CONSULTING FIRM FOCUSED ON MANUFACTURING DIGITALIZATION

WMU Lee Honors College Thesis
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AGENDA

1. Aims of Thesis
2. Business Ecosystem Background
   A. Evolution to Industry 4.0
   B. Business Competitiveness
   C. The Nine Technologies
3. Business Plan
   A. Pain Point & Value Proposition
   B. Market & Competitors
   C. Business Canvas Model
4. Analysis of Model
   A. SWOT
   B. Next Steps
5. Conclusions
AIMS OF THESIS

1. Provide background on Industry 4.0 and the market
2. Explain the challenges of manufacturing organizations
3. Explore the current consulting solutions
4. Outline a business plan for a niche consulting firm
5. Evaluate the plan
ECOSYSTEM BACKGROUND
First Industrial Revolution
- **Steam Engine**
  - 18-19th century
  - Agricultural to industrial
  - Iron and textile industries
  - No longer limited to physical strength

Second Industrial Revolution
- **Electric Power**
  - 1870 - 1914
  - Mass production
  - Steel, oil, electronic industries
  - Assembly Line

Third Industrial Revolution
- **Internet Age**
  - 1980’s – 2016
  - Analog to digital processes
  - Computer and mobile
  - Moore’s Law
  - *Real time scale-able communication*

Fourth Industrial Revolution
- **Cyber-Physical**
- Happening now
- Big Data, AI, Cloud
- Internet connected sensors
- Automation between organizations
BUSINESS MANAGEMENT COMPETITIVENESS

Efficiency
- Taylorism
- early 1910’s

Scale
- Experience Curve & DuPont Model
- 1960’s

Quality
- Deming with Toyota
- 1980’s

Network
- Microsoft, Google, Facebook
- 2000’s

Ecosystem
- Apple, Google, Amazon
- 2010’s
The role of technology has shifted…

From purely a business enabler to also a business driver.

Historically, business requirements collected from “business users” drove the technology that then enabled the business to advance. Technology purely played a supporting role in this model.

In the Digital Age today, technology creates new opportunities and fundamentally transforms businesses in all aspects—operations, business models, strategies. It not only enables the business, but also drives its growth and can be source of competitive advantage.
Industry 4.0: Cyber-Physical

Characteristics

Interoperability
- Autonomous Robots
- Industrial Internet of Things
- Additive Manufacturing

Information Transparency
- Big Data
- Cloud Storage

Technical Assistance
- Simulation
- Augmented Reality

Decentralized Decision Making
- Horizontal & Vertical
- Cyber Security

Nine main technologies

(Marr, 2016) & (Scalabre, 2018)
1. BIG DATA

In 2014 the amount of information stored worldwide exceeded 5 Zettabytes.

By 2020, the total amount of stored data is expected to be...

60x
50x
40x
30x
20x
10x
0x

larger than today

*Zettabyte = 35,000,000,000,000,000,000,000,000 bytes*

Only .05% of data is currently analyzed.

2. AUTONOMOUS ROBOTS
Machines that can make decisions

Worldwide Operational Industrial Robots

Data from Statista
3. SIMULATION
Blurring the real vs. digital world
4. HORIZONTAL & VERTICAL INTEGRATION

Connecting organizations
5. INDUSTRIAL INTERNET OF THINGS

Connecting objects to the cloud

Based on Moor Insights & Strategy's report Segmented the Internet of Things (IoT)

ni.com
6. CYBER SECURITY
Protecting data and communication
7. CLOUD
Connecting data storage

Past

Centralized

Future

Decentralized

Distributed
8. ADDITIVE MANUFACTURING

Printing the virtual world

Local Motors 3D Printed Car
9. AUGMENTED REALITY
See virtual world on the physical world

Microsoft Holo Lens for mixed reality
BONUS: BLOCKCHAIN
Shared ledger of who owns what

How it works

1. It all starts with one node
2. Each node has the shared ledger
3. Nodes form a peer network
4. Users submit transactions
5. Consensus and leader election
6. Execution & Recovery
BRINGING IT ALL TOGETHER

1. Establish a digital record
   Capture information from the physical world to create a digital record of the physical operation and supply network

2. Analyze and visualize
   Machines talk to each other to share information, allowing for advanced analytics and visualizations of real-time data from multiple sources

3. Generate movement
   Apply algorithms and automation to translate decisions and actions from the digital world into movements in the physical world

Source: Center for Integrated Research.

