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ROLE OF DATA & AI IN RETAIL IN 2023

FUTURES BY FRACTAL | GLOBAL RETAIL | MARCH 2023

CONTENTS →

The role of data and artificial intelligence (AI) in the retail industry continues to evolve and expand. With the help of AI-powered solutions, retailers can analyze customer data and make informed investments to support future consumer needs. The COVID-19 pandemic has accelerated the trend toward contactless retail experiences, such as buy-online-pick-up in-store (BOPIS), and curbside pickup.

In this document, we explore emerging technologies, their use cases, and the problems they are solving for retailers.

IN THIS DOCUMENT:

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EMERGING TECHNOLOGIES TO WATCH FOR

AI-powered technologies to make better business decisions and deliver seamless experiences

1 AUTONOMOUS OPERATIONS
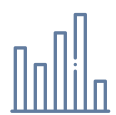

Kiwibot partners with hospitality giant Sodexo to bring food delivery robots to more college campuses
Fig 1.B

Self-Driving Robots: A Revolution in the Local Delivery
Fig 1.C

OPPORTUNITES FOR GROWTH:

- Seamless & digitally managed experiences delivered by integrated technologies such as IoT, computer vision, deep learning, etc.
- Autonomous retail cuts operational costs; helps retailers stay relevant, deliver functional experiences and meet demand while transforming their cost structure

Special cameras will monitor customers as they make their way around the store

Fig 1.A

USE CASES:

- Staff-free stores
- Warehouse automation
- Drone/Robot deliveries
- Cashless transactions
- Reduction of human errors
- Frictionless consumer experience

A study by Inmar Intelligence found that 40% of shoppers prefer to use self-checkout in stores, with 27% using it exclusively

CONSIDERATIONS FOR IMPLEMENTATION:

Autonomous operations require hardware setup (one time + over time maintenance); this can be a highly cost intensive uplift with infrastructural barriers

Changing consumer behavior and shopping habits make it difficult to analyze the demand; need for experimentation and easy adjustment in shopping aisles

Businesses needs to consider their target market and understand what level of automation consumers want as some might prefer human interaction

SMART STORE MOCKUP

SMART MIRROR

SMART SCREENS

ROBOTIC ASSISTANCE

WINDOW SHOPPING

AUTOMATIC CHECKOUT

Illustrative

2 DATA ORCHESTRATION

OPPORTUNITES FOR GROWTH:

- Stabilize with data orchestration to reduce disruption across the supply chain; learn from circular economies to manage bloated inventories, and find secondary markets
- Accurate prediction and forecasting, customer insight and clarity on decision-making followed by feeding the inputs back to the development of the product

USE CASES:

- End-to-end visibility
- Predictive & prescriptive analytics
- Demand fulfillment
- Customer loyalty
- Customer alignment across verticals
- Agile Supply Chain
- Customer Entity Resolution
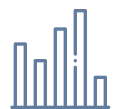
According to a recent survey by Forbes, 80% of the efforts associated with data analysis are spent gathering data and then further processing it, which can cause bottlenecks

Fig 2.A

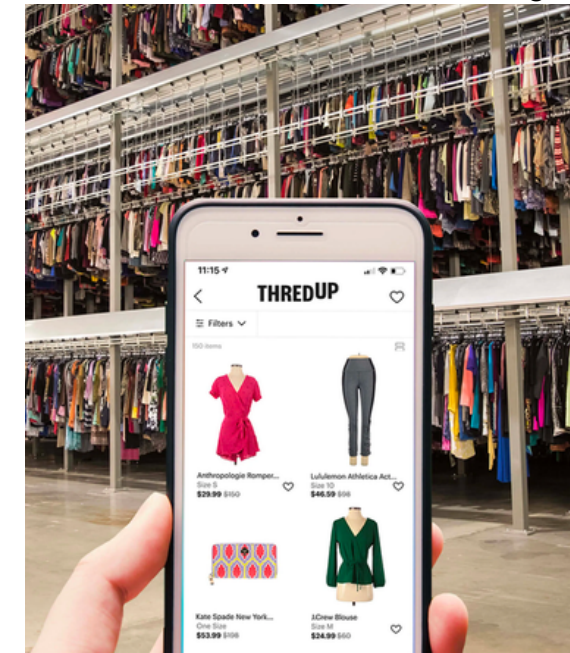ThredUp and Zero Waste Daniel's New Line Is Made Entirely From Used Clothing
Fig 2.B

Fig 2.C

CONSIDERATIONS FOR IMPLEMENTATION:

- As the data will be saved in multiple data stores, this implies that data would come in disparate formats
- As regulations get tougher, brands will have to be prepared for a cookie-less world without third-party data
- Since brands do not have access to first/third-party data, quality of experience for consumers is largely impacted

DATA ORCHESTRATION FOR CIRCULATORY SYSTEMS

Inventory tracking

Demand and supply planning

Create and manage website

Logistics and transportation

Feedback and queries

Delivery and order tracking

Return or Recollection

Measure the impact with data at the center
- KPIs and metrics to track: Energy and water consumption, CO_2 emissions
- Logistics impact on emissions and long-term roadmap and projections

Strategic shifts can help solve inventory woes
- Redesign and optimize physical spaces, from store to warehouse (Ex. Identifying use-cases for underutilized space, parking spaces as pick-up spots, warehouses as discounted sale spots)
- Use shelf space more wisely; seasonality management to move towards a more season-less produce
- Experimentation for at-risk ingredients
- Contingency planning
- Reducing returns & optimizing the returns process

Leverage resale as a service
- Launch clean-out programs so consumers can exchange used products for shopping credits
- Online resale shops can help customers buy their brand's secondhand products

Incremental shifts for better waste management across the supply chain
- Streamline sourcing decisions to align with customer's values
- Keep a check on large boxes or multiple boxes for order delivery using order consolidation

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3 GENERATIVE AI

OPPORTUNITES FOR GROWTH:

- Retailers can use generative AI to create new and unique visual merchandising displays in their stores as well as online
- It can be used to generate new designs for products based on a set of parameters or criteria. This can help retailers create new and innovative products that are tailored to specific customer needs and preferences

USE CASES:

- Product Design
- Visual merchandising
- Content creation for social media
- Personalization at mass in marketing
- Privacy preservation
- Rapid testing & experimentation
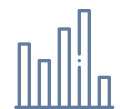
OpenAI's ChatGPT reached a million users a week after its launch —faster than any other breakthrough app in the past five years. It crossed the 100 million users milestone in January 2023

Retailers see promise in Chat-GPT and generative AI

Fig 3.B

AI generative company Designovel revives fashion brand in a completely automated mode

Fig 3.A

Fig 3.C

CONSIDERATIONS FOR IMPLEMENTATION:

- Due to the computationally intensive nature of Generative AI, it requires robust hardware and infrastructure capabilities
- Keeping a check on offensive language, hate speech, or misinformation and its regulation will be a significant challenge
- AI language models have the potential to influence human decision-making, which raises questions about human autonomy and agency

