
Industry 4.0



**Opportunities and
challenges for consumer
product and retail
companies**

Contacts

Düsseldorf

Dr. Axel Nitschke
Principal, PwC Strategy& Germany
+49-170-705-1288
axel.nitschke
@strategyand.de.pwc.com

Frankfurt

Benedikt Schmaus
Partner, PwC Strategy& Germany
+49-170-223-8437
Benedikt.schmaus
@strategyand.de.pwc.com

Munich

Dr.-Ing Peter Hochrainer
Principal, PwC Strategy& Germany
+49-172-233-7765
peter.hochrainer
@strategyand.de.pwc.com

Stefan Schrauf
Partner, PwC Strategy& Germany
+49-151-4612-3326
Stefan.schrauf
@strategyand.de.pwc.com

Vienna

Harald Dutzler
Partner, PwC Strategy& Austria
+43-1-518-22-904
harald.dutzler
@strategyand.at.pwc.com

About the authors

Harald Dutzler

Partner, PwC Strategy& Austria

Focus on apparel, multi-label retail, and grocery

Extensive experience in supply chain management in consumer and retail — strategy, design, operating model, processes, capabilities including digital

*Fit for Growth** platform expert

Benedikt Schmaus

Partner, PwC Strategy& Germany

Leading Strategy& omnichannel and digital transformation in retail

Retail category experience including fashion and shoes, jewelry, consumer electronics, telecommunications, and travel retail

Stefan Schrauf

Partner, PwC Strategy& Germany

Specialist in digital supply chain solutions

Works with clients to develop and implement strategic changes in core operations

Supply chain transformation and strategy development

Dr. Axel Nitschke

Principal, PwC Strategy& Germany

Focus on apparel, sports, and lifestyle retail and industry

Extensive experience in operations — sourcing, supply chain, logistics, organizational setup

E-commerce, strategy design, and branding expert

Dr.-Ing. Peter Hochrainer

Principal, PwC Strategy& Germany

Focus on grocery retail and DIY

Broad experience in operations — strategic procurement, supply chain, production and distribution network, operating model in retail and consumer goods

Expert in large-scale *Fit for Growth* programs

* *Fit for Growth* is a registered service mark of PwC Strategy& LLC in the United States.

Executive summary

Retail and consumer goods (R&C) companies are in the midst of a transformation unlike any before in their history. Although there have been times of disruption and competitive fervor in the past, today's R&C environment is marked by huge changes in technology, consumer preferences, sales channels, marketing approaches, barriers to entry, and supply chain and logistics strategies. No company in this sector can afford to ignore these massive shifts.

Indeed, it all fits under the umbrella of Industry 4.0 — and there are several steps that R&C companies must consider when they confront the new landscape. In recent years, retail and consumer goods companies focused primarily on digitizing their customer interface. Now, the digital integration of the end-to-end value chain becomes a strategic priority. This includes digitization of product and service offerings; developing innovative digital business models; digitization and integration of supply chains; and adopting data and analytics as a core capability. Implementation involves more than just designing a new strategy; corporate culture, management approaches, role of IT, and innovation engines must be reexamined and often revamped.

Digital technologies have evolved to today's tipping point

1990s

Onset of digitization

Ubiquitous digital products: computers, digital cell phones

Universal Internet/Web global platform

Process automation

Computer-integrated manufacturing (CIM)

Common industrial protocol (CIP) and other digital industrial standards

Online business models (e.g., AOL, Amazon)

2000–15

Disruptive digital technologies

Smartphones

Digitized and automated industrial processes

Digital functions (separate from traditional IT)

Customer interface and multichannel access

Cloud computing

Sensors, digital video monitors, and early Internet of Things (IoT)

2016–20 Today

Industry 4.0

Vertical and horizontal integration of digital operations across the value chain

New business-to-business enterprises

Data analysis integrated with customer insight, real-time response, and operations

Expansion of computer processing power

Digital fabrication (including 3D printing) at industrial scale

2020+

Digital ecosystem

Flexible and integrated value chain networks

Virtualized processes

Virtualized customer interface

Industry collaboration as a key value driver

Fully developed Internet of Things and services

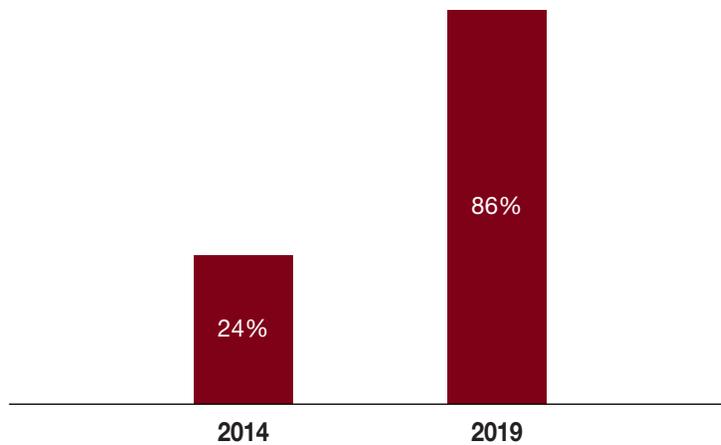
Intelligent algorithms (augmenting human decision making and managing continuous processes)

Industry 4.0 is a natural outgrowth of the third industrial revolution, which fully transformed the nature of commerce in the second half of the 20th century with an array of computerization and IT advances. It was a period of big changes for retail and consumer goods companies, marked by the emergence of credit cards, back-office and warehouse automation, just-in-time supply chains, and the first online business models.

