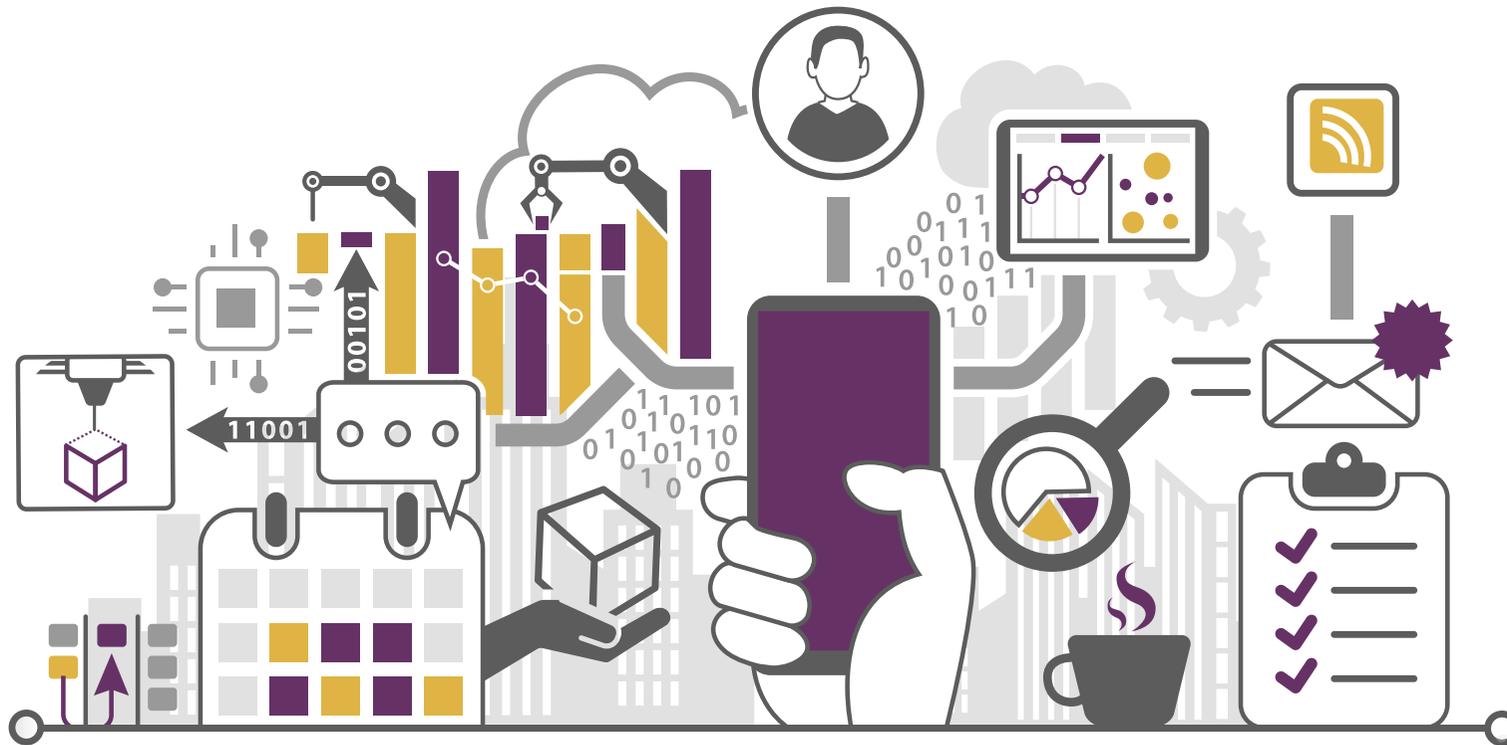3rd Annual

internet of manufacturing MW

June 4-6, 2019, Chicago, IL

SPEAKER INSIGHTS:
FACING THE CHALLENGE OF IT/OT CONVERGENCE

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INTERNET OF MANUFACTURING MIDWEST SPEAKER Q&AS

To really benefit and achieve return on investment from digital transformation, and the IoT technologies needed to build a smart factory, IT and OT teams have to align and work together. However, the challenge of IT/OT convergence is one felt by manufacturers globally, and the struggle to get IT and OT teams speaking the same language, and focused on the same priorities, is heightened by the increased involvement of Lines of Business' in technology implementation.

At Internet of Manufacturing Midwest, we produce **three content tracks, to accommodate the learning requirements of all job titles working to develop and deliver Industry 4.0 strategies.** Recognizing the need to bring different job titles together to network and discuss working frameworks to instil a **collaboarative culture**, our manufacturing speakers and panelists give case studies targeted at those working across various job functions.

