FROST & SULLIVAN

A Virtual Think Tank Executive Summary

How Digital Transformation is Driving Change for Manufacturers

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Introduction

Frost & Sullivan recently conducted a virtual think tank (VTT) with industry thought leaders to understand how digital transformation is driving change for manufacturers. The discussion was led by Paul Tate, co-founding editor and research director for the Manufacturing Leadership Council, which is now a division of the National Association of Manufacturers.

The following industry thought leaders were in attendance to share their perspectives:

- **Scott Rogers**, *Technical Director,* Noble Plastics
- **Stacy Ripperda**, *Business Analyst*, Titan International
- **John Barcus**, *Group Vice President, Manufacturing Industries & Emerging Technologies*, Oracle

The VTT brought together diverse opinions and a great mix of ideas from different manufacturing organizations:

- Noble Plastics manufactures high-value injection-molded parts primarily for industrial use and has a fair amount of Department of Defense customers. The company also produces automation systems, primarily robotics-based automation systems.
- Titan designs, tests and produces both off-road wheels and off-road tires primarily for the agriculture markets and also for the mining, earth mover and construction markets.
- Oracle, an enterprise software and hardware company, delivers industry-specific, customer-centric applications that are cloud-enabled. Its industry solutions group focuses on manufacturing industries, including high tech, industrial, and automotive.

The speed of business continues to rapidly evolve and so do technologies that help manufacturers digitize their factories, drive financial and operational impact, and improve productivity and customer satisfaction. However, digital transformation is not simply about the deployment of digital technologies, and the introduction of new technologies alone does not bring in the aforementioned benefits. Therefore, it is important to understand what organizations must do to succeed in their journey to digital transformation.

"When they talk about value creation, that's not just about cost savings and efficiencies. It's also about creating new opportunities and the ability to perhaps harness the digital technologies to look at new ways of running a business, new services that they can provide, new revenue streams that they can generate. This transformation is not just about transforming what you've got. It's also opening up new opportunities for the future." **– Paul Tate**, NAM

The thought leaders explored a number of different aspects and dimensions of digital transformation, including the technologies they are already working with, their current strategies, the primary business goals of their plan, data entrepreneurship and data-driven decision-making, change management and collaborative culture, and the potential challenges ahead. Oracle brought in the perspective of value creation other than cost savings and also shared fresh ideas on a formal digital transformation strategy and what every company should aim for as part of their digital transformation journey.

Challenges Facing Manufacturers Today and the Need for Digital Transformation

"The manufacturing industry is undergoing unprecedented transformation driven by technologies that help manufacturers to digitize their factories. The fourth industrial revolution can drive financial and operational impact while improving productivity and customer satisfaction." **– Dr. Jay Lee,** Member, Manufacturing leadership Council Board of Governors

Changes in customer demand, industry standards and public policy regulations are rapidly transforming today's manufacturing organizations of all sizes and types, and the pace of change in manufacturing is further accelerated by Industry 4.0 and Smart Manufacturing/Smart Factories initiatives. Manufacturers, due to increased outsourcing to trading partners and when working with a global supply chain operating model, are dealing and interacting with a much broader, diverse, complex set of partners in the value chain. Expansion into new markets and segments makes their supply chains more complicated than ever, and such complexity in supply chains prevents a manufacturer's ability to predict demand and assess the impact of supply chain disruption due to lack of end-to-end visibility. Despite the challenges, continuous innovation, improved quality and increased customer satisfaction remain the top priority. Therefore, in today's competitive markets, manufacturers cannot afford to be slow in their response to adapting to emerging trends. To thrive in these new environments, manufacturers must be agile, stay aligned with a rapidly evolving business environment, and exploit new growth opportunities efficiently. This calls for manufacturers to embrace digital technologies to improve the business processes and corresponding business model, compete effectively and grow, and deliver real benefits for the future.

"The biggest obstacle that we've dealt with is just establishing and maintaining a clear vision for a digital transformation across the company so everybody knows what to do."
– Scott Rogers, Noble Plastics

Panelists discussed the technologies their companies are already working with, their respective strategies and their primary business goals, as explained in the following section.

