# RETAIL & AGRI X-VERSE INNOVATION

## Applying the PIE X lens to digitalized supply chain, omnichannel commerce, brand, and farm experiences

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**December 2022**

# Contents

Page

# Contents Page

# 1. The eXperience-verse revolution

## RETAIL & AGRI X-VERSE INNOVATION

**Applying the PIE X lens to digitalized supply chain, omnichannel commerce, brand, and farm experiences**

In the first report[1] in the "Digital India Innovation and the Experience-verse Revolution" series, we explored the contours of digital India innovations. We undertook a brief historical tour of India's computing journey, and examined the role of research and educational institutions, the IT industry and startups, and the government, in pushing the boundaries of computing.

We then undertook a brief historical tour of enterprise value creation – looking at the four eras of Industrial Revolution, the accelerating pace of digital transformation of private, public, and plural sector enterprises in a tech-intensive modern world, and touched upon some important management frameworks of value creation (such as value chain, platform business, ecosystem innovation, and co-creation).

Next, we proposed a new framework of interactional value creation in this post-pandemic world – the "eXperience-verse (X-verse) Revolution". (See Figure 1.) Unlike the previous four Industrial revolutions driven by technology, this new era requires an "experience-first" frame of reference of interactional value creation by every enterprise[2]. We also explored several examples of the X-verse in practice. [3]

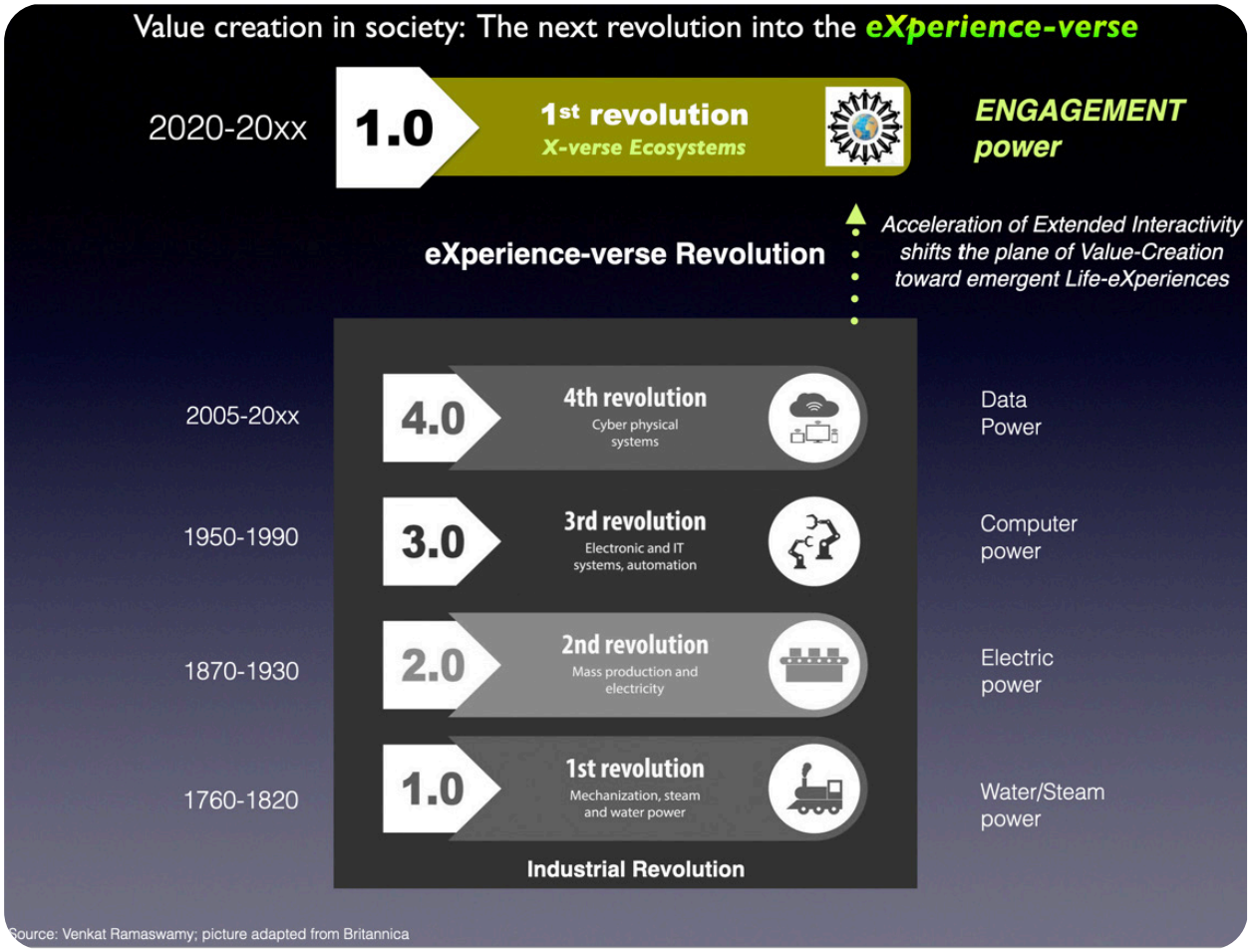



*Figure 1: eXperience-verse Revolution (Source: Venkat Ramaswamy; picture adapted from Brittanica)*

One such example is that of AB InBev, the largest brewer in the world. It uses Microsoft Azure Digital Twins to create a live digital model of their breweries and supply chain. AB InBev's brew masters can get a real-time view into the complex brewing process and are able to adjust the biological and chemical process parameters based on active conditions. Frontline operators leverage AI algorithms to automatically compensate for

bottlenecks in the packaging process. They use mixed reality for remote assistance and to ensure uptime on the machines. Routing algorithms help the delivery trucks transport the beer cases so they achieve the lightest carbon footprint and ensure that the right beers are delivered to the consumer at the local pub for the perfect sip.

Emerging technologies are leveraged at the moment of engagement between the enterprise and the experiencers – the brew masters and digital-twin maintenance expert. The goal is to engender value to the individual-as-experiencer. This value to experiencers comes first in the form of various outputs and outcomes – such as maintenance service provided and uptimes. Then, value is created through not only optimized processes and high-quality products but also through enhanced environments of emergent eXperiences throughout the brewing ecosystem.

We then presented the **PIE X (Platforms, Impacts, Engagements, eXperiences) lens**, that helps visualize opportunities and challenges for risk-managed experience-centric innovation and multi-stakeholder value creation in relational **interactive X-verse ecosystems** (see Figure 2).

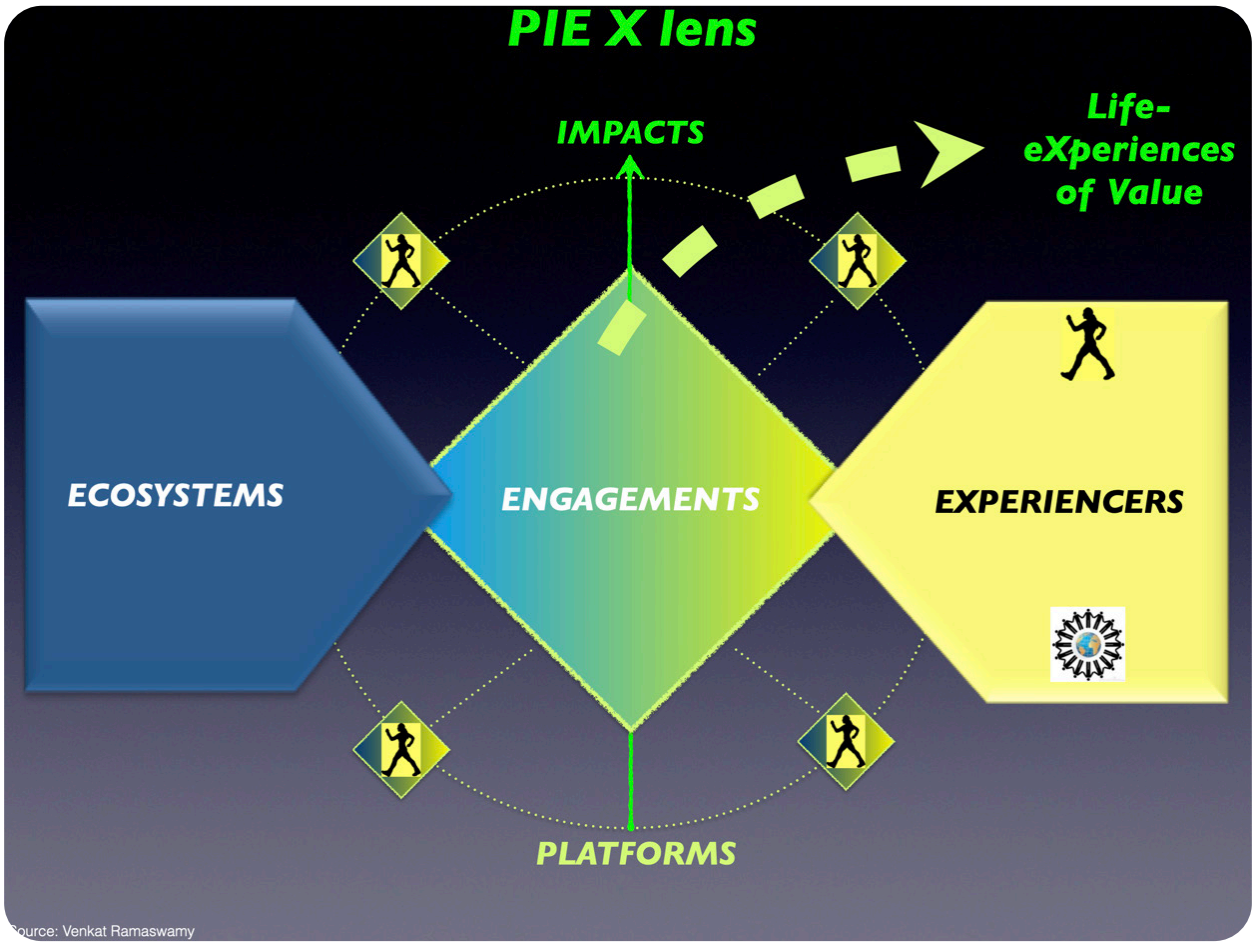



*Figure 2: **PIE X** lens (Source: Venkat Ramaswamy)*

In the second report,[4] we visualised the **education X-verse** and applied the PIE X lens to various learning and skill development experiences at organizations like Microsoft, Coursera, NPTEL, DIKSHA, Infosys and ShikshaLokam. We also introduced three sets of PIE X-verse Ecosystem transformation levers, associated

with Platforms, Engagements, and Impacts in the context of a detailed illustration in the education X-verse.

In the third report, we explored the **healthcare X-verse** and applied the PIE X lens to various digitalized health and insurance experiences in organizations like Ayushman Bharat Digital Mission, Apollo Hospitals, Oracle Cloud for Healthcare, Swasth Alliance, Discovery, Swiss Re and Gro Health, EBC Coalition, C-CAMP and Apple. We introduced two more sets of levers of PIE X-verse Ecosystem transformation, this time associated with focal eXperience ecosystems of enterprises and growing the pie of interactional value creation across all stakeholders-as-experiencers. (See Figure 3.) Taken together, we noted how these levers call for a new **C**omplex **A**daptive **R**elational **E**cosystem (**CARE**) architecture – one that brings fluidity in enacting interactional creation via event-sensed flows of lived-journey engagements in X-verse ecosystems through the PIE X lens.

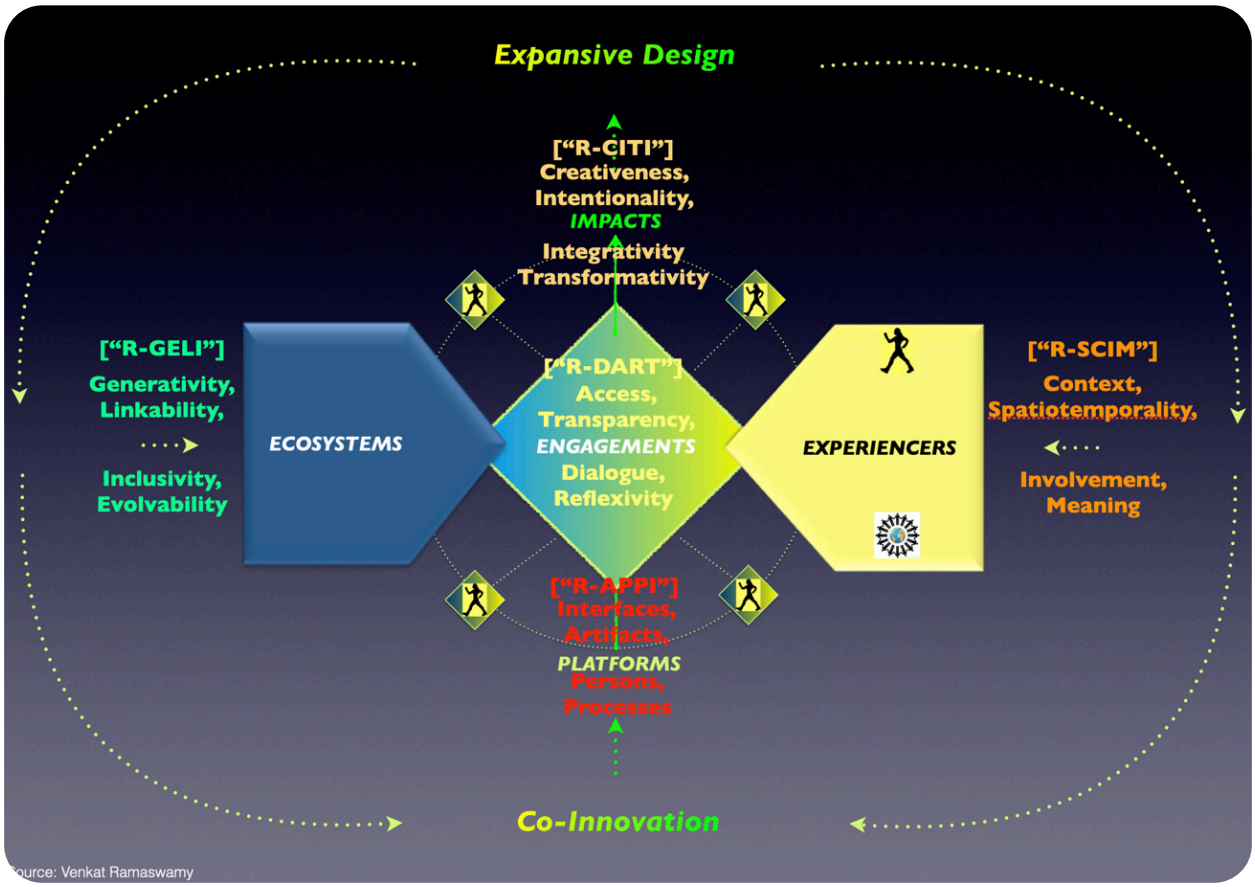



*Figure 3: Risk-managed levers for PIE X lens innovation and expanding value creation with stakeholders as experiencers and creators (Source: Venkat Ramaswamy)*

In this report, we look at the **retail and agricultural X-verse**, and apply the PIE X lens to digitalized supply chain, omnichannel commerce, and brand experiences. In doing so, we introduce two finals sets of risk-managed levers of for the expansive design and co-innovation of X-verse ecosystems together with stakeholders-as-experiencers-creators.

# 2. Retail X-verse – Applying the PIE X lens to digitalized supply chain and omnichannel commerce experiences

## RETAIL & AGRI X-VERSE INNOVATION

**Applying the PIE X lens to digitalized supply chain, omnichannel commerce, brand, and farm experiences**

The COVID-19 pandemic accelerated changes in the retail landscape, which had evolved over the past few decades in a battle between big-box retailers like Walmart and e-commerce platforms like Amazon. As the pandemic shut down many cities and the physical stores in those places, it effected a dramatic adoption of online shopping across the world. For instance, people began ordering groceries, food, and medicines increasingly online. Retailers had to rapidly reconfigure their delivery models and offer hybrid choices – at home or via curb-side pick up at stores.

Some analysts predict that, in the next decade, seven types of business models in three broad categories are likely to prevail in the retail world (see Figure 4):[5]

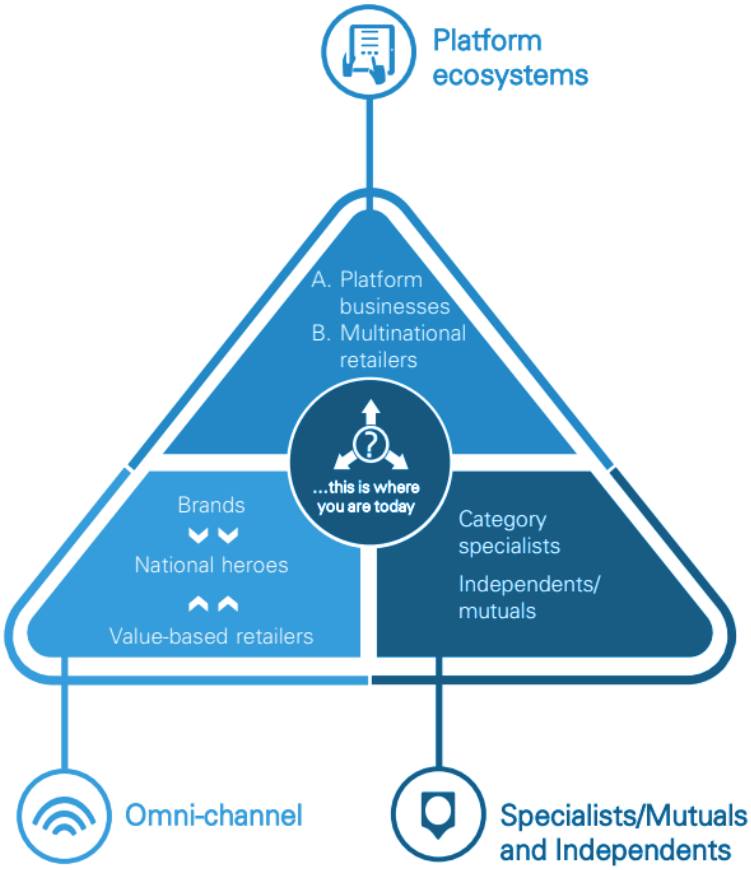



*Figure 4: Future consumer commerce landscape (Source: KPMG)*

- Existing platform businesses and multinational retailers like Amazon are transforming themselves into platform ecosystems.
- Omni-channel retailers, like Walmart, are focusing on the delivery of a seamless, customer-centric, channel-agnostic proposition.
- Specialists and independents, like Patagonia, are emerging as local, purpose-led organizations.

We are already seeing the overlapping of platform ecosystems and omni-channel models – for instance, with Amazon's acquisition of Whole Foods and with Walmart's acquisition of Jet.com and Flipkart.

While the emergence of platform businesses has helped bring together diverse buyers and sellers, there

have also been certain systemic challenges with respect to the business model itself (see Figure 5).

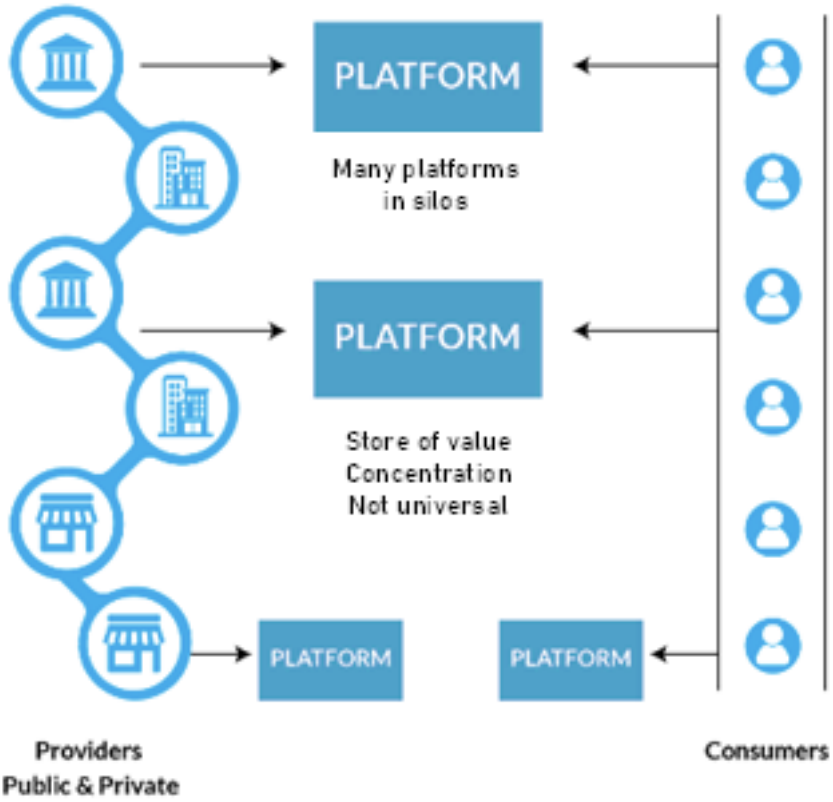



*Figure 5: Closed loop digital retail ecosystems (Source: ONDC)*

The winner-takes-it-all nature of the business leads to a concentration of power in a few successful digital retail platforms. These platforms become a store or keeper of value, with lock-in effects for participants in their network. While these platforms may be efficient, they suffer from nurturing closed loop ecosystems, where network participants cannot migrate between platforms with ease. We see such closed loop ecosystems in not just e-commerce platforms but also in domains like online advertising services, food delivery services, ride-hailing services, and others.

Another significant change that retail organizations have seen is the shift from their traditional linear supply chains to digital supply networks. [6](See Figure 6.)