To give our audience some food for thought before the event, we asked some of the program's presenters and panelists, to share their thoughts on **why they think IT/OT convergence is necessary**, how they approach it in terms of culture and technology, and what they think the biggest challenges facing it still are today.

Internet of Business US

Rebecca Taylor, Senior Vice President of Strategic Partnerships, **National Center for Manufacturing Sciences**

Rebecca thrives leading teams into the next generation of technology development at NCMS.

Passionate about these important issues, Rebecca is a bit of a geek about cyber security - especially for companies that make things.

Rebecca feels very strongly about engaging young people, especially girls, into STEM fields. The technology is way cooler now that when she was learning about mining and mechanical things and knows that children will lead the next industrial revolution with their great ideas on how technology can improve lives and improve the nation.

"The factory of the future may evolve to production equipment talking to each other; constantly improving operations without operator intervention - but we are not there yet. In the interim this important convergence depends the collaboration of IT and OT people to solve problems. They need to understand the other's points of view and how both operations impact each other. Sounds simple, but it isn't when you've been operating independent of each other for decades.

The biggest challenge I see is in cybersecurity. In working with manufacturers, I've had the opportunity to ask the IT folks who is responsible for cyber security on the shop floor and often they point to the production/manufacturing folks. When I ask the same cybersecurity question to the manufacturing folks they point to the IT department. That means **no one is responsible for cybersecurity on the OT side.** Yet, OT is connected to IT so a lack of security on one side means a lack of security across the enterprise.

Most manufacturers I talk to have strongly separated departments for operations and IT with different people, goals, policies and projects. To overcome this, **strategic and organizational challenges need to be addressed and directed from the top.**

A great first step is for the goals and objectives of the IT and OT departments to be aligned. Perhaps have **IT and OT managers set common goals/targets that force them to collaborate.** Sometimes a joint task force or pilot project can get the conversation going and promote interdepartmental alignment. It is a cultural shift that will occur over time and most certainly needs C-Suite direction and endorsement to succeed.

Certainly, the **Internet of Things (IoT) will allow new opportunities for this convergence and allow the associated risks to be managed.** Manufacturers seeking to integrate IoT and IT technologies into OT systems can benefit from IoT but deployment of these technologies is still in the early stages and **manufacturers don't have all the skills and expertise to drive the alignment.** In addition, managing the digital thread as well as associated cybersecurity issues will require further technology utilization to be successful."

Rebecca Taylor will be moderating the panel discussing the future of co-bots in manufacturing on June 6, within the Business Strategy | IT-OT Convergence track.

Joseph Etris, Manufacturing Engineer and Data Analyst, **Continental AG**

After almost a decade of service as lieutenant for Greenville County Department of Public Safety, Joseph joined Continental Powertrain with goal to bring investigatory analysis, edge development, and data-driven approach to the Fountain Inn facility. While at the county, Joseph and IS developer were able to rapidly design and codevelop several automation programs, including applications to identify offenders for DNA collection and models to assess offender risk. Collaborating with multiple non-profit organizations, team used historical data to secure multiple grants establishing programs to assist military veterans and juveniles.

Currently leading a small team in Fountain Inn focused on customized app development using IoT devices. Understanding that as more and more IIoT devices become connected and as computing moves closer to the "edge," there will follow a convergence of IT, Engineering, and the shop floor. The Fountain Inn team has begun to digitalize the plant and integrate edge applications to reduce energy consumption and emission levels.

Joseph takes part in the Internet of Manufacturing Midwest on June 6, delivering the presentation Energy on the Edge in the morning plenary session.

"The convergence of Information Technology and Operational Technology represents **significant opportunities for the manufacturing industry, both from a hardware and a software perspective:**

- IIoT devices installed on traditional equipment can assist manufacturers by capturing valuable data not previously realized, leading to increased knowledge and process understanding.
- On the software side, converging the shop floor with "lean" software development allows for a transfer of knowledge from experienced staff that can then be used to improve operational efficiencies.

Taking advantage of the IT/OT convergences allows large corporations, who have been traditionally less agile, to compete with "start-ups" that have the ability and flexibility to rapidly develop, deploy, and iterate.

Cloud service providers are being utilized to assist manufacturers with the vertical design and development of solutions. From providing the infrastructure (IaaS), platform (PaaS), application platform (aPaaS), and software (SaaS), service providers give companies the opportunity to create customized solutions to meet customer needs.