COMPUTER VISION – CREATIVE GENERATION

LEVERAGE STABLE DIFFUSION MODELS TO GENERATE AI-BASED IMAGES FROM TEXT WHICH CAN ALLOW TRANSLATION OF CREATIVE THOUGHTS TO VISUAL REPRESENTATION

Models are trained on *Neha* (One of Fractal's Data Scientists); with specific text we are able to generate visual images for the same

A photo of Neha enjoying Starbucks coffee

A photo of Neha enjoying coco-cola

A photo of Neha wearing Nike shoes

A photo of Neha wearing RayBan goggles

A photo of Neha wearing Adidas shirt

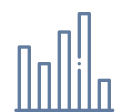*A photo of Neha meeting with Albert Einstein*

Fig 3.D

4 METAVERSE

OPPORTUNITES FOR GROWTH:

- The potential that lies behind metaverse for retailers will be around making offline and online shopping more engaging and useful
- It may also be beneficial for retailers to intertwine online and offline experiences to create a multi-sensorial feeling

USE CASES:

- 3D sensorial experiences for marketing
- Digital events for a global audience
- Metaverse wallets for improved transactions
- Community building
- Rapid prototyping and Sandbox

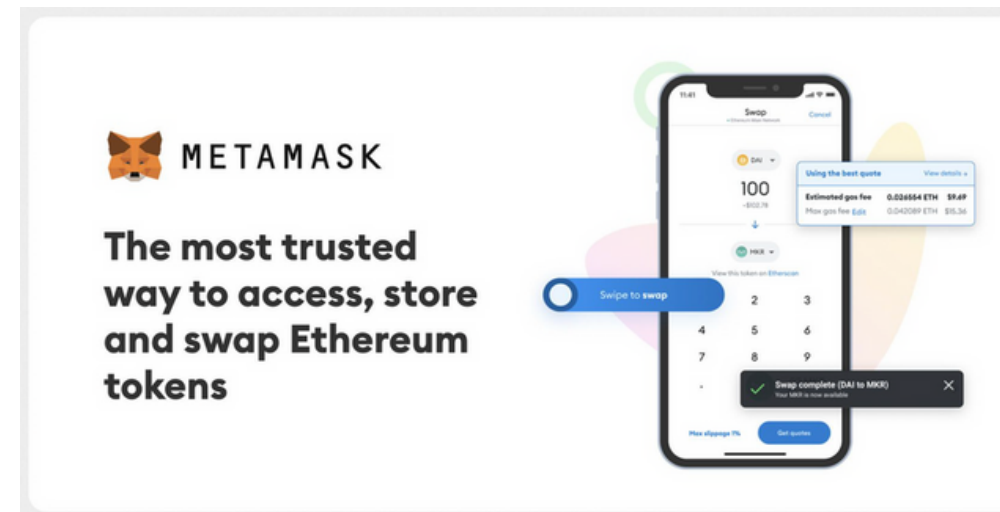According to Gartner, we will be spending at least an hour a day in the metaverse by 2026

METAMASK

The most trusted way to access, store and swap Ethereum tokens

Fig 4.A

Fig 4.B

Gucci has teamed up with product and entertainment company Superplastic to create a limited series of collectible NFTs

CONSIDERATIONS FOR IMPLEMENTATION:

Metaverse will be an attractive target for cybercriminals and data privacy issues will remain to be a challenge
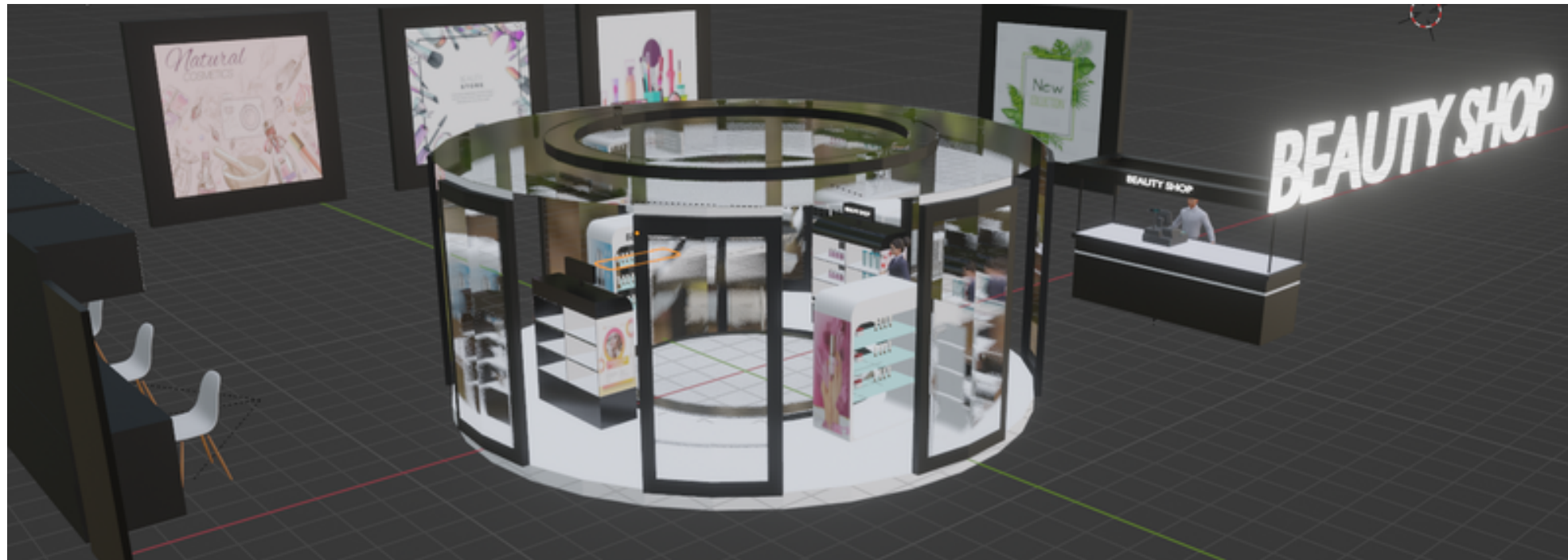
Setting up infrastructure and hiring experienced talent is hard due to the novelty of the technology

Virtual identity over 'real life' for self-presentation could be alarming as consumers get emotionally attached

METAVERSE STORE

- Virtual try-ons
- Product proportions
- 4x improved FOV

- Immersive ecommerce
- Virtual assistants
- Product experience
- Faster prototyping

EXPERIENTIAL RETAILER BUSINESS PLANNING

AN IMMERSIVE VIRTUAL SPACE ENABLED WITH BUSINESS INTELLIGENCE FOR MEETINGS WITH RETAILERS

- Create an interactive experience for people like (Key Account Managers, Retailers) to conduct engaging meetings on stocking opportunities, shelf planning etc.

