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Insight

Keeping Ahead of the New Supply-Chain Dynamics

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Keeping ahead of the new supply-chain dynamics

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Executive Summary

Technological advancements have greatly benefited consumers during the past decade. Consumers can now choose from seemingly unlimited products and services, compare prices in real time, and access detailed information on a product's origins and performance. It's clear that technology will keep changing how consumers behave and keep raising their expectations. Now firms throughout the supply chain need to be proactive in adapting to this consumer-led environment and be ready to cope with new technologies and innovations that will disrupt their businesses. Our aim in this publication is to present a conceptual framework to help Thai players navigate the changes in global supply chains. Thinking systematically will help companies recognize the potential opportunities and disruptions so that they can stay competitive.

EIC suggests 3 C's for businesses to thrive in the era of consumer-led supply chain:
1. Collaborate – companies in the supply chain need to understand that consumers are the true determinants of which products and services need to be offered and at what prices. Firms should be ready to adapt quickly because consumer needs keep changing. Businesses have to work together more closely so that they can better manage production and inventory management.

2. Customize – companies need to be prepared to increase their use of mass customization, since this is an important way to meet today's ever-diversifying customer needs. Investing in technology to help collect data from consumers and analyzing consumer preferences is how businesses can offer a wider range of products and services tailored to their customers. This will also help companies streamline their supply chain management.

3. Control – companies throughout the supply chain must be ready to meet higher consumer expectations regarding social and environmental factors. Companies need to not only improve their business operations, but also how they communicate about themselves on social media. After all, social media is the primary stage where consumers express their views on social and environmental responsibility. Any company that wants to enter into the supply chain of a big brand has to meet high standards on social and environmental issues. Small businesses should strongly consider upgrading themselves in this area.Innovation, whether a new product or a new business

model, can disrupt the supply chain. Innovation will have a severe impact on the businesses that it disrupts. Companies that do not learn to manufacture the new products and use new technology in their operations won't be able to enter into innovation-driven supply chains. This is especially true for tech-related products, whose manufacturers will be forced to monitor rapidly changing technologies very carefully if they want to stay viable. Changes will also result from new business models, such as business platforms and products offered in the form of services. The rise of new models is a particularly fast-growing trend at this time, and it will have an impact on companies and supply chains in adjacent industries. Forward-thinking business models will transform consumer behavior by offering services that are different from those of legacy businesses. Some businesses in the supply chain are shrinking – for example, middlemen like wholesalers and agents – under pressure from online business platforms, e.g., Alibaba and other B2B marketplaces. Because of these factors, a supplier must be prepared to continually upgrade its products and keep up with new innovations so that it does not forfeit its place in the supply chain.

How can Thai industries gain footholds in global supply chains? Understanding technology and consumer behavior is the first step in developing a plan to join a new supply chain. EIC recommends three main actionable steps for business management to consider: 1) Map out a plan for technology use within the business in order to maximize efficiency, 2) invest in human resources and an optimal business structure, and 3) develop supply chain flexibility. Businesses have the opportunity to profit from technology, whether it is finding new markets resulting from new consumer demands or gaining the benefits of performance optimization such as cost reduction, operational risk management and higher customer satisfaction.


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Order Pick Time
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Order Pick Time
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GPS Signal
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120
85%
DATA
Connect...
99%
72%
VOICE RECOGNITION

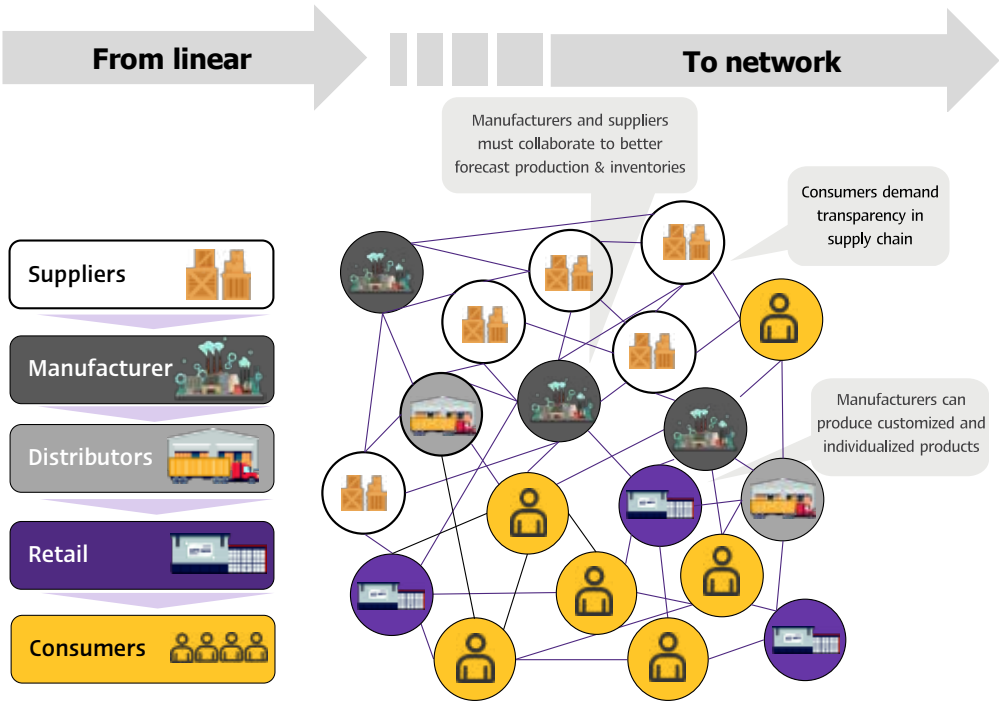
1

Re-centering the supply chain on consumers

Advancements in digital technology have transformed many industries and altered producers' and consumers' thinking processes, demands, behavior and relationships. Producers and consumers are now in continual contact with each other, which is forcing the supply chain system to change. Consumers have gained bargaining power, and so producers have had to adapt. The pattern of relationships within the supply chain has changed from a linear model to a network.

A conventional supply chain is structured as a step-by-step sequence of production processes. Each player handles a single step. The first step is ordering raw materials to be made into parts in the second step. In the third step, parts are assembled into finished goods, which are then stored as inventory in the fourth step. Products reach consumers in the fifth step. But when products become more sophisticated, the number of steps increases. The new supply chain resembles a network because consumers can continually exchange information with different business units throughout the supply chain, without having to go step by step. Such information from consumers can determine the planning of a supply chain, including product design, production quantity and delivery method. Therefore, supply chain systems must be improved to meet evolving consumer demands.

Technology and consumer behavior have changed the nature of relationships in the supply chain



Source: EIC analysis based on data from Deloitte

Some 1.8 billion consumers now rely on reviews on social media for information when deciding on a purchase. Technology has put the consumers in the driver's seat, letting them determine what products and services should be sold, at what prices and using what kinds of raw materials. Consumer demand has diversified, and customers increasingly bypass standardized products and services in favor of ones tailored to meet their needs. Consumer expectations increasingly encompass the social and environmental factors involved in what they buy. For these reasons, today's consumer-centric supply chain needs to be transparent regarding processes and origins, and it should move away from a model based on a single product toward one that facilitates variation and variety. Product design should now rely less on historical data sets and more on real time data retrieved at the point of purchase. Product displays that used to be fixed and lasting should be redesigned to accommodate flexibility and rapid transformation. Above all, a consumer-driven supply chain requires all players to learn how to collaborate and share information more closely.

1.1 Customer insights should drive close collaboration throughout the supply chain

In an age of fast-changing customer demands, businesses need to create competitive advantage by quickly identifying consumer needs and instantly communicating this information to other businesses within the supply chain. The fashion industry is the prime example of close collaboration between upstream and downstream businesses to speed up creation of new products. A fast-fashion retailer like Zara needs only two weeks to put new products into its stores, whereas its competitors take three to six months. Zara responds instantly to changing market demand. They have set up a direct communication channel linking local store managers, who spot new trends, and a head office team comprising all related divisions including design, procurement and production. Zara's strategy calls for constant evaluation and revision of input costs and selling prices, which requires businesses within its supply chain to keep tight control over costs. This business model requires Zara to closely communicate and collaborate with all parties in its supply chain by sharing new data on a weekly basis. It requires keeping a communication channel open between all parties within the supply chain so as to spread information simultaneously.

Because new products have shorter sales lifespans today than ever before, businesses need to greatly improve their ability to forecast market demand so as to better manage production and inventories. Since consumers can compare and select from a wide variety of products more easily than before, businesses need to constantly offer new products and broaden their offerings in order to maintain customer interest. Some 50% of the manufacturing industry's total sales today comprise new products that have a sales lifespan of less than two years. Among goods purchased by general consumers, 30% of electronic products become outdated every year. This means that businesses within the supply chain need to be careful about estimating production output in order to avoid overruns. Poor planning can lead to excess inventory costing as much as 50% of total costs. Conversely, underestimating demand can lead to lost opportunities, as in the case of a computer maker that sacrificed $1 billion in sales because it failed to anticipate high demand during Christmas.

