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With You Today

Eskander Yavar has more than 17 years of professional services experience. He brings both the technical knowledge associated with complex supply chain, financial, and operational performance improvements and the “high touch” interaction style that improves the flow and timeliness of complex projects.

Eskander has extensive knowledge in the energy, waste services, and technology services industries, and has worked on both domestic and overseas implementations. He has also has served on the global leadership team of a multi-national company and has provided a variety of executive support functions that have helped improve the communications, work flow, and effectiveness of large projects.

Eskander Yavar
Industry 4.0 Co-Leader
Management Advisory Services National Leader
eyavar@bdo.com
With You Today

Malcolm “Chip” Cohron
National Managing Director
Digital Transformation Services Leader
ccohron@bdo.com

With more than 25 years of experience in digital and business strategy, Malcolm is a recognized digital transformation/re-invention field executive who helps clients compete in today’s markets by guiding them through their digital transformation journey. Malcolm is known for driving innovation and transformation by identifying go-to-market growth strategies and helping to solve complex business problems, all while delivering tangible results in compressed time frames.


Malcolm has extensive experience in technology solutions, platforms, software and go-to-market/product development, in both Fortune 500 companies and mid-market enterprises along with start-up firms. He is particularly skilled at defining new markets, products, and channels, and achieving revenue targets. Prior to joining BDO, Malcolm spent a part of his career as a partner at a Fortune 50 technology company where he was responsible for business development, and engagement delivery for artificial intelligence (AI), data analytics, digital strategy, and content services.

Malcolm has published books, articles, and serves as a public speaker in the field of Digitization and Digital Transformation throughout the U.S., Canada and Western Europe. He has authored a variety of methods, models and templates that are in practice today. Malcolm has advised public and private board members, offering counsel, guidance, and trends in the marketplace.
With You Today

Rick Schreiber has more than 25 years of public accounting experience advising manufacturing and distribution companies, as well as providing general assurance, tax, and broad-based business advisory services. His clients have included both domestic and international public and private entities, with a focus on aggressive growth middle market companies. Rick has significant experience with initial public offerings (IPOs), secondary debt offerings, and mergers and acquisitions (M&A). He also provides transformational value growth consulting, and is considered a thought leader with regards to the Internet of Things, also coined Industry 4.0.

Rick Schreiber has authored various accounting and industry related articles and routinely participates in speaking engagements, presentations, and industry symposiums. He is frequently quoted as an expert in various publications and media channels such as The Wall Street Journal, Chief Executive, IndustryWeek, Manufacturing.net, and Dow Jones Private Equity Analyst.
Learning objectives

We will cover:

- The greatest opportunities of—and barriers to—successful Industry 4.0 adoption reported in our benchmarking survey

- Middle market executives’ self-assessments across the six dimensions of Industry 4.0 maturity

- Best practices for Industry 4.0 strategic planning and implementation
Agenda

- About BDO’s 2019 Middle Market Industry 4.0 Benchmarking Survey
- Industry 4.0: Today’s Backdrop
- Top 5 Findings
- Industry 4.0 Opportunities
- Benchmarking Across the 6 Dimensions of Industry 4.0 Maturity
- Resources
- Q&A
About the Survey

BDO’s 2019 Middle Market Industry 4.0 Benchmarking Survey
Survey Goals

Provide middle market manufacturers with a resource to benchmark against competitors across BDO’s six dimensions of Industry 4.0 maturity.

Understand how Industry 4.0 is reshaping how manufacturers do business.

Help inform conversations around prioritizing Industry 4.0 investments.
Survey Methodology & Topics Covered

The 2019 BDO Middle Market Industry 4.0 Benchmarking Survey was conducted by Market Measurement, Inc., an independent market research consulting firm. The survey included 230 executives at U.S. manufacturing companies with annual revenues between $200 million and $3 billion.

It offers manufacturers with an understanding of where they stack up in:

- Industry 4.0 maturity
- Strategic planning
- Technology integration
- Process optimization
- Organizational readiness
Organizations are categorized into three group based on their annual revenues:

- “Lower” Middle Market: $200M-$500M
- “Mid” Middle Market: $500M-$1B
- “Upper” Middle Market: $1B-$3B
Industry 4.0: Today’s Backdrop
Manufacturing’s Evolution

18th Century
- Mechanization
  - Machine tools
  - Steam & water power
  - Rise of factory systems
  - Textiles
  - Ironmaking

19th Century
- Technological
  - Mass production
  - Assembly line
  - Electrical power
  - Globalization
  - Engines/turbines
  - Steel

20th Century
- Computer/Internet
  - Digitization
  - Automation
  - Electronics
  - World Wide Web

Now
- Cyber-Physical Systems
  - Cloud computing
  - Data analytics
  - Internet of Things
  - Intelligent production
  - 3D printing
The Internet of Things vs. Industry 4.0

THE INTERNET OF THINGS

△ The inter-networking of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors, actuators and network connectivity which enable these objects to collect and exchange data.