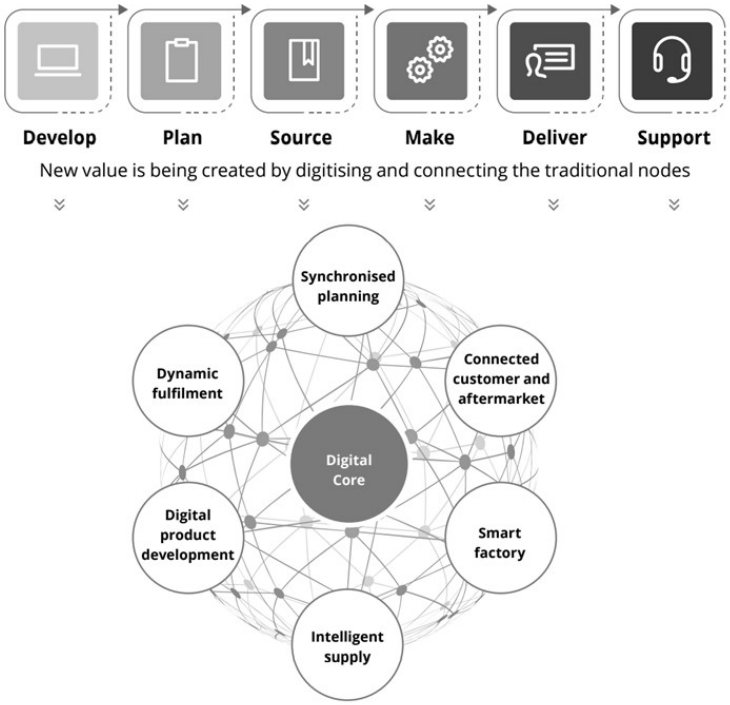



*Figure 6: Shift from tradition supply chain to digital supply network (Source: Deloitte)*

The blurring of lines between the physical and digital spaces, and the significant adoption of emerging technologies such as AI and ML have led to this shift towards digital supply networks. Such retailers can see across the network and proactively operate across it. They are able to provide a connected environment for their suppliers and customers and optimize resources for work. This enables better informed decisions, enhanced collaboration, and provides greater transparency.

Let us apply the **PIE X** lens to a variety of retailers at various levels – at a business model (canvas) level, as well as at more granular levels, such as a function or a line of business – and discover how retail enterprises are creating enhanced value for all their stakeholders.

## Amazon

Amazon is a multi-faceted business with interests in e-commerce, retail, advertising, digital media, and cloud computing. We will apply the PIEX lens to understand how Amazon has reimagined customer and employee experiences.

### *Ecosystem & Experiencers*

During the COVID-19 pandemic, which induced lockdowns in cities and disruptions in supply chains across the world, Amazon had to rapidly reconfigure its systems and ecosystem processes in order to ensure that

the consumers did not face issues of unavailability or delivery delays. This involved not only understanding / predicting consumer demand, it also entailed a sophisticated logistics strategy.

E-commerce, in general, and Amazon, in particular, had driven the extension of retail supply chains, away from big-box retail stores and toward the new end point: a consumer's home.[7] Accordingly, Amazon had invested heavily in building a strong last-mile delivery network in the form of programs like Amazon Flex Drivers (who are gig workers hired as independent contractors) and Amazon Delivery Service Partners (who are small subcontracted parcel delivery firms that exclusively deliver packages for Amazon Prime customers). By 2019, half of all Amazon Prime packages were delivered by these two programs. In fact, Amazon's acquisition of Whole Foods improved its last-mile market position considerably – Amazon Flex drivers started utilizing Whole Foods stores to drop off and pick up packages at Amazon lockers.[8]

Amazon addressed another consumer experience, of shopping in-store. Shoppers do not want to wait in line for a long time at the check-out counter, and would greatly prefer an option where they can pick up their requirements from the store, pay in an uncomplicated manner, and simply walk away. Post-pandemic, this need was felt when shoppers began heading back to stores in large numbers.

### *Platforms & Engagements*

AI and machine learning helped Amazon anticipate customer orders based on their buying patterns. Technology enabled Amazon to plan their supply chain better, stock their warehouses according to the predicted demand per locations to optimize delivery of goods to shoppers.[9]

Amazon is a key customer of the Amazon Web Services (AWS) platform which offers sophisticated AI and machine learning capabilities (see Figure 7). For instance, SageMaker Studio is an integrated development environment enabling end-to-end ML workflows, and also provides common machine learning algorithms. Amazon SageMaker Canvas is designed for business analysts and can generate accurate predictions without writing code or requiring ML experience.[10] Thus, Amazon has also enhanced the experience of a business / sales executive in their organization wanting to leverage AI.

| Amazon Web Services AI capabilities | |
|---|---|
| | Vision —Amazon Rekognition, Amazon Textract and AWS Panorama appliance |
| | Speech —Amazon Polly, Amazon Transcribe and Amazon Transcribe Call Analytics |
| | Natural language processing (NLP) —Amazon Comprehend and Amazon Translate |
| | Chatbots —Amazon Lex |
| | Forecasting —Amazon Forecast |
| | Personalization and recommendation —Amazon Personalize |
| | Enterprise search —Amazon Kendra |
| | Developer platforms and no-code/code tools —Amazon SageMaker, Amazon SageMaker Canvas, Amazon CodeGuru and Amazon DevOps Guru |

*Figure 7: Amazon Web Services AI capabilities (Source: Gartner)*

With respect to the last-mile delivery, Amazon provides each of its drivers (Flex as well as Delivery Service Partners) with an Android smartphone called "Rabbit". It tracks a driver's movements in real time, provides information on the Prime customer, and on each package delivery – such as package size, access codes to enter apartment buildings, or notes on where to leave packages. The driver has to take a picture of the delivered package through the Rabbit and upload it to the Amazon system to confirm delivery.[11]

For the simplified in-store shopping experience, Amazon has developed the Just Walk Out technology, which leverages sophisticated computer vision (CV), sensor fusion, and deep learning algorithms, cloud and edge-computing microservices, and hardware-backed security capabilities. A number of technology innovations were developed to provide a compelling experience for both the shoppers and the shops. For instance, in addition to cameras, Amazon built shelf-sensors which can identify products that shoppers are picking up more accurately and at lower costs. Amazon learnt from its initial pilots where all processing happened on the cloud, and developed an architecture that allows for the algorithms to run either on the cloud with elastic compute or locally in the store.[12]

### *Impacts*

The impact of the above measures on Amazon's economic parameters was astounding. Consumer spending on its platform between May and July 2020 shot up 60 percent compared with the same timeframe in 2019.[13] Amazon made more profit during the pandemic than in the past three years.[14] Amazon's strategy of offering its home-grown technology to global clients, such as AWS, has been very helpful – in 2021, of the USD 470 billion total revenue of Amazon, AWS contributed 13% of its top-line and 74% of its profits (annual operating income).[15] Thus, Amazon has been able to plough back some of these profits into innovations in its business initiatives and remain at their forefront.

But the impacts have not all been positive. Amazon's subcontracted delivery drivers face lot of stress from a feeling of constant surveillance from their Rabbit device. Their movements are tracked by their formal employers (DSPs), Amazon, and Amazon's Prime customers. The last-mile workers face increasing pressure to deliver goods faster, work longer and over the weekends. Some researchers make a forceful point – "The exploitation of racialized-gendered workforces across Amazon's last mile delivery network allows the company to avoid social, moral, legal, and financial responsibility from the oppressive conditions under which their workers labour." [16]

In other contexts, especially during the pandemic, Amazon managed the experiences and wellbeing of its employees. They made changes to 150 processes globally in order to make sure they were following the latest health guidance including thermal screening, and starting their own COVID-19 testing capabilities for their employees. They also tapped into their global employee network for sourcing innovative ideas to handle the pandemic – ideas for encouraging employee engagement, low-cost solutions for maintaining social distance – and leveraged video and virtual communication technologies to quickly share the ideas across the world.[17]

## Walmart

One of Walmart's significant strengths is the extensive network of physical retail stores – ninety percent of Americans live within 10 miles of one of its 4700 stores across the US.[18] We will focus on the stores and apply the PIEX lens to how Walmart manages the experiences of its various stakeholders such as customers and employees.

### *Ecosystem & Experiencers*

Walmart is looking to enhance its customer experience through two strategies – i) leveraging the stores as fulfillment centres so that items travel the shortest distance in the fastest time to a customer; and ii) leveraging curbside pickup at the stores to enhance customer experience.

Although Walmart has 31 fulfillment centres across the US, over 3,500 of its stores can be utilized to fulfill online orders that would otherwise have been routed through a fulfillment center. Thus, when a customer searches for a particular item online, Walmart can determine the store closest to the customer which has that item in stock and get that store to deliver the item, instead of leveraging a fulfillment center for this purpose. With this strategy, Walmart can reach 80% of the US population with same-day delivery.[19] It is looking at offering this fulfillment capability of its stores as a service to third-part sellers too. Sellers who become popular on Walmart's online store would get to stock their products in Walmart's stores.

Another strategy which Walmart pursues to enhance customer experience is to offer curb side pick-up of their online orders at its stores. Walmart had piloted this service in 2013, and by 2017 had opened 1000 online grocery pickup locations across the US.[20] By the time the COVID-19 pandemic hit, when curb-side pickup service became one of the fastest growing delivery methods,[21] it was a well-oiled process at Walmart.

### *Platforms & Engagements*

As we saw in the example of Amazon, AI and machine learning play an important role in how online orders are routed to the nearest stores or how assortments are tailored to what items are ordered. Walmart is planning to add dozens of 20,000 square-foot to 30,000 square-foot automated fulfillment centres, either in the backrooms of its stores or next to them. Robots, instead of employees, in these centres would gather items and bring them to an area where Walmart workers would assemble them into orders for pickup or delivery.[22]

In May 2022, Walmart announced an expansion of its partnership with DroneUp to 34 sites provide order delivery by drones to customers – with a potential to reach 4 million US households across six states.[23] While Walmart originally expected customers to use drones for emergency purposes such as ordering a medicine, the pilot studies for drone delivery threw a surprising use case in convenience – Hamburger Helper, a packaged food product used to create a complete one-dish meal, was the top-seller followed by items like batteries, trash bags and laundry detergents.[24]

Under online grocery pickup, customers can order online items, including fresh produce, and select a time to pick up their orders at the nearest local store. A trained Walmart personal shopper then selects and prepares the customer's order. Customers would go to a specified parking space at the store and call a designated

number to inform a Walmart associate, who then proceeds to retrieve the prepared order and loads into the car within minutes. With curb side delivery, the customer need not get out of the car while their order is fulfilled. It also removes the uncertainty of when an online order delivery may reach their home. It also effectively eliminates the chances of delivered orders being stolen – in 2020, one in three Americans reported having at least one package stolen.[25]

Walmart also reimagined its in-store associate experience as part of enhancing customer experience at the store. In June 2021, it unveiled its Me@Walmart, an app that empowers US store associates to plan their schedules, enhance productivity and own their day. Using geofencing technology, the associates can conveniently clock in with a tap of a button on their mobile app once they arrive at the store. Its push-to-talk feature enables them to communicate with other associates, without the need for a separate walkie-talkie. They can use 'Ask Sam', a voice-activated personal assistant, to quickly locate merchandise and get answers for customers. Stocking associates, instead of scanning each box separately, can simply hold up their phone, use augmented reality (AR) technology and mark the boxes that are ready to go from the backroom to the sales floor – a process that is three times more efficient compared to the earlier manual process.[26]

Walmart already allows customers to scan items in-store using the Walmart app and add them directly to an online gift registry.[27] Now imagine that app being extended with features of Me@Walmart – customers visiting stores can quickly locate merchandise on their own, and simply leverage AR to scan the item into their shopping cart or gift registries.

### *Impacts*

In the US, Walmart is the largest retailer in terms of revenues,[28] and is the second largest online retailer behind Amazon.[29] Walmart witnessed substantial growth during the pandemic years. C. Douglas McMillon President, Chief Executive Officer & Director, Walmart, Inc., in his Q4 2022 Earnings Call said, "Sometimes it feels like 2020 and 2021 were just one long year. If you look at growth since the beginning of fiscal 2021 through the end of fiscal 2022, excluding divestitures, our company is about 17% larger in terms of revenue, 31% larger in terms of operating income. And globally, our percentage of digital sales grew from 6% to 13%." [30]

Walmart leveraged its strengths in stores to create a seamless omni-channel experience for its customers. Douglas McMillon added, "Our stores have become hybrid. They're both stores and fulfillment centres. Last year, we increased the number of orders coming from our stores by 170% versus the previous year, and that's on top of more than 500% from the year before."[31]

Walmart is also articulating its objectives in terms of ecological wellbeing and inclusion. It proposes to build out a fleet of all-electric delivery vans to support its goal of a zero-emissions logistics fleet by 2040. It launched Walmart GoLocal, a last-mile delivery solution that leverages its own drivers and trucks to help businesses, both large and especially small local retailers, reach more customers. During Big Billion Days, an annual sale on the Flipkart platform in India, 40% of sellers were first-time sellers, and more than 100,000 *kiranas* (small-sized local stores) participated.[32] Under its Spark Good program, customers can choose a charity of their choice on Walmart.com, and then round up their purchase total during checkout to this charity.[33]

There have also been impacts that have not been desirable. A Brookings study has argued that although the top two retailers, Walmart and Amazon, raked in billions of dollars in additional profits during the pandemic, they shared little of that windfall with their front-line workers. It found that these two companies were among the least generous of the 13 large retail and grocery companies studied – Best Buy's extra COVID-19 compensation was four and half times more generous than the extra pay Walmart workers received, and the numbers for Target, Home Depot, and Costco were approximately three times more generous than those for Walmart.[34]

In balancing its commitments to its workers and its shareholders, could Walmart have pursued a path towards a more equitable distribution of wealth? As the Brookings research shows, Amazon and Walmart could have more than quadrupled their COVID-19 compensation to front-line workers and still made more profits than the previous year.[35] They could evolve mechanisms to reconcile the competing interests of stakeholders, and do the right thing while building a profitable business.[36]

## Alibaba

### *Ecosystem & Experiencers*

Alibaba's phenomenal growth journey started when it redefined its vision from being "an e-commerce company serving China's small exporting companies" to one "fostering the development of an open, collaborative, and flourishing e-commerce ecosystem."[37] Its ecosystem started with buyers and sellers (Taobao, TMall, 1688, etc.), and then as technology improved, bringing online functions like logistics (Cainiao Network), finance (Ant Financial), advertising, marketing, cloud computing and so on.

It leveraged tech-enabled platforms to enable and automate decision making across businesses in the retail ecosystem. The web-celeb model of retailing is a case in point of such a networked ecosystem – fashion entrepreneur Zhang Linchao models her latest design ideas on her Weibo social network site; the popular designs are then sold on the Taobao platform in flash sales, with orders rapidly fulfilled through the Ruhan manufacturing services network, also hosted on the Alibaba platform. Another business in Alibaba's ecosystem is financial services. Its algorithms could easily analyze the transaction data of a seller on its Taobao platform and assess credit worthiness of the sellers, at scale and at significantly lower costs. This gave birth to the Ant Micro Loan business.[38]

### *Platforms & Engagements*

At the core of its "smart business" model are the following steps – every interaction to yield data; all business activities to be mediated by software; APIs to ensure smooth interaction between systems; and machine learning to make sense of data in real time.[39]

For instance, on Taobao, the domestic retailing website of Alibaba, sellers used the Wangwang instant messaging tool to greet buyers, introduce products, negotiate prices, and so on. Technology allowed online what was done in a traditional shop. Additionally, all data related to the transaction was collected for

further analysis. Later, Taobao exposed APIs to its e-commerce platform, on which third-party software-developers built hundreds of software modules that improved the productivity of merchants. Taobao built a powerful search and recommendations engine supported by machine-learning algorithms. And later, Taobao developed an AI chatbot to respond to customer enquiries – in 2017, during Alibaba's biggest sales day, the chatbot handled more than 95% of questions from 3.5 million consumers.[40]

***Impacts***

Alibaba has achieved remarkable growth over the years. It is the largest e-commerce platform in China, with 51% market share in 2021.[41] Alipay has more than 730 million monthly users in China and handles more annual transactions than Mastercard or Visa.[42] Ant Group issued 10% of China's non-mortgage consumer loans in 2020.[43]

Yet in recent years, Alibaba has found itself in the crosshairs of the Chinese government scrutiny. The very reasons that made Alibaba successful – unfettered access to data and the ability to harness it – have become a strategic business risk. Ant, via super-app Alipay, collects data from over 1 billion users and runs Zhima Credit, a credit-scoring engine with its own proprietary algorithms.[44] It, like the other tech platforms in China and around the world, was reluctant to share its customer's data with the government or other credit-scoring firms.

Thus, in August 2021, when China passed the Personal Information Protection Law and regulated how companies collect, store, and process the personal information of their customers, it significantly affected Ant's business. The regulators wanted to break its "monopoly on information and strictly comply with the requirements of credit information business regulation."[45]

Although in its vision Alibaba mentions about being "open", perhaps it is in effect a closed-loop platform – it is open only if all players are on or want to come to its platform. Let us now turn to India next, to learn about its digital innovations, both public and private, in promoting digital commerce.

## Open Network for Digital Commerce (ONDC)

Consider the case of digital commerce in India. In 2020, it had the third-largest online shopper base globally, behind China and the US, with 140 million e-retail shoppers. An additional 370 million Generation-Z consumers are expected to be added by 2030.[46] While these numbers look compelling, there are other aspects which are not so flattering.

On the consumer side, only 20% of the internet users in India are online shoppers. On the retail market front, the Gross Merchandising Value (GMV) for digital commerce in India in 2020 was US$ 38 billion, which was only 4.3% of the total retail GMV in India. 80% of the Indian retail sector is accounted by around 12 million *kiranas* (hyperlocal neighbourhood provision stores). Over 90% of these stores are unorganized, self-organized, or Micro, Small and Medium Enterprises (MSMEs) and often not digitally connected.[47]

In order to bring about population-scale inclusion in digital commerce, bringing in the digitally-excluded small retailers and consumers, the Government of India proposed the Open Network for Digital Commerce (ONDC) protocol.

### *Ecosystem & Experiencers*

We already saw some of the challenges of closed-loop platform-centric e-marketplaces. In such models, the platform brings together both buyers and sellers and offers a proprietary mechanism to interact within the platform. For instance, a buyer on Amazon platform can order only from sellers on it, and not from another platform such as Walmart / Flipkart. Further, Amazon offers the complete set of activities required to complete the transaction – consumer and supplier onboarding, supplier quality control, payments, supply chain and delivery.

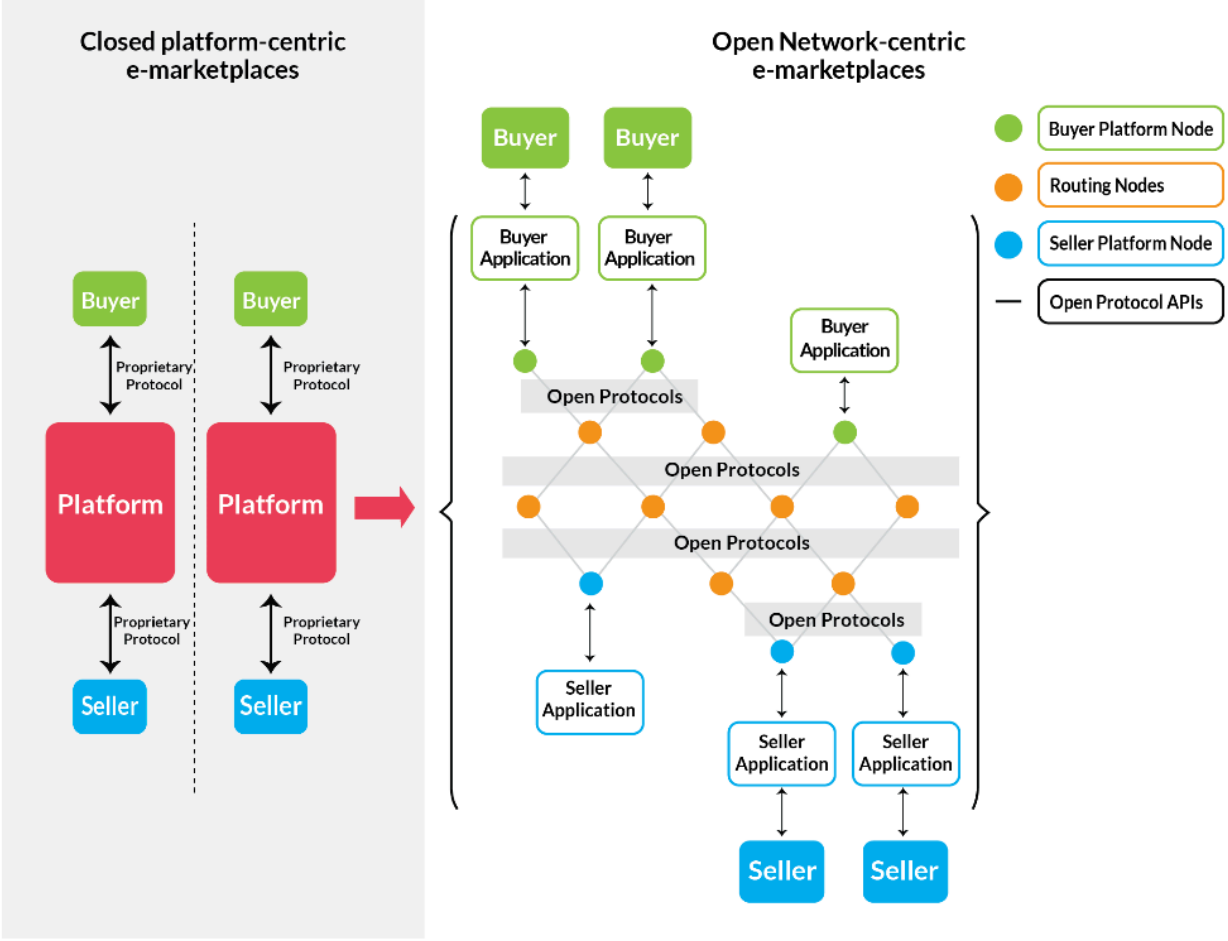



*Figure 8: Closed platform-centric Vs Open network-centric e-marketplaces (Source: ONDC)*

The contrast between a closed platform-centric and an open network-centric e-marketplace is shown in Figure 8. In the open network, services are unbundled – in a transaction, the seller, logistics, and buyer side activities can be unbundled and taken up by different entities. For instance, service providers like telcos and banks, who have a large number of digital customers for their core products / offerings, may offer additional e-commerce services to their existing customers. The telcos and banks need not worry about onboarding suppliers for their e-commerce offering and will leverage the services of all sellers who have published their

digital catalogues using the ONDC protocol.

Consider the open network from the perspective of buyers. They have access to various types of sellers on the network – while earlier they might have bought groceries on one platform, book flight tickets and hotels on another platform, and order food on yet another one, on the open network, they have visibility to all these different types of service providers, and they can book and check-out all the above items in one go.

### *Platforms & Engagements*

ONDC is not a platform or an application. Instead an open-network which is protocol-driven, based on the open-source interoperable specification of Beckn protocol. It is similar to other protocols such as Simple Mail Transfer Protocol (SMTP) for emails, Hypertext Transfer Protocol (HTTP) for the World Wide Web, and Unified Payment Interface (UPI) for the payment systems.

