks, the cost of individual masks becomes very high. Thus, it is not economical in this case.

On the contrary, using 3D Printing, the cost of the masks is very less, thus making it a preferred choice for fewer products. For a WOL3D printer, the electricity consumption is very less, just about 1 unit per hour, and the cost of raw materials is also less reducing overall unit cost. But when the volume increases, traditional manufacturing becomes more economical than additive manufacturing.

So, today 3D printing is suitable for batch production, but in the future may be used for bulk production.

**8) What advice would you like to give to students who would start their careers soon?**

**Ans:** Some of the things which I have learned till now can be summed up in a few sentences:

- Follow your passion and money will follow. There is no point in running behind money when your passion is something else.
- Always try to find a guru in life. It makes your life easy. It's good to have someone to guide and advice you. A guru is a person who won't judge you.



- When you leave Welingkar, make sure you have good mentors. These mentors will help you grow and learn in the industry.
- Grow your network. Your connections from B-School can help you in the future.

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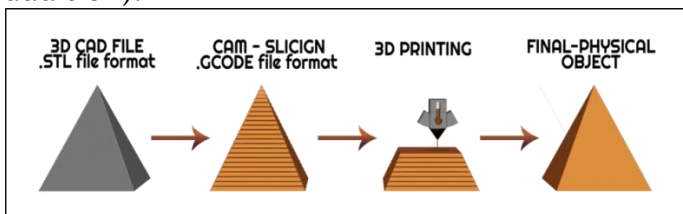
# OPERATIONS

## 3D printing and its Disruptive Impact on Supply Chain of the Future

*Adityan Ethirajan- MBA operations (PGDM 19-21) Birla Institute of Management & Technology, Greater Noida, UP.*

### Introduction of 3D Printing:

3D Printing is a method of creating 3 Dimensional objects using 3 D printer. It also called additive manufacturing (layer by layer addition).



Source – My3Dconcepts.com

### Steps –

1. Creating a 3D drawing file in the system using Solid works, AutoCAD Etc.
2. Slicing 3D drawing layer by layer using software's Cura, 3Dprintos, etc.
3. Uploading the slices file to a 3D printer for Printing.
4. Final 3D solid object.

**Material** – The material state has to be molten or liquid state for printing every side and angles.

**Material Used** – Plastic, Melted powders (metals), resins, Graphite, etc.

### How will 3D printers affect the Supply Chain of the future?

Supply Chain is a network between Suppliers – Company- Customers. A proper supply chain consists of 5 Sectors.

1. Planning – Forecasting demand
2. Procurement – Sourcing materials for manufacturing
3. Manufacturing process
4. Warehousing – Storage & Inventory
5. Logistics – Both Inbound and Outbound



Source- innovecs.com

### 1. Planning / Forecasting Demand

- Any company has to forecast or predict demand for optimum production (to reduce cost, wastage, defect, etc.)

**Scenario (1)** – Various cars manufactures in India like Maruti Suzuki, Hyundai, etc. forecast demand for various quarters of the year, and they produce cars based on forecasted demand. For the past few years in India, demand for cars had reduced and as a result, Maruti Suzuki had to reduce the production of cars (the year 2019).

**3D Example (1)** – Blade is a Supercar manufactured by Divergent Micro factories, and it took around 2 days for manufacturing the entire car by 3D Printing.

- Consumer demand can be met by almost immediate supply with customer desired customization.
- Since 3D Printing reduces manufacturing time (lead time) drastically (with required quality), hence 3D Printing minimizes the need to forecast demand drastically.



*Divergent Blade Car Chassis  
Source – 3dprintingindustry.com*

## 2. Procurement

- It is the process of sourcing various goods (Input materials) for manufacturing from multiple vendors.

**Scenario (2)** – Imagine constructing 2600 square feet office – It requires various materials like cement, concrete, steel beams (for pillar), Plywood (shuttering purposes), etc. Various Machinery equipment's - Transit mixture, Boom placer, Hydra & cranes for erection.

- All these items must be procured from various vendors. Based on the profit impact & supply rate, multiple vendors have to be appropriately categorized (bottleneck supplier, Strategic supplier, etc.). And all the vendors have to be adequately managed during project time.
- Various equipment must be hired at optimum rent. A quotation must be taken

from multiple vendors, and a proper hiring contract must be signed.

- Entire project time would time around (6-8) months.

**3D Example (2)** – 2600 Square feet 3D offices are constructed in Dubai by Gensler within 48 days.

By using 3D Printing, the number of vendors reduces drastically, and hence vendor management becomes significantly easier.