> **"**This transformation is not just about transforming what you've got. It's also opening up new opportunities for the future.**"**
> – Paul Tate, NAM

> **"** We're looking for more real-time reporting, machine-based reporting, automatic reporting. **"**
> **– Stacy Ripperda,** Titan International

Formal Digital Transformation Strategies of Titan International, Noble Plastics & Oracle

Titan International, Noble Plastics & Oracle are at different stages of adopting new technologies for their transformative journey to the future.

Titan International: Titan implemented automatic counting using Oracle's IoT Production Monitoring Cloud. It connects sensors through the platform to address its need for real-time, machine-based and automatic reporting and to avoid manual reporting. The primary goal was to reduce inventory and ship faster through better inventory accuracy and timely inventory visibility. Titan is already expanding at one of its facilities and plans to roll out the initiative to more of its tire plants. While Titan does not have a formal digital transformation initiative or strategy, it plans to connect additional machine sensors to the IoT platform, collect data, and harness and analyze it for predictive maintenance. The company aims to be more proactive in its whole manufacturing process.

"We're looking for more real-time reporting, machine-based reporting, automatic reporting. We've connected some sensors through the IoT platform. We have a great need for that as to avoid manual reporting and it will give us better inventory accuracy, more timely inventory visibility. All of those things will actually in the long run help us reduce inventory."
– Stacy Ripperda, Titan International

Noble Plastics: Noble Plastics is looking at Industry 4.0 initiatives within its manufacturing operations and from the standpoint of offering capabilities with the systems it sells. Noble Plastics began looking at the IoT for better monitoring. It is using Oracle's IoT Asset Monitoring Cloud to monitor machines and production. Noble Plastics has its production machinery hooked into the IoT application and is focused on scalable methods of collecting data in robust and maintainable ways so that it can then plug it into the analytics. Information from the production machinery is combined with information from the ERP system to create a dashboard containing the information and metrics on how an operator is performing, i.e.,

whether the operator is going to meet his/her quotas during a particular shift. Therefore, the benefit that's potentially achieved with data and sources of information is empowering the user to understand where they are in the production cycle or make adjustments on what they can do to make a difference. The same details are also available to sales and supervisors, who can see how each production machine is doing and how it is predicted to finish a shift.

"One of our shift supervisors has a Tesla, and so he's got our app showing all the data up on the screen of his Tesla as he's driving into work." **– Scott Rogers**, Noble Plastics

From a business goal perspective, Noble Plastics is looking at improved return on capital and is trying to make good parts faster through schedule improvements (better delivery times), an increase in product quality (less waste) and improvement in process efficiency (cycle time). Real-time visibility into what is happening in operations has been the most effective way for Noble Plastics to make better decisions faster.

"Some of the early things that we focused on were scalable methods of collecting data in a robust way, and those ways have to be maintainable so that we can then plug them into the analytics. We… are using Oracle's internet of things Asset Monitoring Cloud where we're able to get some of the analytics and use those to benefit [our operations]."
– Scott Rogers, Noble Plastics

Oracle: Oracle is going through a transformation. Although Oracle may not call it a formal digital transformation strategy, it is innovating to support multiple customers at a lower cost while providing significantly better service. By having everybody on the same release of the application, Oracle's ability to innovate becomes easier. The company focuses on leveraging transformational technologies to help drive change with its customers and is also leveraging some of those same technologies with its own hardware manufacturing entity to improve and enhance manufacturing.

The company has a complex integrated supply chain and has orders that are also complex and highly configured. One of the areas where Oracle differentiates is at the beginning of the order process. A lot of the engineering and quality data and manufacturing configuration validations are done in the configuration process, which allows Oracle to transcend across the supply chain and manufacturing to make sure that the right product with the right quality is manufactured.

