

January 2020

# NASSCOM<sup>®</sup>



# AI



*PERVASIVENESS  
IN RETAIL*



# Executive Summary

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- Indian retail market is forecasted to grow at ~11% CAGR through 2021. The market is expected to witness increased adoption of technology-led solutions, thus resulting in achieving technological maturity and sophistication
- Currently, the market is dominated by unorganized retail. However, the share of organized retail, including eCommerce, is expected to increase significantly due to advancements and disruptions caused by new-age digital technologies
- The sector has been leveraging various digital technologies such as Robotics, IoT, AR/VR, etc., for quite sometime. While all these technologies have potential to operate in isolation, when combined with AI these technologies get a centralized brain
- AI not only complements these technologies, but also acts as a link between them, which allows AI to access data from different systems and deliver real-time insights and enable retailers to make informed decisions. More importantly, AI also feeds data into these systems, thus making them more intelligent and drive automation



# Executive Summary

- Some of the most widely used AI technologies across the retail value chain are Machine Learning, Computer Vision, Conversational AI, Data Science and NLP, addressing challenges such as demand forecasting, product development, supply chain planning, store operations, campaign management and customer experience



- While AI is being leveraged to address specific use-case based point solutions, it definitely holds potential to find enterprise-level adoption in retail. However, this would need interventions from all the stakeholders before it could be implemented at scale



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- **Retail landscape**
- **Key technologies in retail**
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# India is among world's leading retail markets; Expected to undergo strong growth due to technological innovations

### Leading Retail Markets in Asia



- Fourth largest retail market in the world after US, China and Japan
- Ranks second among 30 developing countries across the globe in 'Global Retail Development Index'

### Indian Retail Market (USD billion)

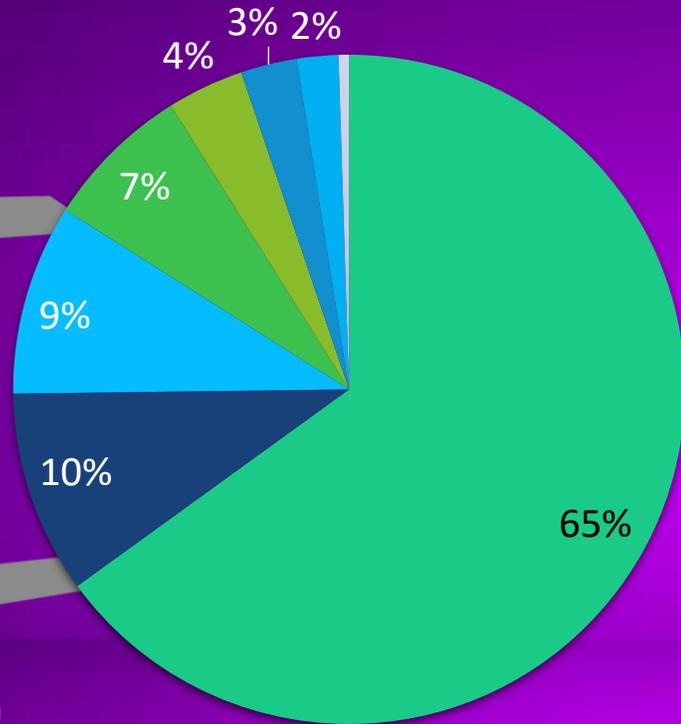


- Retail is among the leading contributors towards India's GDP (~10%) and employment (8%)
- The market is forecasted to exhibit strong growth not only in market size but also market sophistication due to technological innovations



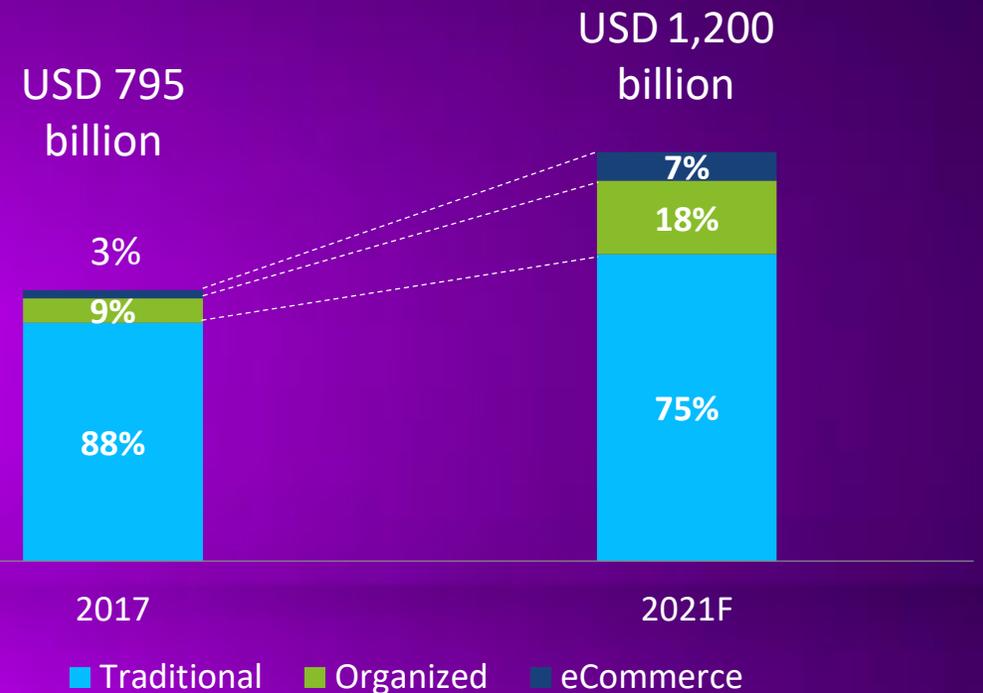
# Advent of digital technologies is expected to lead to stronger growth of organized retail including eCommerce

### Indian Retail Market – Break-up by Category



- Food and Grocery
- Apparel and Footwear
- Consumer Durables and IT
- Jewelry and Accessories
- Health and Entertainment
- Home décor and Furnishing
- Beauty and Personal Care
- Others

