

## **Six Major Changes in Science and Technology Reshaping the Retail Industry**





As the transformation of the retail industry deepens, consumers are now at the center of the entire industry ecosystem. To better meet consumer demand, widespread convergence and innovation have emerged in the retail market. Resource integration and business mode optimization enhance the overall performance of the value chain. Looking at attempts to transform the market, whether through omni-channel or intelligence-based management operations, retail innovation and transformation share the same basis, namely technologies, data, and analysis capabilities. Advances in technologies and analytical capabilities are giving participants in the retail market more opportunities and means to interact with consumers and more options to reshape the value chain. At the current stage of development of retail market technologies and applications, six major trends are emerging to reshape the industry:

- Full digitalization. Data will be a core resource in retail. Data helps companies better understand consumer demand and optimize the entire value chain. Technological advances such as cloud computing, the Internet of Things (IoT) and big data digitalize various aspects of retail, improve data generation, collection, storage, transfer, calculation, and analysis, pushing the entire industry towards full digitalization.

- Prevailing artificial intelligence (AI) technology. As data systems and algorithms develop, artificial intelligence technology is now more widely used in the retail industry. A large number of applications and solutions have emerged to meet the needs for offline store digitization and online consumer services. Meanwhile, many applications, including smart logistics and smart warehousing, are also penetrating into operations. The continuous development of technologies and algorithms will further promote the intelligent transformation of the retail industry, allowing intelligent applications to permeate throughout the sector.

- Deep integration. Complex consumer needs and scenarios and requirements for refined and highly-efficient operations management facilitate deep technological collaboration and integration, serving the needs of specific application scenarios. More practical integrated technology solutions will emerge to empower the entire retail industry.

- Application popularity. The continuous development of technologies and increasingly sophisticated applications further diversifies their application. More market participants will benefit from advances in science and technology that in turn will reshape people, products, and market. For example, the prevalence of technology gives consumers the

opportunity to participate in the manufacturing process itself.

- Lower cost, better efficiency. Emerging technologies, such as cloud computing, are centered around renting, on-demand, and charge-by-byte. Their computing capabilities and devices are used as public infrastructure. Therefore, market participants can acquire data cost-effectively and quickly by using cloud computing technologies. In turn, cost reduction, time efficiency and labor savings will improve overall efficiency. New technologies such as AI also play an important role in increasing efficiency and lowering costs in the retail business.

- Accelerated fusion. Technological advances not only empower companies, but also reconstruct resource use and management and drive deep online and offline integration. They also boost corporate organizational transformation by reshaping fragmented structures in a consumer-oriented manner.

# Chapter 1 The Core Driver of Retail Transformation — Digitization

**Digitization is an important driving force for the retail industry to enter a period of transition and integration.**

As the transformation of the retail industry deepens, a consumer-centric philosophy has become the core concept when it comes to developing the retail market. Extensive integration and innovation are introduced to better connect with, gain insight into and serve consumers. Market participants have made numerous attempts at channel integration, service mode innovation, and optimization of traditional value chains. The rapid development of retail technologies and gradual improvement of data systems have become the drivers of change. Looking at retail enterprises' ongoing efforts to transform, whether through omni-channel or intelligence-based management operation, retail innovation and transformation share the same basis,

namely technologies, data and analysis capabilities. Technological advances and analytical capabilities are giving participants in the retail market more opportunities and means of interacting with consumers and more options to reshape the value chain. As retail technologies become increasingly sophisticated, more integrated technology solutions will become commercially available, and the widespread empowerment of technologies in the retail industry will become more evident.

**Retail enterprises have just begun their digitization journey, indicating broad room for future development.**

According to a survey by Deloitte and the China Association of Chain Stores on the maturity of digital transformation among Chinese retail companies, Chinese retail enterprises are still in the early stages of digitization and practical application.

China's maturity score is 2.9 points, showing Chinese companies still have a long way to go before reaching the smart stage of "Targeted advertising, always online". The scores given to different survey areas indicate that digital capabilities vary in degree of development. Supply chain, commodities and services, and platform operations lag behind, while leadership and change management, omni-channel touch points and content distribution, as well as core processes are developing rapidly. The early development stage and capability imbalance provide broad scope for retail technology application and empowerment.

**Figure 1 Retail company digitalization stages and average score in maturity model assessment**

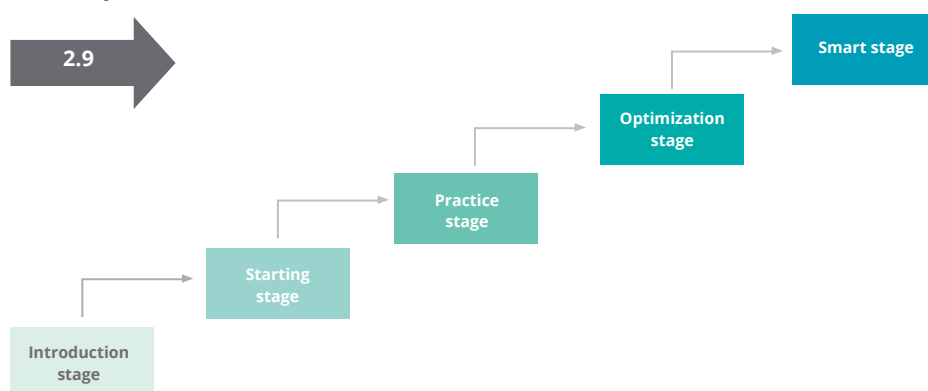
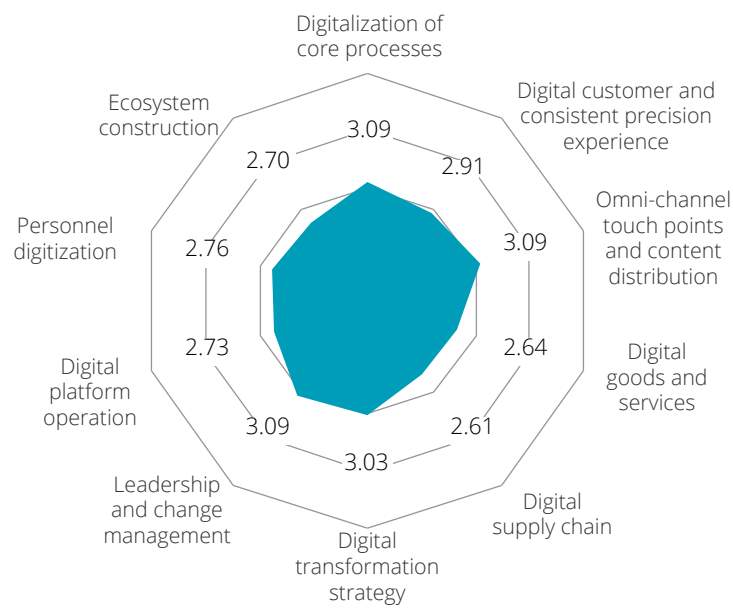




Figure 2 Average score on 10 abilities among survey participants



Source: Deloitte & CCFA Assessment Report on Digital Transformation Maturity of China's Retail Enterprises

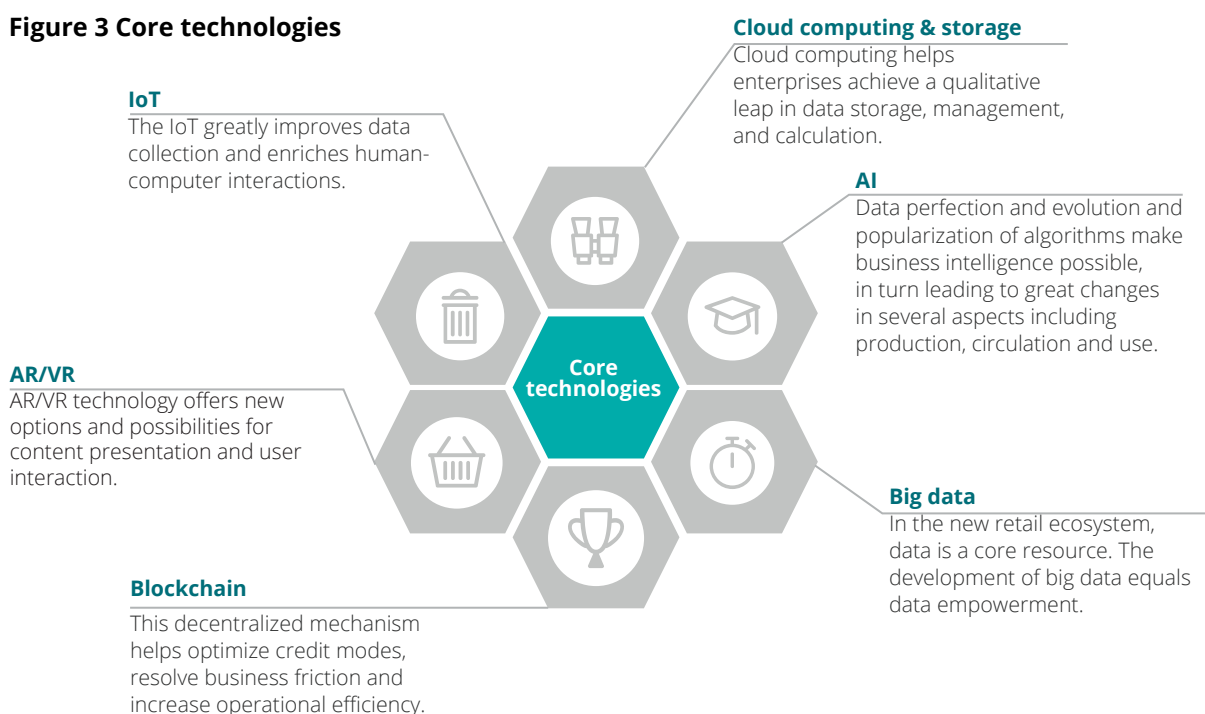


# Chapter 2 Technological Advances Reshaping Business

Scientific and technological advancement is the core driver business transformation and the basis for digital transformation in the retail industry. Core factors such as computing, algorithms, and data have developed quickly over the past few years. They have promoted the evolution and iteration of

key technologies such as cloud computing, big data, and AI, and enabled technology fusion in multiple industries as the focus of innovation and changes shifts to customer demand and application scenarios. This is extending and deepening technology's impact on commercial society and redefining business modes.