"As we execute through the supply chain, the transparency and visibility of supply chain and quality data across our suppliers, our contract manufacturers and our own final assembly area helps us to ensure the quality that our customers require while also helping us to reduce risks and dependably make our delivery commitments. The end result is that we can deliver our products, very highly complex configured products, with a fixed lead time of five days or less. We do that for the majority of the hardware that we sell." **– John Barcus**, Oracle

Oracle leverages many contract manufacturers. Another area where Oracle had the biggest opportunity is with the digitization of the supply chain and automation of activity associated with communications between its contract manufacturers and its own manufacturing entity. In addition, Oracle leverages IoT for monitoring quality with its suppliers.

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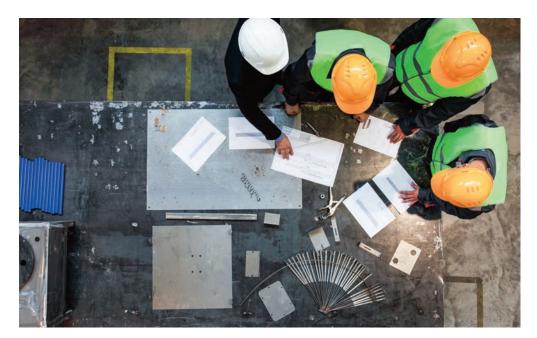> **– Scott Rogers,** Noble Plastics

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> **– John Barcus,** Oracle

The future, Oracle believes, will be to tie the supply chains, suppliers and contract manufacturers together in a way that allows them to be managed a lot tighter and allow the speed of information to transcend much faster through the organization so that quality, manufacturing, supply side, purchasing and sales have the information much faster and can make decisions without having to rely on the rest of the organization.

Oracle's Perspectives on Digital Transformation Strategy & What the Real Digital Transformation Objectives for Companies Should Be

"A big benefit of digitization comes from the ability to anticipate and adapt faster to transitions in the industry. So, when dramatic changes occur, the normal latency that a company sees is reduced and they are better able to adapt almost real-time. In addition, digitization helps manufacturing companies to innovate faster by leveraging a closed-loop feedback cycle enabled by digitally connecting the extended supply chain; including manufacturing, suppliers and customers."
– John Barcus, Oracle

Oracle finds that most companies don't have a formal digital transformation strategy. In companies that may have a strategy or a formal process, their transformation is usually only happening in certain divisions and not mandated across the organization. This is because companies like to see some immediate return on their investments. Therefore, selling it to the organization and allowing the organization to transition forward involves identifying the benefits that companies can achieve with digital transformation and then providing evidence. While cost savings is one benefit of digital transformation, Oracle believes that both the objectives and benefits of real digital transformation are and should be a lot more than mere cost savings. Oracle believes that value creation, through the application of new digital technologies, is not only about improved productivity, increased customer satisfaction, improved financial and operational impact and cost savings but also about looking at new ways of running a business, creating new growth opportunities, new services manufacturers can provide and, as a result, new revenue streams that manufacturers can generate.

Oracle's sees the need for Smart Manufacturing by leveraging advanced technologies. There has been a significant development in the evolution of various disruptive technologies in manufacturing over the past two decades and this development brings new opportunities, both in terms of cost savings and overall value creation. IoT, Big Data, cloud computing, industrial AI, advanced analytics, blockchain and other advanced technologies individually make an impact that manufacturers can leverage (using all of these or combining elements of these into a suite of technologies) to digitize their factories and address particular business problems.

The world is changing at a dramatic pace today, and Oracle is seeing that the bigger benefit of digitization comes from the ability to move faster, adapt faster to transitions and disruptions in the industry, anticipate changes, and automatically execute information faster and manage large volumes of data quicker, all resulting in speed of innovation and execution of those changes.

For instance, real-time data collection from anywhere, deriving actionable insights from the data through advanced analytics in an easy-to-use user interface, and the use of mobility to remotely gather relevant information impacting day-to-day operations and monitor performance to make the right decisions at the right time, improve the velocity of business execution. To this end, digital transformation helps manufacturers establish a foundation for agility and flexibility.