*3D printing office, Dubai; Source-lifegate.com*

## 3. Manufacturing

- Any industry has a manufacturing process for converting input (raw materials) to output (Final product).
- A manufacturing process uses both humans (workforce) and machines for manufacturing goods.

**Scenario (3)** – Shoe manufacturing company has 4 processes. Once the design of the shoe is finalized, selection of material (stamping), cutting of shoe parts (based on cold die manufacturing), stitching of various shoe parts (upper part, lower part, and sole) & assembly of shoe parts.

- Majority of sewing and cutting is performed by man and machines together.

**3D Example (3)** – In 2019, Adidas manufactured a 3D printed shoe called Y3-4D runner.

- 3D Printing has made the manufacturing

process highly automated (minimized human interaction). Since humans are not involved in the manufacturing process, there is no human error, and hence wastages have also reduced.

Hence 3D printing introduction in the manufacturing process is essential for achieving Lean manufacturing (minimizing waste and maximizing productivity)



Source- [3dprintingindustry.com](http://3dprintingindustry.com)

#### 4. Warehousing

- Various companies use warehouses for storage of inventory – reduce the delivery time to customers.

**Scenario (4)** – Various furniture based companies like IKEA, Home Centre rely heavily on warehousing concepts. These companies use a unique warehouse management system to track the various inventory at different warehouses. Each item at multiple warehouses should have safety stock.

- These companies use RFID tags (from 2016) to ensure that once inventory level reduces below safety stock, the supplier is automatically intimated to deliver products to IKEA.

**3D example (4)** – Ashley Furniture is an American company that uses 3D Printing for furniture. It was able to manufacture complicated design furniture with full customer customization.

By using 3D technology, companies can reduce inventory drastically hence reducing the need for warehouses.



Source- [3dprintingindustry.com](http://3dprintingindustry.com)

#### 5. Logistics

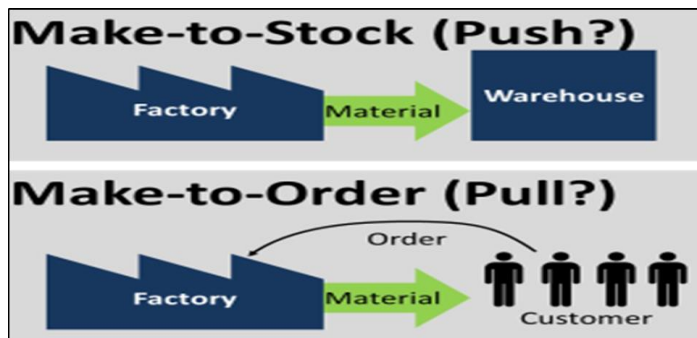
- Logistics is one of the critical components in the supply chain. There are two types of logistics Inbound and outbound.
- **Inbound Logistics** – Delivery of raw materials from the supplier to the manufacturer. Implementing 3D Printing reduces the number of suppliers drastically (as told under procurement); hence more efficient logistics can be applied (as vendors are few).
- **Example (1)** -China is a crucial player in the entire global supply chain, now by implementing 3D printing companies can manufacture at home hence reducing global shipping volume ( air freight and sea)
- **Outbound Logistics** – Includes delivery of finished goods to customers (via warehouses). Implementation of 3D Printing will reduce the number of warehouses and inventory levels, also thus reducing transportation volumes (Motor/road-based).
- Only reverse logistics (delivery from customer to manufacture due to defect, warranty, etc.) will be present not affected by 3D Printing.
- In the future, there would only be express logistics in outbound that is finished product



would be directly transported from the manufacturing plant to the customer.

## Conclusion

- From various examples (scenarios), we can deduce that the implementation of 3D Printing will completely revolutionize the supply chain in the majority of manufacturing sectors.
- It will change the business model from push (made to stock) to pull (made to order) based model.
- It will improve Supply chain transparency (customers can monitor the supply chain process – due to low lead time)



Source – [allaboutlean.com](http://allaboutlean.com)

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# FINANCE

## Financing 3D Printing and Gauging its Profitability

*Nikita Paunikar - MBA, – Department of Management Science, SPPU (PUMBA), Pune*

3D printing or Additive manufacturing is the process of making 3-dimensional objects from a digital file stored on a computer. For this, one needs to build a 3D model, scan it using 3D modeling software, and then print it. 3D Printing Industry is at a very early stage in India. Not many are accustomed to the concept of 3D printing technology. Thus, the lack of awareness of this industry in the market is the primary cause, which is hampering its advancement. Also, our country lacks a proper ecosystem that is required by the 3D printing industry to flourish.