- Help visualize the shelf along with placement of various SKUs, BI overlays that connect to shelf optimization algorithms

- Conversational AI enabled assistant that can answer business on the underlying data
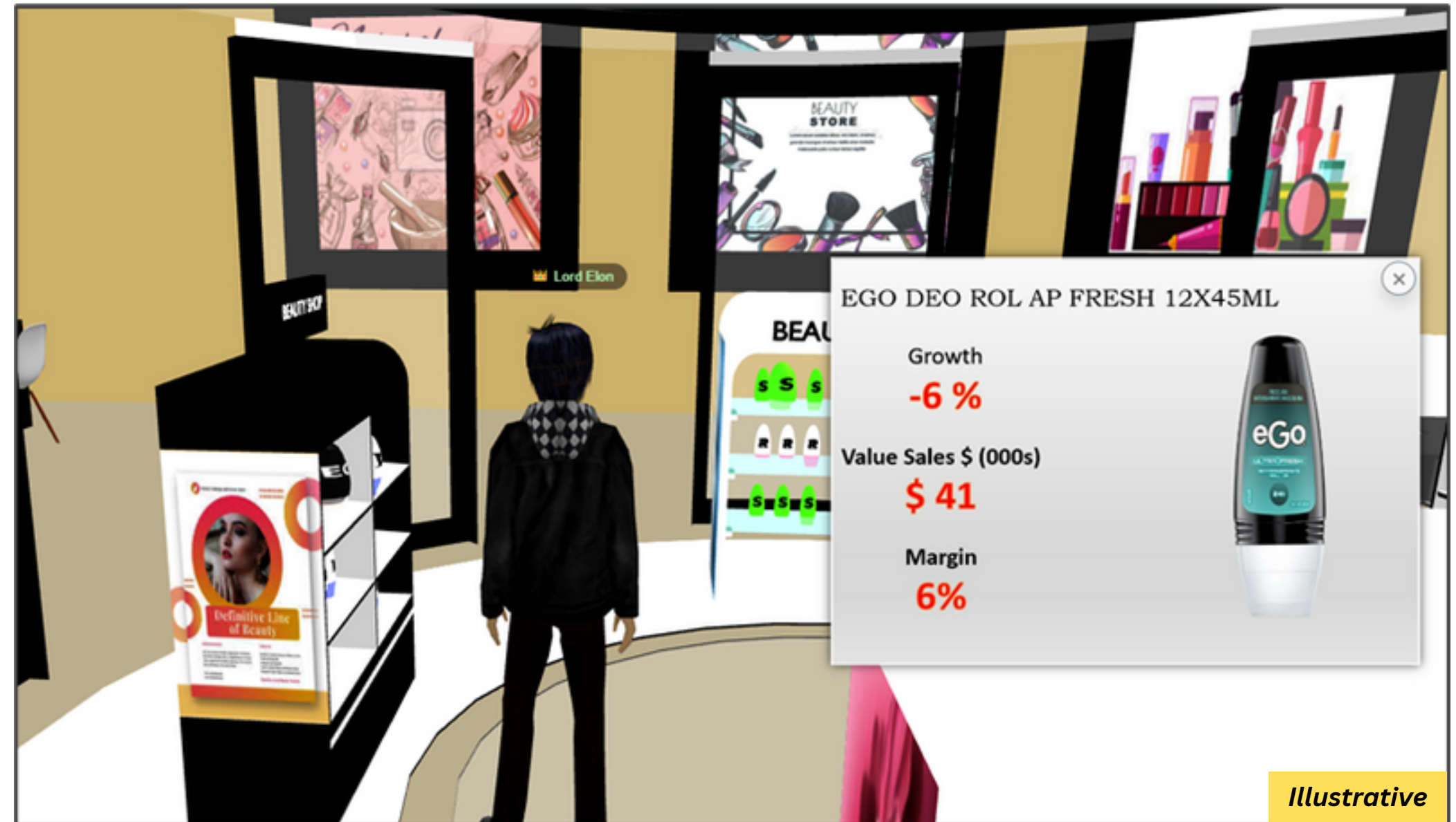

Illustrative

5 CONVERSATIONAL AI

OPPORTUNITES FOR GROWTH:

- Meet consumers where they are with one powerful Conversational AI tool that can address marketing, sales, and customer service use cases across multiple channels
- Reimagine intent recognition and automation to answer complex questions for consumers and ensure higher conversion rates

USE CASES:

- Holograms
- Two-way digital dialogue in store / Assistant
- Order status, Contact-free stores
- Rewards and loyalty programs
- Returns and Exchanges
- Empathy builders / First party data collection
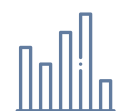
Over 70% of chatbot conversations are expected to be with retail conversational AI systems in 2023

Retail to entertainment: Holograms will shape future of daily life

Walker Hayes performing via hologram at LITVGC festival in April 2022. Provided by Proto.   **Fig 5.A**
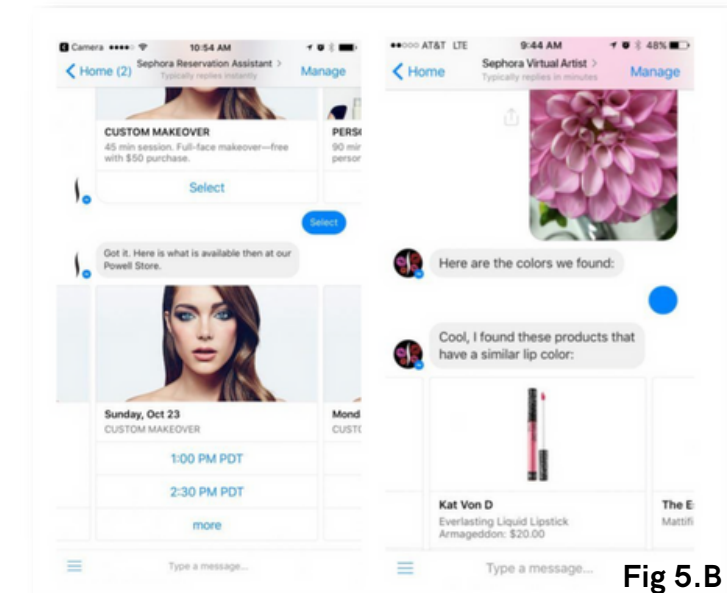
Fig 5.B

Conversational AI enables Sephora to deliver a world-class retail experience to its customers 24 hours a day, 7 days a week

CONSIDERATIONS FOR IMPLEMENTATION:

- Meeting the demands of a growing user base requires a robust infrastructure that can handle large volumes of requests

- Consider the return on investment based on each use case (for example, the level of personalization) before committing to a conversational AI solution

- Consumers expect conversational AI systems to be natural and intuitive, and any issues with the user experience can negatively impact adoption and engagement

VOICE ACTIVATED SHOPPING

SHOPPING APP THAT TAKES PURCHASE INPUT IN THE FORM OF VOICE COMMANDS

- Shows visual confirmation of product selection and units on a screen
- Integration with conversational AI trained on Retail domain conversations

Conversational bot with LLM
Create conversational BOT using LLM models (like GPT-3/BLOOM) to have interactive conversations with users around specific topics based on what it is trained on.

