

Whitepaper

Powering AI/ML Capabilities with Retail Architecture Modernization



Xebia

Introduction

Retail enterprises face new challenges in areas like core retail operations and customer engagement. How they respond to these issues will depend on the degree to which they have modernized their enterprise landscape. New ways of customer engagement exist that leverage data insights, process optimization, and omnichannel customer service. But outdated solutions limit many organizations' adaptability and prevent them from taking advantage of new capabilities.

Infrastructure and legacy systems are a particular roadblock for these advancements. Features that help enterprises develop strategy, create new processes, or leverage AI often demand architectures capable of delivering complex integrations or data access. Enterprises hoping to quickly integrate new technology that their legacy infrastructure positions them farther behind than they thought. In fact, a technical debt that leads to an inability to scale AI capabilities may prevent them from any practical deployment of AI.

That said, with all of the pieces in place, modernizing a retail architecture to enable new technologies such as data analytics and data-driven decision-making can help a business quickly unlock material value in optimizing its processes and improving the customer experience.



Industry Challenges

Beyond their legacy technology, retail industries increasingly face challenges to their core retail functions. According to ISG's 2023 Retail NeXT report, analysts identified six key areas retailers are looking to address:

1 Optimization

Many retail businesses are struggling with inefficiencies that cost time, effort, or money. Finding ways to optimize processes creates an opportunity for enterprises to reclaim some of these resources.

2 Core Modernization

As a broader issue than, but related to, the problem of legacy infrastructure and applications, core aspects of retail businesses lack modern processes and technology - many companies still use dated processes to manufacture, sell, and distribute product. Supply chains are particularly affected by this with order backlogs, surging transportation costs, and logistics bottlenecks.

3 Inflation

The cost of goods sold, logistics, or high rates has resulted in retailers aggressively monitoring costs and, frequently, passing them on to customers. To curb inflation, many retailers are looking to optimization to cut costs.

4 Employee Skills

Attrition rates are at all-time heights, a situation that was growing even before the COVID pandemic. A shortage of motivated and skilled workers creates a bottleneck to growth for many retailers, by limiting their capacity. That demands challenging reskilling or hiring initiatives. It also means that businesses must prioritize employee satisfaction by adopting new ways of working in a digital world.

5 Customer Experience

Digital and brick-and-mortar shopping are not mutually exclusive, as even online customers tend to prefer a real purchasing experience. But niche retailers that provide an interactive digital experience with seamless, omnichannel interactions are gaining an edge over major retailers. This required analyzing customer behavior from a 360-degree angle view.

6 Sustainability

With the rising interest in ESG throughout all industries, retail enterprises are feeling more pressure to improve their carbon footprint through technologies like green building materials, energy efficiency, and improved waste management. The secondary benefit to many of these is that reducing waste and energy consumption tends to help a business's overall efficiency. These problem areas are spurring the increased interest in technological solutions across automation, AI, and data. Companies have a wide array of options for how to solve these challenges.

Limitations of Legacy Architecture

Even functional legacy architectures hold enterprises back from realizing important capabilities. This is an issue in a modern world that is increasingly designed for interconnected, omnichannel solutions capable of integrating powerful new technologies such as AI.

This can affect retail enterprises in key areas:

Many retail businesses are struggling with inefficiencies which cost time, effort, or costs. Finding ways to optimize processes creates an opportunity for enterprises to reclaim some of this resources.

- **Technological Capabilities:** A company cannot always do more with less; the underlying technologies that increase enterprise capabilities depend on robust digital frameworks. For example, the AI systems that help companies generate predictive insights cannot work without a right-fit solution built on infrastructure with high data capability, systems visibility, and reach across retail enterprises.
- **Customer Experience:** The lines between online and offline shopping are blurring, with digital and analog offerings working to complement one another, as in the case of someone using their phone to place a pickup order at stores and restaurants. As technology bridges the gap between customer touchpoints, and creates more cohesive customer experiences, customer expectations for these offerings will grow increasingly.
- **Agility and Futureproofing:** Because of the isolated nature of many legacy systems, it is difficult for enterprises to react quickly to new trends or customer expectations. Digital, interconnected systems tend to be designed with more futureproofing in mind, allowing companies to innovate or adopt new dynamics more efficiently, as seen with companies now moving quickly to respond to growing social and industry interest in ESG

- **Adoption of AI and Machine Learning:** As stated earlier, legacy technology can be a serious roadblock preventing companies from taking advantage of the new capabilities offered by AI and machine learning. Without a strong architecture, it is not always possible to integrate or scale an AI solution.

Improved capabilities are the clear benefit of a transformation to a modern architecture. But competitiveness is as powerful a threat in the above examples. The more tech debt that accrues, the greater the possibility that a competitor has to create an offering that an enterprise cannot keep up with.



Market Trends Suggest an Opportunity to Lead the Field

According to ISG research, companies increasingly acknowledge the value of technologies like modern architectures, recognizing AI and Analytics as key enablers in the retail world, as well as the need to upgrade systems to accommodate them. It also suggests there is an opportunity for enterprising organizations to lead the field with some of these capabilities.