The ONDC technology components include the different network components such as registry, gateway, buyer and seller applications and other building blocks, such as adapter interfaces, that can be used to create these network components. (See Figure 9.)

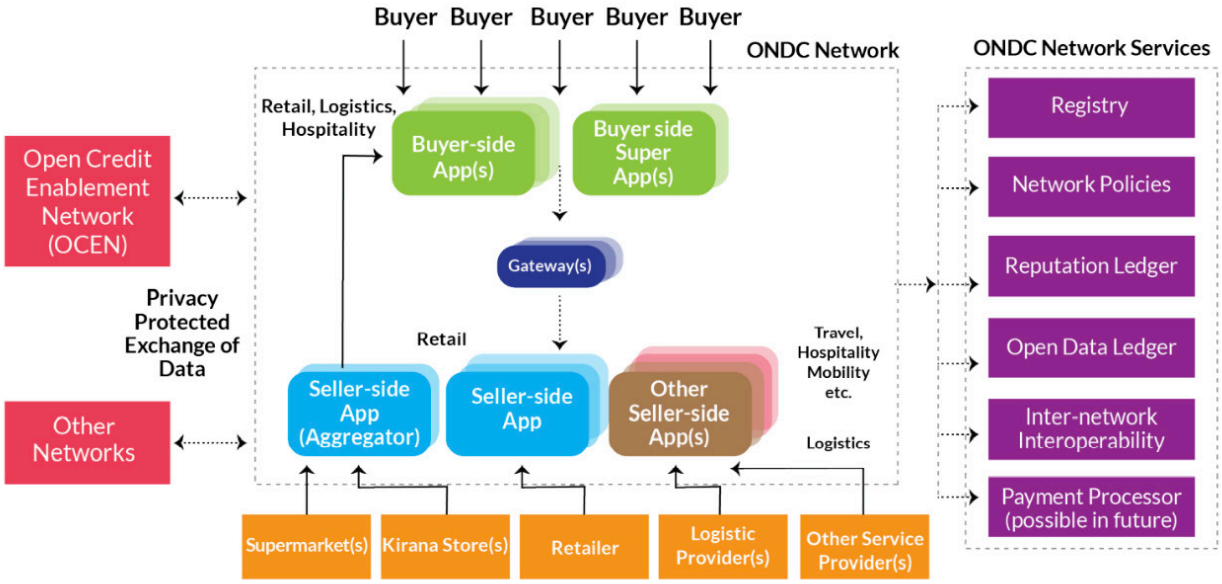



*Figure 9: Technology components of open network (Source: ONDC)*

ONDC will enable the exchange of information for the execution of transactions, allowing all participants of the network to interact and integrate using standardized and certified interfaces. The gateway ensures discoverability of all sellers in the network by multicasting the search request received from buyer applications to all seller applications, based on criteria such as location, availability, and other customer preferences.

Since the basic technical infrastructure is available to all participants in the open network, the differentiation comes through enhanced buyer and seller experiences. For instance, a buyer-app will focus intensely on its

customers, the buyers on ONDC. Its services will include active follow-up with sellers for grievance redressal and escalating aberrant behaviour by the sellers if any. [48]

Just as the mobile app ecosystem took off on the Apple & Android platforms, we will witness the advent of several innovative buyer and seller apps on ONDC. For instance, a startup may develop a language specific (Hindi, Tamil and so on) buyer app and provide voice assistants and chat bots in the local languages. Another startup may aggregate weavers in the North East of India, help them publish their catalogue of goods, provide price adjustment advisories, and help fulfill buyer orders.

***Impacts***

Inclusion in retail e-commerce is one of the biggest objectives of ONDC. Inclusion may be in the form of buyers and typically small-sized sellers who are onboarded to ONDC. It is also in the form of the breadth of product / service categories available on the network – from grocery to fashion and electronics to travel and pharmacy and so on.

The earliest pilot, the Kochi Open Mobility Network (KOMN), was launched in October 2020 to bring about interoperability among different mobility service providers – taxis, bus, ferry and so on. KOMN currently has Yatri App (which has 1200+ registered taxi drivers, recorded 15,000+ customer searches, and supports hundreds of taxi rides per week) and Stayhalo Telegram bot (which enables customers to book cabs in Kochi and view Kochi Metro Rail schedules).[49]

In April 2022, a retail pilot was undertaken in five cities in India, with seven firms, including 5 sellers, 1 buyer, and 1 logistics service provider. In five years, ONDC has set very ambitious targets – adding INR 3.75 lakh crore in GMV to India's e-commerce market, 900 million people as buyers, and 120 million MSMEs as sellers on the open network.[50]

## Reliance Retail – JioMart

In India, other efforts have been undertaken by the private sector to expand the coverage of digital commerce to include *kiranas* and small sized retail stores from smaller towns and villages.

Let us consider the example of Reliance Retail JioMart. Reliance Retail is India's largest retail company, with both online and offline channels. JioMart, its online shopping platform, was launched in 2020 in 200+ cities and towns across India. One unusual strategy that Reliance Retail is pursuing is to sell, through *kirana* stores enlisted as franchise partners, their JioMart orders of packaged food, grocery, fast moving consumer goods (FMCG), and their own private label FMCG brands. Since its launch, JioMart has added 2 million merchant partners, with plans to grow them to 10 million in a few years.[51]

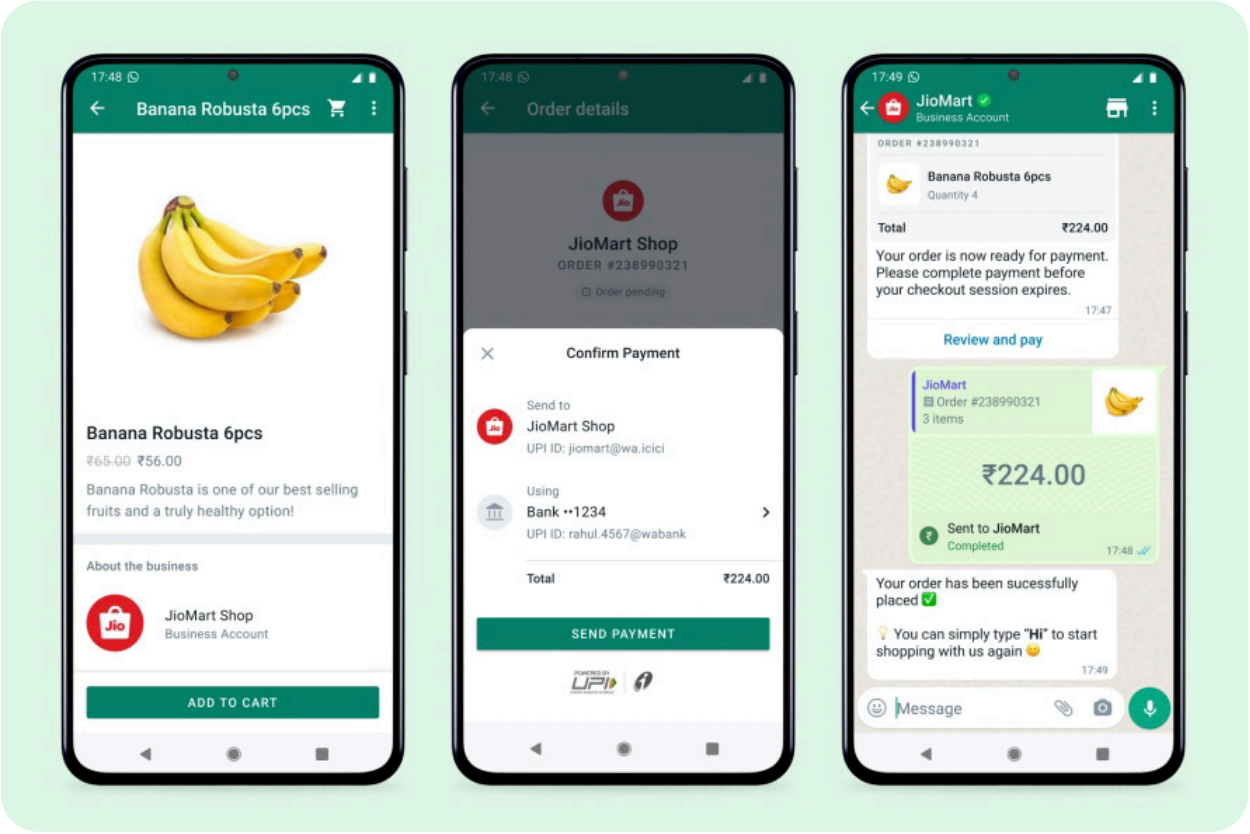



*Figure 10: Ordering and paying on JioMart WhatsApp (Source: Meta)*

Reliance Retail partnered with Meta to develop an end-to-end shopping experience for JioMart on WhatsApp. In India, WhatsApp is hugely popular, with over 459 million users as of December 2020.[52] WhatsApp has also created a UPI-based payment solution in India. Thus, shoppers on JioMart can add items to their cart and make a payment to complete the purchase — all without leaving the WhatsApp chat. (See Figure 10.)[53] The experiences of consumers and *kirana* stores in engaging with JioMart will in turn determine success of Reliance in growing its distribution ecosystem outside of its own store footprint.

Earlier, we saw how Walmart highlights its inclusive efforts through its India arm, Flipkart. Similarly, Amazon India has undertaken a number of initiatives aimed at the MSMEs (Micro, Small and Medium Enterprises) – it has digitized over 4 million MSMEs including sellers, artisans and weavers, start-ups, brands, neighbourhood stores, content creators, and delivery & logistics services, with plans to digitize 10 million by 2025.[54] It has also launched the $250 Million Amazon Smbhav Venture Fund to invest in technology startups that digitize MSMEs for demand access, efficient operations and supply chain efficiency.[55]

These efforts by the private players will tend to be closed loop ecosystems. Nevertheless, all these ecosystems, of buyers and sellers, still have an opportunity to connect using the ONDC protocol and be a node in India's open commerce network.

# 3. Purpose-driven approach to reimagining brand experiences

## RETAIL & AGRI X-VERSE INNOVATION

**Applying the PIE X lens to digitalized supply chain, omnichannel commerce, brand, and farm experiences**

Milton Friedman, in an article in 1970, proposed the notion of "shareholder value", which gained significant attention when the Business Round Table issued a statement in 1997 saying, "maximizing value for shareholders as the sole purpose of a corporation."[56] The notion has become less popular in recent years, with attention shifting to stakeholder capitalism.[57]

The COVID-19 pandemic also profoundly impacted the outlook of enterprises. As the entire world struggled and strived hard to overcome the difficult circumstances, enterprises could no longer continue to measure their success only in terms of mere profits, revenues, and EPS (earnings per share). They have had to consider the interests of not just their shareholders but also of their customers, employees, ecosystem partners, and the society at large as the raison d'être of their existence. Enterprises have a new North Star in terms of value creation – Wellbeing – of biological, psychological, social, cultural, ecological, and economic wellbeing of all stakeholders.[58]

New research from Accenture shows that while digital transformation can help businesses keep pace with the rapidly changing consumer behavior, it does not help them get ahead. They recommend that companies must go from product- or customer-centric strategies to a life-centric approach in order to achieve growth through relevance. Such a life-centric approach entails things like gaining a profound understanding of people, broadening the canvas for value creation, and designing a unified user experience-continuum.[59]

What we have defined as "wellbeing" encompasses the objectives of all purpose-driven organizations. In our previous report on the healthcare X-verse, we discussed the example of Discovery, a South African insurance company, that has pioneered a shared-value business model.[60] Discovery's purpose is to create a healthier individual and society. Its Vitality offering provides employees of businesses a science-based behaviour change program that helps them keep track of their progress towards becoming healthier and rewards them for making better choices with a premium range of health, lifestyle, and leisure benefits. Vitality, as a personal, social, and collective engagement platform, emphasizes how a healthier individual can influence healthier family, and in turn, a community to which one belongs. And when society at large becomes healthy, it reduces the burden on the healthcare system. As for Discovery, it brings productivity into its value chain with a scale-efficient operating model, even as it gains with fewer policy lapses and lower claims. Consequently, Discovery outpaced all other brands in the Kantar Most Valuable South African Brands 2021 study.

Now, consider the recent example of Patagonia, an outdoor clothing retailer, where its founder has donated 100% of the company towards fighting the environmental crisis and protecting nature. Yvon Chouinard, explains, "Earth is now our only shareholder. If we have any hope of a thriving planet—much less a business—it is going to take all of us doing what we can with the resources we have. This is what we can do. Instead of 'going public', you could say we're 'going purpose'."[61]

Patagonia has a history of taking such purpose-driven positions – in the 1980s, it committed to donating the greater of 1% of its profits or 10% of sales to environmental activism. Patagonia also became the first California-based company to be registered as a 'Benefit Corporation' or B-Corp, and certified for its social and environmental performance. Consequently, it developed a loyal set of ardent customers. In a 2021 study, on the reputation of US corporations based on consumer perception of the brand, Patagonia took the top spot.[62]

Indeed, brand purpose is becoming a customer priority. The 2022 Salesforce State of Connected Customer Report finds that 86% of the nearly 17000 consumers surveyed believe that the societal role of companies is changing. They want to know how brands are giving back to the planet, society, disadvantaged groups and more.[63] The "purpose" motivates not just the customers of such enterprises, it also inspires its employees, partners, and other stake-holders. Research has shown that "meaningful brands" outperform the stock market by 134%.[64]

Let us now consider the examples of purpose-driven approaches at NIKE, Starbucks, and Naandi–Araku.

## NIKE

In this report so far, we have looked at various examples of digitalized supply chain and omnichannel commerce experiences of retailers, such as Amazon, Walmart or Alibaba, as they went about transforming their businesses. At NIKE too, similar efforts have been undertaken over the years.

In 2006, Nike launched NikePlus, a running experience platform, with the communications tagline "Get connected to your running experience." Runners could chart their run; track and analyse their performance; share data with their family, friends, coaches, or trainers; and even invite and challenge other runners. They could also engage in a whole host of social interactions with other people, such as finding running buddies, connecting with running events that Nike and others organized, or engaging in conversations with other runners through the NikePlus-enabled community. It was enveloped in a larger ecosystem of capabilities – for instance, the Nike RunReporter platform, with which NikePlus linked, engaged nonprofessional runners who reported live from marathon running events (like citizen journalists). Nike leveraged a host of technologies to collect the data and create an engaging platform – sensors in the shoe, Nike SportBand, NikePlus FuelBand (a wristband that could be worn all day), and Apple iPhone's built-in accelerometer and GPS to launch its NikePlus GPS app. By mid-2013, more than 7 million runners were participating in NikePlus, with over 900 million miles run.[65] As Mark Parker, then Nike CEO had noted: "NIKE+ allows us to connect the physical world of sport with the social elements of digital to create a better sport experience for every athlete. It's about much more than a shoe. It represents a shift for NIKE from product, to product + experiences.[66]

Following the advent of Apple Watch in 2015, Nike abandoned the FuelBand, and instead partnered with Apple in creating a custom NIKE edition of the Apple Watch, and focusing primarily on software applications.[67] It encouraged people to download the NIKE app and become a member, increasing the scale of its direct engagement with individuals-as-experiencers. It launched the NIKE SNKRS app featuring sneaker drops and other member events, and re-configured its earlier custom product design platform NikeID as 'NIKE by You', where members could custom design their own shoes. It also re-configured NikePlus with the Nike Run Club (NRC) app, while also launching the Nike Training Club app, with new home workouts during the COVID-19 pandemic, with a focus on making fitness habits stick with quicker options, goal-setting tools, and new content daily.[68] As it enhanced its software capabilities, John Donahue then ServiceNow (a digital workflow company) CEO and a NIKE board member became its new CEO, succeeding Mark Parker in January

2020, just as the COVID-19 pandemic hit. A couple of years earlier, NIKE had begun an ambitious effort on making experiences more immersive with the NIKE "House of Innovation" (HoI), which included a re-launch of its direct flagship stores. For instance, in November 2018, it opened the HoI New York City (NYC) store, with a re-imagined connected, interactive, immersive retail experience. It was inspired by Nike's newest retail concept, Nike Live, smaller sized stores with a focus on "local community", which tailored the retail assortment, design and community engagement elements of each store to what customers in that particular area wanted most. Nike NYC uses the Nike App to create digitally-connected journeys for experiencers to discover, learn and find the products they want easily and speedily. Powered by digital commerce data, it features a new Nike Speed Shop that offers on-the-go access to products that local members know and love most, with uniquely curated NYC favorites alongside seasonal picks. NIKE members can also reserve their own items in the Nike App and pick them up in the Speed Shop digital lockers. The store also features the Nike Expert Studio – Nike's first dedicated floor to provide even more personalized experiences to NikePlus members, like bookable sessions with Nike Experts and get 1-1 styling and create custom products in an elevated experience in the 'Nike by You 'Studio eXperience environment.[69]

Interestingly, NIKE has more broadly doubled down on creating a more direct engagement with its member, building on its mid-2017 growth plan called the Triple Double Strategy (2X), which promised to double its "cadence and impact of innovation," double its speed to market and double its "direct connections with consumers." Its cornerstone is the new Nike Consumer Experience (NCX), which includes Nike's own direct-to-consumer network, as well as a vastly streamlined wholesale distribution partnership, and focusing primarily on just 40 retailers out of 30,000.[70] NIKE CFO Matthew Friend noted that going into the COVID-19 pandemic, NIKE introduced a bold new phase of its "Consumer Direct Acceleration strategy", where in the early months of the pandemic, it didn't just "navigate through short-term volatility", but instead set a clear vision by building upon a digital advantage, "envisioning the future of the market and creating deeper, more direct relationships with consumers". Coming out of the pandemic, NIKE's continued momentum showed that its direct-to-consumer strategy, with a well-integrated online + offline retail experience, seemed to be working.

At the same time, under the leadership of John Donahoe, NIKE has begun focusing on creating greater value for various stakeholders in the NIKE ecosystem at large—by leveraging its corporate "purpose" to reimagine its brand experiences, an effort that had begun a decade earlier. As Mark Parker, CEO of Nike, noted back in 2010, "In the early days, our "systems" consisted of only those things that helped us build better shoes and shirts, and ads and events. We are, after all, a consumer products company. It took us a while, but we finally figured out that we could apply our two core competencies — design and innovation — to bring about environmental, labor and social change. We opened the aperture of our lens and discovered our potential to have a positive influence on waste reduction, climate change, managing natural resources, renewable energy and factory conditions. We saw that doing the right thing was good for business today — and would be an engine for our growth in the near future. With each new discovery and partnership, we willingly gave up old ideas to shift our thinking toward a better, smarter, faster and ultimately more sustainable future — financially, environmentally and socially."[71]

Nike had begun reporting on its environmental, social and governance goals back in 2001. In 2015, it set 34 specific targets and measures for the next five years. The goals were in three broad areas of sustainability, diversity and inclusion in the corporate business, and community investments, particularly the investments they make in getting kids active. In 2020, it set its goals around three purpose pillars – **people, play, and planet**. See Figure 11 for an FY21 impact summary, and Figure 12 for the specific targets and metrics that Nike is pursuing over five years.[72]

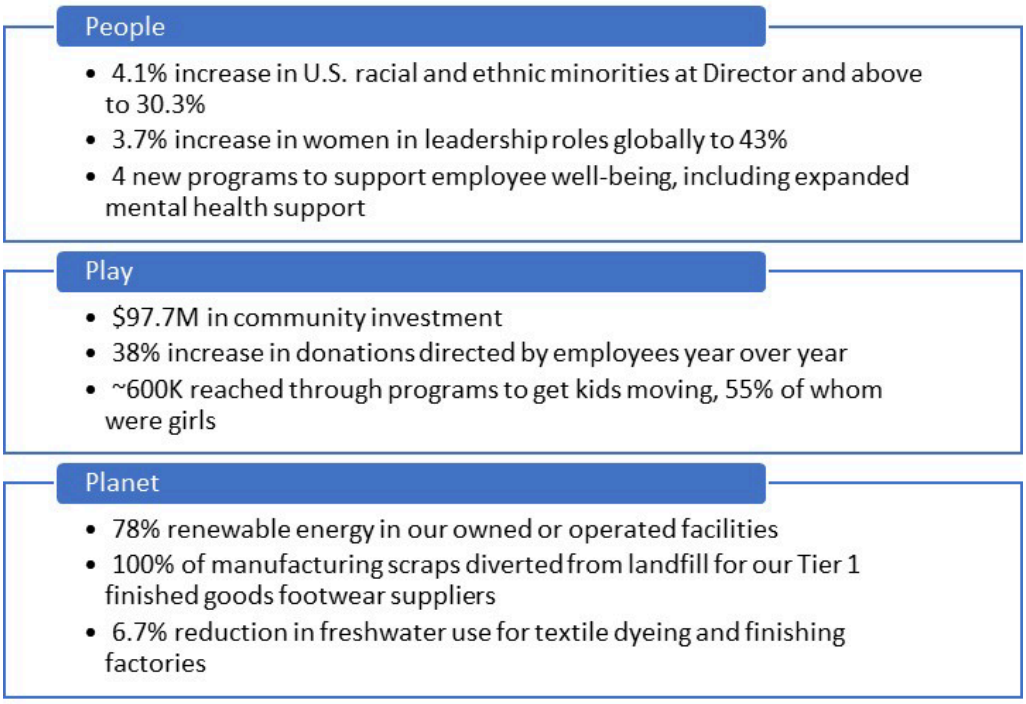



*Figure 11: FY21 impact summary for people, play, and planet (Source: Nike)*

# People

| Representation & Hiring | *Metric* |
|---|---|
| 50% representation of women in global corporate workforce and 45% in leadership positions | % women in global workforce |
| | % women in leadership positions |
| 30% representation of U.S. racial and ethnic minorities at Director level and above | % U.S. racial and ethnic minorities at Director level and above |
| 35% representation of U.S. racial and ethnic minorities[3] in our U.S. corporate workforce[4] | % U.S. racial and ethnic minorities in U.S. corporate workforce |
| $10 million investment in Historically Black Colleges and Universities (HBCUs) and Hispanic-Serving Institutions (HSIs) | $ invested |
| Enhance opportunities and marketing of open roles for first-line athletes[5] to compete for corporate roles | *Qualitative* |
| 100% of strategic suppliers[6] have gender equitable (GE) workplaces[7] | % suppliers achieving mature gender equitable capability |

### Pay & Benefits

| | |
|---|---|
| 100% pay equity across all employee levels on an annual basis | $ earned by men/women; $ earned by white/U.S. racial and ethnic minorities |
| Provide competitive and equitable benefits for all employees | *Qualitative* |

