McKinsey & Company

Future of retail operations: Winning in a digital era

This compendium explores the breadth of change and risk throughout the modern retail industry.

January 2020

Contents

Introduction

Heightened customer expectations, massive advancements in technology, and the rise of omnichannel commerce are just a few of the trends reshaping the world of retail. In an industry already known for thin margins, these changes can increase cost pressures and uncertainty for retailers—all while opening the door to significant opportunities. Traditional approaches will no longer work in the face of change; now is the time to clearly define new aspirations, make fundamental changes to operating models, and rethink retail. Those that make moves now may enjoy a sustained advantage for decades to come.

In this publication we examine some of the most pressing challenges retailers face and the transformative journeys many are on right now. You will find a range of new perspectives across retail operations, including, store operations, supply chain, procurement, and information technology (IT). As the rules of retail are being redefined, these fundamental areas of retail operations are in need of fresh thinking.

Retail operations

Store operations	>	Supply chain	>	Procurement

Information technology (IT)
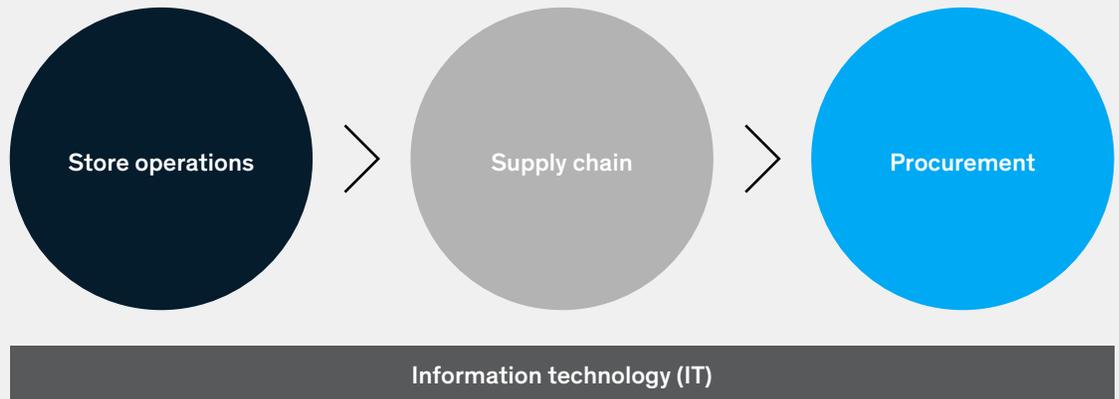
We provide a new take on **store operations**—while flashy technology attracts and engages customers in the "store of the future," the make-or-break technology is actually behind the scenes. That's the technology that gathers and connects data for a seamless customer experience. In our own "store of the future" this includes dwell sensing, RFID, heavy investments in the data lake, and the logic needed to map the customer journey. But technology is only one piece of the puzzle; solving the operations equation also involves analytics, new store processes, and upskilling the store team. Such a transformation can add several points of profitability to the average store.

In **supply chain**, we identify the measures successful companies have taken, which include fundamentally transforming their supply chain to enable a true omnichannel experience, taking more agile approaches when designing their supply chain network, building new capabilities, and adjusting their operating model. We take a look at how retailers can keep up with customer expectations as omnichannel shopping becomes the new normal—including building and maintaining a connected inventory strategy, which increases transparency and access to stock wherever it sits in the supply chain to better fulfill customer needs.

In **procurement**, we explore the unrealized opportunity in indirect spending—spend on goods or services not for resale. Companies can and should take a closer look at indirect spending and embed new processes and ways of working—including using more sophisticated analytics tools, strengthening supplier collaboration, and taking a broader, business-level view of indirect spend, rather than making it simply a procurement issue. Retailers that elevate indirect spending initiatives can cut costs, capture more value, and uncover cash that can be reinvested as part of a broader business transformation.

We recognize that today, nearly every change a retailer makes depends on **technology solutions**—and they often fall short of expectations. With an entrenched divide between the IT department and the rest of the company, many brick-and-mortar retailers struggle to get value out of their IT investments—or get started at all. Retailers must become technology-driven organizations, and that will require upending the status quo. In the end, transforming mind-sets, capabilities, and ways of working is critical not only in established IT areas like application development and infrastructure but in core commercial divisions like sales, merchandising, supply chain, and marketing.

Through our research and analysis, we seek to identify opportunities, provide insight into how to act on them, and learn from those that have forged ahead. We hope these perspectives on retail operations aids your organization in embracing change and realizing a new vision for retail.

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A transformation in store

Brick-and-mortar retail stores need to up their game. Technology could give them a significant boost.

by Praveen Adhi, Tiffany Burns, Sebastien Calais, Andrew Davis, Gerry Hough, Shruti Lal, and Bill Mutell

Now should be a great time in US retail. Consumer confidence has finally returned to pre-recession levels. Americans have seen their per capita, constant-dollar disposable income rise more than 20 percent between the beginning of 2014 and early 2019.

Yet despite the buoyant economic environment, many brick-and-mortar stores are struggling. In part, that's due to the rise of e-commerce, which since 2016 has accounted for more than 40 percent of US retail sales growth. In our most recent consumer survey, 82 percent of US shoppers reported spending money online in the previous three months, and the same percentage used their smartphones to make purchasing decisions. Not surprisingly, younger shoppers favor e-shopping even more: 42 percent of millennials say they prefer the online retail experience and avoid stores altogether when they can.

Meanwhile, the strong economy and record-low unemployment are increasing wage pressure and store operating costs. In the last three years, more than 45 US retail chains have gone bankrupt.

Retail stores have a real future
Yet rumors of the physical store's death are exaggerated. Even by 2023, e-commerce is forecast to account for only 21 percent of total retail sales and just 5 percent of grocery sales. And with Amazon and other major internet players developing their own brick-and-mortar networks, it is becoming increasingly clear that the future of retail belongs to companies that can offer a true omnichannel experience.

Retailers are already wrestling with omnichannel's demands on their supply chains and back-office operations. Now they need to think about how they use emerging technologies and rich, granular data on customers to transform the in-store experience. The rewards for those that get this right will be significant: 83 percent of customers say they want their shopping experience to be personalized in some way, and our research suggests that effective personalization can increase store revenues by 20 to 30 percent.

Several new technologies have reached a tipping point and are set to spill over onto the retail floor. Machine learning and big-data analytics techniques are ready to crunch the vast quantities of customer data that retailers already accumulate. Robots and automation systems are moving out of factories and into warehouses and distribution centers. The Internet of Things allows products to be tracked across continents or on shelves with millimeter precision. Now is a great time for retailers to embrace that challenge of bringing technology and data together in the off-line world.

The evolving consumer journey
How will these technologies reshape the shopping experience? To find out, let's follow one consumer on a journey through the store of future (Exhibit 1).

As Jonathan arrives at his favorite grocery retailer, the store recognizes him, its systems alerted to his presence either as his smartphone connects to the in-store Wi-Fi or perhaps by a facial-recognition technology that he has signed up to use. Once Jonathan agrees to log in, the store accesses the

Several new technologies have reached a tipping point and are set to spill over onto the retail floor.

Exhibit 1

The consumer's journey is evolving.
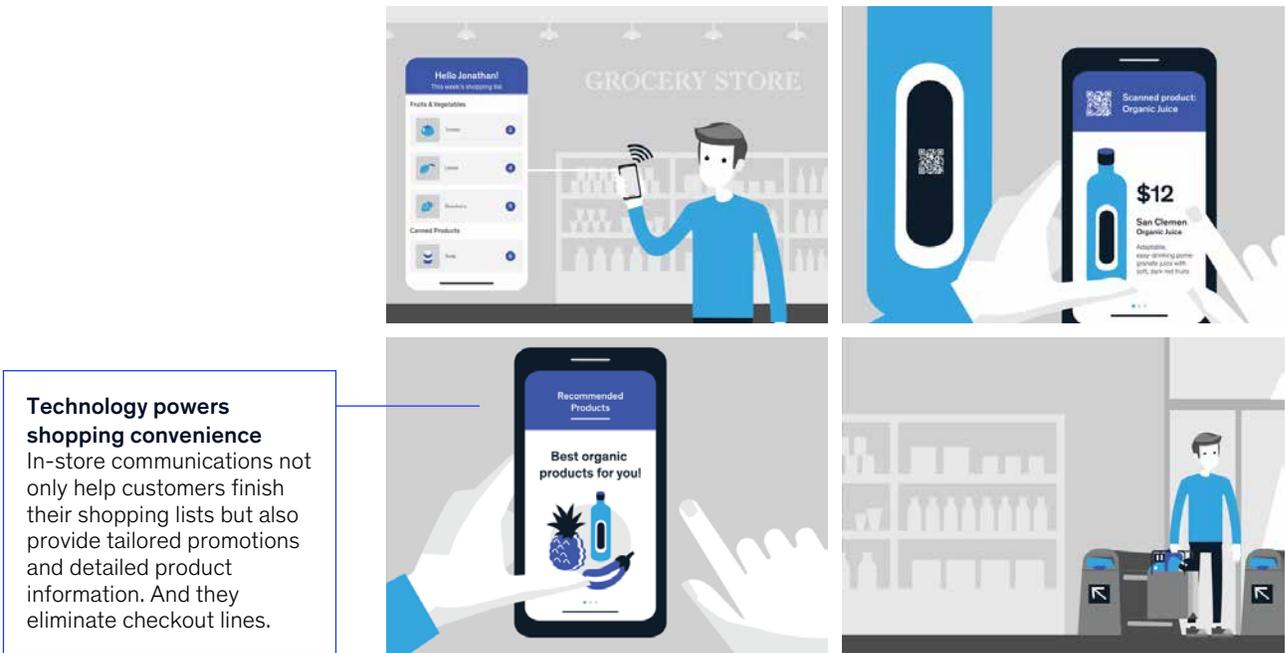
Technology powers shopping convenience
In-store communications not only help customers finish their shopping lists but also provide tailored promotions and detailed product information. And they eliminate checkout lines.

shopping list he's been building at home by scanning items with his phone as he uses them up. As he walks the aisles, smart shelf displays illuminate to show the location of those items, while also highlighting tailored offers, complementary items, and regular purchases that didn't make it onto the list.

Jonathan is tempted by a new, personalized promotion that pops up on his phone as he approaches the prepared-meals aisle. But because he prefers organic foods, he wonders about the product's ingredients. As he scans the package with his smartphone, an augmented-reality display reveals the origin of its contents, along with its nutrition information and even its carbon footprint.

His bag full, Jonathan leaves the store. There was no need to check out: RFID scanners and machine-vision systems have already identified every item he packed, and his credit card, already on file in the retailer's systems, is debited as he passes through the doors.

The evolving associate and manager journeys

Technology won't just reshape the customer experience in tomorrow's stores: working in retail will look will look very different too (Exhibit 2).

David works part time as an associate in the store's fresh-foods department, fitting in shifts around his studies and family life. He negotiates his schedule each week using a mobile app. The store runs a bidding system, and staff can earn a premium by volunteering for busy or hard-to-fill shifts. The technology also makes it easy for David to trade shifts when he has a conflict.

The store rarely struggles to get the people it needs, however. David loves working there because he is passionate and knowledgeable about food. His duties include some manual tasks such as stocking or picking for online orders, but the work is light. Sensors on and above the shelves monitor the status of stock, a machine-learning system plans

Exhibit 2

The associate's journey is also changing.
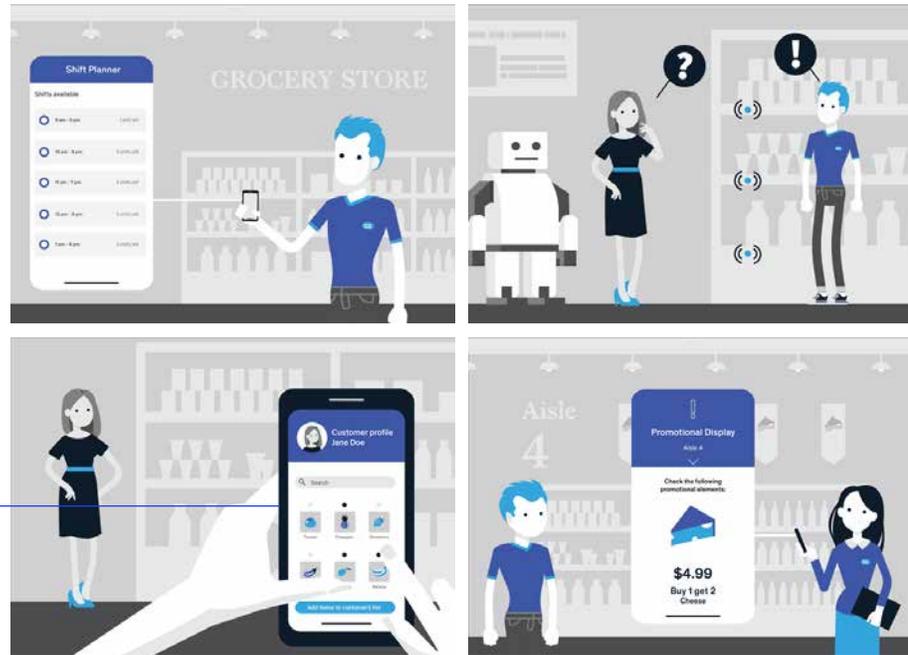
New tools improve retail jobs
Mobile–based shift planners let associates manage their schedules and give them more detailed, accurate information so they can have better interactions with customers.

the replenishment schedule, and items are delivered or taken away by robot carts that glide silently and safely through the store.

David spends most of his time interacting with customers, offering advice on new products and recipes or answering their questions. He has a handheld terminal that he can use to acquire information on each customer's preferences and shopping habits. If a customer can't find something on the shelves, he can pinpoint the location and real–time stock level of every item at a glance or suggest different items based on that customer's shopping habits.

Meanwhile, Rebecca, the store manager, is thinking about plans for a big new promotion that starts next week. The project will involve significant changes to the range of items on display including setting new fixturing in the produce area. But that's nothing new: the store is always adapting its stock and

presentation, and Rebecca spends most of her time working with colleagues to improve and fine-tune its offerings. It helps that many previously time-consuming tasks, such as associate scheduling and reporting, are now handled automatically by artificial-intelligence tools. Her phone alerts her when a situation needs real attention in real time, such as a promotion that's not selling as well as in other stores. This means she can focus her efforts on performance and service improvements, aided by the store's sophisticated performance-analysis systems.

David and Rebecca already have a pretty good idea of how the new promotional set will work because they've tried it out in virtual reality using an interactive digital twin of the store. Conversations with customers have given them an idea for tweaking the offer's presentation, and they are discussing the possible changes now to boost sales, rather than rigidly adhering to a formula devised and handed down from above.

The financial impact of in-store technology

There's another area that is set to look very different in the store of the future, and that's the store's P&L sheet. And while our example has been taken from grocery retail, this impact will be noticeable across the sector. Personalized offerings and optimized assortments will likely raise sales and cut waste, while opportunities to upsell and cross-sell, either automatically or in person, can increase basket sizes and conversion rates.

The profile of the workforce will change as well: skilled and knowledgeable associates will expect to earn more, pushing hourly rates up by about 20 percent. Total wages are likely to fall, however, as automation and technology help shift the balance of labor spend toward value-added and customer-facing work.

Overall, we believe the store of the future is likely to achieve EBIT margins twice those of today, with the added benefits of improved customer experience, better employee engagement, and an easier-to-run store (Exhibit 3). The technology necessary to achieve this transformed P&L is available now, and we calculate that it is ROI-positive.

Are you ready?

The store of the future is still in its infancy, but every one of the technologies described above exists today as a commercial product not just a prototype or proof-of-concept. Retail leaders should act now

Exhibit 3

Technology will likely double store profitability.

	Current EBIT[1] margin	Labor headwinds	In-store labor automation and robotics	Inventory management	Back-office automation	Customer experience	Future EBIT margin potential
	2-4%	-2-3%	2-4%	1-2%	0.5-1%	1-2%	5-9% (Increase of 3 to 5 percentage points)
	20% increase in minimum wages and benefits increases	Warehouse-to-shelf automation, next-gen cameras, supply chain optimization	Reduction in shrink by 20% from advanced analytics	10% reduction in store-management and SG&A[2] costs	Use of in-store assets to drive sales (electronic shelf tags, consultative selling tools)	Each retailer will decide what portion of EBIT to reinvest into price/customer	

[1] Earnings before interest and taxes.
[2] Sales, general, and administrative.

to prepare their organizations for a technology-enabled revolution in customer experience and efficiency. Ask yourself how your organization is doing:

— Do you understand the level of performance your network will need to achieve over the next decade?

— Have you identified the primary use cases for technology-enabled improvements to efficiency or customer experience?

— Are you already testing and piloting new technologies in store or across the network?

— Do you have the capabilities to ramp up your use of technology- and data-driven retail innovations?

In forthcoming articles, we'll take a closer look at the technologies that are shaping the store of the future, and how they are set to transform retail P&L.

Praveen Adhi and **Andrew Davis** are partners in McKinsey's Chicago office, where **Gerry Hough** is a senior expert, and **Shruti Lal** is an associate partner; **Tiffany Burns** is a partner in the Atlanta office, where **Bill Mutell** is an associate partner; **Sebastien Calais** is an associate partner in the Paris office.

Smarter schedules, better budgets: How to improve store operations

Through activity–based labor scheduling and budgeting, retailers can become more efficient while improving customer service and employee satisfaction.

by Sebastien Calais, Andrew Davis, Daniel Läubli, and Bill Mutell
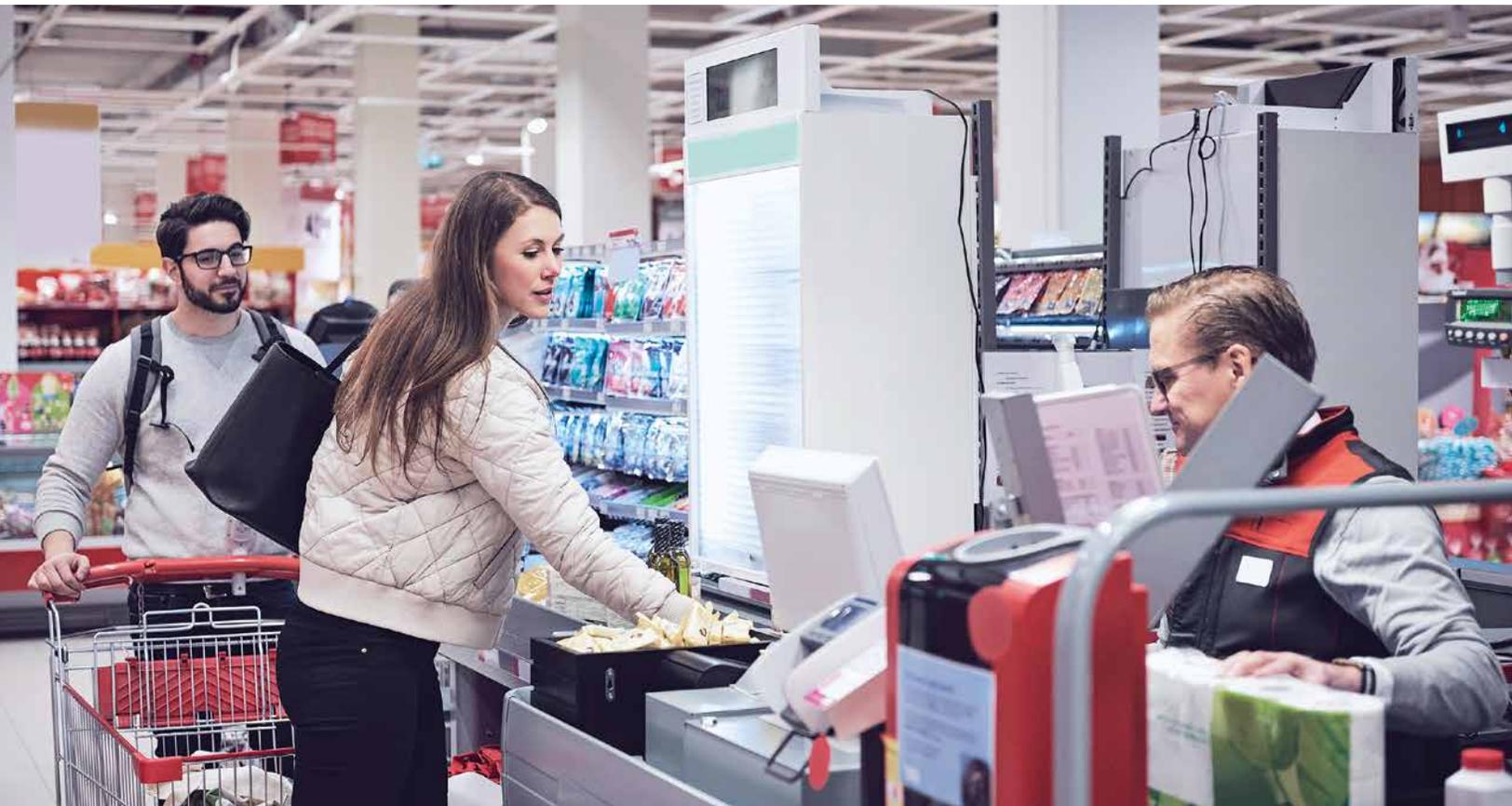
© Maskot/Getty Images

Labor scheduling is an evergreen topic for retail operators with tools, processes, and personnel demands that are constantly changing. While these changes bring new constraints and innovations to a well-defined concept, the fundamentals remain. Companies that have a clear understanding of the fundamental building blocks of scheduling have an advantage over peers in identifying and operationalizing innovation into store operations. The following article outlines the most critical elements of labor scheduling that hold true in virtually any context.