### Indian Retail Market – Break-up by Channel

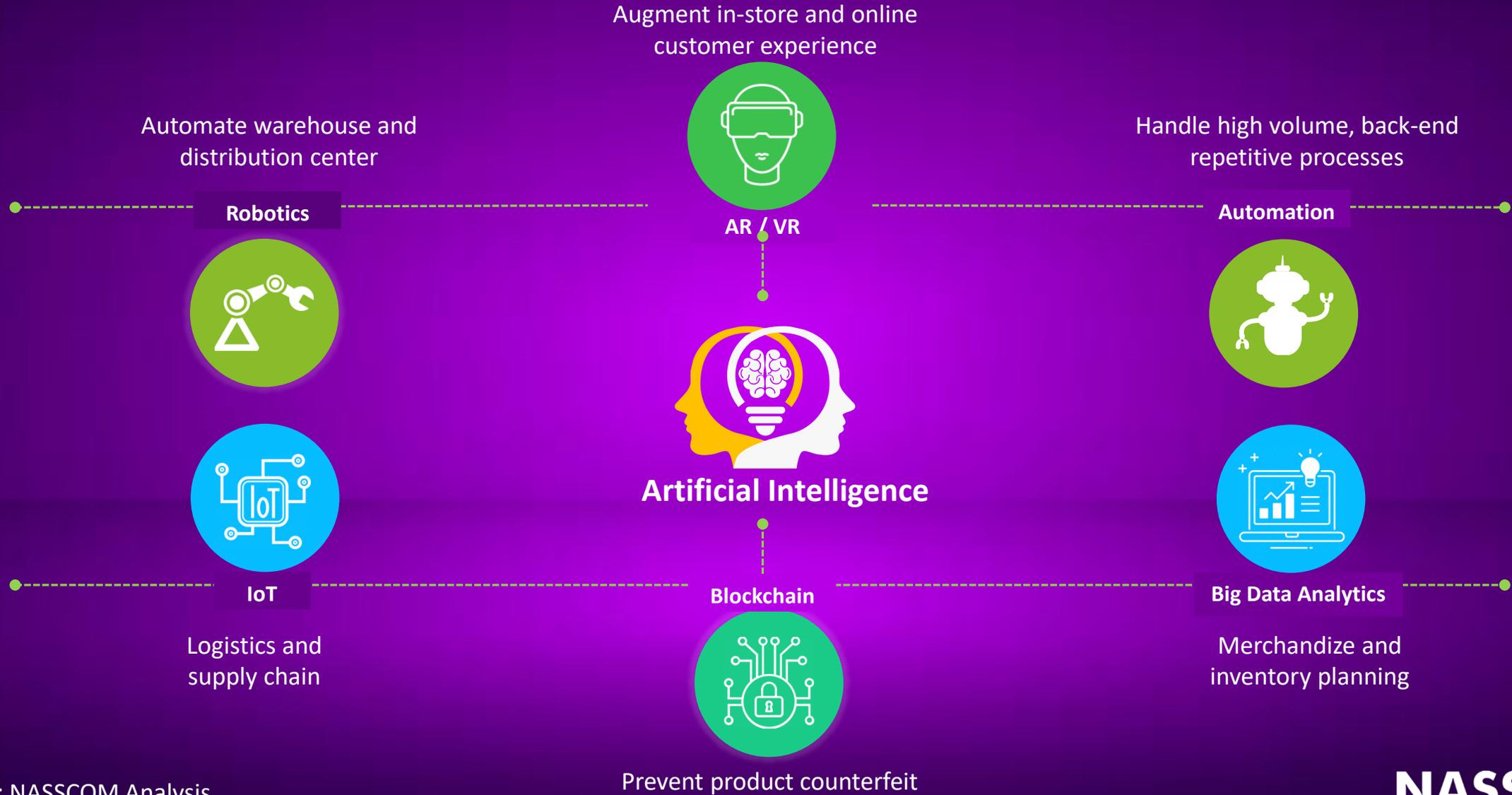


- Share of organized retail, is expected to grow significantly going forward due to increasing proliferation of eCommerce and disruptions caused due to advent of digital technologies



# Retail sector witnesses interventions of AI with different new-age digital technologies...

Illustrative





# ...and other technologies within AI that enables retailers to draw insights and make informed decisions



## Conversational AI

Voicebots and Chatbots to augment customer experience and pre-/post-purchase engagement



## Data Science

Develop recommendation engines by analyzing customer's online as well as offline behavior and preferences



## Natural Language Processing

Handle conversations and provide responses to queries raised by users on the system and external interfaces

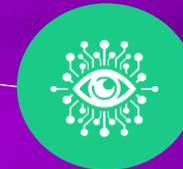


## Artificial Intelligence



## Machine Learning

Machine Learning algorithms create models and simulations that predict output based on multiple variables such as sales, weather, location, etc.



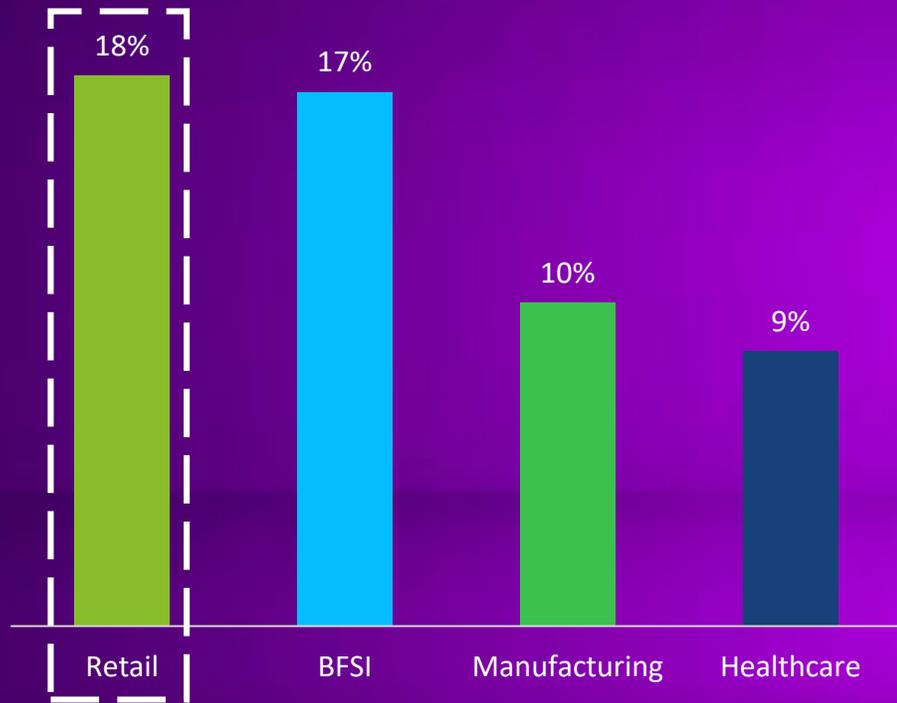
## Computer Vision

Tag objects, monitor human actions and analyze human object interactions to generate consumer behavioral insights