**Figure 3 Core technologies**



Source: Deloitte Research

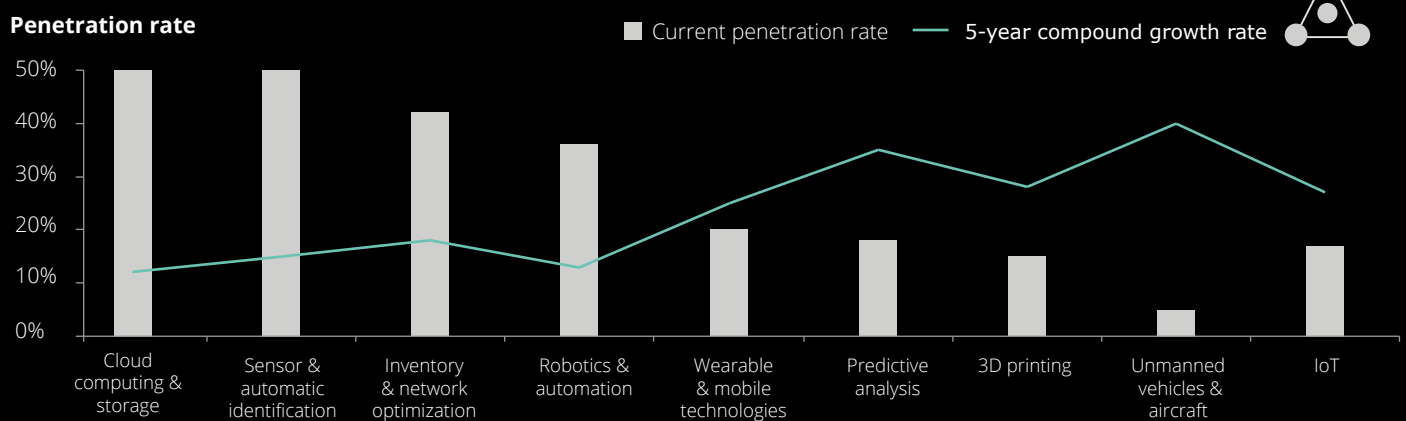
According to the Ali Research Institute, around 2020, there is expected to be an explosion in several new technologies. The impact of technologies such as large-scale machine learning, intelligent networking, 5G and natural human-computer interaction on the retail sector is particularly worthy of attention. According to a global corporate survey conducted by Deloitte and MHI, technologies such as cloud computing and storage, sensors and automatic identification, inventory and network optimization, as well as robotics and automation have been widely recognized and used worldwide and become an important driving force for enterprise optimization and innovation. Emerging technologies such as wearable and mobile devices, predictive analysis, 3D printing, IoT,

and unmanned driving will see rapid growth and wide application over the next five years.

The concentrated development and integration of science and technology will inevitably herald a series of changes at the front end (interactive level), middle end (operational level) and back end (basic level). The application and popularization of technologies such as machine intelligence, human-computer interaction, unmanned driving, and VR/AR will bring interactive innovation and intelligent experience to the front end. The application of science and technology including big data processing, cloud computing and large-scale machine

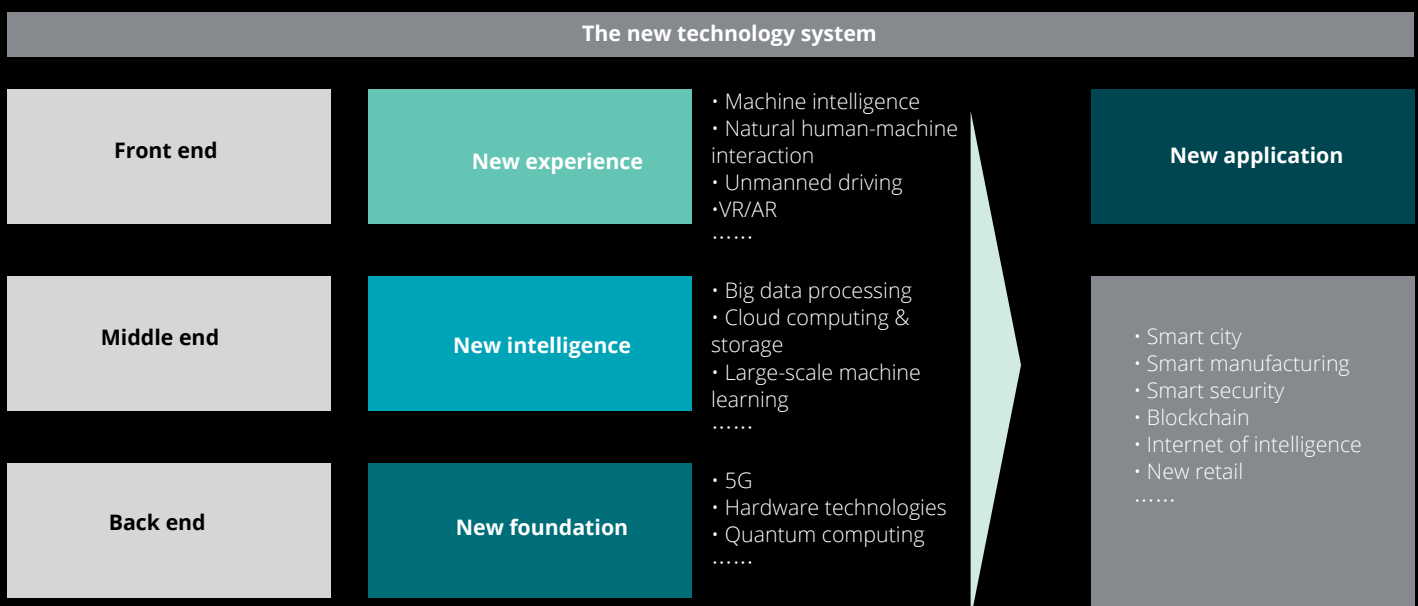
learning at the middle end will promote intelligent upgrading of the entire industry chain, enabling gradual realization of data empowerment. The development of underlying technologies that are progressing with overall technological development, such as hardware technologies (AI chips) and communication technologies (5G) empowers upper-level technologies and together they will form a new technology system applicable in a variety of scenarios.

**Figure 4 Technology penetration rate and compound growth rate in the next 5 years**



Source: Deloitte Research

**Figure 5 New technology system**



Source: Ali Research Institute and Deloitte Research

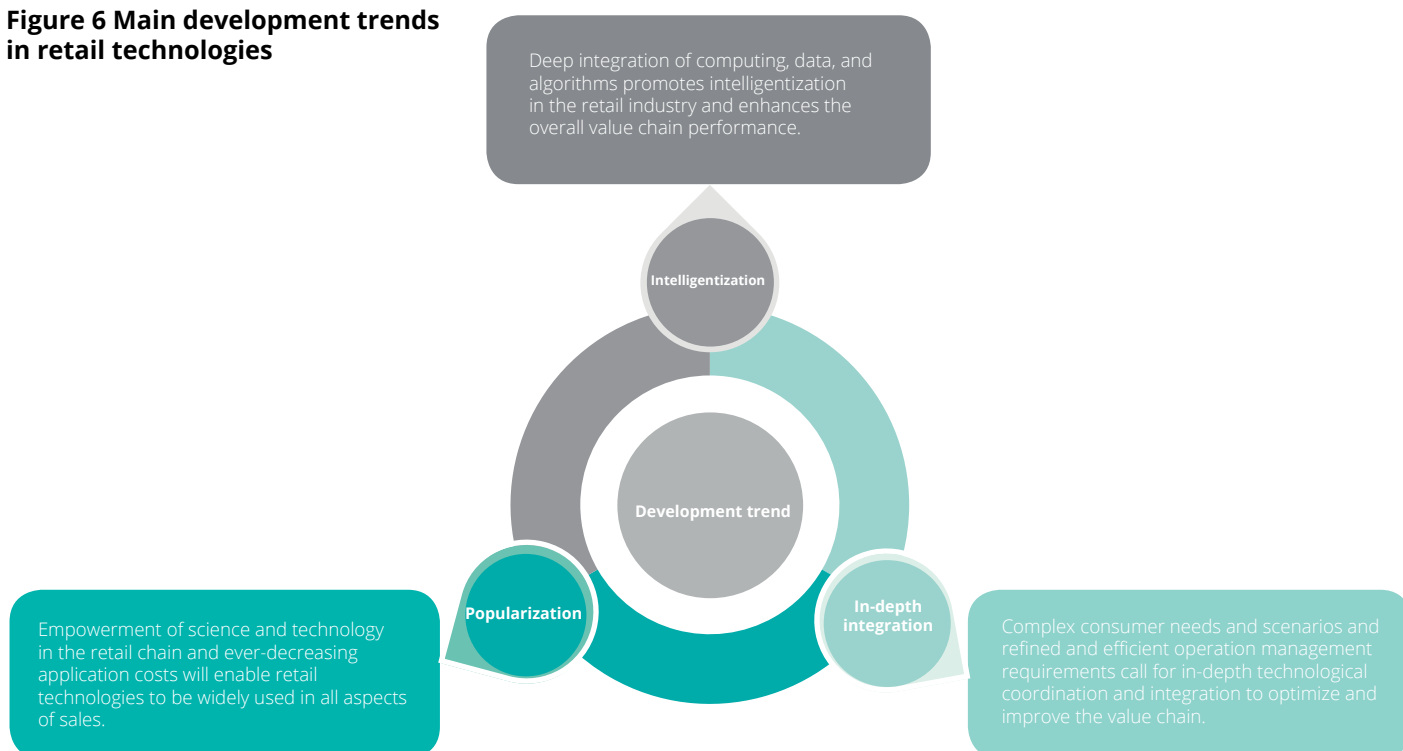
# Chapter 3 Technology-driven Retail Transformation

In the new consumer-centric ecosystem, how best to interface and interact with consumers and meet their needs in an accurate, timely, and efficient manner is a core challenge for retail businesses in the market. In the general trend of transformation and integration of the retail industry, advances in science

and technology are offering market participants more effective means to satisfy consumer demand and improve operational efficiency. The deepening integration of core technologies into the retail industry, with data, algorithms, and computing capabilities as key elements, has led to the emergence of an increasing

number of practical and targeted retail technologies, and made the digital transformation of the retail industry more intelligent, popular, and deeply ingrained.