The more that businesses within a supply chain collaborate, the better their demand forecast will be. One example is Walmart's work with Warner-Lambert, brand owner of Listerine mouthwash. The giant retailer and the consumer products maker partnered up with a goal to improve their forecast of demand and inventories. To do so, each company produced its own forecasts each week, then worked with the other to

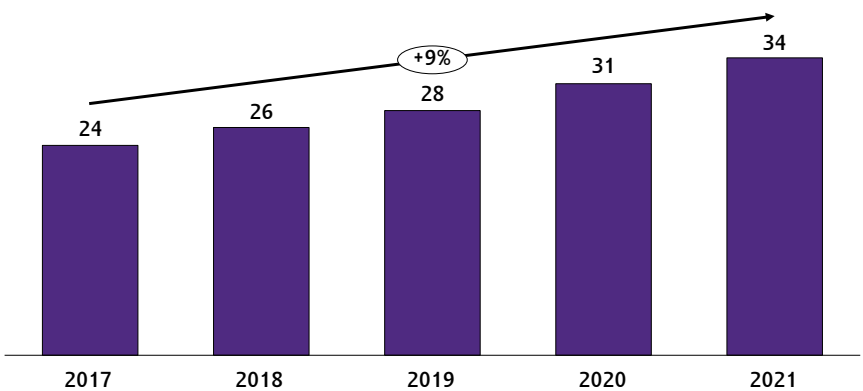
reconcile them on a weekly basis. Together they reduced the product supply cycle time to six weeks in advance of delivery. The collaboration enabled Warner-Lambert to better plan its production, and Walmart was able to improve its Listerine inventory levels to meet 99% of ongoing demand, up from a service level of 85% before, while lowering inventory costs. Besides such collaborations, IT systems can also be integrated to enhance management of data, like using POS systems or enhancing connectivity between businesses in the supply chain to enable key data to be shared, stored and used in a variety of ways.

Logistics companies are an increasingly key link in supply chains because online shoppers want fast delivery. Some 60% of millennial consumers want next-day delivery. According to a 2017 survey by JDA Software, nearly 90% of businesses say that logistics companies have become more important to their strategy and are crucial in gaining a competitive advantage. Strong logistics are especially important for products that are only marginally different from or better than rivals; superior service can provide the good customer experience that leads to a repeat purchase. As a result, logistics companies are under pressure to come up with new distribution methods that are quicker, more accurate and traceable. For example, demand for temperature-controlled delivery service (i.e., cold-chain logistics), will increase in line with growing online demand for fresh groceries, a business that grew by more than 40% globally between 2010-2014. These pressures mean that logistics providers need to work closely with upstream businesses in order to prepare the appropriate mode of delivery and collaborate with downstream businesses to establish delivery networks that better respond to increasingly specialized consumer needs.

1 Cold chain market in Thailand is expected to grow 9% a year until 2021

Thailand's cold chain market forecast

Unit: Billion THB



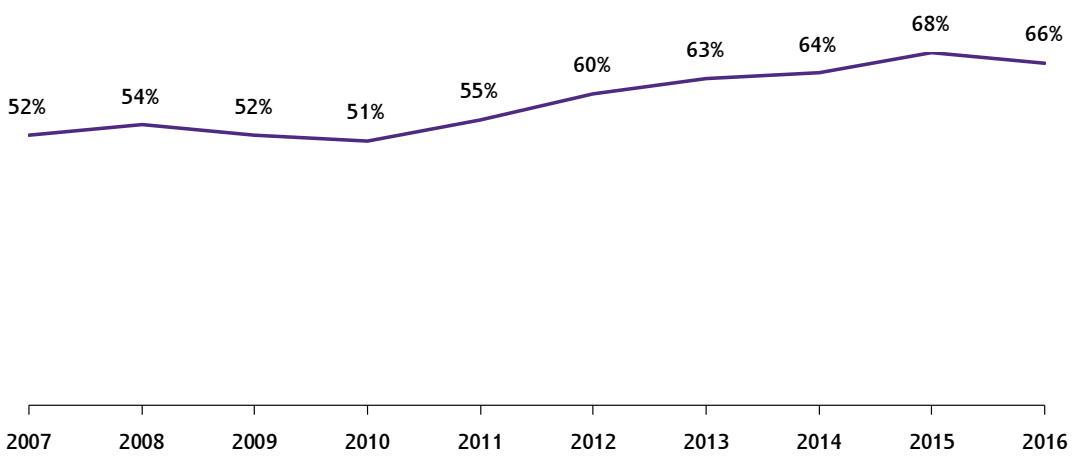
Source: EIC analysis based on data from DBD, MOC

Even small businesses need to improve production efficiency and inventory management. Fast changing demand pushes companies to forge stronger links to upstream and downstream businesses in order to exchange information and adapt appropriately, especially during the design and development stages of the product cycle. EIC's interviews with garment makers in Thailand earlier this year revealed that some have had to cancel wholesale orders from retailers selling online. The manufacturers were unable to follow through on orders that were either too difficult to produce or not worthwhile. This shows how important it is to establish good communications at the initial stage. Businesses that need to collaborate within a supply chain should take better advantage of technology, particularly in the case of any SME that relies on the relationships, judgment and experience of the owner to make business decisions. For example, small companies can share sales forecast data to better prepare partner businesses for the coming three months of production. They can also adopt systems that improve efficiency.

2 Inventory level of Thai manufacturing industry has increased over the past decade

Inventory ratio to average production capacity of Thai manufacturing industry

Unit: % of inventory/production capacity, monthly average

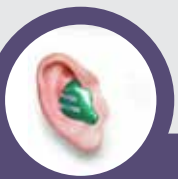


Source: EIC analysis based on data from Office of Industrial Economics

How Will 3D Printing Change Supply Chain?

Current Supply Chain

Change in Supply Chain with 3D Printing Technology



Ownphones uses 3D printing technology to produce over 1,000 customized design for headphone

3D printing fuel nozzle allowed GE to reduce the number of parts used in its jet engines

Boeing's 3D printing titanium parts help the company save on raw material compared to traditional production methods

Using 3D printing technology, Siemens was able to produce parts for train model that has been discontinued

Source: EIC analysis based on data from GE, CFM, EOS, Ownphones, Siemens

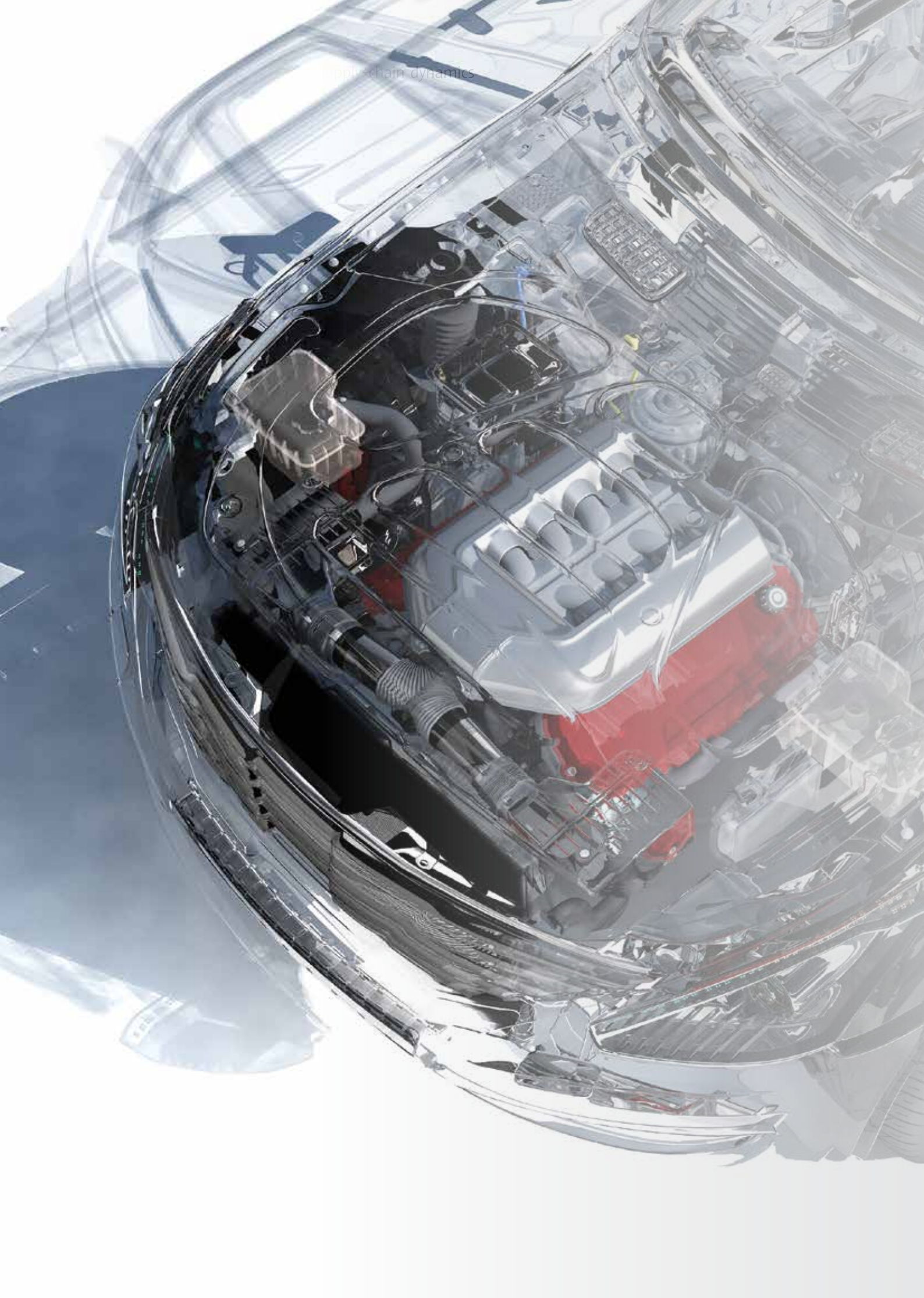
1.2 Customization will make supply chains more complex

As product diversification increases, so will the diversification of raw materials and parts. Consumer industries are shifting away from mass production toward mass customization. Consumers nowadays want to assert their individuality by using unique products and ones with special characteristics and performance. This change in the trend of consumption will drive supply chains to become more complex at every stage. Product development and customization will become more complicated. A greater variety of raw materials and machinery will need to be sourced. More testing and quality control will be needed. And distribution will need to become more sophisticated.