### Health & Safety

| | |
|---|---|
| 100% of strategic suppliers[6] are building healthy and safe workplaces[8] | % suppliers with Level 3 health and safety maturity |

### Inclusive Culture & Engagement

| | |
|---|---|
| Top quartile of benchmarked companies for both engagement[9] and inclusion[10] | Percentile ranking for engagement |
| | Percentile ranking for inclusion |
| Continue to focus on improving access to athletes* of all abilities for our brand, our experiences, our product, our facilities and our company | *Qualitative* |
| 100% of strategic suppliers[6] are measuring and improving worker engagement[11] | Strategic suppliers measuring and improving engagement |

### Education & Professional Development

| | |
|---|---|
| 100% of Vice Presidents complete and be credentialed on Inclusive Leadership education[12] | % VPs completing training |
| 2x investments focused on professional development for racial and ethnic minorities in the U.S. and women globally | $ invested on professional development |

### Business Diversity & Inclusion

| | |
|---|---|
| $1 billion cumulative spend on diverse suppliers[13] | $ spent on diverse suppliers |

# Foundational Expectations

| Foundational Expectations | *Metric* |
|---|---|
| 100% of facilities in our extended supply chain meet NIKE's foundational labor, health, safety and environmental standards | % compliance with foundational expectations |
| | % of facilities measured for compliance of anticipated total scope |

# Play

| Active Kids | *Metric* |
|---|---|
| Drive sustained community impact by getting kids moving in our key cities and sourcing backyards with 50% girl participation | % girl participation |

| Inclusive Community | |
|---|---|
| Invest $125 million to support organizations working to level playing field and addressing racial inequality | $ invested |

| Employee Engagement | |
|---|---|
| Increase the number of employees engaged in their communities to a minimum of 35% | % of employees engaged in their communities |

| Community Investment | |
|---|---|
| Invest 2% of prior-year, pre-tax income to drive positive impact in communities | % of prior-year, pre-tax income invested |

# Planet

| Carbon | *Metric* |
|---|---|
| 70% absolute reduction of greenhouse gas (GHG) emissions in owned or operated facilities through 100% renewable electricity and fleet electrification[14,15] | Owned or operated facility GHG emissions (metric tons $CO_2e$) |
| | % renewable electricity |
| 0% emissions change in manufacturing and transportation[18] | Manufacturing and transportation GHG emissions (metric tons $CO_2e$) |
| 0.5M metric tons emissions reduction through 50% environmentally preferred materials[19] | Materials GHG emissions reduced (metric tons $CO_2e$) |
| | % environmentally preferred materials (EPM) |

| Waste | |
|---|---|
| 10% waste reduction per unit in manufacturing, distribution centers (DCs) and headquarters (HQs)[20] | Waste/unit (g/unit) |
| 100% waste diverted; 80% recycled in manufacturing, packaging, DCs and HQs[21] | % waste diverted from landfill and incineration |
| | % waste recycled |
| 10x finished product waste (FPW) refurbished, recycled or donated[22] | FPW collected and recycled or donated (units) |

| Water | |
|---|---|
| 25% reduction in freshwater usage per kg textile dyeing and finishing[23] | Freshwater use/kg textile dyeing and finishing (L/kg) |
| 13B liters water restored in our extended cotton supply chain[24] | Water restored (L) |

| Chemistry | |
|---|---|
| Adopt clean chemistry alternatives for our 10 priority chemistries across our supply chain | # priority chemistries with clean chemistry alternative |

*Figure 12: Targets and metrics for people, planet, and play (Source: Nike)*

## Starbucks

### *Ecosystem & Experiencers*

In July 2022, Howard Schultz, the interim CEO of Starbucks, sent a letter to its partners outlining ideas for a reinvention of the company.[73] The purpose-driven transformation, centered on coffee and human connections between partners (as its employees are called) and customers through its stores / digital channels, asking the company to become truer to its shared mission: "To inspire and nurture the human spirit – one person, one cup and one neighborhood at a time." See Figure 13.


*Figure 13: Key stakeholders in the Starbucks ecosystem (Source: Starbucks)*

It is forcing a reimagination of the Third Place (the Starbucks store), a term sociologist Ray Oldenburg coined to describe a place beyond home and work where people could gather, relax and talk. For instance, a team of R&D experts and baristas are collaborating in the Starbucks Tryer Center and adopting a purpose-built store design approach to visualize modernized physical stores through an inclusive and sustainability lens.[74]

Starbucks management proposed a unique concept called "experiential convenience," where, through its partners, it would offer experiential, not transactional, convenience to its customers; where the partners would know the customers in their moments of interactions with Starbucks, across any channel, and through highly customized and personalized products and partner engagements, help customers face their day.[75] Such experiential convenience is in line with X-verse innovation of employee-customer interactions.

As part of its vision for a compelling digital Third Place, Starbucks is planning to create a new, global digital community – a community defined by collaboration, experiences, and shared ownership – all centered around coffee to start, and then gradually expand into adjacencies such as art, music, books and beyond.

### *Platforms & Engagements*

At the height of the 2008-09 global economic crisis, Starbucks launched its mobile app and loyalty program, and added mobile payments a few years later. Using the Starbucks app, customers can review their order history, explore new menu options and order ahead so their purchased items are ready for pickup. Starbucks has developed an AI / ML based engine, Deep Brew, that sits on their Enterprise Data Analytics Platform, running on Microsoft Azure cloud. When Starbucks discovered that about 43% of tea drinkers do not add sugar in their tea, they developed two unsweetened ice tea K-Cups — Mango Green Iced Tea and Peachy Black Tea. Deep Brew also helped personalize the recommendations appearing on the screen at different stores with a drive-thru, based on factors like the location, day of the week, time of the day temperature, and amount of traffic.[76]

Starbuck's research shows that authentic customer care provided by a partner is three times more important than any other factor in building brand affinity. Brady Brewer, chief marketing officer of Starbucks, provides a telling example of "experiential convenience": a mother of two drives up to a Starbucks drive-thru outlet; she has just recovered from COVID-19 and has not been able to take her autistic child to his swimming class, an activity which calms the child. The Starbucks partner at the counter notices the child with a forlorn face, enquires about his day, and offers a small cake-treat. The result is a smiling child, and a thankful, crying mother narrating this story on TikTok.[77] Now, imagine being able to provide such experiential convenience to customers, in two-way contextualized interactive fashion during the 100 million global retail visits or 400 million global customer-occasions across channels, per week.[78] This requires sophisticated technology-enabled platforms inside Starbucks orchestrating these interactive experiences, for customers, partners, and other stakeholders.

The customer and barista experiences are also being transformed simultaneously through IoT-enabled espresso machines, which can monitor the coffee temperature and water quality to ensure a consistent coffeemaking / drinking experience. The technology allows for new beverage recipes to be sent directly to the machines. In an era of "smart, connected products," digital technology is now an "integral part of the product itself." Given the scale of Starbucks operations across its 30,000+ stores, this connectivity translates into significant productivity gains for the company, and enhances the barista's experience in being able to serve customers in a more personalized way.[79]

Starbucks is also innovating ways to make its ethical sourcing practices more traceable with blockchain technology across its more than 380,000 coffee farms. Customers can see on their mobile app the impact their coffee purchases have on coffee farmers. In an increasingly interconnected and interdependent relational ecosystem, a focus on innovating experiences of individuals in one part of the digital ecosystem can have positive effects on another part.[80]

Starbucks has announced a new digital community program, Odyssey, in the US, which is powered by Web3 technologies.[81] It is planning to create a series of branded NFT (non-fungible tokens) collections, based on coffee art and story-telling. It is then integrating this into its Rewards-program and platform, whereby customers owning the Starbucks NFT will gain membership into Odyssey, and the NFT will allow for access to exclusive experiences and perks.[82] Considering that the majority of their customers are now Gen Z and Millennials, with Gen Z showing the highest brand love for Starbucks of any age cohort, Odyssey hopes to strengthen these brand experience connections.[83]

### *Impacts*

Starbucks was one of the earliest successful adopters of mobile and payment technologies to transform customer experiences. By 2021, Starbucks was second, only behind Apple, when it came to processing digital payments in the US – an outstanding feat when you consider that Starbucks payments can only be made only at their retail stores. By 2021-22, 38% of all transactions at Starbucks were made digitally, with digitally engaged customers purchasing 2 to 3 times as many products as those that were not digitally engaged.[84] The Starbucks rewards membership grew 66% from before the pandemic, with these members accounting for

more than half of its US transactions.[85]

Starbucks hopes to achieve the following impacts through its five Bold Moves, as part of its reinvention in 2022 and beyond:[86]

1. Re-envision how we bring our mission to life.
2. Renew the well-being of retail partners by radically improving their experience.
3. Reimagine our store experience for greater connection, ease and a planet positive impact.
4. Reconnect with our customers by delivering memorable and personalized moments.
5. Redesign partnership by creating new ways to thrive together.

## Naandi Foundation and Araku Originals

### *Ecosystem & Experiencers*

Naandi Foundation is a non-profit organization working towards creating a sustainable model for large-scale, efficient, outcomes-based delivery of public services such as safe drinking water and sanitation, sustainable agriculture, maternal safety and early childhood development.

In 2021, Naandi articulated its vision for a more equitable and sustainable National Food System for the future.[87] It sought answers to some basic questions about the agricultural system:

1. How is food grown and at what cost to the planet?
2. Are farmers making sustained profit?
3. Does food go beyond calories and contribute to immunity, nourishment and well-being?
4. Is the food system broken and does it need a new framework?

Its answer, a purpose-driven model called Arakunomics, was based on its learnings from two decades of transformative work in one thousand villages around the Araku Valley in Eastern Ghats of India. The Arakunomics model reverses climate change while ensuring economic prosperity of farmer families It is an agricultural practice an economic model and an environmental ideal.

There are three cardinal principles of this model: i) terroir, ii) regenerative agriculture, and iii) shared value. See Figure 14.

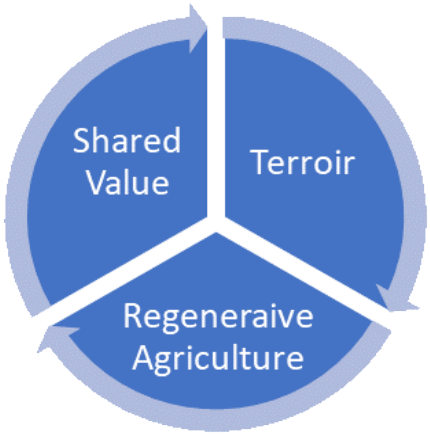



*Figure 14: Cardinal principles of the Arakunomics model (Source: Naandi Foundation)*

Terroir, a French word associated with the vineyards there, refers to aspects like regional soils, climate and the farmer's intimate association with the terrain and land. Naandi mapped an entire mountain range in Araku, spanning 700 villages, and as many farmer families, spanning 10,000 acres,

into six coffee terroirs. This was achieved through painstaking collection of data on soil characteristics, weather patterns and land slopes, geographic exposition etc. Each family knows their respective plot intimately and produces coffee particularly suited to their terroir.

Regenerative Agriculture is driven by the philosophy, 'Agriculture is an ecological act'. It facilitates the valuable soil-plant-microbe interaction, by investing in the creation of a new layer of topsoil. Regenerative Agriculture addresses all the agronomic elements of crop and livestock management - from soil fertility, seed quality, efficient farm management through to appropriate selection of cover crops and crop rotations, biodiversity, and constant skilling of human resources to approach agriculture in an organized and entrepreneurial way.

Shared value is driven by the PQR framework – Profit for farmers, Quality food, and Regenerative agriculture. Each of the tribal families are 'micro-estate owners' comprising coffee, pepper and a variety of fruits and vegetables.

### *Platforms & Engagements*

It has been a long and arduous journey to arriving at the Arakunomics model. Two decades ago, the situation in Araku Valley was very different – the local indigenous population, the adivasis, had fallen into a spiral of low agricultural productivity, debt traps and dependence on monetary aids to sustain themselves. It was during his Aspen Fellowship, that Manoj Kumar, CEO of Naandi Foundation, realized the need to develop a social for-profit model to break the shackles of the existing charity / grants-based model.[88]

Naandi decided to create an employee-owned, fair-trade company that was also committed to a biodynamic approach. The labour-intensive biodynamic approach meant costs were high; the terrain and the co-op model meant quality inconsistencies would need to be managed, and coffee itself is a challenging crop, with the berries needing to be picked at a particular pitch of redness and be processed within 12 hours. Thus, Araku Originals Ltd was formed as a mission-driven for-profit subsidiary of Naandi. It is an end-to-end, cooperative-based business, which supports farmers from seedling to market –linking farmers to small loans, assisting with fair trade and organic certification, marketing and retail trade support, and so on.

Naandi's Gems of Araku is an annual harvest festival that brings together over 11,500 farmer families and coffee experts from across the globe to discover extraordinary coffee lots. Modelled on the "Cup of Excellence" format, over 1800 microlots each season are put through a rigorous evaluation by professional coffee cuppers following international cupping protocols. These stimulating interactions have helped the Araku farmers incorporate best farm and processing practices and raise the quality of their coffee beans to international standards. Gems of Araku now reaches 42+ countries, including Korea, Japan, France, the UK, Germany, and the US.

Araku leveraged the power of globalization to effect the transformation in the valley – innovative financing models were introduced by European companies; international coffee experts began supporting the adoption of the 19 steps to world-class coffee; a flagship store and a score of gourmet partner stores in Paris and Bengaluru started selling the premium specialty coffee grown there.

A surprising aspect of this transformation is the apparent lack of digital technologies. Unlike the case of Starbucks where we saw an almost ubiquitous digital presence, in the case of Araku, the emphasis has been on human connections and grass-root level engagements. As the retail aspect of their business grows, might Araku Originals leverage digital technologies to further engage their customers, farmers, and other stakeholders?

### *Impacts*

In the Araku region of Andhra Pradesh, today Naandi is working with tribal farmer families across 900 villages. 95% of the population in this region is running profitable coffee estates and fruit orchards and engaged in large scale tree planting – with 30 million trees of 22 different species planted so far. [89]

It is one of the world's largest organic coffee cooperatives and fair-trade companies, with over 13,000 entrepreneur farmers. Araku Coffee has become globally acclaimed for quality, it has ensured that all the tens of thousands of tribal farmers are making sustained profits every year. More than 25,000 farming families have been lifted out of poverty.[90]

The framework of Arakunomics won Naandi the prestigious Rockefeller Prize in August 2020 as one of the Visionary Food Systems for the future.

## SAP Cloud for Sustainable Enterprises

We have so far examined how three different organizations, NIKE, Starbucks and Naandi-Araku, have adopted a purpose-driven approach to their business. Industry cloud providers have also recognized the need for creating a holistic platform to support such organizations.

SAP's cloud-based sustainability management solutions deliver company-wide functionality and industry-specific features that can help enterprises incorporate sustainability in business at scale by embedding operations, experience, and financial insights into their core business processes. SAP Cloud for Sustainable Enterprises helps them manage their carbon footprint, reduce material waste, and become a socially responsible business.

1. **Sustainability and ESG reporting solutions** – Connect enterprise's environmental, social, and financial data holistically to steer their business toward better decisions.
   - Source and integrate data from SAP and non-SAP applications into a central sustainability data warehouse
   - Harmonize, allocate, and calculate granular sustainability figures along established structures from finance, HR, real estate and operations
   - Analyze and report sustainable business data according to established ESG reporting frameworks
   - Drive targeted action by giving business units a dedicated view on their sustainability performance

2. **Climate action solutions –** Reduce the carbon footprint of the enterprise's entire value chain based on

actual business transactions.

- Product Footprint Management
- Environment, Health, and Safety Management

3. **Circular economy solutions –** Incorporate circularity into enterprise's supply chain and create corporate sustainability models.
   - Responsible Design and Production
   - Calculate extended producer responsibility (EPR) obligations, plastic taxes, and corporate commitments to optimize material choices

4. **Social responsibility solutions –** Understand the impact of the enterprise's business on people and society.
   - Ensure workplace safety – help ensure the safety of employees and customers by proactively identifying, analyzing, and mitigating environment, health, and safety risks
   - Manage supplier risk – provide a safe and cohesive risk intelligence to guide supplier selection, qualification and segmentation

Such cloud solutions have emerged from SAP's own purpose-driven initiatives towards sustainability. It aspires to achieve net-zero emissions across its value chain by 2030. It also works with global organizations across private and plural sectors to understand their sustainability business needs and customise its cloud solutions to support them. For instance, SAP collaborates with companies like Unilever, which is innovating the global food system; Hitachi, which is scaling the power of renewable energy; and Colgate, which is investing to reduce waste.[91]

In India, SAP and Amul (India's largest dairy cooperative, an example we will discuss in the next section on agri X-verse innovation) are jointly working on transforming the lives of 1.5 million Indians (comprising children, adolescents, youth, women, and farmers), by focusing on focused on knowledge transfer and technology capacity-building toward social entrepreneurship, enablement of skilled workforce, digital inclusion, and bridging the gender equality gap for the community.

The key pillars of the initiative include coding and 21st century skills by imparting digital literacy, coding, problem solving and English skills for citizens in remote villages; school to workforce transition through STEM-focused learning environments to help students in marginalized regions make a smoother transition to the workforce, and create an employable talent pool by encouraging critical reasoning and analytical thinking; women empowerment and entrepreneurship, with over 20,000 young women aiming to be taught in digital-financing skills and functional communications, with the goal of strengthening support for the social business sector and achieving gender equality; and supporting farmer livelihoods help scale community ownership & participation under a Build, Operate, Transfer Model of sustainable development.

As Kulmeet Bawa, President, and Managing Director, SAP Indian Subcontinent, notes,"Technology can act

as a catalyst in shaping India's journey to an inclusive and sustainable economy. While urban development projects such as smart cities and futuristic mobility are reflective of this potential, true progress of India lies in the development of her villages. Our work with Amul is an expansion of this vision and will provide citizens with the information and tools they need to succeed. As India continues to lead global action on sustainability, collaboration like ours will also provide the critical foundation for an inclusive and resilient future in which no one is left behind."[92]

# 4. Agri X-verse – Applying the PIE X lens to digitalized supply chain and farm experiences

## RETAIL & AGRI X-VERSE INNOVATION

**Applying the PIE X lens to digitalized supply chain, omnichannel commerce, brand, and farm experiences**

Agriculture has been central to humanity's existence and growth over a long period of time. Technology has played an important role in shaping the sector over these years, including farming tools and mechanization, chemical technology in the form of fertilizers, biotechnology in the form of high-yield seeds, etc. In our analysis, we will examine scenarios where digital technologies are helping transform the agricultural sector.

The consulting firm, Accenture, identifies four areas of digitalization that impact the agri value chain – precision agriculture, connected supply chain, digital marketplace, and autonomous operations (see Figure 15)[93].

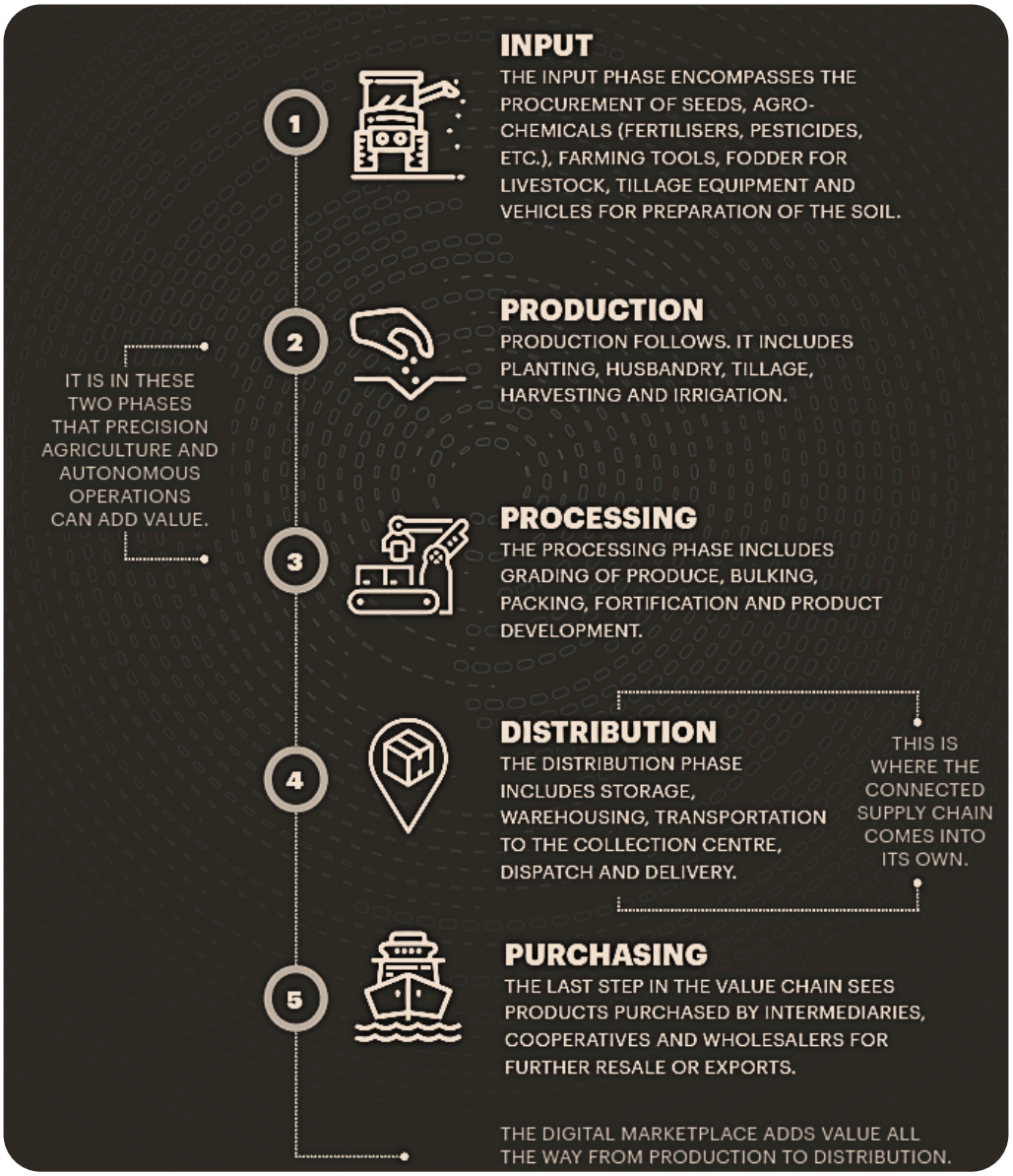



*Figure 15: Agriculture value chain and four digital themes (Source: Accenture)*

Precision agriculture uses technologies such as sensors, geo-mapping, drones and analytics to drive smart decision making on the ideal time for planting, spraying and harvesting. A connected supply chain uses technologies RFID tagging and sensors to monitor, in real-time, the movement of agricultural produce

through the supply chain. A digital marketplace offers farmers an information exchange and transaction platform – for agricultural inputs, produce, access to credit etc. Autonomous operations involve usage of self-driving tractors and agri-bots that automate manual and time intensive farming activities.