**Figure 6 Main development trends in retail technologies**



Source: Deloitte Research



There are many kinds of participant in the retail technology market. Online retailers, technology enterprises and traditional retailers tap into their distinct resources and technical characteristics to promote the retail technology market. Leading online retail enterprises such as Alibaba have accumulated technical strengths and resources through years of development, and have invested heavily in the development of science and technology.

Their technological capabilities cover almost all the major core technologies. In the consumer-centric ecology, enterprises are expected to become service delivery platforms for retail technologies thanks to their industry penetration and technological capabilities, a trend that will drive growth in retail industry. Technology enterprises, which have laid technological foundations or have made breakthroughs

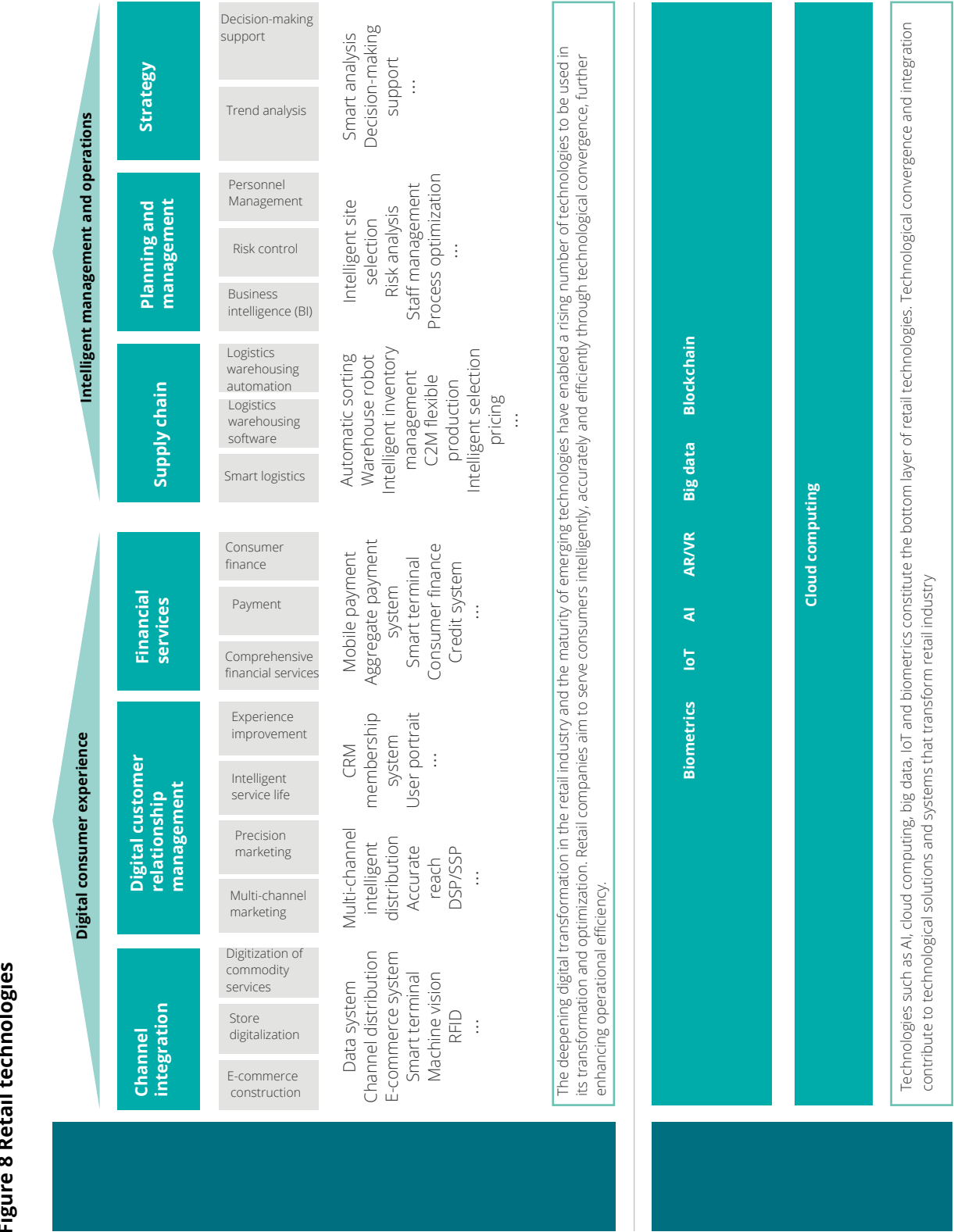
in frontier technologies, and are important promoters of technological development. They are optimizing and improving technologies to adapt them to the retail industry, promoting the development of science and technology.

**Figure 7 Main participants in the retail technology market**

Main participants in the retail technology market					
Main participants	Online retail enterprises	Internet technology enterprises	Traditional retail enterprises	Traditional technology enterprises	Emerging technology enterprises
	Representatives: Alibaba Amazon .....	Representatives: Tencent Baidu Google .....	Representatives: Suning Gome Walmart .....	Representatives: Microsoft Oracle SAP .....	Representatives: DeepBlue Technology Heading Technology Megvii .....
Development focus and characteristics	Relying on strong technical capabilities and resources, extensive layout in the retail industry the main driving force.	Take advantage of technological strengths and resources accumulated in other fields to enter the retail technology segment, and promote the development of core technologies.	Explore omni-channel and supply chain technologies based on offline resources and business characteristics.	Rely on the long-established technological foundation, and focus on basic technological innovation and services.	Pioneers and promoters of the development of retail technologies that focus on the exploration of a few core technologies and deepen exploration of subdivisions.

Source: Deloitte Research

Retail technologies are developed and applied with a focus on digital omni-channel experience and intelligent management. The purpose is to enhance resource operation and coordination in the industry chain while better reaching, interacting with and serving consumers, enhancing performance of the value chain.



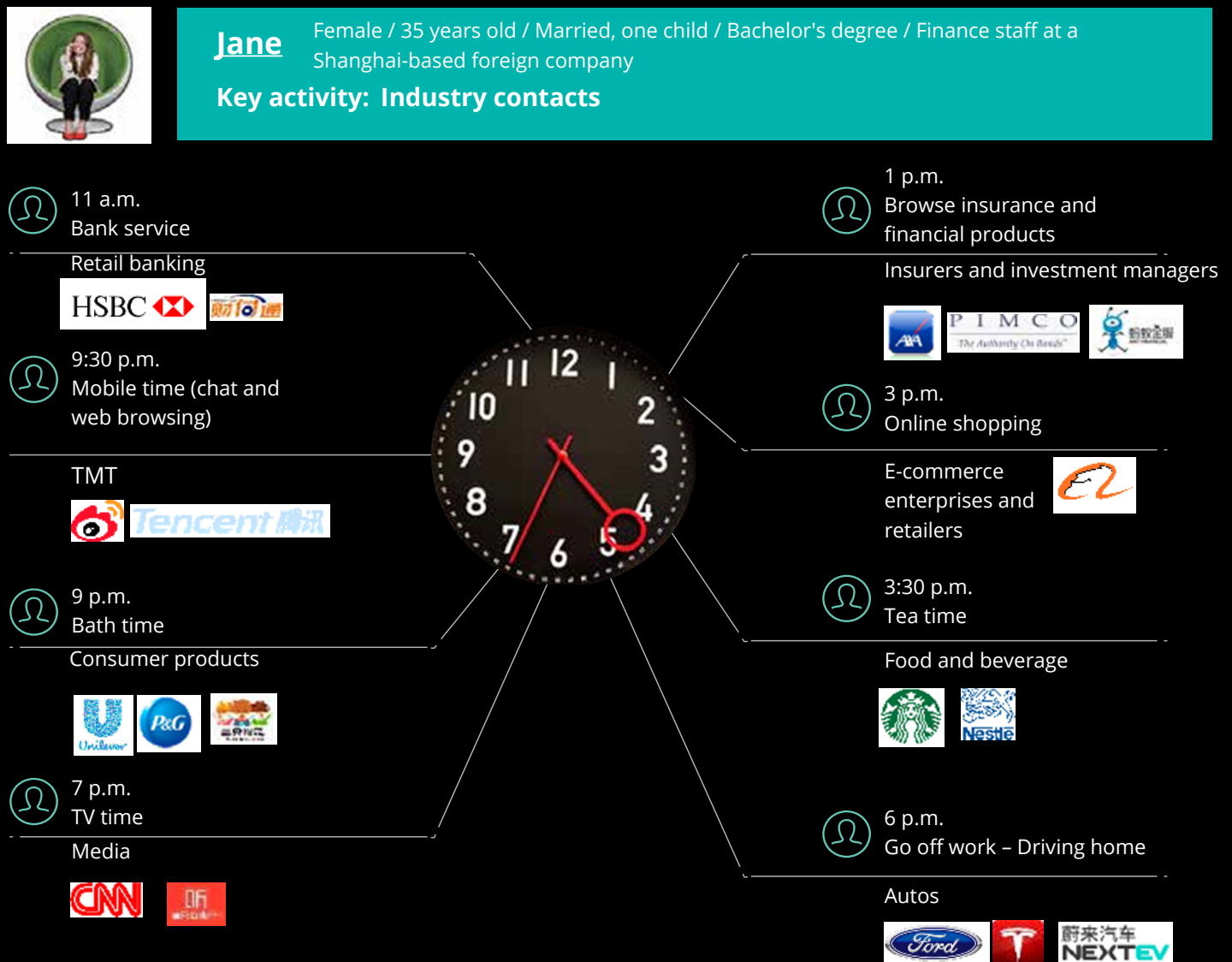
**Digital consumer experience**

Retail is no longer confined to traditional scenarios and categories. Future competition will be a battle for people and time, and the time consumers spend on a particular product or service in their daily

