

3-D Printing: How to Leverage Technology to Gain Strategic Advantage

Infosys® | CONSULTING



Table of Contents

A New Approach to Operations	3
Reaching Long-Tail Customers	4
Accommodating Customer-Led Design	5
Integration with Back-End ERP Systems	6
Production Planning	7

A New Approach to Operations

Leveraging Technology to Gain Strategic Advantage

In our last ebook, we announced the arrival of the Massive Single Lot Production era, an epoch defined by advances in 3-D printing (additive manufacturing) that introduces powerful disruptions to manufacturers in the areas of design, customer engagement and production location.

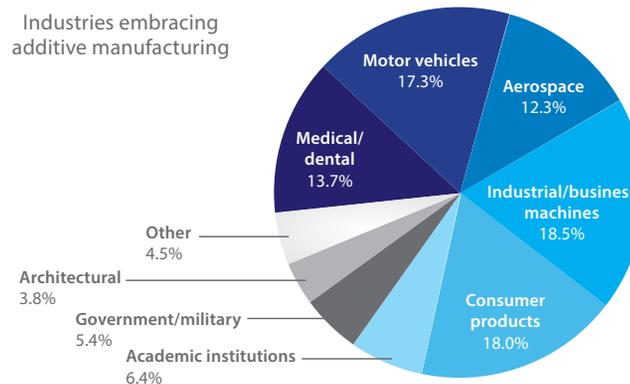
These disruptive features require an entirely new way of engaging with the outside world:

- **Customer-led Design:** Design needs to become significantly more collaborative, shifting a focus from internal designs to interactive customer input.
- **The Long-Tail:** Marketing and sales shift from a focus on selling a single product to as many customers as possible to finding long-tail customers and enabling them to purchase exactly what they want.
- **New Cost Make-Up:** Production costs are driven by a completely new set of inputs, reducing the importance of strategies driven by labor costs in favor of customer proximity and previously marginalized cost drivers such as power and transportation.

These disruptions will, of course, force firms to act differently to the outside world. But to do this, transformative changes are also required to internal operations ranging from dynamic, user-friendly eCommerce platforms to back-office ERP applications.

In this point-of-view, we will explore how firms can leverage technology to gain a sustainable strategic advantage during this time of upheaval and opportunity.

The Growing Business of Additive Manufacturing



Companies have been using additive manufacturing since the 1980s, mainly to make prototypes for testing. But in recent years the machines have been churning out an increasing number of functional products and parts. Analysts expect the market for additively manufactured parts and products – and the market for the materials needed to make them – to continue growing quickly.

Source: Forbes; Wohlers Associates – MIT Technology Review

Reaching Long-Tail Customers in an Era of Massive Single Lot Production

From Mass to Micro Marketing to Drive Growth

Shifting from an era of selling one thing lots of times to selling different things to each customer is a multi-dimensional transformation. Before one can address the challenge of designing and producing bespoke products, they first must generate visibility with end customers.

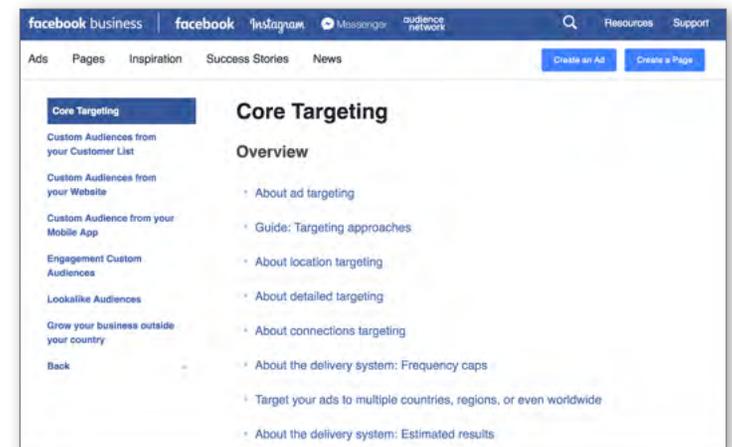
This is more complex than it first appears, as what it really represents is the transition from marketing to the masses to marketing to the long tail. To do this well, companies need three primary things:

1. **An extensible framework allowing the dynamic classification of micro segments**
2. **SEO and paid search techniques that auto-scale to ensure unique web and mobile messaging gets in front of users**
3. **Digital tools to enable customers to purchase and, where relevant, design the products they want to buy**

The first two elements mimic a bit the way Facebook approaches paid ads. To accommodate the long tail, Facebook doesn't sit down and define the audiences they believe marketers will pay to reach. Instead, they mine the meta data users post on their sites and expose terms that emerge within associable cohorts. This has gotten them into a bit of trouble recently with the realization that one can pay to reach groups of dubious values, but the broader strategy has enabled them to translate their massive user base into one of the internet's dominant marketing platforms.

It is misguided to suggest that manufacturers should build a marketing engine akin to Facebook. But the general approach of pushing out ads to an ever-broadening universe and doubling down spend on the strings with the most success can yield demonstrable results.

Long-Tail Micro Marketing Example



Accommodating Customer-Led Design

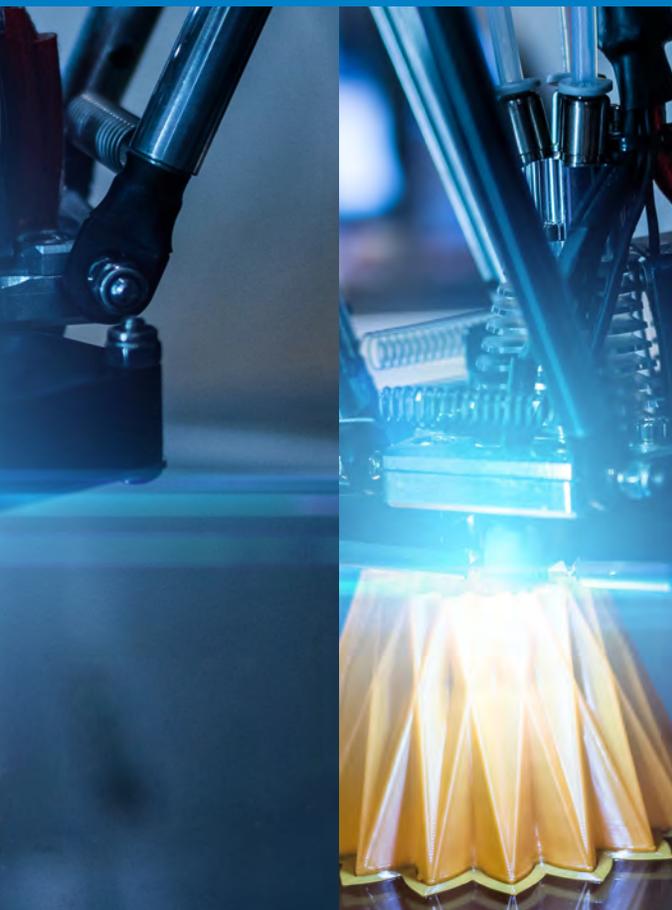
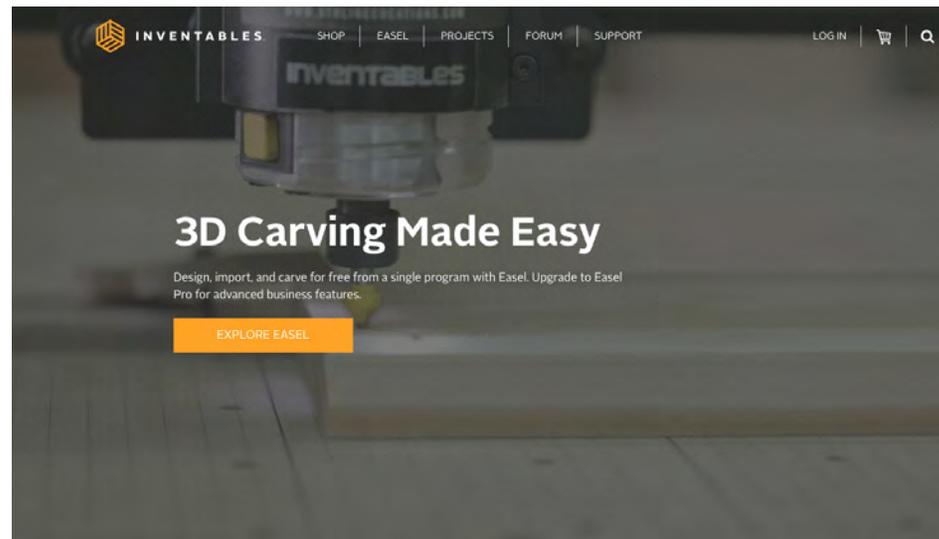
Create Online Experiences Coupled with a Smart Back-End