The extent to which such digital technologies are relevant to the agri-sector depends on the markets / geographies under consideration – agriculture in the western world is characterized by very large sized farms, shortage of labour and a need for enhanced automation; whereas in countries like India and Africa, majority of the population subsists on agriculture, often with meagre incomes, a predominance of farmers with very small land-holdings and poorly developed supply chains and markets.

The consulting firm, BCG, recommends an architecture for digital agriculture solutions, comprising a strong digital stack and a nurturing enabling environment (see Figure 16).[94] The digital stack consists of data and content (such as agronomic guidance), an integration layer, an analytics layer, and a user-facing layer (including apps and tools for farm advisory, accessing credit etc.), and the environment consists of appropriate government regulations, national digital infrastructure and functional agricultural markets.

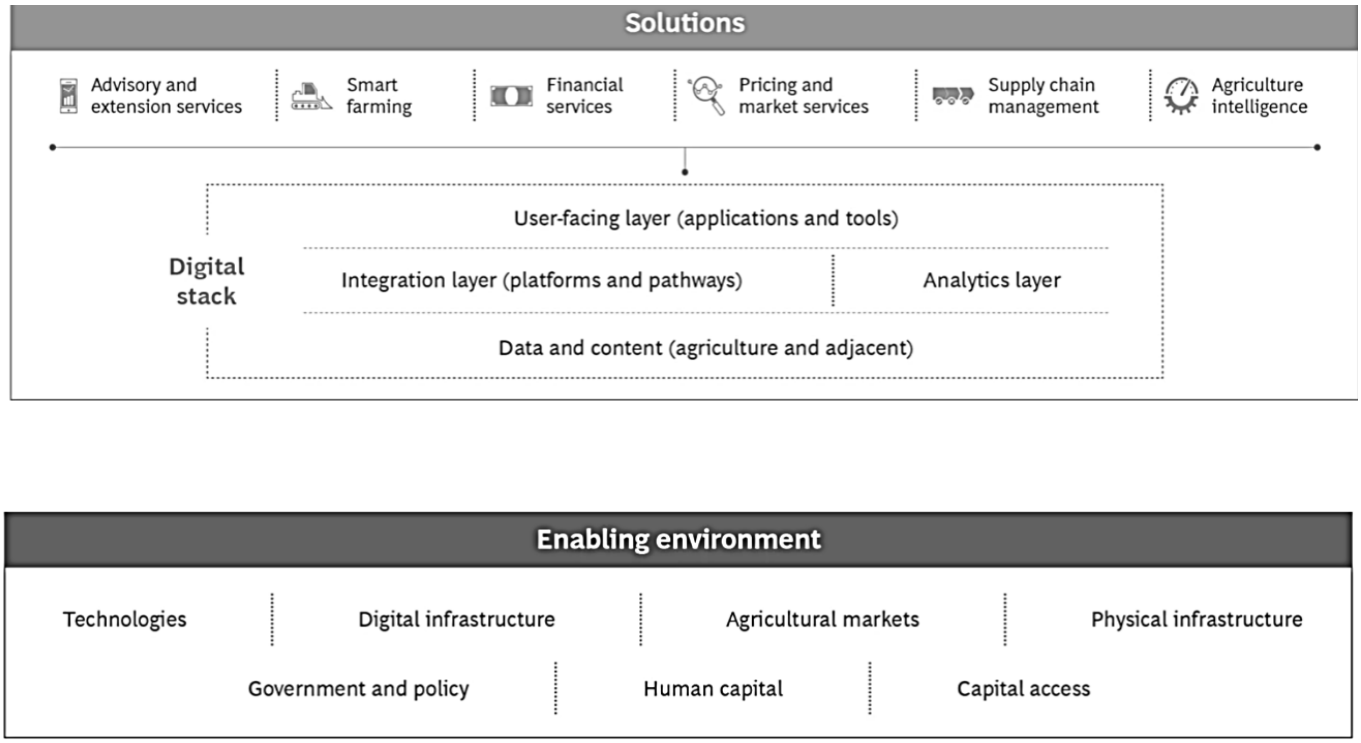



*Figure 16: Digital agriculture solutions (Source: BCG)*

Let us now apply the **PIE X** lens to a variety of companies operating in the agri-sector (agri equipment, digital technology solutions-provider, agri producer) and discover how value is being created with all their stakeholders.

## John Deere

### *Ecosystem & Experiencers*

Deere & Company, the company that owns the John Deere brand name, started off 185 years ago as a maker of agricultural tools such as pitchforks, shovels and steel plows, and later began manufacturing tractors. Today, it is a manufacturer of intelligent, connected machines and applications that are helping revolutionize the agriculture and construction industries.

As Michael Porter and James Heppelmann explain, the increasing capabilities of smart, connected products help Deere expand industry boundaries – from being just a tractor manufacturer to a solution provider for farm equipment optimization. It helps shift the tractor from just being a product / product system to becoming part of a system of systems (see Figure 17).[95]

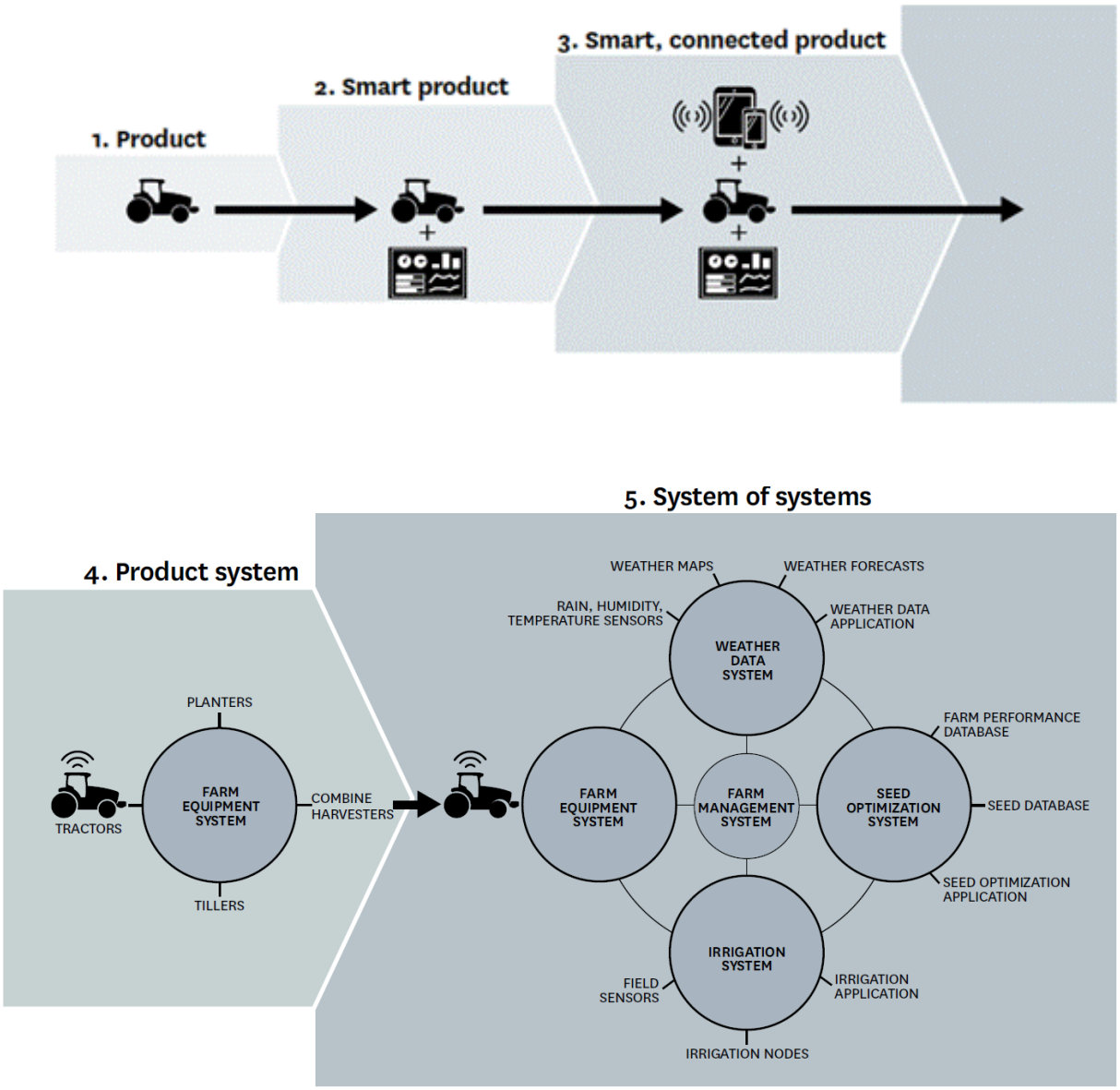



*Figure 17: A tractor company competing in a farm automation industry (Source: Porter and Heppelmann, Harvard Business Review)*

John Deere used to manufacture multiple versions of engines, each providing a different level of horsepower. It now can alter the horsepower of a standard physical engine using software alone.[96] Similarly, the smart connected product concept is enabling John Deere to now connect farm machinery, irrigation systems and soil and nutrient sources with information on weather, crop prices, and commodity futures to optimize overall farm performance.

When seen from the perspective of one of the experiencers, the farmers in the US, John Deere is helping them with enhanced productivity, solving for labour shortages in farms, which are often moving from rural to urban environments, and providing a better quality of life to the farmer.[97]

### *Platforms & Engagements*

John Deere provides farmers with precision ag tools, for areas such as machine performance, field management and data analysis, to monitor, manage, and maximize their farm operations. Its technology stack, across hardware & software, guidance, connectivity & digital solutions, automation / machine IQ and autonomy, accelerates precision & automation while driving efficiency (see Figure 18).[98]

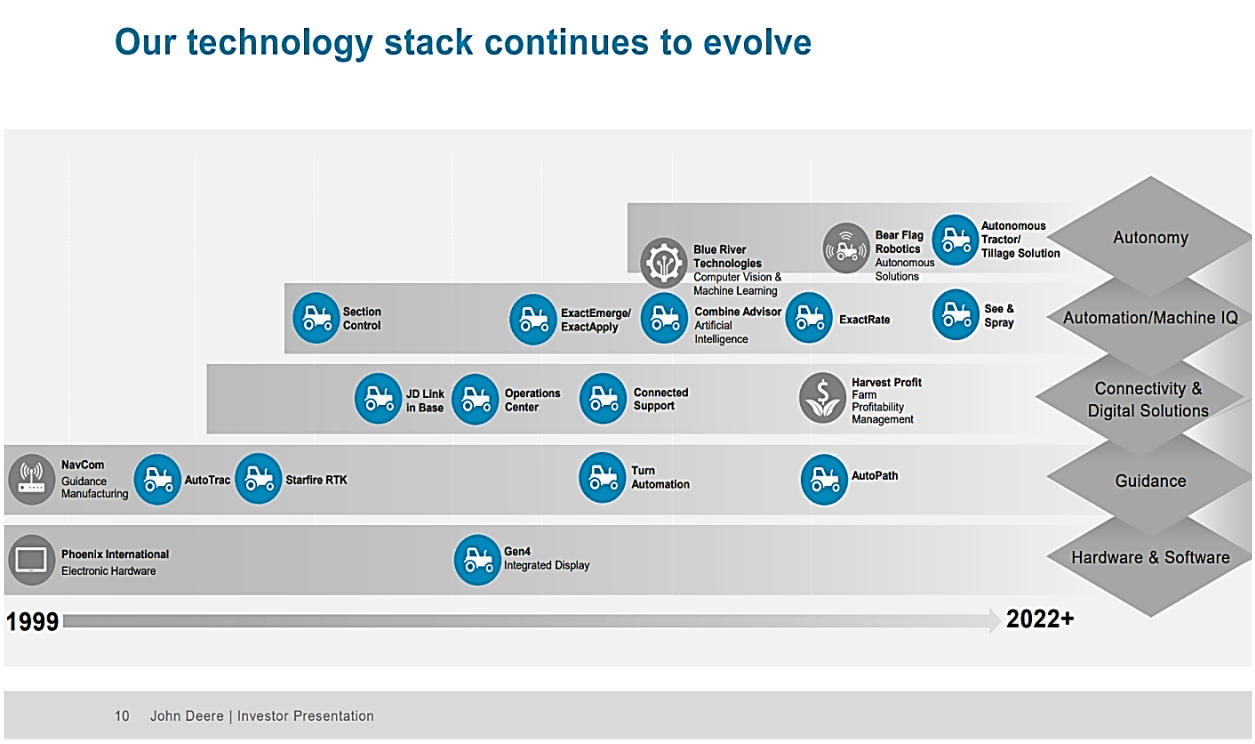



*Figure 18: John Deere's evolving technology stack (Source: John Deere)*

The John Deere Operations Center is an online farm management system that enables farmers to access their farm information anywhere, anytime through web, tablet, or phone.[99] They also developed an innovation in the after-sales service market – John Deere Connected Support enables the dealer network to remotely monitor machine condition and preemptively advise the customer (farmer) on maintenance and repair needs, minimizing field operations disruptions, and also avoiding serious repair costs.[100] In Brazil, John Deere

experimented with Vuzix M400 smart glasses, to help farmers conduct faster and more precise inspections for system maintenance. In addition, they can report on the status of machinery in real-time simply by tapping the touchpad on the Vuzix Smart Glasses.[101]

By combining an 8R tractor, a TruSet-enabled (tillage technology) chisel plow, GPS guidance, and advanced technologies like AI and machine learning, Deere has created a fully autonomous machine. A farmer can use the John Deere Operations Center mobile app to start the tractor with a simple swipe, leave the field to focus on other tasks, and yet monitor the machine on a mobile device, and adjust the tractor's speed or depth by accessing live video, images and data.[102] The machine can maneuver around things like tile inlets in a field and continue to do the job autonomously, operate through inclement weather.

John Deere leveraged digital technologies to not just transform the experiences of the farmers, it also supported its production planning and inventory management processes. It built an AI-powered application to optimize inventory levels, starting with one of its product lines that has over 40,000 unique parts, and was able to simulate and optimize order parameters, quantify the planned use of materials based on production orders, and minimize safety stock levels. John Deere could potentially reduce parts inventory by 25 to 35 percent, delivering between $100 million and $200 million in annual economic value.[103]

***Impacts***

John Deere delivered very good financial results in 2021, despite the pandemic and supply chain challenges – over $44 billion in revenue, nearly 6 billion in net income and over 5 billion of shareholder value added. Besides its focus on such economic measures, John Deere has also articulated "Leap Ambitions," which are focused goals for 2026 and 2030 to boost economic value and sustainability for its customers.[104] It includes measures like:

- By 2026 – Reach 500 million engaged acres with 50% highly engaged (include documentation of more than one production step and 10 or more digital, value-creating activities over a 12-month period).
- Ensure 100% of new Small Ag equipment is connectivity enabled. And deliver a fully autonomous, battery-powered electric ag tractor to the market.
- Connect 1.5 million machines and demonstrate viable low/no carbon alternative power solutions.
- By 2030 – Ensure 75% sustainably engaged acres (include incorporation of two or more sustainable John Deere technology solutions or sustainable practices over a 12-month period).

## Land O'Lakes

Land O'Lakes is a farmer-owned cooperative with a network spanning more than 300,000 producers and touching about half of America's harvested areas.[105] It also owns an agtech company, WinField United, and a sustainability and stewardship-focused business, TruTerra. The company believes that the success of a farming business revolves around 40 mega decisions – about what and when to plant, when and how to fertilize, feed and harvest, do all this sustainably, and how to market and sell – and these are areas where data

and technology can help.

Over the years, Land O'Lakes has built its own agtech applications. Answer Tech, an insights delivery system, provides to its farmers critical technology information and access to top agronomic decision-support and management applications through a centralized portal. It also developed Answer Plot, a research and demonstration program – where product performance is tested in replicated field trials at nearly 200 locations, and over the years has produced over 5 million data points. This localized information helps farmers fine-tune their seed and management decisions down to the acre.[106]

Land O'Lakes announced a partnership with Microsoft,[107] which will help in augmenting its "brute-force" analytics approach with the power of Azure and its AI capabilities. They would use computer modeling, algorithms and replicated trials to derive the insights, and the plots would then be used to validate their models and findings. Azure FarmBeats helps farmers with a range of AI/ML based analytics capabilities including the ability to assess farm health using vegetation index and water index based on satellite imagery, tracking farm conditions by visualizing ground data collected by various sensors, and helping with providing farm health advisories (see Figure 19).[108]

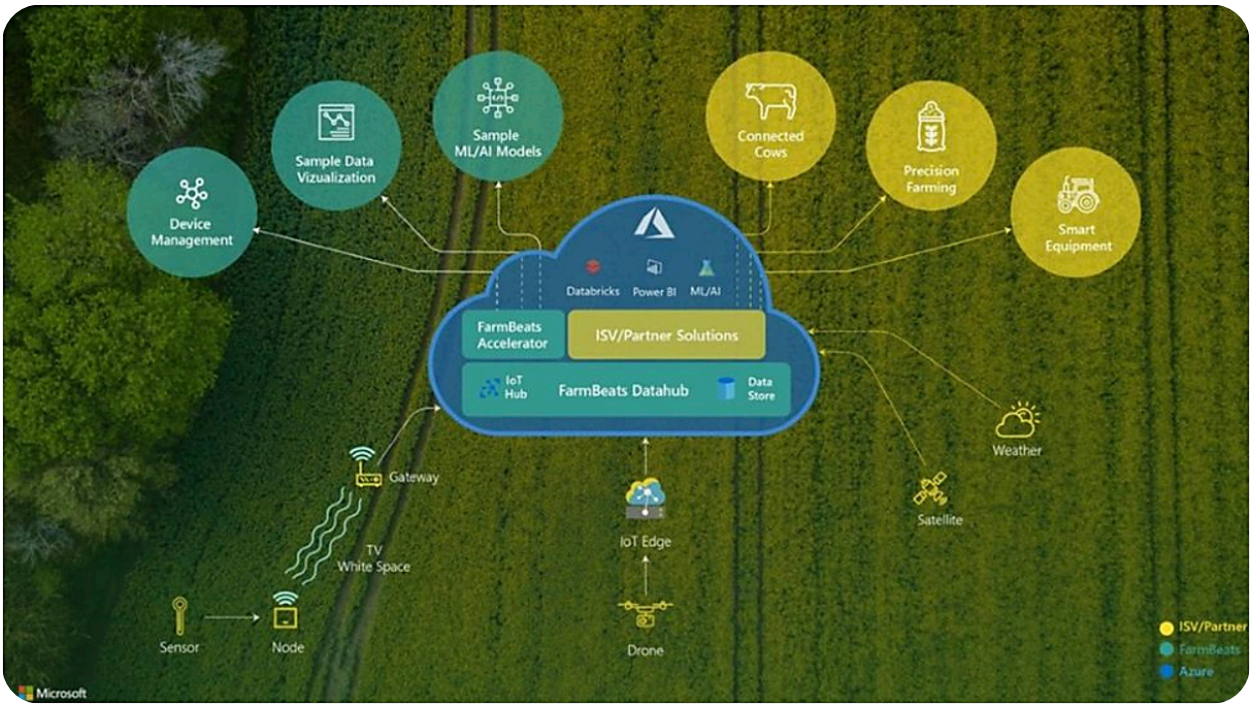



*Figure 19: Azure FarmBeats architecture (Source: Microsoft)*

Land O'Lakes and Microsoft are also collaborating on developing a Digital Dairy solution. It will bring together multiple data streams — including weather, feed management and animal health — from sensors and third-party applications to help the dairy producers. Farmers can photograph their cows, and their AI-application would then determine if the animal is under-weight or over-weight, and modify its feeding accordingly. Consumers of Land O'Lakes' milk, butter and cheese will be able to assuredly trace their products through the entire supply chain, and know that they have been sustainably sourced. (In the next section, we will see

another detailed example of a digital dairy solution – Amul's Cow-to-Consumer IT solution in India.)

Land O'Lakes' commitment to its farmer-communities goes beyond just improving their agricultural productivity. It has an important focus on sustainability and natural resources stewardship to help farm fields become more resilient. Its Truterra Insights Engine utilizes soil, weather, economic, and farm management data to analyze potential impacts of various stewardship practices at a field level and help track against both economic performance and conservation practices. With Microsoft, it is looking to develop capabilities to predict the carbon benefits of regenerative practices, like no-till, precision nutrient management and planting of cover crops, quickly and effectively. Combining such capabilities with the real-time transparency from remote sensing and satellite data will make certification of these projects in global carbon markets easier, quicker and less expensive — ultimately maximizing the economic value for farmers.

Land O'Lakes is also adopting a holistic approach in its engagement with the rural communities in which their cooperatives exist. Its American Connection Project, in collaboration with Microsoft's Airband program and hospitals like Mayo Clinic, aims to close the digital divide, by ensuring broadband will be deployed to rural communities along with services including telehealth, educational resources and digital skilling.

## Agriculture in India

Let us turn our attention to agriculture in the Indian context. It is the primary source of livelihood for about 58% of India's population, and its share in gross value added of India stood at around 18 % in FY20. Agriculture in India faces some significant challenges – it suffers from low productivity and inefficiencies in the entire farming cycle including pre-planting, planting, harvesting, selling, and financing. Small and marginal farmers with less than two hectares of land account for 86% of all farmers in India but own just 47% of the crop area.

Thus, technology-intensive solutions which make economic sense over larger farm sizes may not apply directly in the Indian context.[109] India should follow the strategy of using appropriate technology in agriculture based on local contexts. Simply put, appropriate technology can be a new hi-tech solution or a small modification over a conventional practice, but it is the best fit for the local context.