lives will be an important criterion when valuing market participants. Tencent's WeChat now accounts for nearly 30% of Chinese mobile phone users' time, and Alibaba is also taking more consumer time by increasing investment in social

media and cultural entertainment. Market participants establish multi-dimensional relationship with consumers by taking more consumer time and creating consumer portraits as well as providing personalized goods and services by collecting data, thereby maximizing consumer satisfaction.

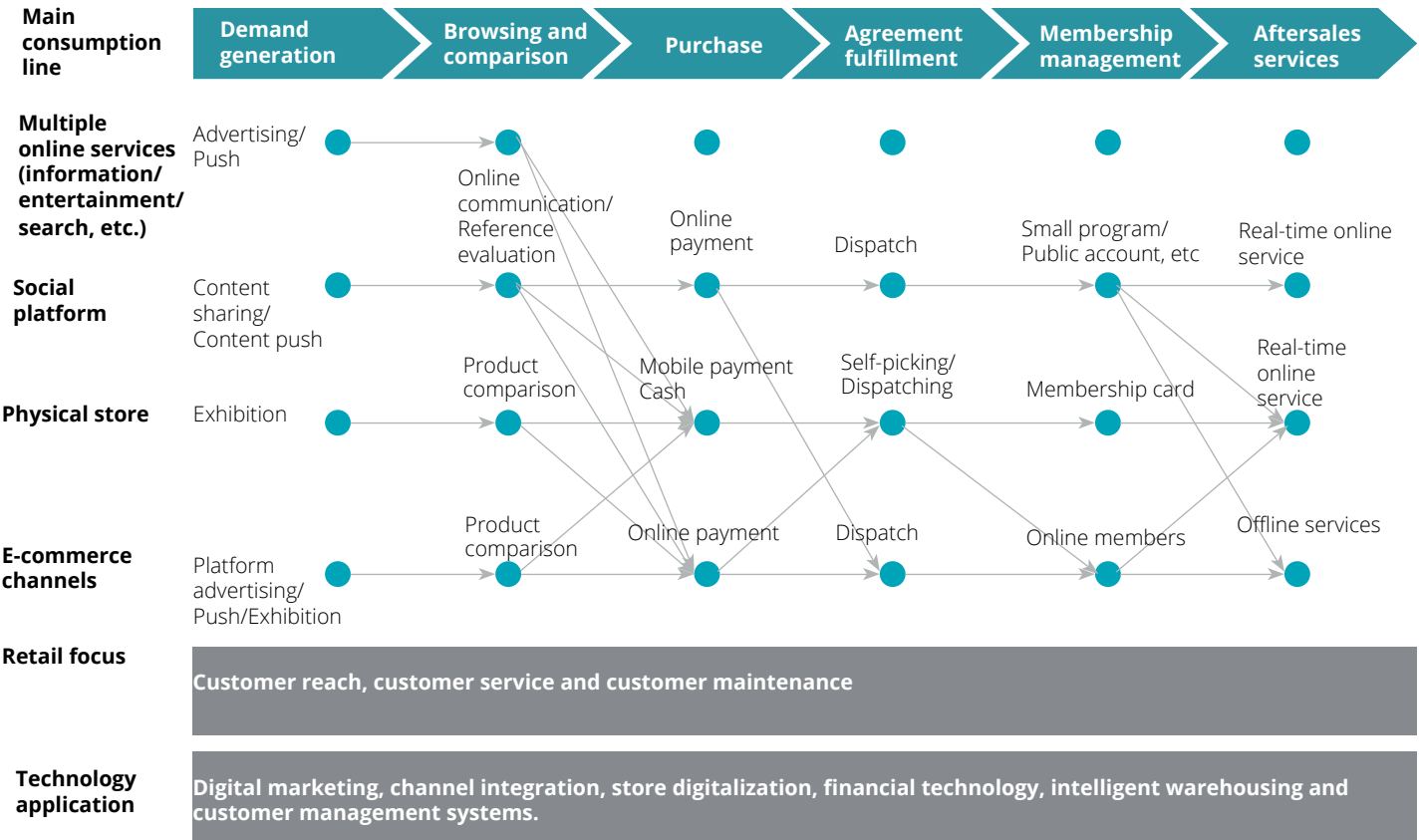
**Figure 9 The shape of future retail**



Source: Deloitte "Future Retail" Series

Technological advances have played a crucial role in the battle for consumers' attention. In an unprecedented digital environment, real life and digital life have been integrated due to consumers' reliance on mobile terminals. Since the advent of consumer demand, people's lives have been affected by a variety of online services and online channels. As purchasing behaviors continue to develop, consumers' route to buying becomes more diversified, and online and offline activities embrace closer interaction and collaboration. To better reach and serve consumers at each node, market participants require new tools and methods to grasp consumer trends and needs in a digital environment. The rapid development of retail technologies makes it possible to achieve this goal more efficiently and cost-effectively.

Figure 10 The consumption line and technology applications



Source: Deloitte Research

### Digital customer relationship management

In addition to traditional physical stores, e-commerce and diversified online services and applications have become important consumer contact points and portals, and increasingly take on front-end marketing roles. Digital channels and contacts also require market participants to unify online and offline resources, and store, aggregate, and analyze multidimensional data to improve performance. Considering market development trends and application requirements, digital customer relationship management centered on consumers is a clear trend in retail market development. In a digital environment, digital customer relationship management includes full life cycle management from digital marketing to loyalty management. The development of digital technologies such as big data and cloud computing enables the recording and analysis of data on consumer behaviors throughout the life cycle, and its use to optimize consumer management.

To meet the needs of different elements of customer relationship management, a series of applications has emerged in the retail technology market. These include not only basic software applications, but also a large number of integrated applications

based on core technologies, such as user portrait analysis and precision marketing based on big data, resolving the various needs of retailers and brand merchants in retail markets. The leading Internet companies, Alibaba and Tencent, are actively integrating and using resources in the process of building an ecosystem for the industry. They aim to establish a system for the transfer and application of data through data opening, connection, and application, enabling user management.

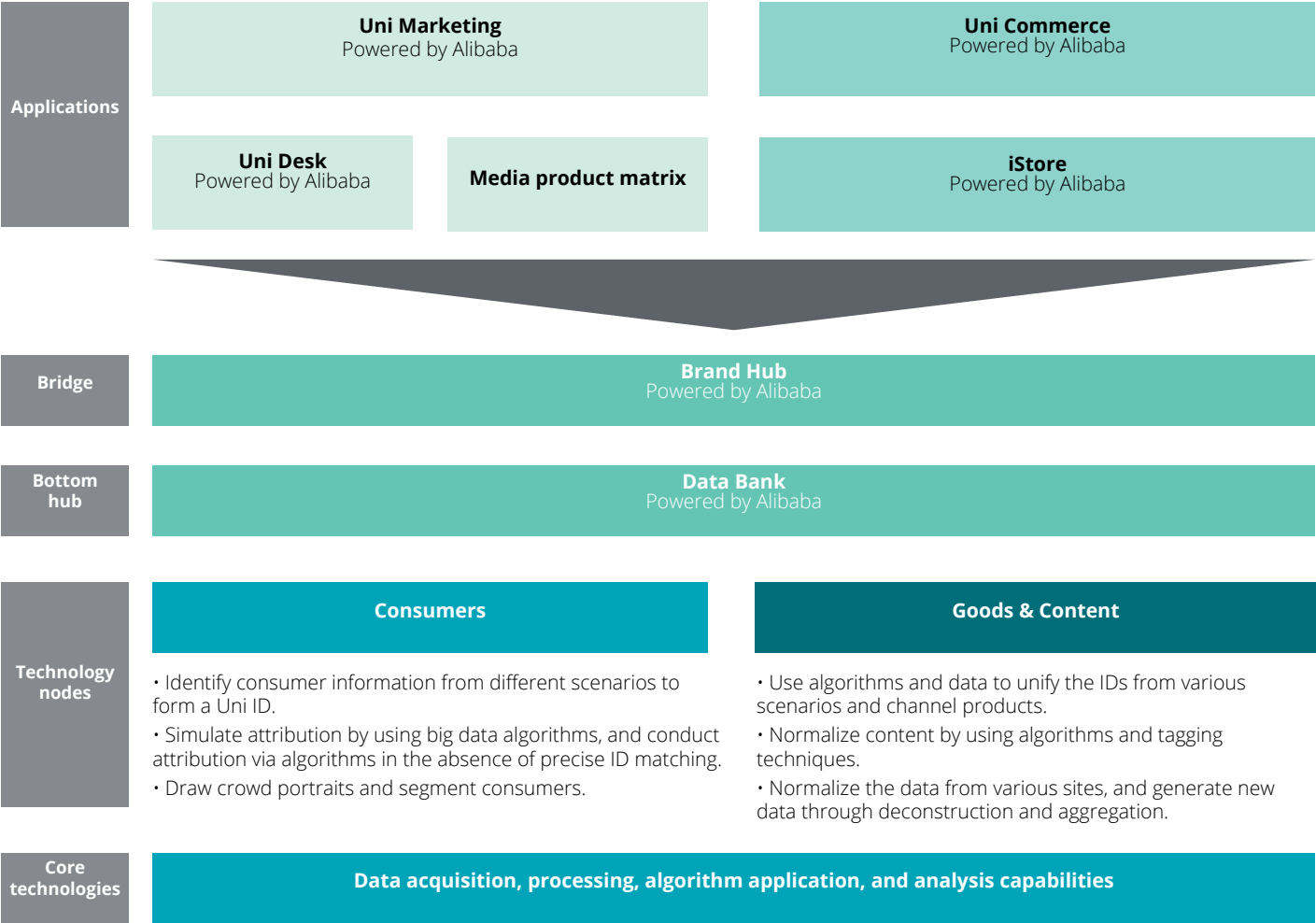
Alibaba, for example, released its global marketing methodology in November, 2016. In 2017, it successfully launched a product matrix for brands and agents, which maintains, deepens, and touches the relationship between brands and consumers and effectively manages digital brand consumer relationships. This global marketing system uses a consumer-centric full-link, full-media, full-data, and omni-channel approach, using data as its resource and means, with data banking as its bottom hub. As the bottom hub of the global marketing and global operations system, the data bank is effectively consumer data asset management center. While empowering front-end products and services, it also precipitates all marketing and operational activities, thereby embodying the application of core technologies including data technology and algorithms. To optimize global marketing and global operations, the core technology applications of the data bank have two main aspects:

- **Consumers.** Consumer-side technology applications have three main elements: using data and algorithms to link and attribute consumer IDs from different stages, channels and products to form the consumer's Uni ID; in the absence of accurate ID matching, using algorithms to simulate attributions; and using crowd portraits to segment people and generate consumer insights.

- **Goods and content.** The technical application of goods and content also has three main aspects: using algorithms and data to unify the product IDs of different scenarios and channels; using algorithms and tagging technology to normalize online content; normalizing, deconstructing and aggregating data from different fields to form new outputs.



Figure 11 Global marketing system



Source: Ali Research Institute and Deloitte Research

With the help of the global marketing system and data bank, brand owners can gain a systematic and continuous awareness of online and offline consumers, and provide targeted services. From the perspective of consumer reach, Alibaba's resources fully cover consumers' daily lives and work, including e-commerce consumption represented by Taobao, Tmall, Juhuasuan and Koubei, video players such as Youku and Tudou, social media, e.g. Sina Weibo, Momo and DingTalk, and information and search services represented by UC and Gaode. This also means that from the point of view of media delivery, the super-media matrix with access to Uni ID can enable brand marketing to influence consumers in different media and gradually cover and reach more consumers as the media grows.

**Friso Care** is a good example. As the Friso Care media agency, Kailuo media under China Unicom Angis is fully involved in the Uni-marketing product system and its uses Uni Desk for media delivery management. To reach more potential consumers, Friso Care is not limited to Taobao. Instead, it uses Alibaba's big data system to identify and reach more target consumers and uses Uni Desk for delivery and evaluation. By using Uni ID, it screened potential consumers and fully leveraged the global marketing product and service portfolio to launch the new Frisomum. Through continuous marketing efforts, the total number of consumers has increased by a factor of 3.8, and its number of target consumers has risen 1.5-fold.

### Channel integration

Channel integration is another concept related to consumer paths. Because online and offline channels are no longer separate, online and offline resources and consumers, namely, people, goods, and sites, must be managed in an integrated manner to achieve optimal allocation of resources and further serve consumers. Technological advances in data management and applications have given market participants more approaches to digitalized consumer relationship management. In terms of channel integration, the data flow not only needs to be open and flowing in real time, but also

the data needs to be physically collected and organized. Due to its different genes, online commerce has inherent advantages in digitalization. However, physical retailing is still at the start and trial stage. Technologies such as IoT, artificial intelligence, and mobile payment provide strong support for offline digitization and better options to optimize customer's experience.

The digitalization of stores is instructive here. The digitalization of stores, as an important step in the integration of online and offline channels, has become an important application of retail technologies. Currently, market participants' attempts include RFID-enabled products, IoT technology-based inductive devices in stores, consumer behavior capture through machine vision, and interactions with consumers through smart devices. These attempts enhance the availability and richness of offline data, and improve consumers' shopping experience at specific points.

In September 2015, **Casio** experienced a sales decline in China. To increase sales, Casio China's largest retailer, Broker, set up a professional e-commerce team and achieved monthly sales of more than one million units within 12 months. To further realize the omni-channel integration online and offline, Casio and Tmall launched the world's first omni-channel smart store to interact with consumers through electronic screens in November 2016. The Smart Shop 2.0 launched in 2017 enables the company to extend from its product, service, and membership channels to the goods, order, terminal, and finance channels, providing an "all-time, all-site, all-goods, and all-channel" shopping experience for customers and achieving online and offline integration. It also provides a new shopping experience through somatosensory interaction and multiple payment modes.

**Mark Fairwhale** launched its first smart store in June 2017. All goods in the store are digitalized with embedded RFID tags, allowing consumers to try different clothes without actually wearing them using a smart screen, which helps boost customer traffic and related sales. A similar technology is AR "mirror", which relies on augmented reality technology to help consumers see the

simulated visual effects of different cosmetic products including lipsticks. This technology helps save physical retail space.

For international coffee giant **Starbucks**, continuously improving the consumer experience is the core goal of its development. To achieve this, Starbucks has made a series of digital innovations in China. These milestones include: In 2011, the Galaxy V1.0 was launched, and the Star Alliance Club officially opened in the Chinese direct market; in 2014, the first version of the mobile phone app was launched, providing membership registration, inquiries, and store lookups; in 2015, the third version of the app was launched, supporting dynamic QR codes, and the Tmall flagship store was opened, selling e-gift cards; in 2016, the fourth version of the app was launched, supporting mobile payment, dynamic QR code payment, and gift card purchase and recharge over mobile phone; in 2017, the WeChat public account "Say It with Starbucks" was launched, the fifth version of the app was launched, and offline digital shop "Baking Workshop" opened, continuously enhancing consumers' omni-channel shopping experience. Here we will use "Say It with Starbucks" and Shanghai Baking Workshop as examples:

- "Say It with Starbucks" was launched in 2017 as Starbucks' digital social gift experience service on WeChat. It aims to rapidly convey consumers' thoughts through digital gift cards and interpret the emotional connotations of "Starbucks" in the digital age. Six months after its launch, it achieved rapid iteration, by rolling out a total of 196 card designs, each with a distinct style. The cards are updated almost weekly to meet the needs of different times, occasions, and festivals. In addition, data suggests it takes less than one minute to give out a "Say It with Starbucks" gift, a concept that fully embodies the original intention that anyone should be able to express feelings at any moment through one small action.

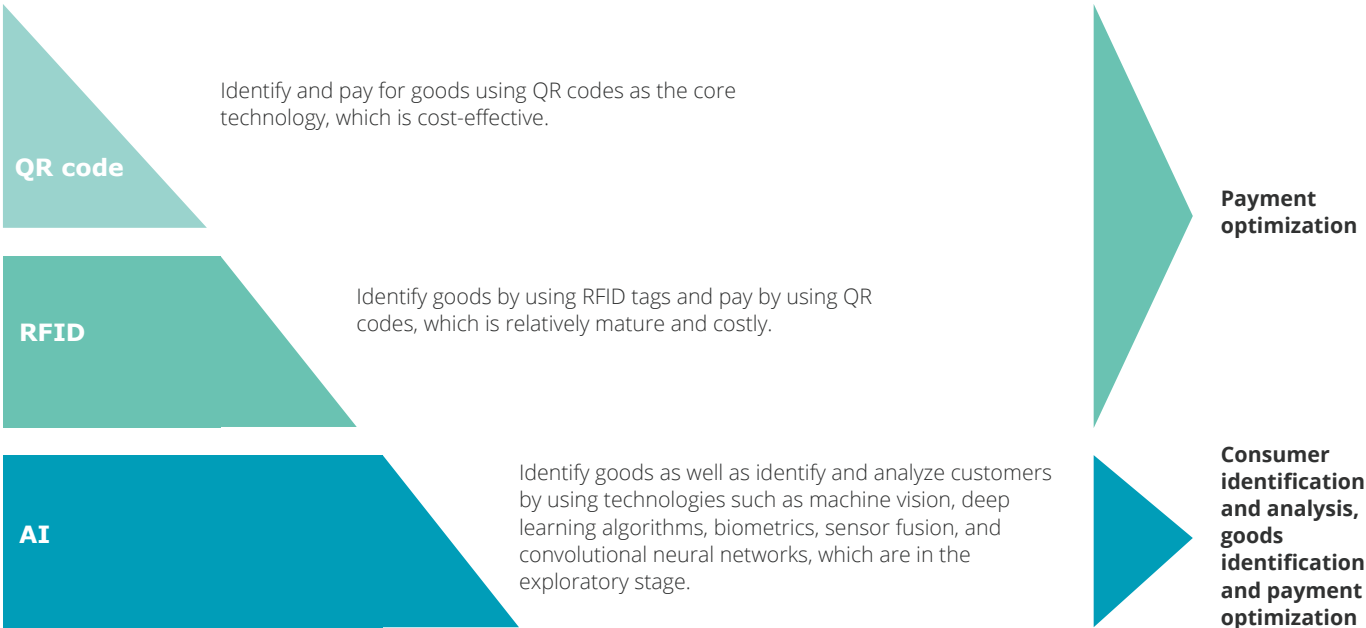
• The high-profile Baking Workshop is another important application-driven digital innovation by Starbucks. Consumers can explore and mark digital menus through electronic maps; omnidirectional ordering allows consumers to place orders and pay at any location in the store; the offline shop and online Tmall Store are interactive, allowing consumers to place orders in the store and choose self-pick up or dispatch; consumers receive mobile notifications after receiving a beverage and can apply for e-invoices on the same page; AR technology allows consumers to watch the workshop including the whole process of coffee roasting, production, and cooking on a mobile phone. The digital store experience is supported by more than 20 digital systems. Seamless system interaction and rapid data exchange

create a fresh shopping experience for consumers.