INDUSTRY 4.0

△ Includes the Internet of Things and takes it a step further with cyber-physical systems (human-machine interfaces & digital-to-physical transfer) enabled by additional innovations, such as AR/VR, advanced robotics and cobots, 3D printing and more.
Industry 4.0 is Digital Transformation for Manufacturers

**Digital Business** is focused on creating new value, market differentiation, and revenue in the digital economy.

**Digital Process** focuses on operational reinvention by optimizing end-to-end process performance and improving efficiency.

**Digital Adoption**, our +1, is at the heart of our approach: a fully integrated change management program that informs and enables the business’s strategic direction, while streamlining user adoption for employees, suppliers and customers.

And **Digital Backbone** is the foundation on which all digital initiatives are built, centering on addressing or removing the IT complexities, risks, and barriers to innovation, to meet business and evolving market demands.
Industry 4.0 is Value Creation
Middle Market Balance

Finite Resources

Risk Aversion

Quick Wins

Strategic Investment

Innovation
Poll Question #1

What are your organization’s spending plans for Industry 4.0 investments in the next 12 months?

a) Increase spending by 10% or more
b) Increase spending by 1-9%
c) No change in spending
d) Decrease spending by 1-9%
e) Decrease spending by 10% or more
Top 5 Findings
1. Business Model Diversification Tops Industry 4.0 Goals

**TOP INDUSTRY 4.0 BUSINESS GOALS**

- Business model diversification: 71%
- Improve operational efficiencies: 67%
- Increase market penetration: 67%
- Improve quality assurance: 66%
- Improve supply chain resilience: 63%
- Improve customer experience: 61%
- Replace or upgrade legacy IT and OT systems: 60%
2. Some are Strategizing, Few are Executing
3. Industry Outsiders Pose the Greatest Threat

<table>
<thead>
<tr>
<th>Threat</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disruption by industry outsiders</td>
<td>69%</td>
</tr>
<tr>
<td>Falling behind the competition</td>
<td>66%</td>
</tr>
<tr>
<td>Pricing pressure due to commoditization or automation</td>
<td>63%</td>
</tr>
<tr>
<td>Customer losses</td>
<td>61%</td>
</tr>
<tr>
<td>Low margins</td>
<td>59%</td>
</tr>
</tbody>
</table>
The Amazon Effect

- Global Ecommerce
- Online Shopping
- Online Marketplaces
- Supply Chain Disintermediation
- Experiential Retail
- Logistics Transformation
- Personalization
4. Poor Communication is the Biggest Barrier to Implementation

<table>
<thead>
<tr>
<th>Top Barriers to Industry 4.0 Implementation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor communication</td>
<td>67%</td>
</tr>
<tr>
<td>Interoperability with legacy technologies and processes</td>
<td>64%</td>
</tr>
<tr>
<td>Lack of skills or insufficient training</td>
<td>63%</td>
</tr>
<tr>
<td>Lack of senior management vision or leadership</td>
<td>60%</td>
</tr>
<tr>
<td>Underinvestment</td>
<td>54%</td>
</tr>
<tr>
<td>Employee pushback</td>
<td>51%</td>
</tr>
</tbody>
</table>
Different Hats, Different Perspectives

The disparity among survey respondents representing different business functions and levels within their organizations highlights communication challenges and potential misalignment.

47% of C-suite VERSUS 14% of other senior executives say they have developed an Industry 4.0 strategy, but are not yet implementing it.

89% of C-suite VERSUS 68% of other senior executives are highly confident in their current IT infrastructure’s ability to integrate advanced technologies.

C-suite executives are 2x as likely than other senior executives to report that identifying the best pilot project will be their Industry 4.0 challenge.
5. The Digital Thread is More Theory than Reality

30% of manufacturers have **data consolidated in a central location**

12% of larger organizations still have their **data in silos**

26% share their **data** with some external vendors
Activating the Digital Thread

The lifeblood of Industry 4.0
Industry 4.0 Opportunities
Greatest Opportunity for Value Creation

27% of upper middle market respondents cite new payment models compared to 10% of lower middle market peers.
Greatest Opportunity for Improved Connectivity

- 13% Sales and marketing
- 15% Fulfillment
- 19% Customer service support
- 25% Planning and procurement
- 28% Inbound or outbound logistics

Larger organizations see greater promise than their smaller peers when it comes to connectivity in customer service support.
Top Targets for Supply Chain Improvement

Upper middle market organizations aim to speed up customer order cycle times while lower mid-market peers focus on reducing inventory turnover.