In recent years, retailers have taken steps to "lean out" their processes and gain efficiencies—with impressive results. Lean-retailing initiatives have yielded as much as a 15 percent reduction in retailers' operating costs.[1] But with competition intensifying and customers expecting ever-higher service levels, many retailers are now looking for new ways to further improve productivity and enhance customer service.

One major area of opportunity is workforce management: specifically labor scheduling and budgeting. Because of the complexity inherent in creating accurate staffing schedules and budgets for a large number of stores, even sophisticated retailers find substantial room for improvement in this area.

Off-the-shelf software and solutions—although useful for important tasks such as monitoring employee attendance and managing payroll— typically produce generic schedules that don't take into account store-specific factors and workload fluctuations. The unfortunate results include high labor costs, inconsistent customer service, and dissatisfied customers.

If a retailer could better predict the number and skill set of employees that each of its stores needs every day (or, better, every hour) of the week, then customers would get prompt sales assistance, shelves would be replenished in a timely manner, employees would be neither idle nor overworked, and, in most stores, labor costs would go down.

That is already happening at a few leading retailers. Chief operating officers have begun looking closely at store activities and taking a more data-driven approach to labor scheduling and budgeting. In doing so, they have captured between 4 and 12 percent in cost savings while also improving customer service— for example, by shortening checkout queues or having more staff available on the sales floor to assist customers—and boosting employee satisfaction. This level of impact has been achieved at several different types of retailers, from large supermarket chains in the United States and Europe to specialty retailers in emerging markets.

A mismatch between supply and demand
Many retailers use workforce-management software to generate a weekly staffing schedule that is unique to each store. This schedule is usually based on revenue forecasts—more employees work during hours or days when sales are projected to be the highest. Revenue is a sensible criterion for scheduling, but it's an insufficient one because customers' buying patterns (average basket size, average purchase price per item, and more) can vary by hour and by day. A European grocer found, for example, that manned service counters, such as deli and bakery counters, account for a much higher share of revenues on weekends than they do during the week. On weekends, therefore, the required labor hours increase at a higher rate than revenues.

Furthermore, most retailers don't have a systematic way to account for store-specific factors that affect how long activities take—such as the distance that an employee must walk to transport a pallet from a delivery truck to the storeroom or how many

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[1] For more on lean retailing, see Stefan Görgens, Steffen Greubel, and Andreas Moosdorf, "How to mobilize 20,000 people," December 2013, McKinsey.com.

elevators employees can use for bringing products to the sales floor. The same activity can be much more time consuming at one store than at another, even if the two stores have equal revenues.

Just as staffing schedules rarely align with a store's true labor needs, labor budgets are also often mismatched with a store's current reality. Many retailers decide on labor budgets in an undifferentiated top-down manner: for example, they mandate that each store's labor costs must not exceed a certain percent of sales. Store managers can then negotiate adjustments based on their intuition or experience. This simplistic approach relies too heavily on store managers' judgment; it also unfairly penalizes some stores. For instance, a store in which fresh produce contributes a large fraction of sales will be at a disadvantage because fresh produce takes more time and care to replenish than packaged goods. We found that such differences among stores can lead to labor-cost differences of up to 30 percent even if the stores' sales are equal. A seemingly equitable top-down directive thus becomes inequitable in practice; some stores can provide exceptional customer service and a relaxed pace of work for employees, while at other stores, stressed workers struggle to meet their service-level targets.

Four prerequisites to an activity-based approach
To revolutionize their labor scheduling and budgeting, innovative retailers aren't simply relying on off-the-shelf workforce-management solutions. Instead they are taking an activity-based approach—one that matches store employees' working hours to a changing workload, which means the right employees are working at the right times, performing the right tasks, and spending the least amount of time required for those tasks. Equally important, such an approach helps retailers develop accurate annual labor budgets for each store. An activity-based approach can be immensely valuable,

particularly to retailers that employ 20 or more people per store.

Companies have historically used activity-based techniques (such as activity-value analysis) to improve processes and reduce costs, but rarely have such techniques been applied to labor scheduling and budgeting. In our analysis of labor-scheduling logic, we identified four prerequisites for excellence using an activity-based approach:

— store-specific *workload calculations*, which are informed estimates of how long it takes to complete certain activities (for example, replenishing one pallet) in a particular store, taking into account predefined service and process standards

— reliable *forecasts of "volume drivers"* (such as revenues per department, per hour, and product flows) for each store, based on sophisticated regression models as well as store-manager experience

— a *flexible workforce*—with a mix of full-time, part-time, and temporary staff—that can adapt to schedules that may change on a daily and weekly basis

— robust *performance-management processes and systems*, with clear productivity and service-level targets, to ensure that all stores are on board and comply with the plan

All four of these prerequisites can be challenging for retailers. We've found, however, that the first prerequisite—generating accurate workload calculations—often proves to be the key improvement lever.

How to calculate workloads accurately
The optimal workload calculations set an expectation for best-practice performance while

also acknowledging each store's unique context. In activity-based scheduling, the time allotted to each activity is a network-wide standard time that is the same for all stores, plus any additional time due to the specifics of each store (exhibit). The network-wide standard time in effect establishes a best-practice benchmark for all stores. Store–specific time drivers can then be measured by observation.

Some activities will be tricky to model. For instance, figuring out how long it should take to ring up purchases at checkout and how many cashiers should be working at any one time isn't a straightforward calculation—customers arrive at checkouts randomly. For unpredictable customer-facing activities like these, retailers will need to use queuing theory.[2]

Retailers should focus on activities that constitute a significant amount of store employees' workload. On the one hand, developing a detailed model of how long it takes to adjust a shelf to an updated planogram isn't necessary, as this activity typically accounts for less than 1 percent of the total workload. On the other hand, replenishment-related activities can take up to 70 percent of the total work hours in a store (see case study, "One retailer's results: Lower labor costs, better store managers").

Implementation and rollout

Implementing an activity-based approach requires a tool that can turn inputs (such as revenue forecasts and customer-footfall estimates) into useful outputs for store managers. Outputs might include the required number of full-time employees per hour and per day, the specific tasks employees should be doing during certain hours of the day, and the associated labor costs.

Retailers typically find it easier and faster to build such a tool from scratch and then inject its outputs into their existing workforce-management systems, rather than build the tool within their current HR systems. In our experience, it takes approximately six months to develop an Excel-based prototype, pilot it in a handful of stores to test the accuracy of all assumptions and workload calculations, observe its impact on the workforce, and refine it.

How quickly the tool is rolled out to the entire store network will depend on available resources, but a store-by-store rollout—whereby an operations "coach" helps store employees learn about the new tool and any new processes—is often most effective. Leadership must ensure that the tool is embedded into daily work and fully linked to HR planning and annual budgeting processes. To keep it constantly

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[2] Queuing theory is useful for calculating how many employees are needed at a given time to meet the retailer's target service level. In the checkout example, the target could be based on waiting time (for instance, 90 percent of customers will wait in a checkout line for no more than three minutes) or queue length (for instance, 90 percent of customers will have a maximum of two people in front of them at checkout).

Exhibit

Stores should be allotted the same amount of time for the same task, with some adjustments based on each store's unique context.

Time for activity		**Standard time**		**Store–specific time driver**		**Quantity**
Total time for store employees to perform a core activity in a department	$=$	Target time for an activity; should be the same for entire store network	$+$	Additional time needed due to local store characteristics (eg, store layout, average basket size)	$\times$	Number of times the activity is performed; variable (can be derived from historical data)

One retailer's results: Lower labor costs, better store managers

A large European retailer, with annual revenue in excess of $20 billion, knew that its stores' labor scheduling and budgeting processes weren't rigorous enough. At every store, both the standard weekly staffing schedule and the annual labor budget were based primarily on revenues and managerial judgment.

Seeking a more data-driven approach, the retailer decided to pilot activity-based labor scheduling and budgeting in two of its stores over a four-month period. The effort involved calculating the timing of 65 activities and building an Excel-based prototype of a new labor-scheduling and budgeting tool.

The retailer subsequently tested the prototype in six additional stores that were quite different from one another to ensure that the tool's outputs would be relevant to the entire store network. Along the way, the retailer discovered and quickly implemented a number of best practices and process improvements.

The new staffing schedules and labor budgets yielded an efficiency improvement along with an improvement in customer service—gratifying results, particularly in light of the fact that the retailer had recently undertaken a successful lean-retailing transformation and in many ways already had best–practice store

operations. Furthermore, the approach helped expose poor store management. For example, one store was perceived in the company as being well managed because it had notably low labor costs. But bottom-up calculation of the store's annual labor budgets showed that the low labor costs were entirely due to favorable store specifics, such as short distances for transporting products and shelves that were relatively easy to stock. Once labor costs were adjusted for those specifics, the store was shown to be among the least efficient in the network. These and similar insights allowed the retailer to better evaluate and train its store managers.

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up to date and relevant, retailers should consider setting up a scheduling team of people who have the requisite analytical skills and who are familiar with store operations. The team would be responsible for maintaining and updating the tool and adjusting the workload calculations to new processes.

An activity-based approach can reveal opportunities for improving store processes. In fact, it can serve as the backbone for a continuous-improvement program; ideally, the new scheduling and budgeting tool would be able to run "what if" analyses for any

changes in service levels or process standards. And in the event that labor budget cuts become necessary, management teams—instead of just imposing top-down percentage cuts—will be equipped to lead practical and detailed discussions about which store activities could be speeded up or eliminated entirely, or where service-level targets could be relaxed. In this way, they will be able to ensure sustained improvements in store productivity, customer service, and employee satisfaction, all while keeping labor costs firmly under control. In future publications, we will outline some of the unique elements that can drive variation in labor scheduling.

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Bending the cost curve in brick-and-mortar retail

Retailers can achieve next-generation store efficiency by breaking down silos and optimizing total cost across the value chain.

by Praveen Adhi, Vishwa Chandra, Karl-Hendrik Magnus, and Aneliya Valkova

© Noel Hendrickson/Getty Images

Making money in retail—particularly in physical stores—is becoming harder and more complex each year. Many retailers around the globe have addressed many of the possible efficiencies in labor productivity and process automation. It is time to consider the next generation of thinking to make a meaningful difference in brick-and-mortar economics and remain competitive in an ever-changing retail environment.

Our colleagues have discussed how an integrated view on cost can help consumer-goods companies optimize operations costs across the value chain.[1] In this article, we take a closer look at how retailers can benefit from a similar end-to-end perspective. The goal is to help traditionally siloed departments, from store operations to supply chain to merchandising, understand the total cost of each SKU by disaggregating the product's journey from end to end. This understanding can enable retailers to make better decisions about what products to purchase, when to transport them, how to display them, whether to offer a sale—and, all along, how to make best use of their employees' time.

While traditional store efficiency programs focused on in-store labor productivity can save 5 to 10 percent in overall costs, in our experience a more comprehensive cost approach can enable retailers to realize two to three times more savings, bending the cost curve more toward meaningful impact than the traditional incremental approach.

Case for change: External environment

Even retailers with stable balance sheets face mounting cost pressure due to several factors, including decreased foot traffic, increased SKU complexity, higher customer expectations, and rising labor costs.

To start, consumers shop from the comfort of their couches rather than traveling to the nearest shopping center; e-commerce has accounted for 40 percent of retail growth in the United States since 2016. A recent McKinsey survey found that 82 percent of US consumers reported spending money online over the preceding three months, and 42 percent of millennials report they prefer shopping online to shopping in store.[2] Still, the in-store experience is far from obsolete. McKinsey projects e-commerce will constitute just 21 percent of total retail sales and 5 percent of grocery sales by 2023.

Second, brick-and-mortar stores are contending with increasing SKU complexity; in a world of ever-shorter product cycles and rapid innovation, SKUs have proliferated rapidly.

Third, stores are facing increased customer service and experience expectations, requiring both more time dedicated to customers and better-trained frontline staff to serve today's highly digital, well-informed customer. In addition, the proliferation of omnichannel experiences is changing the very purpose of a physical store.[3] Stores are increasingly expected to offer a variety of omnichannel services, including in-store fulfillment and returns of online orders.

Finally, retailers' traditional labor pool is dwindling due to low unemployment and rising labor costs. For example, the United States is experiencing record-low unemployment.[4] And to date, states that account for 30 percent of US workers have committed to phasing in a minimum wage increase that will ultimately reach $15 an hour—more than double the federally mandated wage of $7.25.[5]

What retailers can do

To remain viable in this environment, retailers must constantly improve their store economics by simplifying, eliminating, or automating routine activities. Most retailers have implemented several rounds of lean cost-improvement programs, such as automating simple activities (reporting and

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[1] Philip Christiani, Sebastian Gatzer, Daniel Rexhausen, and Andreas Seyfert, "How to untap the full potential: An integrated—not isolated—view on cost," September 2019, McKinsey.com.
[2] Praveen Adhi, Tiffany Burns, Andrew Davis, Shruti Lal, and Bill Mutell, "A transformation in store," May 2019, McKinsey.com.
[3] Raj Kumar, Tim Lange, and Patrik Silén, "Building omnichannel excellence," April 2017, McKinsey.com.
[4] "Employment situation summary," Bureau of Labor Statistics, October 4, 2019, bls.gov.
[5] Chris Marr, "States with $15 minimum wage laws doubled this year," Bloomberg Law, May 23, 2019, bloomberglaw.com.

scheduling) and streamlining their inventory stocking processes. However, most still take a narrow view of what costs they can optimize, focusing on activities the store can influence and accepting upstream activities and decisions as constraints.

To reach the next level of cost efficiency, retailers must expand their focus outside the four walls of the store. Only the most advanced look for efficiency at the intersection of store operations, merchandising, supply chain, and transportation to adopt a total-cost view—that is, the sum of cost components across the value chain (Exhibit 1). By considering underlying costs, from how products are chosen to how they're stocked, in our experience retailers can expand the scope beyond costs addressed in their brick-and-mortar stores by 50 percent. These underlying costs are also more likely to yield efficiency because they have not been scrutinized as much as in-store costs.

A total cost approach can reveal a host of unrealized efficiencies (Exhibit 2). For example, with input from store operations, merchandising can adjust the store's promotional calendar by category and product to incorporate both the expected incremental margin as well as the store labor required to change price tags and build promotional displays. Given this more comprehensive view of cost, some promotional activities will be seen as unprofitable and thus

discontinued. Further, a deeper understanding of net margin and labor implications in distribution centers and stores can inform decisions about whether to add or remove shelf space from a given SKU. The extra labor cost required to stock the shelf between less frequent deliveries may be offset by transportation cost savings.

A comprehensive view of cost can also inform investments into enhanced capabilities such as automation. For example, if a distribution center can be outfitted to build custom pallets that match a store's layout, frontline staff would spend less time sorting products and moving between aisles.

It is important to recognize that these efficiencies will lower costs in some departments but may be cost-neutral or increase costs in others; accounting for these cross-functional effects will be critical to success.

Success factors for bending the cost curve

Four primary factors are crucial to bending the cost curve through a total-cost approach: governance and executive alignment, cost transparency, data and analytics capabilities, and key performance indicators (KPIs) and incentive alignment.

To remain viable in this environment, retailers must constantly improve their store economics by simplifying, eliminating, or automating routine activities.

Exhibit 1

Cross-functional collaboration to understand total cost of handling can lead to a host of unrealized efficiencies.

(SO) Store operations   (SC) Supply chain   (M) Merchandising

Cost decrease

Neutral

Cost increase/
margin decrease

Category and product promotional profitability is adjusted to account for store labor costs to replace price tags and build promo displays. This makes some promotions unprofitable, and they are discontinued.

SO   SC
             M

Extra shelf space is added for fast-moving SKU A to enable stocking all product at once. The store labor savings are greater than the lost margin from removing SKU B's shelf space.

SO   SC
             M

Product is purchased from vendors, shipped, and stocked in shelf-ready packaging, which makes it easier for stores to handle and outweighs the extra vendor costs.

SO   SC
             M

The store receives less frequent deliveries to optimize transportation cost—the savings outweigh the extra labor needed to manage bigger shipments.

SO   SC
             M

The business case on whether to invest in distribution-center automation is amended to include store savings from stocking product that arrives in better-organized pallets.

SO   SC
             M

Promotional displays are built upstream in the distribution center or at the vendor, reducing the time it takes store employees to set up.