Source: Strategy& analysis

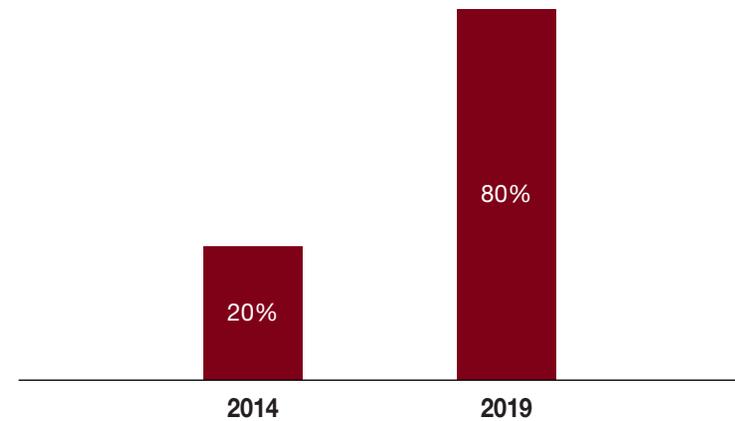
The business impact will increase noticeably during the next few years

Estimated financial value added by digitization for a typical company



Horizontal impact

Related to the value chain, including suppliers, distributors, other companies, and customers

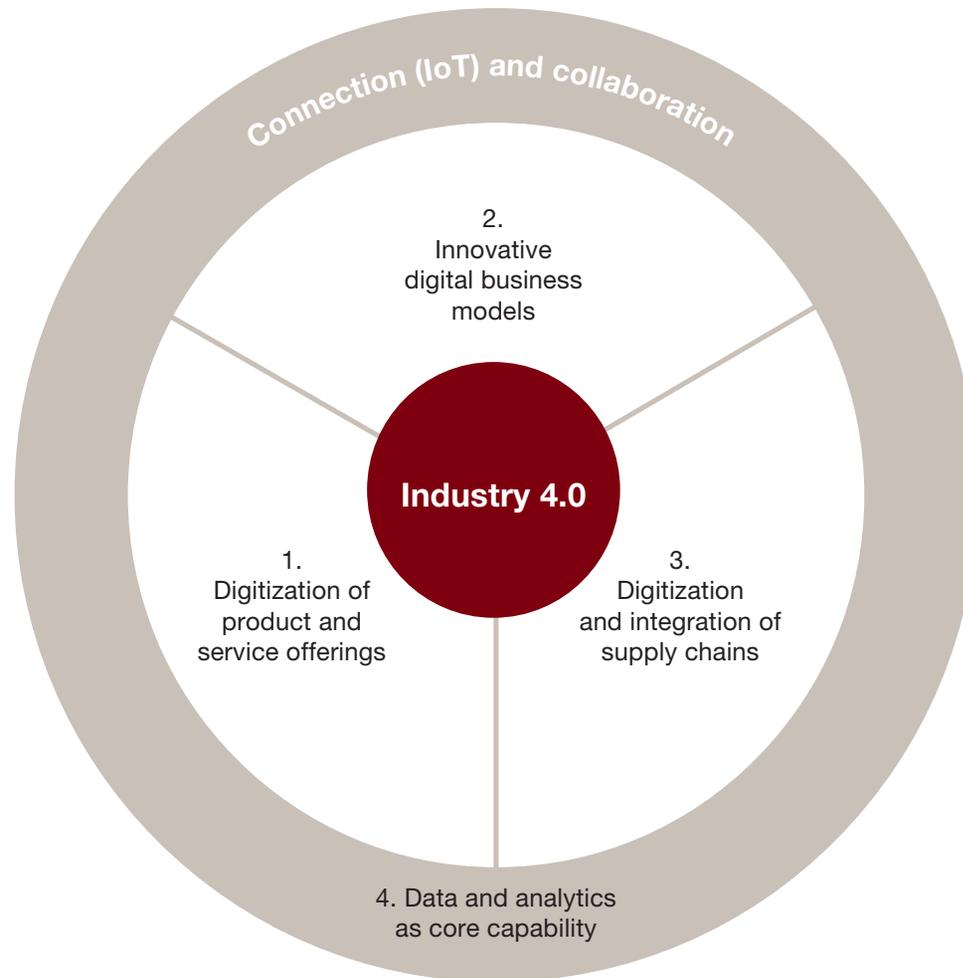


Vertical impact

Related to internal functions, such as product development, purchasing, production, and logistics, up and down the hierarchy