- 10% Customer service
- 21% Inventory turnover
- 22% Performance to plan
- 23% Total delivered cost
- 23% Customer order cycle time
The Six Dimensions of Industry 4.0 Maturity
# Industry 4.0 Maturity

| LEVEL 5 | ADAPTABLE ECOSYSTEM | ➤ Data monetization  
➤ Inter-company planning and collaboration  
➤ End-to-end process management  
➤ Prescriptive analytics/robotics |
|---------|----------------------|--------------------------------------------------|
| LEVEL 4 | INTEGRATED VALUE CHAIN | ➤ Integrated performance management  
➤ Formation of digital thread (customers and suppliers)  
➤ Collaborative engineering and design  
➤ Process simplification and automation |
| LEVEL 3 | INTEGRATED ENTERPRISE | ➤ Collaborative planning  
➤ Standardized information-sharing platforms  
➤ Process simplification and standardization  
➤ Standardized ERP suite  
➤ Consolidated business intelligence/data warehousing |
| LEVEL 2 | BREAKING DOWN SILOS | ➤ Collaboration by exception  
➤ Connected data and devices  
➤ Divisional/functional process optimization  
➤ Share data upstream or downstream  
➤ Pockets of process-level analytics |
| LEVEL 1 | STOVEPIPE | ➤ Organizational and operational silos  
➤ Island of technology and data  
➤ Manual and non-standard processes |
Change Doesn’t Occur in Isolation

Industry 4.0

TECHNOLOGY
What enabling technology do you need to unlock insight and create business value?

DATA
What does data management and information sharing look like in your organization? With your suppliers?

PROCESS
What processes are transformed by digitization or robotics and how do you optimize their value?

ORGANIZATION
How are you incentivizing cross-functional collaboration? How can you facilitate a culture of transparency?

GOVERNANCE
Is the management team engaged and on board? Are you aligned around an innovation-centric plan or strategy?

SECURITY
What controls do you have in place that allow you to securely share information and mitigate cyber risk?
Technology:
The First Dimension
Industry 4.0 Technology Enablers

76% are highly confident in their IT infrastructure’s ability to integrate advanced technologies.

64% say interoperability with legacy technologies and processes is their biggest barrier to Industry 4.0 implementation.
Technology Adoption Plans

Advanced technologies manufacturers are **using now**

- Cloud computing: 63%
- Advanced analytics: 60%
- Internet of Things: 59%
- Robotics Process Automation: 52%
- Blockchain: 49%
- Artificial intelligence: 46%
- 3D printing or additive manufacturing: 46%
- Augmented or virtual reality: 45%

**...and planning to use**

- Artificial intelligence: 46%
- 3D printing or additive manufacturing: 43%
- Robotics Process Automation: 40%
- Advanced analytics: 37%
- Internet of Things: 36%
- Augmented or virtual reality: 34%
- Cloud computing: 33%
- Blockchain: 28%
Spotlight on 3D Printing
A GAME CHANGER FOR MANUFACTURERS

Drivers:
- Consumer demand for greater customization
- Rise of modular manufacturing
- No longer prohibitively expensive or time consuming
- New methods work for a much more extensive range of materials and more sophisticated architecture

Benefits:
- Faster prototype design
- More complex design
- Less waste and lower storage costs
- More flexibility in production planning
- Shorter production runs
- “Made to order” capabilities
Spotlight on Robotic Process Automation

**Drivers:**
- Rising wages in offshore hubs
- Redeployment of talent
- Lower profit margins and pricing pressures
- Increased need for speed
- Self-service models

**Benefits:**
- Error-free, consistent results
- Employees can be utilized for higher-value work
- Increased job satisfaction (not spending time doing repetitive, low-value work)
- Faster, more predictable delivery timing
- Documented trail of work performed
- Identification of anomalies or other red flags
Poll Question #2

Which of the following Industry 4.0 use cases are you most interested in? (Select all that apply)

a) Predictive maintenance  
b) Remote maintenance  
c) Smart warehousing  
d) Analytics-driven demand forecasting  
e) Automated quality assurance  
f) RFID for identification  
g) 3D printing
Data:
The Second Dimension
All About Data Quality

More data = more value

...but only if that data is clean, accurate and accessible as part of an overall information governance strategy.
Current Level of Traceability & Transparency

- 6% Transparency across the value chain
- 26% Data consolidated and shared with some vendors
- 30% Data consolidated in a central location
- 31% Data shared upstream and downstream within the organization
- 7% Data in silos
Data Monetization Strategies

Smarter use of data is the crux of Industry 4.0.
Case Study: Data Monetization

**PROBLEM**
Manufacturer of emergency vehicle preemption devices for traffic lights wants to provide data to its customers, fire and police chiefs, year-round, not just when it’s time for an upgrade.

**SOLUTION**
Working with manufacturer to create an analytics platform so they can aggregate all of the data collected from their devices to derive actionable insights.

