Future of Retail Business in a Digital Society:
In the Pursuit of Consumer-Centric Retailing

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NEC Corporation

Executive Summary

Diversification in demographic composition and evolution of ICT are rapidly changing the environment surrounding retail industry. Today, everything around us (such as consumer electronics, broadcasting, automobiles, telephone, currency etc.) is moving towards digital transformation; this has opened up a wide range of possibilities for consumers, with world moving towards an 'era of choice', where consumers can choose their retailers depending on the time, place and other circumstances.

In such an era, retailers are required to change their conventional strategies, and respond with "Consumer-Centric Retailing" approach that focuses on customers' buying behavior. In order to realize this consumer-centric approach, retailers need to align their strategies with not only customer service but also with store operations, value chain, ICT, etc. This Whitepaper endeavors to examine future direction of retail, based on the NEC's vast experience gained through its long-term partnerships with numerous retailers.

Megatrends

1-1. Towards a world of diverse lifestyles

We live in a society that is continuously moving towards diversification in all its aspects. Further, demographics have seen trends such as low birthrates and aging societies along with an increase in the number of immigrants across the world, creating a widely diverse society (Image 1). As the governments around the world prepare for a mechanism of immigrants intake, and companies start to actively employ people from different backgrounds, the cultural diversification is expected to grow further.

Moreover people's lifestyles are also changing, and as a response to these changes, employers

Figure 1. Changes in the global demographics

Source : Based on data published by World Bank、UN

are offering an increasing number of work style alternatives such as flexible work hours, work-from-home, etc. to ensure a comfortable working environment for employees. Under such conditions, there has been an increase in the number of people with mindsets or behavior patterns that are different from the more conventional patterns; such people are only expected to increase further.

1-2. Increase in the distribution of money and information

Emergence of the Internet has remarkably increased the information volume accessible by people. The days of mass communication and companies as the only sources of information are long gone; today, consumers themselves can be the source of information, and hence are recognized as "Consumer Generated Media (CGM) (Image 2). Furthermore, the information coming from consumers, although subjective, is sometimes considered more trustworthy than the information provided by companies.

Image 2. Major trends in SNS

| Title	Facebook	Twitter	Instagram	LINE	Google+	Pinterest	YouTube
Number of domestic users / MAU MAU: Number of users who log in at least once in a month	24 million* (March 2015)	35 million (December 2015)	8.1 million (June 2015)	58 million (March 2015)	15 million* (March 2015)	Not disclosed	51 million* (March 2015)
Number of global users / MAU	1.49 billion (July 2015)	320 million (October 2015)	400 million (June 2015)	205 million (March 2015)	540 million (February 2014)	100 million (September 2015)	1 billion
Information	Informational volume of information is high	Comprehensive volume of information is low	Specialized in photography	Comprehensive volume of information is low	Comprehensive volume of information is high	Specialized in photography	Specialized in videos

※*Estimates; Source: Press releases, SNN Lab

Moreover, as the currency continues to be digitalized, its circulation continues to increase. As stated above, an increase in the number of immigrants across the world is supposed to have contributed to an increase in the amount of remittances from 126,800 million USD in 2000, to 588,000 million US dollars in 2015[1]. With the advent of electronic money, payment methods other than the conventional methods of cash or credit cards are becoming increasingly common. Recently, virtual currency such as Bitcoins has also emerged as a new currency. New currencies are expected to become increasingly popular in future, requiring countries to develop a mechanism to respond to the resulting needs. As a result of these developments, new payment methods and new currencies have created variety of options for people in terms of savings and payments.

1-3. Growth of Smart Devices

A variety of objects surrounding us in our day-to-day lives, (such as consumer electronics, automobiles, household goods, etc.) are also changing. As the use of internet continues to spread, methods of information transmission and interfaces are also changing from conventional mediums such as TV and radio, to computers, mobile phones, and further to smartphones, tablets and wearable devices. These devices can be connected to the internet and possess intelligence to process information. According to eMarketer, a research company, the penetration rate of mobile phones for the world population is 65%, while mobile-based internet access rate is 83%. Moreover, in recent years, it has become possible to connect consumer electronics such as TV, refrigerator, air conditioner, audio products and even automobiles to the internet. In addition to their internet-connectivity, these emerging products

are also capable of processing information. Further, very soon 3D printer may become a common consumer electronic item (Image 3), and a product may be manufactured at home if sufficient data is available. As these smart devices with internet-connectivity become more common, we will be able to access the information more easily, and these devices will also play an important role as information channels.

