Automation Alley®

White Paper

Industry 4.0: The Future of Global Collaboration in the Face of Competition

A Roundtable Session presented by The World Economic Forum in partnership with Automation Alley, SRI International and MarketsandMarkets

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Forward

The purpose of this roundtable session was to compare and contrast how the leading advanced manufacturing nations are assisting their small and medium-sized enterprises (SMEs) to overcome the challenges of adopting and implementing Industry 4.0 processes and technologies within their organizations and throughout their supply chains. Approximately 40 people representing industry, academia and the public sector participated in a roundtable format moderated and facilitated by SRI International and MarketsandMarkets.

Following opening comments from Noel Nevshehir (Automation Alley), Ian Cronin (World Economic Forum), Dr. John Carrier (MIT Sloan School of Management) and Csaba Szabo (SRI International), the roundtable participants were asked to consider two primary topics:

1. Opportunities and Challenges of Adopting and Implementing Industry 4.0 Technologies, Processes and Practices
2. Solutions Designed to Embrace Industry 4.0 and Overcome Financial, Technological and Cultural Hurdles

Discussion Summary

Topic 1: Opportunities and Challenges of Adopting and Implementing Industry 4.0 Technologies, Processes and Practices

The primary opportunities for Industry 4.0 adoption identified by the participants were: 1) a catalyst for improved competitiveness, 2) the need for workforce readiness, education and training, and 3) more communication and collaboration.

There was a clear understanding that Industry 4.0 initiatives could have a significant positive impact on key operating metrics such as investment, cost, productivity, throughput, quality, capacity utilization, safety, sustainability, resilience and other metrics. But it was also clear that it was good to start small with incremental changes that could be applied and tested for impact. Wholesale changes to manufacturing or operating processes was, in fact, considered potentially more damaging and disruptive.

With that as a foundational understanding, there was a strong consensus that Industry 4.0 deployment would require changes to the workforce, including managers and leaders. This was viewed as an opportunity to address broader education and training issues beyond Industry 4.0. The participants identified several initiatives that an Industry 4.0 program could trigger, such as:

1. Basic awareness training. (what is Industry 4.0?)
2. Micro-credentials
3. STEM / coding as well as “soft” skills
4. How to solve problems vs technology focus
5. Standards in certification
6. Create pipelines for future employees / leaders
7. Reverse-mentorship programs

The need for enhanced communications and collaboration came up frequently as an opportunity. It was seen as part of awareness, education and training, within companies, across companies, and as public-private partnerships. It was also seen as a way to help stabilize the vocabulary around Industry 4.0 and share best practices and cases amongst SMEs. Building trust and confidence in the technologies via real examples amongst peers was seen as a key enabler.

The opportunities discussion also yielded several additional topics and ideas. Some saw Industry 4.0 as an enabler to help struggling SMEs turn around their businesses by improving basic operating metrics and improving operating agility, which could lead to faster success with new products, services and markets. Improved agility could also lead to more “future-proof” investments thought enhanced resilience to rapid change and uncertainty. Others saw opportunities for new revenue sources from

data monetization, and the creation of more attractive workplaces in the manufacturing sector that would offer more attractive careers for tech-oriented youth.

When the conversation shifted to the challenges presented by Industry 4.0 implementation, there were many concerns:

1. Constrained resources (people, time and money) at SMEs
2. Data Security and governance
3. Perceived and real risks / risk-aversion within SMEs
4. Return on Investment is unclear, unattractive or unknown
5. Lack of in-house advanced IT skills / knowledge
6. Large global OEMs / customers of SMEs are insisting on increasingly advanced global data driven supply chains; SMEs are at a data and resource disadvantage
7. Government / politics not always a fair arbiter of transitions nor particularly good at long-term thinking
8. Blind spots: insufficiently aware of the problems / pain points, magnitude and implications of digital transformation, where an SME is on the roadmap, as well as the downside risk of doing nothing

In the context of what was described as an overall risk-averse culture at SMEs, the lack of in-house resources to learn about, plan, fund and deploy Industry 4.0 technologies was a widely held concern. There were many dimensions to this ranging from the need for basic knowledge and understanding of what is available amongst SMEs and technical leaders to the inability to calculate a satisfying business case due mainly to highly uncertain returns from even roughly estimated investments. Sandwiched in between are concerns about having too little or too much data and not knowing what to do with it, increased risk of cyber-attacks and breaches from more data-intensive systems, fear of job losses, organizational siloes and internal competition for resources, and wrestling with shifts from CapEx to OpEx, and hardware to software spending.

