ENHANCING FACTORY PERFORMANCE THROUGH IMPROVED DEMAND PLANNING

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AUTODESK

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Often, demand planning is considered the domain of manufacturers' procurement and supply chain management teams to ensure that their company has sufficient raw materials and components available and can deliver the goods to customers on time. However, those involved in producing the products also need to have sight of peaks and valleys in demand to effectively manage resources, meet deadlines, maintain quality levels, and reduce costs.

During the spring of 2024, ABI Research conducted an online survey of more than 400 manufacturing and production engineers and facility managers across both discrete and process manufacturing environments in the United States, Japan, Germany, and the United Kingdom.

The survey was commissioned by Autodesk and explored challenges that respondents are currently facing and how software applications can help resolve them.

EXECUTIVE SUMMARY

- The online survey revealed that improving future demand planning was the most important objective in the working lives of both manufacturing and production engineers and facilities managers.
- Improving demand planning also informs respondents' efforts to improve manufacturing flexibility and throughput, adjust to customer/market requirements, and reduce waste.
- Production management and tracking software's ability to help users monitor production flows and performance, and identify bottlenecks will be critical to accommodate peaks and valleys in demand.
- Discrete event simulation software's ability to support scenario planning enables users to not only plan to meet demand today, but also optimize their factory layouts for changes in the market.

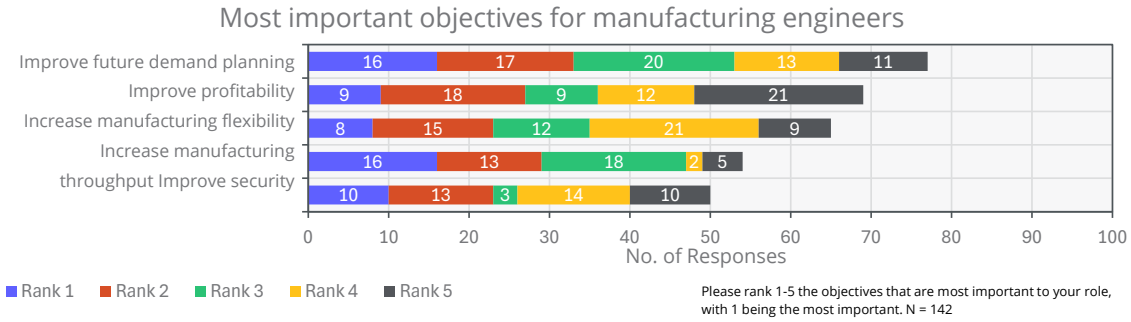
- Simulation and Artificial Intelligence (AI) are the key capabilities underpinning Autodesk's solutions that make lives easier for manufacturing engineers, production engineers, and facilities managers.
- However, to be fully embraced by users, software applications must match their workflows and be easy to use.

WHAT'S IMPORTANT ON THE FACTORY FLOOR?

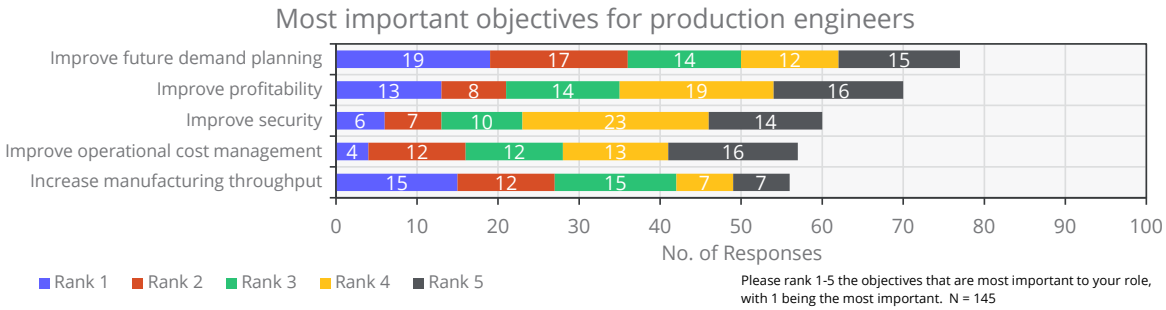
The survey results confirmed the distinct focus areas for the three different roles with:

- **Manufacturing engineers** are focused on developing and implementing manufacturing processes, developing and maintaining manufacturing process documentation, and monitoring and analyzing manufacturing performance.
- **Production engineers** are focused on designing factory layouts and material flow, reviewing factory designs with architects and construction firms, and acquiring reality capture data of facilities.
- **Facilities managers** are focused on making health and safety improvements, improving environmental safety management, and reducing the environmental footprint.