Image 3. Estimated number of 3D printer shipments
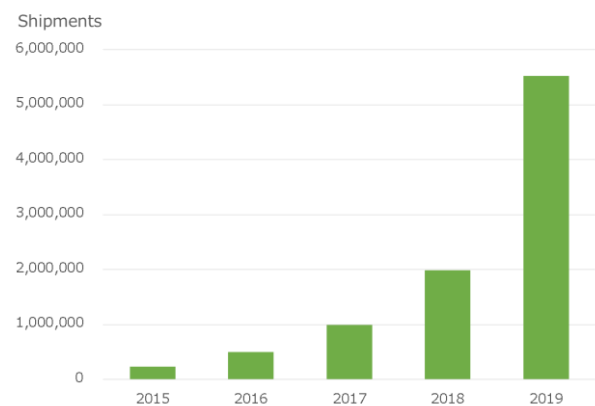
Gartner "Forecast: 3D Printers, Worldwide, 2015"

Moreover, there is an increased tendency towards automation. For example, 'autonomous automobiles' is one of the areas that automobile companies are actively focusing on. Moreover, a lot of research is currently underway in the areas such as automatic re-arrangement of production lines at manufacturing plants in accordance with the product customization, and automatic picking at warehouses or unmanned drone delivery in the logistics (Image 4). Retailers are also engaged in research for developing robots that could serve customers (Image 5). In this way, objects around us are not only equipped with various functions, but they can also behave autonomously when connected to network and possess the intelligence to work towards self-improvement (updates). There is no doubt that the future will see further refinements in this intelligence, as technology makes further advances.

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[1] "Migration and Remittances Factbook 2016", World Bank

Image 4. Examples of experiments using drones

Enterprise / Organization	Service / Project	Current status (Released on)	Detail
Amazon	Amazon Prime Air	Demonstration test in progress. Service scheduled to start in 2016 (as on December 2015)	Can continuously fly for a distance of approx. 25 km with maximum height of 120 meters. Goods weighing up to 2 kg can be delivered within 30 minutes.
Alphabet (Google)	Project Wing	Under development, and in discussion with FAA on flying regulations. Its implementation is aimed in 2017 (as on November 2015)	Drone delivery service, where the drone adjusts itself based on a technology that combines mobile phone communication with internet, to be able to fly at a height of maximum 500 ft.
Walmart Stores		In the process of indoor demonstration test. Pending for outdoor experimentation in FAA (as on October 2015)	Used to make delivery and check inventory in trailer. Uses drone made by the Chinese company "SZ DJI Technology, Co.".
DHL	DHL Paketcopter	Under research since September 2014, however, no specific schedule in regards to its full-scale use as home delivery service	Has been approved as Europe's first automatic delivery of cargo by air. It uses "DHL Paketkopter 2.0" that was jointly developed by Aachen Engineering College and Microdrone, and assumes its application in four categories: Urban First & Last Mile, Rural Delivery, Surveillance of Infrastructure, and Intra-logistics.
Japanese Government	A part of "National strategic special zones" (Chiba city) project	Presented in December 2015, and is scheduled to be implemented by 2020.	Drone carrying goods from the warehouse can be driven, and direct delivery on the veranda of an apartment can be made. It is expected to deliver medicines for treatment (prescription drugs) and daily necessities. Further, it is under negotiations with "Amazon" and "Rakuten" that have warehouses within 10 km sphere of new cities.
Ministry of Land, Infrastructure, Transport and Tourism (Japan)	"Special zone for drones" in Naka district, Tokushima prefecture	On February 24, 2016, experimented in Naka district, Tokushima prefecture. First experiment by government on drone delivery.	Naka district of Tokushima prefecture was specified as a "Special zone for drones", and it was implemented along with the enterprises that conceptualize delivery through drones, such as "MIKAWAYA21" (Tokyo). The drone has a diameter of 1.1 meter and weight of 5.3 kg, has a container mounted on it, which can carry goods of 1 kg such as bread, milk and two eggs. Ministry of Land, Infrastructure, Transport and Tourism has scheduled to cater to drone delivery needs of approx. 150 households.