Currently, unattended retail is one of the hottest attempts at channel integration and also the epitome of technology use cases. The existing unattended retail formats include unattended shelves, unattended vending machines and containers, and unattended shops. Unattended retail can serve office workers within 20 meters and mobile workers in public places such as airports, subways, and hospitals. Reducing labor costs, improving operating efficiency, as well as providing last-mile solutions and new experiences are all important goals for the development of unattended retail. Technological advancement as an external driver of development. The use of technologies realizes innovation in

retail scenarios, data collection, analysis, and application in various ways, and data-driven consumption in an all-around way. We expect the development of unattended retail to promote the further commercialization and popularization of technologies in some areas. It can be used more simply and cost-effectively by a large number of retailers to optimize offline consumption and promote digital upgrading of offline retail.

Figure 12 Development and application of unattended retail technologies



Source: IResearch and Deloitte Research

Currently, technologies driving the development of unattended retailing mainly include QR code-based mobile payment, RFID, as well as AI-related machine vision and deep learning. Judging from the current technological developments, small unattended retail formats based on QR codes and RFID are the mainstream, and the technology is relatively mature. It mainly realizes payment optimization and promotion, making it convenient for consumers to purchase quickly. With the development of technologies such as AI, unattended retail will be more diversified and intelligent, capabilities such as consumer identification and analysis and goods identification will be further enhanced, consumption will be fully digitalized, and channel integration will be deepened.

After it was revealed in 2016, Amazon Go was officially launched in January 2018. Consumers use the Amazon Go app to scan a QR code at the entrance of a store to enter that store. The scan allows the access control system to identify consumers. As consumers shop in the store, cameras, microphones, and sensors in every corner of the store keep track of consumers' movements. When a consumer removes a product from a shelf, the system automatically adds it to a virtual shopping cart and automatically deducts the fee from the consumer's Amazon account 5–10 minutes after they leave the store. The "Just Walk Out" concept could not be achieved without the application of retail technologies. Amazon Go's primary recognition technology is Amazon Recognition, and its hardware includes cameras, microphones, infrared sensors, pressure sensors and load sensors. Its technologies are similar to those in driverless cars, including computer vision, deep learning and sensor fusion. To identify consumers accurately, Amazon Go uses not only

**Figure 13 A new era of consumer interaction**



Source: Deloitte New Road to Retail Transformation and Upgrade of Traditional Brand Enterprises

machine vision technologies, such as consumer characteristic and gesture identification, but also devices such as shelf gravity sensors, infrared light sensors, sound receivers and wireless signal transmitters. In general, Amazon Go achieves a pleasant shopping experience. It may not be perfect, but represents a major technological breakthrough and is the epitome of retail technologies in real use. In the short term, the Amazon Go mode might not be replicated for cost and technical reasons, but its technologies empower transformation and optimization of the retail industry as well as drive efforts to optimize consumer experience and enhance corporate performance.

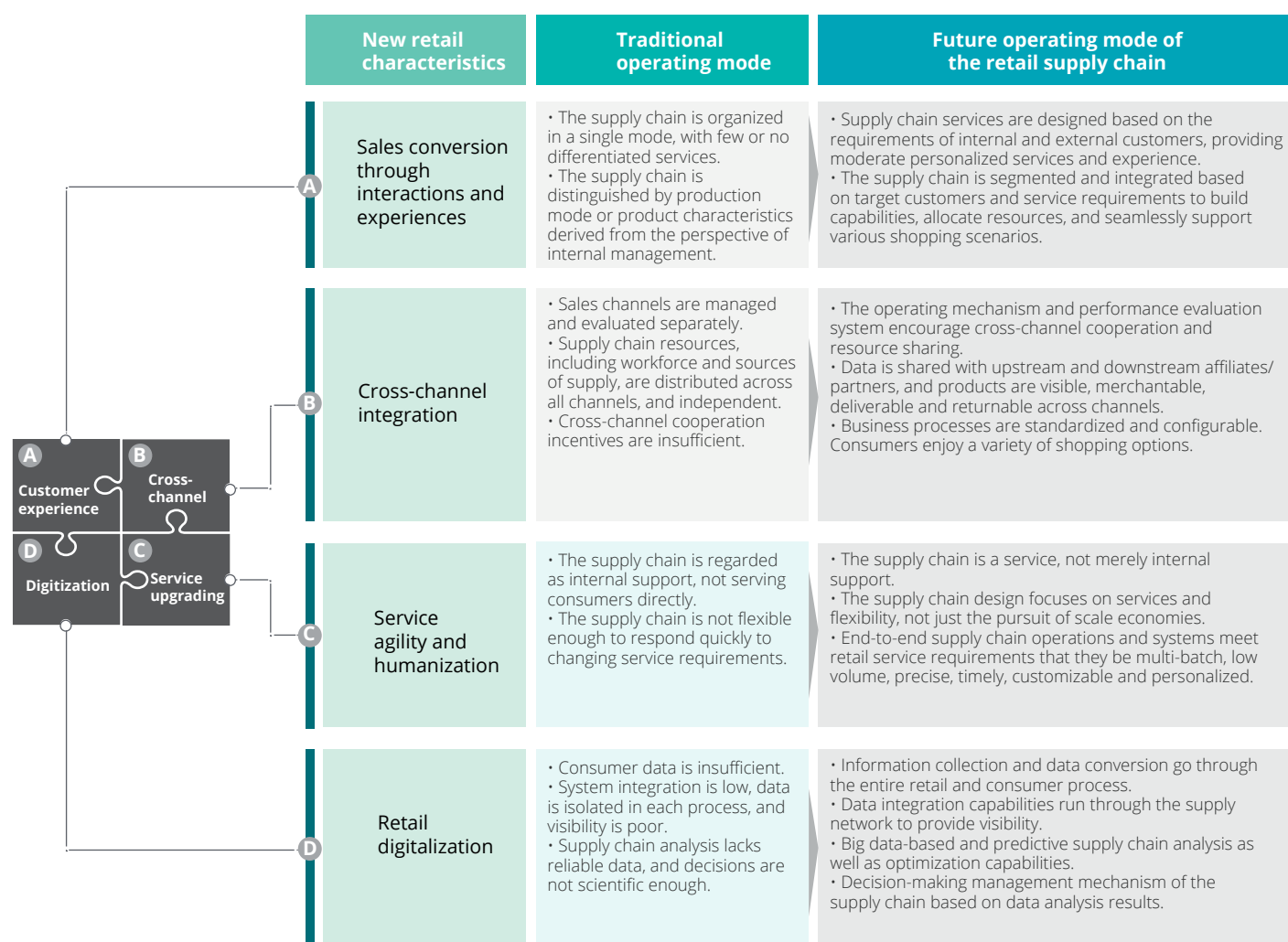
#### **Intelligent management and operations**

In the ongoing transformation of the retail industry, the traditional logic centered on products, inventory, channels, and stores has gradually transformed into a new logic of competition for consumer resources in operations and services centered on around those consumers and driven by data and technology. This means, market participants need to use data and technology to reshape the consumer experience, and also thoroughly optimize and enhance overall management and operation.

#### **Supply chain system optimization**

Supply chain management is one of the most important topics in the transformation of the retail industry. According to a survey conducted by the China Chain Store Management Association of members of the Leaders Summit, supply chain management is also considered to be the primary challenge faced by traditional retail enterprises in the era of new retail. Deloitte believes the enterprise supply chain management mode able to adapt to the new retail ecology in the future should be consumer-centric and data-driven, break through the barriers of traditional retail channels and formats, and provide cross-channel service and experience for internal users and external consumers.