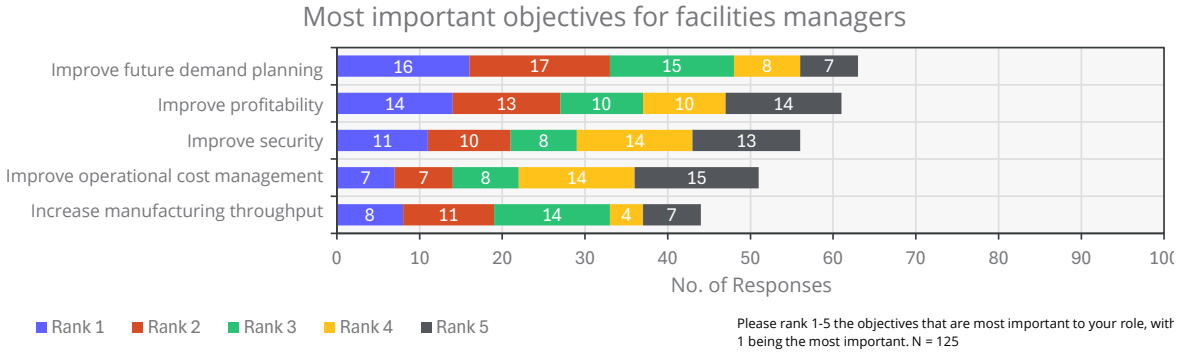
Respondents were asked to rank the objectives that are most important to their role. Of the 17 tasks, improving future demand planning was the most often cited in each role.



Please rank 1-5 the objectives that are most important to your role, with 1 being the most important. N = 142



Please rank 1-5 the objectives that are most important to your role, with 1 being the most important. N = 145



Please rank 1-5 the objectives that are most important to your role, with 1 being the most important. N = 125

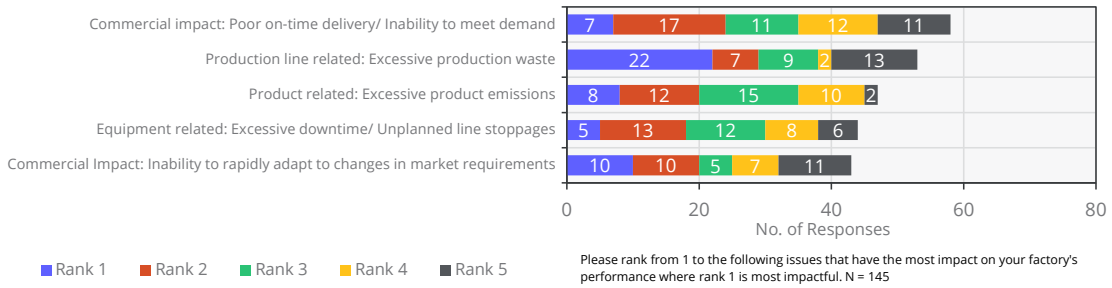
Furthermore, of those ranked 1 or 2, improving future demand planning was the commonly picked objective.

Improving demand planning can support other objectives such as improving manufacturing flexibility and throughput. Better demand planning will also improve profitability with output levels that match customer demand and improve operational cost management.

WHAT AFFECTS FACTORY PERFORMANCE?

While improving demand planning is a key objective for survey respondents, it is important to understand other challenges and objectives in the immediate operating environment.

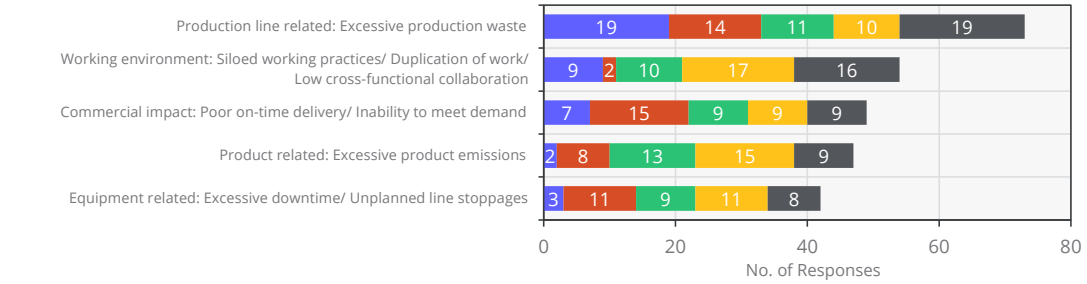
Most impactful issues on factory performance according to manufacturing engineers



Please rank from 1 to the following issues that have the most impact on your factory's performance where rank 1 is most impactful. N = 145

Poor on-time delivery and an inability to meet demand or to rapidly adapt to changes in market requirements were among the top five most commonly ranked issues (out of 21) for manufacturing engineers. This reinforces the importance of improving demand planning for this cohort as part of improving manufacturing processes and performance.