Source: Press releases, news articles (as on February 2016)
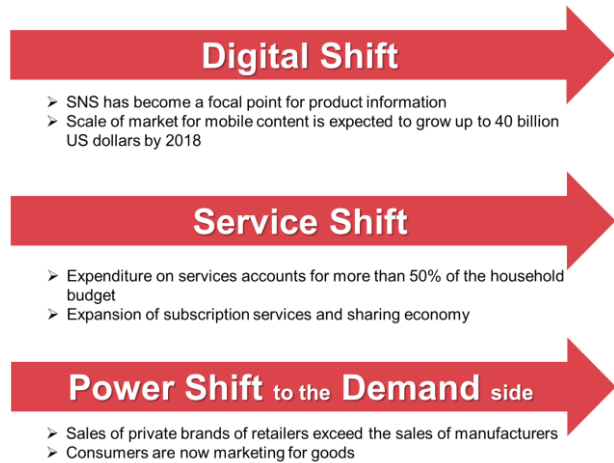
Image 5. Examples of experiments using robots

Areas of use	Business	Examples
Within stores	Reception (Robot receptionist)	Mitsukoshi (Japan) Parco (Japan) Ion (Japan)
	Provide counter related information, serve customers and provide description about goods (Robot for serving and guiding customers)	Lows's (U.S.)
	Taking inventory (Robot for taking inventory)	Super (U.S.) Ion (Japan) Tesco (UK)
	Support in stocking (Robot for tracking transportation)	Super (U.S.)
Delivery centers	Automatic transportation to warehouse (Transportation robot)	Amazon (U.S.) ASKUL (Japan)
Delivery areas	Unmanned delivery (Drone)	Amazon (U.S.)
Support in shopping	Information about store location and transportation (Shopping cart robot)	
	Shopping assistant for family (Communication robot)	

Source: Press releases, news articles (as on February 2016)

2. Changes in the Retail Environment

Retail industry is not an exception to the changes caused by different trends, described in the previous chapter. We will focus on three areas that are likely to have significant influence on the changing environment. These areas are: Digital Shift, Service Shift, and Power Shift to the Demand Side (Image 6).

Image 6. Changes in the environment surrounding retail industry

Digital Shift
- SNS has become a focal point for product information
- Scale of market for mobile content is expected to grow up to 40 billion US dollars by 2018

Service Shift
- Expenditure on services accounts for more than 50% of the household budget
- Expansion of subscription services and sharing economy

Power Shift to the Demand side
- Sales of private brands of retailers exceed the sales of manufacturers
- Consumers are now marketing for goods

2-1. Digital Shift

Today, it has become possible to connect to the internet from various terminals, leading to a Digital Shift in the purchasing behavior of consumers and products. In addition to the mass media and internet, today's consumers also value the information available through social media, and are able to obtain reliable information within a short time. For example, image collection service "Pinterest" gets approximately 100 million visitors every month, out of which 96% visitors responded to a survey that they use Pinterest to collect product related information[2].

Further, with digitalization of products, the market for digital contents such as music, videos and games is expected to increase up to approximately 40 billion dollars by 2018[3].

2-2. Service Shift

Consumer needs are changing from product consumption" to "service consumption", and marketing methodology of companies is

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[2] Pinterest News Release

[3] Ministry of Internal Affairs and Communications: "The Global ICT Industry Paradigm Shift & Future Opportunities" (2015)"

changing from 4P[4] to 4C[5]. In fact, trends show that service expenditure accounts for more than 50% compared to tangible products (Image 7).

Image 7. Service consumption ratio in the household expenditure
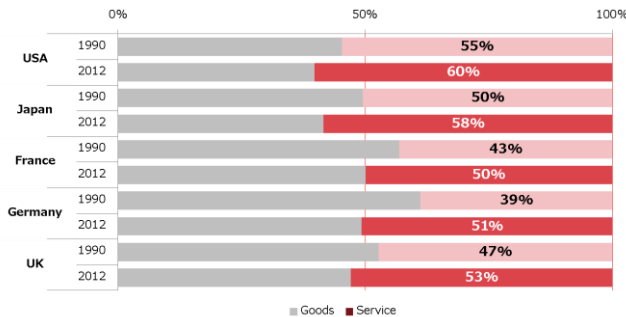
Source : Euromonitor Consumer Income and Expenditure 2014

Further, new subscription services such as NETFLIX and BIRCH BOX, or sharing services such as Uber car dispatch service that uses smartphones, or dress rental service 'Rent the Runway' have also emerged.