The technology used for 3D printing is FDM (Fused Deposition modeling), SLS (selective laser Sintering), EBM (electron beam melting), and many others. Of all these, EDM dominates the segment.

There are many challenges in this industry. The printers that are required for 3D printing are way too expensive. One printer cost around INR 1,20,000 (\$2000). Moreover, these printers are not manufactured in India and need to be imported. Also, there is no single compelling application or software for 3D printing. A lack of all the factors mentioned above makes it difficult for entrepreneurs to invest here. Investors in India are often observed to play safe.

They prefer investing in business models which are copied from the Silicon Valley. And unfortunately, 3D printing is in a nascent stage from this perspective.

In 3D printing technology, India accounts for only 3% of total units installed across Asia-Pacific region, whereas China contributes 35% and Japan more than 30% towards this sector. It

is being estimated that the 3D printing market in India will cross \$79 million by 2021. According to a report by Allied Market Research, the global 3D printing industry is expected to show a CAGR of 21.8% in the period 2019-2025 by reaching \$44,393 million.

This sector can be very profitable for a country like India, where there are many fewer players in the market. There can be multiple segments were in this business, like- 3D printing of prototypes and models, Industrial 3D printing, 3D printing on-demand with service and help, 3D scanning, Creating 3D printers, etc.

For financing the 3D industry here in India, investors need a proper guarantee of the business. Many investors are waiting for the industry to develop an efficient ecosystem. Investors need an appropriate team for the business, they need a value proposition, and they need to end customers for their products to sell. Many angel investors and venture capital funds are ready to invest in this sector, provided the manufacturing cost lowers so that the business will be able to make some profit. For example, a Bengaluru based Start-up Fracktal works is funded by 1 Neoteric technology solutions and Hyderabad angels. The Start-up was commenced in 2014.

A Start-up named Morphedo, based out of Delhi is supported and incubated by Nexus, an international incubator established in India jointly by the US government and the University of Texas. It is also recognized under the Startup India scheme by the Indian government.

The most important thing that this industry needs right now is money. Once that bounces in,

this industry will flourish. As it is an untapped market, it doesn't have any competitors as of now. Investors will start financing this industry once the materials required for the manufacturing building in India. Many big firms like Wipro 3D is working to build India's first industrial-scale 3D printing machine. Its cost will range from INR 80,000- 1.2 Crore, depending upon the size and technology. The government has also sponsored 3D printing by INR 10 Crore for rapid prototyping related machinery under 'Atal Innovation Mission.' When such things happen, investors get a guarantee, and also it motivates them to invest in such an industry.

The benefits of this industry are immense. The 3D printing process allows for customization, and it reduces complexities. Also, the 3D printing industry is emerging as an energy-efficient and environment-friendly industry. It utilizes up to 90% of standardized materials and hence produces less waste. This industry is useful and comes in handy for other sectors as well.

It assists in the medical industry, automotive, jewelry, aerospace, art, design, sculpture, for making prosthetics, toys, gifts, Architecture, fashion, food, consumer, etc. A 3D printed sculpture called 'Jhada' can be seen at the Mumbai airport. This sculpture is made of fractal works.

As seen, there are many new opportunities in this sector, and thus, getting investments from investors will become easier. There will be many businesses supporting the 3D printing industry in India. The profitability, as discussed earlier, will be massive once the market starts to flourish.

Yet, according to experts, it is before 3-4 years that 3D printing emerges as an indeed world-class sector in India. Till then, the investors here will have to start taking risks and start investing in such business models, which have huge profit potential and scope of acquiring a significant share in the market. Financing the Indian 3D

printing sector can prove beneficial not only to one but many other industries as well.

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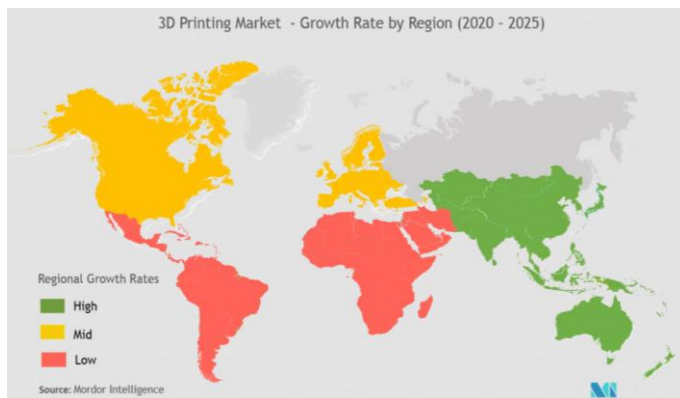
# MARKETING

## Use of 3D printing in Promotional Marketing

*Isha Katurde, MBA (2019-2021) - Marketing, Institute of Management Technology (IMT), Nagpur*

With the largest market in North-America and the Fastest growing Market in Asia-Pacific, 3D printing, also known as Additive Manufacturing (AM), has been around since the 80s, but its advent has been recently in the 2010s. Remember the tortoise and rabbit race? The tortoise here is 3D printing, and the rabbit is the Large scale manufacturing industry. We can rest assured as the tortoise will eventually accomplish the race.