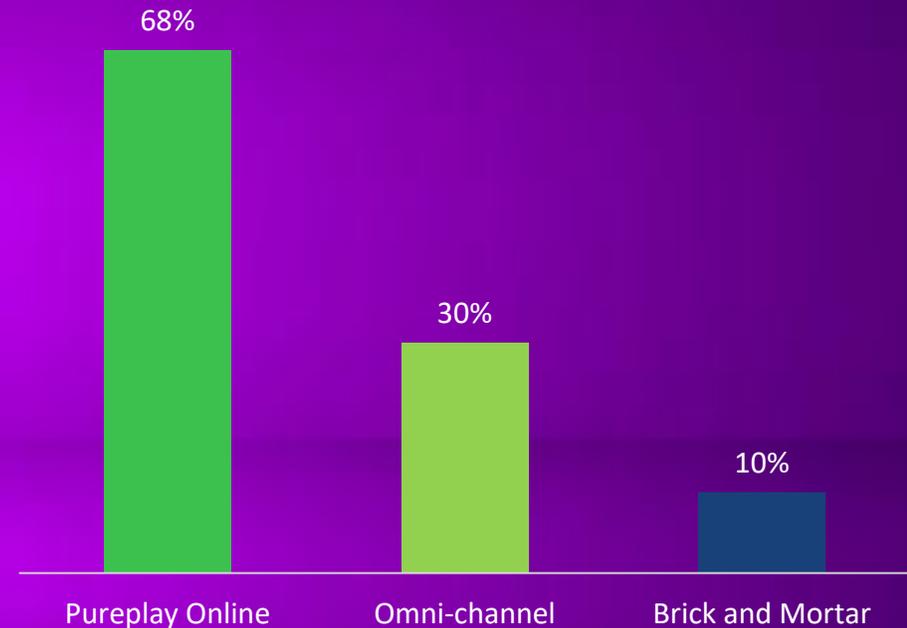
# Growing importance of AI in retail is reflected by increasing spending on AI technologies by retail enterprises

AI Spending by Sector as % of Total AI Spending by Enterprises (2019E)



- Globally, Retail overtook Banking to become the highest spender on AI

AI Penetration by Format



- Online retailers lead in terms of AI capabilities, primarily due to data intensive nature of business



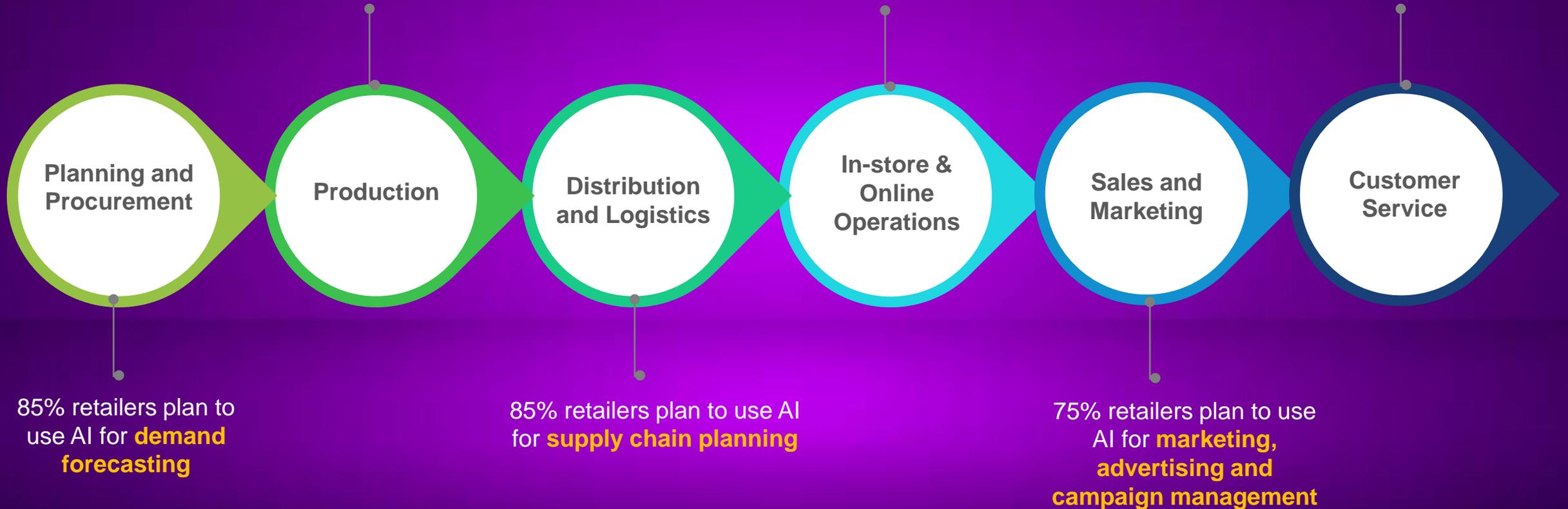
# Rapid advancements in AI are resulting in AI implementation across the retail value chain

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86% CPG companies plan to use AI for **product design and development**

73% retailers plan to use AI for **store operations**

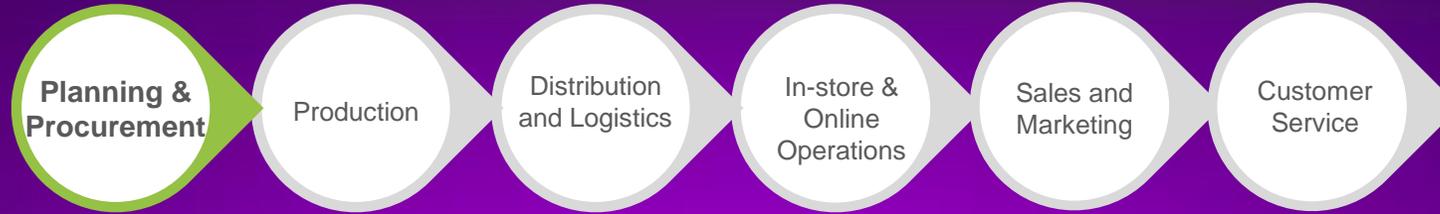
79% retailers plan to use AI for **customer intelligence**





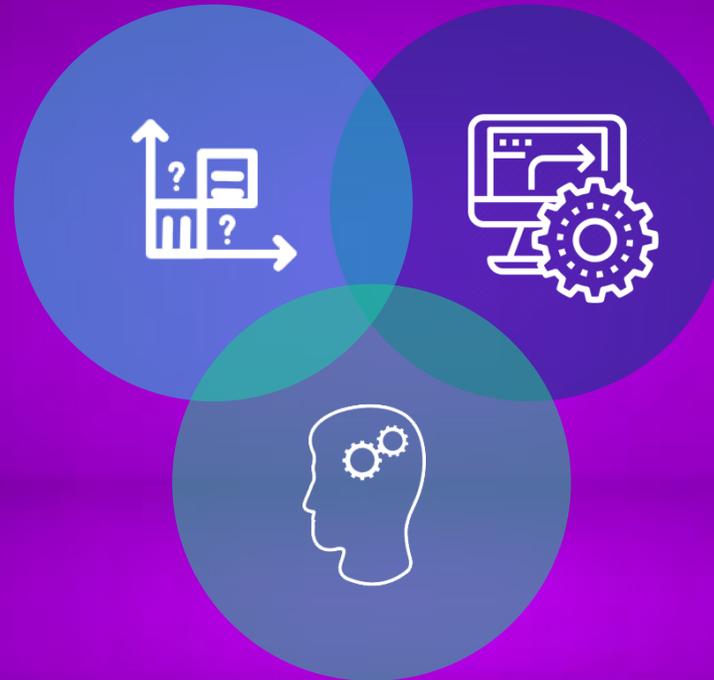
# AI-powered real-time insights help retailers to forecast demand and reduce shelf gap

