How companies can leverage Additive Manufacturing ("AM") technologies for competitive advantage

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How can companies leverage Additive Manufacturing technologies for competitive advantage

Additive Manufacturing (or “3D printing”) is developing rapidly and there are significant value creation opportunities precision engineering companies can capture.

Precision Engineering companies can use Additive Manufacturing to add valuable new techniques to client offerings, supplement their current traditional manufacturing, offer value add services to additive manufacturers and increase offering through the value chain.

Companies should move quickly to capture these opportunities and we will look at how to develop a strategy mixing in-house capabilities and working with outsourced partners.

There are a number of keys to success we will consider.
Additive Manufacturing is developing rapidly, comparable to mobile phones and the internet.

### Internet usage
1996-2015 (#users per 100 global population)
- CAGR 21%

### Mobile phone subscribers
1994-2015 (#users per 100 global population)
- CAGR 25%

### 3D printing / Additive Manufacturing
2009-2019 (US$ of products and services)
- CAGR 37%


How can precision engineering companies leverage AM technology for competitive advantage

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Additive Manufacturing is not “business as usual”

**What it is NOT**
- Using new technology just to print our current products
- Using the same materials we have always used
- Being limited by traditional production methods

**What it IS**
- Redesigning our products to improve performance
- Choosing new materials to improve performance
- Resigning production to maximise new technology
Leading engineering companies are already using 3D printing to create additional value
Six AM value creation opportunities precision engineering companies can capture

1. **Obsolete parts and equipment**
   - Reverse engineering and printing of obsolete parts no longer available from OEMs

2. **Retrofit existing equipment**
   - Improve performance of installed equipment with optimised parts and new materials

3. **Develop new tools**
   - Design and print new tools in lighter stronger materials
   - Customised for new applications

4. **Small batch production**
   - Print times in days not mths
   - Cost effective upto 70-100 metal parts

5. **Creating molds and dies**
   - Significant advantages for more complex parts
   - Tool up new production lines faster

6. **New product design**
   - Design optimisation to improve parts
   - Taking advantage of new printing technology

- Reduced downtime
- <25% weight saving
- ~10-20% on suitable parts
- 4-6 weeks faster production
- ~15-30% material savings
Precision engineering industry can capture this value in 4 ways:

1. Expand your product & service offerings
2. Improve your internal production processes
3. Offer specialist services to AM companies
4. Gear up to support customers’ expansion into AM
Develop a strategy based on mixing in-house capabilities and working with outsourced partners

Traditional logic either in-house or outsource

Develop capabilities in-house
- Design and engineering team
- Specialist equipment such as scanning and measuring equipment
- Range of printers and capabilities
- Post production expertise

Out-source to service bureau
- Develop the job requirement
- Select Service bureau with suitable reputation and experience
- Service level or ad-hoc contract relationship

Partnership is a more preferable model

1. Develop client offering
2. Test parts and print with outsourced partner
3. Over time consider to move high volume work in-house
4. Continue to out-source specialist or non-standard work
What needs to be in place to be successful

3D design, modelling and engineering experience by industry and with deep subject domain expertise

High precision 3D scanning, CAD and design optimisation software and capabilities

Production with state-of-the-art 3D printers and extensive range of print materials

Quality assurance, diagnostics, testing and certification from international laboratories

How can precision engineering companies leverage AM technology for competitive advantage
Our proprietary additive manufacturing production process

**DESIGN**
- Diagnose AM Requirements
- Design Capture
- Design & Engineering
- Scanning and CMM capture
- Geometric analysis
- File conversion
- 2D-3D conversion
- Design optimization
- Mesh healing
- Rendering
- Light weighting
- Materials analysis
- Support structure design
- Nesting
- Object orientation
- Print bed layout
- Laser set up

**PRINT FILE**
- Print file creation
- Printer calibration
- Tool path creation
- Production scheduling
- In-print monitoring and adjusting

**PRODUCTION**
- Printing
- Heat treatment and stress relief
- Cutting
- Polishing
- Blasting and finishing
- External Certification
- Reporting standards
- Machine analytics

**OUR CAPABILITIES**
- Assessment opportunity
- Identification of parts (high value/low turn etc.)
- Pricing Algorithm
- Specialist quotation process
- Scanning and CMM capture
- Geometric analysis
- File conversion
- 2D-3D conversion
- Design optimization
- Mesh healing
- Rendering
- Light weighting
- Materials analysis
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- Heat treatment and stress relief
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- Polishing
- Blasting and finishing
- External Certification
- Reporting standards
- Machine analytics
- Secure delivery
- Part report
- Secure digital storage

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Keys to success

1. Enter the market early to avoid missing opportunities

2. Identify where 3D printing can compliment and build on existing capabilities rather than merely replacing

3. Work with established partners that know the market and technology

4. Be careful to not jump into high capital cost solutions until technology is properly understood
THANK YOU