Transforming Retail: Creating Tomorrow’s Agile Environments
Since the dawn of commerce, retailers have always striven to provide shoppers with pleasant, engaging experiences. But now, that takes a lot more than just eye-catching product arrays and convenient hours. To succeed today, retailers must master everything from understanding consumer preferences that change at lightning speed to fluidly serving customers in their channels of choice to optimizing operations to drive efficiency gains that can pay for the innovation retailers need for competitive advantage. It’s a tall order.

In this Executive Interview, Satish Lakshmanan, executive vice president and chief product and strategy officer at Lumen, discusses the challenges and opportunities retailers face today, as well as the agile IT environments they need and the cultural changes they must make to thrive in this rapidly changing space.

MIT SMR Connections: Let’s talk about the current climate in retail. What problems are retailers experiencing? What do they need solutions for?

Lakshmanan: For retail in particular, it’s an exciting time and a challenging one as well. I see a few key trends.

First, the use of retail media is really expanding. Amazon, Walmart, and all the large retailers are using digital advertising to grow revenue, reach new audiences, and diversify their income streams. Retail media provides digital insights as well as what’s happening in the physical store.

Hybrid shopping is the second trend we see. When customers want to blend online experiences and in-store experiences, that creates a lot of challenges. That’s not just in terms of inventory management but also in ensuring that we’re providing the right services online versus in-store, personalizing those choices, and delivering them on time.

As a result of this need for hybrid shopping, there’s a lot of emphasis on the third trend, which is the growing concern about consumer privacy and data protection.
In the Americas, things may not be as controlled. But in Europe or Asia, there’s a lot of governmental control, such as GDPR [the European Union’s General Data Protection Regulation] and other acts for safeguarding consumer privacy.

There’s also a need for payment flexibility. Customers want to leverage things like digital wallets and touchless payments, so retailers need to adopt those as well.

Social commerce is another important trend. If you think about Gen Z, how retailers cater to my needs versus how they cater to my children’s needs is fundamentally different. Retailers need to adapt to understand the demographics of who’s coming to the store and who’s buying online so they can leverage data to target people more appropriately.

MIT SMR Connections: That’s a much more complex picture than just having a physical store.

Lakshmanan: Correct. Personalization is still king. When you think about personalized customer experiences, when you think about sentiment analysis, when you think about leveraging machine learning and AI to give personalized recommendations and targeted marketing — retailers need to embrace all of these.

Customer support is an important area. If you think about when customers want to return a particular item, when they want to talk to a human agent, how can retailers leverage chatbots to answer early inquiries? How do they handle virtual assists?

And then there’s empowering the workforce. How do retailers, in this rapidly evolving hybrid environment, invest in training their employees and the people involved in manufacturing, supply chain, operations, and delivery? How do retailers help those people feel motivated and feel that they’re actually impacting customer service and helping with operational efficiency?

MIT SMR Connections: Retailers are facing so many different imperatives right now. It must be hard to carve out resources for things like training employees and making sure they feel they’re contributing to customer experience.

Lakshmanan: It’s challenging, but there’s a huge opportunity as well. Retailers have to adapt. They have to find ways to innovate, and they have to find approaches that will help them thrive. That’s the challenge. And the opportunity is: Those that are able to adopt more advanced technologies are more likely to be more successful in capitalizing on these trends.

MIT SMR Connections: Does that mean, then, that bigger is better? So the biggest retailers have an easier time at this than the midsize and smaller ones?

Lakshmanan: I don’t think so. It’s really agility that is key. Your ability to modernize your IT stack, your ability to embrace more cloud-native technologies, your ability to be nimble in who you target and how you target — those will have more impact. The big retailers have the footprint, they have the supply chain, they have the cost advantages, but they may not be as nimble. The smaller ones who may be 100% online can be nimble, but they don’t have as much supply-chain control. So, there are pros and cons as to whether you’re a big or a small retailer. It just comes down to how quickly you can evolve your business.

“Personalization is still king. When you think about personalized customer experiences, when you think about sentiment analysis, when you think about leveraging machine learning and AI to give personalized recommendations and targeted marketing — retailers need to embrace all of these.”
MIT SMR Connections: How do traditional IT infrastructures fail to support digital transformation and that flexibility that you’re saying they need?

