

## Averting Chaos with Dual Supply Chain Management Strategy



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By Ramanan Sambukumar, Vinay Mehta

The potential applications of additive manufacturing are growing by the day. It has evolved from being a mere prototyping tool in the form of 3D printing to securing a more prominent place in the manufacturing process of functional items — from car parts to aerospace components to artificial limbs. New capabilities such as 4D printing, give the potential of producing ‘smart’ products, with shape and characteristic variations in different work environments.

The business community bets big on it. In a survey conducted by Wipro Technologies at the 2014 World Economic Forum in Davos, approximately 200 CXOs were interviewed. 75% of the respondents viewed supply chains as key strategic enablers, while 40% of the respondents said additive manufacturing had already transformed their supply chain thinking or was about to.

Yet, even though additive manufacturing is a disruptive technology, it wouldn't replace the conventional supply chains. It will offer new solutions across the production cycle, ranging from one step prototyping within traditional supply chain to an end-to-end production solution in a segmented supply chain.

As a result, additive manufacturing supply chains will need to work along with the traditional supply chain functions. This calls for a combined supply chain strategy to leverage both the business approaches effectively.

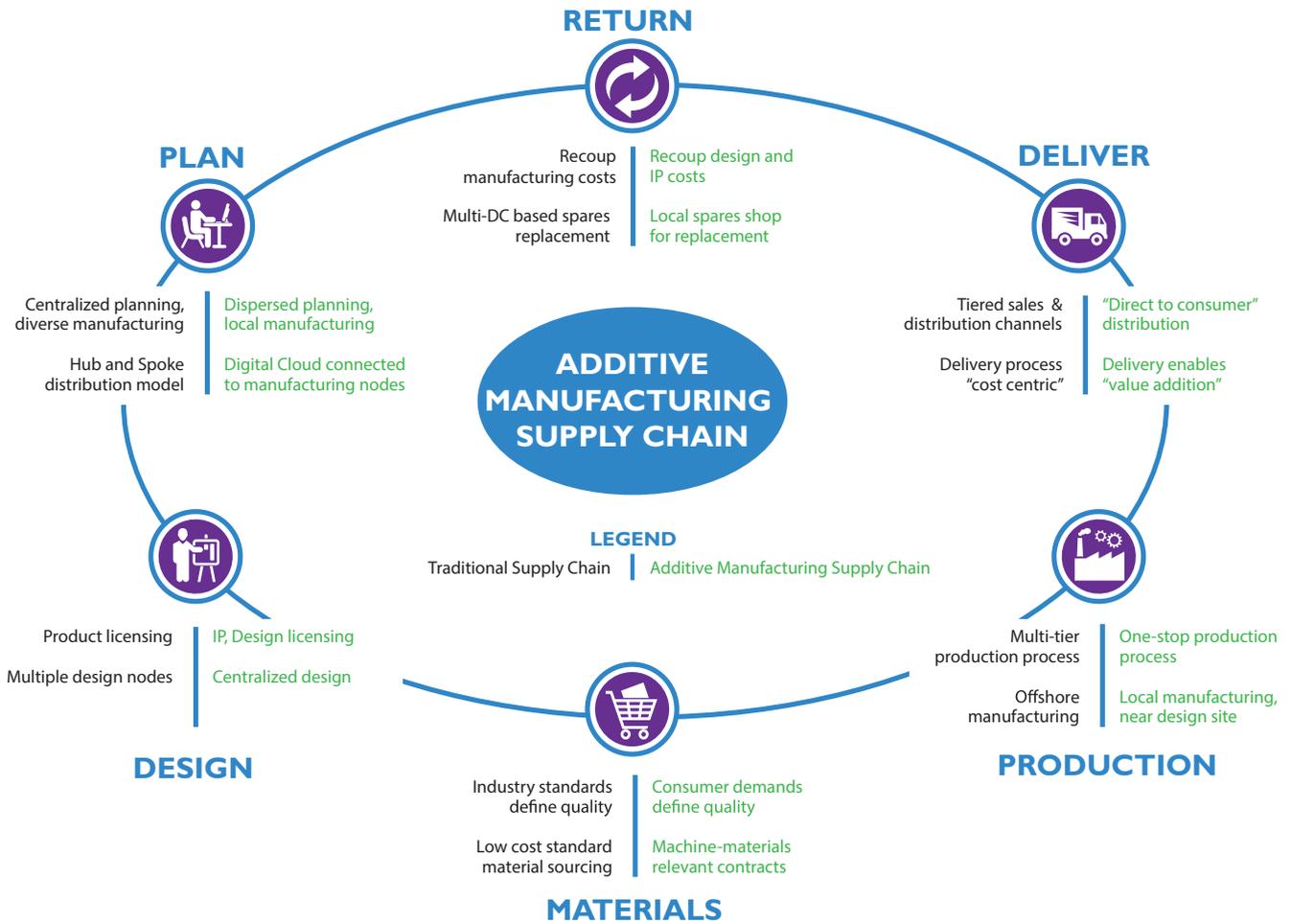
## Traditional Supply Chains vs. Additive Manufacturing Supply Chains