Once these long-tail customers have been reached, the next challenge is seamlessly enabling them to find – and, if applicable, design – the product they'd like to purchase.

The ingredient for success is a world-class, intuitive website. In our work with manufacturers, we often see robust ERP systems loosely attached to front-end eCommerce sites that mimic a several hundred-page catalogue. These interfaces often require power users armed with arcane, 10-digit lookup codes. Instead, firms should work with technology partners to leverage design thinking to develop custom sites that allow users to start with what they know – the problem they're trying to solve – and efficiently navigate to products that address these needs.

For the scenarios where existing parts do not exist, firms need to enable efficient customer-led design. While this does not lend itself to complex electronics, there are many verticals currently finding success, such as clothing design. Even in complex industries like aerospace, not all parts require hard core engineering and are therefore candidates for customer-led design. Ultimately, this is once again a question of web and mobile site design tightly coupled with back-end materials inventories and design boundary conditions.

Example Web Site Enabling Personalization



Connecting the Dots with Back-End ERP Systems

Develop a Digital Translation Layer

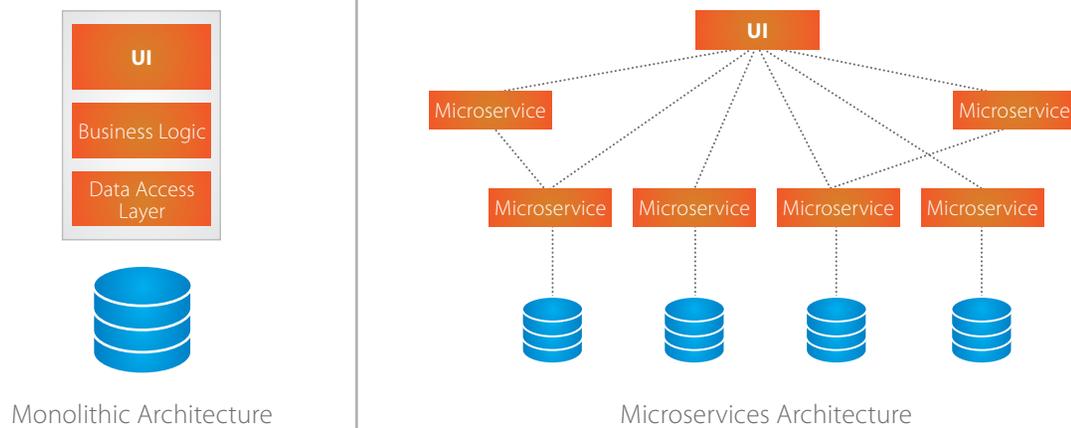
As anyone who has implemented SAP or Oracle can tell you, ERP systems are complex. Developing a cohesive market-facing strategy and accompanying web and mobile tools is hugely important, but if the implications to back-end systems are ignored it can lead to painful downstream disruptions and unfulfilled customer promises.

From an application architecture perspective, the key to accommodating the fragmentation implied by a hybrid additive and traditional manufacturing model is to build a digital translation layer. This layer can be thought of as a massive rules engine that sets the boundary conditions for what the web and mobile properties are able to offer customers and acts as a traffic cop for all downstream activity.