When the discussion shifted to issues beyond SMEs operations, concerns were expressed about how large OEMs / end user customers were driving toward more global data-intensive systems and supply chains. Upstream SMEs especially felt out gunned and expressed little trust for how large downstream customers would use data compiled by these global supply chain networks. The issue of how governments engage with industry overall and SMEs in particular was also considered an important challenge. The main issues revolved around inconsistencies within the various levels of government and policy makers in the U.S. as well as across borders globally. The influence of politics, special interests and widely differing approaches to IP, security, privacy, contracts, etc. in free market vs. planned economies was cited as an obstacle to rapid adoption and implementation of Industry 4.0 technologies.

At a more operationally granular level, even if there is good awareness, a plan and a business case, several participants identified a basic concern about how to introduce and integrate new processes and systems within an often long-standing establish process. This gets to the fundamentals of what to do, where, when, and how to do something new without disrupting operations and creating a lot of downside risk—even if the upside is clear and attractive. This fear often leads to small projects that serve as test cases that get stuck in "pilot purgatory," even if successful.

Topic 2: Solutions Designed to Embrace Industry 4.0 and Overcome Financial, Technological and Cultural Hurdles

After working through Opportunities and Challenges, the roundtable participants turned their attention towards potential Solutions. The main ideas that surfaced focused on:

1. Industry-led collaboration consortia / alliances
2. Customer financing: larger firms with vested interest in improving the ecosystem / supply chain should have an interest in helping SMEs fund the transition
3. Government and industry communication outlets / channels to showcase how value can be created with 4.0 technologies and best practices
4. Government involvement with and support for skill development, training and education
5. Government incentives and support for 4.0 testing and adoption

The macro view was that industry had to step up and be more active, while governments had a critical role to play as an enabler of industry transformation. On the industry

side, there was strong encouragement for collaboration amongst companies in the form of curated non-threatening forums for the exchange of non-competitive information, tools, best practices and cases around Industry 4.0. These would be industry-led, but could also include government and academic participants. Some examples cited included Competence Centers in Italy, "clusters" in South Carolina, Canada's IRAP problem solving networks and others. Another example of a possible way to address SME funding gaps is for larger customers to help finance Industry 4.0 technology deployment and then share the benefits.

Recommendations for government involvement to support Industry 4.0 transitions concentrated on collaboration on compilation of best practices and use cases and the dissemination of this information to increase awareness. SMEs were concerned about competitive issues within and across industries, and while there were challenges expressed about inconsistencies amongst government, many felt that governments could serve as a platform for non-biased data and other resources for SMEs. Many participants thought government needed to play a significant role in providing support and resources for skill development, training and education across all levels. This included creating pipelines for young people to be prepared for Industry 4.0 work environments as well as re-training existing employees from the C-suite to the shop floor.

The participants saw governments as also playing a significant role in creating incentives and support for Industry 4.0 technology development and adoption. Recommendations in this area ranged from conventional tax incentives, grants and other forms of resource support to help de-risk R&D and pilot programs, provide training and advisors to help SMEs develop deployment programs.

Several new ideas surfaced as well, such as the cultivation of technology demo centers where SMEs could see Industry 4.0 in action, and the creation of a objective "digital readiness assessment" tool that could be used by government or academia to help SMEs gain insights about the opportunities, challenges and blind spots to specific companies.

About Automation Alley

Automation Alley is Michigan's Industry 4.0 knowledge center, with a global outlook and a regional focus. Our programs give companies a competitive advantage by helping them along every step of their digital transformation journey. We obsess over disruptive technologies like AI, the Internet of Things and automation, and work hard to make these complex concepts easier for companies to understand and implement. As a nonprofit technology and manufacturing business association, we connect industry, academia and government to fuel Michigan's economy and accelerate innovation.

To be considered for future roundtables, contact us at info@automationalley.com.

About SRI International

SRI International is a nonprofit, independent research center serving government and industry. We work on some of the world's most important problems, collaborating across technical disciplines to spark new ideas and solutions. Our research and innovations have led to new industries and products that impact people's lives every day—from the computer mouse and interactive computing to medical ultrasound, cancer drugs, and much more.

Working with government and industry partners, SRI brings its innovations to the marketplace through technology licensing, spin-off ventures and new product solutions. More information is available at www.sri.com.

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