3 New tech enables customization at mass and individual levels

Industry	Configured customization	Individualized customization
Apparel	Online shoe configurators ("NIKEiD")	Tailored shirts
Cosmetics	Perfume, lipstick, hair dye	Foundation makeup, shampoo
Wellness & Healthcare	Vitamin compounds	DNA-based personalized medicines

Source: EIC analysis based on data from McKinsey & Co, BITE Beauty, Bumrungrad International, True & Co



BOX

Carmakers shift toward common product platforms

The auto industry is increasing its use of modular platforms, which allow different car models to be made using the same parts, thereby reducing production costs. Increasingly intense competition within the car industry and more complex demands from customers have prompted manufacturers to adopt modular product platforms. They adjust traditional production technologies so that basic structures and parts can be used across different models. This reduces costs through economy of scale and makes it easier and faster to modify designs. This in turn lets carmakers better respond to the diverse demands of their customers.

Both large and small car producers are going modular Volkswagen, for example, has been one of the leaders in adopting modular platforms and it plans to expand this approach. By 2025, its reliance on modular platforms will rise to 60% of all parts used in production, reducing costs by 30%. Mazda is much smaller, producing just 16% as many units as Volkswagen, yet in 2011 it launched its "Skyactiv" platform, integrating it into in all models. This technology reduces costs and weight while increasing sturdiness, energy efficiency and environmental performance.

Modular platforms will impact the supply chain via both manufacturing and logistics channels:

1) Parts makers will need to expand production capacity and upgrade quality to meet international standards. Use of a modular platform require a car company to source primary components in higher volumes. This will drive parts producers to expand capacity. But not all suppliers can easily ramp up volume. Expansion will require significant investment in machinery, and labor shortages and rising wages will be constraints. Achieving higher quality will also be a challenge. Many parts producers have only had to meet the less demanding standards required by a regional car manufacturing base. Parts for modular production need to reach top global benchmarks because they are used in cars sold all around the world, including Europe and other markets with stringent requirements.

2) Companies will need to improve inventory management and product distribution. Parts makers will need to increase efficiencies in inventory management and product distribution in order to accommodate more orders, which will be challenging. And they will need to decide whether to manage their own inventories or to outsource this work. In any case, they will need to accurately forecast inventories on a continual basis in order to meet demand from car producers.

Companies need to recognize that meeting consumer needs and creating value is not limited to products but also means providing special services. Businesses should fully understand consumers' wishes in order to cater to them precisely. This affects product presentation and pricing. For example, Bite Beauty, a Canada-based maker of lipstick, has launched a service called Bite Lip Lap that allows the customer to customize a purchase at either of two levels. At the most accessible level, a customer may select a lipstick in any one of 200 shades, for a price of $55. A more particular customer could instead seek advice from a Bite Beauty specialist who will help create a personalized lipstick shade, at the price of $150 for two sticks. The brand also organizes private events for customers. The success of this young company shows the importance of selling products through well-conceived service design.

Businesses should harness consumer data to use in new product development, product customization and supply chain management. True & Co., an online lingerie store, offers highly customized products developed using algorithms and big data from detailed market surveys that cover such information as recent lingerie purchases, color preference, texture preference and size. The company built upon the data to effectively manage its supply chain. For example, having identified some 6,000 different female body types, the company can provide a precision-tailored customer experience. When it found that women prefer dark colors to light ones, its designers adjusted product color options accordingly. This deep insight capability also facilitates materials procurement. True & Co's possession of data on 5 million customers makes them very competitive against rival brands. Similarly, sports shoe makers like Adidas and Nike offer platforms that allow customers to design their own footwear. The customization

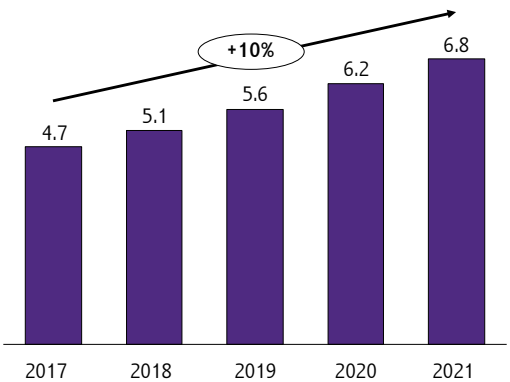
platform yields detailed consumer preference information that allows these firms to identify popular new patterns and trends as they emerge. Companies should exploit the data derived from mass customization in order to improve their supply chain management, product designs and marketing.

After a product has been customized, the company must ensure precise, reliable transportation in order to minimize errors that can alienate consumers. The loss or damage of a customized product will impose an excessive wait on the customer because reissuance or replacement is likely to require extra time to process compared to goods kept in inventory. Moreover, some customized products require special handling, especially in the case of medical and health-related products, e.g., blood samples used in the production of dietary supplements or medications, which may be specific to the customer's genome. Such products entail complex transportation, packaging, temperature and speed requirements as well as protection of personal data. Thus, logistics providers must raise their standards to service customers who require sensitive handling of products. They can improve performance by adding monitoring systems that use RFID; investing in cold-chain systems; tightening security measures in the warehouse; and understanding rules and regulations related to transportation.

4 Investment in technology such as RFID to help reduce shipping errors is expected to increase

Forecast of RFID market in Thailand

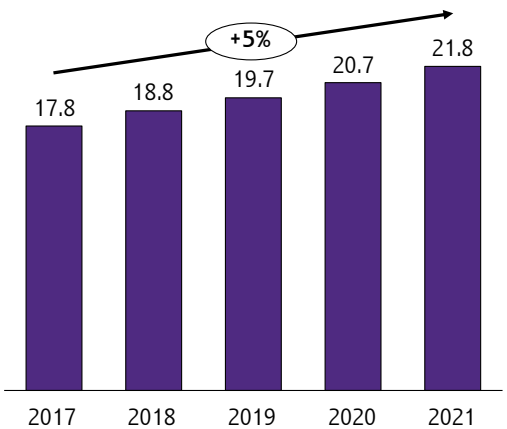
Unit: Billion THB



Source: EIC analysis based on data from MOC, RFIDThailand

Forecast of global RFID market

Unit: Billion USD



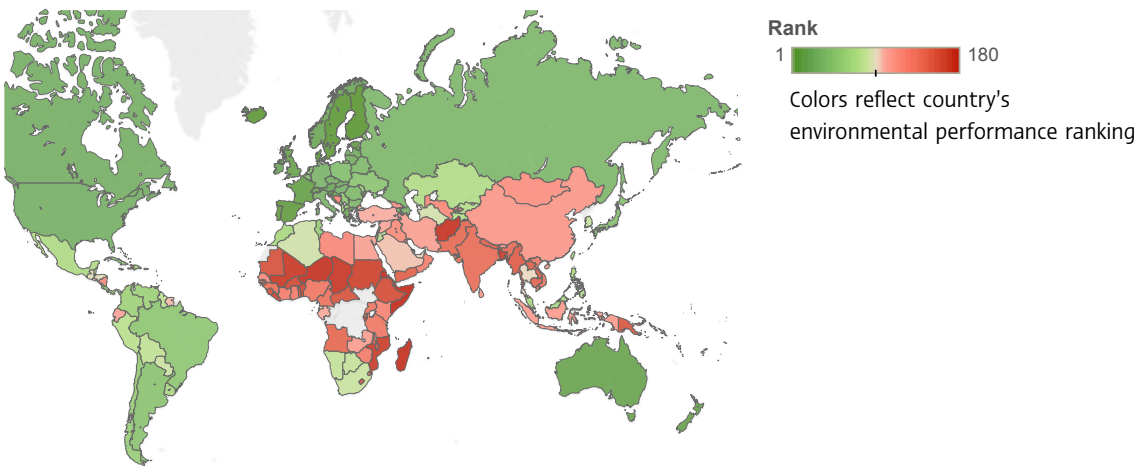
Source: EIC analysis based on data from marketsandmarkets.com and IDTechX

1.3 Improving sustainability is key to meeting consumer expectations

Over 30% of consumers choose brands that show responsibility on social and environmental sustainability. survey of 20,000 consumers by Unilever found that consumers considered social and environmental impacts when deciding on a purchase. Consumers in regions vulnerable to climate change, e.g., South America and Southeast Asia, show greater concern over the environment than those in the United States and Europe. This indicates that a message regarding a product's sustainability factors can shape the consumer's purchasing decision. One rising trend is the proliferation of product labels that provide information on the maker's environmental responsibility. For example, some 400 companies in Thailand have provided labels indicating the carbon footprint of each of about 1,460 products under a program organized by the Thailand Greenhouse Gas Organization.