SO
      SC   M
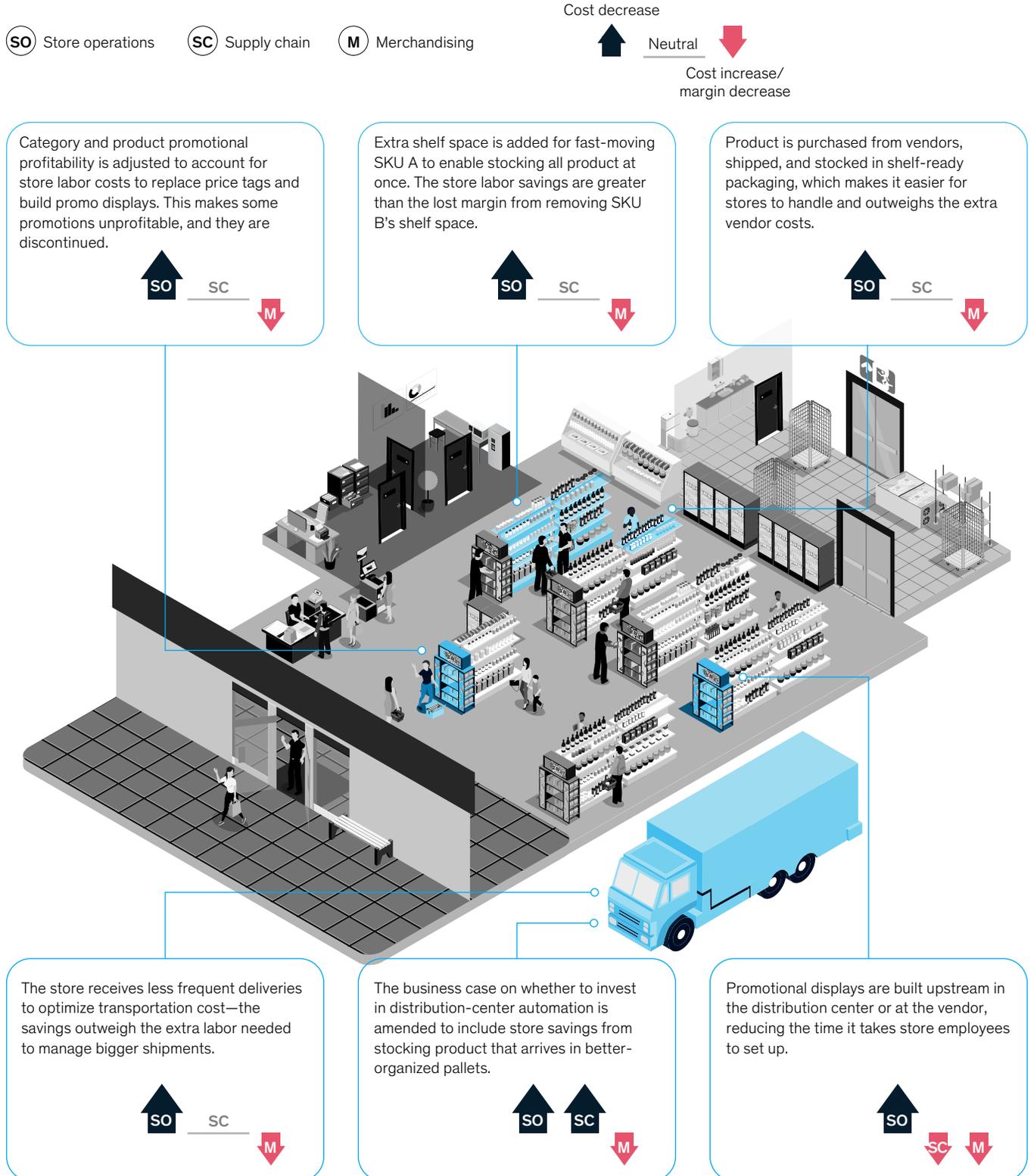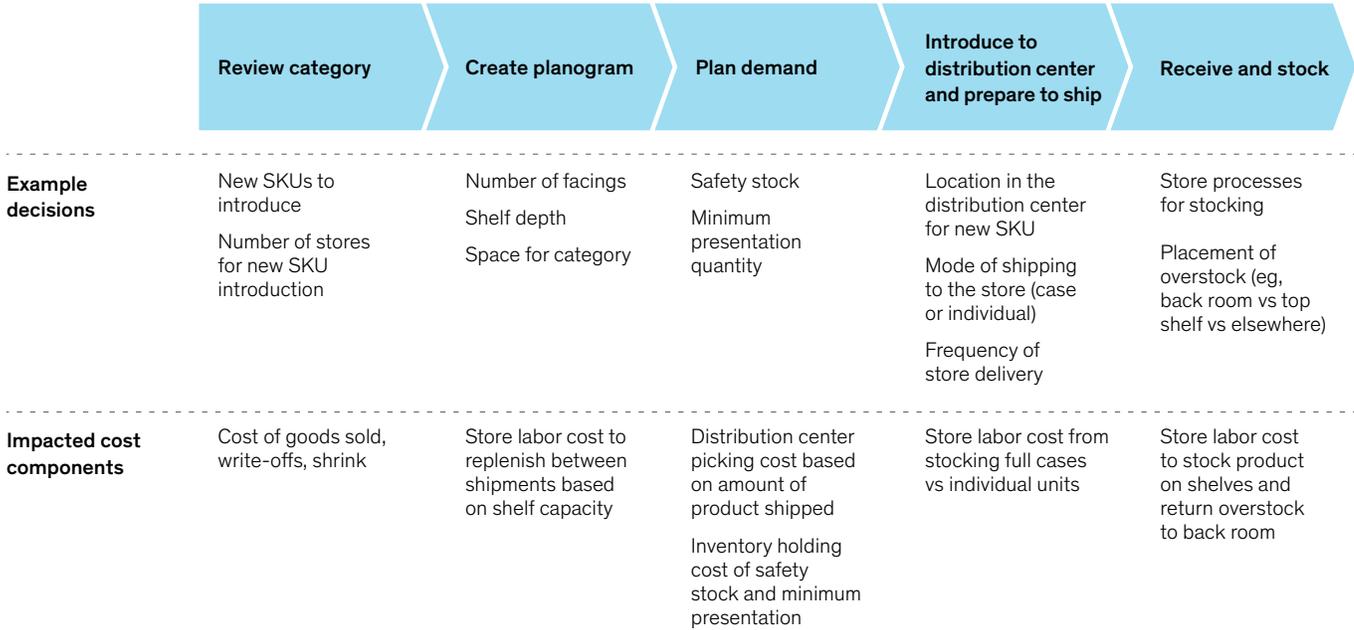
Exhibit 2

The total cost of handling a product is determined by considering cost at each step of the value chain.

	Review category	Create planogram	Plan demand	Introduce to distribution center and prepare to ship	Receive and stock
Example decisions	New SKUs to introduce Number of stores for new SKU introduction	Number of facings Shelf depth Space for category	Safety stock Minimum presentation quantity	Location in the distribution center for new SKU Mode of shipping to the store (case or individual) Frequency of store delivery	Store processes for stocking Placement of overstock (eg, back room vs top shelf vs elsewhere)
Impacted cost components	Cost of goods sold, write-offs, shrink	Store labor cost to replenish between shipments based on shelf capacity	Distribution center picking cost based on amount of product shipped Inventory holding cost of safety stock and minimum presentation	Store labor cost from stocking full cases vs individual units	Store labor cost to stock product on shelves and return overstock to back room

Governance and executive alignment

It starts from the top. Senior-level, cross-functional alignment and sponsorship are required to communicate change and ensure it sticks. Given the sensitive nature of cross-functional savings—some departments will see a cost increase, while others will see a disproportionate cost decrease—each function needs to be confident that senior leaders support them and that every function adheres to the same new standards.

In addition, the business owner of this new process should be selected with care. Ideally, they should reside outside of functions that own a meaningful number of cost components; finance is often a good option because it lacks a direct stake in where costs are incurred. Store operations is another viable option, as it is furthest downstream in the process.

Cost transparency

Retailers often struggle to calculate their total cost of handling for two simple reasons: they either lack a full understanding of cost components or don't have the data to quantify each. For example, many retailers do not have a clear sense of how much labor is used per unit of product in the store, starting with unloading it from a truck to placing it on the shelf, refilling the shelf between deliveries, checking for out-dates, mounting promotions, and beyond.

Each SKU's journey should be mapped and broken down into cost-component steps. Each step includes multiple iterations based on how it is executed. For example, in–store labor cost is a component with at least two iterations based on how a product is stocked—as a full case or individual units. Identifying where a product goes and stocking

a full case all at once requires much less labor per unit compared with stocking individual units and searching for the correct spot on the shelf after each one. These cost estimates should be periodically refined to reflect changes in cost structure.

Data and analytics capabilities

Establishing cost transparency should result in the creation of a central data repository with access to multiple sources of data at the SKU and store levels, including all cost components across sales, cost, margin, safety stock and presentation requirements, promotional calendar, planogram versions, and shipping quantities. Typically, these data sources are not tied to each other, requiring additional work to build a 360-degree view of each SKU.

Once the data are assembled, sophisticated data and analytics capabilities are needed to simulate the different scenarios based on variable factors—such as how a product is shipped from the distribution center, in what quantity, and how often. An advanced decision-engine algorithm needs to be put in place to determine the lowest-cost path through the system and estimate the cost savings should all SKUs follow the optimal path. Identifying the scenario that matches the current state and comparing it to the optimal state can illuminate the concrete savings gained by moving from the traditional to the proposed approach. Savings can be realized both initially, when the decision engine is put in place, and continuously as the algorithm becomes embedded.

Key performance indicators and incentive alignment

While advanced analytics can enable decisions that optimize total cost across the organization, some areas of the organization may experience relative cost increases that permit bigger decreases in other

areas. However, many parts of the organization have narrow P&Ls that don't account for cross-functional effects. As such, end-to-end costs must be embedded in the reporting and KPIs of each function. For example, a merchandising decision to remove shelf space from the planogram of a fast-moving SKU should consider more than the lost margin and vendor funding. The decision should also consider whether less shelf space may negate the benefit of shipping full cases to the store. In that case, the SKU in that planogram will incur the extra cost from being shipped as individual units from the distribution center and the additional cost of having to be restocked between shipments if its shelf capacity is decreased.

Brick-and-mortar retail will continue being challenged to deliver on multiple fronts at once, including customer experience, omnichannel services, and cost excellence. While initially impactful, traditional lean levers employed by store operations limit the scope of opportunity by ignoring 50 percent of cost controlled by other functions, including merchandising and supply chain. To bend the cost curve and reach performance excellence, retailers should take an end-to-end view of cost. With a data–driven decision engine and senior leadership's support, retailers can realize significant opportunity across the organization and make better long-term operating decisions.

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Supply chain of the future: Key principles in building an omnichannel distribution network

As omnichannel shopping is becoming the new norm, consumer and retail companies must be ready to deliver fast, impeccable omnichannel service. Doing so requires a new supply chain network approach.

by Manik Aryapadi, Ashutosh Dekhne, Wolfgang Fleischer, Claudia Graf, and Tim Lange

The consumer product and retail landscape continues to evolve as companies race to catch up with leading e-tailers. Traditional brick-and-mortar retailers such as Macy's, Nordstrom, and Walmart are expanding their online offerings and introducing new models, such as in-store fulfillment of online orders. Online players such as Amazon and Zalando are opening their own brick-and-mortar stores. Vertically integrated players such as Bose, Burberry, and Nike are strongly pushing their direct-to-consumer business through both online and new physical stores. And players of all kinds are complementing their physical stores and e-commerce offerings with innovative applications and social media to mount a truly omnichannel presence.

However, many players still struggle with omnichannel success given the requirements it places on their supply chains—especially in terms of speed, complexity, and efficiency. Customers expect to receive their products anytime and anywhere with a very short time between order and delivery, with excellent service and high convenience. Our research shows that service represents the primary factor that brands and retailers can use to differentiate themselves and "delight" omnichannel shoppers.[1]

Companies that succeed, in our experience, master seven key building blocks of the omnichannel supply chain (see sidebar, "The seven supply chain building blocks for omnichannel excellence"). In this article, we focus on building block number two, the network and ecosystem of the future, and describe the principles that can guide companies' approach to omnichannel network design in an increasingly complex environment.

The current e-commerce landscape

While apparel trails industries such as electronics and sporting goods in e-commerce penetration, the number of people shopping for clothes and shoes online is rising rapidly. This trend is true across regions. From 2014 to 2017, online apparel purchases grew at a CAGR of 24, 15, and 14 percent in Southern Europe, North and Western Europe, and Central Europe, respectively. In the United States, online apparel sales grew 18.5 percent in 2018 alone, to more than one-third of all apparel sales that year.[2] This growth far outpaced total apparel sales growth of 5.3 percent that same year. In China, total online retail spending grew 27 percent in 2018, with 24 percent of retail sales taking place online.[3]

Companies of all kinds, not only in apparel, are racing to meet customer needs—and adapting their supply chain is often one of the primary hurdles. Traditional supply chain networks are often not built for same-day delivery with excellent service. This is an issue especially when fierce competition offers shorter delivery times with a great customer experience; for example, Amazon continuously redefines delivery standards.

Traditional supply chain networks are often not built for same-day delivery with excellent service.

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[1] Holly Briedis, Tyler Harris, Megan Pacchia, and Kelly Ungerman, "Ready to 'where': Getting sharp on apparel omnichannel excellence," August 2019, McKinsey.com.
[2] April Berthene, "Ecommerce is more than a third of all apparel sales," Digital Commerce 360, July 23, 2019, digitalcommerce360.com.
[3] Satish Meena et al., "Forrester Analytics: Online retail forecast, 2018 To 2023 (Asia Pacific)," Forrester, May 15, 2019, forrester.com.

The seven supply chain building blocks for omnichannel excellence

The omnichannel supply chain of the future has seven key elements that combine best practices with digital opportunities (exhibit).

Companies that achieve omnichannel success master seven key building blocks. The essential questions to ask for each element are listed below.

Exhibit

The omnichannel supply chain of the future has seven key elements that combine best practices with digital innovation.

Customer–centric supply chain strategy

Starting point to design an omnichannel supply chain that meets customer needs along all channels.

Network and ecosystem of the future

The supply chain's backbone—provides required speed and flexibility, leveraging information, and partner assets and capabilities.

E2E planning and information flow

Key information flow capabilities that access the right products in the right place at the right time—real-time—to deliver according to customer expectations

Operating model and change management

Key organizational enabler for the company and its people—captures supply chain potential and delivers exceptional customer value.

Omnichannel fulfillment: Node operations

Key physical flow capabilities that ensure competitive cost structures and reliable quality while managing complexity.

Digitization and process automation

Key technology enabler that uses available omnichannel data, analytics, and supply chain systems along the end-to-end value chain—and includes ecosystem partners.

Omnichannel fulfillment: Transportation and LSP management

Key physical flow capabilities that provide reliable, fast service to all customers where it matters, while ensuring competitive transport costs.

Customer–centric supply chain strategy

— *Supply chain strategy and segmentation:* How many supply chain segments are required to deliver the supply chain mission? What is the objective of each supply chain segment—responsiveness versus efficiency?

— *Customer–backed service aspirations:* What is the customer offering across different segments? Where does speed matter versus flexibility and services?

How can we differentiate ourselves from competitors?

— *Assortment and complexity management:* How can we tailor the assortment to a retailer or to a channel (for example, online only)? How is the product portfolio managed?

— *Risk management:* What are the key supply chain risks? How can we best prepare for supply chain disruptions? What are the best proactive mitigation strategies and contingency plans?

— *Sustainability:* How can we create a sustainable supply chain using best practices, such as supporting the circular economy and using sustainable raw materials and packaging?

Network and ecosystem of the future

— *Supply network:* What is the physical flow of goods through the network? What are the different product–supply speed models, and what is the impact on the supplier and production footprint?

The seven supply chain building blocks for omnichannel excellence (continued)

— *Supplier management and collaboration:* How are suppliers managed and integrated to support an agile upstream supply chain that responds quickly to changes, as required by the omnichannel customer?

— *Distribution network:* Is the distribution network designed for each channel individually or is an omnichannel network beneficial?
What is the right composition of distribution centers (DCs), new node types, and partner locations?

— *Inventory-sharing concepts:* How can inventory be shared across channels? Does each channel have its own inventory? What is the best governance and business model for these concepts?

— *Customer collaboration:* What are key areas for customer collaboration that could improve information exchange and product flow along the value chain? Where should partners be employed to drive and access innovation?

End-to-end (E2E) planning and information flow

— *Demand planning:* What are the different demand signals in the omnichannel environment, and how can they be captured to predict demand potential by leveraging advanced analytics? How can we combine them into an E2E marketplace perspective?

— *Inventory management:* What is the optimal inventory level at each stage of the value chain—DCs, stores, partners, etc.? How can we actively manage inventory to increase availability and keep cash requirements under control?

— *Supply and replenishment planning:* How can we best synchronize the product supply with customer demand in stores, DCs, and with partners? Ensure the right amount of capacity along the different segments of the SC?

— *Sales and operations control tower:* How can we align the different organizational entities and plans at key milestones? Manage and decide on trade-offs? Allocate and prioritize customers, channels, and orders in case of constraint?

— *Distributed order management:* How can we ensure real-time visibility and accessibility of inventory across all channels and locations? Find and access the right fulfillment node to fulfill customer orders efficiently?

Omnichannel fulfillment: Node operations

— *Warehouse management:* How can we achieve warehouse excellence in a more complex environment? Leverage automation to increase speed, quality, and efficiency? Should DCs be operated in house or outsourced?

— *Return flows and processing:* How can we manage returns in an efficient and effective way? Optimize return flows across the network? Which decisions on flow of goods can be made by which parts of the value chain?

— *In-store operations:* How can we enable the whole downstream supply chain for omnichannel? Optimize in-store layout and processes to enable local fulfillment while securing a great customer experience?

Omnichannel fulfillment: Transportation and logistics service provider (LSP) management

— *Transport management:* What is needed to manage transport operations efficiently in an increasingly demanding world? How do we keep transport cost under control? Create end-to-end transparency of product flows?

— *Logistics service provider sourcing and management:* What are the right logistics partners for the different supply chain segments? How do we best source and manage LSPs to get competitive rates and services?

Operating model and change management

— *Processes:* How do we design supply chain processes to support omnichannel optimization? How can digital innovation be integrated in the process design? How do we accelerate decisions?

— *Structures:* How can we adjust the organizational structure to capture cross-channel benefits and make change happen? Avoid silos between channels? Use zero-based thinking in organizational sizing?

— *Capabilities and mind-set:* Which additional skills are needed to enable the future organization? Where should an agile way of working be used and how? How can we best address the cultural change toward omnichannel behavior?

— *Performance management:* How should performance of the E2E supply chain be measured? How can we incorporate the omnichannel dimension, measuring the joint performance rather than individual channels? Adjust incentives to enable the right behavior?

The seven supply chain building blocks for omnichannel excellence (continued)

Digitization and process automation

— *Foundational software:* What is the required software and tooling needed to enable the omnichannel supply chain? Which optimization decisions need special tool enablement?

— *Data strategy:* How can we capture data and use it along the value chain? Build the omnichannel data lake to link the data from different platforms and systems? How are legacy systems integrated? How do we integrate into an ecosystem with our partners?

— *Analytics strategy:* How can we contextualize data to conduct relevant analyses? Is operational data consolidated and accessible by the right decision makers? How can we best visualize data and analytics to make them accessible to decision makers?

— *Process automation:* How can advanced digital tools such as robotic process automation, blockchain, and the Internet of Things be deployed? What are the key benefits of these technologies, and how can they enable omnichannel optimization?

In addition, e-commerce fulfillment is much more complex than traditional brick-and-mortar or wholesaler fulfillment. When customers can order 24/7, demand is less predictable and more difficult to shape. Order sizes are significantly lower, and the number of products offered continuously rises. The increase in speed and complexity drives up fulfillment costs. In our experience, an online order's cost per unit can easily be four to five times higher than traditional brick-and-mortar replenishment and ten times higher than wholesale fulfillment. All the while, customers demand a seamless omnichannel journey.

Building out the omnichannel experience can bring huge value for retailers, e-tailers, and vertically integrated players with direct-to-consumer business; our research has found that customers shopping online tend to buy more, and customers that pick up online orders in store often make additional in store purchases.[4] With the seven building blocks of a successful omnichannel supply chain in mind, the following principles should be top of mind while working to build the network and ecosystem of the future.