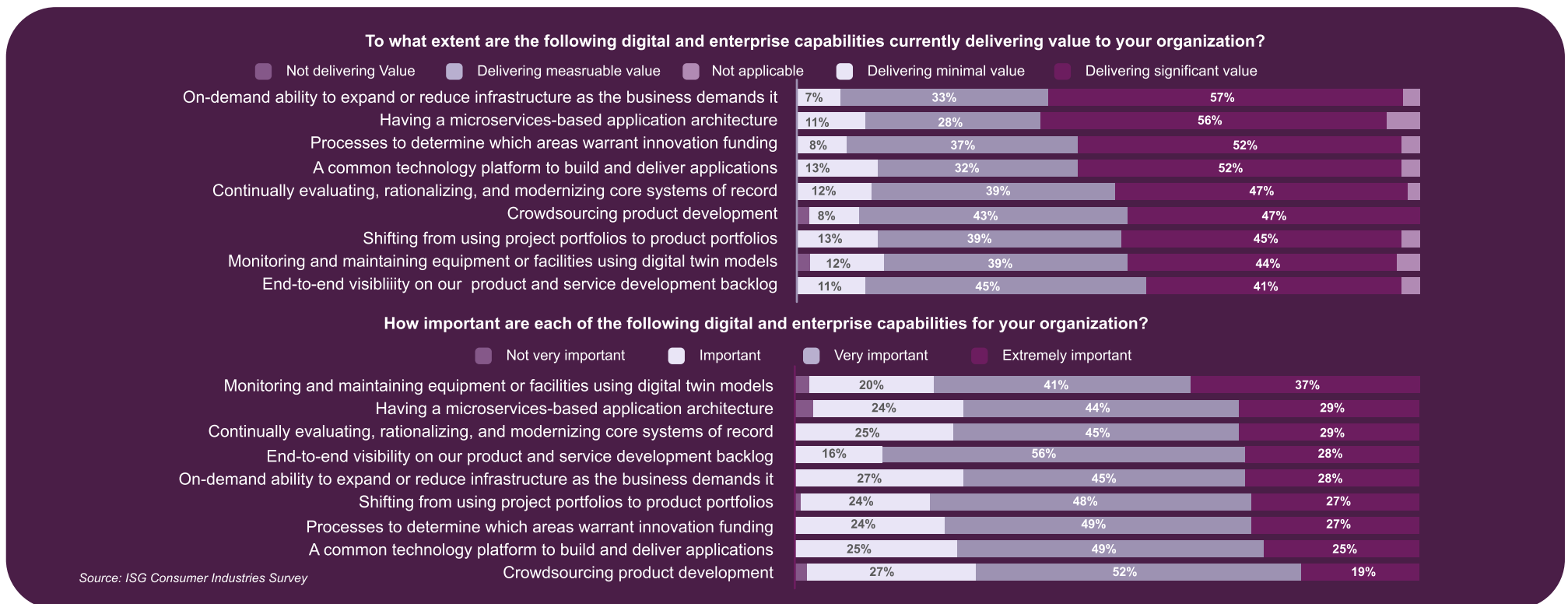
Architecture

ISG's most current survey of consumer industries found enterprises highly value modern architectures and cutting-edge infrastructure:

- Of all of the digital capabilities, a microservices-base application architecture was the second-highest rated factor, with 73% of respondents rating it as Very or Extremely important. Only 4% responded that it was not important at all.
- The respondents also prized a versatile infrastructure. 73% rated the “on-demand ability to expand or reduce infrastructure as the business demands it” as Very or Extremely important. This was also the most highly rated item in the survey of which capabilities were currently delivering value to their organizations.

There is a clear consensus in these findings reflecting the retail industry's interest in robust, modern architecture and infrastructures. That places most enterprises in a position to take advantage of more advanced services like AI and Analytics.

Figure 1: The value and importance of digital capabilities among consumer industries



Industry View of AI/ML

The latest ISG research on retail industries showed similarly high importance placed on emerging technologies like Data Analytics and AI. The most commonly cited uses for these technologies involved automated processes and leveraging data in new ways:

- Respondents most commonly cited automating business processes as a way to leverage AI or machine learning to deliver value to their business.
- Augmented Reality was also a highly regarded capability, with 98% rating it as important, and 89% responding that it delivered significant or measurable value.
- Data use cases are also well represented in the survey, with companies reporting high value for using data analytics, scaling data streams, and using data to generate incremental business value.

Generative AI - such as Chat GPT—is a more recent AI use case. ISG’s 2023 Future Workplace study surveyed all industries to observe how well it was being deployed. It found a high interest rate, but lower adoption rates.

Owing to the technology’s benefits in knowledge management and functional process optimization, 85% of enterprises believe that investment in generative AI technology in the next 24 months is important or critical. However, the same study shows that retail industries have the lowest adoption rates for this technology. Just 8% of use cases have been adopted by retail industries, suggesting a significant opportunity for growth.

Figure 2: The importance of AI and automation capabilities

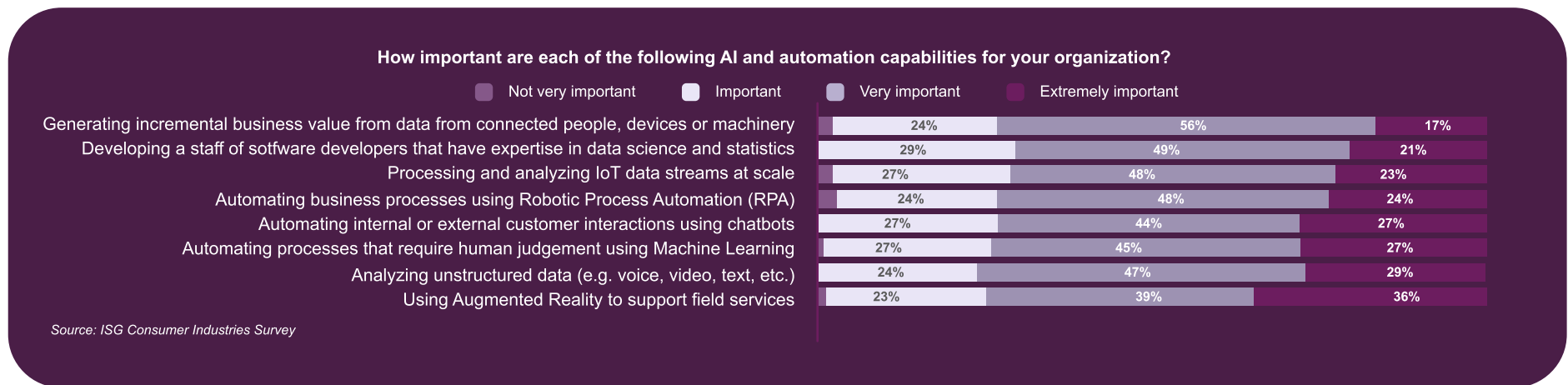
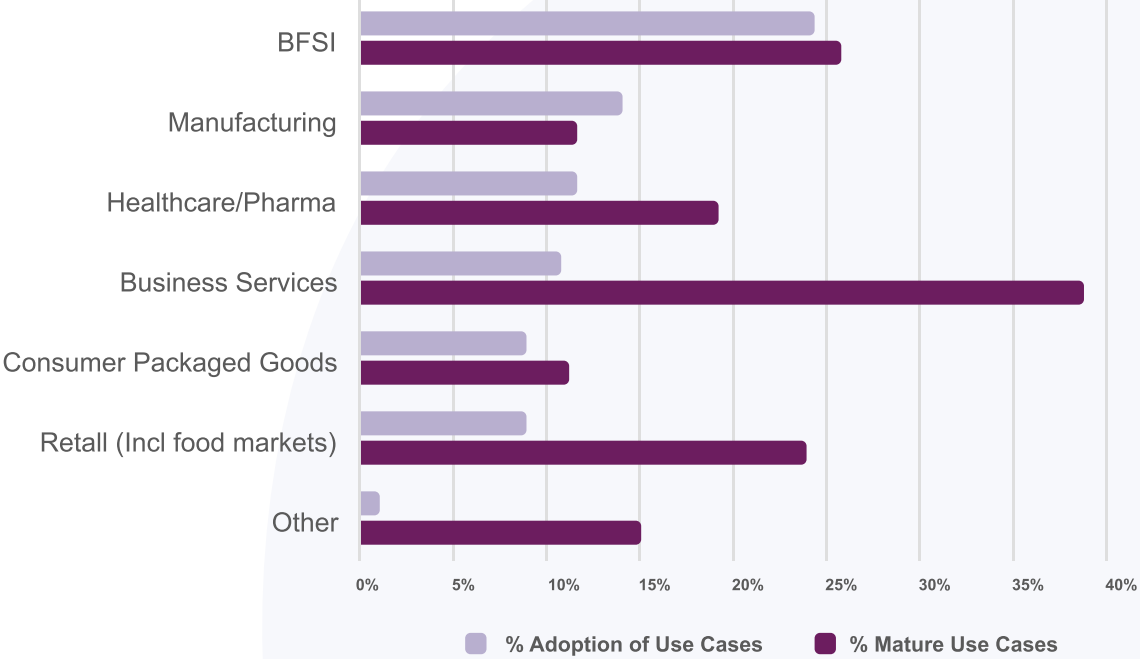