Figure 14 Target supply chain operating mode



Source: Deloitte New Road to Retail Transformation and Upgrade of Traditional Brand Enterprises

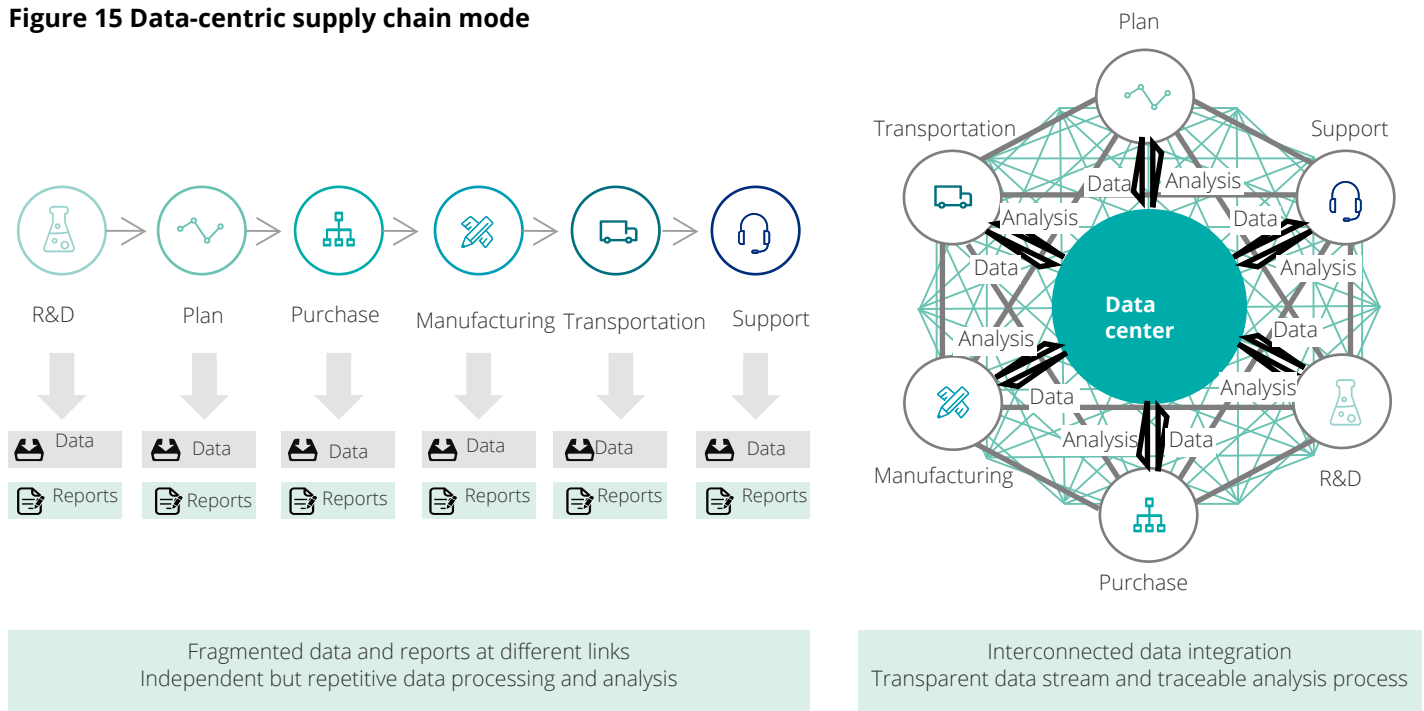
To achieve this goal, Deloitte believes it is necessary to use data to drive transformation of the supply chain. The development and integration of core technologies including big data, cloud computing, AI and IoT have become an important driver of this transformation. To achieve data-driven retail, market participants can rely on deeply integrated retail technologies for:

• **End-to-end data collection and application.** Collecting large amounts of data in real time and providing data support for internal operations.

• **Data sharing and integration.** Multi-source heterogeneous data in each process of the supply chain can be integrated into a shared data platform for comprehensive analysis and processing. The analysis results

can be pushed or returned on demand to the supply chain to support decisions and optimize performance.



**Figure 15 Data-centric supply chain mode**

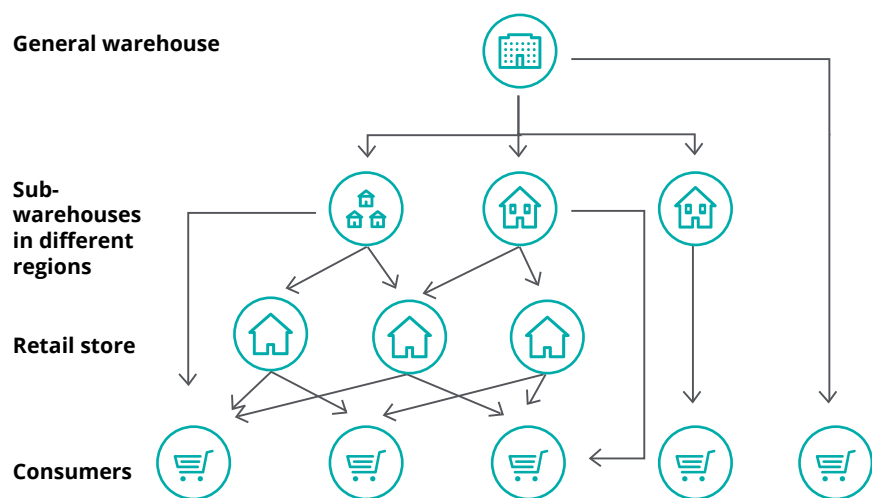
Source: Deloitte New Road to Retail Transformation and Upgrade of Traditional Brand Enterprises

Data broadens the original narrow business landscape for managers of retail enterprises and makes intelligent operation possible. Business Consultant is a data product for digital operation of merchants on Alibaba platforms. A winter jacket manufacturer, GOLDFARM uses business product data to develop insights into market growth, consumer profiles, popular design elements and competitors. It can then quickly adjust its product styles, prices, and promotion strategies, determine product policies and improve its supply chain based on the sales data. In this way, it takes only seven to 10 days for GOLDFARM to complete design and production of clothing which would take to three months in conventional retail.

In 2017, Intime Retail restructured and upgraded its information technology architecture, boosting Internet capabilities and the scalability of the whole system. Improvements included: using Alibaba Cloud to realize smooth system capability upgrades;

interconnecting its middle end to the Alibaba middle end; improving the logistics, payment, and e-commerce capabilities of the core system; migrating the core system to the cloud; and finishing compatibility with and backup of offline systems. After upgrading and transformation, information on all commodities in the Intime Retail marketplace is stored in the digital system and the traditional paper-based replenishment orders were eliminated from all supply-chain activities. Daily real-time sales data is accurate to the stock keeping unit (SKU) of each category, for buyers to reference when making replenishment decisions. After a series of reforms, the replenishment mode of Intime Retail has been transformed from online to data-based, and finally to the intelligent mode. In this process, Intime Retail takes advantages of cloud, big data, IoT and other technologies for timely collection, sharing and integration of end-to-end data finally enabling running of the supply chain.

Logistics and warehousing are extremely important in the supply chain and are also closely related to consumers. With support from retail technologies, these two links are increasingly intelligent and can serve consumers in a fast and efficient way. Logistics and warehousing retail technology applications are integrating the cloud supply chain, warehousing network, central warehouse, pre-warehouse, retail terminals, stores and end delivery, creating new consumer experiences centered on certain businesses. Supported by cloud supply chains, retail enterprises can design their retail terminal networks by time, space, level, category and SKU based on predictions of overall consumer demands in the region. This forms a regional consumption network covering commodity plans for retail terminals at distances of 10 kilometers, five kilometers, three kilometers, and 500 meters, ultimately meeting overall consumer demand in the region.

**Figure 16 Omni-channel order distribution network**

Source: Deloitte New Road to Retail Transformation and Upgrade of Traditional Brand Enterprises

To realize omni-channel order delivery, the supply chain of a brand enterprise must have a series of capabilities. The first is cross-platform inventory visibility and order collection capability. The main challenges include integrating different order entries (including third-party order entries), realizing real-time inventory synchronization, normalizing product and price information, and collecting orders in the background. The second is cross-channel inventory vendibility. Its challenges include creating the inventory matching and warehouse delivery logic for orders in the system, making cross-channel settling rules for orders, and designing the system process. The channel property management mode and taxation issues in traditional retail industry are new challenges. The third capability is the delivery capacity of warehouses and stores, that is, how warehouses and stores at different levels can guarantee order delivery cost efficiency, work efficiency and on-time delivery. Currently, the bulk warehousing of most enterprises cannot meet the delivery mode of multiple, small quantity batches. On the other hand, stores as inventory points closest to consumers feature faster delivery and lower logistics costs than warehouses, so should have the order delivery capability. This tests enterprises' capability to design their order delivery networks and balance order delivery services with costs. Cross-channel returns are the last required capability. The system should be able to trace an original order and locate the order in which the commodity is to be

returned, supporting cross-channel inventory adjustment, refund and reverse logistics.

Take **Nike** for example. In the past, its online and offline operating systems were separate, resulting in the waste and mismatch of resources. Through channel interconnection, Nike has synchronized the inventory of its flagship store on Tmall with that of some of its offline stores so orders made by consumers at the Tmall flagship within three days of the June-18 Festival can sent directly to its offline stores. Even more options are available for consumers. For example, consumers can make orders online and then take the commodities they bought at offline stores, and can exchange these if they have a poor experience. As a result, stores' delivery efficiency is greatly improved, with an order taking five minutes on average. Generally, orders are delivered on the day or the day after being made.

**Mengniu** has signed an all-commodity warehousing agreement with Cainiao to entrust warehousing and distribution of all its commodities sold online to Cainiao's intelligent supply chain. The new supply chain system not only provides strong support to Mengniu's online sales but also reduces its costs by 40 percent. Mengniu has also reorganized its offline supply chain. Through front-end warehouses set up by Cainiao for retail expert, Mengniu's hot-selling products can be delivered to 6 million Tianmao

shops quickly from the nearest warehouse. This eliminates two distributor-related links and greatly reduces management costs for Mengniu.

**Nestle** also attaches great importance to warehousing and logistics and hopes to mix actual inventory with virtual inventory through retail technologies and services and connecting its bulk warehouse with Cainiao's warehouses, so as to deliver fresh commodities to consumers efficiently. Thanks to Nestle's sub-warehouses all over the country, most commodities are delivered from the local or nearby central warehouse and less than 10 percent are delivered from a warehouse in another region, which directly reduces Nestle's transportation costs by 40 percent and greatly improves delivery timeliness. Since its cooperation with Cainiao, the percentage of orders made on the Nestle store on Tmall delivered overnight has increased to 60% and on-the-day delivery doubled. Its logistics rating is more than 30 percent higher than the industry average. The mixed inventory mechanism involves data sharing, combined sales predictions, order replenishment, and coordination between the product supply chain and logistics transportation chain. It not only reduces communication costs but can also greatly improve omni-chain efficiency and timeliness.