Source: leonardo.ai

6 EMOTIONAL AI

OPPORTUNITES FOR GROWTH:

- With rising data privacy concerns, it is better to follow distinct behavioral cohorts throughout the consumer journey instead of tracking each consumer individually
- Emotional AI can help retailers optimize store layouts and merchandising by tracking customer traffic patterns and analyzing purchase behavior

USE CASES:

- Behavioral Analytics
- Hyper-personalization
- Spur engagement and make predictions
- Increase retention
- CLTV
- Behavioral Segmentation (over target segments)

> *Recognizing emotions in an African American face sometimes can be difficult for a machine that's trained on Caucasian faces*
>
> *- MIT Sloan professor Erik Brynjolfsson*

Transforming music into medicine

Fig 6.C

LUCID Announces Preliminary Study Results of Digital Music Therapy's Positive Impact on Somatic Anxiety

Emotion-detection software startup Affectiva acquired for $73.5M

Fig 6.A

:) Affectiva

Fig 6.B

CONSIDERATIONS FOR IMPLEMENTATION:

- Compliance and regulations do not fully exist yet so businesses could find it difficult to set up infrastructure and find themselves in breach
- Need to comply with ethical and legal standards, including privacy and security regulations. There is also a risk of bias, which needs to be addressed to avoid unintended consequences
- Users may also feel uncomfortable sharing their emotions with a machine particularly if they are unsure about the privacy and security
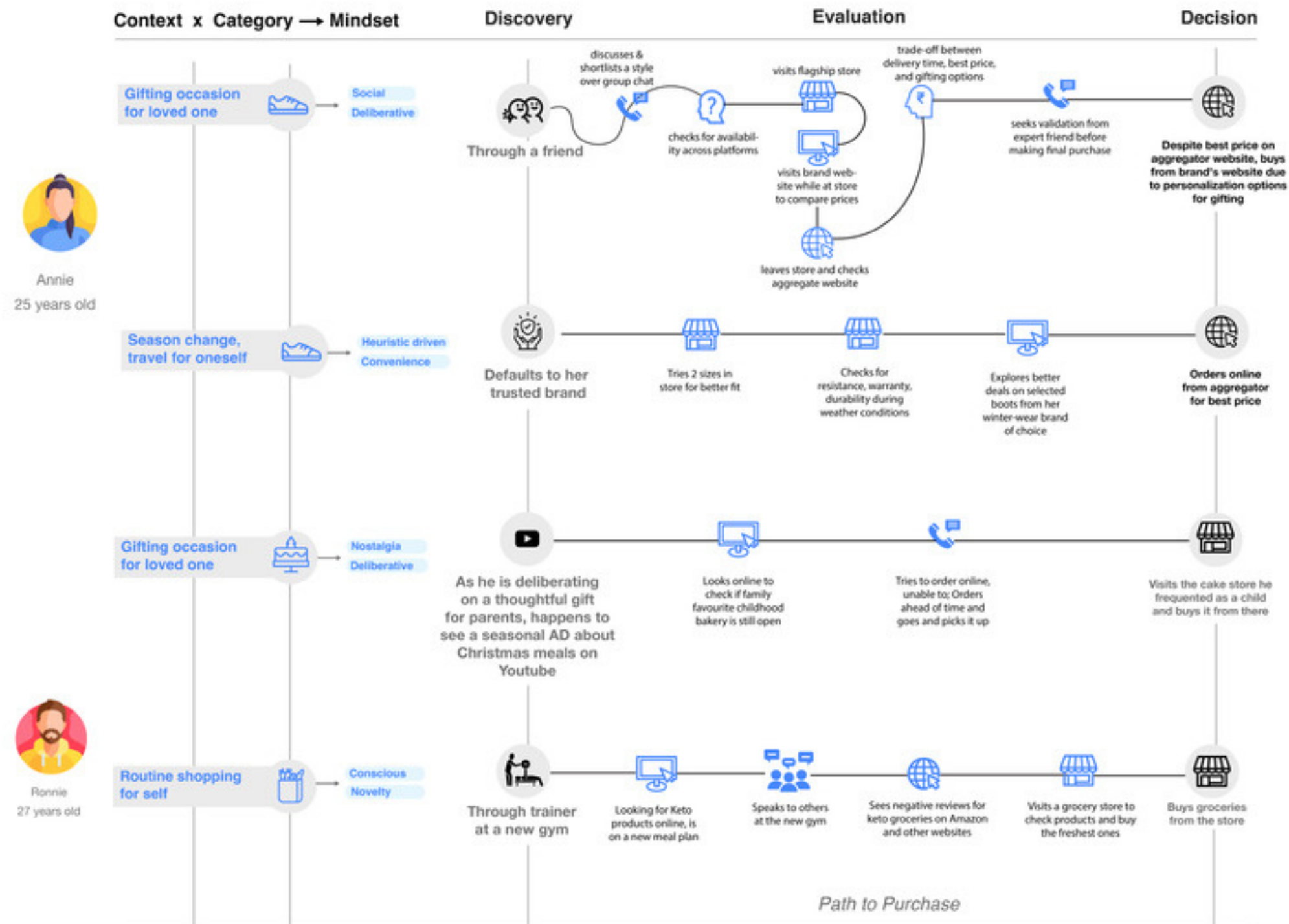
BEHAVIORAL MARKERS TO CAPTURE DYNAMIC PATHS OF PURCHASE FOR FLUID SEGMENTS, AT THE MOMENT

IMPLICATIONS

- What matters to people changes dynamically and locking them into a wrong path will cause friction and missed opportunities
- Consumers from the same demographic group can fall into different behavioral segments; the same consumer can operate with different purchase rules across contexts
- Path to purchase is driven by Context X Category

RECOMMENDATIONS

- Run experience audits (ex. video analytics, in-store walk-throughs) to unlock hidden moments of delight, discovery, and evaluation
- Play to the brand's strengths. Leverage a data-driven strategy to decide which channels to own, instead of trying to be present in all
- Step away from traditional routes, cater marketing to merchandising in the naturally primed shopping environments around the person
- Leave breadcrumbs between the digital and physical experiences
- Assess behavioral indicators at each step in the journey, leverage data to capture emotional markers, decode micro-moments, and adapt offerings

Context x Category → Mindset | Discovery | Evaluation | Decision

Annie, 25 years old

Gifting occasion for loved one → Social Deliberative

Through a friend — discusses & shortlists a style over group chat — checks for availability across platforms — visits flagship store — visits brand website while at store to compare prices — leaves store and checks aggregate website — trade-off between delivery time, best price, and gifting options — seeks validation from expert friend before making final purchase — Despite best price on aggregator website, buys from brand's website due to personalization options for gifting

Season change, travel for oneself → Heuristic driven Convenience

Defaults to her trusted brand — Tries 2 sizes in store for better fit — Checks for resistance, warranty, durability during weather conditions — Explores better deals on selected boots from her winter-wear brand of choice — Orders online from aggregator for best price