Manufacturers face increased production demand for affordable, high-quality products and cannot afford to have recalls and quality-related issues. Visual representation of a plan, visual indicators of performance and better visibility of KPIs through advanced dynamic searches and interactive dashboards and reports enable seamless data discovery and visualization. Users can easily compare multiple scenarios and visualize them fully for improved performance. For example, a live dashboard can show how many items were made, such as first batch yield, or the number and type of quality defects. Then a root-cause analysis, with the help of AI, about what is going on in a process, identifying where the bottleneck is and which processes are resulting in defects, and how to optimally fix the bottleneck and optimize the process to control such defects, results in higher yield and fewer defects in the future. This then contributes to increased competitiveness for manufacturers. An analysis can also be done to find the operators/workforce on the shop floor that are performing well and those that need further training. As opposed to using historical sales to forecast demand, which results in poor customer service and increased inventory, using AI to analyze end-to-end data (enterprise-wide as well as the extended supply chain) enables manufacturers to more accurately predict the demand and increase customer satisfaction.

Machine health is still a blind spot and unexpected failures continue to occur. This calls for real-time machine monitoring and full visibility of machine health across a facility. Predictive insights provide trend graphs, conduct specific machine diagnostics, predict machine malfunctions, and provide manufacturers with alerts and recommendations on machine health. Predictive insights help to understand the health of the machine both today and in the future. For instance, if a machine has the potential to fail in the next few days, what-if analysis can look into the historical performance of the machine and use that for future projections. Machine health is more than a maintenance issue because it affects the entire organization

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and predictive insights play a critical role in helping manufacturers reduce maintenance costs, improve overall equipment effectiveness (OEE) and asset utilization, reduce unplanned machine downtime, and increase productivity.

Oracle's perspective is that the aspects and overarching themes of digital transformation strategy and objectives will have significantly more impact than just cost savings.

Data Entrepreneurship

As more sensors are enabled, there will be more data available. And with an increasing level of networking and connectivity among people and machines/devices, exponential growth in new data is occurring. Nevertheless, today's businesses already have massive volumes of historical data. And unlocking actionable insights from data is critical to decision-making, i.e., data-driven decision-making. However, while data is increasingly becoming a critical corporate asset for the future of manufacturing, what really matters is how the workforce and leadership teams have started to understand how to use that data to drive decision-making, particularly about the future of the business. However, in today's rapidly changing manufacturing world, users of any kind should be able to use the data and independently unlock actionable business insights from complex data with ease, speed and agility. To this end, real-time data analysis capabilities, predictive analytics and AI can help the workforce and leadership teams of today's manufacturing companies leverage data, interpret the results and ultimately help them with their decision-making agility and performance predictability. Panelists agreed that bringing the power of analytics into the hands of the workforce, leadership teams, decision-makers and stakeholders that are driving value for the business will be a critical component of digital transformation.

"There will be a higher expectation that companies will leverage AI to actually improve the ability to interpret the results of the large volumes of data that they will see. I think the younger generation, that's actually grown up with the many AI based applications they are currently using, will expect that AI applications will also be available to help them to do their jobs."
– John Barcus, Oracle

Impact of Collaborative Culture
on Digital Transformation

As technology becomes more impactful, organizations need to evolve as well. Transformation, therefore, is not simply about the introduction, deployment and use of digital technologies, either individually or as a suite of technologies. Rather, digital transformation requires fairly extensive changes to the way people in the organization operate and collaborate, to a company's business processes and its corresponding business model, and also to the leadership and workforce talent/skill sets, their attitudes and ways of working. Delivering real benefits for the future is, therefore, about integration of technologies that are better aligned with the business, followed by effective management of those suites of technologies. These changes help manage a digitally transformed, data-driven organization for the future. Overall, collaboration and organizational and cultural change have to be driven from the leadership group.

In light of this, companies are rapidly moving from the hierarchal organizational structure to one that is far more collaborative. Not just because they need to work together to do things quicker and cut down on delays between organizational silos, but also because now they can share information and get a common view of what needs to be done, end to end, within the organization as well. Cross understanding among divisions maximizes the overall business value. Essentially, a collaborative culture results in a single source of the truth. Such a culture facilitates connectivity among the various islands present in the business, from shop floor to top floor.