2-3. Power shift to the demand side

Throughout retail's history, retailers have continued to change in order to respond to the ever changing consumer needs (Image 8).

Image 8. Transition of retail industry

In the era of mass production and mass consumption, consumer needs were uniform, so manufacturers were at the center of the value chain, and the role of retailers was mainly confined to delivering national brands (NBs).

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[4] 4P: 'Product',' Price', 'Place' and 'Promotion' (Marketing)

[5] 4C: 'Customer value', 'Customer cost', 'Convenience' and 'Communication' (Marketing)

However, changes in lifestyles and consumer needs have caused a shift in the function of retailers, transforming retailers into sales agents for manufacturers or purchase agents for consumers, by performing MD (merchandising) operations according to store locations and customer demographics. Moreover, retailers not only procure goods matching with consumer needs, but they are also expanding their reach to planning and manufacturing areas. A comparison between the retailers' private brand (PB) sales and manufacturers of food items and consumer goods in the U.S. shows sales of retailers coming on par with those of manufacturers; for example, sales of private brand Walmart was 157 billion dollars, exceeding the sales of manufacturers (Image 9).

Image 9. Sales volumes for PB retailers and for food & CPG manufacturers
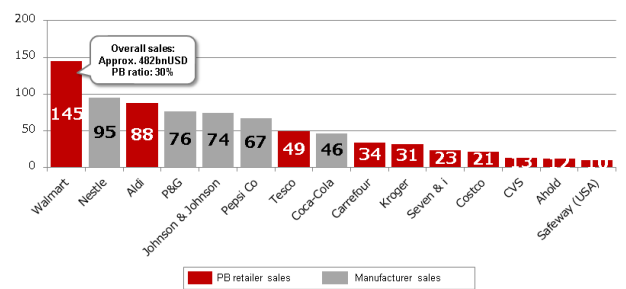
Source : Planet Retail「Private Label 2015」、Annual Reports、Statista、IRI、Web research

As mentioned before, we are in an era where consumers themselves provide product information using SNS, and also contribute to product branding.

2-4.Buying behavior of "Empowered Consumers"

Today's digitalized society offers easy information access to consumers, and these Empowered Consumers are able to dictate terms of WHAT, WHERE and HOW of their shopping experience, as they look for a retailer that caters to their ever-increasing demands. This has marked an end of the era when

"consumers had to go to a particular store to a buy a product"; today's consumers can buy their desired products any time, any place. Further, shopping itself is changing from a simple "product (tangible) purchasing activity" to "an activity to obtain satisfaction and create value experience in the life".
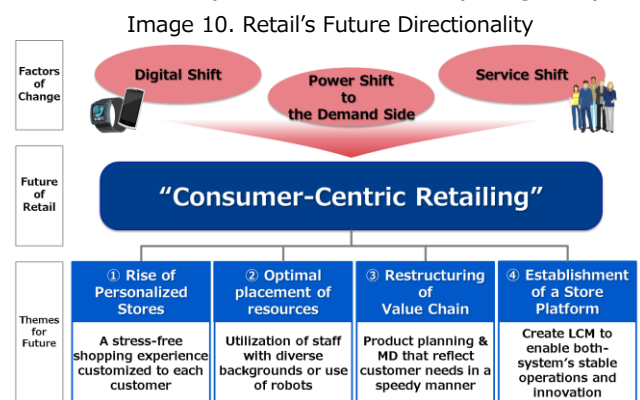
Consumers always look for a shopping method that is most convenient for them. For example, when consumers want to buy a product, they immediately collect information about the stores with available stock, product price, and channel that enables fastest possible purchase, and make a buying decision. At present, consumers buy products using computers or smartphones. However, the day is not far when consumers will be able to purchase their desired products through wearable devices, automobiles and even household electronic appliances. Consumers will be able to choose the most convenient way of buying; for example, they will be able to book a product in advance using different touch points, and then simply pick up the product, or they could also select a product after a virtual-fitting at home, or use a cashless check out[6] option.