5 Consumers in Asia are more concerned about the environment than consumers in North America and Europe due to their experiences with negative environmental impacts from businesses

Ranking of countries based on environmental performance



Source: EIC analysis based on data from Yale Data-Driven Environmental Group and Center for International Earth Science Information Network (CIESIN)

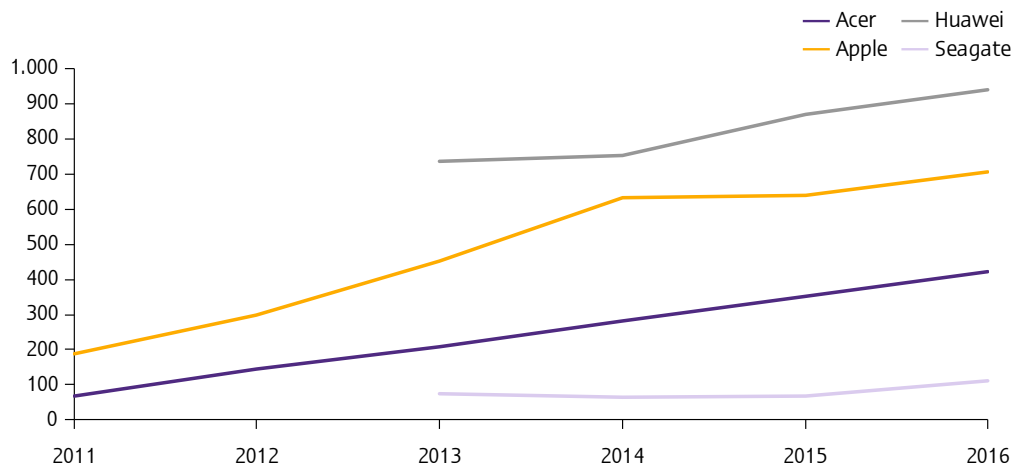
Companies should use social media to understand consumers' expectations regarding sustainability. This is especially important in tracking millennial consumers, because social media serve as their main channel of news and information, and also because this group cares more about social and environmental issues than other generations do. A survey by the PR firm Edelman found that over 50% of global consumers prefer brands that promote the social and environmental causes that matter to them. This suggests that companies should identify the issues and causes that the consumers care about, then consider devising appropriate policies that will communicate a sympathetic corporate stance. For example, Starbucks projects a sustainable image points with its fair trade coffee offerings. Likewise Pepsi has committed to a policy of helping reduce consumption of water. Conversely, companies that fail to heed social and environmental factors run the risk of consumer boycotts. In 2015, for example, politicians and human rights groups in the United States called for a boycott of exports of seafood from Thailand following media reports that slave labor is used in the supply chain. Risks involving sustainability will likely become more prominent in the future in industries that are vulnerable to such problems in their supply chains, including foods, mining and clothing.

Because consumers evaluate the impact of a product or service based on the performance of the overall supply chain, small businesses must upgrade their operations in order to participate in the major supply chains. According to EIC's interviews with SME owners earlier this year, large companies increasingly use international certifications such as ISO to benchmark candidates when selecting suppliers and trading partners. Big brands now inspect their suppliers' operations more closely than before in order to minimize risks in their supply chains. To support greater transparency, companies in various industries have developed sustainability inspection processes, such as the Electronic Industry Citizenship Coalition and Together for Sustainability (TfS) in the chemical industry.

6 Number of audited suppliers are increasing year on year

Suppliers for electronics industry that have been audited

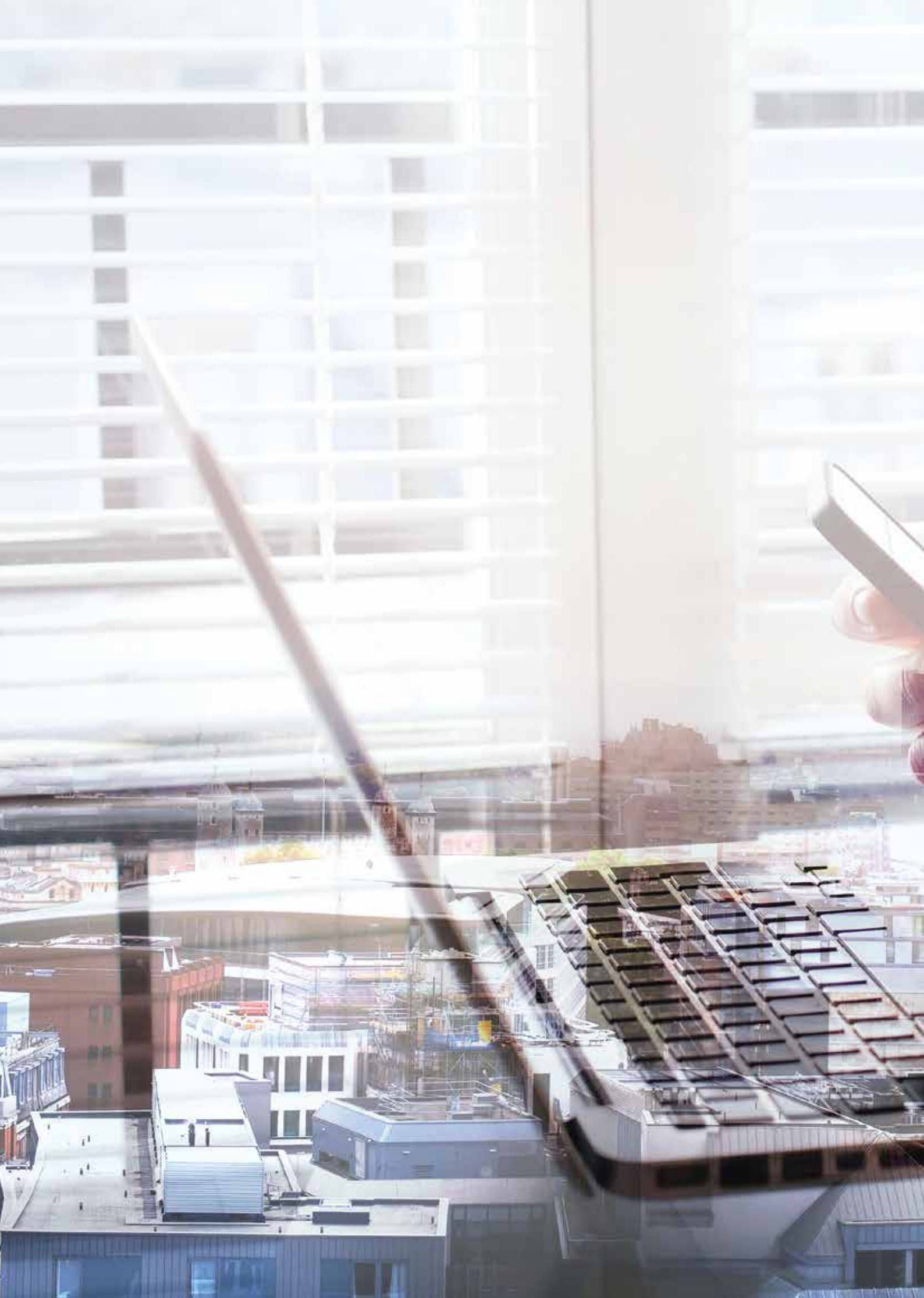
Unit: Number of Suppliers



**data for Huawei and Seagate only available from 2013 - 2016*

Source: EIC analysis based on data from Acer, Apple, Huawei, Seagate, and EIC Coalition

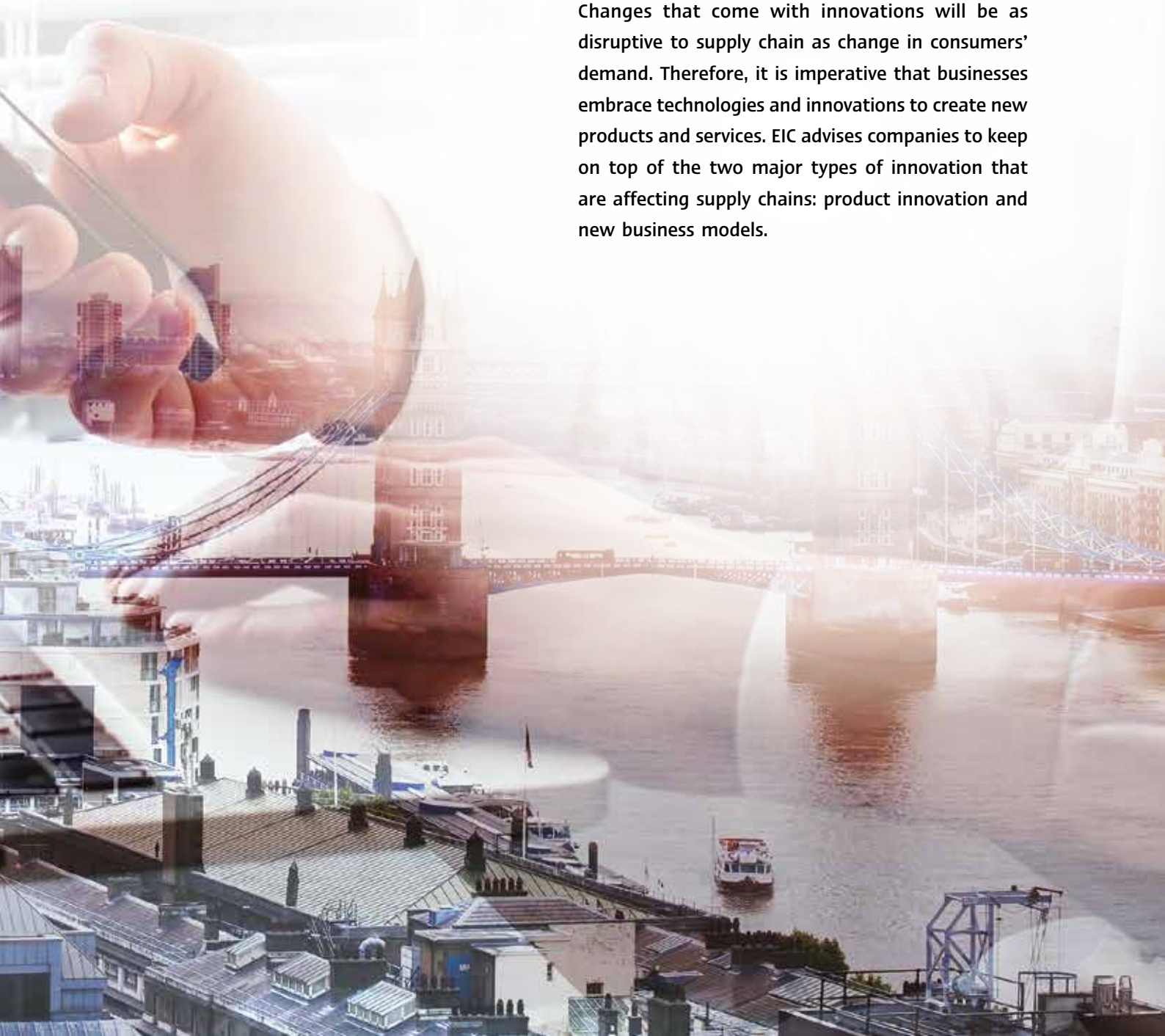
Control of operations in a supply chain requires intensive use of technology because customers now want to know more about a product's sourcing, particularly in the case of consumer goods. Consumer trust deteriorated after major food safety scandals, as in the case of fake milk powder in China and mislabeled horsemeat in Europe. Now, consumers demand full product details regarding ingredients and sourcing. A survey by the data analysis firm Label Insight found that more than half of consumers show loyalty to brands that are transparent. It's clear that producers need to control the quality and safety of their products, and to provide information on the transparency of supply chains.