"We've actually transitioned people across functional areas. One example, we sent some people from customer service up to shipping to spend time and people from shipping down to customer service to spend time. We've already been doing some kind of cross-functional observation. We're already starting to do more information sharing of what's really needed from one area to another, and not always what somebody thinks somebody else needs. We're trying to bring that all together into single sources of the truth."
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Current & Potential Challenges Ahead

"The challenges are really not about the technology itself. It's about skill sets, about cultures, about driving the vision, it's about business change." **– Paul Tate**, NAM

Technology has already moved at a much faster pace than in the past and is only going to continue to evolve more rapidly as companies move into the future. Consequently, some of the biggest challenges of digital transformation will be in bringing the workforce up to speed on these new technologies so they can leverage them, be proficient in them, effectively make the most use of them and gain maximum value. In other words, the challenge is in digitally empowering the workforce. Manufacturers have a mixed workforce of older workers/high-tenured people as well as younger workers. The younger generation has grown up with more exposure to the AI and social apps manufacturers are moving towards. Therefore, technology-wise, the younger workforce that is connected all the time and expects instant results welcomes the use of new digital technologies. In fact, flexible, modern and connected cloud solutions and technologies are making manufacturing attractive to the young workforce due to their built-in, powerful, interactive and intuitive social and mobile features. However, there's a generation of people that is not as comfortable aligning with that change and organizations should bring them up to speed as part of their strategy to make digital transformation a success.

"Of course, technology wise the younger workforce, they're not scared of it. They're connected all the time. The younger folks get very frustrated if they don't have instant feedback."
– Scott Rogers, Noble Plastics

Managing the complexity of data, making sense of it and translating it into critical business decisions is challenging due to data volume, velocity and variety. As a result, most of the available data is never analyzed, despite the fact that companies generate significant amounts of data. But getting the right data to the data professionals at the right time is critical to make decisions. Therefore, having the skill set to leverage the full set of business data and analyze it is yet another challenge.

For organizations undergoing digital transformation, there may be areas that need only a process simplification without any need to change the existing skill set, but there are areas that need more technical expertise and the skill set has to be updated or even changed. In such cases, organizations should re-evaluate their existing talent pool and the challenge will be in managing organizational resistance to such changes.

Another challenge is establishing and maintaining a clear vision for a digital transformation across the company so everybody knows what to do, then identifying and placing the right resources in the right areas. Having a clear vision enables organizations to focus on the core strategic activities that align with their corporate goals and stay ahead in their digital transformation growth curve.

Conclusion

The virtual think tank panelists discussed critical issues, including:
- Increased need for agility to be competitive
- Benefits of digital transformation to enable improvements and change
- Digital transformation strategy and what the real digital transformation objectives for companies should be
- Understanding how to use data, by workforce and leadership teams, to drive decision-making about the future of the business
- Need for cultural change and collaborative organizational structure
- Bringing the workforce up to speed on the new technologies
- Organizational vision

Digital transformation is not simply about the deployment of digital technologies. Frost & Sullivan recommends addressing organizational resistance to culture and change management, establishing and maintaining a clear vision for a digital transformation, shifting from the hierarchal organizational structure to a far more collaborative organizational structure, collaborating and sharing information effectively, leveraging a full set of business data, having the skill set to analyze data, and digitally empowering the workforce to drive success.

While cost savings and efficiency improvements are part of digital transformation, Frost & Sullivan and the thought leaders on this virtual think tank agree that digital transformation also:

- Enables the ability to adapt faster to transitions in the industry;
- Boosts speed of innovation and execution of those changes;
- Creates new opportunities, revenue streams and improved performance through better visibility of KPIs and comparative benchmarks;
- Increases competitiveness through improved yield, quality, flexibility and efficiencies;
- Improves production efficiencies and quality sooner through predictive insights.

"Of course, technology wise the younger workforce, they're not scared of it. They're connected all the time. The younger folks get very frustrated if they don't have instant feedback."
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