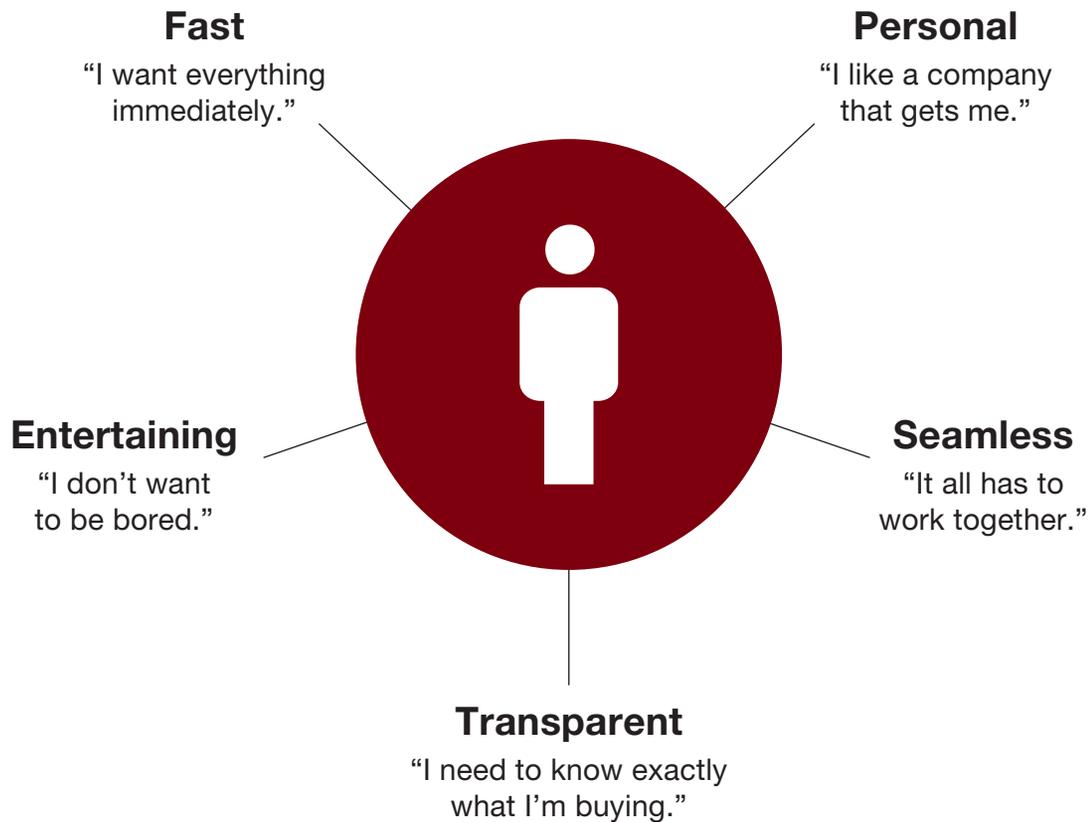
Source: Strategy& analysis

Industry 4.0 involves a holistic approach to a company's value chain



Source: Strategy& analysis

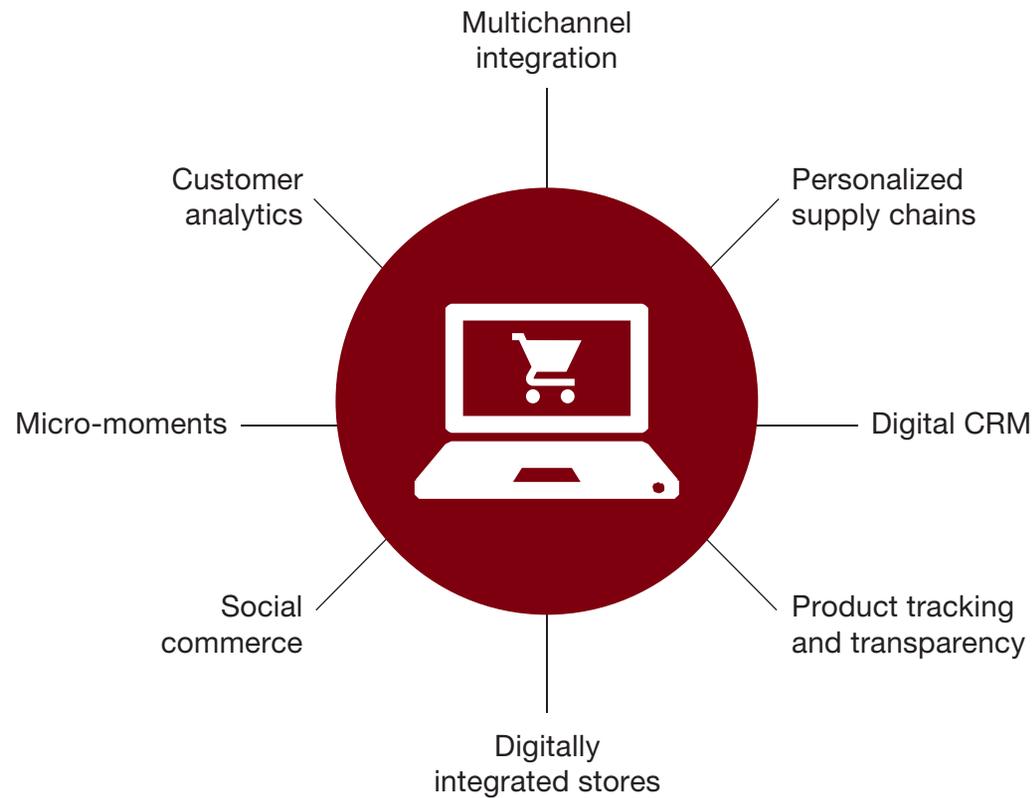
As customer expectations change . . .



For R&C companies, Industry 4.0 promises to have an even more encompassing impact. As customer expectations change, retail and consumer goods companies must begin to embrace the growing digitization and interconnection of products, business models, and value chains — all of which will allow them to be agile and responsive to consumer needs, maximize revenue, and reduce costs and inventory.