Gifting occasion for loved one → Nostalgia Deliberative

As he is deliberating on a thoughtful gift for parents, happens to see a seasonal AD about Christmas meals on Youtube — Looks online to check if family favourite childhood bakery is still open — Tries to order online, unable to; Orders ahead of time and goes and picks it up — Visits the cake store he frequented as a child and buys it from there

Ronnie, 27 years old

Routine shopping for self → Conscious Novelty

Through trainer at a new gym — Looking for Keto products online, is on a new meal plan — Speaks to others at the new gym — Sees negative reviews for keto groceries on Amazon and other websites — Visits a grocery store to check products and buy the freshest ones — Buys groceries from the store

Path to Purchase

*Illustrative snapshot: 2 consumers from the same target segment with distinct purchase journeys. Context x category -> Active mindset
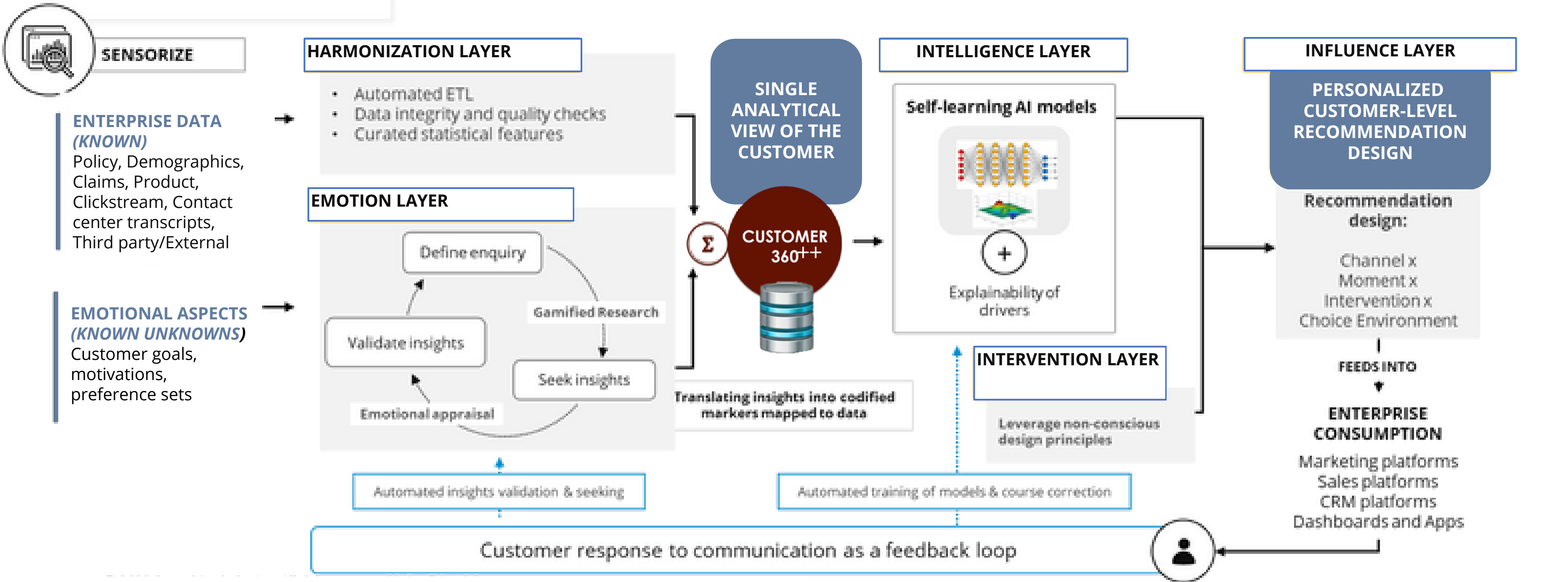*The same person has a different journey with a different context
*Two people in the same context have a different journey
*Physical & digital co-exist in a messy, overlapping way, they are not distinct for consumers anymore

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## PERSONALISATION SYSTEM ARCHITECTURE

ENCODE
Combine enterprise data and emotional signals to create an integrated, holistic view of every customer

PREDICT
Develop framework to derive self-learning insights at n=1 customer level

ORCHESTRATE
Leverage design principles with a real-time recommendation engine to deliver personalized solutions

SENSORIZE

ENTERPRISE DATA *(KNOWN)*
Policy, Demographics, Claims, Product, Clickstream, Contact center transcripts, Third party/External

EMOTIONAL ASPECTS *(KNOWN UNKNOWNS)*
Customer goals, motivations, preference sets

HARMONIZATION LAYER
- Automated ETL
- Data integrity and quality checks
- Curated statistical features

EMOTION LAYER
- Define enquiry
- Gamified Research
- Seek insights
- Emotional appraisal
- Validate insights

Translating insights into codified markers mapped to data

Automated insights validation & seeking

SINGLE ANALYTICAL VIEW OF THE CUSTOMER

Σ

CUSTOMER 360++

INTELLIGENCE LAYER

Self-learning AI models

+

Explainability of drivers

INTERVENTION LAYER

Leverage non-conscious design principles

Automated training of models & course correction

INFLUENCE LAYER

PERSONALIZED CUSTOMER-LEVEL RECOMMENDATION DESIGN

Recommendation design:

Channel x
Moment x
Intervention x
Choice Environment

FEEDS INTO

ENTERPRISE CONSUMPTION

Marketing platforms
Sales platforms
CRM platforms
Dashboards and Apps

Customer response to communication as a feedback loop

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7 IMAGE & VIDEO ANALYTICS 2.0

OPPORTUNITES FOR GROWTH:

- Video analytics can help retailers adopt predictive analytics and increase brand loyalty among consumers by deciding size of staff needed on specific days, product insights and shelves that generate more sales
- It solves for theft and loss, and improves incident reporting time by flagging unusual behavior in real-time

USE CASES:

- Retail heat maps
- Footfall analysis and interactions
- In-store advertising
- Stocking and Planograms
- Crowd Analysis
- Fraud detection and shoplifting
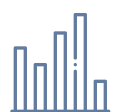
A study by Vouchercloud found that 57% of consumers are comfortable with retailers using facial recognition technology to personalize their shopping experience

How Artificial Intelligence Is Driving Growth At H&M **Fig 7.B**

H&M uses AI in aisle management to keep popular items stocked up by analyzing purchases and store receipts