**RESULTS**
Provided client real-time routing information for emergency vehicles, allowing them to reach the site of emergency as quickly as possible.
Process:
The Third Dimension
Current Level of Process Integration

- 53%: End-to-end process integration within the organization
- 30%: Some process integration
- 10%: Some process integration with outside suppliers
- 6%: Functional silos
- 1%: End-to-end process integration with outside suppliers
Horizontal vs. Vertical Supply Chain Process Automation

**LEVEL OF VERTICAL SUPPLY CHAIN PROCESS AUTOMATION**
- 13% High
- 80% Moderate
- 7% Low

**LEVEL OF HORIZONTAL SUPPLY CHAIN PROCESS AUTOMATION**
- 38% High
- 53% Moderate
- 9% Low
Organization:
The Fourth Dimension
Organizational change needs to start with people.
Assembly Model Evolution

**Make-to-Stock**
Finished goods created and stocked before receipt of customer order.

**Configure-to-Order**
Components created and stocked before receipt of customer order, with predefined configurations. Assembled after receipt of order.

**Make-to-Order**
Products are made after receipt of order, including a combination of standardized and customized components.

**Engineer-to-Order**
Highly customizable products are designed, engineered and produced after receipt of order.

Process Manufacturing  

**COMPLEXITY**  

Discreet Manufacturing
Current Fulfillment Model

- **49%** Configure-to-order
- **30%** Make-to-order
- **13%** Make-to-stock
- **8%** Engineer-to-order
Governance: The Fifth Dimension
Business Model Transformation

- Product-as-a-Service
- Information-as-a-Service
- Pay-Per-Use
- Made-to-Order
Revenue Generation Strategies

- Traditional product sales: 70%
- Aftersales services: 67%
- Information-as-a-service: 67%
- Having customers pay based upon product or service usage: 63%
Strategies to Enhance the Customer Experience

- 71% have an omnichannel, integrated customer engagement strategy
- 68% co-create with their customers
- 65% use customer segmentation to target and customize experiences
- 58% use customer journey mapping
- 57% have a 360-degree view of their customers
Security: The Sixth Dimension
The New Cyber Threat Landscape

Denial of Service attacks can result in supply chain disruption—even if your organization isn’t directly targeted.

Industrial control systems are enabling automation—but also opening the door to attacks on operating technology.

Hackers are using botnets to infiltrate and corral internet-connected devices into an IoT “army” to overwhelm a target’s servers with malicious traffic.

Any security gaps in manufacturers’ supplier networks can serve as ingress points for hackers.

Without adequate security measures and data backup, information in the cloud can be lost or stolen.

Bring Your Own Device policies and remote access are enabling a mobile workforce—but more connectivity means more exposure.

Smart devices like wearables can be hacked to compromise customers’ personal data—creating new product liabilities.
The New Era of Data Privacy: GDPR

- More connectivity = more opportunities for data privacy violation from both bad actors and authorized users
- Penalties of GDPR non-compliance: 4% of annual global turnover or €20 million, whichever is greater
- Prudent and responsible data privacy governance goes beyond checking the box for GDPR implementation

23% of manufacturers have not taken any steps to comply with the GDPR
Security Concerns

28% of manufacturers have experienced a data breach in the past 12 months.

More than 2x the number of upper mid-market manufacturers have been breached than lower mid-market peers.

Only 15% are very confident in their organization’s ability to detect a data breach.

**Greatest Security Threat**

- **25%** Distributed denial of service attacks
- **22%** Employee errors or negligence
- **19%** Third-party vulnerabilities
- **14%** Social engineering attacks
- **20%** Intellectual property theft
Approaches to Mitigating Security Risks

- Data encryption: 68%
- Industrial controls systems security: 62%
- Managed security services: 63%
- Security analytics: 64%
- Continuous threat monitoring: 61%
Getting Started
The Road to Industry 4.0

- Assess Your Industry 4.0 Maturity
- Define Your Vision
- Figure Out Financing
- Set Up Your Pilot
- Map Cross-Functional Processes
- Engage External Stakeholders
- Prepare Your People
Poll Question #3

What have you found most useful in today’s webinar?

a) Case studies
b) Survey findings
c) Background on Industry 4.0
d) Getting to know BDO professionals
Resources
Industry 4.0 Resources

WANT MORE INFORMATION?

Read the complete report:
BDO’s 2019 Middle Market Industry 4.0 Benchmarking Survey

Check out more on Industry 4.0:
❖ The Middle Market Manufacturer’s Roadmap To Industry 4.0
❖ 6 Ways Industry 4.0 Is Disrupting The Supply Chain
❖ 4 Trends Shaping Industry 4.0 In 2019

Visit our Industry 4.0 homepage

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QUESTIONS & ANSWERS
Conclusion

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