2

Keep an Eye on How Innovations Transform Supply Chains

Changes that come with innovations will be as disruptive to supply chain as change in consumers' demand. Therefore, it is imperative that businesses embrace technologies and innovations to create new products and services. EIC advises companies to keep on top of the two major types of innovation that are affecting supply chains: product innovation and new business models.

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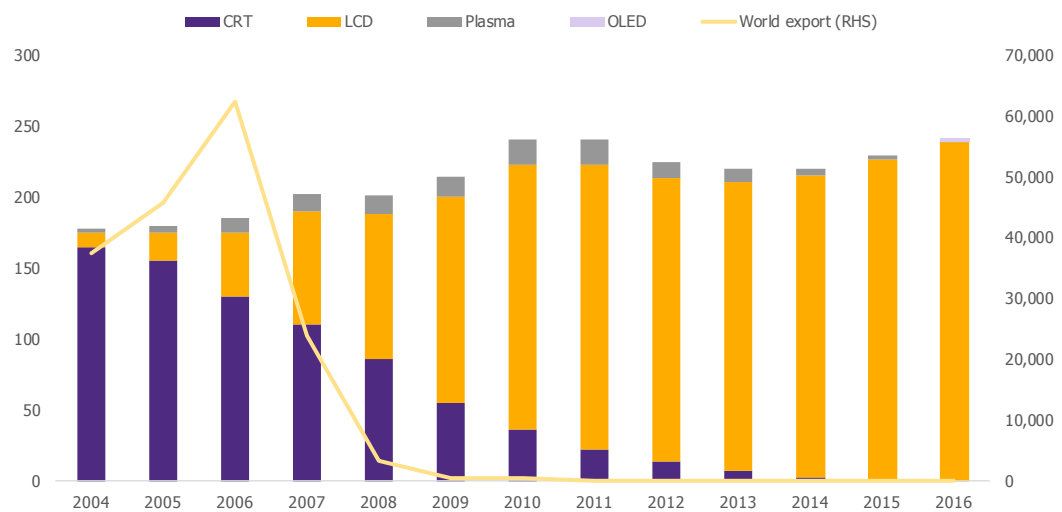
2.1 Product innovation

New products resulting from new innovations may displace a market's existing players and disrupt an entire industry's supply chains. For example, the emergence of smart phones caused Nokia to lose its competitive edge to Apple and Samsung and eventually sell its mobile handset business to Microsoft. Moreover, smart phones made components like keypads obsolete, impacting parts suppliers. Similarly, LCD television sets have almost completely replaced TVs that use cathode ray tubes (CRTs). Producers have had to stop making CRTs and shift to manufacturing LCD models. But the companies that were most affected were parts producers, because LCDs require very different technology. Many parts suppliers could not make the transition, which would have required them to research and develop their own LCD technologies or acquire them. Now screens based on OLED technology are reshaping the TV industry and are likely to replace LCDs in the future. If producers cannot keep up with the best new technology and trends, their competitiveness will shrink or vanish completely.

7 As LCD television gains popularity, production and export of CRT television decreases globally

Television production and exports

Unit: million (LHS), Billion USD (RHS)



Source: Display Search, Trademap

BOX

From TVs to smartphones, Corning kept pace in electronic visual displays

Corning Inc.'s strength is its mastery of technology for manufacturing glass and mirrors, based on 160 years of experience in its industry. The company began as a manufacturer of glass and ceramics, and it started producing glass for lightbulbs in 1879. Corning's continual investment in R&D of glass and mirror manufacturing technology allowed the company to enter supply chains of a wide variety of different industries. In 1939, Corning started producing glass bulbs for the cathode ray tubes (CRTs) that were then the main components of television sets, and it moved on to making LCD glass in 1982. In 2007, the company revolutionized the screens used in smartphones with its Gorilla Glass, which resists scratching and impact. The firm also developed many other products that utilize the special properties of glass. In 1970, Corning was the first company to produce viable optical fiber for the telecom industry.

Throughout the many decades of change in the television manufacturing industry, Corning Inc. was one component maker that managed to survive, thanks to adapting its business and developing appropriate products to accommodate new technology. When active matrix LCD display technology was introduced in 1972, it showed potential to disrupt the industry. Corning began to invest in developing LCD glass, even though the company had been making CRT glass bulbs for over 40 years, and even though the new displays required using very different materials than in CRTs. In 1982, the company developed LCD glass that could display images more accurately than other products available on the market at that time. When CRT TV sets started to fall out of favor in 2005, Corning was able to transition into becoming an integral

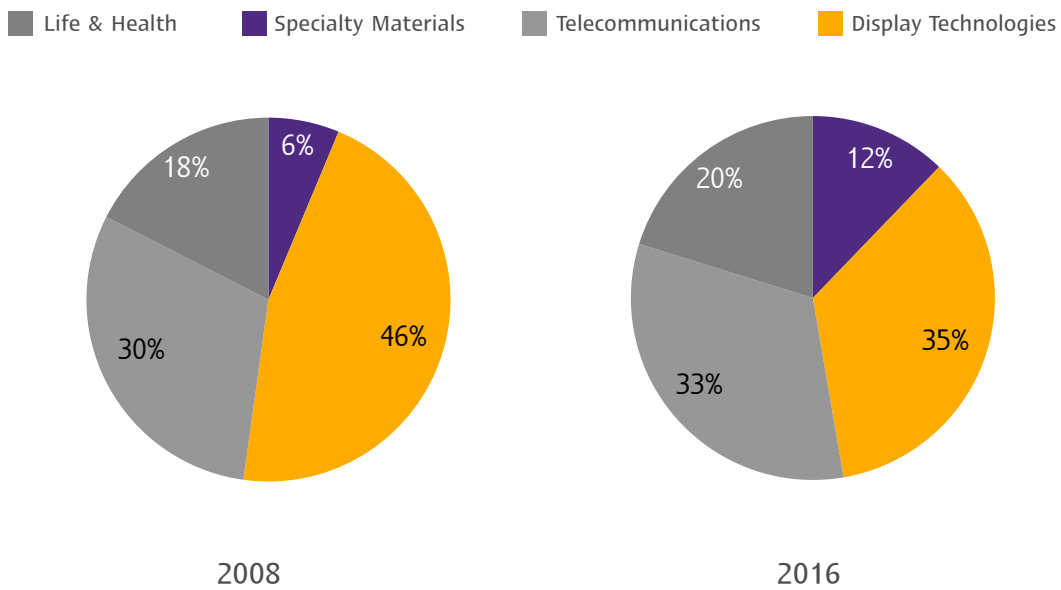
part of the LCD TV supply chain. Building on its glass screen technology, Corning developed its special glass for smartphones in 2008. When the TV market began to decline in 2010, the company was able to thrive on income from supply chains for smartphones and tablets.

Manufacturers should prepare well in advance to cope with the risks of technological disruption. Predicting the arrival of a new disruptive technology is difficult. Decades ago, change came slowly. It took 20 years for LCD TVs to replace CRTs, but the transition from feature phones to smartphones happened within a single decade. To avoid obsolescence, manufacturers should try to identify emerging technologies early on and improve their ability to develop new products for the coming transition. Keeping alert will help companies prepare for competition.

8 Share of corning's revenue from smart phone- related products (specialty materials) has increased over time; while share of revenue from display technologies has decreased.

Corning

Unit: %



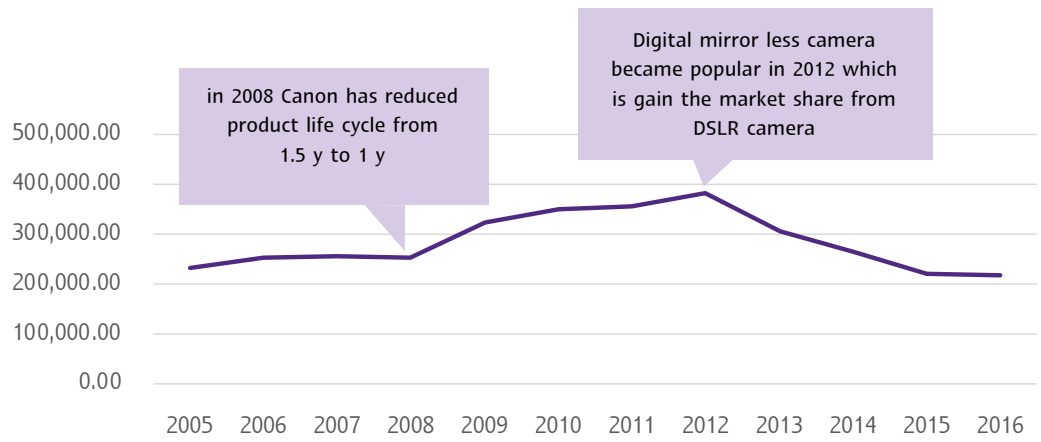
Source: EIC analysis based on data from Bloomberg, Corning Inc.