Illustrative



## Stock replenishment

AI-driven insights by analyzing internal and external data sets such as sales, vendors, weather pattern, etc., could help to **predict demand, automate product order and reduce shelf gap**



## Catalog management

AI-powered **image recognition** solutions could help tag and **categorize product catalogs** with specific attributes such as color, pattern, length, etc., to enable easy and accurate **product discovery** for customers

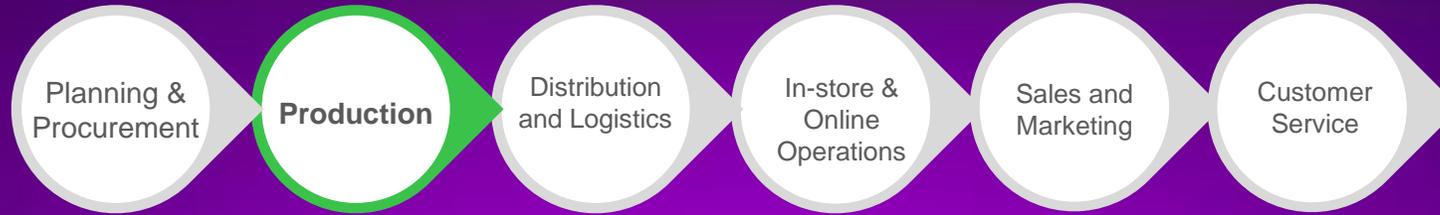
## Assortment rationalization

ML algorithms when applied on different data sets, such as returns, purchases, loyalty card, search results, store receipts, etc., could help to **customize assortments and reduce number of SKUs**



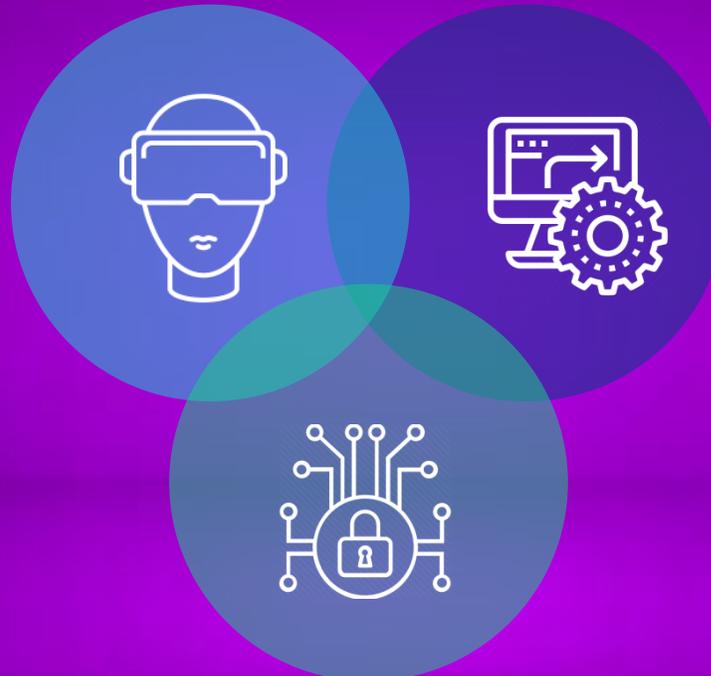
# ML-based self-learning product designing helps designers to develop products based on desired parameters

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## Generative designing

AI and ML powered design tools could offer **self-learning generative design solutions** based on parameters fed into the algorithm by designers



## Quality control

AI could empower robots to monitor their **accuracy and performance**, **computer vision** could help to identify **product defects**, thus enhancing **product quality**

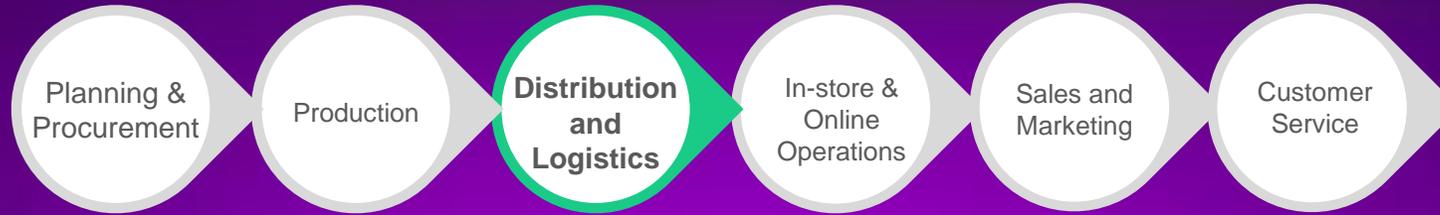
## Predictive maintenance

**Predictive and preventive maintenance tools** powered by advanced AI systems could help retailers to **identify potential breakdowns**, **schedule service** and **save downtime**



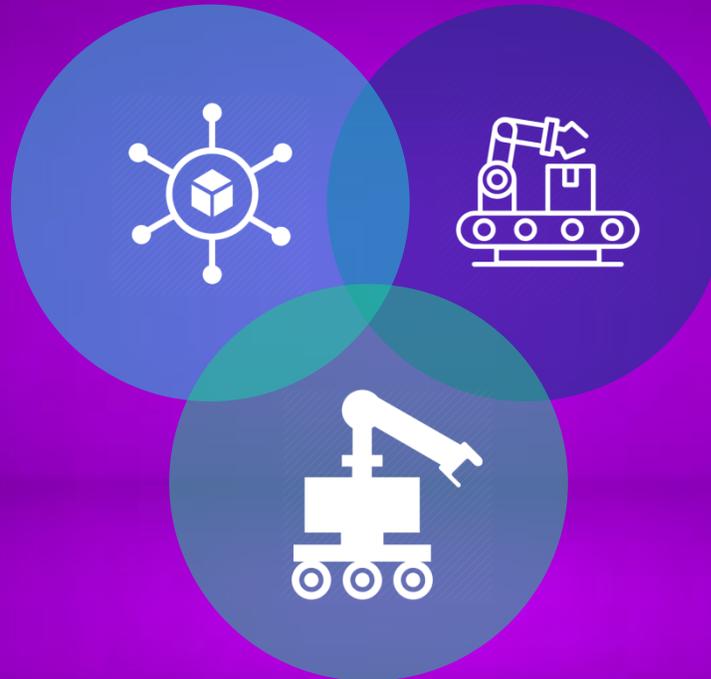
# Technologies such as computer vision and image recognition help retailers to predict shelf life and reduce food waste

Illustrative



## Logistics network management

AI could help retailers to **optimize route** and **schedule vehicles**. Similar routing algorithms when deployed in-store could help **reduce staffs' walk time** to pick orders in the warehouse and distribution center



## Automated warehouse

AI-powered robots when coupled with **visual recognition** help not only to **automate packing and picking** items but also could help robots to communicate and collaborate with each other

## Supply chain optimization

AI-powered **image recognition** when coupled with **IoT devices** could **prevent food waste** due to variations in temperature. It could also help **predict shelf life** of products based on factors such as color, appearance, etc.