Lakshmanan: Traditional IT infrastructures tend to be monolithic. Legacy IT infrastructures were based on vertically integrated customized hardware. So from the infrastructure side all the way to the application side, there were a lot of silos, along with a proliferation of applications retailers could use. But with this type of monolithic approach, there was so much interdependency on the hardware and the middleware and the software layers that it was hard to be agile. This type of infrastructure was purpose-built and worked well for given use case applications like databases. But it was hard to be agile.

Today, retailers need to evolve and transform digitally to match changing consumer behaviors. They need to move away from physical retail stores and use omnichannel capabilities. To start, retailers need to evaluate the maturity of their IT landscapes, which means they need to understand the current state of the technology and how many applications they need to support, both for internal productivity needs as well as for customer-facing applications. And they need to define where to make strategic investments to enable agility and advanced capabilities.

MIT SMR Connections: Should retailers undertake formal evaluations of what they’re operating on — network, applications, and so on?

Lakshmanan: Retailers need frameworks for understanding the applications needed to support internal productivity needs. For example, retailers want to streamline their supply chain operations and optimize inventory management. They want to be able to have inventory in a lot of those field locations so they can meet customers’ needs for delivery within, say, four to six hours. At the same time, they want to minimize the costs of having to hold inventory to support just-in-time delivery.

These needs require a dramatically different way of managing inventory internally. So retailers need to look at the objectives they’re trying to achieve for both internal operational efficiency and external customer engagement. What do they need to do to serve customers and evolving customer demand, and how do they best balance those two things effectively? That’s the key question.

To get there, most will need to transform their IT environment and operations, which requires a cultural transformation, a skill set transformation, and a modernization of the IT stack itself. So there are three parts to it.

MIT SMR Connections: Could you speak more about the cultural transformation that’s needed here?

Lakshmanan: The shift is to an IT culture that is agile, that is nimble, that is customer-focused; it works backward from the customer need. To give you an example: If you want to offer hyper-personalized customer experiences, that will require you to be extremely nimble in delivering application enhancements.

For instance, let’s say a mobile app is the way most people are ordering their groceries or their clothes. The ability to push capabilities and features into that app and do it on a regular, rapid basis — just as social media companies do for applications on your phone — will be necessary to continue to engage and retain that customer.

To be able to quickly deliver retail functionality on a phone, the IT stack should be capable of rapid development, rapid testing, and rapid deployment. That’s a huge cultural shift in how technology is built, tested, and deployed, and how the customer needs are factored into planning the next phase of deployments.
It’s cultural from a customer service standpoint as well. If someone is calling in, how do you respond? If you are using social media to reach out to a customer, how do you identify the customer’s preference? How do you prioritize your activities beyond IT to appeal to that customer as their needs change? How do you inject innovation into the company? The demographics of who you’re trying to serve, and what you’re trying to serve them with, will also affect your day-to-day business operations.

**MIT SMR Connections: How do you define a “future-fit” IT environment for a retailer? What does that consist of?**

**Lakshmanan:** There are three imperatives. **Agility** is number one. That means modern cloud-native and microservices-based technology stacks on which you can quickly train and deliver enhancements. Second is **leveraging your data and insights** to power your operations, to power your sales, to power your personalization, and to power your customer targeting. The third is **targeting customer-centric solutions**.

It’s one thing to have the data and insights. It’s another thing to be able to use that data toward personalization and making ordering and delivering easier and using advertising for social media and even for customer support. Being able to meet those needs in a customer-centric, immersive way is important. To me, that’s a future-fit IT environment.

**MIT SMR Connections: Give us an example, if you would, of a company that has some insights but can’t bridge the gap, so they don’t know how to use the insights in order to improve the customer experience.**

**Lakshmanan:** Let’s take a traditional clothing company you would find at the mall, as opposed to a digital-first retailer like Amazon. If you think of the Amazon omnichannel way, you go to an Amazon online store, and you basically decide what you want to purchase. You have the ability at the click of a button to pick the item you like, and to choose from selections and choose from personalized recommendations you might want to buy along with your original selection. And then, often, you can get that delivered the same day you ordered it. That’s a very modern retailer environment.

At the other extreme, you go into a physical store and start browsing. Certainly, there’s personal satisfaction in doing that. Those of us who are a little old-school love going into a store and actually trying on clothes and seeing how they fit. But those are the traditional companies that haven’t made the entire shift to the online digital experience. Nor are they personalizing your consumption experience based on your particular need. They’re not modernizing the buying experience.

