The impacts of 3D printing implementation on business performance: Moderation effect of knowledge management competences

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What is 3D Printing?

• 3D Printing: Additive Manufacturing

The 3D printing technology is based on layer-by-layer fabrication replicating the product design on computer.
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3D Printing Implementation

Aerospace

Fashion

Automotive

Plastics

Healthcare
3D Printing Implementation

3D Printing Status

Current and intended acceptance of 3DP among countries (%)
3D Printing Status

• Additive manufacturing beyond prototyping technology

3D Printing Benefits – Supply Chain

• **Reduce Leadtime**
• Sustainable
• Customization
• Freedom of Design
• Complex product
• Vertical Integration 2.0
• Manufacturing Visibility
• **Simpler SC Network**
Adidas starts to produce 3D printed shoes

- Adidas on October 7, 2015 unveiled the future of performance footwear with Futurecraft 3D. Adidas has partnered with Materialise, a pioneer and leading specialist in 3D printing, for its Futurecraft initiative.

- Creating a flexible, fully breathable carbon copy of the athlete’s own footprint, matching exact contours and pressure points, it will set the athlete up for the best running experience. Linked with existing data sourcing and footscan technologies, it opens unique opportunities for immediate in-store fittings.

Adidas benefit ...

Lead-time of updating colour reduces from 6 months to 1 month after using 3D printing design.

**Adidas Net income grows 38% to € 350 million!**
Compact Supply Chain Network

- Supply Chain (Traditional)
- Supply Chain (Future 3D Printing)

Research Gaps

- Early stage of the research of 3D implementation in industries, limited publications
- Modelling method, no empirical work
- Drivers of 3D investment
- Impacts of 3D implementation
Theoretical Model

3D Printing Implementation Practice

Knowledge Management Competency

Business Performance

Project Complexity

- Knowledge Acquisition
- Information Interpretation

Variables | Measurement Items | References
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3D Printing Implementation Practices | Opt1: Yes/No | 
| Opt2: Percentage of 3D printed activities account total manufacturing activities of the product. | 
| ROS growth | 
| Market Share | 
| Market share growth | 
| Return on investment (ROI) | 
| ROI growth | 
| Pre-tax return on assets (ROA) | 
Knowledge Acquisition | Proficient’ is a good description for the process of information acquisition engaged in during the development of the product. | Brockman and Morgan, 2003
| We displayed a high level of competence in acquiring the information needed to develop the product. | 
| The process of information acquisition engaged in during the development of the product was productive | 
Information Interpretation | Everyone working on the project shared a similar understanding of the role the acquired information would play in developing the new product. | Brockman and Morgan, 2003
| Everyone had the same intent for how the acquired information would be used in developing the new product. | 
| Everyone working on the project shared a similar understanding of the role the acquired information would play in developing the new product | 
Project Complexity | this product modules | Tatikonda and Rosenthal, 2000
| the product configuration | 
| the product technologies in this project | 
| the individual manufacturing stages | 
| the process layout | 
| the manufacturing technologies in this project |
Data Collection

• Combination of Primary and Secondary Data source
• Survey: Qualtrics
• Bloomberg: Survey or Business Performance

Thank You!

Q&A