The consulting firm, McKinsey, has identified several scenarios where digital technologies can play a key role in transforming Indian agriculture, by connecting farmers to markets and shared equipment, automating farm management processes, and analyzing data to drive actionable insights for farmers (see Figure 20).[110]

A number of digital initiatives in agriculture have been undertaken by the government and the private sector. For instance, the Government of India launched the Electronic National Agriculture Market (eNAM), an online trading platform for agricultural commodities in India. It offers a "plug-in" to any market yard (or *mandi*) existing in an Indian state. The platform basically increases the choice of the farmer when he brings his produce to the mandi for sale. Local traders can bid for the produce, as also traders on the electronic platform sitting in another state/ mandi. India's Digital Agriculture Mission 2021–2025 aims to support projects based on emerging technologies like AI, block chain, GIS technology and drones. But, agriculture in

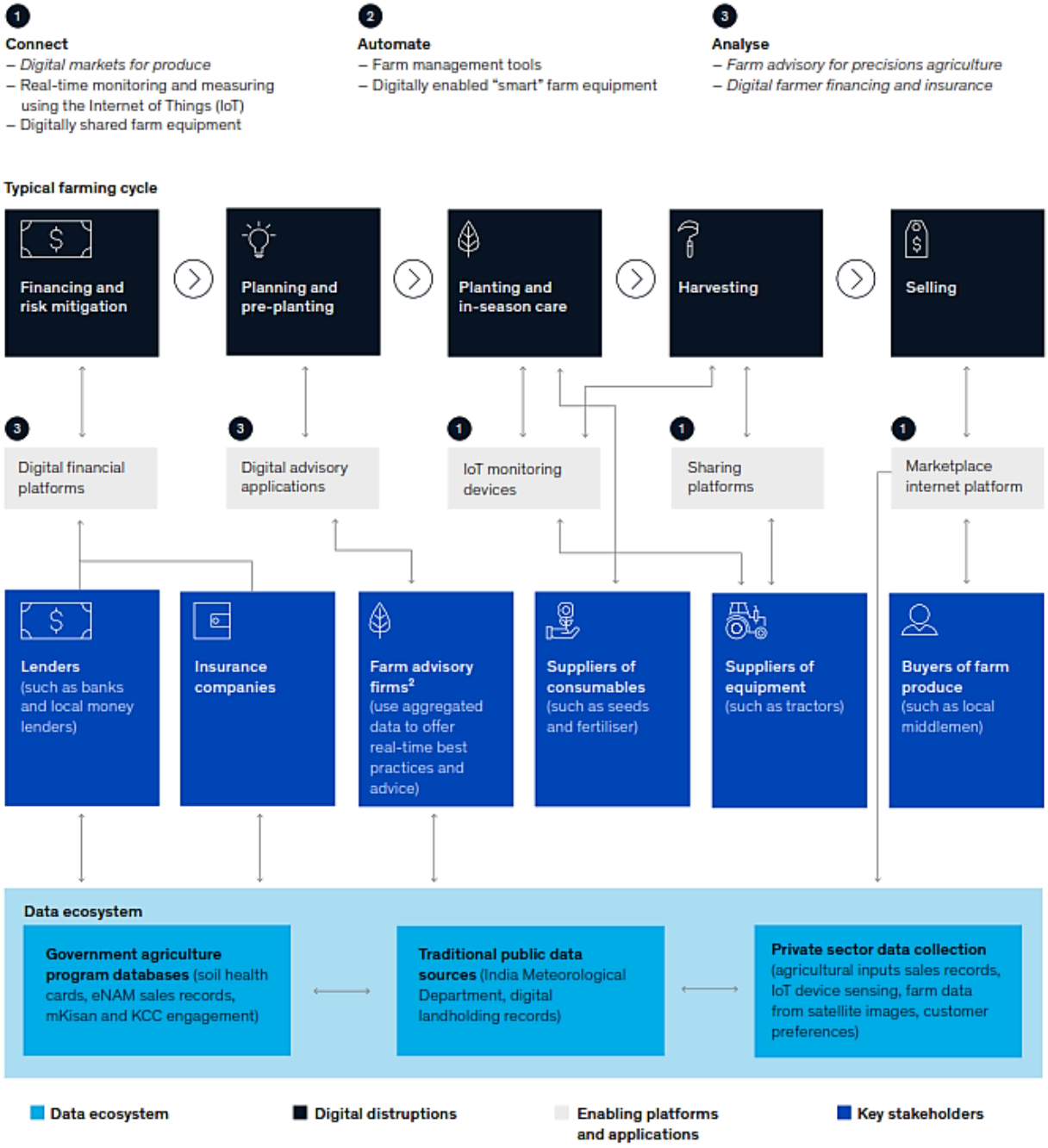



*Figure 20: Farms of the future in India: making data-driven decisions from seeding to selling (Source: McKinsey)*

India is simply too diverse, federated (controlled by the State governments) and involving too many small-scale marginal farmers. Consequently, unlike the ONDC initiative we saw in retail earlier in this report, or the digital healthcare initiative (ABDM – UHI) we explored in our earlier report on the Healthcare X-verse, there is no single, unifying pan-India digital agriculture initiative, at population scale and scope.

Let us next turn to the large-scale efforts undertaken by Amul, India's largest dairy cooperative.

## Amul

### *Ecosystem & Experiencers*

Amul, the brand promoted by the Gujarat Cooperative Milk Marketing Federation (GCMMF) Ltd., is India's largest food product organization, with a turnover of INR 63,000 crores (USD 8.4 billion) in 2021-22.

Amul's complex ecosystem comprises the milk producers (cows and farmers), village diary cooperatives, district milk cooperative union, state cooperative mil marketing federation, and the consumers (see Figure 21)[111].

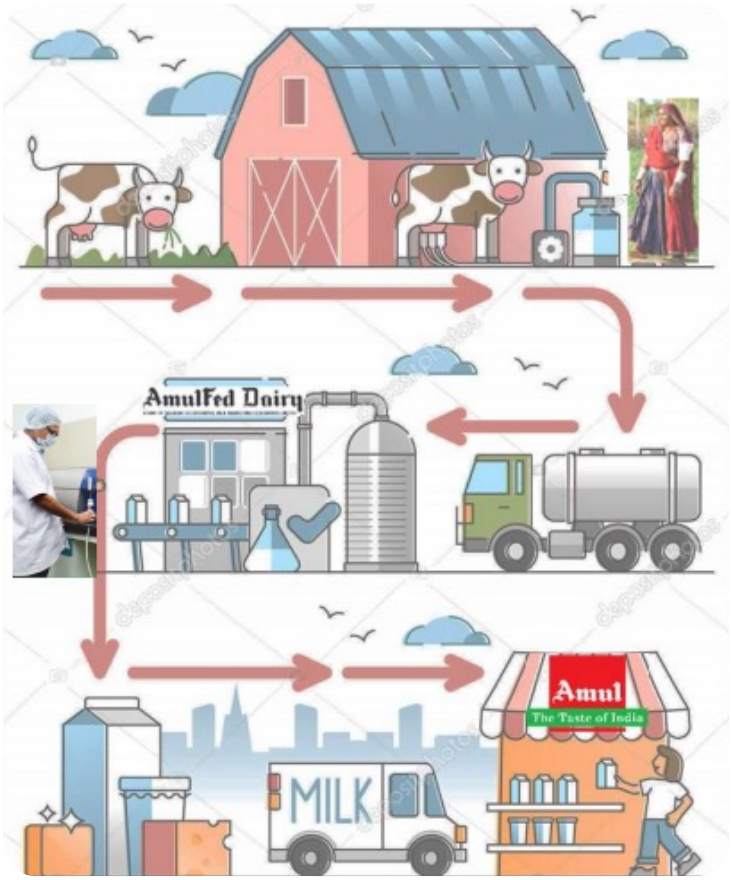



*Figure 21: Amul's supply chain – from cow to consumer (Source: Amul)*

One of the experiencers in this ecosystem is the marginal farmer from the Indian villages. The genesis of Amul goes back to 1946 when the farmers of Kaira district in Gujarat, India went on a strike protesting the economic exploitation by private milk contractors who had a monopoly over milk-procurement in their region. And the farmers established a dairy cooperative model that established a direct linkage between milk producers and consumers by eliminating middlemen, and nearly 80% of the consumer's money going back to the farmer.[112] The Amul ecosystem is a source of subsistence for these farmers, and especially the women farmers for whom it offers economic empowerment. The farmers are interested in aspects like an efficient and clean milk collection process, payment without delays, and protection of their cattle. At the other end of the value chain is the consumer – who has journeyed from a milk-deficit country around India's

independence to one with milk self-sufficiency and 21% of global milk production now.

### *Platforms & Engagements*

Amul, with the help of IBM (for IT services) and SAP (for platform), began a large-scale digital transformation program in 2009 and developed a set of applications covering the Cow-to-Consumer (C2C) IT value chain. For instance, Amul implemented the Automatic Milk Collection System in its village dairy cooperative societies that brought three stakeholders – the farmers, the village co-operative societies and the milk unions – on a single digital platform. From the farmer's perspective, this system provides a tremendous sense of transparency and trust since the milk collection system captures exact quantity of fat and SNF (Solids-Not-Fat) of milk in real-time, speeds up the milk collection process, and based on the milk composition, automatically calculates and makes payment to the farmer through cashless-payments directly into their bank accounts linked to the milk society. From the milk unions' perspective, the accurate real-time as well as historical data enables them to do better analysis and identify future growth plans. Amul has also implemented a Distributor Management System at their distributors and wholesale dealers, where salespeople book orders from retailers on their mobile apps.[113]

Veterinary services are an important part of the entire value chain – the health of the cows ensures a steady supply of milk to the cooperatives, and regular income to the farmers. Earlier the farmers had to make phone calls to their local cooperative to book time for a doctor. The entire process was manual and took too much time for booking and allocation. Amul implemented the Centralized Veterinary Call Center in 2013. It set up a facility with 40 call center operators covering a network of 14 Veterinary Centers and 180 Veterinarians in a few districts in Gujarat, India. Farmers could call VCC or book an appointment through a mobile application. All details of animal treatment, case paper, medicine utilization, feeding and other animal details are all recorded in the mobile app. This digitization has ensured quicker visit recording and allocation, reduced visit time, availability of online disease and treatment history, and advanced medicine management.

Given the criticality of cows to the overall business, Amul implemented a cattle health tracking system. Every cow in its dairy farm is equipped with an e-sense tag, an activity tracker to monitor the animal's health. It gives actionable information on the reproductive, health, nutritional, and wellbeing status of individual cows and groups. These health sensors are so efficient that it has a nearly 100% accuracy in determining if the cattle are in heat. Amul has also developed an app called Pashu Seva for Artificial Insemination call booking. Recently, they have developed an eBay-style app, Pashudhan, that facilitates buying and selling of cattle online. Seller-farmers enter details like the location, price, productivity, breed, and even a photo, and buyer-farmers will see listings based on their preferences.[114]

Amul has achieved digitization in other parts of the value chain too. The Amul Logistic App, an Android-based app to assist in monitoring milk collection and milk quality, digitizes the monitoring of truck sheets, track transporters' real-time, automate data recording, store pictures along with data and control data discrepancies. For instance, the app prevents malpractices and adulteration of milk as it is possible to compare milk collected at the society / collection centres and received through tankers. Similarly, the Amul Vehicle Tracking System, implemented in all the vehicles of veterinarians and milk tankers, has helped reduce

transportation cost as they can monitor vehicle movements using GPS and geo-fencing technology.

Let us now consider how Amul engaged with consumers, especially during the COVID-19 pandemic. It realized that consumers who were spending more time at homes would increase their intake of milk and milk-based products. Amul in fact introduced 33 new products, including immunity boosting variants like 'haldi doodh' (turmeric latte), 'tulsi doodh' and 'ginger doodh', and collected an additional 3.5 million liters of milk per day.[115] Amul also realized that people may not be able to visit shops to buy milk. Hence, it remodeled it last-mile supply chain process almost overnight – it partnered with food-delivery platforms such as Swiggy, Zomato and Domino's, allowed Resident Welfare Associations of large apartments to place orders directly with them, and launched the Amul Cart app for retailers to place online orders with their distributors.

Amul realized that families would be spending time together during the pandemic, and tapped into the sentiment of nostalgia. It sponsored reruns of popular Indian TV serials like 'Ramayana' and "Mahabharat', and brought back its famous ads from the 1980s during 'Retro Sundays' program. It enlisted over 3000 chefs and organized 1250 cooking shows through Amul Facebook Live, reaching 870 million Facebook users.[116]

***Impacts***

Amul collects 25 million litres of milk every day, from 3.6 million farmers across 18700 village cooperative societies, via 5,000 milk tankers that go to 200 chilling stations; then processes the milk at 80 diary plants and produces 750 different SKUs; and ships them via 62 branches and 10,000 distributors to 1 million retailers in over 1000 cities in India.[117] A total of 15,200 villages (around 81% coverage) have been covered by Amul's IT systems, with over 1.6 million daily messages being sent to farmers on the quantity and quality of milk procured.[118]

In April 2022, Amul partnered with SAP to launch a community outreach initiative, aiming to transform 1.5 million Indians, comprising children, adolescents, youth, women, and farmers. It includes training children in coding and 21st century skills, enabling their school to workforce transition, women empowerment and entrepreneurship, where 20,000 women will be taught in digital-financing skills and functional communications skills, and supporting farmer livelihoods.[119]

## Agtech startups – Cropin and WayCool Foods

There are more than 450 start-ups in the Indian agtech ecosystem, with the Indian companies featuring among one in every nine globally. They broadly fall into one of these five business models – upstream marketplace, downstream 'farm-to-fork' supply chain, farming-as-a-service, IoT or big data-led innovation, and engineering led-innovation model.[120] From 2014 to H1 2020, Indian agtech startups have received $467 Mn in funding. This is an emerging area of investment with a significant headroom for growth – the agtech startups have tapped just less than 1% (in 2020) of the total addressable agtech market potential of over $24 billion (in 2025).[121] We will now briefly consider two innovative Indian startups – Cropin and WayCool – who are pursuing very distinct strategies of value creation.

Cropin, an ag-ecosystem intelligence provider, has partnered with over 250+ organizations globally to digitize over 16 million acres of farmland, impacted nearly 7 million farmers, and developed solutions based on data and insights for over 400 crops and over 10,000 crop varieties in over 56 countries. These solutions, like AcreSquare (for B2B farmer engagement), RootTrace (for seed-to-shelf traceability), SmartRisk, SmartFarm and others, are crop and geo-location agnostic and are available in a plug-and-play model.[122]

Their latest offering is the Cropin Cloud, a purpose-built industry cloud for agriculture. Its Data Hub will take data from drones and Internet of Things-enabled devices, and provides ML-ready data pipelines for enhanced analytics. Its Intelligence will help predict yield, harvest size, crop disease, and more through the use of AI and field-tested ML-models. (See Figure 22.) We can see some parallels in this approach with Land O'Lakes – Microsoft's Answer Plot - Azure FarmBeats solution.

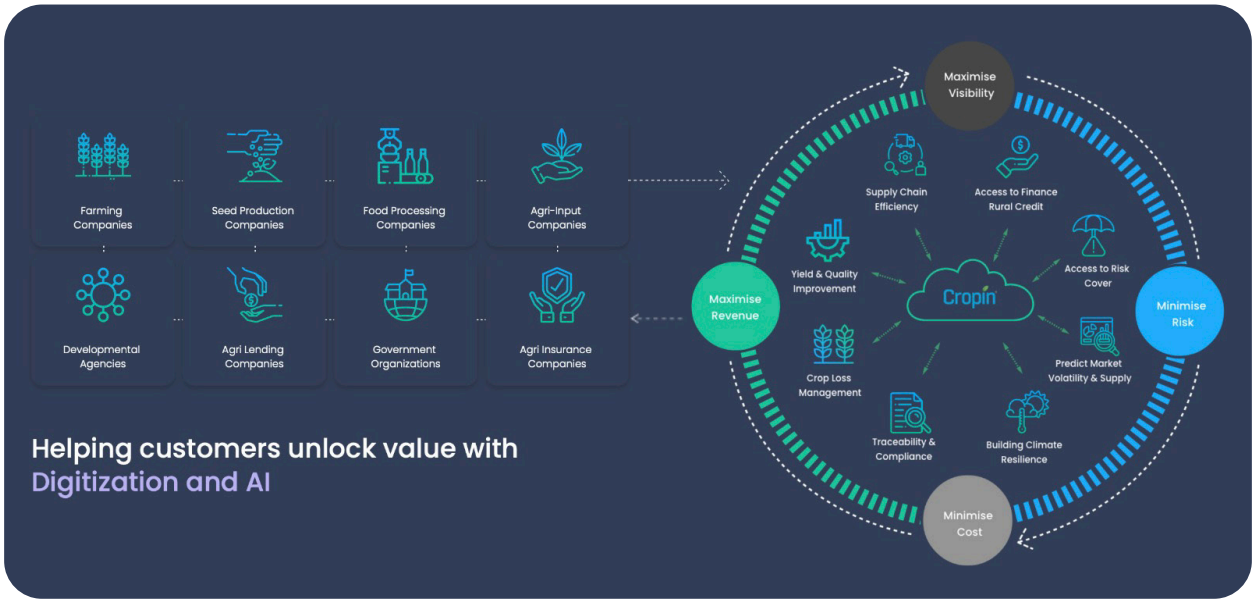



*Figure 22: How Cropin unlocks value with Digitization and AI (Source: Cropin)*

Cropin is looking at offering its agri cloud capabilities-as-a-service to the larger ecosystem – to customers across farming companies, seed companies, food processing companies, fertilizer manufacturers, financial service providers, government, development agencies, and more.

WayCool Foods, one of India's fastest growing agri-tech startups, currently handles 900+ tons of food products (such as staples like rice, pulses, wheat flour, dairy, and value-added products) per day, across 1,00,000 clients (hotels, restaurants, retail stores, kirana etc.), and from a network of 85000+ farmers in more than 50 regions in India.

It adopted a tech-enabled supply chain approach to transform Indian agriculture, and spent its four initial years putting this tech-platform in place connecting the farmers, its warehouses, distribution centres and customers. For instance, RAPID is their automated supply chain management system. Once the barcode-enabled crates laden with produce arrive from the farm collection centres to the warehouse, they are

scanned, digitally weighed, and sorted against the assigned order from the customers. 40% of the crates are sent directly to the customers without any human intervention at the warehouse.[123]

WayCool's impact goes beyond just the supply-chain technology to societal impact. It has started a program called Outgrow where it works with over 1200 marginal farmers from 150+ villages in India to help them across the seed to sale process. WayCool helps with soil health check, seeds and input advisory, cultivation planning, and produce liquidation. It enters into contracts with farmers to grow produce that is delivered to their collection center very near to the farms. This ensures that the farmer has very low or no transportation cost and lowers wastage.

We will next examine ITC, an Indian private-sector conglomerate, and its renowned large-scale agri digital transformation initiative, e-Choupal in detail.

# 5. Risk-managed levers for PIE X-verse ecosystem innovation and co-creation of unique value with stakeholders

## RETAIL & AGRI X-VERSE INNOVATION

**Applying the PIE X lens to digitalized supply chain, omnichannel commerce, brand, and farm experiences**

## Into the X-verse: The evolution of ITC e-Choupal

In the previous two reports in this series, we introduced some key risk-managed levers that enterprises can use in navigating transformational PIE X shifts.[124] These levers focused on configuration of:

- interactive system-environments associated with platforms (and underlying protocols), by bringing together Artifacts, Persons, Processes, and Interfaces ("APPI") in event-sensed flows of data, content, and service exchange;
- enactment of interactional creation associated with engagements that create value through Dialogue, Access, Reflexivity, and Transparency ("DART") in the lived-journeys of eXperiencers;
- wellbeing amplification associated with impacts, by harnessing Creativeness, Intentionality, Transformativity, and Integrativity ("CITI") in cross-sector actor-networks at speed, scope, and scale;
- N2I2N interactions associated with interactive structures of X-verse ecosystems, through Generativity, Evolvability, Linkability, and Inclusivity ("GELI");
- I2N2I interactions associated with interactive agency of X-verse ecosystems, through Spatiotemporality, Contextualization, Involvements, and Meaning ("SCIM").

We now discuss two final sets of risk-managed levers, for the expanded design and co-innovation of X-verse ecosystems together with stakeholders-as-experiencers-creators. We introduce these levers using the example of ITC, an Indian conglomerate with businesses in agriculture, food and other industries, and its agricultural, food, and retail X-verse innovation, while also connecting with the previous sets of levers in the course of ITC's evolution of its "e-Choupal" initiative and its purpose-driven transformation.[125] In doing so, we also delve further into CARE (Complex Adaptive Relational Ecosystem) architectures that bring fluidity in X-verse value co-creation with shifting roles of stakeholders, a concept to which we alluded at the end of the previous report on healthcare, following our discussion of the Apple example).

ITC has articulated a paradigm of "responsible competitiveness" for growth, an "integrated approach that builds extreme competitiveness whilst at the same time ensuring that the environment is nourished and not plundered, dignity of labour is preserved and sustainable livelihoods are created along the entire value-chain".[126] This has enabled the entrepreneurial energy of ITC's entire enterprise ecosystem to be harnessed to innovate initiatives that create sustainable livelihoods and enriching environments, while improving business competitiveness and enhancing ITC's triple bottom line performance metrics.

ITC's focus on sustainable development areas converged from three angles. First, is the identification of developmental challenges that matter to India as a nation. Second, is the shaping of those interventions that create enduring value for stakeholder communities that arein the catchment areas of its operations. A large

number of people participate annually in a needs and priorities appraisal exercise. Third, is the design of those initiatives where ITC's interventions can multiply societal, environmental and business impact significantly, by way of touch-points with ITC activities, or their geographical vicinities. The resultant key focus areas, viz., livelihoods for the poor, sanitation, gender equality, vocational skills, education, and climate action, mirror global SDGs too.[127]

Against the backdrop of ITC's sustainable development focus, its Agri Business Division (ABD) has faced two key ongoing challenges since the late 1990s: improving its position in the global commodities-export market, and sourcing high-quality agricultural commodities as a source of advantage for the company's packaged-branded-foods business in later years. The problem in India was that the quality of the small-holding farmers' production was suboptimal, and farm productivity has historically been both too low and not rising fast enough to contain rising prices. State-run markets have generally tended to be quite opaque and not in the farmer's interest.[128] So, ITC concluded early on that the best way to improve the firm's position was to lift the economic performance of the entire social ecosystem in which it operated, by designing platforms for more effective engagement between the company and Indian farmers to create mutual value.

As a company with an Indian soul, its leaders empathized with the small-holding farmer's hardships and their fierce desire to remain entrepreneurs, and wanted to help lift as many of them out of poverty as possible. ITC recognized that farmers were frequently cheated on weight and price, and were often not paid in full for their crops on the day of the sale, in violation of government regulations. ITC reasoned that the best way to raise the small farms' productivity and quality was to help growers improve their practices and that the best way to do that was to support their own discovery of what efficient farming meant.