Also, edge computing devices that capture and process data at the proverbial "edge," are allowing the computation to be completed on-site and near real-time. A hybrid approach, or mixture of cloud and edge computing, has been rapidly growing and gives enterprises the ability to analyze data in the cloud and then deploy prescriptive solutions at the enterprise edge, creating a "build, measure, and learn" feedback loop."

Why are you taking part in the 3rd Annual Internet of Manufacturing and what lessons will you gain from the event?

"As a lifelong learner, I appreciate the opportunity to be around other leaders who have similar passions and goals. Being able to collaborate and share best practices with one other can help us all better transition our paths towards digitalization while providing us a great opportunity to improve our core businesses and create value for our customers. "

Lyman Tschanz, Vice President, Connected Enterprise Consulting, **Rockwell Automation**

Lyman Tschanz was named Vice President in Rockwell Automation's Connected Enterprise Consulting, organization in July 2018. In this role, Lyman is responsible for advancing relationships with industry, academic, and governmental institutions for further understanding of the Connected Enterprise, and development of the required manufacturing workforce of the future. He is also responsible for partnering with customers to consult and guide them in developing their digital transformation strategies.

Lyman has 40 years of experience in general management and operations, mergers and acquisitions and global business management in

the automotive, automotive aftermarket, electrical equipment and industrial automation industries.

Overcoming IT-OT Challenges

"Manufacturers face multiple challenges in transforming their business through IT-OT convergence. Many companies have done a variety of pilots and proof of concept projects to begin their digital transformation, and they realize some level of benefit. However, these projects tend to stall and be limited to a local level, and struggle to advance across the entire organization.

A key starting point to **realizing the potential large benefits of digital transformation occurs when the senior leaders of the organization commit to an enterprise wide initiative.** A vision for the key areas of target improvements then can be realized, and a roadmap of the technical solution to enable the convergence is developed. This results in a digital business case with costs, benefits, and a project plan.

Since this work does not fit into typical organization functions, we see many companies create new leadership roles which are responsible for digital transformations. As an example, a **digital transformation officer.** These roles cut across the organization to provide needed focus on the digital priorities for the company, since these transformations can impact nearly every function in a company.

Another key step in developing the digital business case is for a company to select the right trusted partners with broad digital and process knowledge and experience in this space. The best partners in IT-OT convergence have the following attributes:

- Offer a complete holistic solution across the entire IT-OT space, including a broad range of partners in adjacent technologies.
- Provide **scalable and user configurable solutions**, which are able of supporting the unique needs of each customer.
- Are agnostic and configurable to connect a range of existing IT and OT systems, without large custom development work.
- Demonstrated experience in enterprise wide deployments across a range of industries, with well developed use cases and proven results.

Responding to the Skills Gap

There are many areas of new or expanded knowledge required for a company to realize success in an IT-OT convergence, including; manufacturing execution systems, machine learning, data analytics, and increased cybersecurity to mention a few. This is on top of the core competencies that most companies have in ERP systems, traditional IT networks, OT plant floor process control systems, and automation architecture.

There is presently a critical shortage of employees with digital knowledge and experience. Some universities and technical colleges are just beginning to launch content in this space, but few students with this education are available. As a result, most companies tend to develop their own current best resources in these new areas of knowledge. A new range of hybrid employees emerge, with knowledge in their core function, but also with an expanded view of the enterprise data and connections across functions and processes. These people have interest and acumen in broadening their digital knowledge,

and these employees quickly become valuable resources. Typically the partner company responsible for the convergence can provide support and training throughout the project, to help the employees learn these new skills become self-reliant over time.

Infrastructure Issues

Beyond the base system, there are several infrastructure issues to consider on the digital journey for a company, mainly in the areas of digitized data, network infrastructure, and increased cybersecurity.

The core of the IT-OT convergence is the data, and often much of the key data needed to optimize the enterprise may not currently be digital, may not be available real time, or may be of unreliable data quality (manually entered). This can mean investments are required to collect the key data by adding digital sensors, machine upgrades, scanners, or vision systems to mention a few.

As the enterprise moves towards being digitally connected, there are dramatically larger amounts of data being stored at various points in the business and being moved around the organization. The network infrastructure will need to be expanded to provide increased storage, greater bandwidth, and improved reliability.