Put the customer's needs first

To start, companies need to adopt a granular perspective of what the customer really wants, today and in the future. This understanding will inform which channels to serve, which products and services to offer, and where to offer them. For example, a young adult living in a large city, such as London or New York City, wants to purchase and receive a newly launched sneaker that a celebrity presented on Instagram that same day. However, the customer does not know where she will be in a few hours, so it is important that she can track the delivery and reroute it at any time. If, for example, she goes to a café, the shoes are rerouted (via an app) to be delivered there.

Developing this detailed understanding of customers requires harnessing customer data. This information should be combined with customer-behavior insights culled from customer interviews, observations, and the latest research from market experts, as well as analyses of competitors' e-commerce offerings. Advanced analytics can be used to process all this information and gain a clear understanding of customer expectations.

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[4] "Employment situation summary," Bureau of Labor Statistics, October 4, 2019, bls.gov.

In an ever-volatile environment, speed of implementation and efficient use of resources are crucial.

In addition to understanding the customer today, companies must also look to the future and stay flexible as the market rapidly changes. For example, while next-day service was novel just a few years ago, it is common today. How future incumbents and disrupters will shape the market is still unknown. As such, serving the customer of the future requires unprecedented agility—quickly adapting to changing customer expectations.

Forget one size fits all

A deep understanding of customer desires should be the foundation of defining the strategy and building various customer segments based on preferences, product categories, and locations.[5] This segmentation recognizes that a one-size-fits-all approach is a waste of resources. A segmented approach enables the company to prioritize specific services for each customer group—for example, which speed of delivery to offer for each segment and which differentiated services to offer or not. While the London customer may expect same-hour service, customers living in remote areas might not mind waiting a few days. Developing this understanding to undergird the strategy is crucial to avoid common mistakes, such as offering convenience at a premium to customers that care more about price or building offerings that quickly become outdated.

Be fast and collaborative

In the traditional supply chain model, companies often choose a purely quantitative approach to model the perfect fulfillment network needed for the service offering. This generally involves a rather rigid and time-consuming approach: three months of data collection, six months of modeling, and three months of decision making before implementation. This traditional approach leads to a onetime strategy and long implementation times. However, in an ever-volatile environment with constantly changing customer needs, evolving partnerships, and newly developing competition, reacting quickly is critical to ensure that the supply chain network is responsive, flexible, and efficient.

Therefore, companies should remain agile in their thinking and assemble a cross-functional team. One best practice is to develop the future supply chain network in a workshop-based environment. In practice, this means determining the fulfillment options suitable for each customer, product, and location segment and defining the required product flow. Starting with the segment that has the most demanding lead time, the best fulfilment option needs to be found for each segment while considering operational needs, such as costs to serve and volume constraints. Once a solution for each segment in each location is defined, it must all be combined into one comprehensive service network.

Seek partnerships and share resources

In an ever-volatile environment, speed of implementation and efficient use of resources are crucial. Therefore, it is necessary to take advantage of existing infrastructure, such as warehouses and retail stores, as well as resources available in the

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[5] Raj Kumar, Tim Lange, and Patrik Silén, "Building omnichannel excellence," April 2017, McKinsey.com.

market. Leading companies are actively seeking partnerships, not only along their own value chain but also with players from other industries. Sharing infrastructure brings synergies—costs and risk are split, for example—and enables better customer service and faster delivery times. For instance, a player operating department stores may offer in-store pickup services to e-commerce companies, and e-commerce companies can offer online order fulfillment to department stores. The partners would establish commercial terms for compensation, such as sharing the margin. Connected inventory is another example of using existing partner resources, enabling players to offer products that are already close to the consumer rather than putting additional inventory into the market. This can increase the availability of certain products with minimal effort from the retailer.[6]

Look for innovative fulfillment options
When identifying existing assets within a company and their partners' networks, it is important to consider innovative fulfillment options. The types of fulfillment options a player regards as suitable depend on the specificities of the market and the company, but customer orders can be fulfilled in a variety of ways. Shipping products from a warehouse or distribution center is the most traditional and cost-efficient way. Warehouses typically have a higher level of automation, handle significant volumes, and seek locations that incur low operating costs, such as rural areas or industrial areas outside of large cities.

However, rising customer expectations for faster delivery have triggered the development of more innovative fulfillment options. Thus, one should consider that products can also be shipped directly from the production facility or dark stores— noncustomer-facing miniwarehouses usually within a city, where products are stored, picked, and shipped directly to consumers. Pop-up nodes are another option; for example, a container placed at a major sports event or a truck, van, or bike driving around

a city holding inventory and delivering products to customers who order via an app. Products could also be manufactured right where the customer is with, for example, 3-D printing techniques. The main advantage of these fulfillment options is proximity to the customer; however, operations are less efficient and more costly, and they require additional capabilities. Indeed, retailers have several elements to weigh when considering the variety of fulfillment options available to them (Exhibit 1).

Think early about new capabilities and never stop learning
To enable the identified solutions, companies must carefully consider the new capabilities required to run their future network and understand how to build them. Those capabilities include physical flow ranging from operating new node types, such as dark stores and pop-up nodes, to managing new transport flows and partners, such as last-mile services. Information flow capabilities such as planning demand and inventory, stock visibility in the decentral node network, and distributed order management should also be implemented (see sidebar, "The seven supply chain building blocks for omnichannel excellence"). For example, a new fulfillment solution such as shipping from a dark store requires new operational processes and systems to run a small-scale node efficiently and an agile and efficient structure that supplies it with small quantities at a high frequency. In addition, the planning landscape needed to have the right inventory in the dark store requires new capabilities, such as demand sensing, dynamic supply allocation, and capacity planning at each location. Finally, the dark store requires real-time and accurate inventory visibility combined with a distributed order management system that makes the stock available and accessible.

This connected fulfillment network should be deployed along an agile road map to enable quick testing and learning of different node types that include capabilities in various locations rather than

6 For more, see "Better service with connected inventory" in this compendium.

Exhibit 1

It is crucial to consider all elements when weighing fulfillment options.

Fulfillment option

— Different operational modes — Description

Ship from factory	Ship inventory in transit	Ship from warehouse or distribution center	Ship from dark store	Ship from retail store	Ship from pop-up node	Consumer
Offshore factory Nearshore factory		Central DC operated by retailer Decentral DC operated by retailer or 3PL Decentral DC operated by partner Decentral DC operated by wholesale partner		Ship from own store Ship from partner store Ship from wholesale-partner's store	Mobile node Temporary node Market production 3-D printing	Returns utilization
Shipment from factory/ production facility in offshore or nearshore country Typically located in low-cost countries	Products shipped to destination based on specific customer order or demand sensing	Shipment from warehouse/ distribution center Operated internally, by partner, wholesaler, or 3PL	Shipment from noncustomer-facing miniwarehouse—small scale, not automated Located in or close to a city/ densely populated area	Shipment from retail stores using back-of-house or in-store inventory Fulfilling walk-in customer purchases Can be own stores, partner stores, or wholesaler stores	Shipment from nonstandardized node, used on as-needed basis (eg, special events) Examples: truck/van/bike, etc carrying a low quantity of products that shoppers order via app; temporary DC with a plug-and-play concept	Customer returns used to fulfill new orders

Lead time

High ——————————————————————— Low

Degree of productivity

High ——————————————————————— Low

Volume-handling capacity

High ——————————————————————— Low

Inventory-holding capacity

High ——————————————————————— Low

Cost of operation (eg, wages and rent)

Low ——————————————————————— High

Case study

A global brand's omnichannel success

This global brand is becoming a strong omnichannel player and serving its own retail stores, wholesale stores, and e-commerce customers alike. Due to strong past growth—overall revenue grew by 9 percent and online penetration by 158 percent from 2012 to 2016—it was necessary to rethink the entire supply chain and work in cross-functional teams to define an omnichannel strategy of the future.

The company first conducted intensive market research, including interviews with end customers, store visits, and competitive analyses to understand customer expectations of omnichannel shopping and delivery. Customer segments were defined and tied with specific services and delivery times.

The company then defined the supply chain network to serve the customer segments. The company used the existing brand's player's and its partners' infrastructure to integrate traditional fulfillment options, such as central and decentral warehouse shipping. At the same time, it was important to be very close to the customer and replenish retail stores fast, which is why the solution included innovative fulfillment options, such as shipping from a dark store, retail store, or temporary node. The fulfillment network consisted of various individual solutions per location; for example, the company identified a partner e-tailer with spare room for additional inventory in a German warehouse close to major cities, whereas in Southern Europe it was necessary to establish a partnership with a department store and use its wider network of warehouses and stores.

The key to success was going beyond modeling and quantitative analysis to involve a cross-functional team that made sure all relevant elements were considered. For example, marketing ensured that customer expectations were always prioritized, the supply chain team assessed operational feasibility of fulfillment options, the logistics team played devil´s advocate on transportation costs, and the commercial team expanded the partner network.

The implementation road map was built in an agile way to allow for fast testing and learning. Individual elements could be piloted and evaluated quickly to decide if a fulfillment option should be scaled or taken off the solution space.

the traditional approach that initiates only when all node types and capabilities are fully developed. Building these required capabilities should also be planned in modular sequence. Regardless of how the omnichannel distribution network looks, it is important to stay flexible and adjust to any road map changes, such as an increase in customer requirements or new logistics service offerings— for example, delivery solutions for fast last-mile delivery. Testing, learning, and adjusting quickly should be the credo.

For an example of a retailer that found success in building a network and ecosystem of the

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Enabling a truly end-to-end omnichannel experience requires a new way of supply chain thinking. The supply chain needs to be readjusted based on changing market conditions, and players should pursue an agile approach that enables them to adjust quickly to changing trends, options, and customer expectations. These principles can help determine the approach to building the network and ecosystem of the future.

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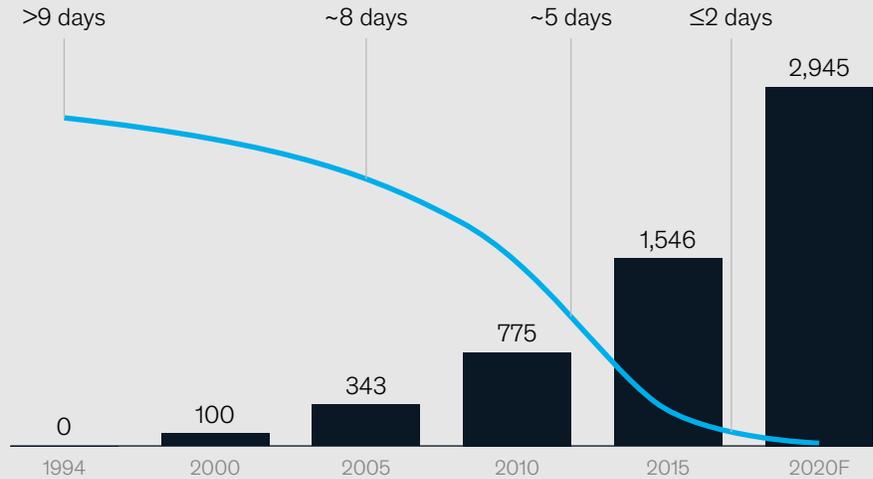# A retailer's guide to successfully navigating the race for same-day delivery

By Manik Aryapadi, Tim Ecker, and Julia Spielvogel

A "new normal" has emerged when it comes to the delivery speed that customers expect in ordering online. The standards have been re-set by the likes of Amazon and several other market leaders, placing increasingly more pressure on incumbent players to respond accordingly. We conducted a broad effort in which we took stock of the current situation, focusing on Europe and particularly, Germany, from both a market and consumer perspective. Our analyses show that although the pressure on incumbent players may appear to be overwhelming, we believe that retailers have a strategic asset they can leverage in the future: their dense store network, which provides them proximity and (potentially) quick access to their customers. But to fully benefit from their network, omnichannel retailers will need to consider changing gears in four areas: the local fulfillment network, quick and integrated IT systems, new store layouts and processes, and a rethink of business economics.

Same-day delivery: Ready for takeoff

In the past 20 years there has hardly been any business success story like e-commerce. And as online sales have surged, shipping durations have gone down.

Amazon's free delivery time

>9 days   ~8 days   ~5 days   ≤2 days

Year	Value
1994	0
2000	100
2005	343
2010	775
2015	1,546
2020F	2,945

US e-commerce market size
Index (2000=100)

Today, people expect to receive their parcels by the next day. And their shopping decisions increasingly depend on shipping time.

46%

abandoned a shopping cart due to a shipping time that was too long or not provided

Customers who did not purchase an item online due to long delivery times

35%

of respondents

Source: UPS

But consumers are still not satisfied. Up to half state a general interest in same-day delivery, despite limited willingness to pay > €1 surcharge for that service.

General willingness to pay extra for same-day delivery
Share of consumers in percent, n=4,700 respondents

100% ▼

Country	Share	Willingness to pay > €1
United States	53	20
Germany	34	10
China	34	19
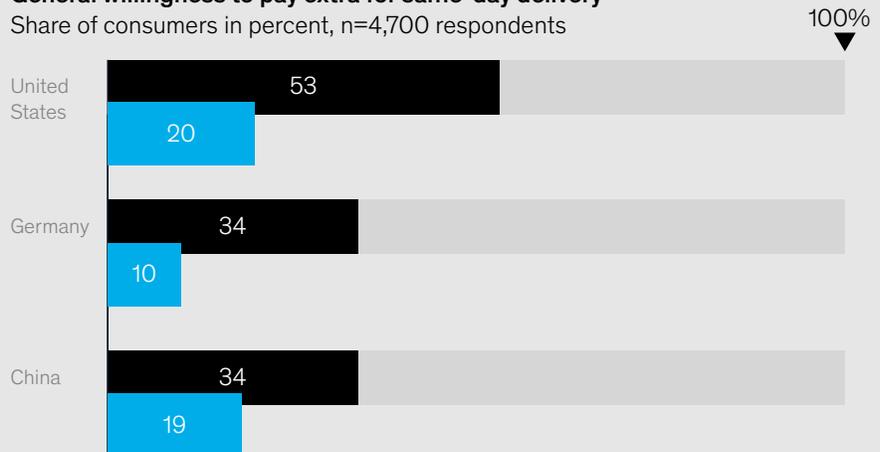
■ Willingness to pay > €1 surcharge for same-day delivery

Especially attractive segments that are young, urban, and time-constrained are demanding same-day delivery.

Younger
+13 p.p.[1]

base delivery choice mainly on speed and reliability

Urban
+4 p.p.
willing to pay €3 extra for same-day delivery

More time-constrained
+5 p.p.
willing to pay €3 to €5 extra for same-day delivery

[1] Percentage point difference vs overall sample of 4,700 survey respondents across the United States, China, and Germany.

For this reason, e-commerce super-giants Alibaba, JD.com, and Amazon are committed to pushing same-day delivery into the mass market now.
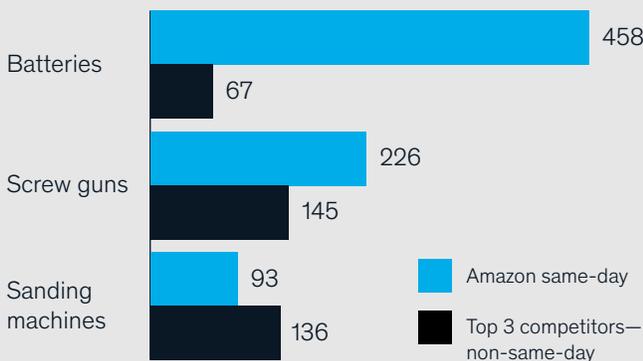
● Testing   ● Scaling   ● Market standard

Same-day delivery promise

		2014	2015	2016	2017	2018	2019
China	Alibaba	Scaling	Scaling	Scaling	Market standard	Market standard	Market standard
	JD.com	Scaling	Scaling	Scaling	Market standard	Market standard	Market standard
Western Europe	Amazon		Testing	Testing	Scaling	Scaling	Scaling
United States	Amazon	Testing	Testing	Testing	Scaling	Scaling	Scaling

It is the next building block in their bid to win consumers on selection, price, and convenience.

Product selection by delivery speed
Number of SKUs for 3 exemplary product categories

Batteries: 458 (Amazon same-day), 67 (Top 3 competitors—non-same-day)
Screw guns: 226 (Amazon same-day), 145 (Top 3 competitors—non-same-day)
Sanding machines: 93 (Amazon same-day), 136 (Top 3 competitors—non-same-day)

■ Amazon same-day
■ Top 3 competitors—non-same-day

Relative pricing
Out of 122 products analyzed

	Competitors cheaper	Amazon cheaper
Non-same-day on Amazon	15	46
Same-day on Amazon	9	52

Source: Amazon; McKinsey analysis

Retail stores: The return of a strategic key asset

The one central requirement for same-day delivery is simple, yet challenging: a dense network of warehouses. In Germany, for example, it would take 11 well-placed warehouses that stock the same assortment and are able to move it from click-to-ship in two hours or less to cover all tier-1 and tier-2 cities.

Warehouse coverage

Inhabitants

● >1,000,000

● >500,000–1,000,000

● >200,000–500,000
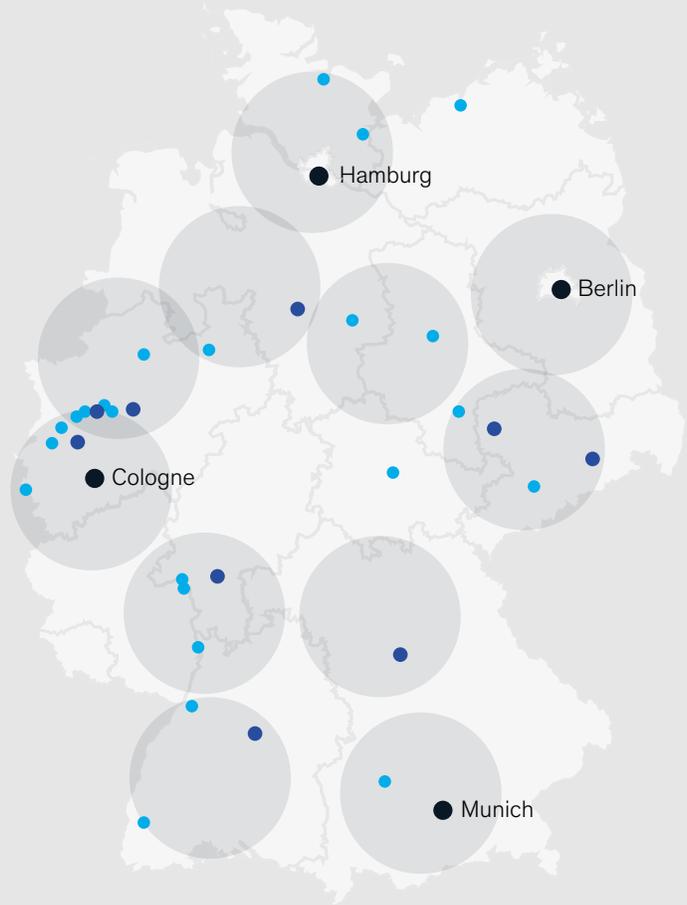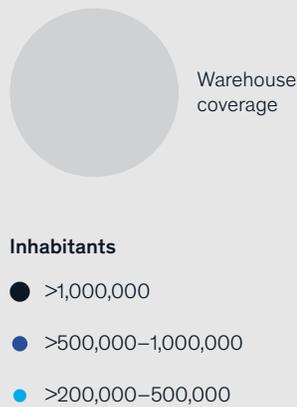
Amazon has a very dense delivery network, putting the industry leader far ahead of almost all other major Western retailers with their same-day offering. For these retailers to catch up, the obvious option would be to invest hundreds of millions of euros or dollars to match Amazon's footprint one to one.