However, to have any chances of success, ITC's approach also called for engaging multiple stakeholders from the communities in which the farmers lived and operated, including non-governmental organizations (NGOs) and the Indian government entities responsible for the state-run marketplaces, or "mandis" as they are called.

ITC purposefully built a service offering called e-Choupal ("choupal" means "meeting place" in Hindi), which has evolved over the decades in four phases or tiers.

### *Offering as an Engagement-based Platform*

Illustrative of the R-APPI levers of interactive platformization, the first "engagement platforms" ITC built entailed an "R-APPI assemblage system" called e-Choupal, which consisted of village-level information and communications technology) kiosks with Internet access managed by an ITC-trained local farmer (called a *sanchalak*). These kiosks were typically located within five kilometers of the farms in the sanchalak's village, with about four or five villages being served by a single kiosk. Farmers gathered around and interacted with the sanchalak and other farmers in the village and sometimes with ITC personnel. The e-Choupals provided information in the local language on the daily weather forecast, prices of various crops, and other agricultural news. Farmers could learn about the weather conditions and farming methods specific to each crop and

region, agricultural extension services, and agriculture universities in ITC's enterprise network that offer expert advice. ITC also provided an e-mail service through which farmers (via the sanchalak) could interact with technical people at ITC, specific agricultural scientists, and fellow farmers in other villages who may have dealt with similar challenges.

The choice of a farmer as Sanchalak for the human component of the e-Choupal "R-APPI assemblage system" was not obvious to ITC. Indeed, it was originally the least obvious choice, as ITC explored options from the village headman to the postman and other village-level candidates such as school teachers. On the other hand, choosing a farmer as Sanchalak meant honing the profile and selection process to identify those individuals with credibility in each village, and who would be seen as trustworthy agents of change, among other criteria, such as the layout and location of the farmer's dwelling, his education, and ability to physically support the technical aspects of the infrastructure. Insights gathered in the conversations with farmers at the prototyping stage helped shortlist the "farmer" as the ideal profile for an e-Choupal Sanchalak. Every Sanchalak, once chosen by ITC through its due diligence, must take an oath before the community saying that he will serve their best interests without discrimination. The Sanchalak also agrees to a social contract that he will spend part of his income on community welfare.

ITC's interactive platformization distinguished four component eXperience-environments of what appears to be a simple sales transaction by farmers, viz. price discovery, selling decision, crop delivery, and payment collection. ITC's system liberated the farmer from the "Mandi" (government marketplace) system which literally forced the farmer to sell at whatever price was offered because the farmer had already sunk some costs having transported his crop to the nearby Mandi town *before* discovering the price. Illustrative of the R-DART levers of value-creational engagements, farmers, with the benefit of access to price information, knowledge of past price trends and market news that impact future prices, available through the e-Choupal portal, began to engage in an informed dialogue amongst themselves to weigh the risks and benefits of selling immediately, or holding for a later period, and so on. Each farmer could then take his own decision based on the individual context of storage available, cash-flow needs, or risk-taking ability. (In later years, the government's mandi system too evolved, as we briefly saw earlier in the case of the eNAM platform.)

Treating e-Choupal as their own engagement platform of empowerment based on the trust so built, and the Sanchalak being a fellow-farmer they could relate with, the farmers started engaging in broader conversations about how e-Choupal could fulfil anything from their daily needs to long term aspirations. For ITC, the simple service offering of buying on an engagement platform meant seeing it as a *means* by which actors engage in creational interactions to achieve outcomes of value to them, rather than as a service designed for delivering certain fixed outputs. This engagement generated insights for new business opportunities while reaching out to underserviced rural communities.

ITC's e-Choupal was focused on value-creational engagements, which afforded individualized decision-making for farmers. There are over 6000 e-Choupals covering over 35,000 villages across ten states in India. Should a farmer choose to sell his produce to ITC, the quality of a farmer's crop was tested by the village Sanchalak for determining the "quality factored price". Once approved, farmers could take their tractor-

loads of grain to a hub with processing centers / warehouses located 25–30 kilometers from the villages, similar to the distance to Mandis. A second e-Choupal engagement platform consists of hub facilities located 25 to 30 kilometers from the villages, where farmers bring their grain. Each of these hubs serves about 40 to 50 Choupals. ITC's hubs not only give farmers an alternative option to going to the mandis, but they also provide electronic weighing, conduct objective quality testing, ensure spot payment, and provide rest-stop services. ITC began to employ intermediaries from the mandis (called *samyojaks*) at its hubs to handle much of the hub logistics. With its judicious blend of "human+click+mortar" capabilities, ITC's e-Choupal platform services reached out to more than four million farmers.

### *Extending the ITC e-Choupal X-verse Ecosystem*

In 2004, ITC broadened its hub-platform facilities, as part of a tier two expansion of its X-verse ecosystem. ITC expanded its hub facilities to include distribution capabilities and began building a third engagement platform, including a marketplace Choupal Saagar, which entails a physical infrastructure offering fertilizers, seeds, pesticides, farm equipment, and other goods and services, by various organizations. ITC began further connecting "producers" serving farmers, with farmers in their role as "consumers" of goods and services of agri-business and beyond. This is akin to a more popular "two-sided" market orchestrated by a platform provider. [129] Based on the needs and aspirations of farmers, this tier built services for agri-productivity improvements. Most important, this platform enhanced value by using insights generated from ITC's ongoing dialogue with farmers to shape the mix of merchandise sold at Saagar outlets. The dialogue happens both when farmers transact at e-Choupal (through the sanchalak at the kiosk and when farmers are at the hub facility) and particularly in dedicated "live forums" facilitated by ITC personnel on a rotating basis across villages. Through such dialogue, ITC gained a more granular understanding of the interactions among soil types, seeds, and fertilizers, which it used to promote new hybrid seeds, fertilizers, and tilling techniques that help farmers save money in seed, land preparation, plowing time, and water usage, while helping them maximize crop yield. Further, by aggregating the demand of the villages, the company created the scale to obtain much better prices from manufacturers than the villages could on their own. Sales and service personnel for the fertilizers, seeds, pesticides, and equipment companies also had a platform through which they can engage with the rural market, both making their job more exciting and generating new sales for their enterprises. Choupal Saagars also act as a major outlet for ITC's own branded products, while continuing to strengthen relations with its farmer suppliers. In addition, "Choupal Haat" is a physical platform for network partners to engage more directly with rural consumers, allowing for dialogue and assessment of outcomes, in conjunction with its "Choupal Pradarshan Khet"(CPK) agri-demonstration plots in collaboration with farmers.

During 2004-2008, ITC expanded its business partnership ecosystem, which ranged from partner companies such as Nunhems that offer hybrid seeds to Bayer with expertise in crop science and use of fertilizers and pesticides; to agri-development partners such as International Development Enterprises India for drip irrigation technologies, to Central Institute for Medicinal and Aromatic Plants, and agricultural universities

for tapping into specialized knowledge and best practices; and internal ITC units such as Wellgrow that supplies neem-based fertilizers.

Just as in the Apple example we discussed in the previous report on healthcare, ITC's growth of the pie of X-verse ecosystem value is illustrative of the R-GELI and R-SCIM levers expanding N2I2N interactions of network structures, and I2N2I interactions of farmer-centric agency. At one level, the same sociotechnical architecture of the platforms built in Tier One has become a "meta-market" interactive structure enabling delivery of information (weather forecasts, soil testing services), knowledge (crop management knowledge), financial products (credit, insurance) and farm inputs (seed, nutrients, crop protection chemicals) in a seamless fashion. The conventional system forced the farmer to run from pillar to post for each of these components. At another level, the core philosophy of e-Choupal developed in Tier One viz., freedom of choice to pick or leave any or all of these components, remains with the farmer. Thus, each farmer is engaged with the platform components through his own interactive agency to co-create unique value, e.g., by taking up a trial plot for first-hand experience, integrating the farmer's own crop management knowledge, and conversing with fellow farmers in sharing of knowledge and practices.

As ITC evolved its service as an engagement-based platform on the one hand (Tier One), and its partnership-based platform ecosystem (Tier Two) on the other, it naturally set the stage for a more transformational approach to achieving sustainable developmental impact, one that recognized the need for famers' (and partners') value creation to be more co-creational in scale-scope, so as to continuously expand value creation in ways that generated more enduring "all-win more" value. This was accomplished by bringing to bear X-verse co-creation thinking in configuring its engagement-based platform ecosystem. X-verse co-creation thinking centers on interactional creation of outcomes based on *actual experiences* of individuals (through their engagements in environments of the platform ecosystem), to continuously enhance the value of platform ecosystems to actors.[130] It is important to underscore here that X-verse co-creation thinking came to be recognized as *essential* to making solutions generated through sustainable developmental platforms to be transformational in its scale and scope. In conventional thinking about platform scaling, the typical focus is on augmenting the interactional capacity of a platform, in terms of its ability to handle a larger number of (transactional) interactions. What we are talking about here, however, is recognizing the need to scale the capacity to *connect with and personalize each individual's engagement experience*.

As a result, ITC also improved its soil-testing services at its labs and built a data warehouse of soil properties in the villages where it operates. This data has then been used by agricultural input entities in ITC's partner network to generate better products and services for farmers. ITC has also driven the design of new weather insurance products for farmers, with new pricing structures reflecting more accurately the impact of rainfall and temperature changes on individual crop yields. This deeper personalization involves a more granular and direct level of communication and interaction with individual farmers—augmenting their interactions through sanchalaks that enhance e-Choupal scalability through its partnership network.

The Tier Two ecosystem expansion is illustrative of how R-CITI levers can amplify wellbeing-impacts, with ITC acting as a nodal company in the village enterprise ecosystem, by pulling together resources, products,

and services of many different suppliers of "farmer input" and buyers of "farmer out-put" and injecting into the system a lot of agricultural expertise from its own enterprise network resources, as it continued to evolve its capabilities. The key addition in Tier Two was the co-option of other partners, each one specializing in different areas, thereby expanding the choices for the farmer, and creating multiple interactive experience environments for farmers with ITC partners. As farmers engaged through these new environments, ITC saw that some of them became micro innovators and entrepreneurs, both in their domain of farming practices and in income augmentation. This required a deeper personalization and rural community engagement with the ability to facilitate greater livelihood-enhancing opportunities for the farmer household as such. This led to further expansion of PIE X-verse sustainable developmental impacts through expansive design of ecosystems with stakeholders, as discussed next.

### *Expanding Sustainable Developmental Impacts*

Investment in sustainability initiatives at scale and scope cannot be sustained by merely keeping a portion of profits aside. It requires continuous ecosystem innovation especially based on partnerships to build and enhance platform capabilities to support sustainable developmental initiatives and continuously enrich stakeholder environments.

Consider for instance, provision of information and knowledge to small-holding farmers in Tier One. This is certainly one component of the services provided by ITC e-Choupal. While this is a necessary condition, this will not, by itself, raise their incomes. The information and knowledge need to be often translated to investments on the farm. But, given the inherent risk associated with farming, farmers hesitate to make those investments. This is where ITC's livestock and other supporting initiatives, which bring supplementary incomes come into play, enhancing the risk bearing ability of the farmers. Once the intent to invest is there, the farmer's challenge shifts to gaining access to the recommended inputs, credit, crop insurance, farm machinery, and the like. The intensity of agriculture also has a bearing on natural resources like water and top soil, with each farmer's situational constraints being unique. At the same time, ITC also learned more about various constraints that impacted the long-term potential of farming, e.g., depletion of water tables, change of climate, erosion of top soil, etc., and understood that such constraints could only be overcome through collective action.

ITC has adaptively designed experience environments with farmers who have access to land records, health and education services, NGOs working for cattle breed improvement and water harvesting, and self-help groups. To facilitate expansive design of X-verse ecosystems, four "BEST" levers of **B**alance, **E**quitability, **S**ustainability, and **T**rust, are often applied in the following sequence:

***Balance:*** How might we *balance* heterogeneous stakeholder values more effectively?

***Equitability***: How might we address the *equitability* of wellbeing-impacts more effectively?

***Trust***: How might we address *trust* more effectively?

***Sustainability***: How might we best address the *sustainability* of X-verse ecosystems?

The risk-managed BEST levers help navigate the expansive design of X-verse ecosystems in an age of increasing stakeholder capitalism, ESG considerations, and increasing use of SDG based impact metrics. Its effectiveness, however, depends on connecting it with the other levers we discussed, such as SCIM interactive agency, e.g., making participants' engagement experiences more meaningful, and DART value-creational engagements, e.g., reflexively plowing back insights gained into deepening capabilities. Ultimately, the BEST levers facilitate the configuration of enterprise ecosystems as "living-systems" that better connect with the lives and livelihoods of stakeholding individuals and better managing the governance of triple bottom lines as in the case of ITC —balancing economic success, environmental stewardship, and social progress—to achieve sustainable social legitimacy. ITC's commitment in this regard has resulted in a more holistic view of the linkages between the decline in agricultural productivity and the deterioration of the natural resource base. For instance, its Mission Sunehra Kal (MSK) initiative, connoting a brighter future, is a rural capacity-building program empowering rural communities to adopt sustainable changes that make them economically competitive and socially secure. It aims to accomplish this not only by helping farmers with new farming practice solutions to achieve higher income, but also by enabling communities to develop and manage water, soil, and forest resources for long-term ecological security, empowering rural men and women by creating new non-farm livelihoods and facilitating the development of primary education, skilling, health, and sanitation infrastructures. The interventions also aimed at developing an appropriate mindset of the rural communities.

Trust is earned the hard way, but also lost easily without constant focus on enhancing valuable experiences of sustainable wellbeing-impacts with all stakeholders (individuals)—paying as much attention to the wellbeing-impacts through which a stakeholder identifies and becomes included in and involved with the ecosystem. Indian farmers who use ITC's e-Choupals and hubs are deeply excited about being part of ITC's ecosystem and not just because it is helping them grow higher- quality crops and raise their incomes. They are also happy about being able to participate in the transformation of their own wellbeing-impacts and that of their communities at large. ITC employees—who believe they are improving the lives of both farmers and rural Indian citizens—share in that excitement and are equally engaged. Stakeholder groups and empowered community-based institutions are formed as mechanisms to deal with the tragedy of commons typical in resources like water, grazing land and transfering ownership of infrastructure like schools or community toilets for ensuring sustenance. In addition to the business partners in Tier Two, several not-for-profit entities were co-opted to facilitate social mobilization, group formation, and community capacity building. Similarly, there are several other support initiatives that provide and expand linkages of environments within and across ecosystem platforms. For instance, MSK's water harvesting initiative works in tandem with its Farm and Social Forestry initiative, which has greened more than 950,000 acres through tree plantations by enabling financial, technical and marketing support to small and marginal farmers. This greening has sequestered more than 6,182 kilo tons of carbon dioxide (equivalent to keeping as many as one million gas-polluting cars off the road).

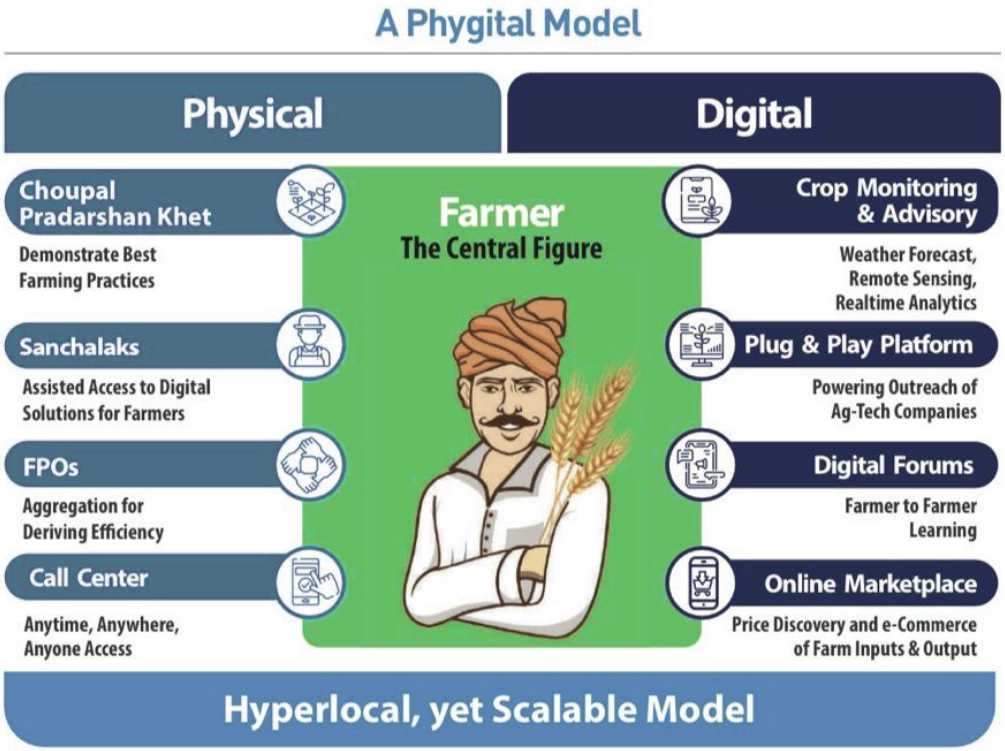
At the same time, commitment to outcomes of value to small-holding farmers, and doing whatever is necessary as well as sufficient, is very crucial to demonstrate impact from the farmer's perspective and

involve stakeholding communities on larger scale.[131] Moreover, sustainable developmental outcomes are not static targets but a dynamic goal as the communities evolve. New goals get set on an ongoing basis to evolve initiatives and strengthen their enduring relevance. Ultimately, this is only as impactful as the value of sustainable developmental outcomes realized by the creational interactions of engaging actors (farmer-facing including their households, partner-facing, and ITC-facing).

### *Phygital X-verse Ecosystem Orchestration*

ITC is looking at enabling a transformation of the agri eco-system from the conventional production-centric supply chains to demand-responsive value-chains anchored by market players. It is working with farmers to develop robust models for value-added segments, such as food-safe IPM (Integrated Pest Management) chillies, organic mango pulp traceable to farms, specialty coffee certified for fair trade, end-use specific wheat flours, 'medicinal and aromatic plant extracts' and so on. ITC proposes to foster inclusive agri value-chains through nearly 4,000 Farmer Producer Organisations (FPOs) benefitting around 10 million farmers across multiple crop clusters.[132]

In the next phase, while the existing e-Choupals and agri-extension programs of ITC will continue to exist, it will not be expanded any further as the company launched a new, fourth-tier mobile cloud ecosystem platform through a super app called ITCMAARS or Metamarket for Advanced Agriculture and Rural Services. ITCMAARS will carry forward the e-Choupal model and create a robust 'phygital' eco-system to deliver



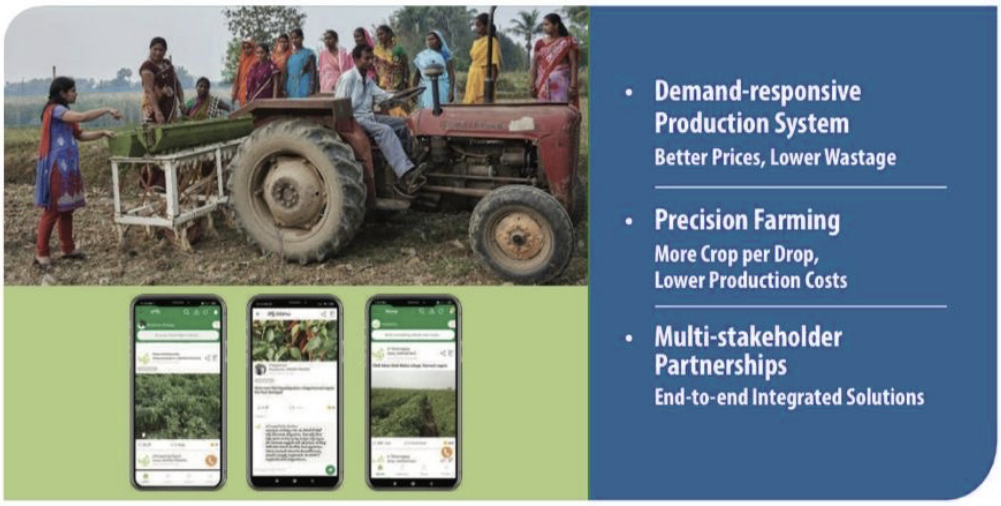



*Figure 23: ITCMAARS: Catalyzing NextGen Agriculture (Source: ITC Annual Report 2021)*

seamless customized solutions to farmers, anchored by FPOs. (See Figure 23.). The app has been launched in seven states with over 250,000 farmers grouped in 750-plus FPOs under six value chains – wheat, paddy, soya, maize, potato, and chilli.[133]

S. Sivakumar, who oversees the Agri and IT businesses of ITC, and is the brain behind the e-Choupal initiative, describes ITCMAARS as a platform that is "more collaborative and integrated than ever before by leveraging new digital technologies. It is also about providing end-to-end and personalised services to the farmers, for example, real time information on weather and markets, on-farm diagnostics, continuous crop monitoring for building weather resilience, agronomic advisory for improving productivity and quality, farm inputs and financial products to make agriculture a viable enterprise, besides access to remunerative output markets".[134]

In the case of ITCMAARS, alliancing is facilitated by plug-ins of a range of agtech solutions and startups, architected to offer a full complement of agricultural micro-services / solutions. S. Sivakumar notes: "We are refining the services of more than 20 startups at the moment. These startups will be able to use our platform for providing many services including location specific weather forecasts, crop advisory, quality testing of crops etc. to farmers."[135] This fourth-tier will enable two new aspects and enhance the capabilities of the e-Choupal ecosystem as a whole through co-innovation. First, by making digital as the default mode of interaction among the stakeholders, in as many situations as are relevant, a lot more data can be captured. Such data becomes the fuel to further personalize the scope of interaction leading to even better experiences and value co-creation opportunities, especially with “translation” of knowledge, learning, and insights together with stakeholders.[136] Second, it is far easier to enhance the patterning of X-verse ecosystem applications by extending the engagement to contexts of new environments such as skill-building and health care, and leveraging digitally enabled interfaces that augment a purely physical approach. In doing so, both developmental needs as well as business opportunities are addressed simultaneously at speed, scope, and scale. This, however, calls for a strategic “event-oriented” architecture that is relational but also functions like a “complex adaptive system” that recognizes patterns and interrelationships in engagements. Such a CARE (Complex Adaptive Relational Ecosystem) architecture entails supporting a wide variety of engagement

platforms, from supporting the procurement of crops, to selling a variety of product-service offerings to farmers, to incorporating the various partners using ITC's network. (See Figure 24.)