# ML algorithms operating in tandem with computer vision help prevent frauds and enable self-checkouts

Illustrative



## Returns management

AI-enabled **predictive analytics** could help retailers **reduce product returns** by analyzing customers' past transactions including sales, searches, and variables such as weather condition, etc., to **predict their buying pattern**



## Self-checkouts

**Computer vision, deep learning** algorithms and sensor fusion could enable **self-checkouts** in a store. It could also **prevent frauds** at self-checkouts

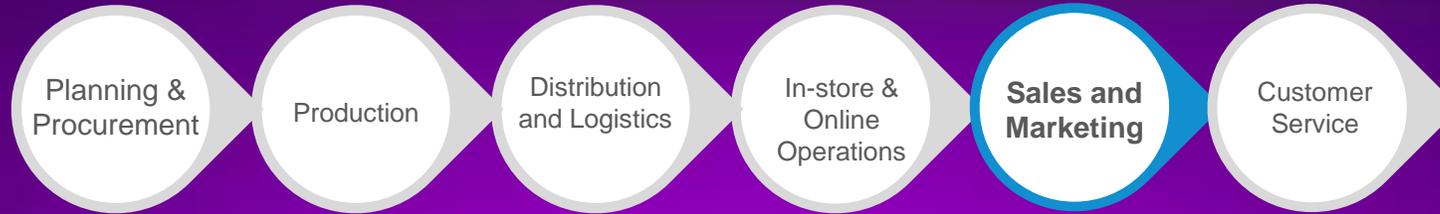
## Prevent address frauds

**Data science** and **ML tools** could help classify and identify complex Indian addresses to **resolve address inconsistencies** and **prevent address frauds**



# Analytics performed on past data help optimize marketing campaigns and perform data-driven micro-segmentation

Illustrative



## Optimize marketing campaigns

AI-powered **deep learning** algorithms could help retailers to **personalized recommendations** based on user data such as behavior, locations, etc., and **predict consumer intent** and **purchasing behavior** to optimize marketing campaigns



## Customer segmentation

Advanced analytics on previous purchases, time and **channel** of purchase, etc., could help to move from demographic-based mass targeting to **data-driven micro-segmentation**

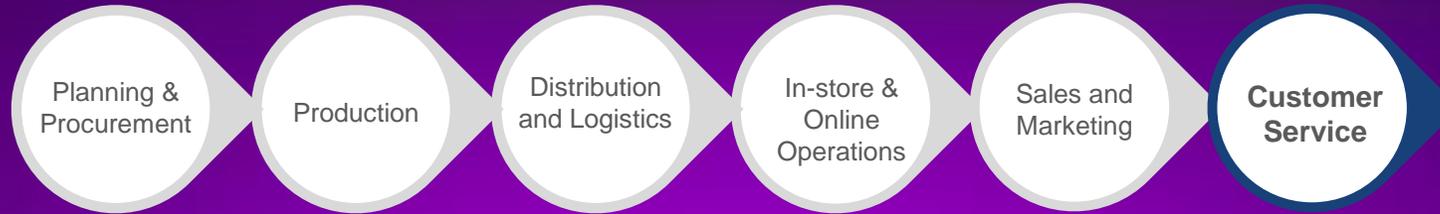
## Sales forecasting

AI-powered **predictive analytics** that leverages past sales data, industry-wide comparisons and economic trends could help retailers to **forecast sales** and make informed decisions



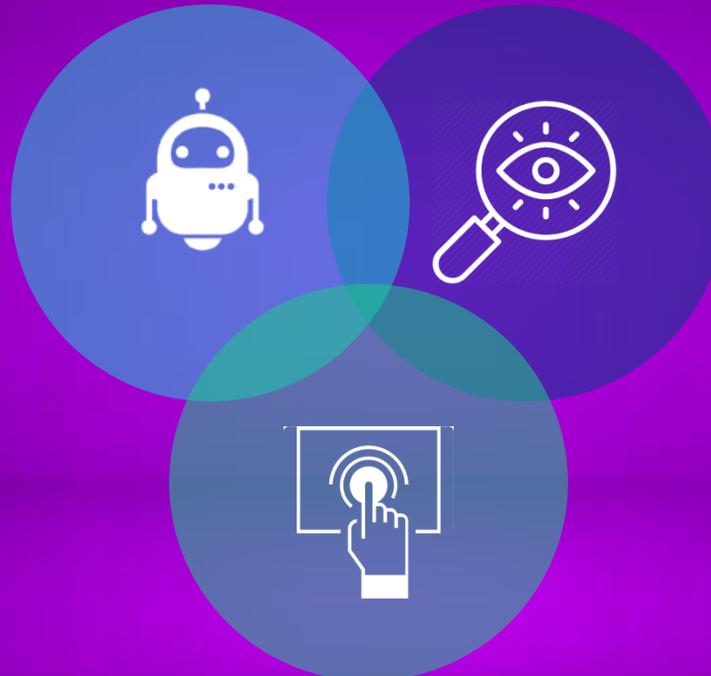
# Conversational AI helps retailers to augment customer experience and enhance post-purchase engagement

Illustrative



## Chatbots

NLP powered **conversational bots** could **augment customer experience** and engagement by providing product information, order status, product recommendation, payment support, etc. In addition, they could also be helpful for **post-purchase engagement**



## Visual searches

AI-powered **image recognition** could allow customers to **visually search products** in the store using an image and **notify similar products** with their exact location in the store