Retailer same-day offering in top 20 cities
Amazon vs top 20 non-food and top 13 grocery retailers

Amazon's same–day shipping promise covers all 20 of Germany's largest cities
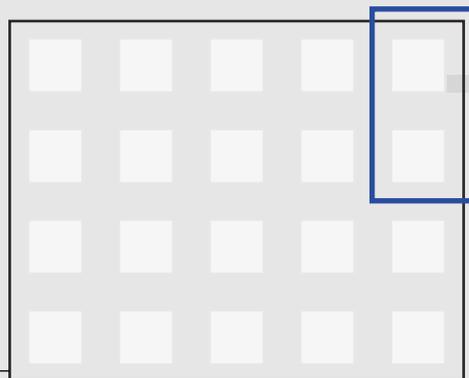
The average large retailer covers only 2

But there is a better and much cheaper option for today's fast-growing but still moderate market volumes: retailers should shift the rules of the game and use their existing store networks for same-day shipping.

● Store location

Same-day coverage of relevant population,[1] Amazon vs disguised omnichannel fashion retailer
by type of competition, %

28 stores across Germany, covering 5 of Germany's 20 biggest cities	Ongoing testing and buildup of ship-from-store capabilities

|	Competition area (Amazon and retailer) ■	Area at risk (Amazon only) ■	Retailer monopoly area (retailer only) ■
Population	22	16	7
Purchasing power coverage	23	17	7
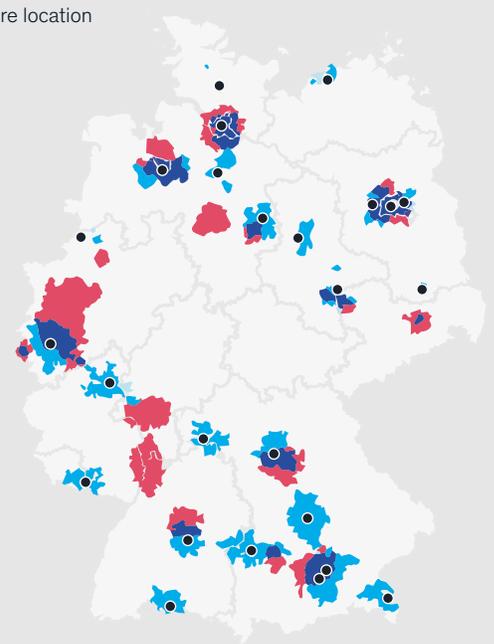
[1] Relevant population areas defined as high density (>750 inhabitants/km^2) and/or high income (purchasing power >€21,900 per capita); viable market coverage defined as area within 30 minutes driving time from respective retail location.

Source: Alteryx; BKG; ESRI ArcGIS; MB-Research; McKinsey analysis

Viable market coverage for same-day delivery via ship from store[1]
%
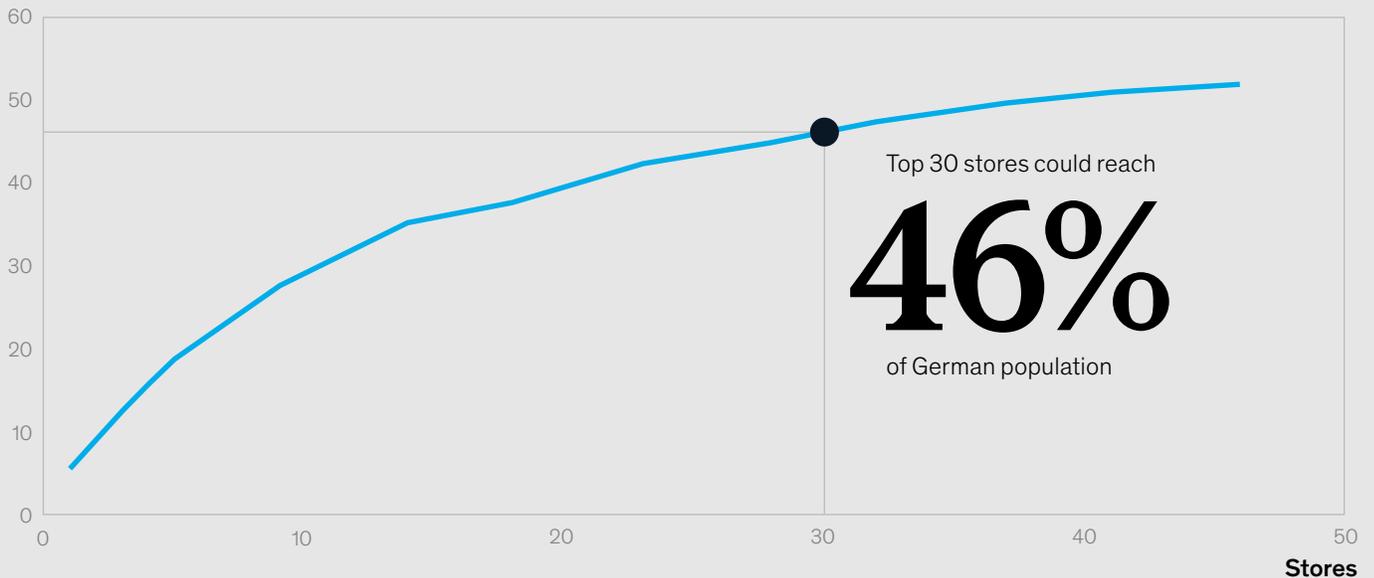
In Germany, connecting 30 stores to the grid would be enough to reach almost half the population and come close to matching Amazon's current service offer.

Top 30 stores could reach

46%

of German population

[1] Relevant population areas defined as high density (>750 inhabitants/km^2) and/or high income (purchasing power >€21,900 per capita); viable market coverage defined as area within 30 minutes driving time from respective retail location.

Source: Alteryx; BKG; ESRI ArcGIS; MB-Research; McKinsey analysis

This strategy—using existing stores rather than new warehouses— could be the entry gate to same-day delivery for aspiring retailers.

Innovation road map: Four areas for shifting gears

Omnichannel retailers who follow this strategy will need an upgrade in terms of not only fulfillment but also IT and store design, as well as a fundamentally different mind-set in terms of economics.

1. Local fulfillment networks

- ☐ Urban fulfillment locations within 90 minutes drive time from customer
- ☐ Optimized E2E click-to-ship in two hours or less
- ☐ Strong set of last-mile partners that allow for seamless processes

2. Fast, integrated IT systems

- ☐ Full inventory transparency across all warehouses and stores
- ☐ Direct transfer of order data between web shop and (in-store) fulfillment
- ☐ Prioritized picking logic to allow fast-tracking of same-day orders

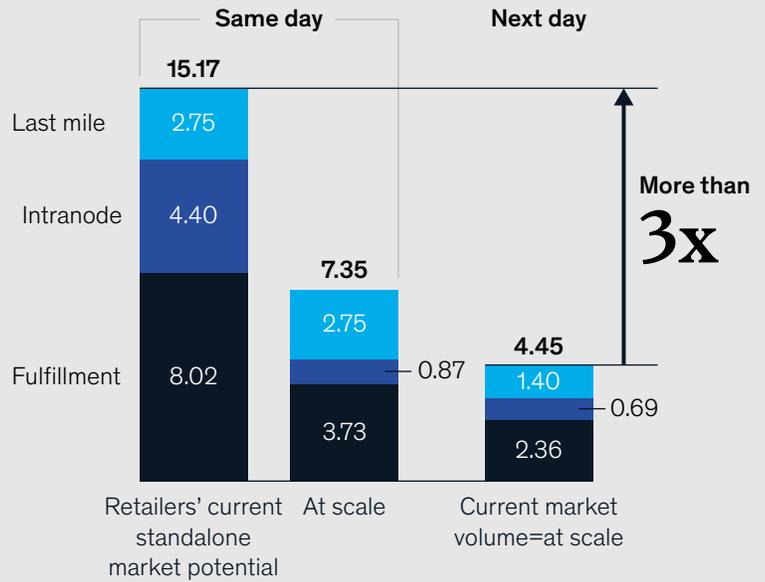## 3. New store layouts and processes

- ☐ Dedicated and clearly signed collection and return areas
- ☐ Easy-to-navigate back room set up in line with product demand and characteristics
- ☐ Sufficiently trained, equipped, and incentivized store staff

4. Rethinking economics

- ☐ Willingness to bear initial extra costs that can exceed €10 per shipment
- ☐ Pressure-tested make vs buy logic along the entire supply chain
- ☐ Clear upside aspiration, eg, CLV increase and/or subscription income

Entering the race for same-day delivery can be hard. Most retailers would initially fall way short of the volumes required for at-scale operations and more than triple their delivery bill when compared to today's next-day standard.

Estimated same-day vs next-day delivery costs
EUR/shipment, non-food retail example, Berlin area[1]

	Same day		Next day

- Last mile
- Intranode
- Fulfillment

15.17
- 2.75 (Last mile)
- 4.40 (Intranode)
- 8.02 (Fulfillment)

Retailers' current standalone market potential

7.35
- 2.75
- 0.87
- 3.73

At scale

4.45
- 1.40
- 0.69
- 2.36

Current market volume=at scale

More than
3x

[1] Includes costs of own warehousing and fulfillment and third-party transport and delivery.

Subscription models can cross-finance shipping costs but require high customer relevance and a broad set of benefits. Retailers that adopt same-day delivery need to explore various paths to monetize their convenience leadership.

	Amazon[1]		Zalando		Other retailers	
Customer GMV EUR p.a.	~550 Non-prime	>1,200 Prime	~250 Non-plus	? Plus	~120 Regular	? Subscribers
Customer orders p.a.	10–15	>25	4–5	?	1–3	?
Membership fee EUR p.a.		110		19		?
Member benefits Selected examples	Same-day shipping[2] Video streaming Music streaming Online data storage		Same-day shipping[2] Early promotion access Return pickups Personal style advice		?	

[1] US market example. All values converted from USD to EUR at FX $1=€0.91 (rounded).
[2] In selected regions. Otherwise premium next-day shipping.

Source: annual reports; press research; Statista

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Better service with connected inventory

It is not just the customer experience that manufacturers and retailers enhance by extending their reach to the entirety of stocks in the market.

by Ashutosh Dekhne, Tim Lange, Karl-Hendrik Magnus, Isabell Scheringer, and Simon Vincken

Consumers are very familiar with the scenario: the T-shirt they have set their heart on is no longer available in their local store or their preferred online shop. Or it can't be delivered on time. The customer could of course go to another retailer, brand store, or online shop. But that is often a time-consuming option or at least inconvenient. In the end the customer buys another product—or none at all.

That's unquestionably a frustrating outcome for all parties. At best, the customer experience is tarnished, and in the worst case, the customer is lost. Wouldn't it be great to have direct access to all inventories available in the market—regardless of what company is stocking them? In fact, available stock levels are typically perfectly sufficient, but they are distributed among a growing number of network nodes: at retailers, at vertically integrated companies with direct-to-consumer business, at e-tailers and wholesalers, in stores, in warehouses, or in transit (Exhibit 1).

In response, some companies are beginning to connect their inventory. This rarely leads to mutual assistance between direct competitors. Therefore it is unlikely to soon see a store of a sports goods retailer providing FC Barcelona soccer jerseys to a neighboring department store with sold-out stock. But why shouldn't the department store place orders directly with an outlet or warehouse of the respective sports article manufacturer? After all, it is in its interest to offer an outstanding customer experience, irrespective of the sales channel.

Everybody benefits

When two or more companies systematically share their inventory, they essentially construct a network of fulfillment nodes and form a pool of stocks that is larger than what each individual partner had previously. As a result, customers get a better buying experience, but the companies involved also benefit directly.

Not only do connected inventories increase the availability of individual products, they also broaden the product range. Delivery times decrease, too, as goods can be dispatched from multiple points close to customers. Ideally, transport costs thus decrease as well. There are also further benefits for consumers. Any outlet or boutique operated by the partner companies directly or by franchisees can serve as a potential pickup point. That gives more options to buyers, who can lower their environmental impact by picking up their goods at the nearest store rather than having them sent home.

The two greatest benefits for companies are self-evident. First: by connecting their stocks, companies can interlink customer journeys in online and off-line channels and thereby increase their chances of winning new customers and holding on to existing ones. Second: the improved availability of products, the faster delivery, and the better consumer experience enhance the overall likelihood of making a sale.

Other merits: Thanks to the linked customer journeys, the partners can now also collect more information about their customers. Participating companies can offer faster delivery times without having to increase the volume of stocks in the market. In addition, the optimization of inventory levels across the entire network avoids excess stocks. That results in a higher sell-through at full price, which means less discounts and inventory markdowns at the end of the season. In turn, working capital is kept low and the overall costs across the supply chain decrease.
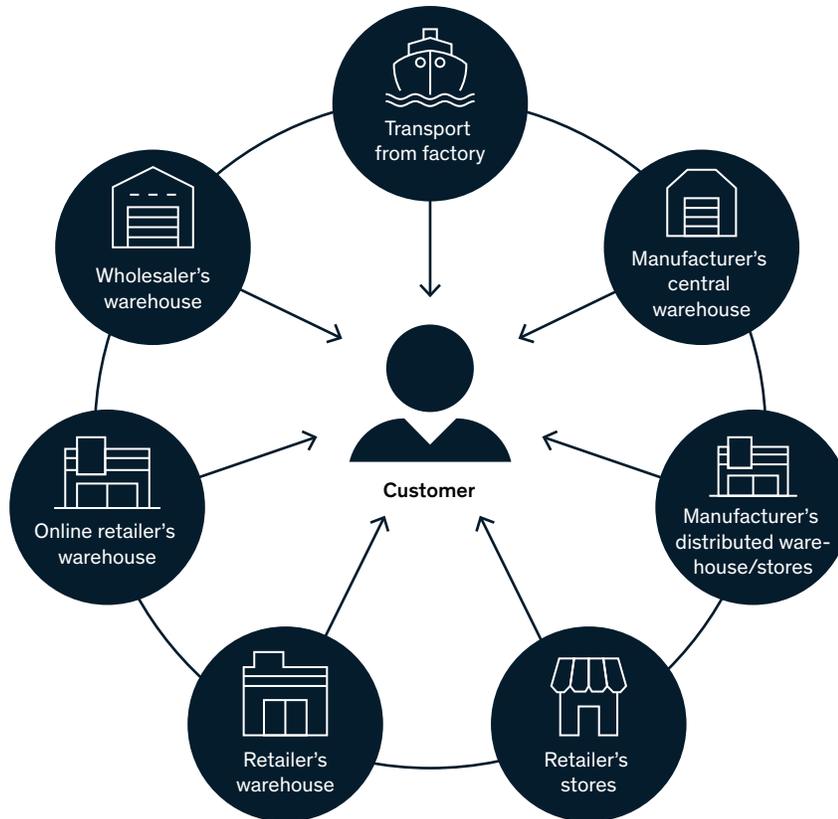
Five networking models

But just how complex is cooperation? Who owns the goods? Who gets what commission when? Or in short: how does connected inventory work in practice?

Exhibit 1

Goods are distributed to end customers over a growing number of network nodes.

Inventory nodes of retailers and manufacturers

Inventories can in fact be linked up in a variety of ways. The simplest model involves shedding transparency on intracompany inventories, assuming they are not transparent already. With transparency in place, the mildest form of connected inventory between two companies is a unilateral partnership: the manufacturer assists retailers faced with out-of-stock articles by delivering the items ordered. Such partnership arrangements can be extended to provide retailers access to products that they do not normally stock (along the lines of an "endless aisle" concept). More complex, but also more advantageous, are bilateral partnership arrangements in which both partners get access to their respective inventory. Ideally, what results is a virtual inventory pooling several retailers and manufacturers. Such a pooling model allows, for instance, a retailer in Frankfurt to transact a jeans

order by a customer in Cologne through a partner retailer that delivers the jeans from the inventory it holds in its Cologne warehouse (Exhibit 2).

Underpinning the commercial basis of these models are several sales concepts. These concepts are marked by specific ownership structures.

— *Commission model.* The stocks are owned by the company that manages them and that can handle fulfillment. This company processes the order and pays commission to the partner company that concludes the business, whether online or in a brick-and-mortar store.

— *Repurchase model.* Ownership of the inventory is transferred from the party that manages it when it is sold to the party that transacts the sale to the customer. Commission is paid as compensation to the party that originally managed the inventory.

— *Joint venture model.* The stock is owned by a joint venture founded by the partners seeking to network inventory. In this model, the partners jointly bear the risks and share the benefits, which makes the model particularly appealing.

Exhibit 2

Inventory can be interlinked in a variety of ways.

Connected inventory models
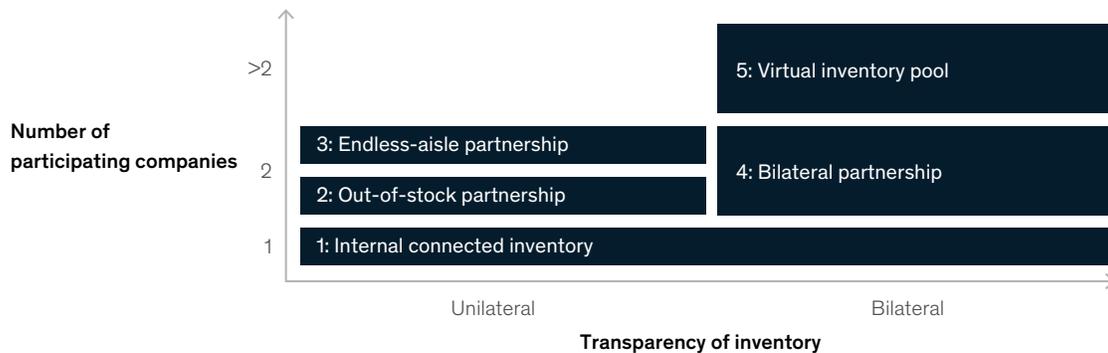
1: Internal connected inventory
A company connects the inventory in its central warehouse together with its local distribution centers and stores. When a customer orders a product online, the most efficient dispatch point measured by time and cost is selected or a store is suggested for personal pickup by the customer. Sales clerks in stores can also check at a click if a sold-out product is available elsewhere.

2: Out-of-stock partnership
Manufacturers and retailers reciprocally disclose their respective stocks of products that the retailer regularly sources from the manufacturer. If the product is out of stock at the retailer, the customer can still complete the purchase because the manufacturer can send the article directly.

4: Bilateral partnership
Manufacturers and retailers reciprocally make their inventory transparent so that they can take care of each other's fulfillment as needed. When a customer places an order in a partner's online shop, the product is sent from the best possible distribution point.

3: Endless-aisle partnership
In the endless aisle model, the manufacturer provides the retailer virtual access to its entire inventory, including products that the retailer does not have in its product range. The retailer can thus offer an extended product range in its online shop that is then directly handled by the manufacturer.

5: Virtual inventory pool
Several retailers and manufacturers connect their inventories. The pooled inventory is held by a neutral entity (eg, a joint venture) to which every partner has access. A customer order is always fulfilled from the best possible distribution point.

Determinants of success: From incentive systems to delivery slips

Regardless of the model that the partners choose: building a connected inventory concept inevitably requires new solutions in sales, the supply chain, and IT that are by no means simple. Furthermore, it is important that all parties have sufficient incentives to keep goods in stock. Otherwise, the natural tendency is to keep one's own inventory as low as possible in a bid to lower the risk of excess stocks. In addition, it has to be clear who owns the stocks in the pool—specifically, who owns the stocks in which phase of the fulfillment process and at what points ownership—and the associated risk—is transferred to another partner.