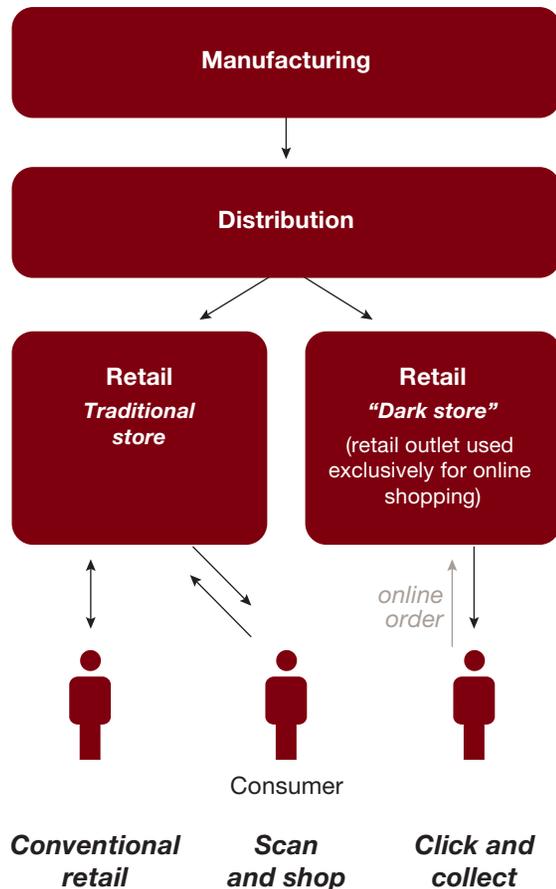
Source: Strategy& analysis

... retail and consumer goods companies increasingly turn to Industry 4.0



Source: Strategy& analysis

Multichannel offerings and the grocery sector



- One German grocery chain uses integrated multichannel offerings to combine online and offline shopping
- Customers switch easily between channels; the store and its online and smartphone counterparts have the same look and feel
- Hybrid business models add revenue and build customer loyalty:
 - Click and collect: Customers order online, and pick up their groceries at easy-to-reach locations*
 - Scan and shop: Customers scan product codes with their smartphones in the store, and the goods are collected and delivered to their home; they pay through their online account*
- Other grocers have a hard time competing because their systems are not integrated; their “click and collect” offering involves long waits and problems with out-of-stock items

The Industry 4.0 digital revolution is mobilizing a new type of R&C consumer, who wants a seamless, fast, efficient shopping experience and who is looking for products that are more personalized than ever before. For retailers, these preferences can be addressed through multichannel offerings, a combination of an online and physical outlet shopping experience with channels that consumers can switch between with ease, depending on their schedule or preferences on any given day. In a multichannel environment, enhanced product tracking and transparency lead to improved consumer services.

Source: Company websites; Strategy& analysis

Product tracking and transparency lead to new services

Increased customer focus on product quality

Increased customer focus on product quality

Premium quality becomes the new mainstream

Use of labels to indicate aspects of product quality

Customer engagement in product design process

Higher expectations for transparency in product supply

Digitally enabled end-to-end traceability of product journey

Additional product information (on ingredients, manufacturing, and product origin) digitally available at the point of sale via smartphone apps (for example, ToxFox is an app released by a European not-for-profit group that identifies endocrine-disrupting chemicals in foods, cosmetics, and other products)

New digital business models are emerging . . .

Personalized online fashion showrooms

Examples: Stylistpick, Modomoto, Zalon

Products are recommended by celebrities, bloggers, and stylists

Online fashion consulting (for example, at Zalon), taking into account shoppers' particular interests

Platforms combining fitness and fashion

Example: Under Armour's Connected Fitness platform

Help companies learn how athletes and other individuals use their products

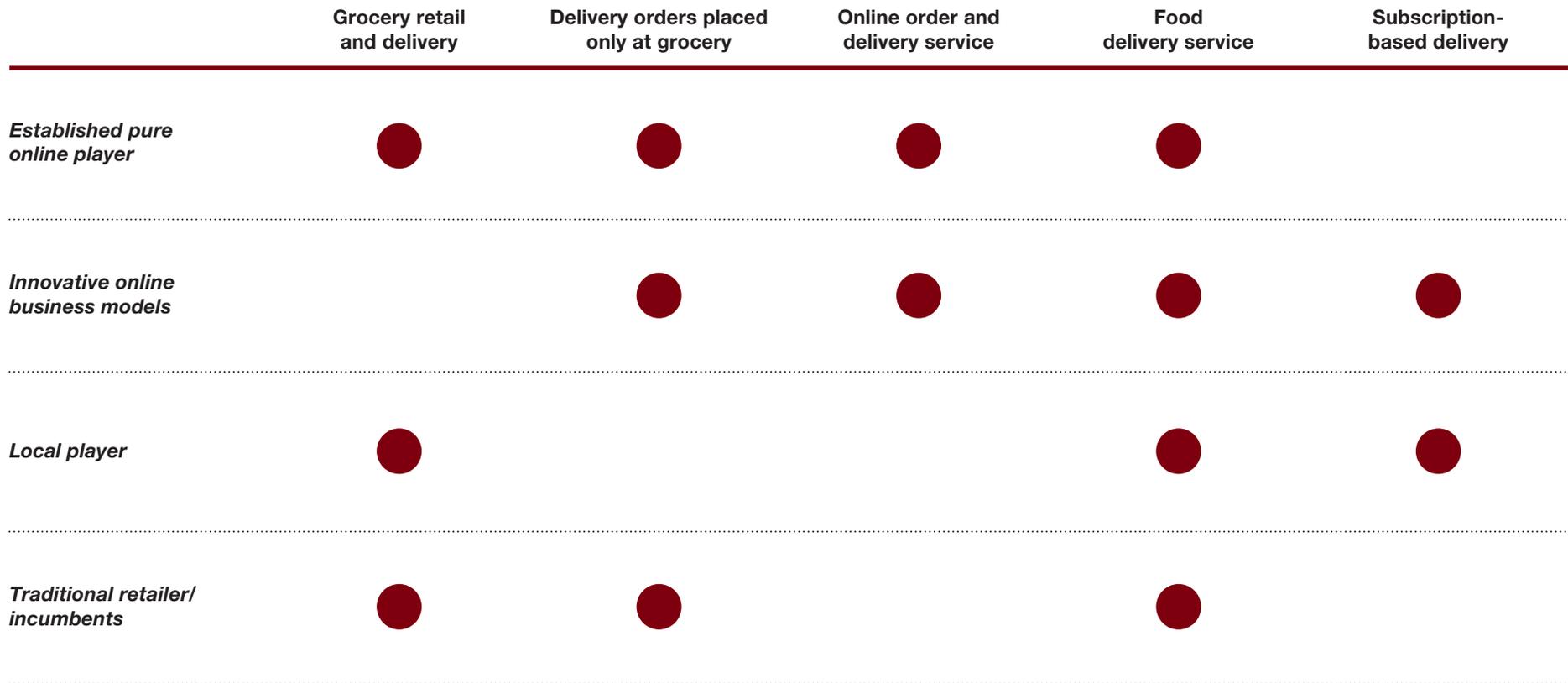
Connected Fitness platform integrated with more than 500 devices and wearables

Established R&C companies that are slow to embrace Industry 4.0 face a growing number of new, more digitally inclined competitors — and not all of them are pure-play online firms. It's critical that incumbent companies take this threat seriously and begin to develop their own unique business models with multiple channels and end-to-end technology or they will find themselves falling behind in revenue, customer, and earnings growth.