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Additive manufacturing facilitates single-unit production from raw materials. As such, it bypasses many traditional supply chain production phases, including work-in-progress, materials transit, and multi-stage assembly.

With additive manufacturing, designers benefit the most as they create custom, one-off and iterative designs, allowing manufacturers to reduce production and inventory costs.

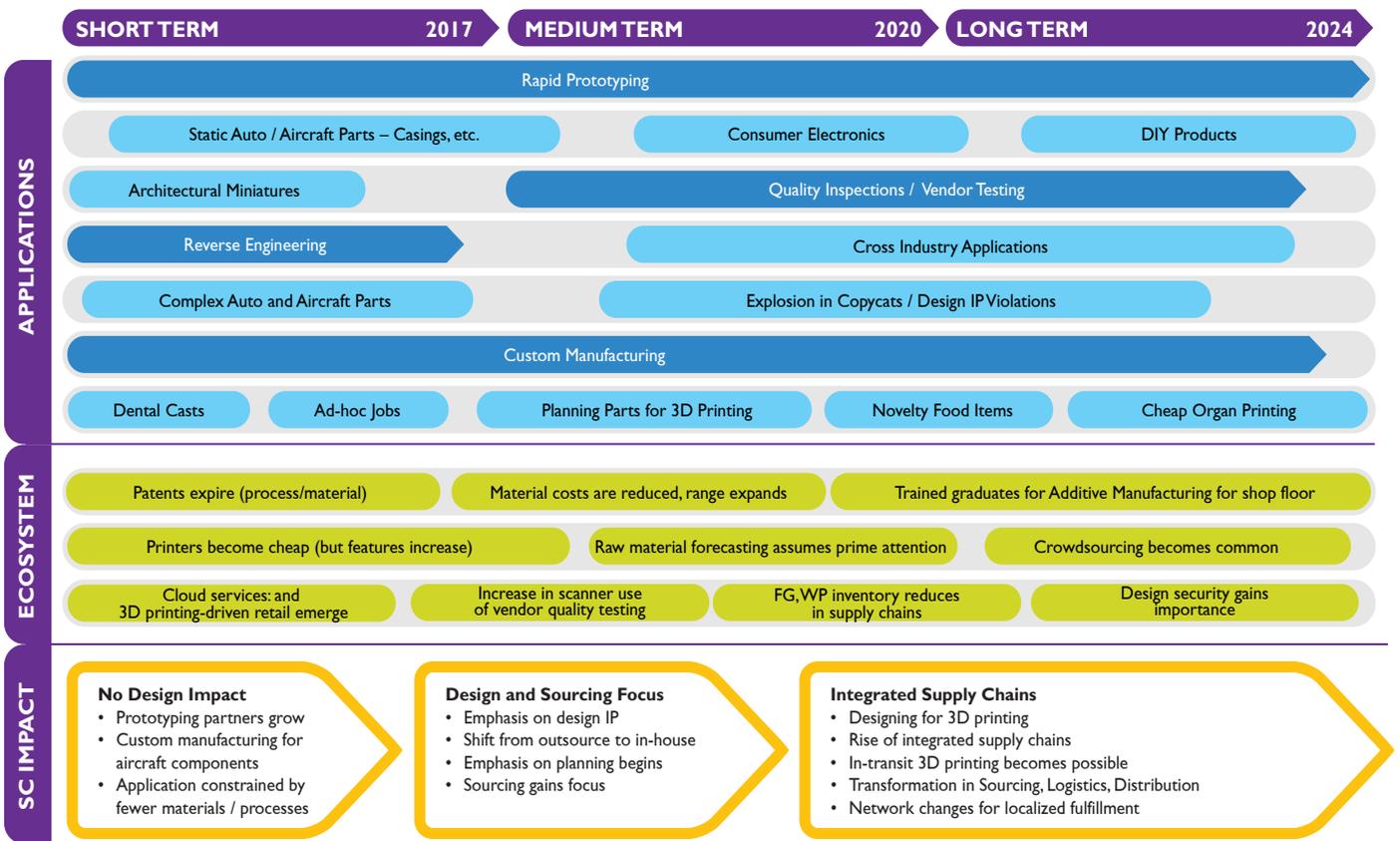
Figure 1: Additive Manufacturing Supply Chain vs. Traditional Supply Chain



An additive manufacturing supply chain has different focus areas and processes (see Figure 1), and those differences create new rules of engagement with partners. For example, the centralized planning function of traditional supply chains gives way to dispersed planning with local manufacturing,

while multi-tier production processes transition to a one-stop production process. The most pronounced impact will be observed in supply chain functions of planning, design, sourcing and logistics.