Figure 3: Adoption and maturity of Generative AI use cases across industries



Source: ISG Consumer Industries Survey

The Pillars of Retail Enterprise

Having examined the new capabilities of AI and the architecture that supports them, it is important to understand how these functions can be specifically deployed to optimize a business.

Many use cases for modernizing retail enterprises involve making processes more efficient to minimize costs and maximize output. But ultimately, five areas form the pillars of retail operations:

- Modern Architecture
- Data Analytics
- AI, Machine Learning, and Gen AI
- Integrations
- Right Infrastructure

Modern Architecture

As discussed, legacy architecture slows down enterprises and can prevent an enterprise from leveraging new and evolving technologies. Modern architecture practices encourage agility, cost-efficiency, security, and experiences.

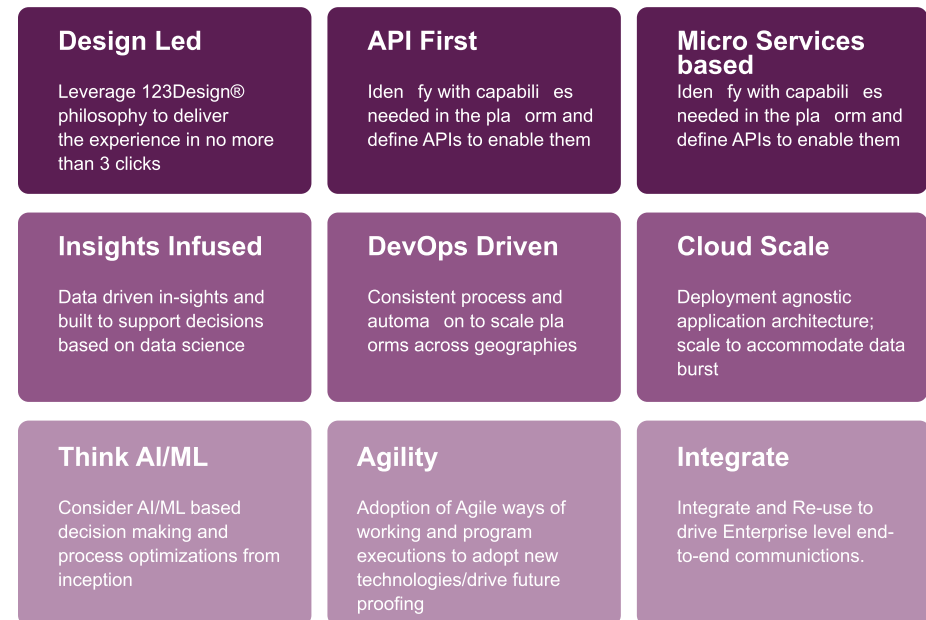
Consider one such architecture model and how its various components translate into direct business benefits. The MACH approach of leveraging Microservices, API-First, practices is an architectural practice prioritizing benefits like flexibility, agility, and scalability:

- **Agility and Scalability:** By deploying applications as loosely coupled, independent services, it is easier to customize, develop, and deploy new and existing functions as the business demands. It solves for the major problem that many legacy systems face: isolated and siloed constructions. This particularly leverages the Microservices and API-first areas of MACH design.
- **Cost-efficiency:** A cloud-native solution, coupled with the aforementioned agile microservices, allows businesses to use only the resources they need, optimizing their costs.

- **Enhanced Experiences:** Back-end services can be accessed through multiple channels, allowing customers greater access and streamlined experiences. Offline and online systems can be unified, especially with IoT devices. It also enables an enterprise to leverage customer and business data better for personalization and business insight. This aspect particularly leverages the Headless principles of MACH.