Source: Company websites; Strategy& analysis

... and companies need to adopt Industry 4.0 to compete

Example: Grocery, nutrition, foods



Source: Company websites; Strategy& analysis

Digitization in consumer packaged goods and retail integrates the entire supply chain

Smart site concept

- Environment and resources
- Supplier and customer integration
- Support, administration, and place
- Logistics and transportation
- Innovation and technology
- Operations and planning

Smart manufacturing, engineering

- Vertical integration
- Predictive maintenance
- Big data process optimization
- Condition monitoring
- Augmented reality
- Integrated digital engineering
- Digital manufacturing clone

Digital supply chain

- Horizontally integrated planning and execution
- Logistics visibility
- Prescriptive analytics, decision support, and social supply chain
- Advanced warehousing and logistics
- Smart spare parts logistics

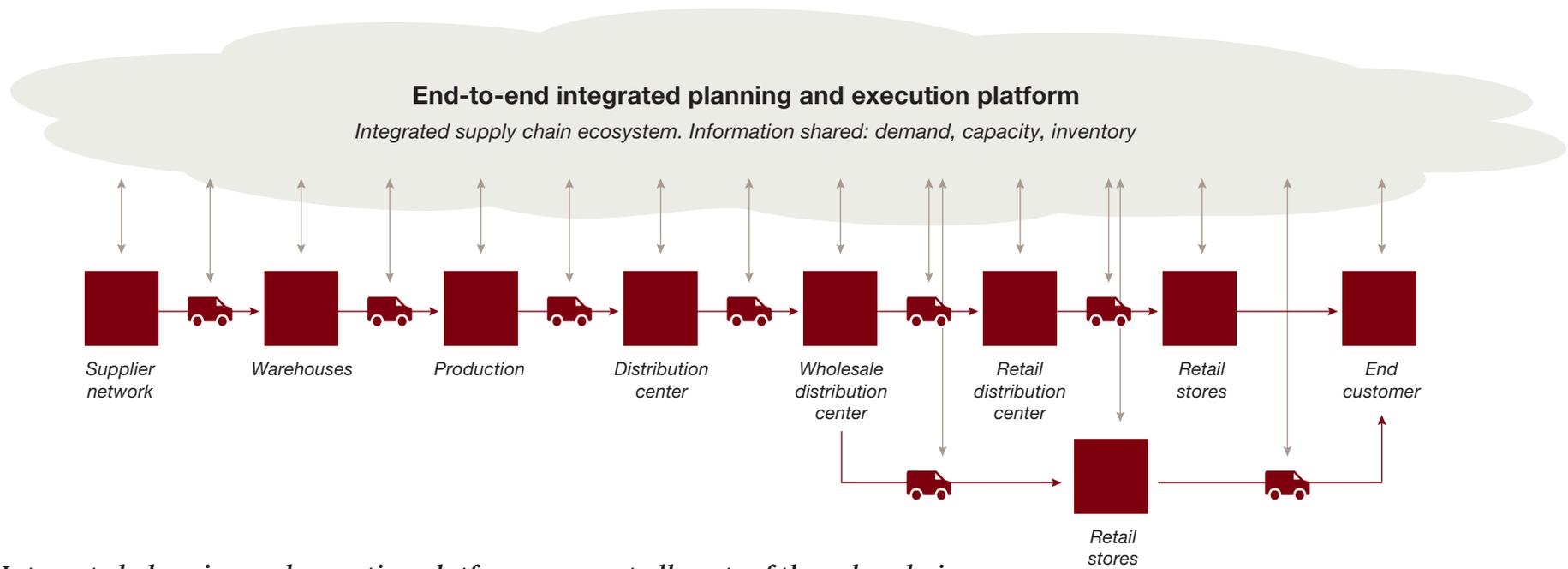
Digital procurement

- Procurement value proposition
- Digital category and service procurement
- Digital supply chain and supplier management
- Innovative procurement data utilization
- Digital processes and tools
- Organization and capabilities

Results: Increased agility and responsiveness, reduced cost and inventory

By digitizing the supply chain, R&C companies can connect all supply, logistics, and distribution platforms to create a “single version of the truth” — that is, one set of data to be used for integrated planning and execution across the organization and its partners. This essential facet of Industry 4.0 improves communication and efficiency throughout the supply chain’s critical areas of impact.

