The Future of 3D Printing & Advanced Manufacturing

Disrupting the Design-Build-Distribute Supply Chain

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Assertions

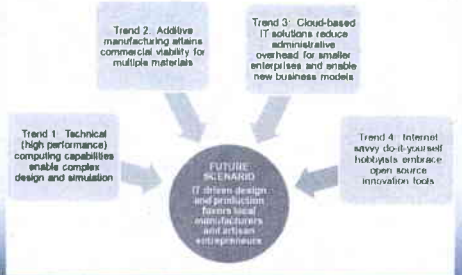
- 3D printing/additive manufacturing is ON THE HORIZON and there will be competition from unexpected directions
- New cloud-based business models will level the playing field
- Economies of scale will go from a barrier to entry to a barrier to change

Implications

- The emerging ecosystems for Economies of One
- Coexistence of economies of scale and economies of one

MARKET DRIVEN INNOVATION

Four important trends in the production & operational environment



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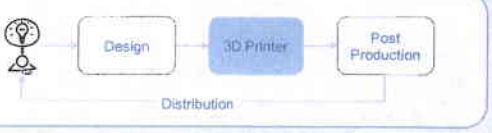
Changing production models



Currently:
Separation of end user or customer and producer
Distribution as a service
Production as a linear hand-off between firms

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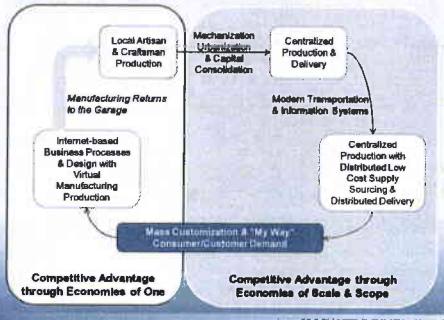
The artisan entrepreneur



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myFactory

Express yourself in 3D.

QUESTION: Who is a manufacturer? Who is a designer?

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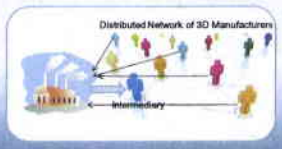
Cloud-based business models

Makerspaces, Job shops
3D printer hubs



Virtual Factories

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Finished part geometries and customization well beyond traditional substractive methods…

…but we don't have standards and design rules yet

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For existing manufacturers …

Great gifts

- Customization is feasible (Economies of One)
- Production of replacement parts is simplified
- Manufacturing is sexy again
- Entrepreneurs drive change in unanticipated ways

Serious challenges

- We don't know how to design for this technology
- Cloud-based business models enable artisan entrepreneurs to compete
- Extensive installed base is a barrier to change
- Entrepreneurs drive change in unanticipated ways

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Pennsylvania perspective

- Training programs to emphasize modeling, simulation and experimental design
- Access to high performance computing
- Local economic development really matters and can have impact
- Being rural isn't as much of a challenge

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Dr. Irene J. Petrick, Managing Director of TrendScape Innovation Group and Penn State University professor, is an internationally recognized expert in strategic roadmapping. She is actively engaged with companies in their innovation and technology strategy activities, including work with twelve Fortune 100 companies, the U.S. military, and a wide variety of small to medium sized enterprises. Her research interests include innovation and supply chain collaboration. She has over 25 years of experience in technology planning, management and product development in both the academic and industrial settings. Irene is author or co-author on over 130 publications and presentations.

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