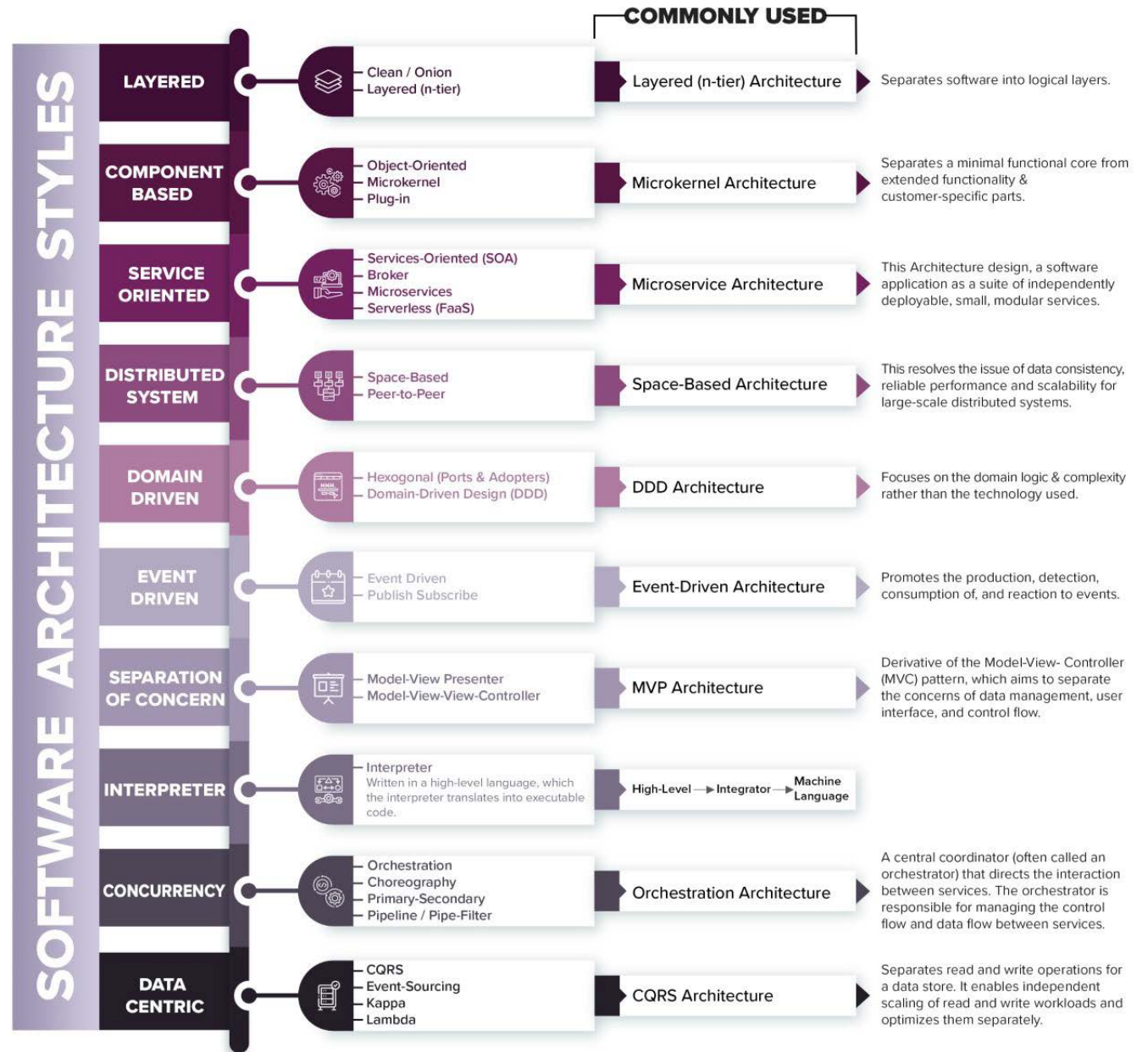
Depending on how advanced a newly implemented architecture is, the ultimate result is that an enterprise has more control over its operations. A key aspect of that depends on how well they can then measure and understand those operations, which is where the importance of a robust data infrastructure comes into play.

Figure 4: Key considerations for a modern architecture



Keep in mind that one architectural pattern doesn't address all styles. If a retail organization is going for a custom product, it should evaluate that product from an architectural point of view. Consider if the product fits with how they intend to scale and futureproof the landscape. A few of the key styles and patterns are shown in the graphic below.

Figure 4: Key considerations for a modern architecture



Data Analytics

Companies can gather their data in two ways: by building the warehouses and hubs necessary to gather a complete set of information, or by deploying analytic tools that make the most of that information. This unlocks valuable insights with significant business use cases for enterprises.

Many businesses are unable to leverage modern data tools because they lack the proper visibility. For this reason, companies must establish a data lake, a centralized repository where they can gather and store data from wide sources such as:

- Basic information about a business, such as pricing, sales, and inventory information.
- Customer data, such as purchasing patterns and demographics.
- Historical data stored in analog or inconsistent formats can be digitized and properly leveraged.
- Advanced use cases, such as storing sensor data from IoT devices or monitored social media mentions.

Once this information is gathered, it can be analyzed and organized comprehensively, giving a business access to several important uses.

Business Process Optimization

There are manifold use cases—such as supply chain planning or inventory management—where access to operational data creates an opportunity to develop insights into how those operations can be streamlined. In the case of inventory management, for example, having a better view of how much product is moving and which products are in demand allows a company to make more efficient purchasing or storage decisions.

Master Data Management

A unified data lake acting as a single source of truth provides improved data consistency and accuracy across an entire organization, guaranteeing more precise operations and better-informed decision-making. This also aids in improving compliance, reporting, and supplier relationships.

One of the most compelling uses for these data structures is that they also help to power important capabilities in AI applications.

Figure 6: Capabilities related to data and analytics

Customer Repository and MDM

An single all encompassing repository of customer that enables bringing together extended models of customer data from a broad range of providers, and operating in real-time with functions to cleanse, manage and govern

Real-Time Decision Making

Ability to provide high intelligent and real-time optimized personalization of all engagement interactions from communication, content, offers, product to individualized coupons with inbuilt ability to self-learn based on customer behavior and context



Loyalty Management

A loyalty capability that manages both transactional and non-transactional reward management across all channels in real-time

Self-Service Reporting and Analytics

Best in class visual reporting capabilities with ability to serve on-demand standard and adhoc reports, along with ability to model data for deep analysis that can drive actionable insight

Omni-Channel Integration

A multi-channel interaction and campaign management capability to drive batch and real-time, micro targeted messages and promotions across every channel of engagement, and support sophisticated contact management strategies

AI, Machine Learning, and GenAI

The market has taken a strong interest in AI for some time now, but it has recently been rekindled with the addition of new Generative AI capabilities, which stand to stretch the limits to which an enterprise can handle knowledge and improve processes. Many specific use cases exist, but most applications fall into two broad categories.

Knowledge Management and Analytics

AI and Machine Learning tools can be combined with a data lake in order to forecast trends and business opportunities, allowing enterprises to formulate better informed strategies. The use cases here are also varied. Tools can be trained on market data to anticipate industry-wide trends or focused on customer purchasing habits to gauge future demand. With Generative AI, these models can be examined and expanded in new ways using intuitive controls.

Powering Comprehensive AI Processes

Beyond analytics, AI and Machine Learning algorithms have direct applications for core retail operations. These include automation, fraud detection, and dynamic decision-making. However, they require standardized and comprehensive data systems before effectively integrating with a business

Integrations

Integrating modern architectures powered by AI/ML and Generative AI is a pathway to growth and a cornerstone for the survival and flourishing of the retail industry in the coming decades. It fosters innovation, enhances customer experiences, and allows for agile, data-driven, and sustainable business operations, securing a promising future for the retail sector.

Standardized Integration Mechanisms

In the complex world of modern retail, seamless integrations are paramount. Retailers rely on a multitude of systems, from inventory management to e-commerce platforms, and these systems must communicate effortlessly to provide a cohesive customer experience.

Distributed systems are designed to operate independently, ensuring high availability and fault tolerance. However, they must also seamlessly share data and synchronize operations. This integration is critical to providing customers with a consistent experience, whether they're shopping online, in-store, or via a mobile app.

Standardized integration mechanisms, such as APIs (Application Programming Interfaces) and middleware solutions, facilitate this seamless flow of data between systems. APIs enable different software applications to interact and share data, ensuring that critical information is always up-to-date and accurate.

Seamless Experience

For customers, a seamless experience is non-negotiable. Whether they're shopping online, in-store, or through mobile apps, customers expect a consistent and frictionless journey. This consistency hinges on the integration of back-end systems that power various touchpoints.