Integrated planning and execution connects all parts of the value chain



Integrated planning and execution platforms connect all parts of the value chain

- *Metrics*: One set of numbers shared across the value chain
- *Operational execution*: Companies share location, tracking, and transfer invoice information; automated replenishment and order-taking systems; rapid problem identification and joint resolution
- *Tactical planning*: Companies share planning, scenarios, and forecast information, along with a collaborative sales and operations planning process, and capable-to-promise checks across the entire value chain
- *Strategic collaboration*: Joint strategic volume and market planning; joint supply chain improvement activities

Source: Strategy& analysis

How a dairy manages production and logistics from cow to consumer

Sourcing regions

Optimized collection routes for the delivery of milk to the local dairies

Tracking of milk batches, separated transportation according to product target

Dairies

Automated packaging management, with real-time data on product and customer packaging requirements

Automated, self-cleaning product lines with sensor-based production documentation

Automatic management of the production and logistics network based on the current capacities, inventory in the distribution chain, and sales forecasts

Packaging and logistics

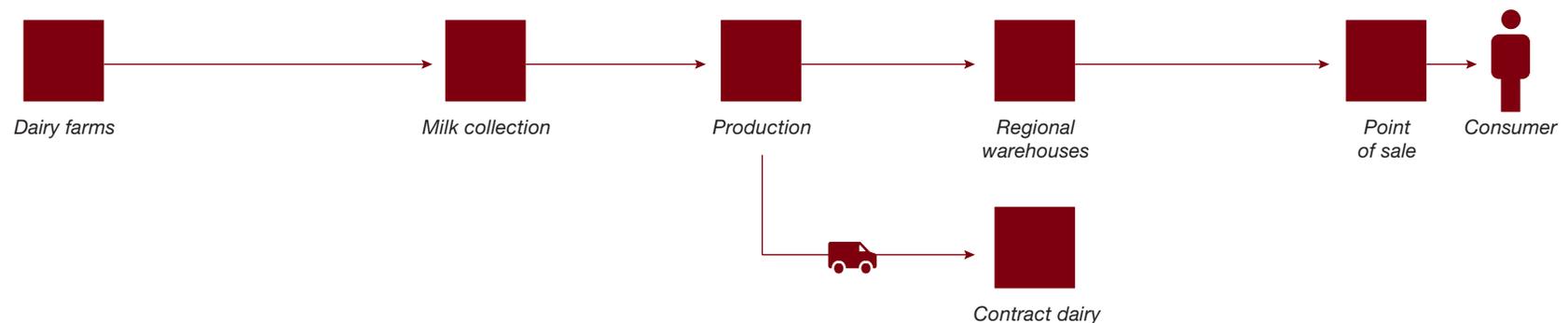
Warehouses near customers are stocked to reflect a specific product mix

Logistics planning for semi-finished dairy products to external locations and dairies

Customers

Real-time product tracking and dynamic route optimization

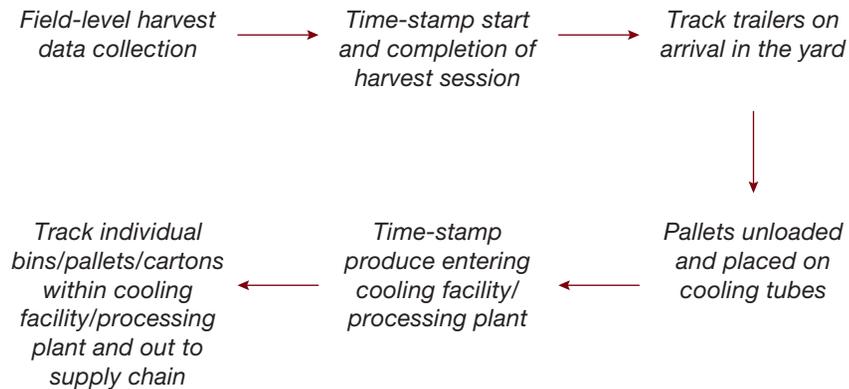
Comprehensive quality tracking from cow to shelf for cooling and hygienic requirements



Source: Strategy& analysis

RFID systems track each product through the supply chain

Case example: RFID tracking in grocery retail



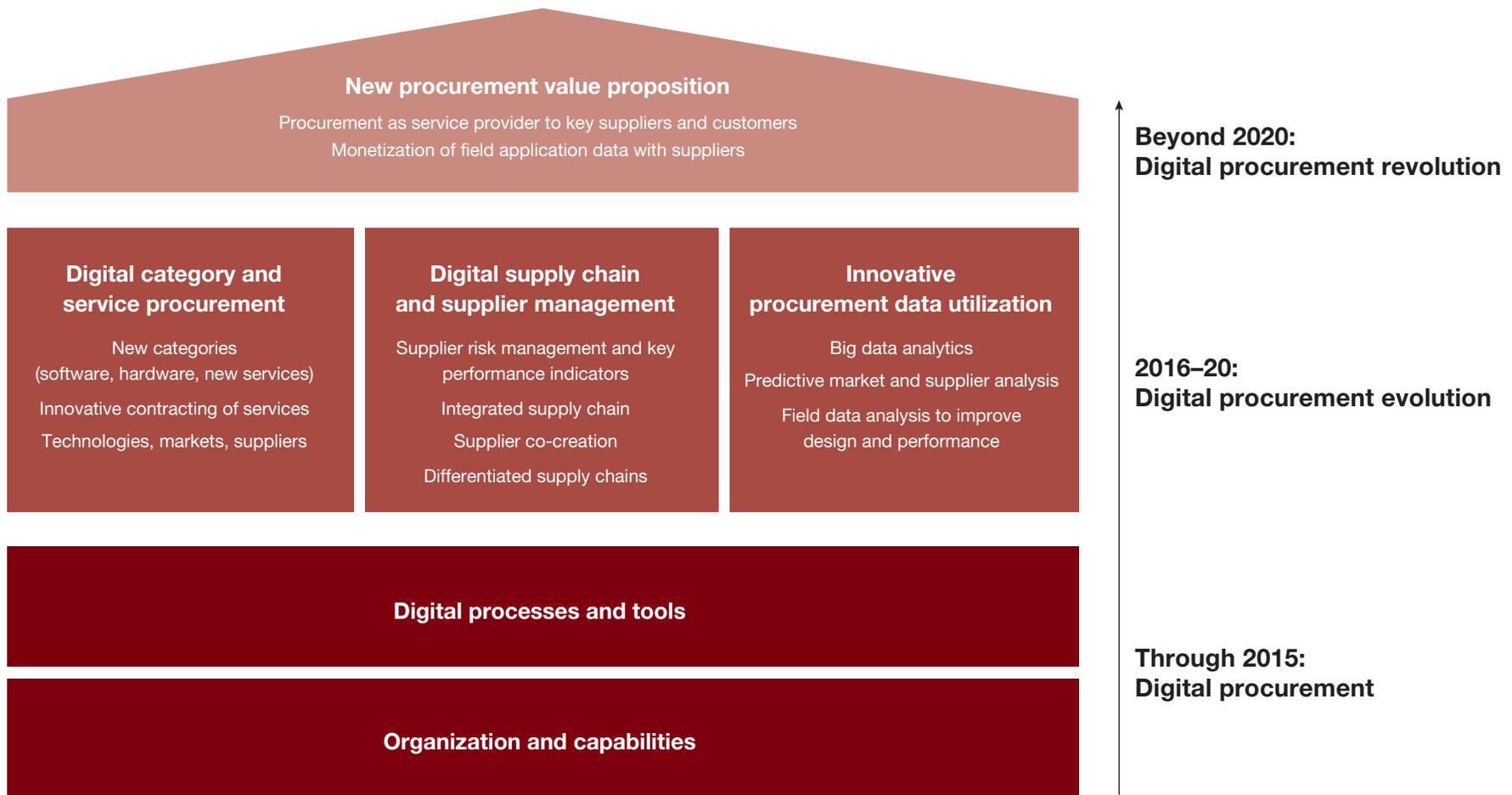
Benefits of this system:

- Real-time information about the flow of goods from the point of origin to the consumer
- Event details: physical composition, manufacturing, and serial numbers
- Transparency about factors like product origin
- Improved delivery process visibility and availability status
- Links to the back-end business process structure (using ERP, EMS, CRM, etc.)

One of the most important tools for an R&C company's digitized supply chain is end-to-end RFID tracking. The primary benefits of an RFID system are the breadth of information available — everything from physical composition to manufacturing status to serial numbers — and the delivery process and availability transparency it offers. Importantly, RFID data can be linked directly or indirectly into back-end enterprise resource planning (ERP), engagement management systems (EMS), or customer relationship management (CRM). Through those systems, RFID plays a pivotal role in supporting operations, customer interactions and networking, and strategic analysis and planning.

Source: Strategy& analysis

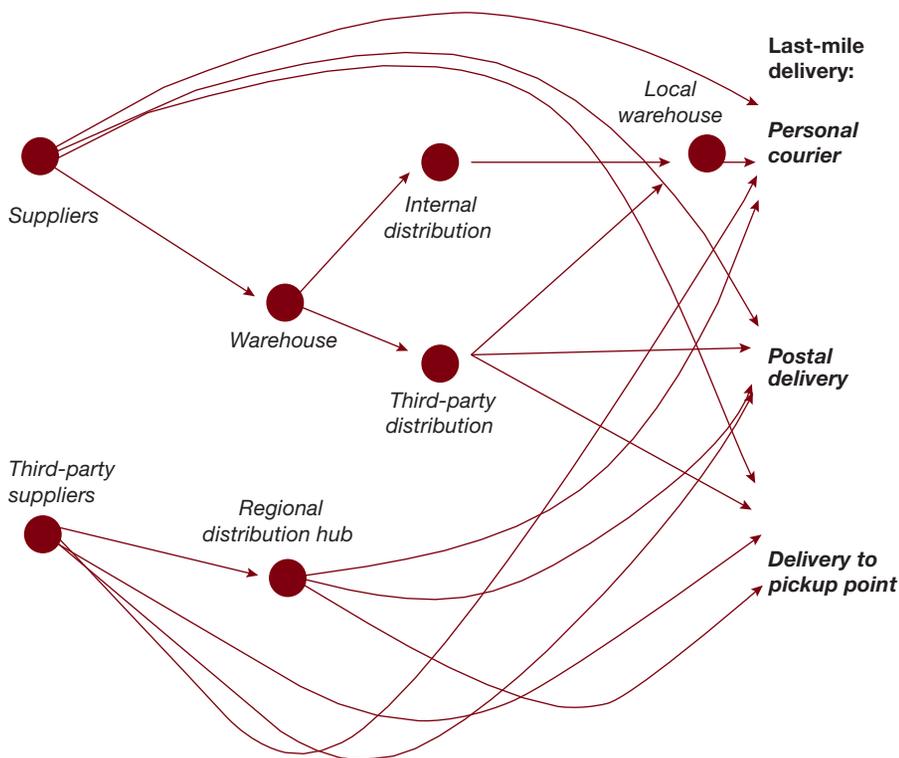
Procurement will evolve dramatically with Industry 4.0



Source: Strategy& analysis

Industry 4.0 enables incumbents to adapt smart distribution networks

Smart distribution network



- A smart distribution network that supports the business model set up around the customer needs to adapt to a high degree of complexity
- Sophisticated business processes are required to handle network complexity and to give customers maximum flexibility in last-mile delivery (to the home or person)
- Marketplace models and drop shipments will become increasingly relevant; shipment routes will be more complex

In an Industry 4.0 environment, R&C companies must put sufficient resources into developing adaptable distribution networks that make products available to consumers when they want them and offer maximum flexibility in last-mile delivery options. In considering fresh, nimbler distribution models, R&C companies should weigh the value of innovative ideas — such as crowdsourced distribution networks — that are changing the look of logistics.