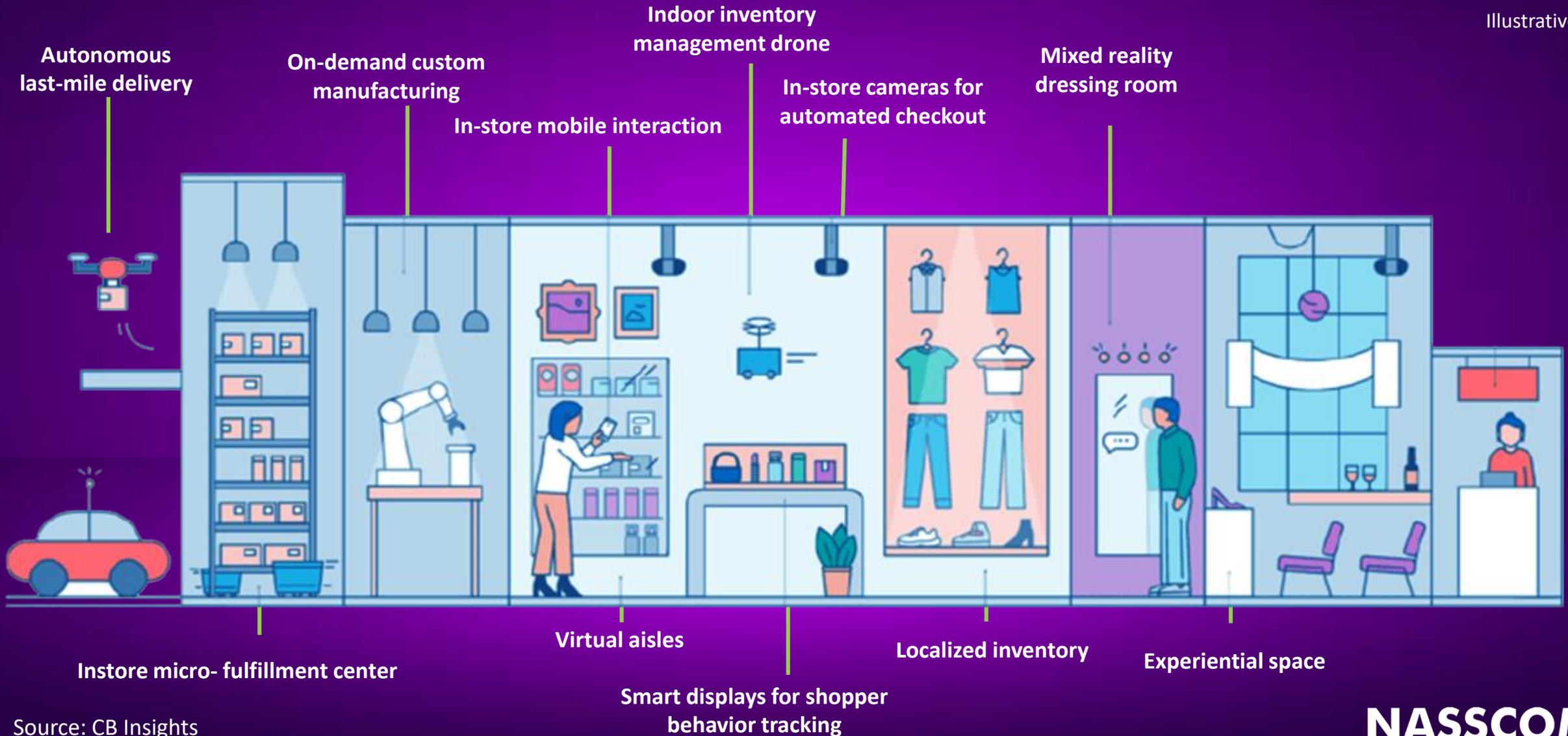
## Immersive shopping experience

AI-driven **immersive media** including AR and VR interfaces could **enhance customer experience** by providing **virtual trial rooms** where customers could try products such as apparel, makeup, etc.



# AI when implemented at scale, with right interventions with other technologies would change the face of retail

Illustrative





# While AI holds potential to disrupt retail sector, it still faces roadblocks that need to be addressed by stakeholders



**Roadblock:** When it comes to developing AI-enabled solutions, cost of infrastructure and computing speed is one of the key deterrents, especially for small retailers and early start-ups

**Proposed solution:** Service providers should focus on developing AI solutions that could work with limited computing speed and are compatible with existing systems in the organizations

## Infrastructure



**Roadblock:** Lack of relevant and insightful data is one of the key roadblock in AI adoption among retailers

**Proposed solution:** While retailers might take some time to gather data, service providers should focus on prioritizing AI solutions that could leverage existing and/or real-time data to generate actionable insights

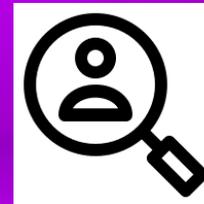
## Data



**Roadblock:** While AI-enabled use cases such as delivery through drones and autonomous vehicles could disrupt retail sector, they are still far from implementation in India due to regulatory hurdles

**Proposed solution:** Consultations among all stakeholders to develop regulatory frameworks that could speed-up adoption of these solutions

## Regulations



**Roadblock:** Adoption of AI across retail processes and functions is expected to result in altering workforce composition and job roles

**Proposed solution:** It would be imperative for retailers to either hire right talent and reskill their existing employees or collaborate with right set of service provides to implement AI solutions

## Talent

## Case Studies



# Case studies



Delium is a product start-up built on the cornerstone of inducing autonomy & responsibility into its software products, thus making businesses that employ them self driven. The Eye does this for Turns retailers by using machine learning to drive core retail functions.

### Client details

Grace Supermarket, one of the top successful supermarket chains in Chennai (25 outlets of varied formats across the city)  
 Daily Needs, a leading supermarket chain with 3 outlets and a warehouse catering to the needs of customers in Pondichery.

### Problem statement

Inventory profitability and replenishment. Accurate “recurrent” planning was impossible with expanding assortment and customers. Micro errors, accumulating into bloated inventory. Supplier service in smaller cities. Too much data and reminders to make sense of and track.

### Solution provided

The Eye’s first persona – The Replenisher, learns from historical data (or cold starts), plans and executes autonomously current planning operations. The Eye builds perceptions about business entities that are used to prioritize tracking and building operational recommendations.

### Value delivered

In 2 months of usage, Grace saw a 10% cut in inventory. Daily needs reclaimed 20% of operational capital in 8 months of usage, also reclaimed 40% of man hours from the purchase team for use in other operations while still growing in sales. Supplier conversations are data driven and peaceful.

### AI technologies used

Perceptions are build based on our proprietary fuzzy data pattern matching algorithms. Biases are made stronger or change with time using feedback loops. XGBoost sits at the core of our demand forecasting engine. All interaction and conversations with The Eye is via an NLP interface.



# Case studies



Verdis, is the ‘virtual data scientist’ for organizations. Artificially Intelligent Verdis connects to internal and external data sources to help organizations uncover growth opportunities in real time in their supply chain performance.

### Client details

The client was a multi-store chain of apparel brand with more than 15K SKUs at any given point of time. The stores were present across 20+ cities including metro and state capitals.

### Problem statement

Uncertainties in the fulfilment pattern at the stores combined with those arising due to external factors such as variations in transportation lead time and the weather, were leading to inefficiencies in inventory holding including sales losses and stock outs at various points of time.

### Solution provided

Using AI and ML, Verdis reduced the uncertainty and bias in SKU placement at the stores. Its multiple models and simulations combined data for sales, weather, location and transportation lead times to deliver real time advisory (insights) for maximising sales at the least inventory cost.

### Value delivered

The client’s stock turnover ratio increased in a range of 12% to 27% across its multiple stores. Its sales growth, hovering at 8-9% for the previous years, is in the range of 10%+ for the corresponding period the product solution has been in operation.

### AI technologies used

ML was used for modelling for predictive outputs with multiple variables. NLP/NLG technologies were employed for response management to queries raised by users on the system and external interfaces.



# Case studies



Yellow Messenger helps enterprises transform their core business functions - Sales, Marketing, Customer Support, HR, ITSM, Analytics, etc., using AI and ML powered Digital Assistants. It powers automation for 100+ global clients, in 120+ languages, handling 10M daily conversations.

### Client details

Asian Paints Limited, an Indian multinational paint company, engaged in the business of manufacturing, selling and distribution of paints, coatings, products related to home decor, bath fittings and providing of related services.

