Advanced Manufacturing in a highly connected world

Duane Dickson, Deloitte Global Leader, Chemicals and Specialty Materials
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Today’s presentation will highlight developments in Advanced Manufacturing

Technologies  Ecosystems  Enablers  Shifts
Advanced Manufacturing technologies expected to double in value to $85+ billion globally by 2019

Global smart sensors’ market

Advanced Sensors
Create an internet of things using embedding sensors

Advanced Robotics
Use of sophisticated robots for complex tasks

Additive Manufacturing
Use of 3D printing for manufacturing

Global nanomaterial market

Advanced Materials
Use of nanomaterials to develop new solutions

Global industrial robotics market

USD billion

CAGR: 12.2%

CAGR: 5.5%

CAGR: 45.7%

2013 2019e
10.8 21.6

2012 2019e
2.0 5.5

2012 2020e
26.8 41.2

2012 2019e
2.5 16.2

Note: 1Growth estimate data is not available


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Additive Manufacturing impact on operations

Considerations and impact on companies’ business functions

R&D/ Production
- Choice of components that favor Additive Manufacturing over traditional
- Crowd-source ideas to break existing design and manufacturing limitations

Supply chain management
- Decisions related to in-house over outsource
- Choice of suppliers driven by their Additive Manufacturing capabilities
- Co-production with suppliers and customers

Legal
- Intellectual property issues
- Regional and country regulations

Human Resources
- Need for lower headcount
- Talent with requisite skills in areas such as design and material sciences

Finance
- Fixed and variable cost comparisons between Additive Manufacturing and traditional manufacturing

Information Technology
- CAD/ CAM systems
- Integration of IT systems with R&D and manufacturing platforms

Source: Deloitte. 3D Opportunity: Additive manufacturing paths to performance, innovation, and growth
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Unmet need

• Development of non-petroleum based supply chains for large volume plastics used in packaging, apparel, food, and other consumer packaging

Process technology

• New biorefining technologies enable the production of the constituent monomers of PET, ethylene glycol and terephthalic acid, from biomass

Material innovation

• Polyethylene terephthalate (PET) is a versatile, inexpensive plastic used in synthetic fabrics, packaging for food and beverages, and for other liquids.

Business models and ecosystem

• These companies have formed the Plant PET Technology Collaborative (PTC) to support the development and use of plant-based PET.

Open innovation

• PTC members are pooling their resources, knowledge and experience in an effort to find a sustainable alternative to using fossil fuels for PET manufacturing
Enablers
Building Advanced Manufacturing capabilities

**Industry initiatives**
- Simulations
- Adoption across functions
- Sustainable solutions

**Joint initiatives**
- Skills training
- Advanced Manufacturing R&D
- Advanced Manufacturing facilities

**Government initiatives**
- Regulations
- Advanced Manufacturing infrastructure
- Funding and incentives

Source: DTTL Global Manufacturing Industry group. October 2014
Shifts
Value creation vs. value capture

Nature of consumer demand
- Personalization/customization
- Co-creation

Nature of products
- From "dumb" to "smart"
- From product to platform
- From product to service

Economics of production
- Exponential technologies
- Eroding barriers to emergent manufacturing models

Economics of distribution
- Diminishing value of intermediaries
- Direct to consumer vs. build to stock


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Shifts in Manufacturing

Changing nature of consumer demand
• Personalization/ customization
• Co-Creation

Changing nature of products
• The rise of self-healing materials and intelligent products
• From product to service

Changing economics of production
• Exponential technologies
• Emergent manufacturing models

Changing economics of distribution
• Direct to customer
• Build to order vs. build to stock
Navigating the future manufacturing landscape

From value creation to value capture

1. Focus on structural advantages
2. Look for emerging influence points
3. Rethink business models to capture value
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