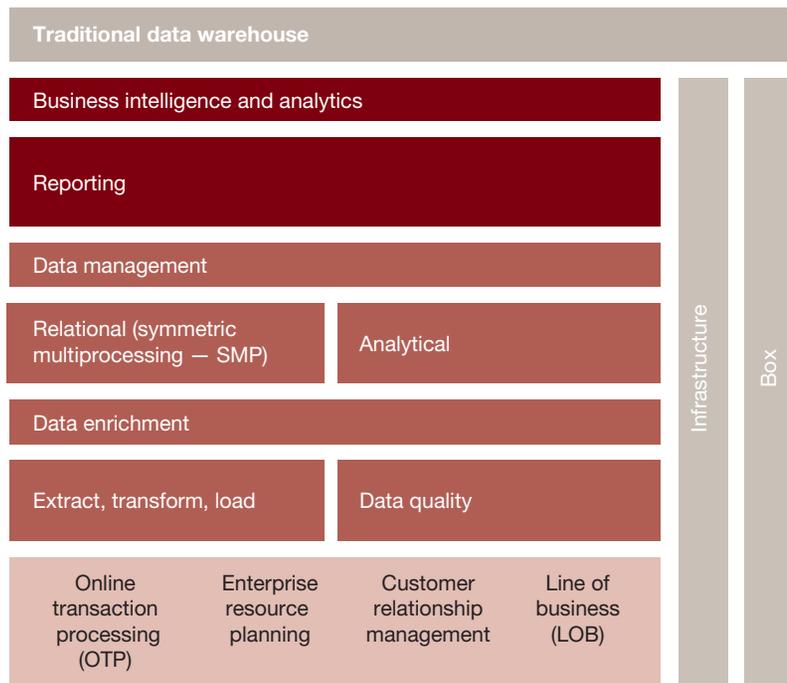
Source: Strategy& analysis

New forms of crowdsourced distribution networks

- **Private individuals take over last-mile deliveries** for established players by picking up the order at the service point and delivering it to the private address
- **Customers will decide** how much to spend on shipping in advance; the individual who delivers the parcel gets paid a small fee in compensation
- Major **shipping companies and ride-share services** are becoming participants in this type of service

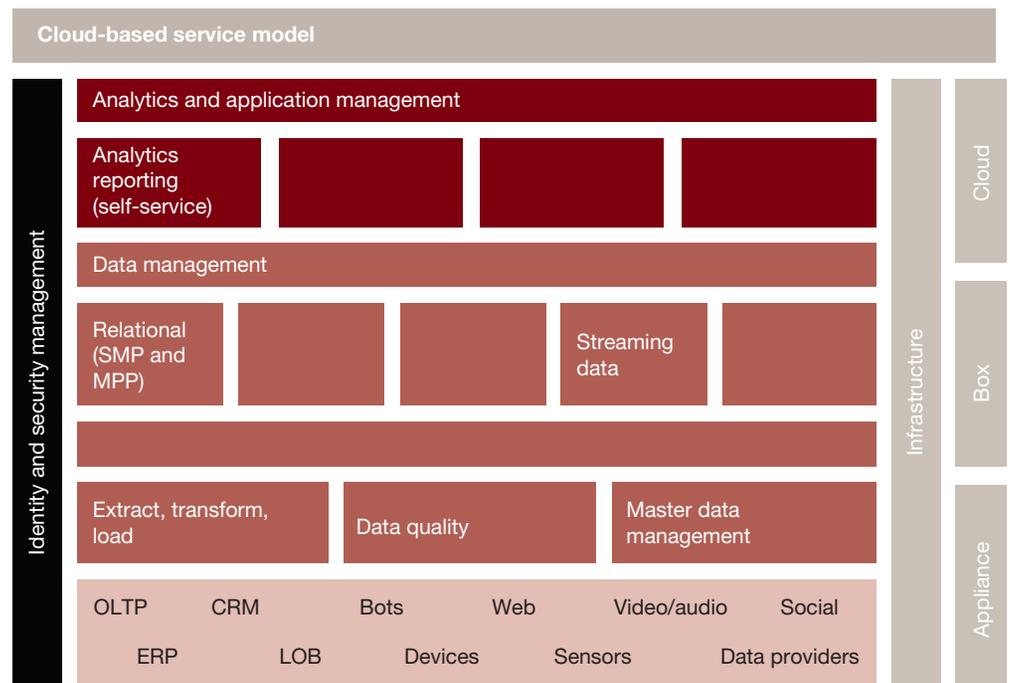
Information systems' architectures have to evolve to fulfill requirements for Industry 4.0

Current IT architecture



- Monolithic architecture focused on internal services
- Limited collaboration
- Limited scalability

New information architecture



- Support of modern workloads (e.g., big data, social analytics)
- Constant, multidimensional interaction with customers, vendors, and smart devices
- Scalable to support future growth

Source: Strategy& analysis

Industry 4.0 will revolutionize retail and consumer goods

- Multichannel offerings will require advanced real-time in-store inventory management capabilities
- End-to-end transparency will show availability while reducing safety stock at the same time
- Real-time information and predictive analytics will elevate planning and allocation to the next level
- Horizontal integration will drive down costs to handle complex supply chain networks
- Seamless channel integration will depend on convenient and cost-efficient last-mile delivery
- Transparency on quality and origin will help companies to differentiate in market and fulfill consumer demands

For R&C companies, the challenges of Industry 4.0 are significant. Multichannel offerings will require advanced real-time in-store inventory management capabilities and end-to-end transparency on product availability, along with the reduction of safety stock. Seamless channel integration will depend on convenient and cost-efficient last-mile delivery, and real-time information and predictive analytics will elevate planning and allocation to the next level. Successful companies will see this transformative period as an opportunity to both grow revenue and profits in the short term and redesign their organizations for the next industrial revolution in the long term.

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