The Indian market has started to understand 3D printing, but we can also see massive growth in the International markets. The 3D printing market was valued at USD 13.7 billion in 2019 and is expected to reach a value of USD 63.46 billion by 2025, at a CAGR of 29.48% over the period 2020-2025.

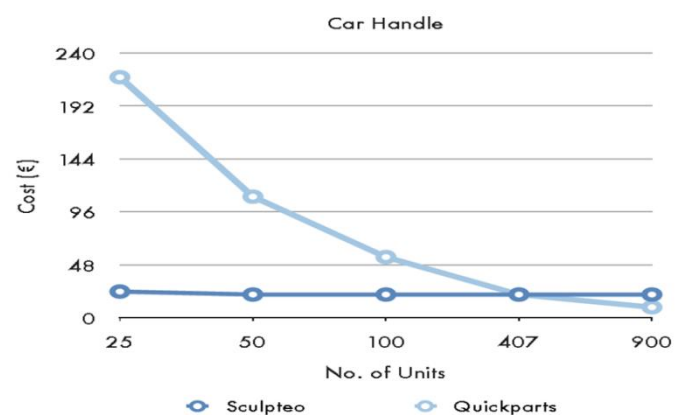


### Why Is 3D printing growing?

In an era of sustainability and customization, 3D printing fits in perfectly. It has the following advantages: manufacturing complex parts, easy customization, cheap small scale production, fast production, and reduced waste.

With the availability of various types of printers and technologies like Stereolithography (SLA),

Digital Light Processing (DLP), Fused Deposition Modeling (FDM), etc. 3D printing has benefited industries like the aerospace, automobile, gifts and toys, jewelry making, etc.



In the image, **Sculpteo**: 3D printing company  
**Quickparts**: Injection Modeling company

### 3D printing and Promotional Marketing

A personal touch always wins the customer's heart, and that is how big brands like Coca-Cola have achieved a stronghold over their customer base. Promotional marketing is a method to generate interest and awareness regarding a brand or a product, increase sales, or to create brand loyalty.

A few companies have effectively reached their customers through a perfect blend of personalization and promotions.

**Coca-Cola:** To introduce its mini bottles in Israel in 2013, Coca-Cola invited its customers to develop their digital mini versions and nurture them like a Tamagotchi(Sims). Whoever took the best care of their digital mini versions were invited to the factory, and their mini versions were 3D printed as a giveaway.



**IKEA:** Considering long sitting customers (gamers), IKEA collaborated with San Francisco-based prosthetics firm UNYQ to develop the "Ubik" chair. A scan of the customer's body is taken at the store when they purchase a Ubik chair. This scan is then used to 3D print a chair that ergonomically suits the customer and gives them a comfortable sitting, especially for long working hours.

**Nescafe:** It 3D printed the lids of the coffee jars and inserted an alarm system that would wake up its customers every morning. The tagline was "Wake up and smell Nescafe." The motive behind 3D printing the lids was to do the designing parallel with the production to make minor changes quickly and design the perfect cover for customer comfort.

### Why these Brands used 3D printing?

Coca-Cola made use of Personalization by 3D printing mini versions of its customers and using it as a giveaway for its mini bottle promotions. 3D printing is cheap (small-scale production) and is easily customizable. Also, according to research by Promotional Products Association International (2017), about 82% consumers like receiving a promotional product, after receiving the promotional product 85% consumers are more likely to do business with the company and almost 58% consumers keep a promotional product with them for 1-4 years. This ensures a lifetime of fixed customers and good Mouth Marketing.

IKEA puts forward customer comfort by providing customizable designs with 100% personalization. IKEA's mission is "to offer a wide range of well-designed, functional home furnishing products at prices so low that as many people as possible will be able to afford them." This is provided by 3D printing at low-cost production, customizable designs, and fast production for quick delivery.

Nescafe took advantage of 3D printings adaptable designing to develop a lid having an

alarm system with which a customer can easily open the jar. Thus less cost and attractive packaging.