What does that look like? One example is this technology where you can walk into a store, pick any item that you want, and leave without standing in a checkout line. You just walk out with that item and the store automatically charges you for it. It’s called Just Walk Out technology. The industry leaders can provide these modern experiences.

Then there are the retailers that still need to make that evolution. They may have started the journey but are still a long way off. They’re not yet using the power of AI [artificial intelligence] and predictive analytics to optimize inventory management, do demand forecasting, set pricing, do customization, deliver personalization, provide privacy, or ensure security. All those capabilities are important to being able to make that transition. What’s required is a cultural shift, a relentless pursuit of transformation across all functions, and the modernization of the IT stack that enables agility, customization, and personalization by leveraging data, insights, and AI. (For more on retail transformation, see “Becoming Future-Fit: 5 Tactics for Retailers”).

**MIT SMR Connections: Could you talk more about the role of the cloud in these future-fit IT environments?**

**Lakshmanan:** The decisions come down to the use case, the workload, and your objectives. When it comes to enabling flexibility, adopting cloud is no longer a choice — it’s an imperative. The cloud provides not only agility, scalability, and usage-based consumption but also the ability to embrace innovative technologies at a pace that wouldn’t be possible if you were doing it all yourself.
Cloud gives unparalleled flexibility while being able to provide a tighter omnichannel experience. Think about advertising, think about personalization, think about leveraging the tools to personalize the shopping experience. Those things are possible through the cloud.

Then there’s security and compliance. You’ve got to do it securely. If a lot of these transactions are going to happen online, you’ve got to ensure customer privacy. Having a seamless ability to access the data and being able to protect customer proprietary behavior are equally important. And all these capabilities can be done in an effortless, agile, secure manner via the cloud.

There’s also the ability to benefit from your cloud provider’s experience with their other retailer customers. That can help not just to architect and validate how you’re thinking about building a solution, but it also can inject innovative new ideas you might not otherwise have considered, such as this concept of Just Walk Out. The injection of outside ideas can be very helpful.

MIT SMR Connections: What about choosing and deploying future-fit IT infrastructure? Are there strategies and best practices retailers should consider?

Lakshmanan: It comes down to balancing all the needs. That involves some things that I talked about earlier: having a cloud-native architecture by modernizing your IT stack, adopting more cloud-native technologies, and re-architecting your applications to be microservices-based as much as possible — creating a customer-facing base that gives you the agility you need.

The other best practice is leveraging data and insights to power your operations, to power sales, and to power targeting. There’s often so much data available. If you think about it, retailers are just like banks. They have so much consumer information based on a history of transactions, based on online purchasing trends, and based on in-store trends that they can leverage — and that data is really powerful. It’s everything from operations, inventory planning, inventory delivery, and online consumption experience all the way to personalization of what customers want to buy and how you target them.

Finally, how do you make it all very customer-centric? How do you understand the personas who actually are buying? What is the evolution in their buying behavior? How do you understand their changing needs? The fact is that now, through online tools, they really have a lot of choices. How do you help them narrow down to the right set of items that you think they need versus what they think they want, and then support them in that buying journey in the most efficient way?

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Again, success means being able to balance all these needs effectively and being able to adopt cloud-native infrastructure to be able to build the right applications.

MIT SMR Connections: What classic pitfalls have you seen in terms of balancing all of these things? Are there things companies definitely shouldn’t do?

Lakshmanan: It’s a good question. One of the classic pitfalls is trying to do everything at once — for example, moving everything to the cloud at once. You’ve got to really understand whether you are going to be 100% on-premises or 100% cloud, or if you’re going to be hybrid. Are you going to be multi-cloud, or are you going to invest all of that in a single cloud? If so, which applications will you transition to? How do you leverage cloud-based technologies to modernize those applications? Trying to do all of that at once can be daunting.

MIT SMR Connections: Let’s talk about the role of AI, specifically generative AI and machine learning [ML]. How are retailers using AI?

Lakshmanan: All types of AI are playing a pivotal role in retail. Specifically, generative AI is used in the personalization of interactive customer experiences and ML automation is used to improve efficiencies and reduce the cost of doing business.

Consider the customer’s buying journey. There’s a front-end buying journey, which is where the customer is interested in something. They may know exactly what they want and they’re browsing for it. At that point, it’s about being able to provide the right information at the right time, understanding the customer’s preferences, understanding their behavior, and using data to do that — all enabling them to have that right buying experience. Generative AI-enabled chatbots and virtual agents play a role here, but they also play a role on the back end, for customer support and enabling modern shopping experiences.