Today, steady investment in innovation has shrunk product life cycles. This is especially true for electronic parts for mid-range products for the mass market. In the past, it usually took two years to develop a new electronic product. Now the cycle is down to just one year. This change has implications for production plans and the sourcing of parts in the supply chain. Producers of parts such as CPUs and enclosure materials need to improve their production lines to become faster and more efficient. Failure to do so can prompt buyers to reduce orders or shift them to other suppliers. For example, the product cycle of Canon's DSLR cameras shorted to 1 year after 2008, from 1.5 previously, and its revenues grew at an annual rate of 11% from 2008 to 2012. But mirrorless cameras became more popular in 2012. Canon's DSLR revenues dropped in 2013 and 2014, even though it continued to develop and launch new models. This demonstrates the risk from disruptive technology.

9 Canon's revenue generated from DSLR camera

Canon Inc. revenue - digital camera (DSLR)

Unit : Million USD

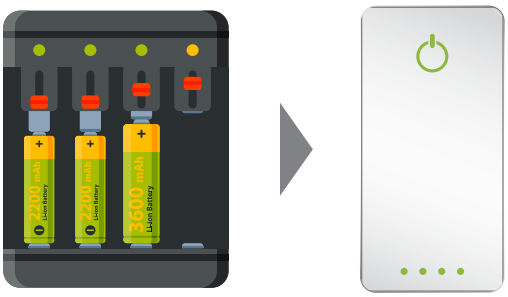


Source: EIC analysis based on data from Bloomberg

On the other hand, new innovations can lead to the creation of new ancillary products and products that ride on similar trends, generating new markets. One example is the wide variety of new accessories that follow the invention of smartphones. For instance JBL's portable speakers used to rely on a wired connection to a music player, PC or phone. The company then switched to using a new type of connector for Apple iOS devices like the iPhone, for greater convenience. JBL kept improving its speaker designs, which eventually allowed for a wireless connection, namely Bluetooth, that works with many devices. Another example is the power bank, which used to be a charger for AA batteries. It was later developed into a lithium battery that provides enough electric power for smartphone users. The rise of smartphones has also supported the growth of wearable devices that can track fitness and exercise. Fitbit, for example, came out in 2009 following the release of Apple's iPhone. An iPhone mobile application collects data from the user's Fitbit and processes the information to display statistics and charts. Even "selfie sticks," which were first invented in 1990 for use with traditional cameras, were later reborn as accessories for smartphones. During 2015, sales of selfie sticks topped $55 million.

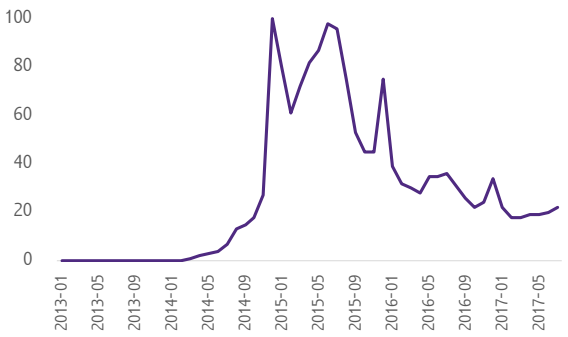
10 Products that have been modified to support innovations have created new markets

Charging equipment for rechargeable batteries was modified into power bank to be used with smartphones



Selfie stick was invented in 1995 but did not become popular until 2014

Unit: Index of interest on selfie stick based on search term



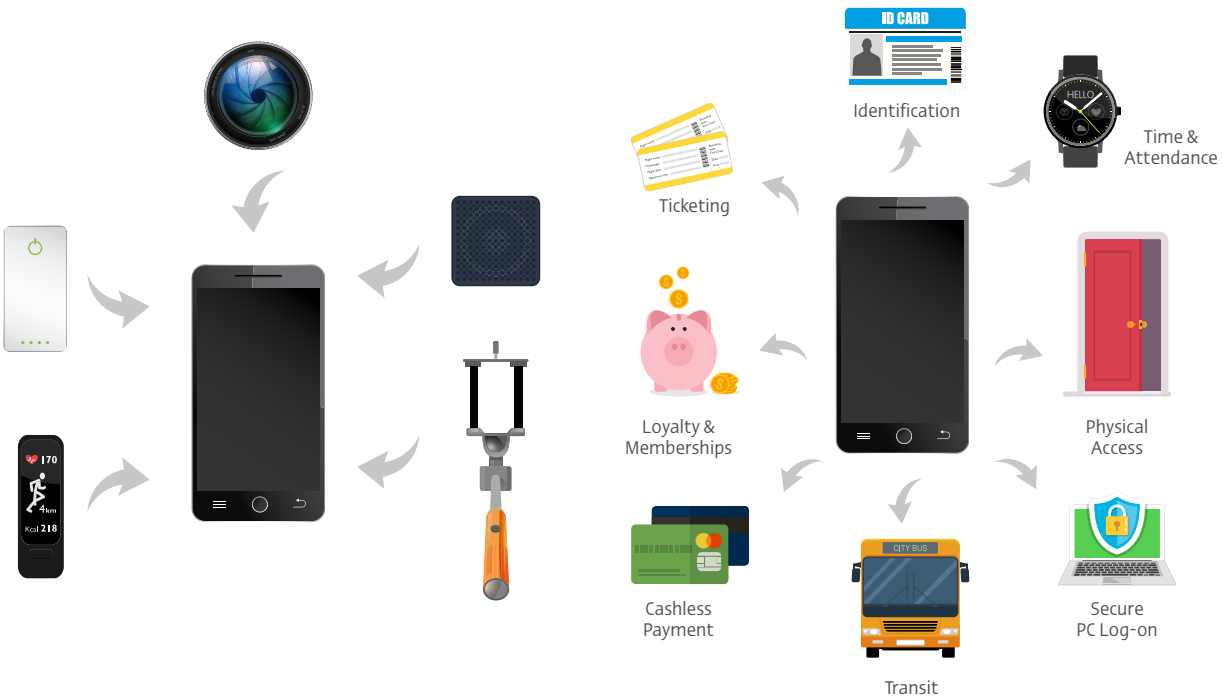
Source: Google Trend

Businesses should closely follow trends in technology and innovation so as to improve products and services for the future. The electronics industry, for example, continually introduces new technologies that allow devices to interconnect. This new technology can open up new opportunities. The advent of near-field communication (NFC) technology enables smartphones and even credit cards to transmit signals, such as for electronic payments, over short distances of 4-5 centimeters. So now other related devices must be improved to be able to link to electronic data capture systems (EDCs) and credit cards. In other words, smartphones are bringing about a partnership among phone makers, credit card providers and financial institutions. And NFC is being used for other purposes as well. In France, the city of Nice has installed NFC chips in all of its public transportation service systems for use in payments. The city has also installed NFC chips at key attractions to provide information to tourists. Or consider Tapit, a marketing company, which is among the first to use NFC technology to help clients with promotions and product launches by encouraging the participation of event attendees. A business that quickly spots how innovation creates new opportunities will gain a first-mover advantage.

11 Opportunities to develop new products and services to serve new markets created by innovations

New products invented to compliment smartphones

NFC technology development has been integrated with new smart devices and new services