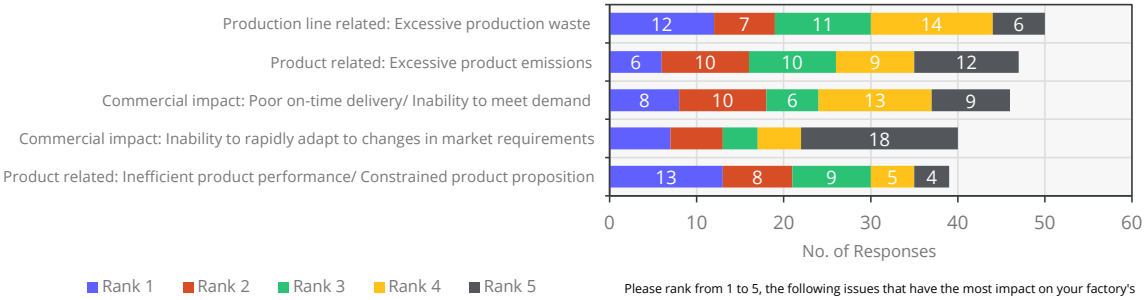
Most impactful issues on factory performance according to production engineers



Please rank from 1 to 5, the following issues that have the most impact on your factory's performance where rank 1 is most impactful. N = 145

Production engineers see an inability to meet demand as something that will ultimately affect factory performance. Better demand planning will help this cohort reduce waste and support the need to reduce emissions.

Most impactful issues on factory performance according to facilities managers



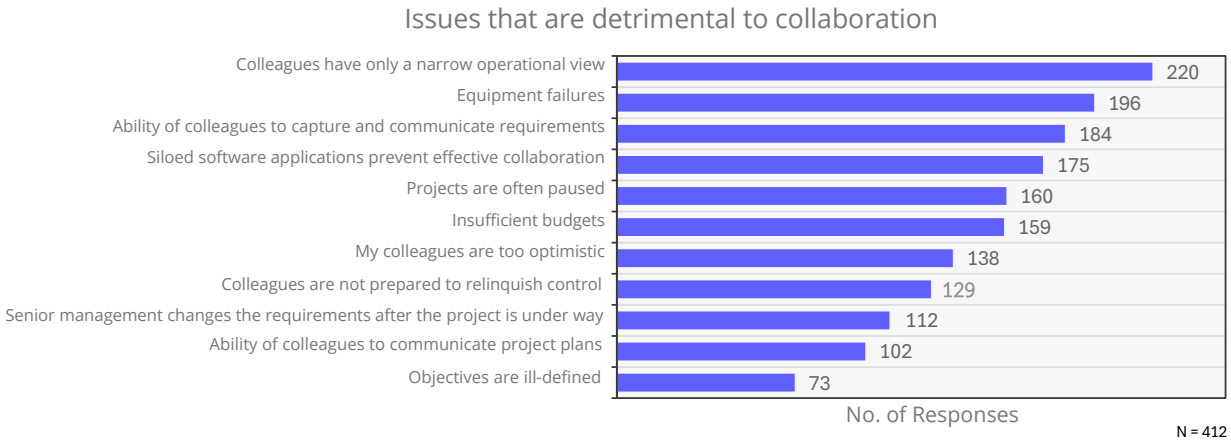
Please rank from 1 to 5, the following issues that have the most impact on your factory's performance where rank 1 is most impactful. N = 125

For facilities managers, meeting customer demand is the third most cited issue affecting factory performance in addition to ensuring that the factory adapts to changes in market requirements. For this cohort, better demand planning can support their work to reduce their firm's environmental footprint.

WHAT PREVENTS OPERATIONAL EFFECTIVENESS?

Successful operations are a mix of high-performing equipment, clear and effective processes, engineering talent, and organizational leadership. The online survey explored issues that hold back operational effectiveness.

Two of the top three issues identified have nothing to do with equipment or technology. For operations to be effective, individuals need to develop a holistic view of the operations, rather than focusing entirely on their tasks, and work on articulating their requirements so that other stakeholders can fully appreciate their needs.