Japanese startup develops AI cameras that can spot shoplifters even before they steal
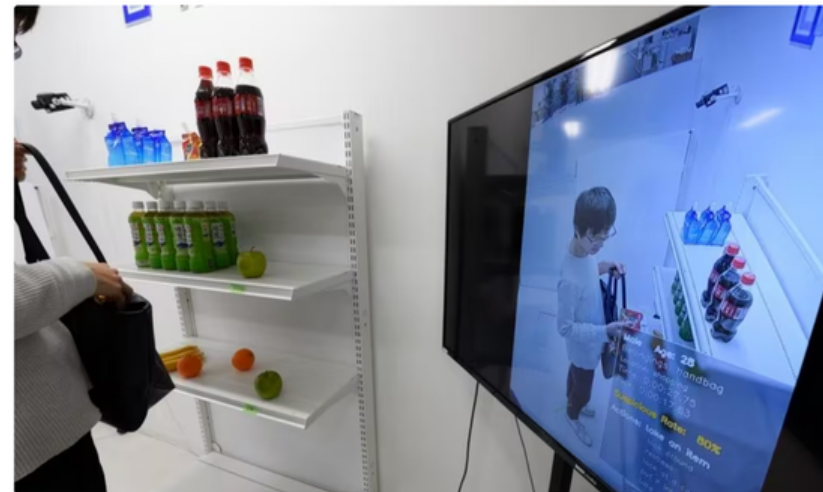
Vaak made headlines last year when it helped to nab a shoplifter at a convenience store in Yokohama. (Bloomberg)   **Fig 7.A**

CONSIDERATIONS FOR IMPLEMENTATION:

- Size of image and video data can be enormous, and processing this data can be a significant challenge leading to the use of cloud technologies

- Collecting sufficient amounts of quality data, especially in domains such as healthcare where privacy regulations restrict data sharing

- Consumers must be able to understand how their data is being used, and they need to be informed about any potential biases or inaccuracies in the system

COMPUTER VISION – IN-STORE INTELLIGENCE

Leverage CCTV video feeds from store to enhance store management and optimization.

- Footfall tracking
- Space Optimization & Management
- Compliance surveillance
- Crowd management

RESPONSIBLE AI

OPPORTUNITES FOR GROWTH:

- Responsible AI can solve any bias with data features like customer segments, demographic features, order hours, etc.
- Robust data governance and real-time monitoring techniques can identify and prevent fraud in the supply chain
- Break data siloes and leverage technology that can help enable clean, consistent and usable data

USE CASES:

- Transparency through a single source of truth
- Robust Data Strategy and Governance
- Visibility and performance management
- Supply Chain Planning Control tower
- Last mile tracking
- Logistics route planning
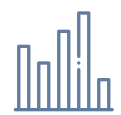
The level of efficiency achieved with an AI-enabled supply chain is said to deliver over 65% effectiveness in reducing risks and lowering overall costs

The Creator of ChatGPT Thinks AI Should Be Regulated

Fig 8.A

Fig 8.B

The Apple Card Didn't 'See' Gender—and That's the Problem

Fig 8.C

The way its algorithm determines credit lines makes the risk of bias more acute.

APPLE CARD

Accused of using sexist algorithms

Fig 8.D

CONSIDERATIONS FOR IMPLEMENTATION:

Significance of Responsible AI is unknown across industries which makes adoption a bigger challenge

Businesses might think that Responsible AI can slow down processes, so they tend to leave things as they are

ASSURANCE AND ACCOUNTABILITY THROUGH SINGLE SOURCE OF TRUTH

Data centralization and AI predictions should represent one business strategy and help ensure Responsible AI decisions

01 Use case-driven capabilities

Visibility and performance management

- KPI dashboards
- Near real-time data
- Search and report

Predictive alerts

- Business rules-based logic
- Alerts with severity levels
- Key performance "predictors"

Rapid response

- Optimization analytics
- Simulations-"What if?" scenarios
- Root cause analysis

Optimization and E2E orchestration

- Deploying information and action plans
- Execution compliance
- Collaborative execution

02 Integrate predictive modeling with operational execution

Cross-functional ownership and KPIs

- Cost to serve
- Perfect order
- Net promoter score
- Environmental, social, and governance (ESG) performance
- Order cycle times

AI/Robots   Human   Adaptive
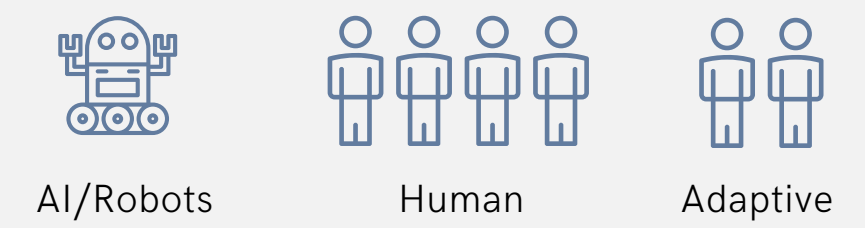
03 Robust data strategy and governance

Ingest a wide range of structured and non-structured data within and outside a company

Internal systems

Suppliers

Contract manufacturing

Event correlation
Reliable data flows
Event enrichment

Logistics

Customers/ distributors
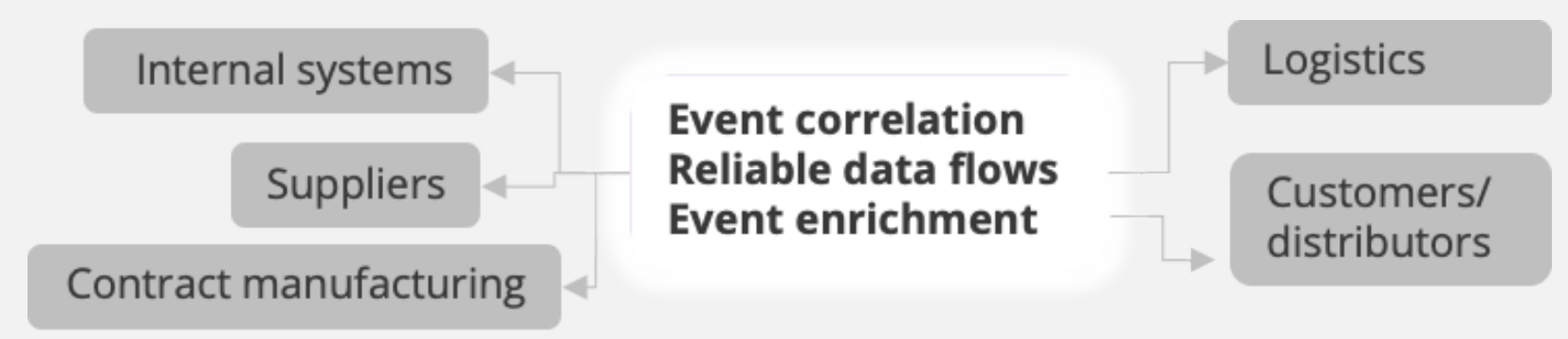
GET IN TOUCH

As you craft your way ahead, we would love to engage more deeply in a conversation with you to discuss:

- Building resilient Retail organizations by powering every human decision in the enterprise
- Leveraging customer analytics spanning across acquisition, engagement, retention, and growth
- Improving the Inventory ROI and profitability by enabling intelligent merchandising decisions across Plan to Sell cycle
- Enabling an insight and demand-driven supply chain by leveraging advanced analytics and intelligent automation
- Helping boost sales, and productivity and reduce costs across every facet of store operations
- Operating in today's 'Data Economy' using a Modern Data Estate

Questions, thoughts, ideas?