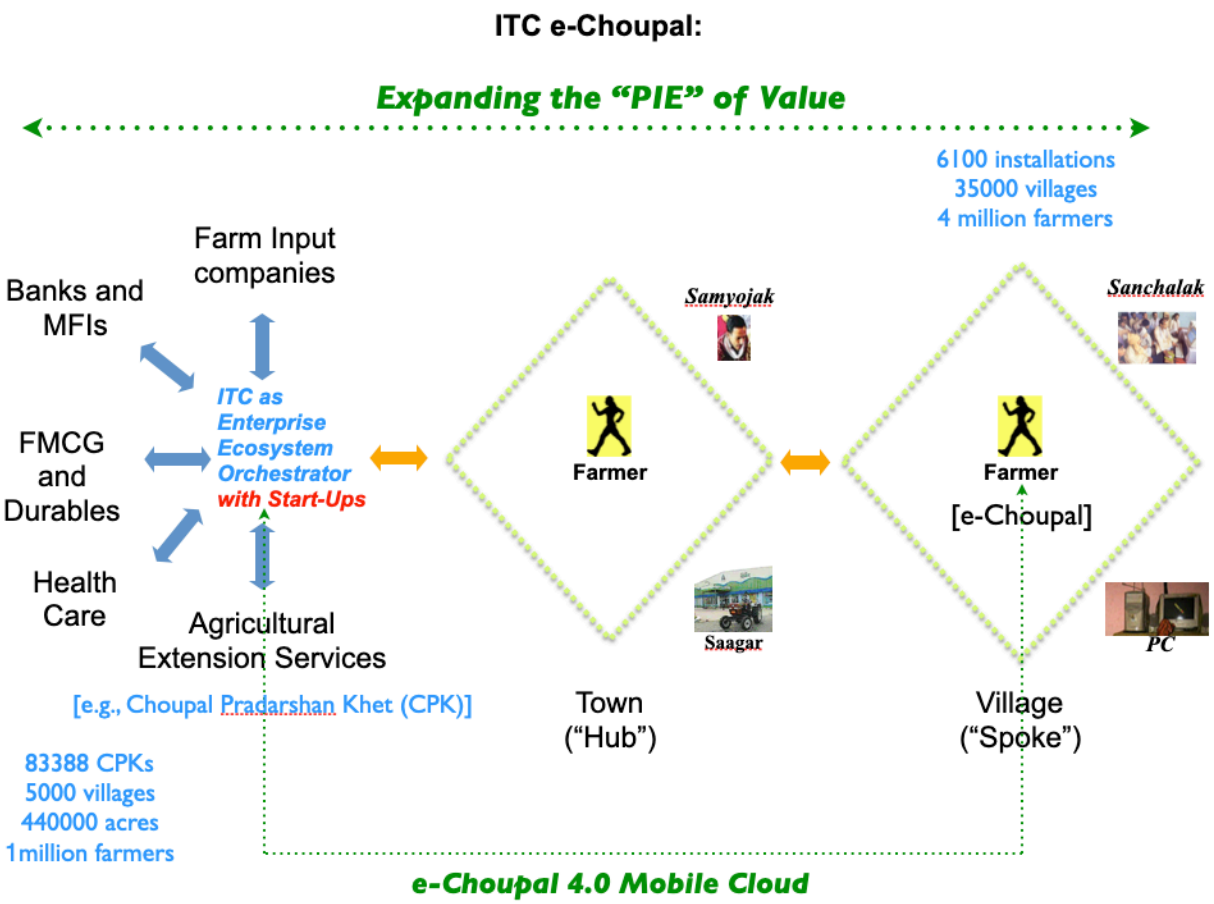



*Figure 24: Strategic architecture of ITC e-Choupal's relational X-ecosystem (Source: Venkat Ramaswamy and S. Sivakumar).*

Given the heterogeneity of individuals and offerings to be supported, the system has to be "event-based" recognizing the spatiotemporal context of the farmer on the one hand, while being generative and linking together those experience environments in the network to fulfill varying outcomes on demand. This requires connecting the R-SCIM levers of interactive agency with the R-GELI levers of interactive structures. The CARE architecture must be fluid enough to engage stakeholding farmers as both producer and consumer, and as insight giver and receiver. The same is true for stakeholding partners.

Strategic CARE architectures are central to X-verse innovation and value co-creation in achieving transformational scale and scope, i.e., a scaling up that recognizes the contextual involvement of each farmer's engagement in integrating resources that actualize valuable wellbeing-impacts that are unique to each farmer. It implies that value is enacted by each farmer together with ITC, in stark contrast to traditional enterprise thinking that implicitly assumes that value is already inherent in the goods and services delivered to the farmer. Instead, goods and services must be seen as a "starting point" for actualizing outcomes of value facilitated by ITC's strategic architecture, which are embodied in the "lived-journey" engagements and "lived-

experiences" of farmers. By implication, this means evolving a capability-based enterprise ecosystem whose scope is continuously refined (and re-defined) by a wide variety of intentionalities of farmer engagements, and being responsive to them through ongoing active, explicit dialogue with farmers, connecting with their lived experiences, and gaining a deeper understanding of what constitutes meaningful farming existence, both individually and collectively in communities.

CARE architectures also have to be flexible in accommodating changes easily in the network due to continuous changes in regulations and tax laws, especially as the concept of futures and options in the Indian commodities market is evolving. ITC also has had to integrate the rural distribution platform with its enterprise financial systems so management could improve decision making through real-time visibility of end-to-end financial implications of enterprise actions in its value chain.

Co-innovation of CARE architectures can, in general, be facilitated by four key "**PLAT**" levers of **P**atterning, **L**eading, **A**lliancing, and **T**ranslating, often applied in the following sequence:

***Alliancing*:** How might we enhance actor-network *alliancing* in co-innovation of X-verse ecosystems?

***Translating***: How might we enhance actor-network *translation* in co-innovating X-verse ecosystems?

***Patterning***: How might we enhance the *patterning* of X-verse ecosystems through co-innovation?

***Leading***: How might we enhance *leadership* in systemic ways in co-innovating X-verse ecosystems?

While Tier 4 of ITC e-Choupal is still in progress, collaborative leadership with alliancing partners is crucial to patterning ecosystem experience environments and resulting interactions. For instance, elaborating on the partnership with Bayer, S. Sivakumar notes that ITCMAARS "aims at providing on-demand crop advisory linked to products & services across the value chain. ITC's collaboration with Bayer will enable access to quality inputs by digitalizing the local marketplace eco-system for farmers. This will leverage Bayer's expertise in agri-inputs and ITC's deep-rooted linkages with farmers through the platform, thereby creating value and a brand of trust for the farmers." From Bayer's perspective, D. Narain, CEO & MD of Bayer CropScience Limited, notes, "At Bayer, we are looking at meaningful collaborations to create greater value for farmers and the entire agri eco-system. Bayer's partnership with ITC aims to offer tailored solutions, enabling farmers to achieve better harvests and progress to sustainable agriculture. We also plan to leverage ITC's extensive rural reach to create capacity building for adoption of greater product stewardship and traceability of produce."[137] Collaborative ecosystemic leadership requires system leaders that catalyze collective leadership and engage actors across boundaries through a disciplined stakeholder engagement process, which often entails ongoing experimentation, rapid learning, and iteration based on the patterning of actor-networked relations in the X-verse ecosystem.[138]

### *Leading the Agri X-verse Revolution*

By co-innovating with stakeholding individuals-as-experiencers-creators, ITC has moved farmers from

subsistence farming to profit-earning and improving their standard of living, which in turn has benefited ITC's enhanced partnership network in selling valuable goods and services. ITC Agri Business is seen by senior management as a strategic source of competitive advantage, a core capability that supports ITC's food businesses, which has been able to produce higher-quality products at competitive costs, thereby driving more sales. For instance, of ITC's agri-business division revenues of Rs 16,196 crore in 2021-22, internal sales for supplying commodities to the FMCG business was Rs 2,800 crore. ITC's Aashirvaad brand became one of India's largest-selling wheat flours within just two years of its launch, supported by identity preserved wheat sourcing. In other cases, ITC was able to create new markets where there was none – it launched ready-to-cook instant pasta at the very low price of Rs 15 for an 83-gram packet, when the only other similar product was an import, priced at Rs 85.

As an X-verse ecosystem platform orchestrator, there are also revenue gains from partner companies who pay commissions on all products and services sold through its Choupal Saagar retail platform and "Choupal Haat" physical platform engagements. Other ITC stakeholders too realize tremendous benefits, which in turn, brings value back to ITC through their continued engagements in the ITC enterprise ecosystem. Stakeholding individuals are excited about being able to participate in expanding their own wellbeing-impacts and that of their communities at large. ITC employees, who believe that they are transforming the lives of farmers and rural India at large, share in that excitement and are equally engaged. Building such a digitalized co-creational ecosystem implies continuously enhancing the wellbeing-impacts of all stakeholders while building new strategic capital (i.e., new sources of value co-creation advantage).[139] This requires not only continuously meshing the capacities of platform ecosystem components, but also connecting with and understanding how outcome experiences are valued by all stakeholding individuals, while managing risk-value relationships jointly.

ITC became one of the first companies of comparable dimensions that has been water positive for 20 years, creating more than 4 times water harvesting capacity than its consumption, carbon positive for 17 years, sequestering thrice the amount of carbon dioxide emitted by its operations, and solid waste recycling positive for 15 years. In 2021-22, ITC also achieved Plastic Neutrality.[140] To secure livelihoods for the stakeholder communities not just for today but also for the future, ITC's social investments, which support its business platform ecosystem architectures, has evolved with a two-pronged approach – "On the one hand, it seeks to make today's dominant sources of income sustainable by empowering rural communities to conserve and augment their social and environmental capital in order to secure agri production systems and thereby their current sources of livelihood. On the other hand, it aims at creating capabilities for income generation and employment for the future by helping the communities put in place the necessary socio-economic infrastructure to equip them to take advantage of emerging economic opportunities."[141]

For businesses to embrace SDGs successfully, a radically different approach to developmental interventions that traditionally have typically been designed as point solutions needs to be followed. While point solutions do make a difference, the impact is not felt with scale and scope and in a way that can transform lives and livelihoods through lived experiences, so as to generate enduring value in society and economy. For instance, to overcome individual farmers getting trapped in the tragedy of the commons requires a co-creational

platform-based approach. In this regard, ITC's Soil and Moisture Conservation initiative, is aimed at promoting local management of water resources by facilitating community-based participation in planning and executing watershed projects. Nearly 25,000 water harvesting structures have been constructed under this initiative, covering a total area of about 1,300,000 acres. To appreciate its scale, the area covered by interventions through the Soil and Moisture Conservation initiative is about 90 times the size of Central Park in Manhattan.

Although we have primarily focused in this section on the initiatives of ITC as a focal private sector enterprise from an agri-business standpoint, achieving SDGs nationally and globally requires multi-stakeholder coalitions across development sectors, wherein business leaders have to work closely with governmental organizations, nonprofits, and civic groups, together with consumers and citizens at large. ITC considers the Indian Union and State governments to be important stakeholders as they play a vital role in helping amplify its developmental impact, and supporting national goals, and global SDGs. For instance, as part of its collaborative initiative with NITI Aayog (India's public policy think tank) in 27 Aspirational Districts, ITC leveraged digital training platforms to enhance capacity of farmers during the pandemic – overall, 25 lakh farmers have been trained so far, raising farmer incomes by nearly 60% for select crops in the Kharif 2020 season.[142]

To further amplify wellbeing-impacts, ITC has established more than 84 Public Private Partnerships in areas like Water Stewardship, Sustainable Agriculture and Solid Waste Management. The Climate-Smart Agriculture initiative, aimed at building climate resilience of farmers, has covered over 4.5 lakh farmers across 8,000 villages. The Well-being Out of Waste (WOW) program, an end-to-end waste management initiative, currently reaches out to 5 million households, supporting livelihoods for nearly 17,000 waste collectors. The overarching aspiration of its Sustainability 2.0 initiative is to support livelihoods for 10 million people.[143]

### Becoming a Co-Creative 'Living' Enterprise in the X-verse

The two sets of BEST and PLAT levers of expansive design and co-innovation call attention to expanding both X-verse innovation of eXperience environments and sustainable developmental impacts of risk-managed value, together with stakeholders-as-experiencers-creators, through a strategic CARE architecture of life X-verse co-creation, as shown in Figure 25.

Life X-verse co-creation is about co-creating life experiences with individuals through the enactment of interactional creation via event-sensed flows of lived-journey engagements, mediated by interactive-platforms in life-eXperience ecosystems, engendering wellbeing-impacts.[144] In their bestselling *Harvard Business Review* article, "Building the Co-Creative Enterprise," Ramaswamy and Gouillart featured ITC as an illustrative example of a co-creative private sector enterprise, one that by giving all its stakeholders a bigger say, and engaging co-creatively with them, leads to better insights, revenues, with an enduring triple bottom line. Today, ITC is re-imagining the future in a post-digital, post-COVID world. As Sanjiv Puri, Chairman and Managing Director notes: "The challenges have today fast-tracked the need to build back better and

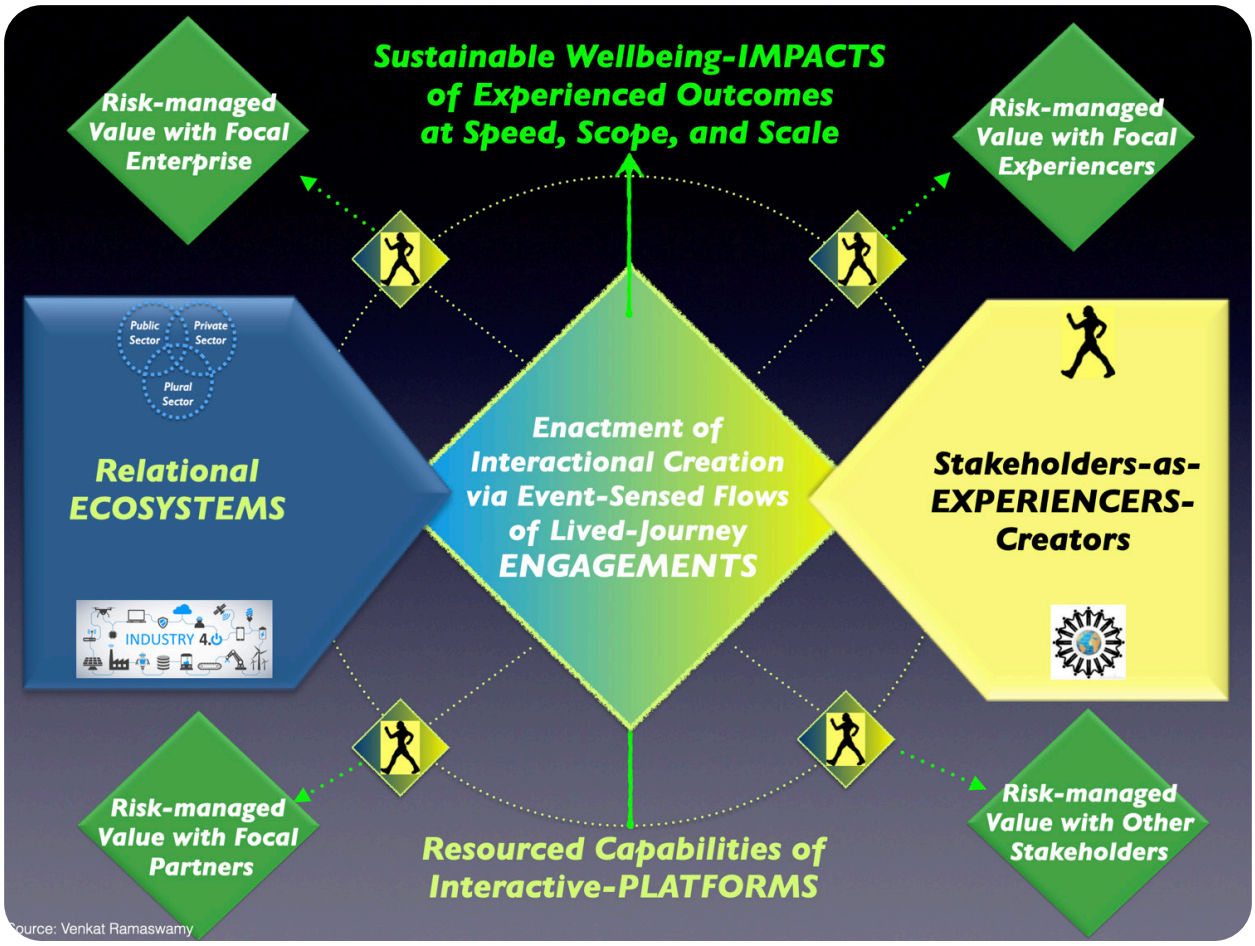



*Figure 25: Crafting a strategic architecture of life X-verse co-creation (Source: Venkat Ramaswamy)*

take urgent action to bequeath future generations a better tomorrow. The need of the hour is to craft new economic models that innovatively integrate environmental stewardship and livelihood generation as core outcomes. This calls for a new paradigm of Responsible Capitalism. Enterprises of tomorrow have to be not only agile, consumer centric and innovative, but also purpose-driven and responsibly competitive."[145]

Building on its remarkable journey of two and a half decades, ITC has now embraced an even more bold and ambitious Sustainability 2.0 vision and strategy, toward becoming a co-creative 'living' enterprise, one that connects deeply with the living systems of life experiences,[146] and the lives and livelihoods of people. One is reminded of a question posed by ecologist Stephan Harding, "What kind of economy is consistent with living inside a living being?", which inspired Marjorie Kelly in understanding that: "You start with life, with human life and the life of the planet, and ask, how do we generate the conditions for life's flourishing?"[147] Sanjiv Puri further notes that the goals envisaged in the Sustainability 2.0 vision "will further strengthen our multi-dimensional efforts to combat climate change, enable the transition to a net zero economy, work towards ensuring water security for all, restore biodiversity through adoption of nature- based solutions, create an effective circular economy for post- consumer packaging waste and scale up programmes that support sustainable livelihoods."

Co-creating engagement-based platform ecosystem solutions as a coalition of plural-private-public sector

partnerships together with served individuals as co-creators of wellbeing-impacts has the enormous potential to enhance transformational impact by synergizing joint creational capacities.[148] The broad challenge is to continue evolving its relational interactive X-verse ecosystem platforms with deeper insights through involvements of different types of stakeholding individuals, with unique needs, motivations, and desires for individual wellbeing, economic growth, and collective welfare, while taking advantage of technosocial advances in a digitalized impact economy for co-creating unique value with them. This requires seeing stakeholders as not only entities that are affected by (and affect) enterprises, but going further by seeing them as possessing creational capabilities harnessed through SDG-infused ecosystem platforms. To borrow from Neil Armstrong, a small step by SDG-facilitating actors in such ecosystem platforms would be a giant step toward co-creating a better future for all.[149]

# 6. Conclusion

## RETAIL & AGRI X-VERSE INNOVATION

**Applying the PIE X lens to digitalized supply chain, omnichannel commerce, brand, and farm experiences**

In this report, we built on the concepts of the eXperience-verse and the **PIE X** lens that we first introduced in our original report in the "Digital India Innovation and the Experience-verse Revolution" series. We explored retail and agri X-verse innovation and applied the PIE X lens to various digitalized supply chain, omnichannel commerce, brand, and farm experiences.

In section 2, Under retail X-verse, we started with an analysis of how Amazon has reimagined its customer and employee experiences. We then explored how Walmart leverages the power of its network of physical stores to manage the experiences of its various stakeholders. Next, we examined how Alibaba developed a "collaborative, and flourishing e-commerce ecosystem". At the core of its "smart business" model is the confluence of data, software mediation, API-driven interaction, and machine-learning for sense-making in real time. We then turned to India, to learn about its digital innovations, both public and private, in promoting digital commerce. Unlike the closed-loop e-commerce systems / platforms prevalent across the world, the Government of India has proposed the Open Network for Digital Commerce (ONDC) protocol in order to bring about population-scale inclusion in digital commerce, and connecting the digitally-excluded small retailers and consumers.

In section 3, we examined how organizations like NIKE, Starbucks and Naandi Foundation – Araku Originals are employing a purpose-driven approach to reimagining their brand experiences. Nike has set its goals around "people, play, and planet". Starbucks has proposed the concept of "experiential convenience" to reimagine its stores as the Third Place. Naandi Foundation is successfully experimenting with its "Arakunomics" model to reverse climate change while ensuring economic prosperity of farmer families. We also considered, in SAP Cloud for Sustainable Enterprises, an example of how cloud-service providers are creating digital platforms to support such purpose-driven organizations.

In section 4, under agri X-verse, we applied the PIEX lens to a variety of companies operating in the agri-sector (agri equipment, digital technology solutions-provider, agri producer) to discover how they are creating more value for all their stakeholders. John Deere has developed smart-connected farm offering ecosystems, that help connect farm machinery, irrigation systems and soil and nutrient sources with information on weather, crop prices, and commodity futures to optimize overall farm performance. Land O'Lakes, one of America's largest farmer-owned cooperatives, is collaborating with Microsoft to provide to enable its farmers make data-enhanced farming decisions, keeping mind both productivity and sustainability. We then examined the state of agriculture (and digital agriculture) in India. Unlike the ONDC initiative in retail earlier, or the digital healthcare initiative (ABDM – UHI) we explored in our earlier report on the Healthcare X-verse, there is no single, large scaled and scoped, unifying pan-India digital agriculture initiative. We studied how Amul, India's largest dairy cooperative, is transforming the experiences of its farmers and other stakeholders through its Cow-to-Consumer IT platform. We briefly explored two India agtech startups – Cropin and WayCool Foods.

In section 5, we studied in detail the evolution of ITC's, an Indian conglomerate with businesses in agriculture, food and other industries, e-Choupal initiative, in innovating farmer-centric experiences while delivering significant sustainable development impact. e-Choupal has seen four phases / tiers of growth – i) Offering

as an Engagement-based Platform, ii) extending the ITC e-Choupal X-verse Ecosystem;(iii) expanding Sustainable Developmental Impacts, and iv) Phygital X-verse Ecosystem Orchestration. ITC offers a shining example of how every enterprise must become a co-creative 'living' enterprise in the next generation of X-verse innovation and value co-creation. In the context of ITC's e-Choupal, we discussed two sets of risk-managed levers – R-BEST and R-PLAT, for the expanded design and co-innovation of X-verse ecosystems together with stakeholders-as-experiencers-creators.

In the next and final report in this series, we will examine in more detail how conventional enterprises can go beyond conventional industry practices of value creation, to become next generation co-creative living enterprises in the X-verse of the future.

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