### Promotional Ideas

- EduTech Companies like Byjus can use prototypes of, for example, molecular structures of benzene and diamond as promotional products. These prototypes will have a QR code, which on scanning opens a YouTube video that explains the molecular structure- thus promoting the EduTech brand.
- Toys manufacturing companies like Lego, Barbie, and also retailers like Hamleys can provide custom-designed toys by delivering an interactive design interface for kids and getting those designs 3D printed.
- Billboards can be 3D printed for promotional advertisements, for example, TV ads for Samsung.
- Lenskart and various accessories companies can allow their customers to design their accessories; for example, the frame of spectacles can be designed on the spot with a ready to fit the glass.
- Cadbury, Ferrero Rocher, etc. can also work on similar lines by custom designing their chocolates.

### Covid-19 and 3D printing:

Many companies can promote their brand's care for their customer by 3D printing their products locally. A lot of care with hygiene has to be taken in delivering products from distant locations. If 3D printers are fitted into the Brand's retail shop, the company will have to share the design on the cloud and get the product printed locally for the customer, just like astronauts in ISS 3D print tools not available with them.

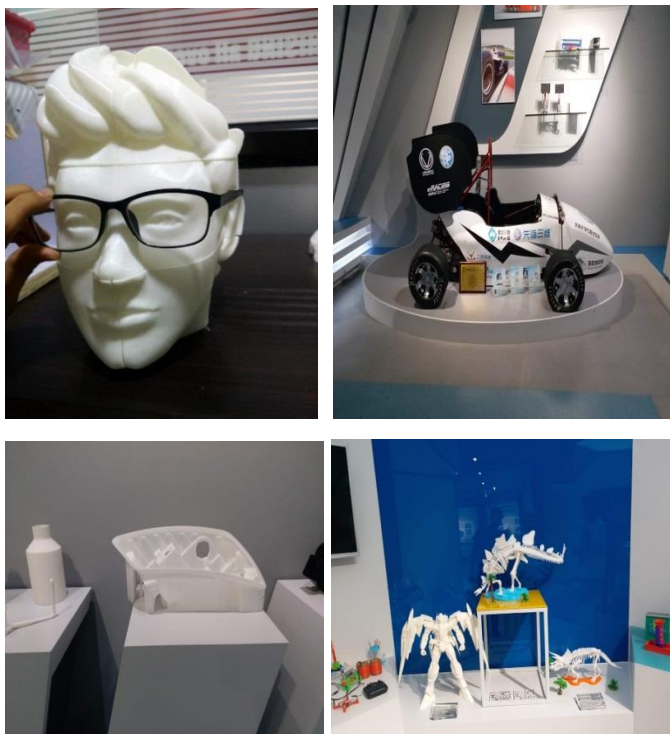
This will save on a lot of time and finance while

taking care of the customer's health.

## Conclusion

3D printing is a promising technology, albeit the slow growth rate in its popularity. Through it, a brand can promote itself or its products by manufacturing personalized and customized products that form a long-time impression on their customers. In the challenging times of pandemic, brands can use 3D printing to promote their values. Thus a profound thought over 3D printing can highlight its importance in promotional marketing. As Sean Gerety says, "The technology you use impresses no one. The experience you create with it is everything".

Below are some pictures from my 3D printing expeditions:



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# HUMAN RESOURCES

## Recruitment and Hiring Challenges in the 3D Printing Industry

*Mansi Kapoor- MBA HR 2019-2021, NMIMS Mumbai*

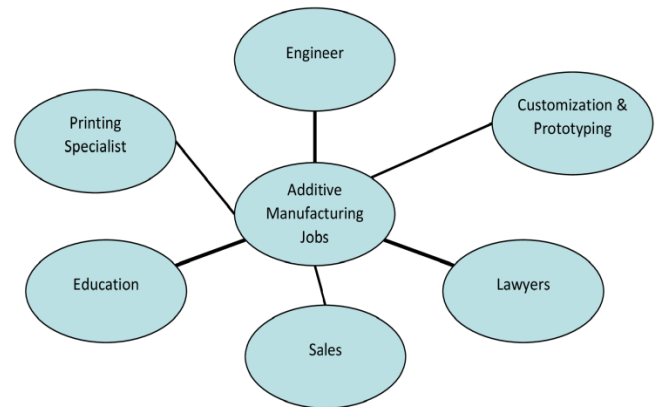
About two days ago, I came across a piece of news "HP's 3D printing will help print over 1 lakh ventilator parts". In challenging times like these, where survival is the only mission, and rapid manufacturing is the hope, such headlines feel like bliss to an otherwise "Nth Lockdown Day."

The 3D Printing industry has moved beyond rapid tooling and prototyping. It works on the principle of "Additive Manufacturing," which is not bound by the shackles of restricted design, flexibility, and economies of scale. Each unit is independent and can be customized according to the needs, which is simpler because it works on additive methodology as opposed to the subtractive traditional manufacturing system.