For instance, how do customers check out seamlessly? How do you engage chatbots and virtual agents to answer queries? If they want to do an exchange or a return, how do you make that experience seamless? And then how do you leverage the technology for internal inventory management and dynamic pricing?

Sentiment analysis is another key area for generative AI. How do you analyze social media sentiments and customer reviews? And how do you use them to create more customer trust and loyalty? A lot of people forget that the customer experience is a function of both the front end and the back end. It’s all of those things combined.

In my view, the biggest benefit for retailers is customer retention, reducing churn. That means having a customer who continues to be a shopper within the store, whether it’s an online version or the in-store version and making sure they come back for more rather than going to a different platform or a different way of consuming that particular good.

MIT SMR Connections: What about edge computing? What role does edge computing play in those advanced use cases like Just Walk Out applications?

Lakshmanan: It’s early days, but I believe edge computing will be a game changer for retail. You can think about edge computing as a location from which you can consume IT capabilities that you don’t necessarily need to replicate within your store presence.

This benefits retailers by providing efficiency. Edge computing benefits customers by providing security for their data, and it can enhance their in-store experiences, too.

One retail use case for edge computing is real-time monitoring of checkout lines, of delivery zones, of inventory, and of what’s happening inside a given retail store. Real-time monitoring enables retailers to take action immediately when needed, which directly improves customer experience.

Enhancing security is another use case — for example, processing surveillance cameras, accessing alarm systems, and monitoring suspicious behavior.
Then there’s inventory management and pricing accuracy. Edge devices can check inventory levels in real time, so you can make sure you’re optimally stocking items, reducing out-of-stock situations, and avoiding pricing errors. If you’re trying to attract someone to come to the store, you want to make sure that your pricing there is commensurate with an online shopping experience.

Customer insight and personalization is another area where near-instantaneous response times are needed to look at personalization or customer sentiment or customer engagement, and to use data and real-time insights for upselling opportunities to customers. That drives incremental growth. And finally, there’s creating immersive experiences via things like augmented reality, virtual reality, or context-specific in-store suggestions that can be delivered directly to a smartphone. They’re a little bit cutting-edge, but being able to do so effectively is something the edge devices can definitely empower. The technology is there for these use cases, but they may be too risky for many retailers at the moment.

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Becoming Future-Fit: 5 Tactics for Retailers

Satish Lakshmanan of Lumen offers the following recommendations for retailers looking to get started with modernizing their IT infrastructure and workforces:

1. **Strike a balance between on-premises and cloud technologies.** Use a rigorous ROI-based approach to assessing technical stacks and applications to decide which applications to keep on-premises and which to migrate to the cloud. Applications that are latency-sensitive and serve edge computing needs can leverage edge, AI, and internet of things technologies to provide greater value to customers.

2. **Embrace an omnichannel strategy.** Create a seamless experience across all the methods customers use to purchase products and services. In addition, provide highly efficient deliveries to homes or offices to support customer retention.

3. **Invest in data analytics and AI.** Use data at scale to gain insights into customer behavior and preferences, and leverage AI to deliver highly customized experiences. Harness customer data to drive operational efficiencies and cross-sell and upsell goods and services.

4. **Focus on security.** Continuously upgrade security tools to protect against data breaches and preserve customer trust.

5. ** Upskill the workforce.** To keep pace with transformation and industry disruption, provide the training employees need to adapt quickly to changing market and customer needs.
Satish Lakshmanan is executive vice president and chief product and strategy officer at Lumen. He is responsible for developing and implementing strategic initiatives within Lumen and for shaping the product strategy, driving innovation, and overseeing the development and business performance of the company’s product portfolio.

Previously, he was the global director of artificial intelligence and machine learning (AI/ML) specialists at Amazon Web Services. His team was responsible for defining go-to-market strategies for all Amazon AI/ML services and for engaging major customers across all industries and market segments to develop transformative solutions. The team also aggregated learnings from customer engagements to influence Amazon’s AI/ML services road map.

Before joining Amazon, Lakshmanan held senior product management and strategy positions at NetApp, Western Digital, and SanDisk. He received a Ph.D. from Rensselaer Polytechnic Institute and a bachelor’s degree from the Indian Institute of Technology, Kanpur, both in chemical engineering.

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