Let's talk: Retail@fractal.ai

You just finished Module 6: Role of Data, AI & Automation in Retail
Thank you for reading!

Module 1:
Navigating to Win

Module 2:
Everywhere, Embedded Commerce

Module 3:
Retail Health

Module 4:
Environmental, Social and Governance (ESG) in Retail

Module 5:
Emerging Shopping Missions, Mindsets & Moments

For more information
Contact: Retail@fractal.ai

Module 6:
Role of Data, AI & Automation in Retail

BEHIND THE SCENES

PROCESS, TEAM
AND REFERENCES

PROCESS OVERVIEW

AI meets human insight for Applied Foresight

Cross-cultural behavioural study

800 participants
Literature review
Appraisal framework

SME interviews & workshops

Hypothesis capture
Trend prioritization
Horizon mapping

Brand audits

Digital experience audits
Tech investments
Case studies
Dominating, disrupted, disruptors

Future of
RETAIL

NLP based exploratory analysis

Signal validation
Measuring direction
Magnitude of trends

Shop-along(s), store-visits & walkthroughs

Study of shelves
Check-out experiences
Packaging trends
Inventory management tools

Signal scan with PESTLE framework

Macro-trends
Strong signals
Weak signals

Click to see what we studied

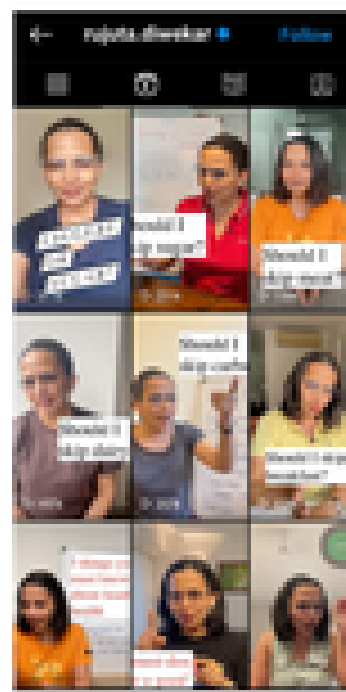# SIGNAL SCAN, TREND WORKSHOPS AND EMOTIONS UNCOVERED IN A CONSUMER DIPSTICK
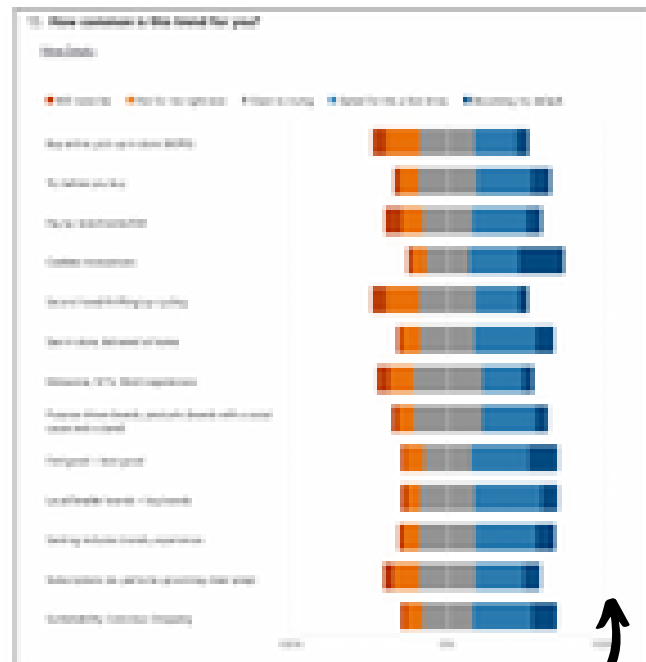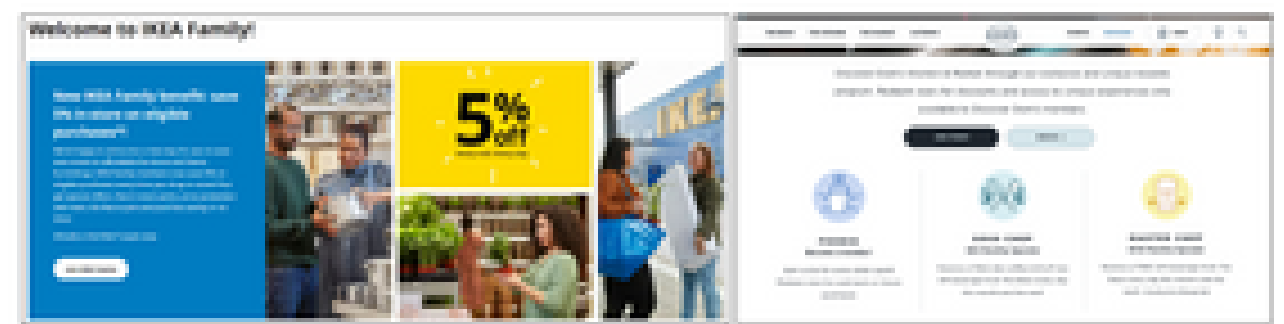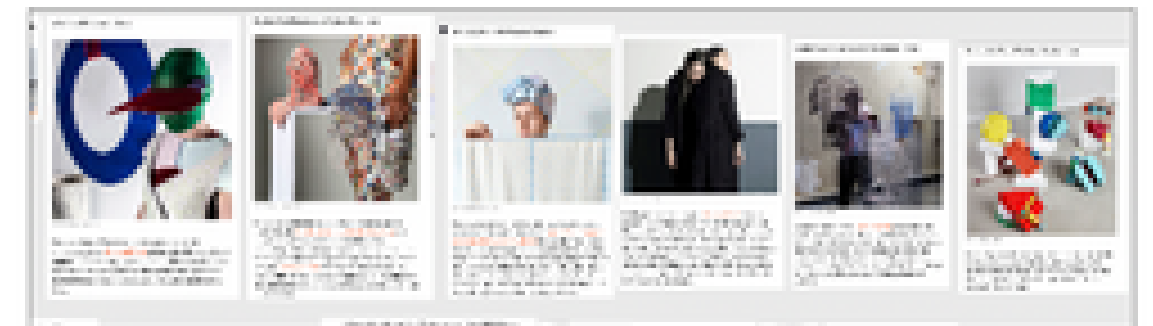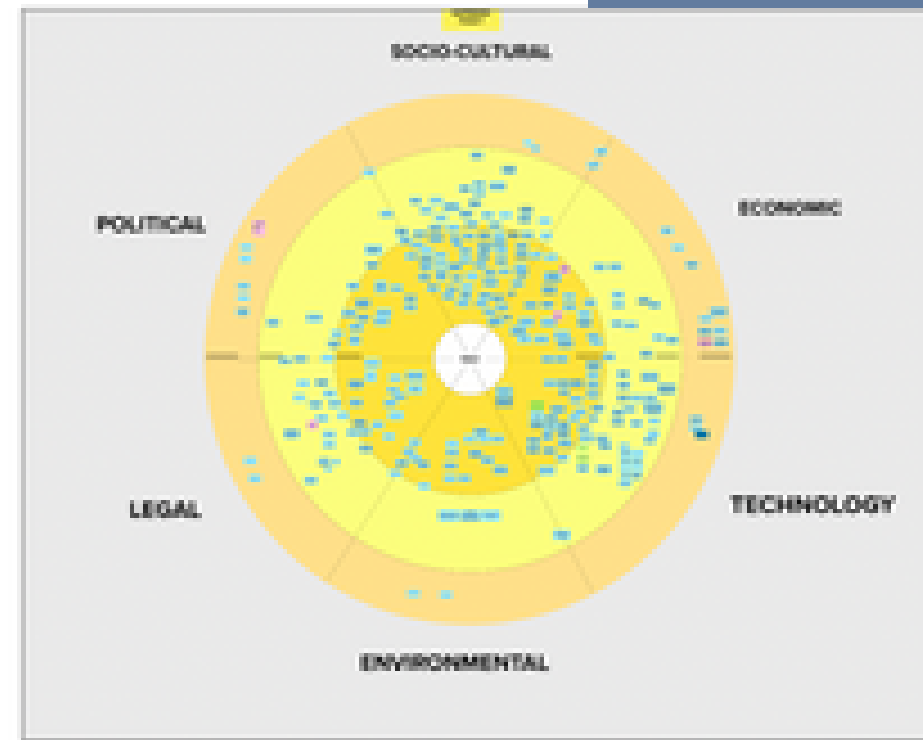