Moreover, the criteria of convenience and satisfaction differ from person to person. For example, an elderly person would prefer to place order verbally and get it delivered at their doorstep, while a working person living alone may want the ordered goods delivered in the trunk of their car in the parking lot. Thus, convenience and satisfaction differ depending on an individual's living environment. Further, the same person may have different criteria depending on the circumstances such as whether a product is ordered during office break, after office-hours or on a weekend. This shows how the values and satisfaction criteria are not only different for different people, but how they can be different even for the same individual; this phenomenon can be described as a situation of 'a single individual with multiple consumer personalities. The digital native generation[7] born after the second half of 1990s will form the main consumer group in future. Thus, it is not difficult to imagine that diversification and personalization of consumer behavior will only continue to increase, along with increased demand for convenience and selective consumption.

3. Future of Retail Business: A Consumer-Centric Retailing Approach

As mentioned earlier, retailers cannot survive in today's extremely competitive world of retail unless they are able to satisfy the diversified demands of 'Empowered Consumer" in real-time, and become the 'retailer of choice'. NEC believes that in order to achieve this, retailers are required to shift to a "Consumer-Centric Retailing" model, and engage in strategies based on following 4 perspectives discussed in the next sections: 1) Customer touch-points, 2)Operations, 3) Value-chain, 4) IT infrastructure (Image 10).

Image 10. Retail's Future Directionality

3-1. "My Store": Personalized store revolution

Today's retail is on the verge of an extreme form of store personalization that would aim to create virtually one store for every single customer, to respond and satisfy consumers' diversified needs. This would entail optimized product assortment, layout and services for each customer across the channels such as physical stores, mobiles and EC. It has become imperative for brick-and-mortar retailers to overcome the physical limitations and offer a customer experience that brings together the best of both online and offline worlds, in order to satisfy increasingly demanding consumer. In order to realize this, retailers are required to provide appropriate and latest information through all the channels, which can be done through an omnichannel approach with an integrated information management. The days when systems were built separately for each channel to fit the needs of a particular company are long over.

On the other hand, digitalization of everything also means that retailers are now able to obtain information that could not be obtained until now. It has now become necessary to gather all possible information about each individual customer, discover meaningful trends from the vast data, and leverage this data to develop capabilities to enable efficient customer communication. For example, technologies such as Big Data or in-store camera image analysis have made it possible to acquire sensing data, product search & shopping history, membership information, and use this data for a real-time customer analysis to understand customer attributes, products bought or not bought, purpose of store visit, etc. This enables retailers to engage customers or give customized offers depending on each individual customer's needs at a given point of time.

Furthermore, retailers will be able to offer more options to their customers using ICT (Information and Communication Technology). ICT makes it easy to imagine possibilities where retailers could recommend items that a customer might need, based on the sensing data of their refrigerator contents or increase customer satisfaction by reducing the cash register waiting time through biometrics-based checkout-free system, or even a new delivery method where customers will be able to receive a product customized to their needs, by simply accessing 3D printer at their home. However, it is not enough to simply use IT tools to gather and analyze information; it is also essential to have the know-how of customer understanding, the timing & content of communication that makes customers feel comfortable or incentives that can motivate shopping. For many retailers, standardization and structuring of such know-how and skills of a top class store associate may hold the key to retailing competitiveness (Image 11- please refer to the next page).

3-2. Optimal placement of labor resources in a trans-border society

Our future is expected to see great transformation of people's lifestyle and values along with the social change.

As advances in ICT and globalization continue, and the boundaries between genders, work & private life, nationalities, cultures, time and space keep getting lower and lower, people's lives are moving towards a new world transcending these boundaries, from conventional style of rigid and limited range of thinking to the world with new values.

Retailing industry is also required to utilize labor resources with differences in age, culture and other varying backgrounds in this

transborder society[8]. What's more, these labor resources in a store could be robots and not humans. Advances in IT will also help retailers in overcoming obstacles such as languages, physical abilities that stand in the way of using various types of labor force. For instance, robots could be used to transport stock in the store's backyard or to guide customers to product shelves in the store; this will help improve operational efficiency and accuracy. If robots are equipped with technologies such as Artificial Intelligence (AI) and image recognition, robots will also be able to perform operations such as personal authentication, and also contribute to improved customer satisfaction by sophisticated store guidance and customer engagement. What is important is not to replace the labor force by a cheaper one by simply treating the staff as a cost unit.

It is important to define and identify the respective value offered by stores which are customer touch-points or by departments that are responsible for various services. This will lead to the optimal resource placement required for successful strategy deployment and reinforcement of competitiveness (Image 12- please refer to the next page.).