Blockchain is now the hottest topic in technology. People easily relate the blockchain to digital currency. However, because data in the blockchain cannot be tampered with, the blockchain is very useful for commodity tracing. For example, Cainiao and Tmall Global have applied blockchain technology to trace, upload, and verify information on imported commodities covering the whole logistics chain from production, transportation, customs clearance and declaration for inspection to third-party inspection. The information is provided for consumer queries and verification. Currently, more than 30,000 commodities imported from 50 countries can be queried through the blockchain-based logistics chain. MOUTAI also uses blockchain technology to combat counterfeiting.

### Digitalization creates new species

With continuous transformation of the retail industry, new retail business modes such as Hema Fresh Store emerged quickly in 2016. Thanks to its digital operation philosophy and extensive application of retail technologies, Hema Fresh Store has realized online and offline omni-channel deployment, integration of retail and catering functions, and continuous integration of supply chain resources. Hema Fresh Store has become a strong competitor in the market. In 2017, new retail players experienced tremendous growth. According to incomplete statistics, new players that have emerged only since the last year are Rainbow Sp@ce, Xinhuadu Haiwuhui, Fresh Ideas of Better Life Group, Bailian RISO, Meituan Zhangyu Shengxian and CenturyMart Jingxuan.

Alibaba's Hema Fresh Store is one example. After about two years of development, Hema Fresh Store has formed a business mode that integrates retail and catering, and online and offline functions, meeting the diversified demands of consumers through more accurate product services and better consumer experience. Hema Fresh Store has the following characteristics:

• **Purchase-based membership.** Hema Fresh Store allows consumers to make cashless payments through an app, which is not only a massive boost to payment efficiency but also introduces the concept of payment-based membership. In this way, it solves the problem of conventional supermarkets in which consumers who make payment by bank card or in cash cannot be recognized as members and add to the outlet's database for consumer segmentation.

• **Covering consumers in a three-kilometer circle.** The omni-channel system of Hema Fresh Store combines highly efficient delivery service (at most half an hour within a three-kilometer circle) with retail plus catering service at offline stores, meeting the demands of consumers.

• **Support from a digital background system.** Its digital infrastructure and system architecture make Hema Fresh Store more intelligent and automated. Besides, Alipay and other Alibaba resources help create a closed loop of consumption data as well as online access to Hema Fresh Store for consumers.

• **Supply chain system.** Hema Fresh Store has introduced multiple suppliers through

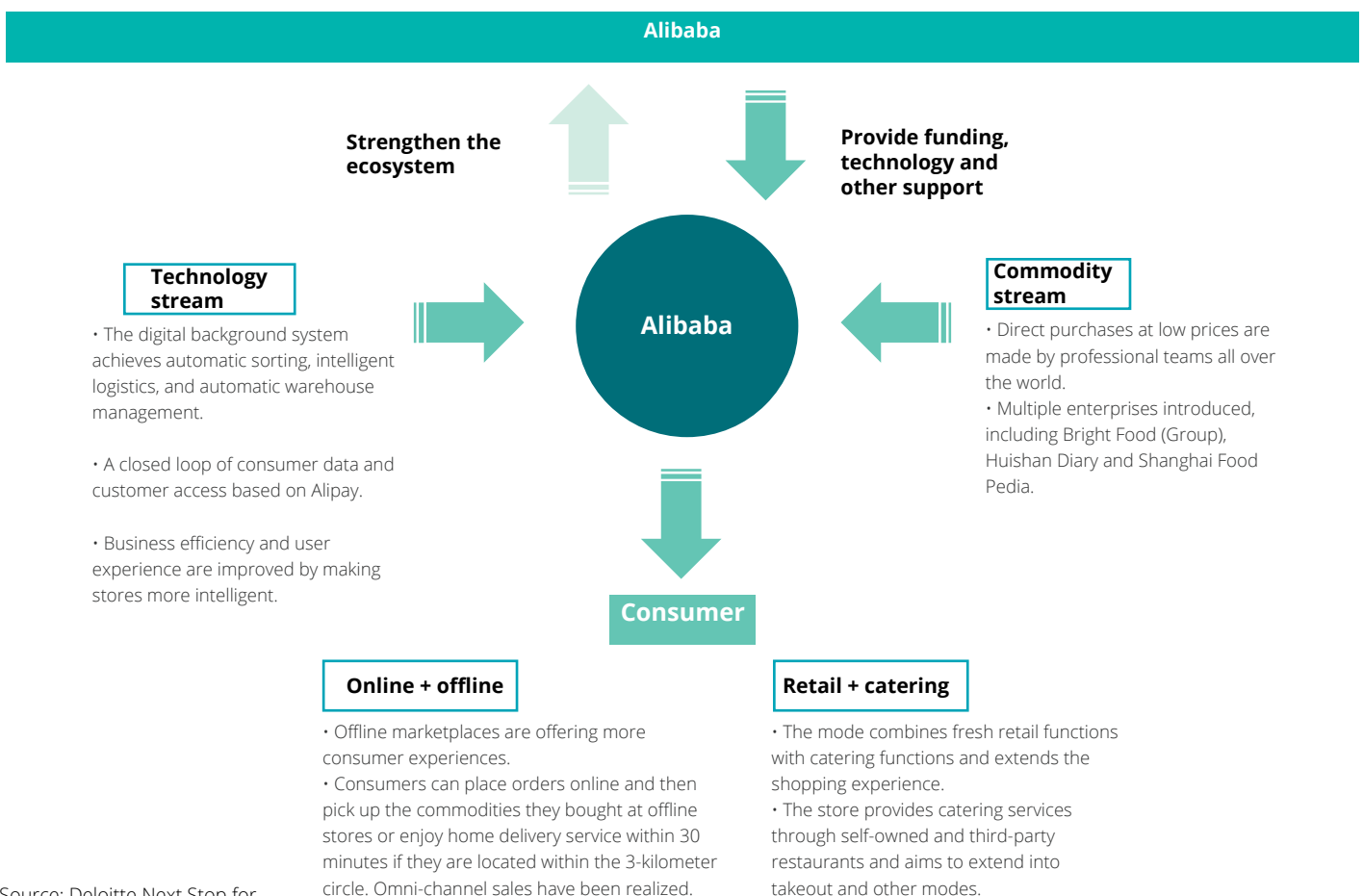
joint ventures and makes direct purchases across the world through professional teams.

• **Online-offline integrated omni-channel mode.** Hema Fresh Store has formed an online-offline integrated consumer operating, commodity management, warehousing and delivery system, which allows online and offline stores to share inventory as well as realize digital purchase-sale-stock management. Operating efficiency is also improved through a store-at-front-and-warehouse-at-back mode.

• **Innovative experience of combining retail functions with catering functions.** Hema Fresh Store introduces special self-owned or third party catering brands to provide onsite catering services for consumers to prolong their visits to its stores. It also cooperates with the takeout market to expand its business mode.

• **Resource support from a super platform.** The rapid early-stage development of Hema Fresh Store was to a large extent driven by Alibaba in funding, technology, and other aspects. Hema Fresh Store's innovative business mode exemplifies Alibaba's exploration of omni-channel development.

Figure 17 System of Hema Fresh Store



Source: Deloitte Next Stop for Convenience Stores.

Retail technologies are key to the Hema Fresh Store system, and deep integration of operating modes and technologies are a vital foundation for its overall mode. Hema Fresh Store comprehensively applies technologies such as big data, mobile Internet and IoT, as well as advanced devices to match consumers, commodities and marketplaces more accurately.

- Consumer digitization. The mobile app connects consumers to online and offline stores, quickly meets their demands in different scenarios, and records customer information from every channel to a digital system.
- Store digitization. The use of Wi-Fi, self-checkout devices, interactive screens, electronic labels and other IoT devices not only improves the

consumer experience but also records more consumer behaviors to the digital system. With the help of digital management of commodities and a suspension system based on the store-at-front-and-warehouse-at-back mode, commodities at the front can be packaged and delivered in the background through a distributed sorting system, greatly improving operating efficiency.

- Logistics and warehousing digitization. Hema Fresh Store has realized digital management of commodities and services based on IoT, laying a foundation for digital management of logistics and warehousing. Supported by its powerful algorithm and data capabilities, the system can realize accurate management of commodities,

enable fulfillment of online orders, and cover multiple links from order collection and distribution, task output, commodity sorting, commodity packaging and delivery arrangement, to path planning, realizing accurate and efficient fulfillment of online orders.

- Purchase digitization. Deep digitization is fundamental to the optimization of Hema Fresh Store's supply chain. Data-based deep insight into consumer demands and digital management of commodities provide support and provide a basis for product selection and pricing, a mode is evolving into a Customer to Business (C2B) structure.



# Conclusion

Technology, data, and analysis capabilities have become an integral part of the retail evolution. With technological progress in a consumer-centered ecosystem, market players can reach, perceive, and talk to consumers through more diverse and efficient means. Besides, enterprises in the ecosystem are also able to optimize their operation and management more effectively, allocate and use resources efficiently based on consumer demand, and meet that demand quickly and accurately with optimal goods and services. We expect future development of retail technologies to be better targeted after heavy investment and continuous trial and error in the early stages, more integrated solutions will become available, and empowerment of technologies for the retail industry will accelerate. As the drivers of continuous innovation and transformation of the retail industry, enterprises should view technological innovation with an open mind and apply it in their strategic transformation.



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