Any industry, especially after midway into 2020, has realized that reduced storage, warehousing, and workforce will not just be about saving huge costs as a luxury but a necessity to keep the business running- because everything has revamped to an on-demand or agile philosophy.

The 3D printing industry has its benefits across all the domains ranging from aerospace to healthcare, supplying customized and on-demand products in half the duration taken by a traditional manufacturing unit. With the prediction of a rise of 42% in the volume of industrial automation and robotic sales in the US, the benefits of this industry cannot be questioned. The question is, "Do we have the skills for this rapid change?"

**Scope of the skills required in the 3D Printing industry** Let us have a quick look over the types of jobs/sectors that can be associated with this industry.

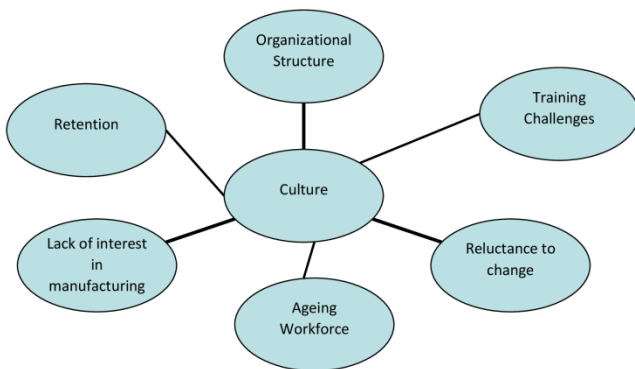


Anyone with an eye for accuracy and detail and having decent qualifications to suffice for the above roles can be a part of the 3D printing industry. For designers and engineers, a familiarity with Computer-aided design (CAD) is required. People involved in providing solutions need to remain abreast of the new technological advancements along with sound mathematical precision of advanced mechanical engineering. The education sector is of utmost importance, even if not directly related. This sector will be required to act as a platform that will bring students and industry experts together to spread awareness about the success of this technology. These students, if given proper industrial training, will pave the way for sound R&D practices in this arena. Coming to legal aspects, it will be essential to protect intellectual property. So, lawyers will have to deepen their knowledge along with technical information. Across all the sectors of jobs required in the 3D industry, one requirement remains a necessity- Business knowledge. Additive manufacturing is freedom redefined for the manufacturing industry; all the people employed should be able to use this freedom to bring out the most

feasible and creative solution as per the needs of the business.

### Where is the Gap?

As seen above, there are not very specialized requirements to work in a 3D printing industry. As of now, there are only a few accreditations in 3D printing, which makes academic credentials of little value. Experience in related fields and the skillsets are undoubtedly the desired parameters, but most importantly, what will drive this industry is the desire to change. Let us look at the impediments that hinder recruitment and hiring activities in the 3D printing industry.



Whenever there are instances when there are challenges in recruitment and hiring, they have a direct impact on the organizational culture. It is a bi-conditional relationship, wherein, either the culture is not ready to adapt to the changes, or the changes hamper the culture to attain and retain the talent. The above illustration shows the relationship between the challenges and culture.

**Reluctance to Change:** Organizations have become comfortable with the existing traditional manufacturing practices. There have been instances where poor performance resulted from 3D printers, and when fast output is the only goal, managers feel that the time lost in making engineers learn new software is the time lost in creating new products.

**Lack of Interest in Manufacturing by the Younger Population:** A technology-oriented

industry requires an agile workforce that is capable of adapting the new dynamics. The challenge of the perception of a manufacturing job as dangerous and less secure remains constant. Millennials have contrasting views about professional drivers as opposed to the previous generations, which does not fit into manufacturing jobs.

**Ageing Population of Skilled Workers:** With the current manufacturing workforce ageing fast, it has resulted in a massive skilled-employee vacuum in the industry.

**Domain Expertise:** Additive manufacturing is not a field that can thrive in silos; it comes with a multidisciplinary aspect. Everything is so tightly coupled that perspectives will need to come from domain knowledge. An engineer should know the business to bring the best designs; a lawyer should know the trends to protect the intellectual property, just the qualification is not enough.

**Training Challenges:** There is a shortage of AM specific training programs across institutions. Along with the lack of STEM (Science, Technology, Engineering, Mathematics) related skills in the manufacturing market, there is a shortage of training programs that can incorporate these. This can also be a result of lack of exposure to AM related technologies by the instructors.