Transparency is also key to success. It has to be clear at all times which product is where and in what quantity. This requires a distributed order management system capable of interlinking the various nodes in the network and instantly determining the optimal dispatch point. Furthermore, to have the right quantity of the right product in the right place, integrated planning that factors in the inventory levels and forecasts of all partners is also needed.

The location of inventory in the market can also have legal and tax implications (e.g., import duties). Consequently, an advanced assessment should be conducted to determine the extent to which a specific networking model might be restricted by antitrust law in one or several jurisdictions. In addition, the partners should enter into clear agreements in order to offer customers a seamless consumer experience—regardless of which company executes the order. The partners need to align an array of details, such as their delivery and gift packaging, delivery slips, or conditions for returning goods.

Success stories in other sectors

The associated complexity of requirements is most certainly one reason why the concept of connected inventory is only just beginning to take root—although there are already some high-profile initiatives (Exhibit 3). Other sectors have made far more progress in this regard.

Take the aerospace industry, for example, where one supplier of replacement parts has set up a program for sharing inventory. Aircrafts have expensive

Exhibit 3

Connected inventory is still the exception in retail—although there are prominent early adopters.

Amazon, Procter & Gamble	As early as 2013, Amazon and Procter & Gamble (P&G) joined forces to sell products, such as diapers and toilet paper directly from P&G's warehouses, where Amazon set up on-site distribution centers to deliver goods directly to customers.
Zalando, adidas	In 2015, Zalando and adidas launched a pilot project in which one of adidas' distribution centers was linked up to Zalando's inventory system. As a result, not only do Zalando's customers have access to a larger offering of adidas products, but adidas can fulfill orders of products that Zalando no longer has in stock.
L'Oréal	The cosmetics company L'Oréal offers its customers the option of checking whether a product is available at an online retailer. If so, customers are directed to the corresponding web shop to make their purchase directly.
YOOX NET-A-PORTER, Valentino	In 2017, online fashion retailer YOOX NET-A-PORTER (YNAP) and the luxury label Valentino unveiled their Next Era program, which provides customers access to both Valentino and YNAP products on a shared platform. The program is also intended to allow both companies to reciprocally use each other's logistics infrastructure spanning central warehouses, fulfillment centers, and boutiques.

Source: Fox; L'Oréal; The Street; YOOX NET-A-PORTER; Zalando

replacements parts that nevertheless have to be available everywhere and at all times to enable fast repairs. The planning system ensures the best-possible warehousing of parts by drawing on linked forecasts of requirements. Everybody benefits from the program: The replacement parts supplier can hold on to its inventory and also gain access to the stocks of participating airlines. The latter can then source replacement parts directly from the supplier but also generate revenue from their own inventory by selling it to partner airlines. In addition, the cooperation arrangement allows the airlines to adjust their inventory programs to ensure the local availability of parts while avoiding excess inventory.

Similar initiatives in retail seem only a matter of time—particularly as the same-day or even hourly delivery pervasive in online retail is setting a pace that can likely only be maintained with the backing of powerful partnerships. Against this backdrop, connected inventory can make a substantial contribution toward improving product availability and the customer experience while reining in costs and capital intensity.

Key statements

— The first retailers and vertically integrated players with direct-to-consumer business are beginning to intelligently connect their inventories in the marketplace

— Everybody involved, including consumers, benefits from the advantages of connected inventory: greater availability and faster delivery of goods, greater delivery convenience, and lower environmental impact.

— Retailers and vertically integrated players that enter into corresponding partnership arrangements attract more customers, secure higher conversion rates, and benefit from an array of additional advantages.

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The invisible hand: On the path to autonomous planning in food retail

It's not news to food retailers: sometimes your stocks are too high, sometimes they're too low. Advanced planning now gives them entirely new options for solving the expensive problem—and cuts costs in the process.

by Manik Aryapadi, Ashutosh Dekhne, Tim Lange, Markus Leopoldseder, and Karl-Hendrik Magnus

Supply chain planners in food retail today are not to be envied. They have to please customers who have never made more exacting demands on availability, freshness, and range. And they ignore such expectations at their peril: the competition is relentless, driving all market participants to seek out improvements incessantly. Those who stick to their legacy processes can only make comparable progress at the cost of mounting stocks, increasing write-offs, and an increasingly complex supply chain.

Internally, planners are often struggling with outdated IT systems that are isolated from each other, unreliable sources of information, and in some cases, largely manual and poorly coordinated processes. Forecasts are commensurately inaccurate and personnel expenses high. Externally, on the other hand, decision makers are faced with an increasingly unfathomable offering from digital service providers that—although they can process huge volumes of data with their solutions—cannot give retailers any advantages of relevance as long as they leave their operating models unchanged.

A look at online retail already reveals the shape of things to come: leading companies are developing highly integrated planning systems that already use the most advanced analytics and machine-learning solutions available today. These high-tech methods, also referred to as "advanced planning," will, in the future, take control of steering in food retail as well. And they set exacting requirements on companies: they entail tapping the entire wealth of transaction data along with external parameters as sources. Retailers need a completely different process landscape, new capabilities, more computing power, and advanced algorithms.

Those who do a particularly good job of establishing advanced planning in their organizations stand to reap big rewards. Like an invisible hand, the system works autonomously, effectively, and efficiently. Planners only have to intervene in exceptional cases to check and make corrections. More than that, the system improves forecasting accuracy, as not only does it draw on multiple data sources, it also interconnects them using artificial intelligence and machine learning. At the same time, advanced planning enables an ever-tighter integration of stock management, procurement, logistics, marketing, and sales, leading to greater efficiency improvements and sales growth. This approach makes manual transfers between systems things of the past—process chains are no longer interrupted, and data remain consistent.
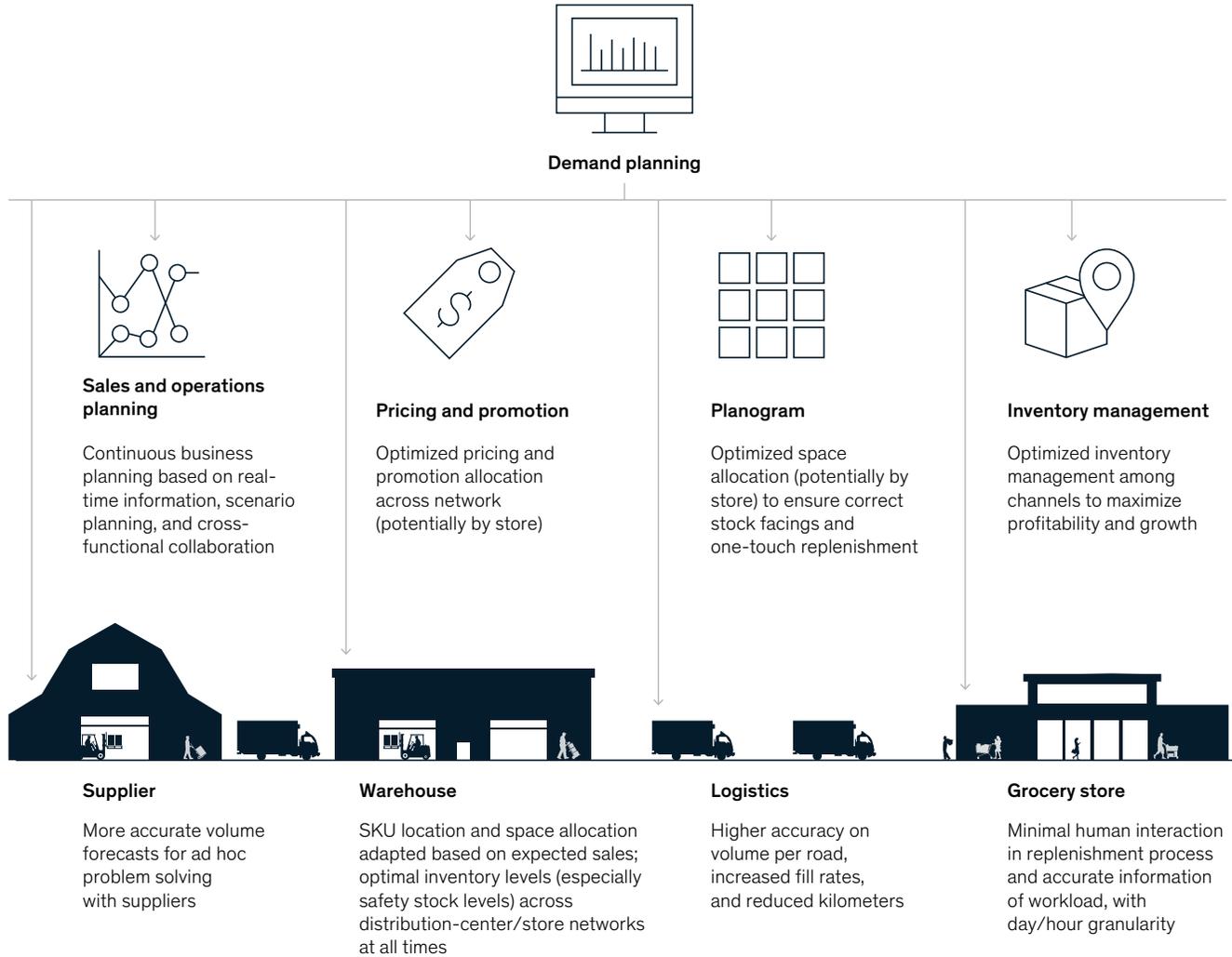
Areas of application across the entire supply chain

Food retailers can apply advanced planning to practically all activities along the value chain (Exhibit 1), with a focus on improved demand forecasting, which allows better planning of store processes or a sustained increase in the quality and shelf life of fresh produce:

— *Better demand forecasting.* Leading retailers have already created algorithms with which software can automate order processes by "learning" from data—also without having to rely on rules-based programming. This entails determining and continually optimizing all parameters that influence replenishment management—individually at article and store levels. Often, more than 50 parameters are factored into the analysis, among them prices and sales promotions (including those of competitors), cannibalization, local weather conditions, store-opening times, and holidays—and at a far greater level of detail than standard systems. This results in more precise demand forecasts and more cost-effective orders. On average, retailers with such planning systems report a 25 percent reduction in stock shortages in their fresh-produce assortment, at least a 10 percent decrease in write-offs, up to 9 percent higher gross margins, and a better inventory range. At the same time, the cost of inventory planning decreases by as much as 30 percent due to the higher degree of automation.

— *Better store processes.* Advanced planning also improves store-labor planning. That is because the system shows how much labor will actually be needed in a specific period of time—

Exhibit 1

The future of planning builds on award–winning advanced analytics with real-time, action-based recommendations for all core functions.

Demand planning

Sales and operations planning

Continuous business planning based on real-time information, scenario planning, and cross-functional collaboration

Pricing and promotion

Optimized pricing and promotion allocation across network (potentially by store)

Planogram

Optimized space allocation (potentially by store) to ensure correct stock facings and one-touch replenishment

Inventory management

Optimized inventory management among channels to maximize profitability and growth

Supplier

More accurate volume forecasts for ad hoc problem solving with suppliers

Warehouse

SKU location and space allocation adapted based on expected sales; optimal inventory levels (especially safety stock levels) across distribution-center/store networks at all times

Logistics

Higher accuracy on volume per road, increased fill rates, and reduced kilometers

Grocery store

Minimal human interaction in replenishment process and accurate information of workload, with day/hour granularity

for instance, at checkouts or packing shelves in individual store departments. On top of that, precision forecasting helps to lower inventory in the store's stockroom radically—and in turn, reduces movement between shelves and the stockroom. This effect is amplified when shelf space per article is adjusted to the demand forecast, effectively turning shelves into efficient storage space.

— *Better quality of fresh produce and less spoilage.* Thanks to more precise forecasting, retailers can order their goods from suppliers much earlier and with greater accuracy. Consequently, fewer fresh articles are left unsold. Better forecasting also means increased planning reliability for suppliers. They can collect their harvests to match demand and thus reduce the field-to-shelf time. As a result, retailers can increase the level of freshness

of their articles and reduce spoilage by up to 30 percent.

In view of such potential, many food retailers are showing a keen interest in advanced planning. However, they are still struggling with implementation in their businesses. For instance, the topic is frequently only pursued by a single function acting alone—typically, IT, logistics, or procurement. What is lacking is the embedding of the new method in the organization's operating model, along with a corresponding adjustment of all processes. Often, the backing from other functions is also lacking, as in the immediate term, they tend to see the introduction of the new system primarily as a disruption to their processes and the corresponding consequences for weekly sales. Such factors make complete implementation of advanced planning far too protracted and difficult for most retailers.

The make-or-buy question poses another challenge. Many retailers do not have the capacity and capabilities needed to develop an advanced-planning solution efficiently in house. If the retailer opts for an external solution, it has to negotiate difficult trade-offs. On the one hand, it might be interesting to choose a smaller, newer service provider with innovative solutions. On the other hand, large and established providers often offer pragmatic, if less innovative, solutions with many functionalities. Many retailers have a hard time even coming up with a workable assessment of the capabilities of individual providers.

Four determinants of success combined

The potential improvements are of such a magnitude that it pays to overcome these problems. And the experience of the early adopters shows that in food retail, too, advanced planning leads to success, if companies can meet four preconditions:

— *Clear, comprehensively set course.* Optimizing planning has to be one of the company's overarching objectives and be strategically embedded accordingly. It is the technology that supports the strategic transformation, not the other way around. This requires the committed support of senior management and of all organizational functions, in particular. That is especially the case when initial setbacks create uncertainty.

— *Most advanced technology.* A central determinant of success is the choice of planning software and its gradual integration across all organizational units. To this end, retailers should first draft a requirements profile tailored to their needs. Pilot projects and experience from other stores can then help ease the selection process. In other words, the software is at the end of this process, not the beginning.

— *Rigorous adaptation of the operating model.* The full potential can only be captured when processes, structures, and employee skills are fundamentally transformed. To lift the operating model to this next level, processes should be redesigned, metrics reworked, objectives and employees' performance dialogues adjusted, new roles created, responsibilities along processes reallocated, capabilities needed built up, and specialists recruited.

— *Intensive change management.* A comprehensive advanced-planning transformation affects many stakeholders and entails new requirement profiles. Many of those affected often respond with skepticism or even open rejection. So it is especially important to explain to everybody involved what the benefits are, to win their enthusiasm for the new system, and to celebrate early successes visibly. It is the combination of all four determinants of success that actually allows retailers to make the most of all the technological capabilities that advanced planning has to offer and thereby unfold the full performance potential (Exhibit 2).
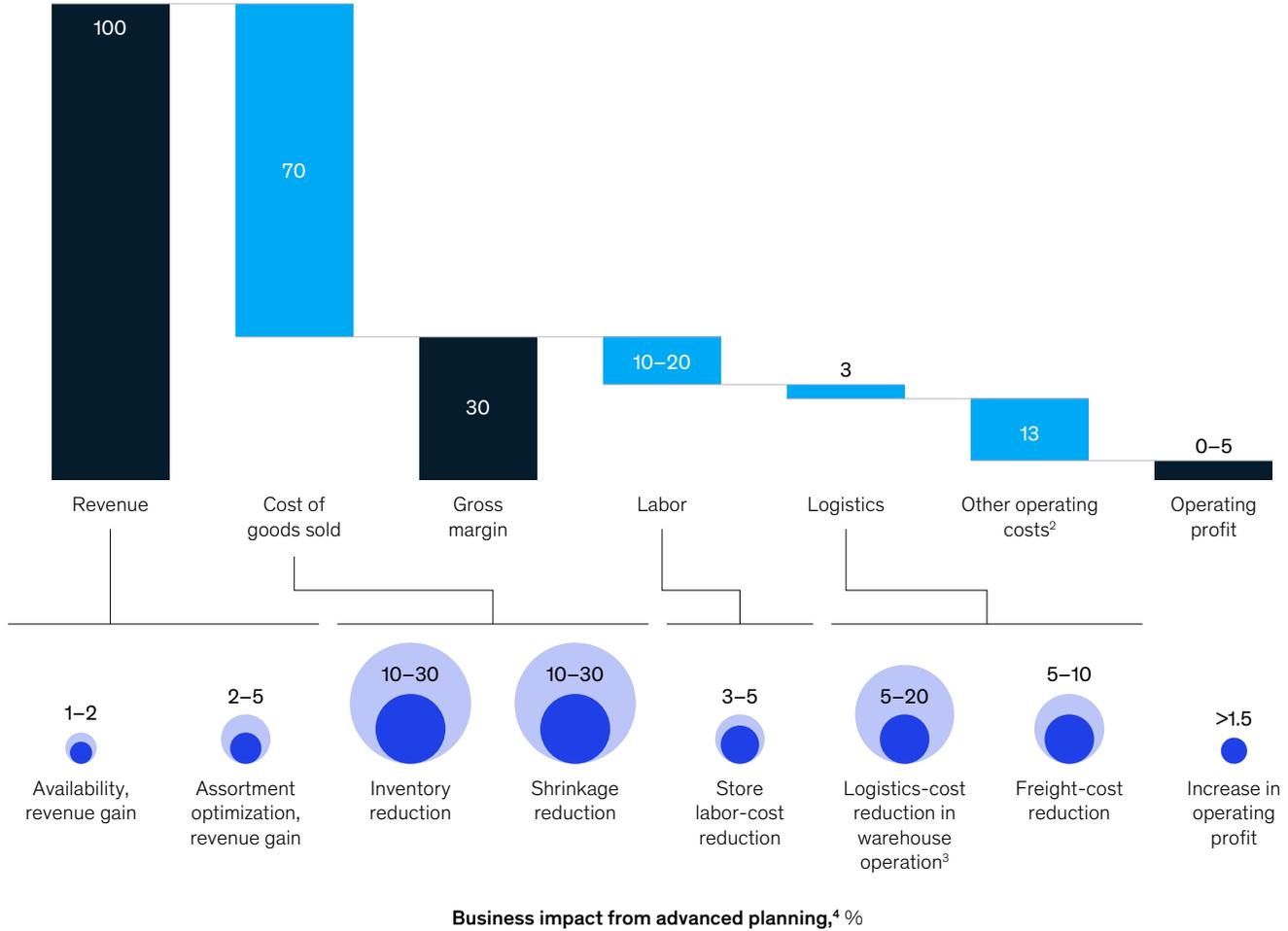
Three steps to success

So where should retailers start? A three-step approach has proven successful in practice. The first step is to analyze in detail the current planning

Exhibit 2

All major profit-and-loss items are positively influenced by advanced planning.

Standard profit and loss, illustrative, % of revenue[1]

Business impact from advanced planning,[4] %

[1] Varies significantly among retail types.
[2] Includes rent and maintenance.
[3] Includes labor cost.
[4] Impact assumes range of different tools (eg, demand forecasting, inventory management, and workforce management).

process: Who is involved in the process? What tools are they using? How high is the degree of automation? Where are there quality problems, such as with regard to availability and stock quantities? Once these questions have been answered, it is possible to develop specific use cases. What is decisive at this stage is a clear orientation toward business impact, as well as a precise understanding of the effects of the

changes introduced on the various processes, structures, and employees concerned.