### Problem statement

Ensure seamless delivery of goods from the point of supply to the point of demand  
 Deliver an effective way to provide business-critical information to dealers and optimize customer support's time to handle distributor's queries

### Solution provided

Developed Captain Asian Paints chatbot to provide on-demand information on order and invoice status to dealers simply by saying Hi on WhatsApp  
 Capability to converse in over 55 languages

### Value delivered

Reduced critical call volume by 25%  
 Added benefits include cost reduction, reduced query SLA, enhanced workflow, better user engagement and reduced time per service request

### AI technologies used

NLP/ML libraries like SpaCy and Keras for converting user inputs into structured text.  
 Tensor flow to predict the user intent and trigger the required journey configured.



Singular Intelligence offers an AI platform that augments and automates decision making in the consumer goods sector (FMCG, Retail, Ecommerce, D2C) tackling trillion dollar global inefficiencies and accelerating RoI, Profit, Sales and Market Share.

**Client details**

The Client is an FMCG Company with a focus on Food & Drinks including perishable products – milk, cheese, snacks, chocolates etc. that are sold via Retail Stores and Smart Vending machines - micro-markets in the autonomous retail channel.

**Problem statement**

The client wanted to implement and grow their autonomous retail channel. Key problems were losses due to wastage, returns, out of stock and inventory not aligned to dynamic consumer needs at local area, time of day, day of week, seasonality and specific customer segment level.

**Solution provided**

Dynamic, efficient, price/promo recommendations for stocks on shelf, replenishment recommendations to avoid out of stock and align local demands with preferred product assortment at micro-market level. Real-time IoT enabled shelf data combined with weather and competition.

**Value delivered**

Increased sales and profits, reduced wastage and returns, improved supply chain efficiency, improved customer experience. The solution enables the new business model of autonomous, cashier-less retail and is also applicable to D2C, Ecommerce, C2C models.

**AI technologies used**

The harmonized shelf and market data is fed to a real time multi-model prediction engine that uses Deep Neural Networks, LSTM and Transfer learning. The outputs that learn from all factors in real time are further processed in a decision recommendation layer.



Wesense.ai is an AI startup providing in-store insights for retail and building solutions to facilitate capturing, analyzing and acting on real-time customer information. Operates in 25 cities and 250 stores across India serving clients such as Dell, Xiaomi, Titan, Lenskart.

**Client details**

One of the leading multi-chain retail brands having presence across India

**Problem statement**

The client was experiencing steep decline in orders and revenue from a certain geography. Unable to identify the actual reasons behind the steep decline, they were assuming the decline is due to lesser footfalls.

**Solution provided**

Provided Traffic Sense product, which tracks total walk-ins with demographic attributes. After over two months of implementation they understood that 70% of traffic was experienced during 20% of the time.

**Value delivered**

The store was not equipped properly during peak hours leading to steep decline in customer satisfaction and churn. They focused their skilled resources during the peak resource. In a month's time they saw an increase in sales by 5%

**AI technologies used**

Deep Learning, Computer Vision, Convolutional Neural Network, Edge Inference, TensorFlow, OpenVINO, OpenCV, Google Cloud, Serverless, Face Detection, People Detection, Action Recognition



MintM helps retail businesses with identification and tracking of people and goods using computer vision.

**Client details**

Big basket is India's largest e-grocery company operating in several cities and has several warehouses.

**Problem statement**

Client had a challenge where every item returned by the consumers had to go through a lot of manual process before being available for inventory causing higher cost and loss of revenues.

**Solution provided**

MintM Image recognition technology enabled client to make this process fully automated. The moment products returned to warehouse, they were put on conveyer which was equipped with CCTV camera and rest of the process was automated.

**Value delivered**

Client saved minimum 2 man power effort for every small warehouse and also the inventory tracking improved reducing the time to replenishment to half.

**AI technologies used**

Image processing, Computer vision, deep learning.



# Case studies



Wobot Intelligence is an AI-based Video Analytics solution meant to monitor compliance checks and SOPs adherence. It uses existing CCTV cameras and its' activity recognition and person RE-ID architecture, to detect deviations and anomalies in standard procedures.

### Client details

Cure.fit is a preventive and curative healthcare & fitness company based in Bengaluru with 300+ Cult.fit and Eat.fit centres.

### Problem statement

Cure.fit faced challenges in maintaining hygiene, productivity of trainers and customer experience (staff SOPs) standards which lead to internal operational inefficiencies as well as non-adherence to process compliance.

### Solution provided

Cult.fit and Eat.fit leveraged Wobot's AI platform to monitor their Hygiene (Mopping, Hairnet, Gloves, etc.), Customer Experience (Person Count, Staff using Phone, Staff Uniform and Availability) processes and other general SOPs.

### Value delivered

Wobot's solution helped Cure.fit to improve their hygiene, safety and service delivery standards. It also helped them ensure consistency in delivery of customer experience and scale sustainably.

### AI technologies used

Deep Learning, - CNN, LSTM, FCN, Darknet  
Libraries - OpenCV, Keras, Tensorflow , PyTorch



# Case studies



Analyttica Datalab Inc. is an AI/ML tech-enabled solutions company that drives business impact through a strong focus on its customers. It offers an optimal man-machine blend of solutions that combine analytical expertise and technology.

### Client details

A major US retailer for body essentials having presence in over 20 states in the US and growing its footprint in other states at a rapid pace.

### Problem statement

The client faced a challenge in meeting its quarterly sales targets for a consecutive 5 quarters and observed a decline in sales over time. The client was taking all the classical remedial measures but they did not deliver expected result.

### Solution provided

With the help of Analyttica’s patented analytics and AI solution ATH Precision, a complete sentiment engine was built that helped the company understand the connect between social brand sentiments and sales

### Value delivered

The solution helped the client identify one of the root causes behind their dwindling sales. Based on the data driven recommendations the client’s social brand sentiment improved which resulted in 18% growth in sales in Q2’19 over the same quarter last year.

### AI technologies used

With the help of advanced ML techniques pertaining to NLP, Analyttica was able to build a sentiment engine within its AI powered ecosystem that would highlight negative sentiment content on social channels and lead to faster resolutions of customer concerns



# Case studies



Marax is a 3 year old company working on solving the user retention for mobile commerce. It has two key products: MARS and Churn Prediction.

### Client details

Marax is currently working with large consumer tech brands like Ola Cabs, Rapido and DailyNinja

### Problem statement

How to send just-the-right offer to each user?  
How to promote long term retention using incentives/offers?

### Solution provided

MARS enables businesses to create, manage and optimize the incentives for a user driven by a budget. These incentives are also delivered using rich UI that promotes long term retention of the user

### Value delivered

Up to a 30% uplift in conversion rates from the same marketing budget.

### AI technologies used

Reinforcement Learning for core budget optimization. Internal marketing simulator that helps to benchmark the models before they hit production.



Inflect Technologies builds B2B SaaS products for top Consumer Packaged Goods companies and large-format Retail Chain to provide them in-store execution insights via Computer Vision.