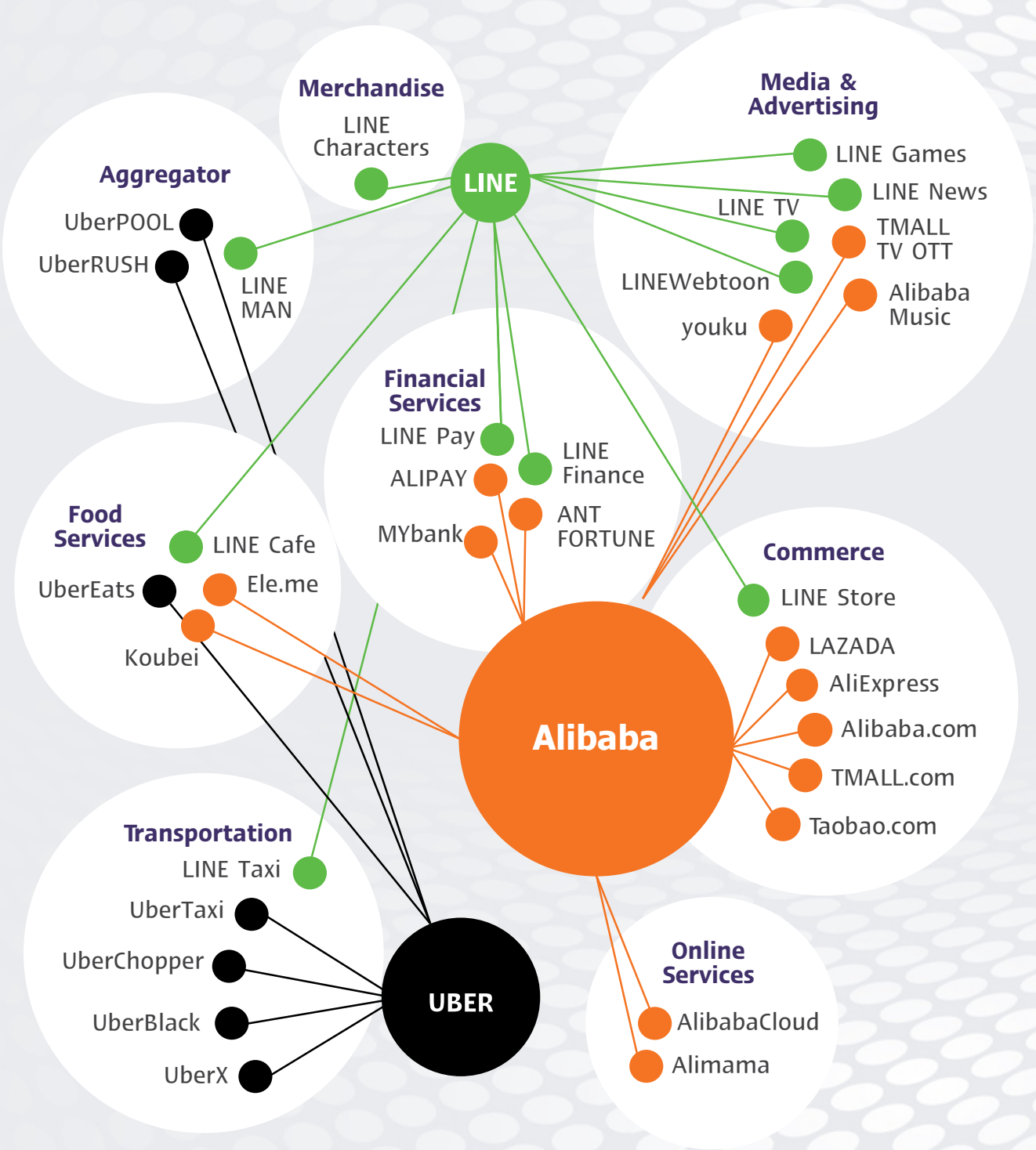
Source: EIC analysis based on data from cityam, colourfastRFID

2.2 Business Model Innovation

Technological progress can lead to a new business model that disrupts a traditional business. Business model innovation means adapting new technology to an existing business or developing an approach that is entirely new. For example, Amazon pioneered technologies that enabled customers to buy books online. The company later developed its system into a platform on which other merchants and customers could buy and sell to one another directly. Another example is a new business model by Philips Lighting that uses internet of things technology to monitor and control light bulbs. Philips Lighting's new model transforms it into a lighting service provider rather than a seller of lightbulbs. This and other examples demonstrate that technological progress is changing the business landscape. Companies should therefore work to understand new trends and adjust their strategy appropriately to protect market share and stay competitive. **Among the many new business models, EIC believes that platform businesses and product-as-a-service (PaaS) will become more widely adopted and create a strong impact on supply chains.**

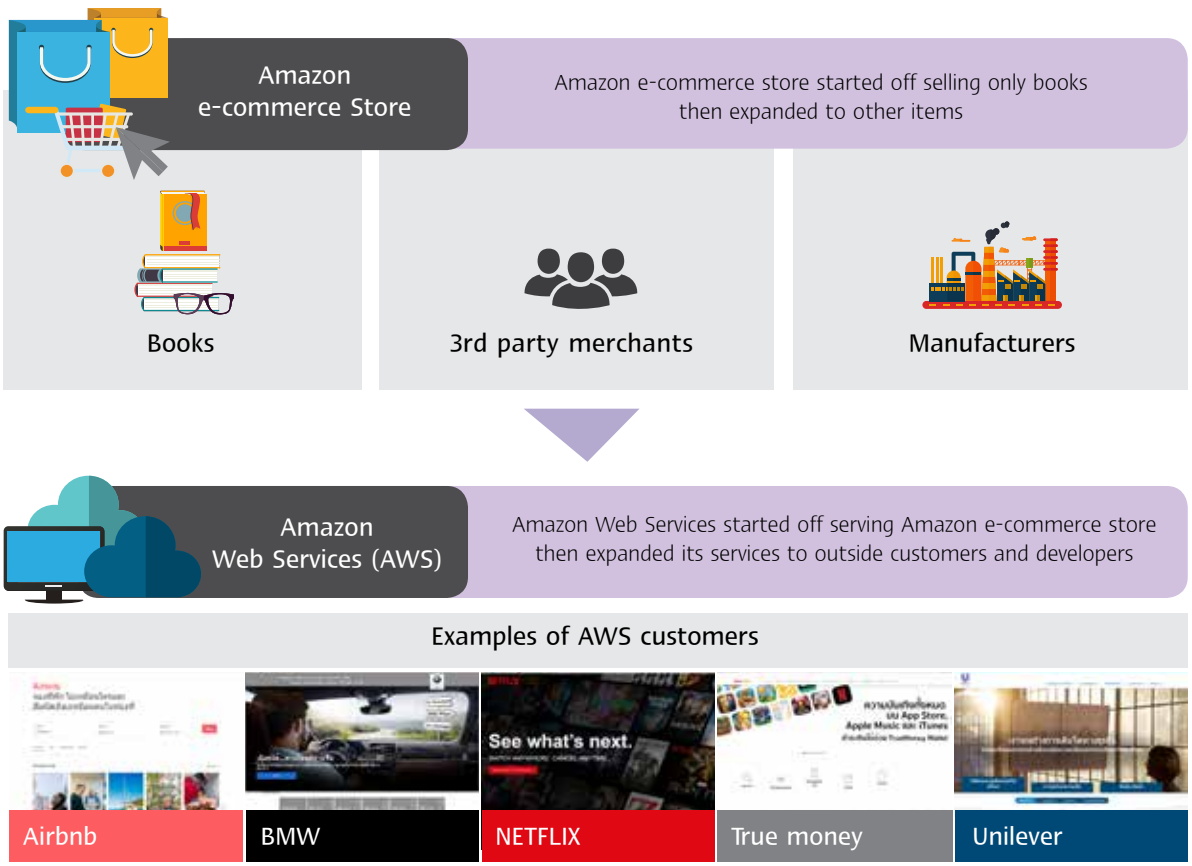
The platform business is a type of business model that creates an online channel to link consumers and producers. The platform allows the platform builder to access a large group of people and expand its business to related industries after gaining enough users. For instance, Uber started out as a platform for passengers and drivers, then expanded into other types of logistics businesses, such as food delivery ("UberEATS"). A platform company might not only add new services but expand the platform's enabling technology into a new business as well. Amazon, for instance, built its online marketplace using cloud computing. After it succeeded, the company set up a business unit called Amazon Web Services (AWS) to sell its cloud technology to other companies. Today AWS is the world's most popular cloud service.

Expansion of Platform Businesses into Various Industries



Source: EIC analysis based on data from Line, Alibaba, Uber

12 Expansion of Amazon's Platform Businesses



Source: EIC analysis based on data from stratechery and Amazon Web Services

As platform businesses accumulate users, more choices become available to buyers and sellers alike. Platform business models allow buyers and sellers to get to know one another without having to go through a middleman or having to rely on investment by large firms. AirBnb and other platforms for travel accommodations allow any individual who has a spare bedroom to rent directly to travellers without having to invest in building a hotel or hiring employees. This creates direct competition for middlemen like travel agents and hotel platform websites such as Agoda.com and Booking.com. A B2B platform like Alibaba allows companies worldwide to buy directly from manufacturers in China. These platforms make it possible for even people and companies with limited resources to enter the market with ease. Upstream companies can benefit from gaining more sales options. Conversely, downstream companies are likely to face greater competition.

As more choices become available, the customer's decision-making becomes more complicated. Thus sellers need to build trust and provide value beyond the norm. Digital platforms allow consumers to access more information about service providers, especially from reviews by other customers. So factors beyond price and quality increasingly affect buying decisions. For example, when calling an Uber car, a prospective passenger can choose whether to use the service of a particular driver based on the average score given to him by past customers. Therefore, the passenger might not necessarily choose the Uber driver who is closest but the one with the best rating. This illustrates the need to develop customer trust. One way to achieve this is to use social media to interact with customers and the community. Moreover, social media can be used to communicate a company's value proposition. In this way, the supply chain in the new environment is not only passing on products and services but also providing value and trust.

A service platform doesn't only affect businesses within the same industry, but also related industries. For a given platform, a diverse set of resources is used to build the system, which can be adapted for other purposes. In the case of Airbnb, most rooms on the platform are adapted from rooms previously used for residential purposes. These rooms often have access to a kitchen and washing machine. Therefore, Airbnb not only affects the business of hotels and serviced apartments but may also have an impact on restaurants and laundry services. At the same time, Airbnb creates new opportunities, since room owners and guests need cleaning services, convenience stores, supermarkets, and even packaged goods from online merchants. So a new trend like Airbnb can create jobs and business opportunities in a new supply chain, thanks to a new business model and new consumer behavior.

Another business model that is becoming more popular is the product-as-a-service model (PaaS). BMW, for example, founded a company, DriveNow, to offer a car sharing service using BMW and Mini cars. The goal is to open a new market for consumers who do not have high purchasing power or do not want to own a car. Another example is Rolls-Royce, which developed jet engines that use internet of things (IoT) technology to monitor and collect data. The company employs usage-based pricing, which transforms Rolls-Royce from being a jet-engine manufacturer and seller to a service provider. This business model in fact increases Rolls-Royce's income by taking market share from other service providers in providing after-sale service (a closed-loop process).

BOX

Rolls-Royce now rents jet engines by the hour

Rolls-Royce recognized an opportunity to use big data and IoT technology to enhance its jet engines. The company started off by installing IoT on the different parts of an engine to track its status and performance in real time. This enabled engineers to diagnose malfunctions and advise customers. Airlines thereby saved cost and avoided flight schedule disruptions, since an unexpected landing requires a full plane check-up, which causes a delay.