In the second step, the use cases have to be assessed by reference to their potential for improving revenue, margins, costs, and stocks, and the cost of implementation is estimated. Starting with the preferred use cases, the company then derives the vision for its advanced planning. The

system's sustainability then has to be secured with the aid of a stable business case. In this context, the company should aim for a balanced mix of quick wins and long-term improvements.

In the third step, the new planning methods are piloted in one or two use cases—for instance, in fruit and vegetable planning and in automated replenishment. The aim is to test the improvement potential of advanced planning in real-world operations. When designing the pilot trials, a pragmatic, test-and-learn approach is recommended. After all, the objective is not so much to come up with a perfect design on day one but rather to reiterate quickly and continually improve processes as experience is gained. In parallel, the operating model should be adjusted to the new requirements, and the digital know-

how needed should be built up. The latter point, in particular, is often underestimated, even though recent studies show that these soft factors are more frequently the cause of failures in digital transformations than are shortcomings in technology or data quality.

Once the pilot programs are completed, the organization is ready for a wider rollout. To this end, the road map is adjusted to take into account the experience gained in the test runs, and the new planning mechanism, including the operating model, is then applied to the entire assortment. Organizations can then expect to see measurable improvements reasonably quickly—often, within the first 12 months.
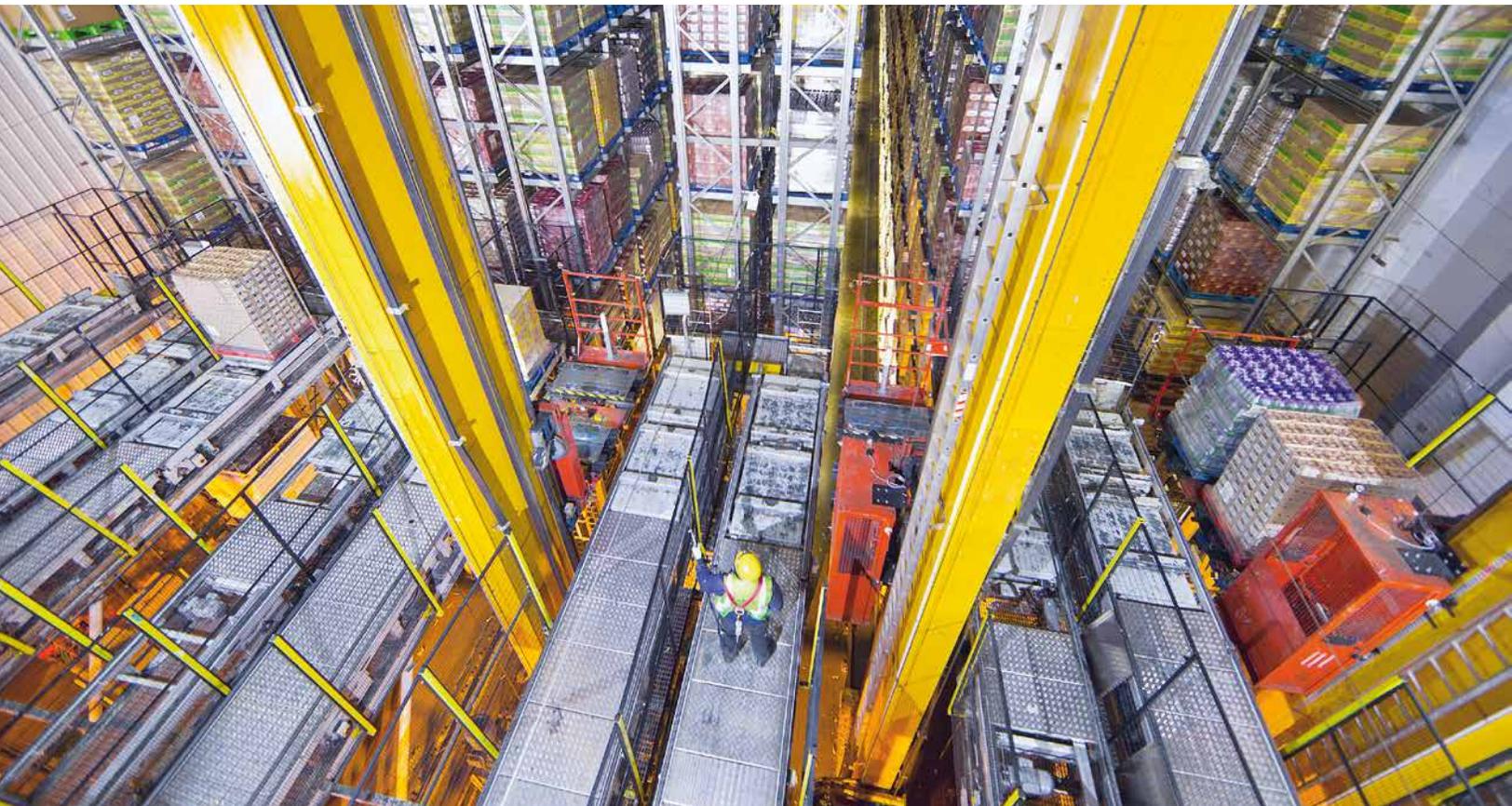
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Automation in logistics: Big opportunity, bigger uncertainty

As e-commerce volumes soar, many logistics and parcel companies hope that automation is the answer. But as this second article in our series on disruption explains, things are not so simple.

by Ashutosh Dekhne, Greg Hastings, John Murnane, and Florian Neuhaus

The history of logistics is also a history of automation, from the steam engine to the forklift to today's robotic pickers and packers. So today's fevered interest in new machinery, after a lull of several years, has plenty of precedent. Many trends are thrusting automation toward the top of the logistics CEO's agenda, not least these three: a growing shortage of labor, an explosion in demand from online retailers, and some intriguing technical advances. Put it all together, and the McKinsey Global Institute estimates that the transportation-and-warehousing industry has the third-highest automation potential of any sector.[1] Contract logistics and parcel companies (which, for sake of convenience, we will call simply "logistics companies") particularly stand to benefit. (Automation is also on the table at other transport companies, such as trucking companies and port operators. See sidebar "Automating freight flows: Changes for every sector.")

Yet for all the excitement, most logistics companies have not yet taken the plunge. For every force pushing companies to automate, countervailing factors suggest they should go slowly. We see five reasons companies are hesitating: the unusual competitive dynamics of e-commerce, a lack of clarity about which technologies will triumph, problems obtaining the new gizmos, uncertainties arising from shippers' new omnichannel-distribution schemes, and an asymmetry between the length of contracts with shippers and the much-longer lifetimes of automation equipment and distribution centers.

This is the second in a series of five articles on disruption in transport and logistics. In the first, we examined the implications of autonomous trucks. Automation is no less potent a force. In this article, we will review the reasons automation is coming to the fore, examine the five factors that are hindering investment, and lay out strategies that can prepare contract logistics companies for an uncertain future.

Three cheers for automation

At first blush, more automation seems like the answer to three problems facing contract logistics companies.

Start with a shortage of workers. It's no secret that, at least in the United States, labor markets have tightened. Unemployment rates are at a 50-year low, and wages are increasing. Some of the largest e-commerce facilities currently require 2,000 to 3,000 full-time equivalents, an order of magnitude more than traditional distribution centers employ, and need to add even more workers during the holiday peak season, when labor is most scarce.

While many of the jobs that might be automated are currently difficult to fill, that's not to say that automation will have no effect on the workforce: it will, and companies must reckon with the significant costs to their employees and communities. In 2017, the US Bureau of Labor Statistics estimated that nearly four million Americans work in warehouses as supervisors, material handlers, or packers. That's almost 3 percent of the total labor force; collectively, they earn more than $100 billion in annual wages. Automation won't make all these workers redundant, of course, and many can be reassigned to new jobs that involve collaborating with and maintaining the new machines. But if even a portion of these jobs are lost, it will still represent significant upheaval.

E-commerce, the second trend, is remaking the entire logistics industry. The inexorable rise of online sales is well documented. In the United States, for example, growth has averaged 15 percent annually over the past decade, and the range of goods has expanded dramatically. That's been good for logistics companies. We estimate that, out of every $100 in e-commerce sales, these companies (or e-tailers' in-house logistics units) are collecting $12 to $20, a massive increase from the $3 to $5 spent on logistics in a typical brick-and-mortar retail operation. (It's important to note that, in our

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[1] Michael Chui, James Manyika, and Mehdi Miremadi, "Where machines could replace humans—and where they can't (yet)," *McKinsey Quarterly*, July 2016, McKinsey.com.

estimate, e-tailers are saving $12 to $16 out of every $100 of sales versus their brick-and-mortar competitors, which explains why their economics work so well.)

But even as logistics companies have benefited from burgeoning volume, the business is not without its challenges. Many B2B networks are struggling to adapt. Many large logistics companies fulfill e-commerce orders by carving out a corner of warehouses designed for B2B operations. And some logistics companies have at times been willing to use e-commerce as a loss leader to add business to their transport divisions. But as volume expands, all such arrangements are coming under immense strain. Here, too, automation seems to be an answer.

Automating freight flows: Changes for every sector

Automation will affect the supply chain far beyond the walls of the warehouse and sorting center; it will change the way goods flow across all modes (exhibit). In the first article in this series, we addressed the impact of autonomous trucking, a critical automation technology, on roads, rails, and ports. And our colleagues recently produced a detailed look at other forms of port automation. They find that while ports are accelerating their adoption of automation, they are not yet recouping their costs. Moreover, while operating expenses are falling as expected (by 15 to 35 percent), throughput is falling as well (by 7 to 15 percent). Port operators can take several steps to get the most out of automation. Among other moves, they can

build automation-ready capabilities rather than simply automating old processes. And they can apply better project discipline to ensure that automation investments account for all attributes of port operations.

Of the remaining transport modes, automation in ocean and air freight is quite possible but will probably not move the productivity needle much. In rail, automation will likely begin in terminals, which offer controlled environments and repeatable processes. Intermodal terminals will likely see increased use of autonomous hostlers to move containers to and from trains. Autonomous cranes are also likely to emerge in the near term. While the physics of trains makes automation on the main line
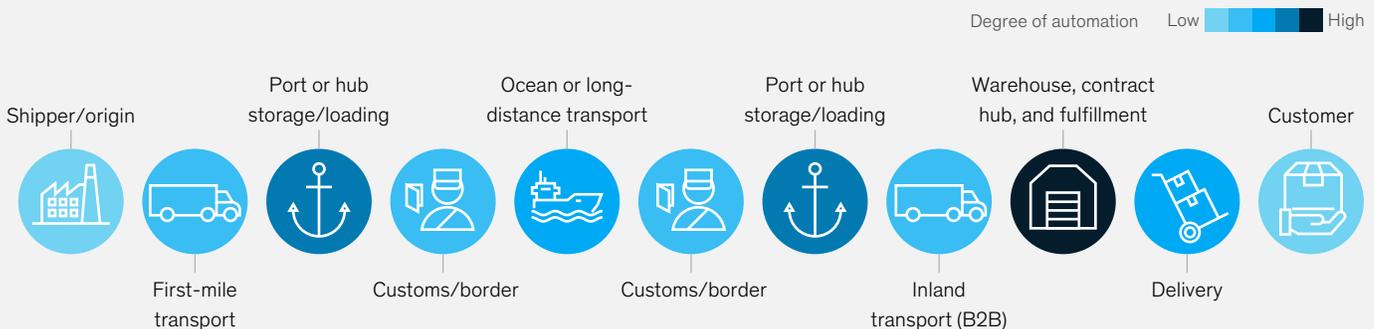
a longer-term prospect, rail operators and governments are investing in technologies that lay the foundation. Positive train control (PTC) is a long-desired step toward an automated future: its data links allow for real-time automated control of sets of trains. Several European and US railroads have PTC schemes in the works, and a few have fully implemented them.

Over time, railroads will continue to search for opportunities to automate the main line, but some limits will persist for the foreseeable future. For example, trains traveling heavily populated routes or hauling hazardous materials will likely continue to need human oversight.

Exhibit

Automation is emerging to varying degrees across the global logistics chain.

Today's global logistics chain, illustrative

Degree of automation   Low ▮▮▮▮ High

Shipper/origin — First-mile transport — Port or hub storage/loading — Customs/border — Ocean or long-distance transport — Customs/border — Port or hub storage/loading — Inland transport (B2B) — Warehouse, contract hub, and fulfillment — Delivery — Customer

There is a third reason for heightened interest: automation technology has come a long way. Ocado's new fully automated warehouse has demonstrated the potential of several new technologies—as seen by a big YouTube audience. Other companies, such as CommonSense Robotics (CommonSense), GreyOrange, and XPO Logistics, are rolling out intriguing new offerings.

These three trends make it seem like more investment in automation is a layup. Indeed, many are finding success with it. Some companies' new automated pallet-handling systems cut shipment-processing time by 50 percent. And DHL International (DHL) has built almost 100 automated parcel-delivery bases across Germany to reduce manual handling and sorting by delivery personnel.

In fact, if you squint hard enough, an entirely new logistics paradigm is coming into view (Exhibit 1). Many operations could be automated by 2030, as artificial intelligence takes over the many repetitive activities that logistics companies perform. We expect to see fully automated high-rack warehouses, with autonomous vehicles navigating the aisles. Managers with augmented-reality goggles will be able to "see" the entire operation, helping them coordinate both people and robots. Warehouse-management systems will keep track of inventory in real time, ensuring it is matched to the ordering system. Three-D printers will crank out spare parts made to order (see sidebar "Automation technologies to watch").

Five reasons for hesitation

Logistics companies are intrigued by the potential of automation but wary of the risks. Accordingly, they are investing conservatively. McKinsey research estimates investment in warehouse automation will grow the slowest in logistics, at about 3 to 5 percent per year to 2025. That's about half the rate of logistics companies' customers, such as retail and automotive (6 to 8 percent) and pharmaceuticals (8 to 10 percent).

Five issues are holding the sector back. Two are the flip sides of the forces (e-commerce and technological advance) that are motivating the renewed interest in automation. Also clouding the outlook are purchasing problems, the potential for change in the omnichannel supply chain, and the risks associated with short-term contracts.

Frenemies and 'coopetition'

To capture the large e-commerce-growth opportunity, any logistics company must meet two fundamental requirements: speed and variety. Think same-day delivery of any of a million SKUs. To deal with that, more automation in picking, packing, and sorting seems like an easy investment call. But the unusual dynamics between logistics companies and e-commerce customers hold many logistics companies back. The risk manifests in a few ways. One is that e-commerce companies have a lot of buying power; if they do not like a logistics company's offer, they can easily shift their business to competitors. That tends to keep prices low and may keep logistics companies from making an adequate return on a big investment in automation.

Another wrinkle is that most large e-commerce companies, such as Amazon and JD.com, have built their own logistics capabilities. Indeed, we estimate that if Amazon's logistics unit were a separate company, it would be the fifth-largest third-party-logistics company in the world. To be sure, working with these companies can present challenges for shippers. The online giants, with their superior data and extraordinary scale, can readily offer white-label products that undercut their shipping customers' offerings.[2] But many thousands of shippers find the benefits outweigh the risks. The online giants deploy their in-house logistics first in the most lucrative niches, such as parcel delivery in dense urban areas, while slowly expanding into other areas. As that happens, they threaten to shunt logistics companies toward low-margin services, which may not justify an investment in automation. The moves by big e-commerce companies to build more warehouses in the last mile, and offer same-

[2] Rick Braddock, "To compete with Amazon, big-name consumer brands have to become more like it," *Harvard Business Review*, June 14, 2018, hbr.org.

Exhibit 1

A new logistics paradigm is emerging.

10 prominent technologies that could remake warehouse operations
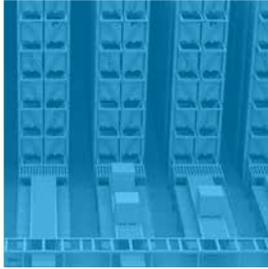

Multishuttle system

Typically used with an automated storage and retrieval system (AS/RS) that moves goods (mostly on pallets) in 3 dimensions to store and retrieve items without human intervention.

Analytics tools

Algorithms that help operators analyze performance, identify trends, and make predictions that inform operating decisions, often using machine learning to improve over time.
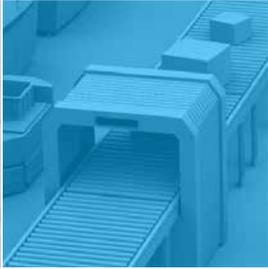
Optical recognition

Sensors that scan items (often on 6 axes) to apply sortation and other logics. Examples include a conveyor's diverts, laser-guided vehicles, and camera-based movement of drones.

Conveyor connection

A connection between 2 disparate conveyor systems that often uses decision logic to affect the flow of items. Typically, connections integrate different systems of flow, for example push and pull flows.

Management system

Analytic and digital systems that integrate analytics, performance reporting, and forecasting tools, allowing managers to easily control a full system such as a warehouse.

Smart storage

Storage solutions that use advanced analytics and digital tools to place and retrieve items in the most efficient way, adjusting storage media based on the product, picking, and order characteristics.
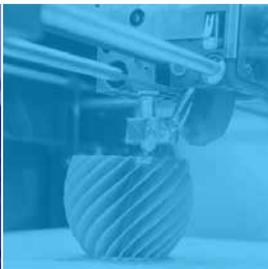
3-D printing

Also called additive manufacturing, this process creates parts by adding layers of a material (metal or plastic, typically) to create a desired shape.

Swarm AGV[1] robots

Autonomous guided vehicles that operate freely or on digital tracks to bring items (often from a storage rack) to a picking station based on instructions from the order-flow software.

Smart glasses

Glasses that augment and assist reality of wearers—for example, by displaying directions to storage locations for picking—reducing inefficiencies of searching.

Picking robot

Systems with robotic arms that mimic human picking motion. Picking robots can be fixed (with goods brought to them) or mobile (traveling to storage to pick items).

[1] Autonomous guided vehicle.

Source: McKinsey analysis

day as well as instant delivery, are a potent step in that direction, and logistics companies will have to carefully monitor the pace of change.

A particular challenge of serving e-commerce companies is that demand is very spiky, easily doubling around Christmas or Singles' Day. On Singles' Day 2017, Cainiao, Alibaba's logistics arm, processed 812 million orders, eight times more than on a typical day. If logistics companies are to fulfill customer expectations during peaks, they will have significant spare capacity for three-quarters of the year. And if they do not build sufficient capacity for peaks, e-commerce giants have further incentive to build their own capabilities, as Amazon did after the 2013 Christmas season.

Automation technologies to watch

Warehouse automation technologies can be broadly categorized into devices that assist the *movement* of goods and those that improve their *handling*. In the first group, we've already seen automated guided vehicles (AGVs) that move cases and pallets. New twists are the equipment and software needed to retrofit standard forklifts and make them autonomous. The new gear can be switched on whenever needed—peak seasonal shifts, say—and the forklift can remain manual when demand is slower. Other recent technologies include swarm robots (most famously, Amazon's Kiva robots) that move shelves with goods to picking stations and advanced conveyors that can move goods in any direction. Advanced automated storage/retrieval systems (AS/RSs) store goods in large racks, with robotic shuttles moving in three dimensions on rails attached to the structure.

New handling devices automate the picking, sorting, and palletizing of goods. Picking systems typically include a robotic arm with sensors that can determine the shape and structure of an object, then grasp it. Some devices remain fixed and have goods brought to them (often by AGVs). Others travel to the goods and retrieve and move them at once. Magazino's new TORU cube is an example of the latter.

With the e-commerce boom, efficient sorting has become increasingly important, particularly in parcel operations. Advanced conveyor systems use scanners that can pick up bar codes on any side of a package to determine the appropriate action.