Image 11. Towards a future of personalized stores

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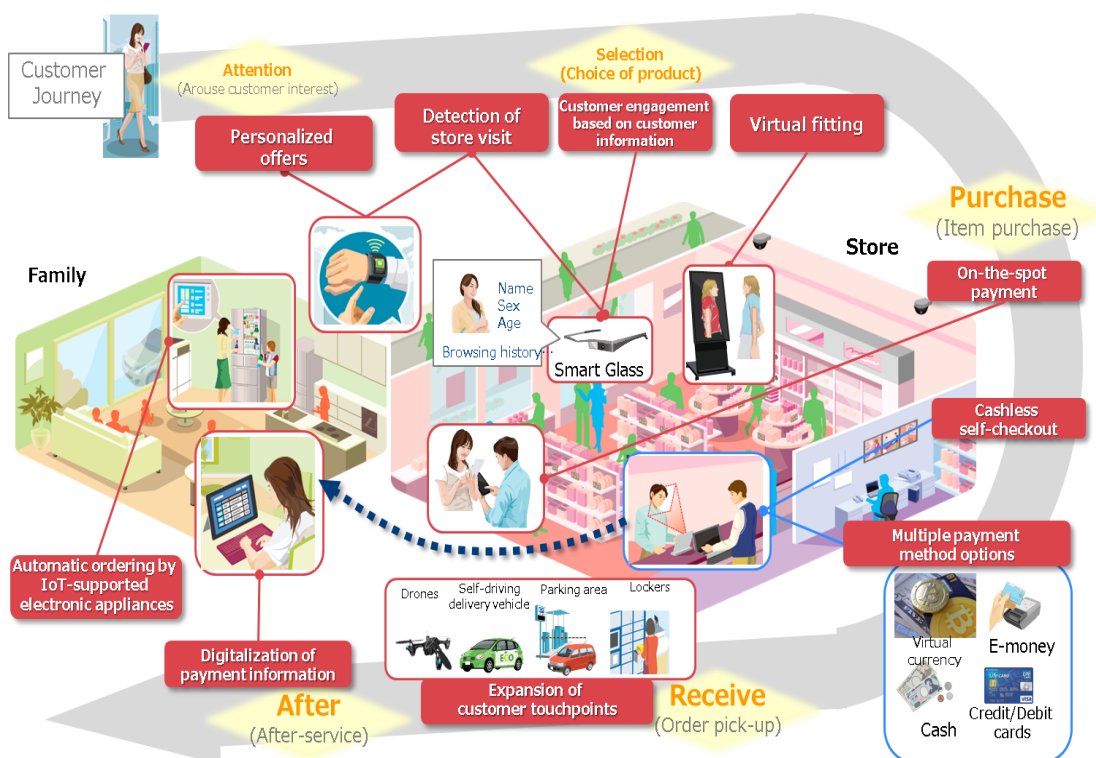
[8]Trans-border society indicates a future society where the boundaries between genders, young & old, work and private life are low, and can be crossed easily. The term has been proposed by Japan Telework Society.

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Image 12. Future Direction of Workforce
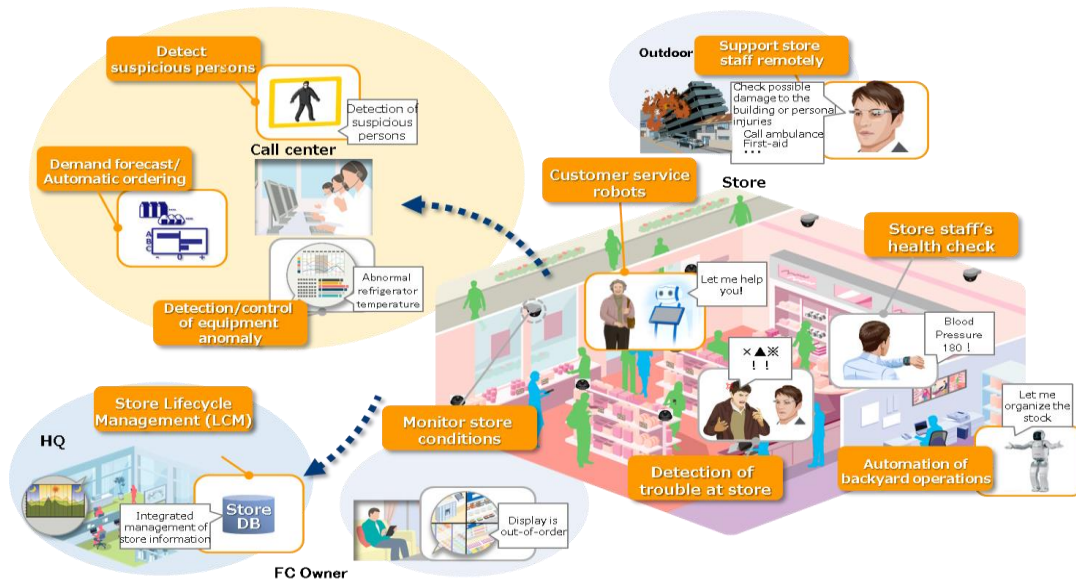
3-3. Restructuring of Value Chain

