

Manufacturing's Digital Awakening

How Digital Platforms Can Help to
Enable Next-Gen Experiences

AN INTERVIEW WITH RAGHURAM JOSHI



Liferay asks five questions to manufacturing expert Raghuram Joshi, Senior General Manager at Robert Bosch Engineering and Business Solutions about the industry's changing digital landscape.

Q. What developments have you noticed in the manufacturing industry in recent years?

Raghuram Joshi: One of the most significant changes in recent years is the emergence of digital as a core component in the manufacturing process. Some people call it “Industry 4.0”, some “Smart Manufacturing” and others “Future Factories”. This means using IoT (internet of things), AI (artificial intelligence), blockchain and other modern technologies to make the manufacturing process more efficient, predictable and equipped to produce higher quality products.

Another aspect is an increasing complexity with regards to organizational processes. Manufacturers need to deliver a higher variety, they need to deliver the right product and they need to deliver it at the right time. Even though I am able to say this in one sentence, this is actually extremely complex because of the number of internal and external stakeholders involved.

Employees previously worked in organizational structures that were merely functional in nature. People were experts in separate and siloed departments, but the need to collaborate is real and it needs to happen now. As the channels of distribution and communication become increasingly complex, it is important that departments work together towards a common goal to produce better results.

At the same time, new digitalization possibilities create the opportunity to connect not just the manufacturing setup of the **OEM (Original Equipment Manufacturer)**, but also the ability to integrate beyond their organization. This could include **suppliers, vendors, partners** and more. Closer collaboration can help all parties to work more efficiently and optimize the entire supply chain.

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Resellers have started to play a dual role as they are now part of a bidirectional flow of information. They can simultaneously give the manufacturer an indication of how the market is doing in terms of supply chain, as well as a customer perspective. Today it's not just about delivering a product, but also about getting customer feedback, getting to know who is the real end-user, how the product is being used and what kind of repairs are happening. By collecting this information the manufacturer can then work on product improvements and incorporate the feedback in early production and design phases. Taking a product to market is now far more of a collaborative approach.

As **customer** demands continue to increase, user experience now greatly influences how products are designed and manufactured. Even manufacturers who have never had direct access to the end customer are now trying to gain first-hand insights into their end-users—as this information is arguably more valuable to them as opposed to the reseller. This is because the manufacturer has a greater interest in providing maintenance, enabling a renewal of contract and ensuring the customer remains loyal.

In the past, it was easier to identify **competitors**, but due to digitalization this is becoming increasingly difficult as competition is likely to emerge from alternative industries. That being said, we now frequently see cases where competitors are coming together to solve problems facing their entire industry.

Q. In regards to Servitization in manufacturing, what initiatives have you noticed emerging in the market?

RJ: In the past, revenue generation or turnover in the manufacturing industry was linear in nature—i.e. the more I produce, the more I am able to sell. However, the emergence of digital has enabled new non-linear business and revenue models, which is why manufacturers are reevaluating the way in which they serve their customers. Examples like subscription-based models, “pay as you go” or “pay as you use” are becoming increasingly practical and relevant. End users are demanding products as a service rather than buying them as capital expenditure (CAPEX).

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manufacturers to enable their entire ecosystem. When I talk about ecosystems, I am referring to suppliers, partners, vendors, your own employees and sometimes even your competition.

While on the digitalization journey it is important that manufacturers maintain a holistic view throughout the full product development process until the point of consumption. For this to be possible, they would need to enable the entire supply chain and manufacturing site etc., which allows them to progress and provide their product as a service. In other words, you need to enable the entire stack.

As a manufacturer in the digital world, the ability to operate with a digital twin of a product is essential. Without this digital infrastructure, organizations risk missing out on the benefits of monetizing software and services.

