

## 3D Printing and its Implications for the Global Logistics Industry

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3D printing also known as **additive manufacturing** was originally developed as an automated method of producing prototypes.

3D Printing has the potential to become the single disruptive phenomenon to impact global industries since assembly lines were introduced in the early 20th Century.

The impact of 3D Printing for the logistics industry was and will still continue to be a most debated topic.



The evolution of new technologies could bring revolution to production techniques which in turn results in significant proportion of manufacturing becoming automated and removing reliance on large and costly workforce, which in turn could lead in reversal of the trend of globalization which has characterized industry and consumption over the last few decades, itself predicated on the trade-off between transportation and labour costs.

For Industries such as the Automotive and life sciences it was predicted that 3D printing would start to become a supplementary way to manufacturing parts which would add new complexity to supporting logistics as it would be necessary to smooth integration.

### Impact of 3D Printing in Global Logistics

In a recently completed study of the potential impact of 3D printing on supply chains, the technology and consulting giant found that a “software-defined supply chain” using 3D printers and open-source designs will usher in a new era of dramatically reduced lead times and lower costs, in part through the elimination of capital investments such as molds, casts and machine tools.

- Goods which are produced in other countries could be near sourced and this will lead to reduction in the shipping and air cargo volumes.
- Reduction in warehouse requirement as because of mass customized products which results in fall in inventory levels as goods are made in order.
- There would be fewer opportunities for logistics suppliers to be involved in companies' upstream supply chains, as manufacturing processes are increasingly re-bundled within a single facility. Tiers of component suppliers are done away with, as is the need for supplier villages, line side supply etc.
- A major new sector of the logistics industry would emerge dealing with the storage and movement of the raw materials which 'feed' the 3D Printers. As 3D Printers become more affordable to the general public, the home delivery market of these materials would increase.
- The service parts logistics sector would be one of the first to be affected. At present billions are spent on holding stock to supply products as diverse as cars to x-ray machines. In some cases huge amount of redundancy is built into supply chains to enable parts to be dispatched in a very short timescale to get machines up and running again as fast as possible. It doesn't take much imagination to understand the benefits for a service parts engineer of being able to download a part design from an online library, 3D Print it and then fit it within a very short time window. This would make global and national parts warehouses as well as forward stocklocations unnecessary to fulfilling customer needs.
- It will accelerate a shift from "push supply chains" to "pull supply chains." With 3D printing, the long production runs for mass production will often give way to limited production runs for customer-driven mass customization and build-to-order products.
- With 3D printing, manufacturing will become more agile and will be better able to react to customer demands. This means there will be less work-in-progress and finished product in transport and in stock and less obsolescence of existing stock. Although the cost per unit may be higher, with reduced storage and less outdated product, the overall supply chain system costs may be lower than that of traditional manufacturing supply chains.

## Opportunities

- The 3D technology enables many new supply chain models such as:
  - **Streamlined logistics model:**Manufacturers use 3D printing at their own sites, reducing inventory levels and warehousing requirements. This is most suitable for items in the inventory "long tail" or where further finishing, assembly or testing is needed before the product or part is shipped.
  - **Customer-managed inventory:** This is an extension of vendor managed inventory model, where suppliers installing 3D printing at customer site, providing software design for products and parts to be manufacture on demand.This model could also see the customer acquire a printer with suppliers providing the design data for the printers to produce on a license or pay-per-print basis.

- **3D printing hub:** Firms will offer a 3D printing service locally or remotely. To cite an example for the same, last year USP announced, it was installing several Stratasys printers at its sites across the USA to provide this service, whereby consumers and businesses can obtain printed products on submission of their design.

These new models, whether partially or fully adopted as the technology matures, will have a tangible impact on the cost and capability of supply chains. Closer provision of parts, such as through installing printers at client sites, will drastically reduce delivery times and increase on-time, in-full and e-fulfillment indices. Supply chain networks will be simplified, with a reduction in warehousing needs enabled by a reduction in inventory levels.

### 3D Evolution & the Future Logistics Company

The biggest change induced by 3D printing may happen in global value chains and logistics. Nobody knows what is really going to happen, but it is wise to keep the eyes open and be ready for change.

The dynamic change in the Supply Chain will lead to the evolution of new type of Logistics Company which will resemble a “4PL”, or service management company. The new logistics company will design solutions which comprises of demand planning, manufacturing, delivery, next market monitoring, service parts management and return and recycle services. In nutshell they will become a company of product life cycle management service provider.

3D printing can change the classic mass-production paradigm that bigger is better, production is global and supply chains are highly complex.

“The global supply chain has been shaped by rules of mass production because the cost of unit production goes down, but with 3D printing that is no longer true.

### Conclusion

If 3D printing takes off, then manufacturing, and consequently global logistics, will be transformed. According to the recent survey the views of the supply chain expert predicts that 3D Printing will play a key role in logistics industries.

As more and more research into the application of the 3D printing becomes available, SCM predicts that it will play a much more prominent role in future supply chains, and it will take less than 10 years for the method to be implemented much more widely.

The Service Parts Logistics industry will be either transformed or decimated by 3D manufacturing – or perhaps both.

With growth in 3D printing it is predicted that some third-party logistics providers will be hard hit (businesses will print what they need). It is also been estimated that by 2020 3D printing and production will comprise up to 20% of the supply chain.

By shaving weeks off manufacturing times and at-home production, this technology may reverse the trend of low-cost global manufacturing outsourcing, distribution (parts warehouses and forward stock locations will become unnecessary), production, and retailing – posing a threat to the global transportation industry. Although many supply networks will likely be altered, it is predicted that some supply chains and distribution networks would remain intact, due to the rapid growth in business and home need for raw materials to feed the 3D printers. Birth of a new logistics sector for storage and movement of these powders and supplies, recycling, and waste disposal is also anticipated.

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