**Organization Structure:** Employees in AM need to adapt to the best practices globally and network of supplies. Hence the organization structures should be such that can support cross-functional culture. One such example can be a Holocratic organization structure that distributes the power of decision making, thereby empowering every employee to do what they do best.

**Retention Challenges:** This again goes back to the millennial perspective, where they tend to be more attracted to the organization that pays them better. Coupled with total rewards, lack of



skill-enhancing training also impedes the retention rate of employees in the manufacturing industry.

To sum up, the challenges are not skill-specific, they are more of perspective and culture driven. If the country wants to become self-reliant, its youth must realize the importance of manufacturing. Diminishing the contribution of the manufacturing sector and increasing dominance of the service sector will serve no good. AM requires a combination of technical, managerial skills where the engineers are creative, resourceful, and ready to figure things out- this will ensure a speedy recovery of bridging the skill gap. Organizations can work towards agile workforce planning, where they collaborate with the industry experts to identify the skills and the differences and increase proactive training in this field. We should remember that it all begins with "A desire to bring about a change"!

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# GENERAL MANAGEMENT

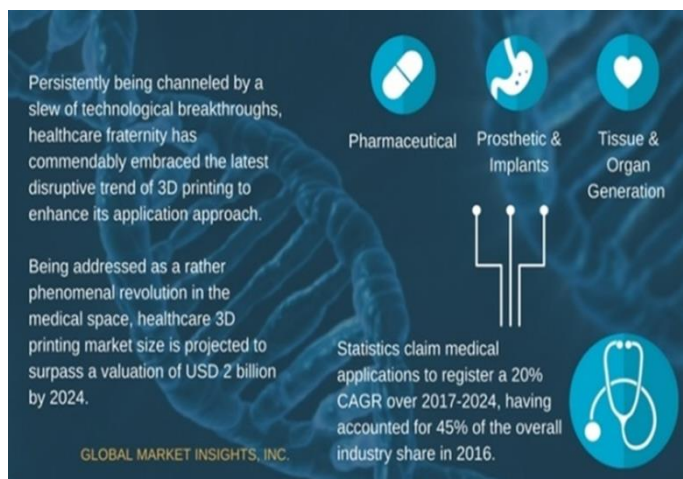
## Impact of COVID 19 on the 3D Printing Industry

*Anushka Bajpai & Milind Gupta – PGDM- Business Analytics, NMIMS Mumbai*

In March 2020, the novel coronavirus spread rapidly across the world. As we wait for scientists to develop a vaccine for COVID 19, social distancing has come across as one of the best measures to contain the spread of the virus or at least flatten the curve. Also, rapid and widespread testing was of the utmost importance to curb the infection. But there were many problems. One was a lack of test swabs. As the number of infections increases worldwide, the mass production of low-cost medical equipment has become the need of the hour.

Traditional ways of manufacturing are high in standard times, but a pandemic is different. With the spread of the virus, the demand for testing had so overwhelmed supply, that even people with symptoms of COVID 19 could not get tested, which meant no one knew how many people had the virus or what the safe path to open the economy would look like.

Also, there was a massive insufficiency of protective medical gears for healthcare professionals and other frontline workers. Traditional manufacturing works slowly, and this was when a new industry like 3D Printing began tackling the shortage.



### What is 3D Printing?

It is a manufacturing technique that builds three-dimensional objects using digital files. It starts with a 3D model that can either be created or downloaded from the 3D repository. It is an additive process that establishes the model layer by layer. The material used is plastic, as it is cheap and easy to use. With all of the non-essential manufactures closed during this crisis, many of these printers were now available to print items that are essential, like the nasal swabs, face shields, masks, and PPE kits.

To aid this demand gap, the 3D printing community has come together to tackle this problem and save the lives of many. Origin, Carbon, Desktop Metal, Formlabs, HP, and other 3D printing companies started working on this effort to ramp up the production of this critical medical equipment. One advantage of this technique is that the devices can be produced in bulks at a pharmaceutical manufacturing facility. The digital design file can be passed on to hospitals that have its printers to print demand.

### The response of leading 3D printing Companies to Combat the Pandemic:

Many companies try to restructure their production and assembly lines; for the 3D printing industry, it's a mere change of CAD file. Some of the world's leading 3D companies have come together to combat the current supply crisis.

**Desktop Metal** – Ric Fulop, the founder, and CEO of Desktop Metal, had the idea to bring together the normally competitive industry into coalition. He started a website [printedswabs.org](http://printedswabs.org) to act as a clearinghouse for the effort. While

one might think of a swab as a glorified Q-tip, these medical devices are way more complicated than one might think. The tip of the swab should be such to grab a significant enough sample; the neck of it should operate to make it as comfortable as possible for the patient. These are some of the design considerations. The company is providing technology and resources to medical equipment manufacturers to 3D print critical medical parts.