Today's retailers are faced with a situation where they need to reevaluate their existing value chain and make pro-active efforts to restructure it in order to achieve Consumer-Centric Retailing. Many retailers have already started developing their PBs (Private Brands); however, in order to ensure immediate supply of products that reflect consumer needs it is expected that the number of retailers moving further closer towards SPA (Specialty store retailer of Private label Apparel) model will increase. Furthermore, those consumers who want customized size and design for their products are no longer forced to choose from the products on the shelf. The times when customized products ordered by customer can be delivered at customer's doorstep, or can be simply obtained at home with 3D printer, are not a distant future. This creates new opportunities for retailers who can leverage unconventional product supply sources to respond flexibly to their customers' expectations by offering products not manufactured in house or products manufactured by individuals to differentiate with their competitors (Image 13)

Image13. Future Directionality of the Value Chain
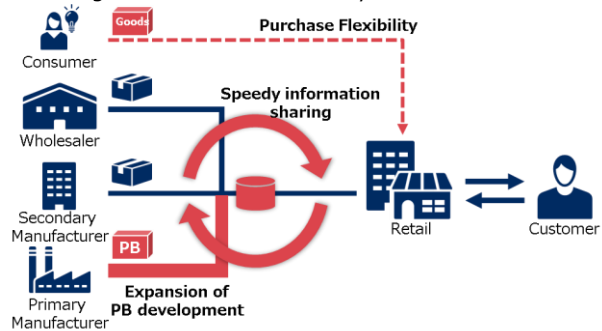
Retailers are expected to create a mechanism that is capable of responding to changes. This can be done by sharing the information acquired at the retail stage of the value chain through the company's value chain irrespective of the areas covered by the value chain. The information acquired at the retail stage is critical since retail is the closest customer touch point. As the term 'Consumerization of IT' indicates, technologies such as mobile, SNS, cloud developed and spread among the consumers before getting adopted by the enterprises. Retail is not an exception, as it has become imperative for retailers to develop their ICT infrastructure to support the ever changing digital consumer behavior. For example, at present, store associates need their work terminals or backyard PC to access information, which can prove inefficient. For example, if a

store associate gets an inquiry from a customer in the middle of arranging product display, a wearable device or AR[9] supported keyboard can be used to input search words and look for required information even with products in hands. Online consumer trends can be captured with the help of access logs, but recently different tools are also being tried to analyze consumers' behavior at brick-and-mortar stores using IT. In addition to such digital methods, development of an in-house social networking mechanism called Digital Workplace, can also be used to optimize the 'kizuki' (awareness) of the store associates who are involved in director customer engagement or the opinions of headquarter staff who use the store as consumers. Such mechanism can increase staff's level of engagement (feeling of attachment, commitment), leading to the creation of a strong organization capable of coping with the changes in a better manner.