Figure 2: Additive Manufacturing's Impact on Supply Chains



## The Additive Manufacturing Development Roadmap

Current applications for additive manufacturing are burdened by a variety of issues, including patent limitations, production speed and quality concerns. However, market innovations and dynamics are going to expand the scope of applications while reducing the issues (see Figure 2).

The timeline in Figure 2 shows the changes, developments and growth that we foresee with the evolution of additive manufacturing. Over a 10-year period you can observe the development of a

better ecosystem with fewer patent limitations and greater availability of resources through new market models. Supply chains will focus on design and IP security; while manufacturing will follow the customer and logistics will be measured on velocity and time-to-delivery.

## The Road to Coexistence

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In order to operate with a dual supply chain strategy by including additive manufacturing, organizations need to assess their strengths and goals:

- How mature is your traditional supply chain? Where are you in the maturity curve with additive manufacturing?
- What products are most suited to it? Under what delivery options? For which customer segments?
- What processes of additive manufacturing will provide you competitive advantage (design, prototyping, manufacture)?
- Who is or should be managing the process of creating the additive manufacturing supply chain and aligning it with your traditional supply chain?

Companies which are already using additive manufacturing or experimenting with it should ask the following questions:

- What challenges or issues have you encountered as you've ramped up with additive manufacturing? Are they technical, financial, strategic?
- Is additive manufacturing giving you the strategic differentiation from your competition that you predicted?
- What are the strengths you're experiencing? Where are you falling short of?

As part of the assessment of your current supply chain's maturity level, you will need to consider IT integration, flexible ERP models, advanced PLM solutions for better cost, inventory and demand planning across the dual supply chain.

An external consultant with expertise in industry trends, suppliers, strategy and technology integration can help you assess the stage you are in, and propose a roadmap to meet your strategic goals. This can help you get there quickly with minimum process disruption and a faster return on investment.

## Setting Yourself Up for Success

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As your business gets more serious about adopting additive manufacturing, you have to keep in mind that innovation and partnerships underline any investments or utilization of technology if it has to be successful. Goals should be measured on quantitative benefits and if the associated numbers aren't met, then the strategy and implementation should be reconsidered.

Hence, in the beginning, choose a project that can be measured on basic success metrics, such as customer reach, material orders and rate of production innovation. Upon experiencing success, extend your investments across new opportunities by analyzing them on time-bound returns on revenue, market share and profits.

To avoid the potential for conflicts between the two supply chains, you'll need to pay attention to where the same components and assets might be used and draw a line to distinguish between them.

Now we will see how traditional and additive manufacturing supply chains can work together.

Figure 3: How Traditional and Additive Manufacturing Supply Chains Can Coexist



There are three distinct areas in which traditional and additive manufacturing supply chains will coexist (see Figure 3). We see additive manufacturing as the innovative component that

facilitates design and manufacturing creativity and agility, alongside traditional manufacturing, which will provide the launch pad for those solutions to enter the mainstream.

## Delivering on the Dual Supply Chain Strategy

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Additive manufacturing is in its early stage as a supply chain technology. But since it is a disruptive technology, you can't afford to sit on the sidelines waiting for all the initial issues to be addressed. Since the time to get into the game is now, it's critical to fine-tune how your new additive manufacturing supply chain will co-exist with your traditional supply chain, even if your investments and partnerships are at small scale.

Additive manufacturing isn't limited to the large coffers of big organizations only. In fact, the true winners will be small and mid-size players who can improve their time to market and level the innovation playing field.

To overcome the challenge of establishing an operating strategy for dual supply chains, launching a pilot project to test your strategy and identify both **what works** and **where you need to change and improve** are your first critical steps. Your ability to manage both these technologies to reap the benefits of innovation and consistency will determine your organization's ability to meet ever-changing customer demands.

## About the Authors

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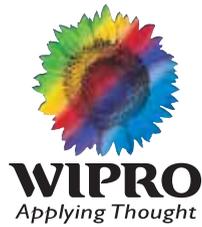
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