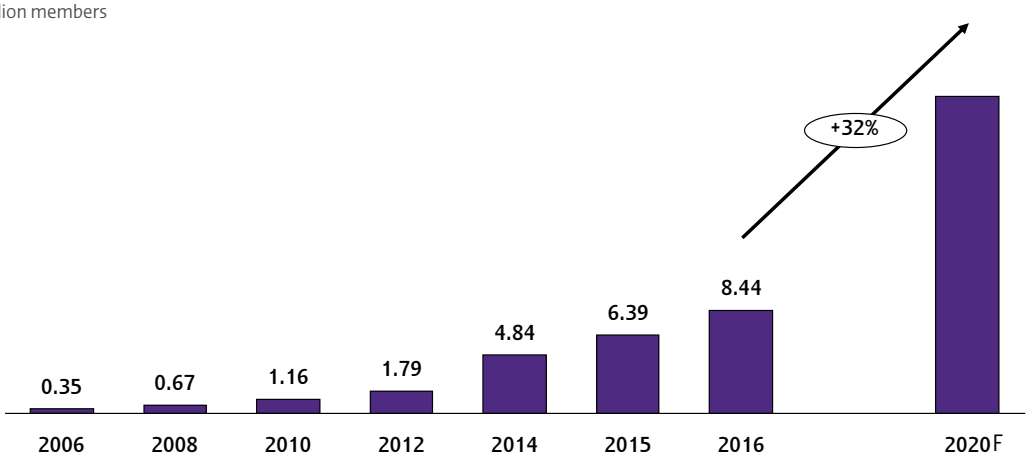
Deploying this technology has allowed Rolls-Royce to build a new business model that rents out jet engines on an hourly basis according to actual usage. The company calls the service Total Care because it also covers engine maintenance. Data gained during use is used in designing, building and planning the engine maintenance schedule. This makes flying more predictable and safer. This business model has even supported the rise of low-cost airlines, since they have not had to invest in engines and parts, reducing costs significantly.

Switching products to PaaS will spur competition among service providers in the supply chain. For example, car rental companies will now face competition from auto manufacturers. Car service centers might lose some customers who previously brought in their own cars for maintenance, because car-sharing companies have their own maintenance services. One way to mitigate the impact is to provide outsourced services for the non-core businesses of car sharing companies. The transformation from products to services will also change the composition of customers in the supply chain from individuals to companies. Competition will become fiercer as the number of customers falls and each account becomes larger. Moreover, businesses must develop new products to meet the demands of new customers. For example, insurance companies need to come up with products for car sharing companies, which require special policies. When an accident occurs, the car-sharing company must take responsibility, so it needs an insurance plan that is different from one designed for an individual car owner.

13 More auto-makers are offering car-as-a-service, which is expected to grow 32% until 2020

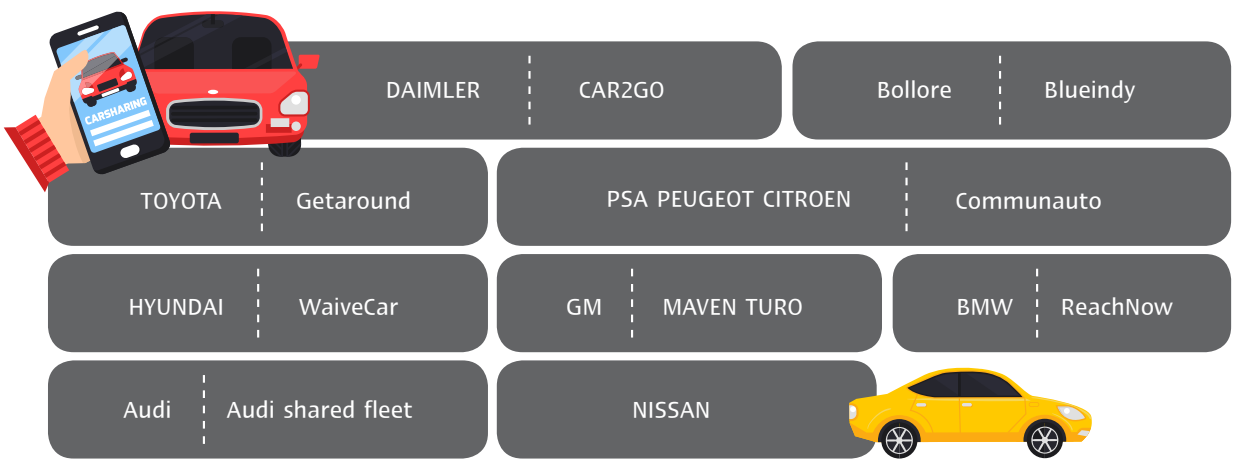
Worldwide car sharing growth

Unit: million members



Source: EIC analysis based on data from Berkeley Transportation Sustainability Research Center, Berg Insight and Frost and Sullivan

14 Automaker-backed car sharing program in N. America



Auto parts makers must promptly raise their competitiveness to tap opportunities as car producers switch to the PaaS model, especially by integrating IoT into their products. Otherwise, these companies could get left out because the PaaS model allows producers to control their own supply chain regarding maintenance. The PaaS model will also reduce demand for spare parts because diagnostics of malfunctions and depreciation of engine parts can be done more accurately. And maintenance can be better planned using better targets and parts inventories. Moreover, some parts will be equipped with censors that transmit data back for analysis and product development. As a result, the production of auto parts has become more sophisticated, with greater reliance on software technology. If parts producers fail to move toward providing systemized parts that are integrated into product services, they risk being replaced by technology. If a part maker is not an OEM, it might lose orders because car producers want to profit by integrating their own maintenance services.

Innovations in products and business models are transforming the supply chain of a variety of industries. Many companies are not prepared to cope with the changes that result from new technologies and new business models. These companies will get left out of the supply chain or have already closed down, as in the case of companies that made keypads for cellphones, and even Nokia's own handset manufacturing operations. A company should invest in research and development to be innovative and constantly find ways to improve quality of service. This can help attract customers and get them to stay, so the company can survive in today's fast-changing supply chains.

Epilogue

Advances in technology constantly bring about change in manufacturing and distribution methods. Now the digital technologies being introduced into machinery, transportation and production impact the supply chain faster and more widely. Thai businesses are advised to accommodate the new waves of change and prepare to invest in new capabilities in order to grow in a fast-paced environment. In this regard, EIC proposes three priorities for effective supply chain management:

Plan the deployment of technology carefully to maximize efficiency – Advanced technologies can increase efficiency and provide new capabilities for businesses. However, in order to avoid unprofitable investment, entrepreneurs should carefully consider the efficiency and cost-saving potential of any new technology in before investing in it. A report by McKinsey Global Institute found that only 1% of the data generated by the 30,000 sensors on an offshore oil rig is used in analysis. Similarly, many factories that have invested in an IoT system only use the information for the purpose of real-time control and monitoring. These companies should take better advantage of the system by using the data to forecast maintenance or to analyze operational processes in order to allow customization of products and services.

Investing in new technologies is costly and requires resources. Cost and complexity might discourage companies, particularly SMEs, from investing in new tech. But the real risk might not be from a technological investment that fails to profit, but rather from a failure to invest in competitiveness-enhancing technology. For example, investing in IT, in order to build databases, analyze operations and connect with other entrepreneurs in the supply chain so as to cooperate. So companies should study both the potential benefits and risks of technology by planning how it will be used. Making a good plan based on a sound business rationale requires a company to understand the various technologies and their roles in cost minimization, profitability and risk management.

Invest in human resources and organizational structure – An entrepreneur should go well beyond investing in technology and consider other ways to improve organizational efficiency. In the face of changes in supply chains and new business models, employees need to develop new skill sets. For example, a plan to deploy new technology must include investment in skills development in order for the company to take full advantage of the technology. Companies must have plans for training relevant personnel, particularly focusing on imparting a greater understanding of technological change and informing suppliers and trading partners of the potential shared impact. In addition, organizational restructuring might be required in order to enhance decision-making, particularly in the case of an SME, where a single individual often makes most of the decisions. At large corporations, coordination among internal units is key to ensuring shared understanding. This matter is particularly important for any business looking to change its model, such as to PaaS, which requires close collaboration between design, manufacturing and service units. In addition, manufacturers are advised to pay attention to research and development in order to keep up with technological change.

Develop greater flexibility in the supply chain - In addition to technological change, other disruptions, e.g., natural disasters and cyber-security attacks, will play a greater role in transforming supply chains in the future. Risk management is crucial in preventing discontinuities in the supply chain. For example, a company should design a network of suppliers in a way that minimizes risks of disruption from natural disaster by building facilities in different locations, and sourcing materials from different providers and places. At the same time, system maintenance will become more important, particularly for IT systems. This became evident in the WannaCry incident in early 2016, when more than 200,000 computers around the world were attacked by ransomware, which could not have been protected by a software update.

Planning for post-disaster recovery and reconstruction is as important as risk prevention, because entrepreneurs cannot eliminate all risks from their supply chains. They must prepare for unforeseen impacts by planning for diverse contingencies. It's crucial to enhance the flexibility of suppliers at all levels in order to eliminate a supply chain's weakest link.

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Sutapa Amornvivat is Chief Economist and First Executive Vice President at Siam Commercial Bank (SCB), where she leads the Economic Intelligence Center. She previously set up and led Risk Analytics Division under Risk Management Group. Sutapa currently sits on Subcommittee on Finance, Banking, Financial Institutions and Capital Markets, The National Legislative Assembly.

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