This newly built layer should be comprised of several micro-services that accepts inputs from all parties and ensures, above all else, that large-scale changes to the underlying ERP system are not required. For all of the advantages and promises offered by 3-D printing, there is no quicker way to destroy a business case than to require a full re-implementation of your ERP system.

At Infosys Consulting, our vast experience with enterprise software enables us to guide customers through this transformation, finding appropriate trade-offs between market-facing flexibility and adherence to internal boundaries.

Example Architecture Framework



Source: <https://inform.tmforum.org/features-and-analysis/2017/02/what-are-microservices-and-why-should-you-care/>

Accommodating a Highly Localized Production Footprint

Once this translation layer of micro-services has been built, the downstream decisions guiding production location can be made in a responsible manner. The rules-engines defined in the translation layer can help weigh trade-offs between traditional and additive manufacturing and pair end-user demand with the optimal production location in a firm's portfolio.

For scenarios where additive manufacturing is the answer, this translation layer can additionally feed the correct information into a network of 3-D printers and ensure that the proper data makes its way downstream into financial systems so the general ledger is not disrupted by these disparate approaches to production.

A Blending of Old and New

As discussed, to fully leverage the era of massive single lot production brought about by advances in 3-D printing, manufacturers need to make important advances in two areas:

- **Dynamic Interaction** – The creation of modern web and mobile tools that support dynamic interaction with an ever more diverse set of customers and designers
- **Translation Layer** – A well architected translation layer that leverages the enterprise software footprints already in place, but provides the flexibility to capitalize on the massive opportunities presented by additive manufacturing

These two elements affect different pieces of the value chain, but are best constructed in unison as part of an overall business-led technology transformation. At Infosys Consulting, we help companies prepare for the challenges of the future by providing the technology solutions to enable business to respond to market opportunities of the future. We would be excited to discuss the incredible opportunities presented by 3-D printing with you and talk through the high-level steps required to realize this potential.



About Infosys Consulting

We are a global advisor enabling organizations to reimagine their future and create sustainable value leveraging disruptive technologies. And as part of technology leader Infosys, we have access to a global network and delivery capability of 200,000 professionals that help our consultants implement at scale. To see our ideas in action, please visit [InfosysConsultingInsights.com](https://www.infosysconsulting.com).

About the authors



Roberto Busin

Partner & Manufacturing Segment Head, Europe

Roberto_Busin@infosysconsulting.com

Roberto leads the organization's Europe manufacturing segment and manages its Switzerland country operations. He is an expert on transforming companies in the areas of supply chain, operations and digital, and has extensive experience setting up global delivery centers with multi-national teams around the globe. Roberto works with business leaders across some of the biggest brands in Europe, and is bringing new ways of approaching artificial intelligence enablers to organizations.

Roberto has an advanced degree in engineering from the Swiss Federal Institute of Technology and is fluent in 4 languages. You can connect with him and follow his insights on LinkedIn.



Shanton Wilcox

Partner & Manufacturing Segment Head, North America

shanton.wilcox@infosys.com

Shanton focuses on applying advanced operations capabilities to manufacturing and service organizations to integrate and streamline value chain operations. He has a record of outstanding success with a deep set of experiences across several industries, including aerospace and defense, automotive, high tech and consumer goods. Shanton has held leadership roles at Deloitte, Ernst & Young and Capgemini Consulting where he was the North American lead for digital manufacturing. He has been published in leading trade journals such as SupplyChainBrain, Logistics Management and CSCMP's Supply Chain Quarterly. He is also the lead contributor on the annual State of Logistics Outsourcing study that Infosys Consulting produces.

For more information, contact Consulting@infosys.com

Infosys® | **CONSULTING**

© 2018 Infosys Limited, Bangalore, India. All Rights Reserved. Infosys believes the information in this document is accurate as of its publication date; such information is subject to change without notice. Infosys acknowledges the proprietary rights of other companies to the trademarks, product names and such other intellectual property rights mentioned in this document. Except as expressly permitted, neither this documentation nor any part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, printing, photocopying, recording or otherwise, without the prior permission of Infosys Limited and/ or any named intellectual property rights holders under this document.

Stay Connected    