Seamless integration ensures that customers can switch between channels without disruptions. A customer should be able to add items to an online cart as seamlessly as they are able to locate those items when they visit a physical store. This level of continuity enhances customer satisfaction and builds brand loyalty.

Right Infrastructure

Retailers should carefully design their architectures to ensure seamless data and application integration. The right infrastructure can help distribute workloads strategically, optimizing performance and cost-effectiveness. Moreover, robust data management and orchestration tools are essential for managing these complex environments effectively.

Adoption of Next-Gen Store Infrastructure

Brick-and-mortar stores remain a crucial part of the retail experience. However, these physical spaces are evolving with the adoption of next-generation store infrastructure. Retailers are leveraging technology to enhance in-store experiences, streamline operations, and gather valuable customer data. Next-gen store infrastructure includes technologies like RFID (Radio-Frequency Identification), IoT sensors, and advanced point-of-sale (POS) systems. These innovations enable real-time inventory tracking, personalized shopping experiences, and cashier-less checkout. By adopting next-gen store infrastructure, retailers can bridge the gap between online and offline shopping and deliver exceptional customer experiences.

Strategies for Successful Cloud Adoption and Edge Computing

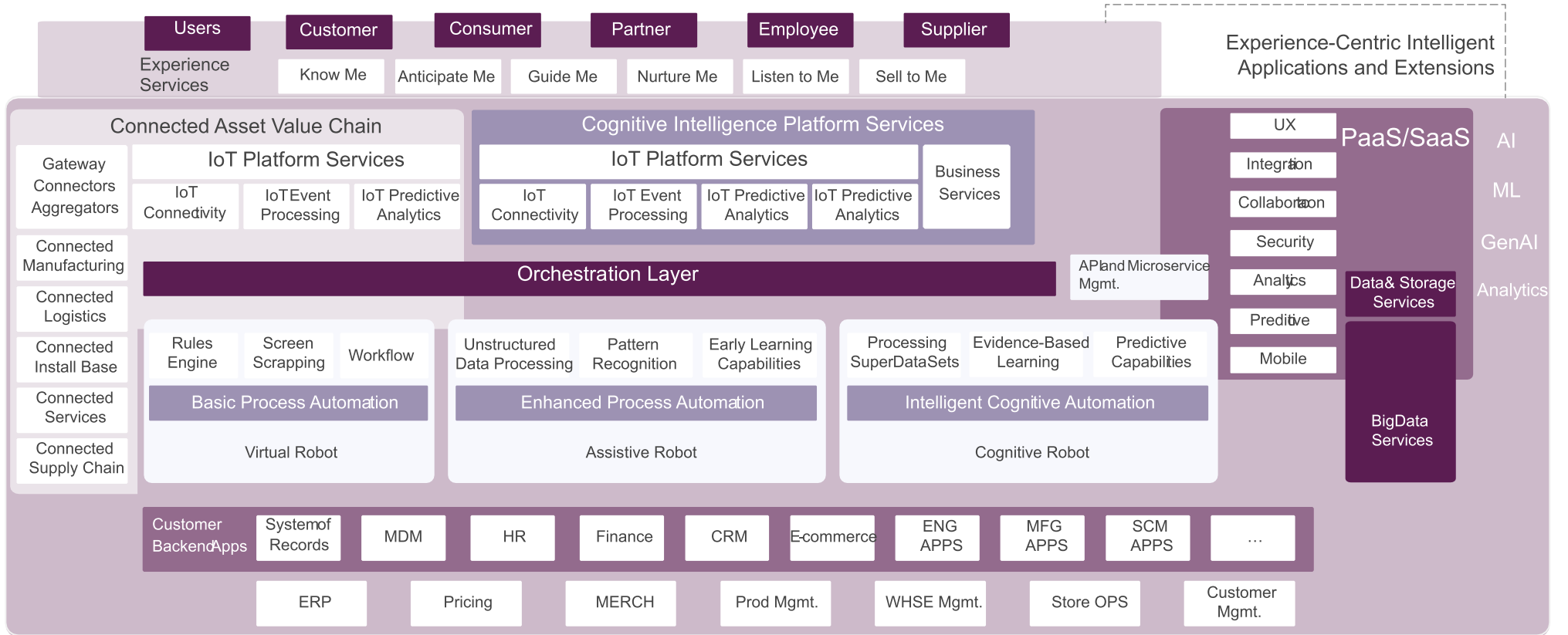
Cloud adoption is no longer an option but a necessity for retailers aiming to remain competitive and agile. Cloud computing offers scalability, cost-efficiency, and flexibility. Retailers can leverage cloud services for everything from hosting e-commerce platforms to running advanced analytics.

Successful cloud adoption begins with a well-defined strategy. Retailers should assess their existing infrastructure, identify workloads suitable for the cloud, and choose the right cloud service providers. Additionally, edge computing - an extension of cloud computing—brings processing closer to where data is generated, enabling real-time decision-making for applications like IoT devices and AI.

Hybrid and Multi-Cloud Environments

Hybrid and multi-cloud strategies provide retailers with resilience and flexibility. Hybrid environments combine on-premises infrastructure with public and private clouds. Multi-cloud, on the other hand, involves using multiple cloud providers for different purposes. These approaches prevent vendor lock-in and enhance disaster recovery capabilities.

Figure 7: Logical architecture for modern retail enterprises



How Modern Architectures can Power AI to Address Business Challenges

The raw power AI offers a business has been touted plenty, yet mentioning precisely what capabilities Modern Architectures can power gets neglected. Consider the following use cases for AI and how they can be leveraged to address industry challenges.

Market Strategy

AI has several functions that allow businesses to better understand the market, while also giving them tools to develop thorough strategies:

- **Market Analysis** services allow AI to analyze market trends, demographics, competitor data, and more. Combined with machine learning algorithms, the technology can identify patterns, correlations, and hidden insights to generate actionable market reports.
- **Expansion Planning** can be challenging for retailers, owing to the complexities of local market dynamics, demographics, and customers. By having AI study geospatial data and demographic intelligence, enterprises can make more informed decisions about which areas are ripe for expansion.
- **Brand Monitoring and Sentiment Analysis** specifically focus on channels like social media, customer reviews, and online forums to track consumer opinions. AI is particularly helpful for this application given that the fast pace of modern media can be difficult for enterprises to track via analog means.

Inventory Management

It is a constant issue for enterprises to strategize about the optimal levels of how much inventory to purchase and how to price it when the market's unknown variables collide with the real limits of real estate and budgets. AI can help in this field by performing similar analytics as before, but using more complex models.