Graphic: Deloitte University Press | DUPress.com
INDUSTRY 4.0 ECOSYSTEM

Suppliers

Hardware manufacturers
• Sensors, robots, servers
• Digital-physical devices

Software makers
• Data analysis & simulation
• Data communication

Customers

Manufacturing Companies
• Automotive
• Aerospace & Defense
• Other Mfg

$214B Industry in USA by 2023 HSRC
2016 GLOBAL INVESTMENT

$493B revenue gains

$421B cost reductions

$907B yearly investment
2018 SURVEY ON INDUSTRY 4.0

- 88% believe their future depends on it
- Only 12% have implemented something
- 55% have already seen a 2-year ROI
- 50% lack digital culture/training

27 countries
477 reports
2,000 companies
>4,000 industry respondents
# Business Model Canvas - McKinsey & Co.

<table>
<thead>
<tr>
<th>Key Partners</th>
<th>Key Activities</th>
<th>Value Propositions</th>
<th>Customer Relationships</th>
<th>Customer Segments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alumni</td>
<td>Education &amp; Training of employees</td>
<td><strong>Consulting:</strong> individual, judgement based and tailored analysis and advice.</td>
<td>Long Term, personal relationships</td>
<td>Multitude of industries and sectors</td>
</tr>
<tr>
<td></td>
<td>Research Recruiting Software Solution Dev</td>
<td><strong>Providing expertise</strong> the customer lacks</td>
<td>Long term project based</td>
<td>Fortune 100 &amp; 500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Subspecial services like implementation, recovery and transformation</td>
<td>Shorter projects</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Advanced Data &amp; Analytics</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Resources</th>
<th>Channels</th>
<th>Revenue Streams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image, Brand &amp; Reputation Human Capital Global Presence Dedicated staff (IT) Intellectual Property</td>
<td>Personal contacts Dedicated website</td>
<td><strong>Consulting fees per diem</strong> Subscriptions and fixed prices per deliverable</td>
</tr>
</tbody>
</table>

[http://www.businessmodelgeneration.com](http://www.businessmodelgeneration.com)
FIRM STRUCTURE

Limited Liability Partnership

Partners

Shared ownership, separate liability

Shared Staff & Support

Tech Suppliers

Mfg Clients + Value Chain
IDEA MERITOCRACY
And radical transparency

- Weighted vote decision making
- Everything is recorded and firm public
- Principles based decisions
- Constructive criticism
- Pain + Reflection = Progress
- Baseball Cards on each person

Ray Dalio
Bridgewater Founder, $160B AUM
Location: Greater Detroit

- 12,437 mfg companies in MI with avg 48 employees
- Strong automotive sector
- 21% increase in robots since 2010
- 15,100 operational robots in 2015

Services

- Consulting projects
- Benchmarking
- Company Analysis
- Culture training
ANALYSIS OF MODEL
Strengths
- Location
- Innovative People
- Idea Meritocracy
- Large Demand

Weaknesses
- Limited funding
- Reliant of human capital
- Little experience so far

Opportunities
- Other industries
- Location Expansion
- Client Referrals

Threats
- Competitors with resources
- Emerging market risks
- Economic downturn
CONCLUSIONS

1. **Industry 4.0** is changing the cyber-physical relationship

2. The way we make things is becoming more **connected**

3. Companies need to adjust their operations

4. **Consulting firm can help them transition**

5. More experience & people are needed to start the company
Who has the first question?

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