Global Distributed Manufacturing of Personalized Products as a Service

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Institute of Gerontology
University of Michigan at Ann Arbor
Goal

Convince the selection committee this idea deserves $20M to $30M of research investment.

Return on Investment:
10x: $200M-$300M Revenue / Year
Goal

Convince the selection committee this idea deserves $20M to $30M of research investment.

Targeted Return on Investment of this Blue Sky Vision:
10x: $200M-$300M Revenue / Year
100x: $2B-$3B Revenue / Year
My Blue Sky Vision:

(or a company like ) builds the “Global Distributed Manufacturing of Personalized Products as a Service” in their operations.

I pick because of their ”culture”.
Amazon Culture: Zero Net Income

Amazon Culture: Motto, Compensation, and 6-Page

Motto

• Work Hard, Have Fun, Make History
• Always Day 1

Compensation

• 40% paid by Amazon stocks
• 2% before-tax company matching to employee's retirement fund

Presentation/Reporting

• No PPT
• 6-page report format (similar to old NAMRC 8-page paper)
Amazon Culture: Motto, Compensation, and 6-Page

Motto

• Work Hard, Have Fun, Make History
• Always Day 1

There's so much stuff that has yet to be invented. There's so much new that's going to happen. People don't have any idea yet how impactful the internet is going to be and that this is still Day 1 in such a big way.

“Day 2 is decline followed by death. That is why it is always Day 1.”

Jeff Bezos, Amazon
Compensation

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Amazon Culture: Motto, Compensation, and 6-Page Presentation/Reporting

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In the past – NAMRC paper was limited to 8-page
## Top 25 Private Employers in the US in 2016

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Walmart</td>
<td>2,300,000</td>
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<td>2</td>
<td>Amazon</td>
<td>541,900</td>
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<tr>
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<td>Kroger</td>
<td>443,000</td>
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<td>Yum! Brands</td>
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https://en.wikipedia.org/wiki/List_of_largest_employers_in_the_United_States
Amazon’s Massive Fulfillment Center
Amazon’s Massive Fulfillment Center
Amazon in 2018

Revenue and Net income chart showing significant growth from 2017 to 2018.
Top 50 Private Employers in the US in 2016

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Number of employees of Amazon in 2017

566,000

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My Blue Sky Vision: $2B-$3B of the revenue in Amazon is from the “Global Distributed Manufacturing of Personalized Products as a Service”

Amazon is looking for new ways to “make history”
My Plan to Reach this Blue Sky Vision

as a NSF GOALI partner in manufacturing

Examples and Blue Sky Visions in Three Levels:

Level #1: Local
Level #2: National
Level #3: Global
Level #1: Local

Example: Manufacturing in the Univ of Michigan Hospital

- For over 100 years, the Univ of Michigan Hospital makes assistive devices in house for trauma patients with quick-turn-around-time and personalized fit.

- The current plaster molding based manufacturing is changing to the cyber-based design and additive manufacturing (AM) for custom assistive devices.

- **not** an easy task – still a R&D project.
Level #1: Local – My Blue Sky Vision

- **Integration** of “advanced” manufacturing processes (additive, subtractive, incremental forming, flexible polishing, …) and **cyber-manufacturing systems**
- **Design for manufacturing** of personalized products
Level #1: Local – My Blue Sky Vision

Manufacturing of Personalized Products

• **Books**: Print- and Bind-on-demand

• **T-shirts / hats**:

• **Garden tools**: Amazon has the big data to determine “what”, “when” and “where” to make these personalized products
Level #2: National – Example
Veteran Affairs (VA) Medical Centers

VA is the largest health care provider in the US – 170 VA Medical Centers for 9 million enrolled veterans.

Many veterans need **personalized** assistive devices (e.g. orthotics & prosthetics)

12 VA Medical Centers in the US has formed the **VA National 3D Printing Network (VA3DN)**

According to Dr. Beth Ripley (PI), VA3DN needs the **manufacturing engineering support**.
Level #2: National – My Blue Sky Vision
Create the “VA Cyber Manufacturing Service Center”

This **VA Cyber Manufacturing Service Center** will provide the cyber design and manufacturing service for personalized assistive devices to all 170 VA Medical Centers in the US.
Level #3: Global – Example

Cloud-Front Global Locations

https://aws.amazon.com/cloudfront/details/
Level #3: Global – My Blue Sky Vision #1
builds the *Manufacturing as a Service* (MaaS) of Personalized Products in Global Operations

https://aws.amazon.com/cloudfront/details/
Level #3: Global – My Blue Sky Vision #2
DoD Makes “Custom” Products in Military Bases and Hospitals Worldwide

900 US military bases outside US

Concluding Remark:
This is an **Open** Blue Sky Vision

All other Blue Sky ideas can partner with this vision:

- Manufacturing and Mass Customization using Voxel-scale Engineering Methods
- 3D Printing for Civil Infrastructure Construction
- Personalized Manufacturing: Psychology and Sociology as Fundamental Design Elements in Future Advanced Production Systems
- Metamorphic Manufacturing: The Third Wave in Digital Manufacturing
- Just-in-Time Learning for the Factory Floor
- Distributed Decentralized Rural Agile Manufacturing
- FACTORIES-IN-SPACE
Thank You

and

Tribute to Dave