- **Pricing Optimization** allows retailers to identify the optimal price points of their goods to maximize revenue and competitiveness. In addition to market analysis, these models leverage historical sales data, inventory levels, and minute customer preferences. These models are more helpful than

traditional analysis as they can be simulated across multiple different scenarios, giving a fuller picture of a company's options and the full range of a product's price elasticity. Models can also be updated dynamically in order to allow businesses to respond to changes in real time.

- **Assortment Planning** is crucial for ensuring that products are placed correctly to suit customer demand and avoid excess inventory. While these models depend on similar market and customer data, they are also tuned to specific geographies, covering wide regions or hyperlocal areas. They can also be configured to take into account limitations such as warehouse space or other stocking issues. These models can also be tuned dynamically to account for real-time changes - like how a clothing store may need to account for a seasonal changes.
- **Demand Forecasting** works similarly to the other analytic use cases mentioned here, but leverages purchasing trends and customer feedback to gauge public interest in a product or services, which can be crucial for development, stocking, and pricing strategies.

Supply Chain and Logistics

AI can be used to chart routes, accounting for routes that may have escaped analog assessment and dynamic changes in conditions such as traffic or construction. In addition to improving the efficiency of things like delivery routes, reduced travel distances also positively impact a business's carbon footprint.

- **Supply Chain Optimization** allows an enterprise to avoid issues like inefficient inventory allocation, inaccurate demand forecasting, and a lack of visibility into the supply chain. By leveraging information from suppliers, manufacturers, and logistics providers, retailers can get a real-time view of how the supply chain is stocked and operating. Historical or market data can even be added to create predictive analytics. These models can also operate dynamically, taking in variables like weather disruptions or geopolitical events.
- **Delivery Route Optimization** takes into account geospatial data, real-time traffic information, and even vehicle performance to create a more efficient delivery route. This is especially helpful in cases where delivery trucks need cold storage or are operating under similarly tight constraints

Security

Fraud Detection is a critical challenge in the retail industry, but manual review processes do not always catch issues or even result in false positives. Even as a supplemental process, AI can help improve an enterprise's ability to catch instances of credit card fraud, identity theft, and return fraud. They can also enhance RFID- or IoT-based security.

These capabilities work by using advanced machine learning algorithms, pattern recognition, and real-time data analysis to detect anomalies in large volumes of transactional data. By using historical fraud data as a basis, AI can detect suspicious actors, sources of money, spending habits, and more. With enough information, an enterprise can even build predictive models to stop fraudulent transactions before they are processed. The advantage of machine learning models is that the more attempts at fraud they encounter, the better they will be able to prevent it in the future.

Business Operations

AI can power several process improvements that allow a company to serve better products, enhance customer interactions, and improve the staff experience.

- **Staff Scheduling and Performance Optimization**

is a key part of a business, given the staffing issues confronting many companies. Finding the right employees to work on the right shifts requires a strong knowledge of both skillsets and hourly demand. As with other areas, feeding information from sales history and employee performance sources into an AI model can generate dynamic insights that allow a roster to be automatically generated or altered in real time.

- **Order and Queue Management** is especially difficult during peak hours, and an inefficient process contributes to long wait times, lost sales, and angry customers. AI can optimize order flows by considering factors like preparation time, ingredient availability, and staff workload, ensuring efficient order processing. Using information from IoT devices allows such a system to consider data like real-time customer foot traffic or staff availability. And automated point-of-service kiosks or mobile ordering platforms can further automate and streamline the ordering process.

- **Quality and Safety Monitoring** is a critical concern, especially in the restaurant industry, where an inefficient quality control process can result in contaminated food. Fed by real-time data from sources like IoT sensors and production equipment, AI can detect errors that deviate from safety standards in a workplace. This could include unsafe temperatures, environmental anomalies, or deviations in the product itself. As a predictive method, AI can be tuned to detect high-risk suppliers to alert management to potential sources of trouble.

Customer Experience

AI can be used to enhance how customers interact with a business, particularly through service features and personalization. The core application of AI in this space is to better understand how customers want to interact with an enterprise and work to make it as simple as possible for them.

- **Personalization** features are powered by AI's ability to profile a customer through their purchasing history, browsing patterns, demographic information, social media activity, and more. These patterns can then inform an AI's ability to recommend products and services, which can especially help cross- or up-sell products through a targeted ad campaign. Those same profiles can help inform how a business designs its offerings, customizing its menu based on its understanding of specific customer segments.
- **Virtual Assistants** like Google Home respond to simple queries, while chatbots can carry on more complicated requests and natural responses. In either case, machine learning models can help expand their capabilities and deliver a faster and more convenient form of interaction for customers.
- **Visual Search and Augmented Reality** allow customers to enhance their experience, most commonly through their cell phone cameras. AI is essential for powering the visual recognition techniques that allow customers to find products by uploading images. That can be used to power augmented reality features, like displaying product information through a phone overlay.

Enhancing Customer Outreach

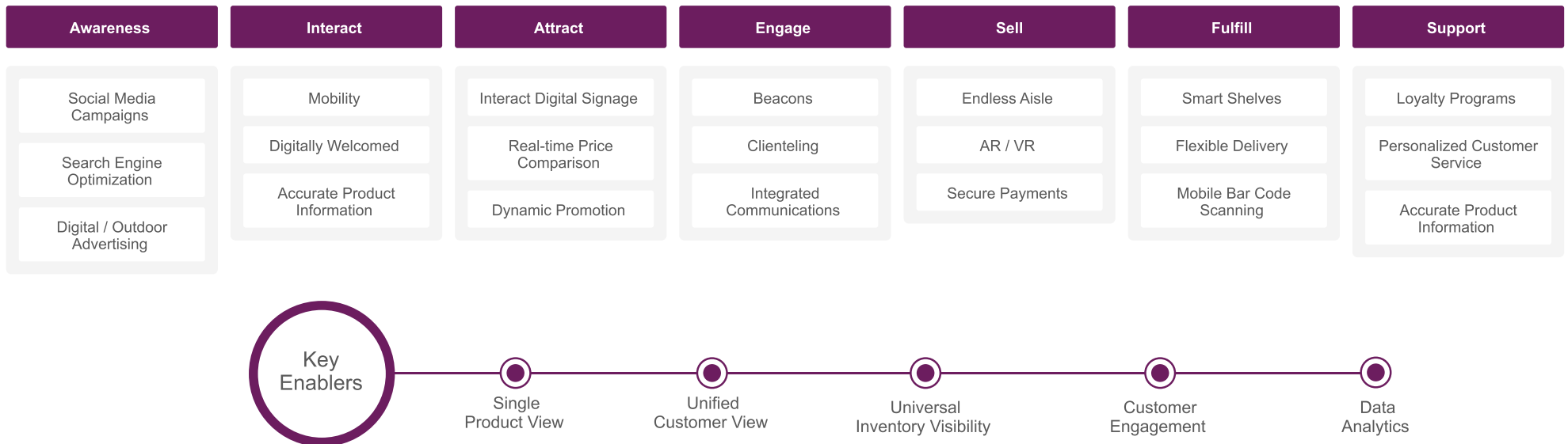
Customer engagement has changed drastically for retail establishments. In-person interactions are much less important than they used to be, but customers now engage with businesses through multiple channels. And they expect robust experiences through each channel.