**Client details**

Heineken in APAC (collect photos from 250K stores per month). Kimberly Clark Corporation in APAC (collect photos from 2.5K store per week). Other customers: Samsung (IMEA, APAC), Britannia (IMEA, India), Mondelez (IMEA, APAC)

**Problem statement**

Retail companies want to lift sales by avoiding out of stock products on retail shelves and adhering to product planograms. They want to save cost on slotting fees and branding payout by measuring compliance of retail stores.

**Solution provided**

Computer Vision, Deep Learning. Process photos at scale by running Deep Learning enabled AI-models on photos incoming from different geographies.

**Value delivered**

Impact on Marketing and Sales division of Retail companies. Helped one of the customers save \$500K USD monthly whereas provide same-store lift by 1% to 5% to several customers.

**AI technologies used**

Object detection using deep learning by predicting polygon around more than 200 objects on a single photo where each polygon is labeled at a class level from more than 2000 classes.



Streamingo.ai is an innovative deep learning technology company singularly focused on providing video-based insights at scale. Our flagship product FizzStream, helps generate automated consumer behavior insights from video-based studies.

**Client details**

Headquartered in the USA, our client is one of the world’s most respected FMCG companies with several successful billion-dollar brands in their portfolio. They are known to be the innovation leader in the CPG industry and one of the largest investor in consumer and market research.

**Problem statement**

CPG companies have started to use video-based studies to understand consumer behavior better. The ROI on such studies is quite low, given that the behavior analysis is done by humans (causes inconsistency, slow completion times and inaccurate).

**Solution provided**

Streamingo.ai specializes in analyzing consumer behavior studies recorded on videos. The innovative AI algorithms: tag objects, actions, human object interactions and generate behavior insights that are not possible with normal human analysis.

**Value delivered**

- Reduce the time required for analysis by 80-90%
- Achieve repeatability/consistency in analysis of study videos
- Reduce cost of studies by up to 70%

**AI technologies used**

Deep learning based multimodal video analysis (Speech processing, Computer vision, image processing etc., working seamlessly together)  
 Patented techniques in the areas of action detection, human object interaction and object detection.



# Case studies



AskSid is a B2B vertical AI SaaS business offering a Conversational AI full stack solution for Retail and CPG brands delivering Accelerated conversions, Enriched product catalog, Enriched Customer Profile & Automation.

### Client details

Market leader in luxury bodywear since 1950 in Europe. Designing and manufacturing its products exclusively in Europe having strong reputation of delivering high-end products and high-end customer service.

### Problem statement

Delivering the same high standard of service online as its customers expect in its boutiques. Creating personal conversation on digital channels with its customers enabling accelerate conversions by leveraging consumer insights and automating customer service requests.

### Solution provided

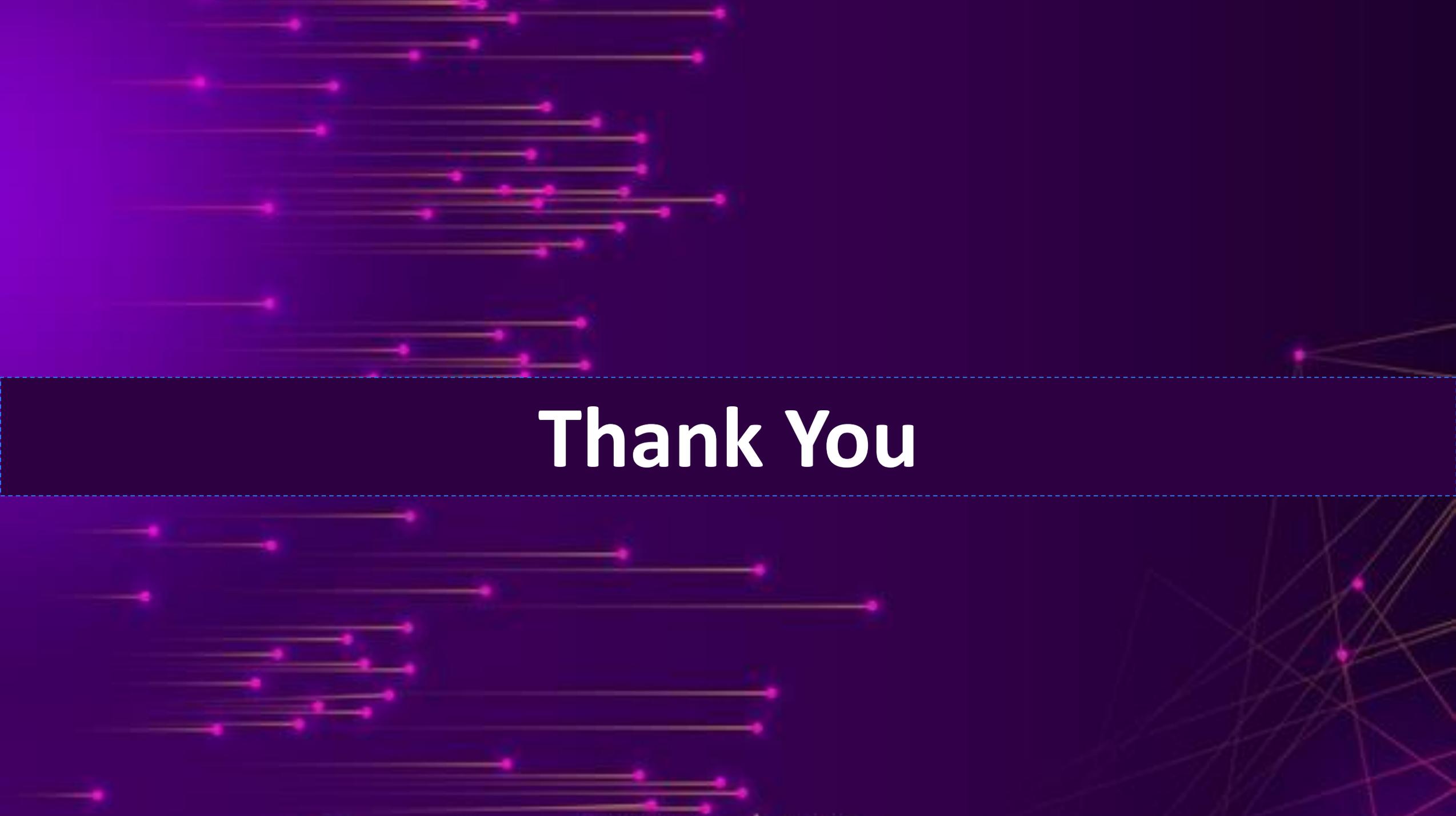
AskSid.ai’s Full Stack Conversational AI solution for Retail & Consumer Goods Brands

### Value delivered

11% influenced orders rate vs 1.5% conversions of website, Product Catalog Enrichment with 1000+ new product questions, Actionable Insights impacting cross-functional KPIs across online business, marketing, and New product trends.

### AI technologies used

Proprietary Multi-Language AI/ML deep learning Models for Retail & CPG – Intents model, Named entity models, QnA Models, Computer vision model, text processing | understanding | generation models



**Thank You**