The retail industry is witnessing a shift owing to the global move towards omni-channel retail models, with a major focus on digital modes of shopping. This transition is being supported by an increased uptake of next-generation technologies across the entire retail ecosystem. The number of merchants accepting digital payments has also reached an all-time high as customers are getting more and more comfortable using their smartphones, tablets and other mobile devices for online purchases.

To ensure seamless service delivery across all these channels, retailers are expanding well beyond the traditional enterprise resource planning, customer relationship management (CRM) and supply chain management solutions. New technological tools such as internet of things (IoT), data analytics, cloud computing, artificial intelligence (AI), augmented reality (AR) and blockchain are making significant headway into the retail industry. Traditional and new retailers are using these technologies to automate various parts of the retail chain, from manufacturing to last-mile delivery. These solutions are helping retailers optimise their supply chains, leverage consumer data to increase sales and customise shopping experience.

IoT and data analytics

Retailers across the globe are using IoT in order to optimise their operations and provide a seamless shopping experience. For instance, IoT devices integrated with Bluetooth low energy and Wi-Fi are facilitating in-store navigation by helping customers find the desired product. In grocery stores, IoT is being used for predictive equipment maintenance such as monitoring temperature fluctuations to ensure food safety. IoT is also assisting in energy conservation by dimming the lights and controlling the AC systems based on the footfalls in stores and external weather conditions. The integration of lighting controls also enables retailers to study the movement of shoppers within the store for over a period of time and accordingly optimise the shop layout and merchandise placement. Meanwhile, some retailers are using IoT-based contactless checkout/self-checkout mechanisms involving automatic scanning of the products when the customer walks out of the store. Retailers are also using radio frequency identification technologies to improve the precision of inventory tracking.

In addition, big data analytics is being used to formulate models for determining the optimal prices of products. By making use of interactive and self-service interfaces, retailers are able to make appropriate assumptions about product pricing and immediately see the impact on the volume and demand of their own products as well as that of their competitors'. Further, with big data analytics, retailers are also deriving valuable insights for optimising and personalising marketing and promotional campaigns.

Cloud computing

In an omni-channel customer environment, retailers can benefit immensely from cloud computing platforms by gaining access to information pertaining to inventories, their location, and how to best deliver products in the fastest and most efficient way possible. These platforms also give retailers the flexibility to make changes to orders when they are already in transit. The retail-as-a-service (RaaS) cloud computing model can integrate different verticals like inventory and order processing, thus improving restocking capabilities. Retailers can have an enterprise-wide supply chain visibility. With the cloud, retailers can have supply chain systems capable of adequately handling their business without stock-outs, expedited deliveries or high inventories. Cloud also helps to capture the real-time status of consignments, digitised documents from suppliers, carriers, logistics providers, brokers, etc. Another major advantage of moving to the cloud is the flexibility offered in terms of pay-as-you-use, thereby eliminating the need for retailers to make large upfront investments in technology to update their IT infrastructure. Retailers can increase or decrease their computing usage as per their needs. Particularly, they can scale up their operations at times of peak demand, therefore eliminating the need for stores to purchase additional equipment, a capability that is difficult to achieve using an in-house IT set-up.

AI

AI is reshaping the entire retail technology landscape by significantly improving all aspects of the retail ecosystem ranging from sales, CRM, inventory management, customer acquisition, shopping experience, purchase pattern analysis, customer retention, logistics, delivery and payment services.

Using self-learning algorithms, AI has helped several global retailers introduce advanced recommendation engines that allow consumers to find the right item for themselves quickly by taking into account their preferences, personal information, previous purchase data, etc. Further, AI is also helping retailers monitor how successful an item is with shoppers by monitoring their facial and hand gestures.

Moreover, AI is also helping retailers effectively analyse customer behaviour and customise their offerings. For example, beauty products manufacturer L’Oreal has introduced a hair colour

that uses AI and AR to enable users to try on a new hair colour in real-time. While the AR component allows customers to try on different styles digitally, AI helps capture the user's hair, strand by strand, and offers the most accurate look possible.

Going forward, AI can help retailers optimise pricing and promotions by identifying the various factors that influence pricing through the real time monitoring of market conditions as well as in-store metrics, automate price decisions for each product by channel, and store and determine the optimal entry price points for newly launched products.

Blockchain

Blockchain refers to chronologically linked digital records of data and transactions. The technology allows all the stakeholders involved to view the data in real-time and also see the full history of the information.

The process of applying blockchain to retail has already begun and there are some exciting developments taking place in this domain. For example, the end-to-end data trail that blockchain provides is significantly easing the accounting burdens on organisations in areas such as supply chain and inventory management. By leveraging a shared information layer, the parties involved in a retail supply chain ecosystem are able to achieve full item tracking, advanced proof of authenticity, and interoperable provision of after-sales services. Moreover, customers can also obtain information from every point in the supply chain, and gain insights into the origins and manufacturing processes of products. This results in complete transparency between retailers and customers, and adds a new trust dimension to the brand-customer relationship.

The most popular application of blockchain, cryptocurrencies such as bitcoins, have been successful in creating a secure and trusted digital payments system. Global companies including online travel company Expedia and e-commerce platform Shopify are taking bitcoin payments from customers. Besides, the digital records created using blockchain are helping streamline the return and refund process. Further, blockchain has also made it easier to track the ownership of large purchases like cars, houses and other high-ticket items, thereby reducing the resale of stolen goods.

Blockchain has started making inroads into the Indian retail market. Recently, Tech Mahindra has partnered with Indian blockchain company Nucleus Vision to develop blockchain solutions for the retail industry. Nucleus Vision currently offers a blockchain-based platform named ION that offers various benefits to retailers such as easy customer identification, creation of real-time customer personas, cryptocurrency-based loyalty and redemption programmes, interchangeable loyalty awards across global partners, etc.

Key challenges and the way forward

As in the case of other industries, next-generation technologies such as IoT, cloud computing, AI, AR, blockchain, etc. are adding new dimensions to the retail space. These solutions are helping retailers optimise their operations and at the same time deliver a more personalised experience to customers.

Even though retailers are bullish on the opportunities offered by these technologies, they are not making significant investments in making a discernible switch to these systems. Retail enterprises are reluctant to address the security, data management and integration-related challenges associated with greater technology adoption. They need to make a thorough analysis of their requirements and capabilities, the relevance of the technology as well as the associated security risks before committing huge investments in incorporating the new solutions. This is especially true in the case of large retailers, which are very slow to adopt cutting-edge technologies and like to adopt a wait-and-watch strategy. Since it is mostly large companies that have the resources and the sales volume required to make the adoption of these technologies viable, the uptake of these new-age tools in the retail industry as a whole is currently limited. However, going forward, retailers across the board are expected to step up investments in upgrading their IT infrastructure in order to remain competitive in the face of changing industry dynamics.