Measurement model

AI models

In-person store visits
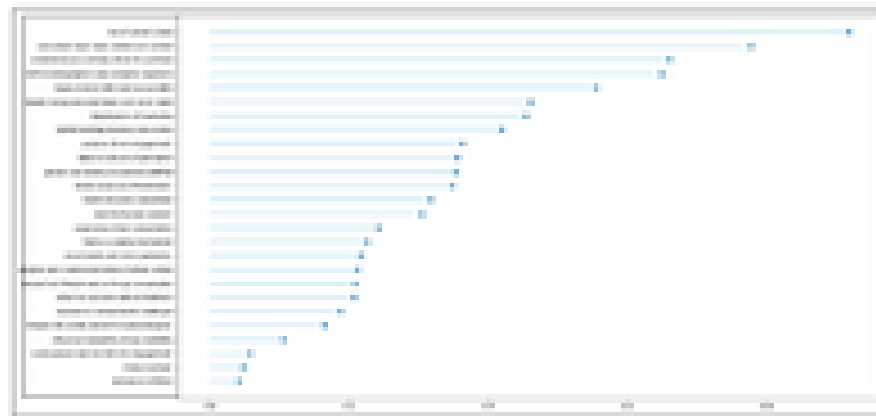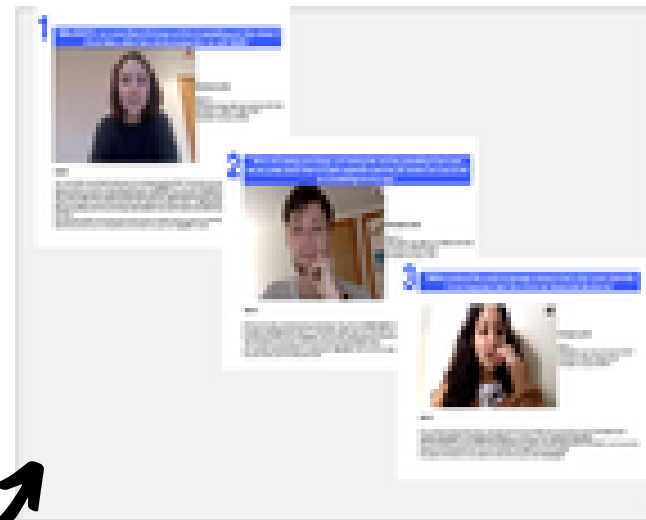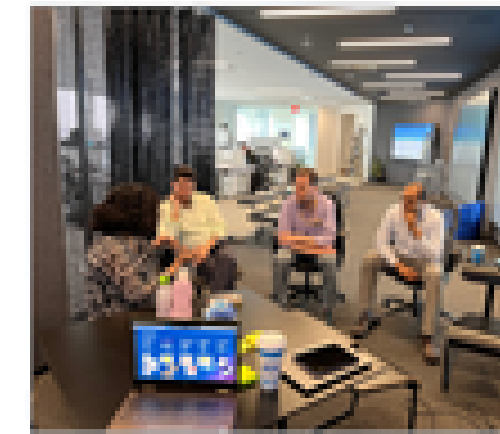
PESTLE Scan

Hybrid Workshops & hackathon

MEET THE TEAM

Sangeetha Chandru: Chief Practice Officer Retail | Analytics & AI

Ann Hintzman: Chief Design Officer | Fractal Experience

Satish Kumar: Principal Consultant | Retail Advisory

Sharada Karmakar: Engagement Manager | Retail AI Strategy & Enablement

Seema Agarwal: Client Partner | Consulting Retail

Shashank Chaudhary: Engagement Manager | Consulting Retail

Shivani Gupta: Lead Behavior Architect | Fractal Dimension

Ashna Taneja: Decision Scientist Consultant | Fractal Dimension

Lavanya Julaniya: Senior Design Consultant | Fractal Experience

Gurjyotkaur Bindra: Design Consultant | Fractal Experience

Shagun Parab: Design Consultant | Fractal Dimension

REFERENCES

1.A <u>Aldi's shopping image</u>: BBC News

1.B <u>Kiwibot partners with Sodexo and image</u>: TechCrunch

1.C <u>Self-driving robots headline</u>: CMR

2.A <u>Spotify and big data</u>: HData Systems

2.B <u>ThredUp Headline</u>: Vogue

2.C <u>Thred-up- new line made from used clothing</u>: Adweek

3.A <u>AI generative company Designnovel revives fashion brand</u>: Apparel Resources

3.B <u>Headline on Chat-GPT</u>: Insider Intelligence

3.C <u>Chat Gpt Image</u>: Newsmeter

3.D <u>Neha's images:</u> Fractal's Data Scientist (AIML team)

4.A <u>Metamask, a metaverse wallet</u>: Sensoriumxr

4.B <u>Superplastic teams up with Gucci</u>: Vietreader

5.A <u>Headline on Holograms</u>: Digital Signage Today

5.B <u>Sephora's Reservation Assistant</u>: Sephora's chatbox guide

6.A <u>Headline on Affectiva</u>: Tech Crunch

6.B <u>Affectiva Image</u>: Walker Sands

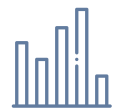**6.C** <u>Lucid's image and headline on transforming music into medicine</u>: Lucid Therapeutics
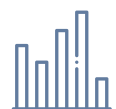
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