3-4. Establishment of a Store Platform

As IoT advances further, retail stores of future are set to become highly advanced smart organisms that cannot be compared to the conventional stores. Internet connectivity will no longer be limited to the conventional ICT devices, but it will extend to the other store equipment, and it is no longer difficult to imagine the introduction of robots and 3D printers in a store environment. The amount of data obtained from the internet or from the stores across the globe will increase exponentially. The effective use of this data is essential to achieve Consumer-Centric Retailing, and establishment of a cloud-based store platform for the integrated management of all the information has become indispensable. Moreover, it is important to offer services to consumers without stopping store-operations which can be made possible by collecting real-time information of all the IT and OT devices, and take preemptive measures by detecting symptoms that could cause failures. ICT will not be limited to supporting the operations of store staff but ICT will also be able to take over operations of store staff. In other words, it will be increasingly important to ensure continuous stable and normal operations of ICT, IoT equipments and systems in the stores. However, in order to pursue continuous Consumer-Centric Retailing, it has become essential to develop agility that enables speedy execution of planning and deployment for new business opportunities by leveraging ICT. It will be vital to strike a balance between two opposing aspects of security and agility related to ICT strategy. While accommodating these two aspects of security and agility, it will be important to analyze the data obtained from various devices, and reflect that data in the planning of IT strategy in order to achieve ICT-LCM (Life Cycle Management) model involving Planning, Development, Deployment and Maintenance. (Image 14) .

Image 14. Future direction of ICT Strategy
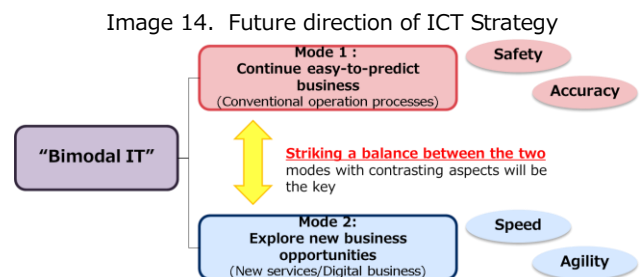
Source : Created by NEC, based on Gartner report

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[9] Augmented Reality (AR) is a term used for the sensory information obtained from real environment, and modified by either supplementing or removing a part of the information through computer processing.

4. Conclusion

In the future world surrounded by digital things, and cohabitated by people with diverse backgrounds, consumer behavior is expected to evolve significantly. The level of convenience demanded by consumers continues to increase, and there is a tendency to choose a retailer that can satisfy the consumer needs that keep changing from time to time. The time when retailers used a customer-segment specific approach are over, and retailers are faced with the necessity to pursue a "Consumer-Centric Retailing" involving a personalized approach by understanding the products and services desired by each individual customer. This will be the future direction of retail in the digital society.

This environment has made it essential for the retailers to provide added value to the consumers to differentiate from other competitors and capture consumers' mindshare, in addition to executing conventional retail business fundamentals such as purchasing products from suppliers and selling them to consumers. For example, it is becoming indispensable for retailers to offer multiple delivery service options in accordance with consumer's preferences for place and time. For example, it is becoming indispensable for retailers to offer multiple delivery service options in accordance with consumer's preferences for place and time. Retail delivery service options such as installation of self-service delivery lockers, drones, self-driving car and so on continue to increase.

As the aging and digitalization of the society continues, people's work and lives are adopting to a lifestyle that is not bound by time or place. This change in the lifestyle has created two major trends in consumers' shopping behavior: one trend where consumers simply want to buy the necessary items in an easy manner, while the other trend leans towards shopping for pleasure. Brick-and-mortar stores will continue to be indispensable as places of people-to-people exchanges and community building. Brick-and-mortar stores will continue to be indispensable as places of people-to-people exchanges and community building. As the retailers practicing "Consumer-Centric Retailing" are in a position to have a deep understanding of their customers, they will be able to use their stores as communication hubs for their customers. Retailers will also be able to offer most appropriate and concrete gift options for occasions that mark an important life event in the life of a friend or a colleague. Finally, there is no doubt that retailers with a consumer-centric business model will also increase their importance as a social infrastructure.

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Business Outline :

NEC has been a leader in the field of industrial technology, and we have been a driving force behind the development of cutting-edge technologies in the three areas of computing, network, and software solutions. We have been also promoting various research and development initiatives that look into the future in the advanced areas of data science and artificial intelligence (AI).

As a 'Value Provider' we are focused on the values of "Safety," "Security," "Efficiency," and "Equality" through our Solutions for Society business, as we work to solve social issues from a global angle with the ultimate goal of helping people live more prosperous lives.

Brand message:
"Orchestrating a brighter world"
NEC brings together and integrates technology and expertise to create the ICT-enabled society of tomorrow. We collaborate closely with partners and customers around the world, orchestrating each project to ensure all its parts are fine-tuned to local needs. Every day, our innovative solutions for society contribute to greater safety, security, efficiency and equality, and enable people to live brighter lives.

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