**Stratasys** – 3D printing manufacturing company is using its existing capabilities to address the shortages of safety items like masks and facial shields. The first-ever 3D printed face shield created by the company was supplied to a prominent university that approved its use on campus. Stratasys is also supporting the CoVent-19 challenge, which is an open innovation platform that aims to design low- cost and quickly deployable ventilators.



**Carbon** – The company is working with many medical industry partners and hospitals to print PPE kits, face shields, and test swabs for Covid-19 testing. It joined forces with Verily, the Alphabet company, to develop face shields that can be easily created using industrial 3D printers. The objective is to empower the global 3D printing companies such as HP with designs that can boost the face shield manufacturing capabilities and meet local demand.

**Formlabs** – Under the guidance and support of healthcare agencies, Formlabs is printing face

shields, test swabs, and masks. It has also launched the Formlabs Support Network for COVID-19 Response. It is an initiative where healthcare organizations, government agencies, and other volunteers can work in collaboration on various projects ranging from Covid-19 testing, PPE, and medical devices.



**Materialize** – The Belgian 3D printing company has developed innovative contactless 3D printed door openers. Studies reveal that door handles are most prone to germs in hospitals, homes, offices, and factories. These hand-free door openers would prevent further spread of coronavirus. The company has also shared the design file of these handles for free to contain the infection.



**Roboze** – As the number of infections increases worldwide, more and more people need to be put on ventilators, which makes it very difficult for the existing manufacturing facilities to cope up with this demand. Roboze started printing respiratory valves to be used by Covid-19 patients throughout Italy. The company's 3D parts division produced hundreds of such

printed valves.

The 3D printing industry appears to be on the verge of a breakthrough. Widescale testing would be needed to open the economy safely, and continued testing would be required long after that. Even if other methods of producing the test swabs and other safety devices develop and the existing manufacturers ramp up their capacity, there would still be demand for 3D printed versions of these devices. 3D printing technology can effectively be used to bridge the demand and supply gap for a variety of other healthcare equipment like ventilators, masks, and face shields. The technique is a phenomenal revolution in the medical space and has been readily embraced by the healthcare fraternity. Printing capabilities during this time of crisis could prove to be a turning point for the industry.

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## CALL FOR ARTICLES

We invite articles for the July 2020 Issue of SAMVAD.

The Theme for July month- “**FinTech**”

The articles can be from Finance, Marketing, Human Resources, Operations or General Management domains.

You may also refer to sub-themes on Dare2Compete.

### Submission Guidelines:

- Word limit: 1000 words or a maximum of 4 pages with relevant images.
- Cover page should include your name, institute name, course details & contact no.
- The references for the images used in the article should be mentioned clearly and explicitly below the images.
- Send in your article in .doc or .docx format, Font size: 12, Font: Constantia, Line spacing: 1.05' to **samvad.we@gmail.com**. **Deadline for submission of articles: 18<sup>th</sup> July, 2020**
- Please name your file as: <Your Name>\_<title>\_<section name e.g. Marketing/Finance>
- Subject line: <Your Name>\_<Course>\_<Year>\_<Institute Name>
- Ensure that there is no plagiarism and all references are clearly mentioned.
- Clearly provide source credit for any images used in the article.

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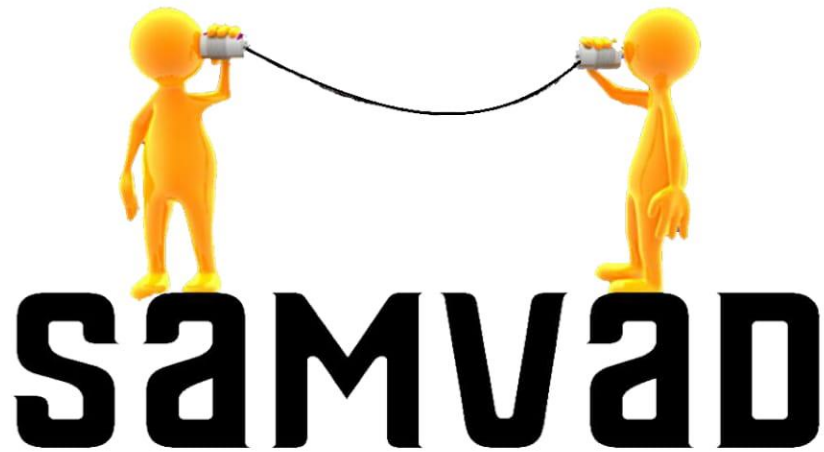
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