Lastly, as more and more people in the organization get access to the converged data, the needs for system security increase. In order to realize the benefits in a digital enterprise, more employees need increased access to more data across systems. At the same time the system architects need to mitigate the risks of human errors, or worst the risk of malicious intruders, which is a difficult balance.
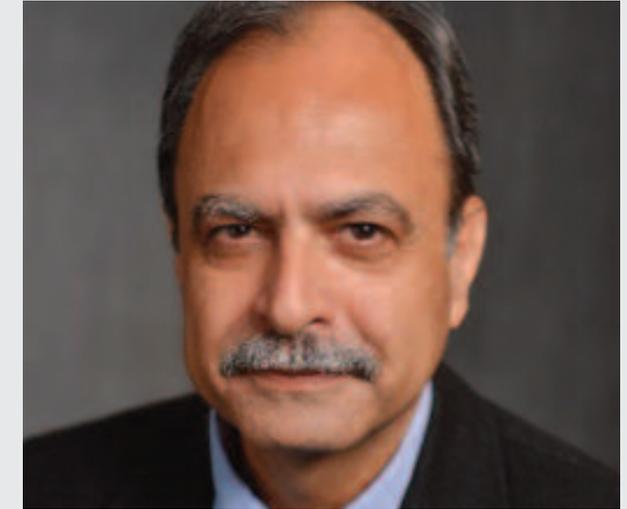
Culture

Perhaps obvious, but any large change in a company requires change management. In addition, there are at least two unique culture considerations that companies face in a digital transformation. First, the entire organization needs to embrace the connected enterprise data as the source of the truth and the root of improvements. When there is a business problem, the leaders need to not just ask about the problem but also ask for the data that is available surrounding the problem.

And the leaders need to encourage and empower the organization to act on the data. As an example, if an operator on a line sees in real time that quality levels are way off, do they keep running the line, or are they empowered to stop the line and immediately address the problem?

Secondly, employees will begin to see data outside of their traditional role that was rarely or never available to them in the past. This will lead to interactions and collaboration across functions, driving new levels of improvements. Everyone will develop a better understanding of how their output might impact performance in an unrelated area. Employees will be more effective when they understand their role in the broad organization and how they connect through others to the end customer. As an example, a scheduler will have the opportunity to reprioritize the MRP production schedule, because they can see a critical shortage at a key customer that developed after the MRP schedule was released."

Haresh Malkani, Chief Technology Officer, **CESMII — The Smart Manufacturing Institute**

Haresh was appointed CTO of CESMII starting March 1, 2018. He brings over 29 years of experience in an industrial RD&E environment covering development and deployment of Smart Manufacturing technologies including sensing, automation, control, modeling, simulation and analytics for applications in continuous, hybrid and discrete manufacturing operations.

In his role as CTO for CESMII, Haresh oversees the technology mission, road map and objectives of CESMII. He will spearhead development of technologies spanning advanced sensors, controls, platforms, data analytics, modeling for manufacturing, and smart manufacturing standards and protocols. He will oversee the development and application of the nation's first open, collaborative Smart Manufacturing technology platform for industrial applications. In addition, he will provide guidance on the institute's technical program content for training and workforce development.

Prior to joining CESMII, Haresh was Director of Digital Manufacturing & Automation Technologies at Arconic/Alcoa.

Haresh takes part in the How Industry 4.0 is Reshaping Manufacturing panel discussion in the Business Strategy | IT-OT Convergence track on June 5, 2019.

"One way to describe IT-OT convergence challenges is to look at in on two fronts: information and organization. In the traditional ISA-95 architecture, the information obtained from devices, machines and processes needs to be merged with the information received from the enterprise level. This mash-up usually occurs at Level 3 – in many cases in MES/MOM systems. And **it is not easy because the data models necessary for a successful mash-up get complex**. With new IIoT architectures, the traditional ISA-95 levels are being bypassed – data is collected from all layers and is integrated and analyzed in the Cloud. **In other words, OT data from the plant floor is being handled by IT systems in the Cloud Data** – this is one

manifestation of this IT-OT convergence. This is also creating challenges, and opportunities, from an organizational point of view. Traditional OT groups that typically deal with sensing and control now need to be well-versed with IT technologies that were prevalent only at the enterprise level. On the flip side, IT professionals are dealing more and more with operational data that is coming directly from the shop floor.

Converging IT and OT from an organizational point of view can be done in a couple of ways. For small organizations, the two organizations have actually been merged into one. This is harder for larger companies with legacy organizations that are deep rooted. In other cases, companies have formed cross-discipline teams from IT and OT to develop and implement solutions with the new IIoT based architectures."

Hear more in June!

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June 4-6, 2019, Chicago, IL

400+
Attendees

40+
manufacturer case studies

30+
hours of learning

60%
manufacturing audience

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