Business to Business (B2B) Example: Imagine an engine manufacturer whose business model in a linear context, is to sell engines. Let's say this manufacturer enables the engine to be provisioned digitally and connects it to one or more digital platforms, where it can provide diagnostic data for predictive and preventive maintenance as well as for field service. A possible advancement would then be to connect the machine to multiple other machines in the ecosystem and for these products to be able to talk to each other—this opens up tremendous possibilities for service.

Business to Consumer (B2C) Example: A manufacturer that sells dishwashers and washing machines can also offer services for these products like predictive maintenance. However, this service can be further enhanced by utilizing a smart home platform to provide services focussed on end-user convenience. This empowers customers to decide how they would like their home equipment and machinery to run, whether this is from a power usage or comfort perspective.

Q. How can a digital platform enable manufacturers on their digital transformation journey?

RJ: Digital enablement happens on multiple layers. The first is the digital core, comprised of the ERP (enterprise resource planning) and PLM (product lifecycle management) processes within the organization. These are the processes on which the rest of the digital infrastructure is built. Today, organizations are rethinking the digital core and are looking at how efficiently their systems are being used to solve business process problems.

The second layer is where digital platforms like [Liferay DXP](#) come into play. This layer helps with enabling different stakeholders to participate in the larger digital transformation strategy. Therefore, your businesses' infrastructure or "core" cannot be separate from this layer. In particular, this is where employees play a

vital role. By utilizing their understanding of customer expectations and customer engagement, they can better serve the end-user's constantly evolving needs.

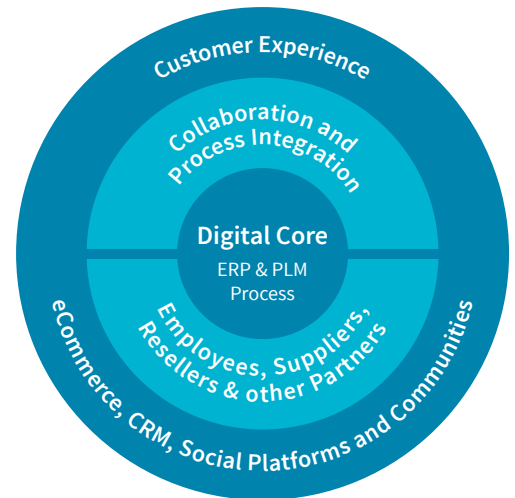
A fundamental characteristic to consider when selecting a digital platform is flexibility. It is important to have a mature platform within an enterprise, but it is equally necessary to have a flexible environment that is able to interact with the outside world. Otherwise, you are at risk of being left on an island. We are now confronted with a highly democratized environment wherein it is difficult to predict with whom the manufacturer will be interacting with next and which technology platforms they will have

adopted. You need to consider how you can best integrate your digital platform and how to best leverage your position within the ecosystem. This is what will define your new business and pricing models, as well as the speed and agility with which you can respond to customer demands.

If your platform does not provide integration possibilities, you potentially jeopardize important opportunities because:

- Partners in different regions may use different platforms.
- Your employees may expect or need other ways of interacting with the organization.
- Your competition may be able to offer the technology you're missing, giving them access to new markets and customers.

In addition to flexibility, one of the biggest challenges in digitalization is adapting to scale. "Scale" can be in terms of having multiple access points, value or reach. The scale in terms of value is the ability to provide multiple business and pricing models using the same data points that is collected from interactions with the customer and from products. Scale in terms of reach refers to the ability to reach more people in terms of technology and touchpoints.



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Q. What are the main challenges for manufacturers in regards to digital transformation?

RJ: There are many common challenges that arise when transforming digitally. However, the major challenges can be observed in areas including migrating from legacy systems, change management and logistics within the ecosystem.