Gen Z patrons are a unique subset of this, specifically. More than any other demographic, they tend to be digital natives looking for extreme personalization in their apps and digital channels. For example, seamless online ordering tends not to be enough for them; they also want to see recommendations, targeted offers, and interactive shopping experiences through their phones.

AI use cases are particularly helpful for meeting these new customer expectations, allowing enterprises to better track sentiments and results, and generate effective content. That is a boon for the creative aspects of marketing, as well as social media outreach and sentiment analysis.

In short, the methods for customer engagement have become much more complex, but that complexity pays dividends in terms of impact. Consider how the attached graphic demonstrates how the different channels – of awareness, interactions, and sales – lend themselves to deeper engagement options through loyalty programs, dynamic promotion, interactive signage, or AR.

Figure 8: Methods of customer engagement



Optimizing the Customer Experience

Customer expectations are a moving target; there is no guarantee that past service will ensure future patronage. At the same time, customer loyalty is a difficult thing to secure. Modernizing infrastructure and enabling AI-powered technology creates an opportunity to serve customers in the ways they expect and reach more consumers in the process. This is primarily by enabling new personalization features, enabling streamlined, omnichannel avenues for a business, and better tracking the habits and preferences of customers.

Building new experiences

With a modernized infrastructure, companies can devise and execute on new offerings for their customers. We have observed businesses taking this opportunity to devise seamless, omnichannel experiences. Unifying the offline and online shopping experience allows customers to come to the same business through whatever experience they prefer: retail, website, app, or third-party channels.

Leveraging data

As discussed earlier, data and analytics tools are a powerful way to expand an enterprise's capabilities. That extends to understanding and serving customers as well. Analytic tools can track how customers shop and leverage that data in material ways. That extends from shopping habits to social media activities and more. The resulting insights might be as simple as helping a business understand what products are in high demand. But the right data and toolset can help develop audience segments and generate insights into how to specifically appeal to as narrow or broad a group as desired.

Leveraging technology

Modern technology can unlock new capabilities that improve how a business engages with customers. Modern sales and support platforms offer a wide range of personalization options that help encourage customer loyalty. These can help generate self-service options or details about a customer's purchasing history. Gen AI can revolutionize customer support, in particular, AI chatbots have proven to help with first-call resolution rates, cut down on the wait time for service, and contribute to an overall improved customer support experience.

Virtual or augmented reality technology can be deployed in more advanced cases to create a completely new customer experience.

From Merchandising to Customer Notion

The retail landscape is in the midst of a revolution. The speed of this transformation is propelled by an ever-more discerning and demanding consumer base, coupled with shrinking product and trend life cycles. This environment poses a considerable challenge for retailers striving to stay ahead. The advent of omnichannel sales has reshaped consumer expectations, necessitating a seamlessly interconnected shopping experience. In response, merchants are forging collaborations with cross-functional teams to enhance vertical integration and establishing strategic partnerships with third parties to expedite and fortify the supply chain.

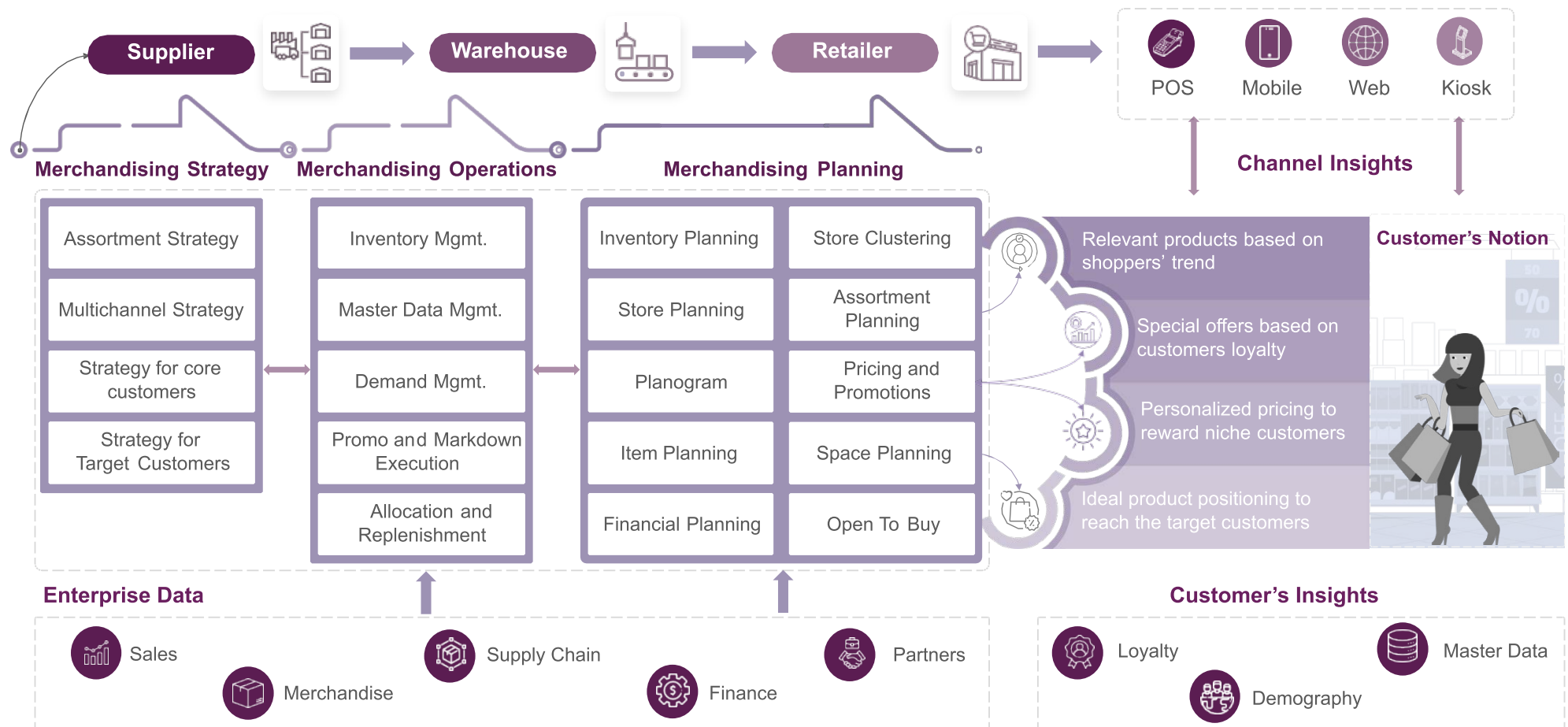
In the face of these challenges, a pivotal aspect for retailers is the imperative to cultivate next-generation merchants who can navigate and thrive in this evolving landscape. The landscape of decision-making is undergoing a profound shift.