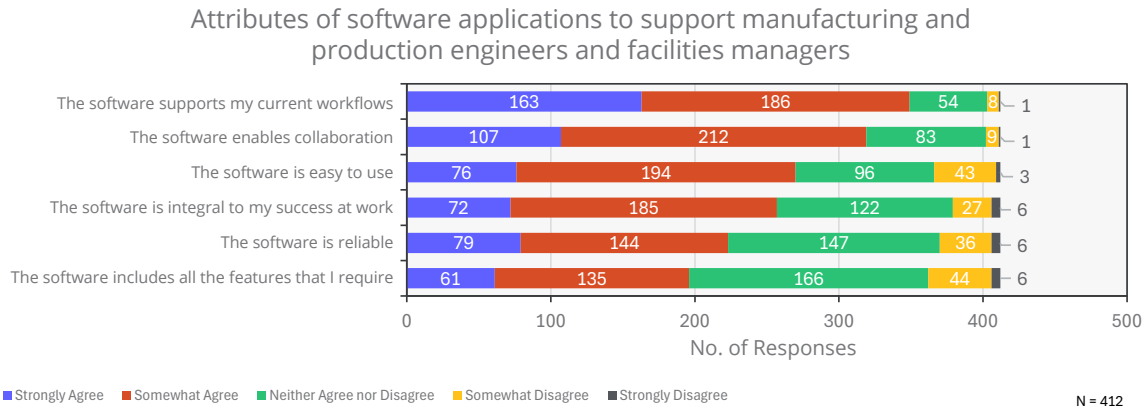
N = 412

Furthermore, tools that help with collaboration can support demand planning and overall success. Budgetary constraints are not the major issue that one might expect. How staff interact with one another can determine success.

HOW CAN SOFTWARE APPLICATIONS HELP ALLEVIATE FACTORY PERFORMANCE ISSUES?

Until relatively recently, operational decisions were made based on data collected manually and noted down and stored on paper. The topics of Industry 4.0 and digital transformation have heightened awareness of the potential that software applications need to support production line improvements and improve manufacturers' ability to anticipate and plan for customer orders.

To improve productivity, software applications need to match users' workflows and be easy to use. Software applications also must enable collaboration and remove silos on the factory floor, as these have been identified as challenges faced by production engineers.



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Software vendors should match workflows, but also provide capabilities that offer ways to improve users' workflows. Two software solutions from Autodesk—Fusion Operations and FlexSim—look to improve customers' ability to perform demand planning and enable collaboration among disparate teams on the factory floor. Both Fusion Operations and FlexSim can support manufacturers' desires to meet these objectives.

Fusion Operations is production management and production floor tracking software that taps into many of the issues outlined in this whitepaper. This software helps production engineers understand the flow of products in the facility and identify where waste is generated, and helps manufacturing engineers monitor Key Performance Indicators (KPIs) such as throughput.

To help with demand planning, users can receive updates regarding the availability of materials, components, and equipment needed to perform the work. In addition, manufacturing engineers can work on the processes and schedules to fulfill orders.

Engineers do not necessarily work onsite all the time and Fusion Operations enables users to access their information from mobile devices to keep abreast of activities and collaborate with colleagues throughout the day. Fusion Operations is not only a tactical monitoring tool, but also can be used to identify bottlenecks and machine overloads; risking the company's ability to meet demand.

Using the information from Fusion Operations, we can look at all those data points and understand exactly where our issues are. That's the biggest way Fusion Operations has helped us improve.

– Lionel Cruz, Director of Manufacturing and Innovation, the Industrial Sewing and Innovation Center (ISAIC)

We invested in Fusion Operations to give us better visibility of our actual production costs in real time, which led us to improve our quoting system to be more accurate at the front end.

– Andy Neal, Managing Director, IG Masonry Support

Acquired by Autodesk in October 2023, FlexSim's simulation capabilities support the needs of engineers and facilities managers to optimize their facilities and production lines to meet anticipated demand. The solution can be used for longer term projects such as redesigning a factory's layout and shorter-term issues such as resolving bottlenecks on the production line.

To help customers improve their demand planning, FlexSim allows users to assimilate data to run scenarios like scheduling against anticipated demand levels and experiment to test if current layout configurations can meet demand. Furthermore, the solution can give users confidence that their plans can be brought to fruition.

FlexSim enables collaboration with the ability to create a digital twin of a production line; providing a mirror image of production in real time. Colleagues can access the twin to discuss and suggest tweaks and perform scenario analysis.

The key benefit of simulation is the ability to conduct what-if analysis to inform decisions without impacting the day-to-day operations.

FlexSim gives you a quick and rough high-level idea of which brainstormed ideas will give the best output. Then narrow it down to 2-3 options and make detailed models in a more focused way.

– Michael Belote,
Director of Manufacturing 2.0,
LM Wind Power

The beauty of the simulation model is that we have an immersive environment to virtually experience the workspace while conducting what-if scenarios on the system.

– Jason Merschat,
President,
Advanced Process Optimization, Inc.

Improved demand planning can be provided by both Fusion Operations and FlexSim. The analytical power provided by AI, coupled with the low-code visualization tools make for a powerful combination to support the monitoring and optimization of automated production lines.

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