1. **Legacy systems:** Digital transformation initiatives need to consider previously purchased technology that was intended to be a long term investment. Since manufacturing setups have a legacy of their own, the first step is extracting data from these systems. As these setups are so diverse, you rarely have one solution that suits everyone. Because of this it is necessary to run pilots in the field and then roll them out to the larger organization—making it a very cost and effort-intensive activity.
2. **Change management:** The moment a digital infrastructure is put in place, an aspect of transparency is created. This creates several challenges in the functional organization, because until now it's unlikely that expertise was ever questioned—and this may not be the case anymore. The company's culture and willingness to adopt digitalization can often be more difficult than the technical matter at hand.
3. **Ecosystem logistics:** Industry 4.0 and new digitalization possibilities provide the opportunity to not only create connectivity within an organization's own manufacturing setup, but to also integrate suppliers, customers and other partners. This opens up new challenges with respect to IT maturity and a common understanding of security within the entire ecosystem.

Q. What common digital transformation mistakes do you think decision makers could learn from?

RJ: Mistakes are inevitable when transforming digitally and there are several common pitfalls. The most common mistakes I have encountered that manufacturers need to be cautious of include:

1. **Unclear goals:** Companies need to define what is the real problem they are trying to solve when transforming digitally and set out clear goals on how they plan to achieve this. For example, they may want to improve productivity, quality, time-to-market or efficiency in the supply chain, but many digitalization projects end up as only proof-of-concepts, because unclear goals make it difficult to measure whether the transformation has been successful or not.

2. **Siloed digitalization team:** The second common mistake observed, happens when selecting the digitalization team. In many cases, the responsibility of digital transformation is left solely to the IT department. In order to see meaningful results the digitalization team cannot work within a siloed environment and the need to engage with partners and alternative departments including business, technology, data science, and user experience is essential.
3. **Unscalable pilots:** Many pilots that have been tried out by companies have not necessarily been successful. What organizations commonly fail to acknowledge is that a pilot project will inevitably need to be scaled up across the whole organization, but this is neglected in many of the implementations seen in the market. Scale by Design is an important element to be recognized and relates not only to technology, but also to external partners and an organization's overall business operations.

It is a very exciting and interesting time to be in manufacturing with lots of new opportunities arising—whether that is in relation to technology or the services we can now make available. In this non-linear environment generally no two solutions are the same, from both a technology and business model perspective. However, taking this into consideration, whomever manages to master the combination of these two aspects is at a huge competitive advantage. The pace of change is unlike anything seen before and while not all of the components of manufacturing's digitalization are fully mature, not trying them could be a risky move. If organizations wish to remain relevant it is imperative that the adoption of new technology is high on their list of priorities.

For a long time, there has been a gap between the availability of technology and the expectations of the customer. This gap, if it even exists anymore, is closing rapidly. People are ready for digital transformation and we need to build the necessary platforms to enable them.

About the Expert:

With 20 years of experience, Raghuram Joshi is responsible for Enterprise Applications—including IoT and Cloud implementation as well as digital content management systems at Robert Bosch Engineering and Business Solutions (RBEI), a 100% owned subsidiary of Robert Bosch GmbH.

RBEI which is referred to as the Technology Powerhouse of Bosch, is situated in India with over 19,500 associates, making it the largest software development center of Bosch outside Germany, offering end-to-end Engineering, IT and Business Solutions. As one of the world's leading global suppliers of technology, Robert Bosch Engineering and Business Solutions has a global footprint with a presence in The United States, Europe and Asian Pacific region.

About Liferay:

Liferay is a global company, with 23 offices around the world and a presence in more than 40 countries through its partner network. The company is recognized as a Leader in the Gartner® Magic Quadrant for Digital Experience Platforms. Liferay makes software that helps companies create digital experiences on the web, mobile and connected devices. Our platform is open source, which makes it more reliable, innovative and secure. Hundreds of organizations in manufacturing, healthcare, financial services, government, insurance, retail and multiple other industries use Liferay. Visit us at liferay.com.



Liferay makes software that helps companies create digital experiences on web, mobile and connected devices. Our platform is open source, which makes it more reliable, innovative and secure. We try to leave a positive mark on the world through business and technology. Hundreds of organizations in financial services, healthcare, government, insurance, retail, manufacturing and multiple other industries use Liferay. Visit us at liferay.com.

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