Past successes no longer serve as reliable predictors of the future. Analytics is now the key tool enabling retailers to gain insights, make informed decisions, and uncover untapped sources of growth in this dynamic and data-driven retail realm.

Enterprises can prioritize customer experience by leveraging technology to create personalized interactions. Chatbots, virtual assistants, and AI-driven customer service solutions can provide instant and efficient support. Additionally, user-

friendly websites, mobile apps, and in-store technologies can enhance the overall shopping experience. Embrace data analytics to gain valuable insights into consumer behavior, preferences, and market trends. Leverage advanced analytics tools to optimize inventory management, pricing strategies, and product placements. By understanding customer preferences, retailers can tailor their merchandising approach, ensuring the right products are available at the right time.

Figure 8: Methods of customer engagement



First Steps Towards Adoption

With a wide range of retail use cases, the best way to begin adopting them is to strategize around exactly what services a business needs. That calls for comprehensive gap analysis, envisioning a future-ready roadmap, and fostering stakeholder engagement.

Consider the following questions as you develop a roadmap for a transformation:

1 Understanding the state of your technology

Any endeavor should thoroughly analyze an enterprise's current systems, processes, and technologies. Methodologies like APO (Application Portfolio Optimization) and APR (Application Portfolio Rationalization) can help identify gaps and areas of improvement. This will help benchmark your current capabilities against industry standards.

2 Enterprise Architecture Governance

Retail is changing, consumers' expectations are continually evolving, technology is advancing at an unprecedented pace, and robust Enterprise Architecture (EA) governance is essential. It acts as the guiding compass that aligns an organization's strategic goals with its technological capabilities. In the context of modern retail, EA governance helps create a well-structured and future-ready technology landscape. It ensures that your technology landscape aligns with your business strategy, embraces data-driven decision-making, and stays agile in the face of constant change. Formulating an EA Governance Framework will help align business strategy and data-driven decision-making. Incorporating standards and best practices, in turn, drives agility and adaptability.

3 Developing a roadmap

Establishing long-term goals for both a transformation and your business as a whole. Consider how a modular approach to transformation can facilitate seamless scalability through phased implementations. This may help mitigate risks. Whatever your goals are, consider the different styles of infrastructure available to best align your needs with your potential capabilities.

4 Engage stakeholders

Change management is a crucial aspect of any transformation. Gaining buy-in from key stakeholders is the first step here, but a full plan will also include updating management strategies to address potential resistance and implementing training and development programs to equip the workforce with necessary skills.

From there, an enterprise should have a solid implementation plan, aligning it to their needs and abilities. Consider the following questions as you do:

- What kind of tech debts are we carrying forward from a solution architecture and technology point of view? How will it limit the enterprise's scalability and add new business capabilities?
- What key data elements play a significant role in business process optimization or driving critical decisions? Are these data elements feeding into my data warehouse or master data management?
- Can I create AI or machine learning models to utilize my data feeds correctly and drive better analytics and business-oriented decision-making?
- Are my new solutions easy to integrate with the existing enterprise landscape?
- Does the new solution require new ways of deployment and varied infrastructure needs? Or can it be hosted using enterprise-wide infrastructure and hosting standards?

Keep Ahead of the Market

Industry trends suggest that more retailers are adopting these cutting-edge technologies. ISG's Retail NeXT report found a number of major enterprises are making large investments in emergent technology. Amazon plans to invest \$1 Billion in AI and robotic supply chain technology, for example. At the same time, Walmart has invested significantly in machine learning and artificial intelligence to optimize and scale its stores.

The fast pace at which larger retailers are moving suggests it may be a matter of "when" and not "if" these technologies become standardized. It is important that other consumer enterprises are not left behind. Especially given the usefulness in modern architectures where agile action and future-proofed design are concerned, a transformation may be a key factor in remaining ahead of the curve as technology continues to progress.

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Devipad has 20+ years of experience in Enterprise Architecture, Design, Development, Product Engineering, DevSecOps, Performance Engineering, Cloud Adoption and Platform Modernization across multiple business domains across Retail, CPG, QSR, Media & Publishing, IP and Asset Management industry verticals. He has been instrumental in building products and solutions for IBM, Adobe, McDonalds and VeriFone.

He has played key roles in building business critical solutions for McDonalds, VF Imagewear, Keurig Dr Pepper, Staples, IKEA, Office Depot, Dixons, Fonterra and many more Retail Industry Leaders. He has been part of many Retail transformation initiatives spanning across eCommerce, Restaurant & Stores, Mobility, Enterprise Integrations, Core Retail Products and Solutions, Enterprise Application Modernization, Transformations and Refactoring/Re-architecting.



Sunder Pillai

Industry Leader Retail,
CPG & Enterprise North America, ISG

As the ISG industry lead for Retail & CPG, Sunder brings his 22+ years of experience leading engagements as a strategy and IT consulting executive with deep experience and expertise throughout the ITO sourcing process. With a focus on results-driven IT outsourcing, consulting, digital business strategy and technology services industry leadership, he has built his experience helping clients in several industries achieve their desired business outcomes. He has deep experience in the consumer services, travel, transportation, hospitality, retail and CPG industries. He offers ISG clients comprehensive negotiations experience and vital, proven expertise and extensive knowledge of the outsourcing industry and related trends.

About Xebia

Xebia is an IT Consultancy and Software Development Company that has been creating digital leaders across the globe since 2001. With offices on every continent, we help the top 250 companies worldwide embrace innovation, adopt the latest technologies, and implement the most successful business models.

To meet every digital demand, Xebia is organized into chapters. These are teams with tremendous knowledge and experience in Agile, DevOps, Data and AI, Cloud, Software Development, Security, Quality Assurance, Low Code, and Microsoft Services. In addition to high-quality consulting and state-of-the-art software, Xebia Academy offers the training that modern companies need to work better, smarter, and faster. Today, Xebia continues to expand through a buy and build strategy.

We partner with leading IT companies to gain a greater foothold in the digital space.

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