Autonomous palletizers use robotic arms to build pallets from individual units and cases, often using advanced analytics to determine the optimal placement for each box.

Beyond the machines that mimic human hands and arms, other innovations will improve the productivity of people in warehouses. Drones are already in use in the warehouse for inventory management and outside the four walls for yard management. We expect to see much greater adoption of drones for these uses. Exoskeletons augment human motion with mechanical power through gloves or additional support for legs. The systems feature electric motors that augment the person's own strength to allow them to move more goods (for example, heavier items) or move goods more easily and safely.

Technology racing ahead

We combed the industry and found more than 50 technologies that could further automate some part of the supply chain, including many in logistics (Exhibit 2). All are much more than a twinkle in some technologist's eye, but none are yet in widespread use. The question that confronts logistics companies (and warehouse companies) is simple enough: Which ones will take off to yield the greatest return on investment?

Finding answers is much more difficult, of course (see sidebar "Automation technologies to watch.") No one wants to buy technology that becomes obsolete shortly after acquisition. Not only would that leave a company less efficient than competitors that made better choices, it would also leave it worse off than those competitors that made no investment at all. The cost of removing and replacing equipment, much of it not fully depreciated, would put unlucky investors in a deep hole.
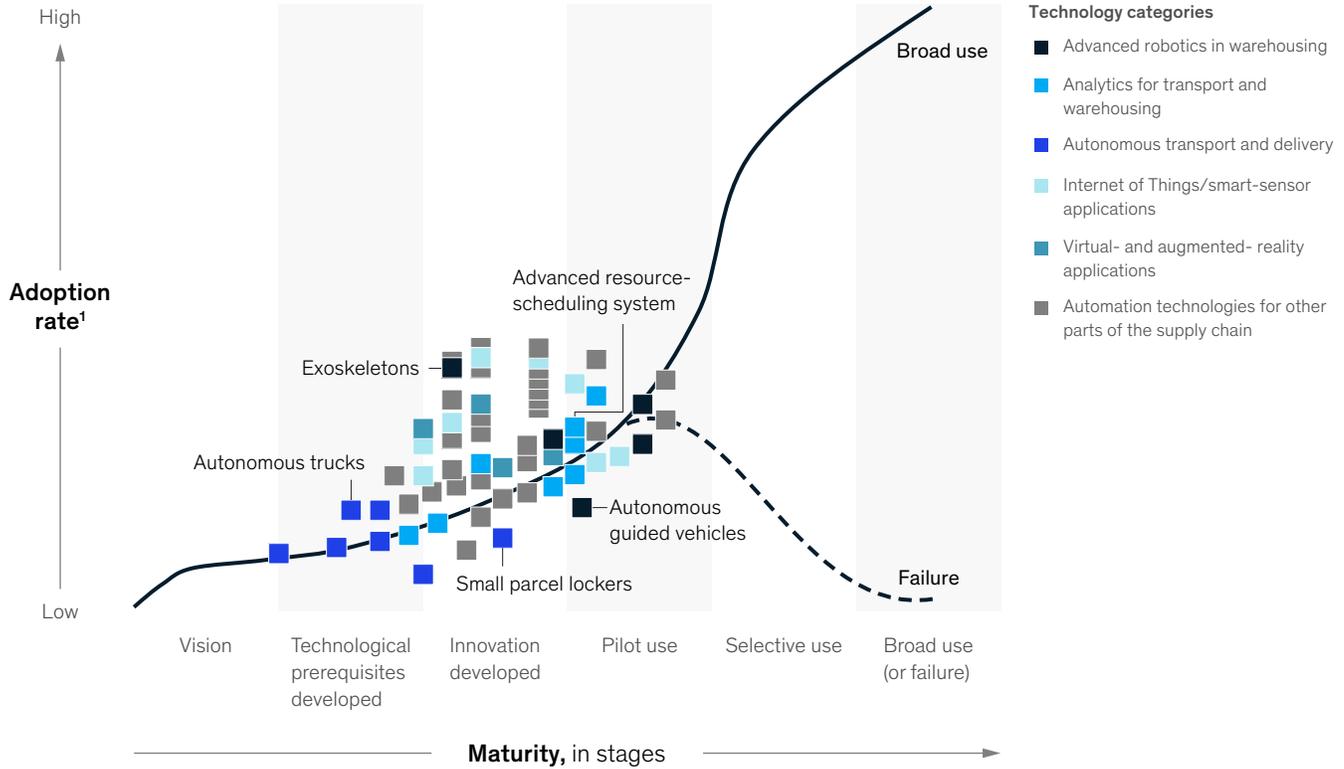
Purchasing woes

Even if a logistics company makes a great choice about the automation equipment to buy, it can run into another problem. The leading warehouse-automation manufacturers have enjoyed strong revenue growth of 15 to 20 percent annually since 2014. At many, order books are now full. In 2017, the order book at Vanderlande Industries reached an all-time high. Our conversations with many would-be buyers, especially at parcel companies, suggest that manufacturers operating at full capacity cannot even provide them with quotes.

Part of the problem is that the manufacturers are not yet at scale. Many companies, including the market leaders, are focused on a narrow range of

Exhibit 2

Dozens of logistics technologies are under development.

Logistics-technology development

Technology categories
- Advanced robotics in warehousing
- Analytics for transport and warehousing
- Autonomous transport and delivery
- Internet of Things/smart-sensor applications
- Virtual- and augmented- reality applications
- Automation technologies for other parts of the supply chain

[1] Speed of innovation adoption based on maturity.

technologies and solutions. That may change: the industry is in turmoil, with significant M&A activity underway. Notably, large technology conglomerates are investing in automation start-ups. For example, in 2015, Siemens took a 50 percent stake in Magazino, a start-up that builds automated picking robots. Once the dust has settled, some larger companies that are better able to meet demand may emerge. Then again, such companies will also have stronger pricing power.

A related issue is some confusion at logistics companies about which advanced equipment they truly need. Often the equipment on the purchase order is more expensive than it might have been. We

have seen purchase prices for the same equipment vary by as much as 50 percent.

Rapid change in shippers' distribution networks
Brick-and-mortar retailers are reacting to the e-commerce onslaught in part by evolving their distribution networks into omnichannel systems in which consumers can purchase and receive items through any channel. They might purchase online and take deliveries at home, the classic e-commerce model. Increasingly, they can order online and pick up in stores. Or they might purchase in-store and receive shipments at home, an option that menswear company Bonobos and other companies offer. And of course, they can still go to the store and walk out

The shipper's perspective

Shippers—the manufacturers and retailers that hire logistics providers to move their goods—will also grapple with automation in coming years. As new technologies come online and omnichannel delivery becomes more common, most will need to revisit their long-standing in-house and outsource decisions. Shippers interested in automation must first determine whether they have the capital and know-how to invest effectively in automation or whether it is more economical and easier to outsource increasingly complex warehouse operations to a logistics company. The same uncertainties about omnichannel that hold back logistics companies' investments in automation can also constrain shippers. However, our analysis indicates that shippers are investing more in automation than logistics companies are, in large part because they cannot find logistics companies that will invest enough in automation to meet their needs.

Beyond the level of investment, shippers and their logistics partners must also contend with the complexity of omnichannel. Take one example: to operate efficiently, an omnichannel retailer must either open the full inventory system to the logistics company so that it can route orders between stores and fulfillment centers or add steps to the order-routing process to determine whether the order remains in house or is sent to the logistics company.

Supply chain managers should also expect changes in their negotiations with logistics partners. As contract logistics players add more fixed costs in the form of automation, their strategic flexibility will decrease. Shippers should expect their partners to seek contracts in line with the life cycle of automation investments. Put another way, logistics companies will seek to share some of the technology upside—and some of the risk—with customers.

Shippers cannot completely outsource the intricacies of automation and the best practices of automated warehouses. To be a smart customer requires enough knowledge of automation to evaluate bids intelligently. Contract logistics companies we speak with often see automation listed prominently, yet typically with sparse detail, in requests for proposals. Shippers frequently know they want automation but don't know what kind they need. Getting a fair shake from logistics companies will require shippers to stay aware of technology trends and understand well how these might meet their needs.

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with their purchases. On top of that, consumers demand ever-faster delivery, which requires more local storage capacity, further driving complexity. Building a supply chain to support an omnichannel system is highly complex (Exhibit 3).

With all this complexity comes a lot of uncertainty: Where should new fulfillment centers be built? What share of B2C orders should they accommodate? And perhaps the biggest question: How much and what kind of automation are ideal? Shippers are asking the same sorts of questions (see sidebar "The shipper's perspective").
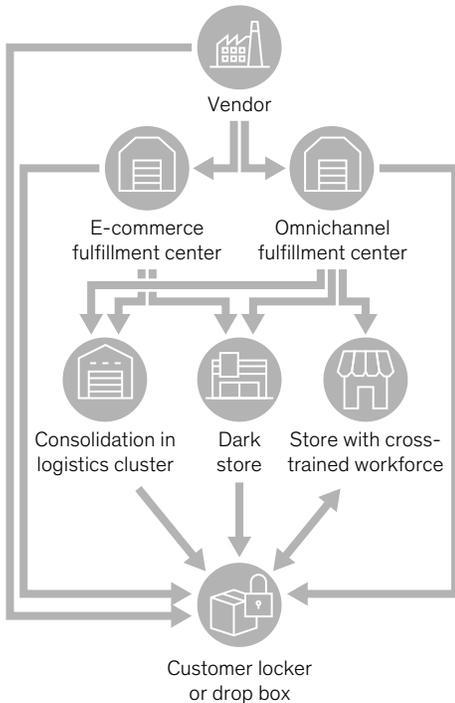
Too-short contracts
Most logistics contracts run for about three years, sometimes longer. That's much shorter than in the past. Shippers have tried to cut costs by more frequent tendering and have sought greater flexibility to respond to rapid changes in customer demand. The trend has exerted significant pressure on logistics companies. Because they typically develop sites with a particular customer in mind, they need to calculate carefully the investment required to add a new customer. With a significant initial investment required, logistics contracts are often not profitable for two years. That leaves only a year or so of profit before renegotiations begin. Big investments in automation would push the break-even point back further, leaving logistics companies at even greater risk that a customer would change providers, which would leave the facility empty and automation equipment unutilized while the third-party-logistics company searches for a new customer.
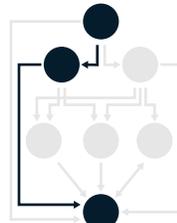
Exhibit 3

To fulfill omnichannel orders, shippers are redesigning their supply chain.

Supply chain

Vendor

E-commerce fulfillment center

Omnichannel fulfillment center

Consolidation in logistics cluster

Dark store

Store with cross-trained workforce

Customer locker or drop box

Strategies

Hub and spoke

Network strategy
- Use segmented approach to place inventory in larger (regional) and smaller (local, metro) sites
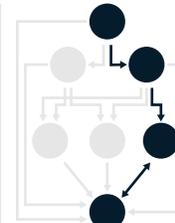
Applicability
- National/regional
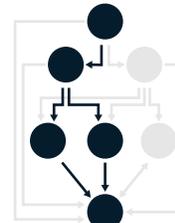
Logistics clusters

Network strategy
- Locate near hubs and competitor facilities to benefit from availability of labor and collaborative transportation

Applicability
- For low volumes
- Reduced capital-expenditure investment

Retail infrastructure

Network strategy
- Rely on own footprint of brick-and-mortar stores close to customer
- Train store associates to serve both e-commerce and store visits

Applicability
- For areas around retail footprint
- Reduced capital-expenditure investment
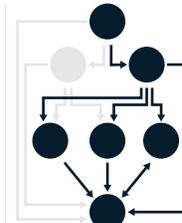
Omnichannel infrastructure

Network strategy
- Build smaller e-commerce fulfilment centers close to customer

Applicability
- For geographies with high population density (metropolitan areas)

In the future, contract planning might get even more difficult. E-commerce requires dense networks, especially in urban areas. But no single customer has the scale to support a full-scale network. Logistics companies must therefore build fulfillment centers and purchase automation technology before demand is known, let alone contracted.

Strategy under uncertainty

In these murky waters, what should contract logistics companies do? As the previous discussion illustrates, there is no single automation strategy that guarantees a company will thrive. In the following sections, we offer some guidance that we hope can start the thinking process.

Contract logistics

The big changes we've discussed—the simultaneous rise of e-commerce, omnichannel supply chains, and new automation technologies—present contract logistics with a great opportunity to sharpen its value proposition, which has historically relied on one of two factors:

— *Superior services.* To meet the needs of small shippers, which typically lack the capabilities or scale to set up and manage complex fulfillment, contract logistics companies offer heavily customized services, such as differentiated packing, effective returns management, and high-speed fulfillment.

— *Efficiency through scale.* By serving multiple customers, contract logistics companies build the scale and expertise needed for warehouse efficiency—for example, shift planning during peak hours and seasons. For many shippers, large and small, these capabilities were the key reason they outsourced their warehousing.

In our view, automation is not (yet) very helpful in delivering value-added services, which are often quite complex. Consider what happens when a worker checks whether a returned pair of sneakers is ready to be reshipped. Reliably unpacking the shipment (customers often use whatever they can get their hands on, such as supermarket plastic bags), recognizing the condition of the returned item, and then selecting the correct next processing step is not a job easily performed by a robot.

However, a lot of automation equipment is well suited to drive efficiency, the first factor, in three ways. Start with the jobs of putting away and picking, especially of high-velocity items. Automation can reduce the dependency on an ever-tightening labor market. Second, automation can enable higher throughput in a smaller space. Given the tight market for warehousing real estate, especially near city centers, the business case for automation is improving significantly. Large manufacturers and start-ups such as CommonSense have identified this advantage of automation as a core value driver. And of course, automation can help during peak times. Business cases for automation often rely on average throughput, or the base load. Even on those terms, automation can succeed, but it means that a lot of equipment sits idle much of the year, as it is only used for one or two shifts a day. During peak times, this idle capacity can easily be unlocked through a third shift without adding large numbers of part–time warehouse employees—who are harder to find during the Christmas season, for example. From an efficiency standpoint, automation has a lot going for it right now.

So how can contract logistics players make the most of this opportunity? With specialized equipment proliferating—more than 20 logistics activities could soon see mechanized help—almost every logistics customer now needs guidance in picking the optimal equipment for its purposes, procuring it, fitting it into the warehouse layout, training workers on it, and maintaining it. With contract logistics companies' scale and experience, they can meet the need and become true partners to their customers, offering expertise, better rates of procurement, and deep operating knowledge. But to get there, logistics companies must do two things:

— Be at the forefront of understanding and deploying automation (for example, by partnering with automation providers to test new equipment). Scale will help with this requirement, especially in segments that use specific types of equipment (for example, to handle small items or returns).

— Get sharp on the marketing strategy, including a definition of the market segments they can serve well, discipline in targeting clients in these segments, and clear communication of the value proposition to them. With the rise of equipment comes a greater need for companies to specialize in activities common to a given industry, as most machinery is not as versatile as human labor. It will become tougher to serve every client out of the same warehouse setup. Contract logistics players need to shape and communicate a clear benefit for each customer industry.

Delivering the best service at the lowest cost in a given market segment will create a strong value proposition. The expertise gained by doing this may also help to mitigate some of the contract issues: the deep relationships formed by becoming a true partner and adviser will likely also lead to stable contracts that can accommodate longer payoff periods. Some customers will still leave, of

course, but when they do, the logistics company's expertise and market-leading role should attract replacements, lowering the risk of equipment obsolescence. Therefore, logistics companies should avoid equipment that is specific to only one customer if that customer is not willing to help shoulder the burden.

Yet superior expertise and support may not be enough to make all contracts profitable over their duration. Contract logistics companies should also get smart about pricing. The power of incentives, such as adding attractive terms to extend contracts or penalties if contracts are terminated before customized equipment is paid off, is not to be underestimated.

Parcels

For parcel companies, the strategic considerations are a little simpler. Increasing demand is a given, as are rising requirements for speed and reliability. Considered that way, there can be little question that parcel companies need to automate. And in fact, many already have. DHL invested about €750 million in its German parcel network, and United Parcel Service (UPS) has announced a long-term plan to invest even more.

But within that imperative, parcel companies face some subtler questions:

— *What kind of equipment should be installed?* Parcel companies around the world have two choices. One is to install large equipment that can handle the vast majority of parcels, say those up to 120 by 60 by 60 centimeters. This approach puts a high value on flexibility to accommodate a wide mix of parcels. Other companies have focused on equipment designed for smaller items, as e-commerce fulfillment features lightweight (less than 5 kilograms) items that are typically smaller than a shoebox. This kind of equipment is less flexible,

as it cannot handle the large items, but it is significantly cheaper to install and often even to operate.

To decide, companies must review two pieces of data: the historical mix of parcel sizes and the growth rate of each size. If the data do not yield a definitive answer, it may make sense to create a flexible base capacity of large equipment and then add smaller sorters to accommodate e-commerce peaks.

— *Which process steps should be automated?* The most obvious candidate is sorting in the hub. The labor-cost savings, especially in the developed world, make this a relatively clear case. Unloading and loading in the hubs are more complicated. Over the past five years, more equipment for these activities has been developed. Some providers say their gear can increase the productivity of one employee to more than 3,000 items unloaded per hour, from the previous 700 to 1,000 items per hour. In our experience, however, this equipment often struggles with the different shapes and especially the packaging of today's e-commerce parcels. Plastic bags are the worst nightmare of many parcel-hub engineers.

When it comes to to the automation of loading, large parcels are extremely difficult. Just imagine a 50-pound sack of dog food landing on a small, delicate box of LEGO toys. The child who receives the latter will not be happy with its condition. For smaller items, automation has been in place for years, but reviews are mixed. Parcel companies are well advised to ask manufacturers to showcase their solution with the company's parcel mix.

Apart from hubs, some parcel companies, such as DHL, have started to automate delivery bases. Key advantages of this model are more

sorting "depth"—that is, less manual sorting— and easier same-day deliveries that are fulfilled close to a city and then sorted to the route in the delivery base. Automating in this way allows a company to outcompete some low-cost services offered by rivals.

— *How much capacity should be installed?* E-commerce growth, and the volatility of its volumes, make this a vexed question. Many companies seem to have chosen not to overinvest in growth. The US operations of FedEx and UPS as well as Japan's Yamato Holdings are only slowly expanding capacity. There are two reasons, which we raised previously, for being cautious and not rushing to capture all the growth: e-commerce players such as Alibaba and Amazon are investing in their own delivery systems, and e-commerce volumes tend to be low margin. Instead of

focusing on investing in growth, many players are trying to get more out of their existing automation equipment—for instance, by introducing new products with different speeds that allow for sorting through the entire day. This will initially postpone the question of installing new capacity, but ultimately, all parcel companies need to find the right balance between yield and growth.

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Despite the uncertainty, logistics companies can make informed decisions. We hope this article offers clarity on a complex situation, and together with the entire series of articles, provides logistics executives with a useful perspective on how their industry is changing—and how they can change ahead of it.

Ashutosh Dekhne is a partner in McKinsey's Dallas office, **Greg Hastings** is an associate partner in the Charlotte office, **John Murnane** is a senior partner in the Atlanta office, and **Florian Neuhaus** is a partner in the Boston office.

Next–generation supply chain—transforming your supply chain operating model for a digital world

In a digital age, most supply chains run on old principles and processes. A few leaders can show us how a new operating model can answer the demands of today—and tomorrow.

by Manik Aryapadi, Ashutosh Dekhne, Christoph Kuntze, Tim Lange, and Andreas Seyfert
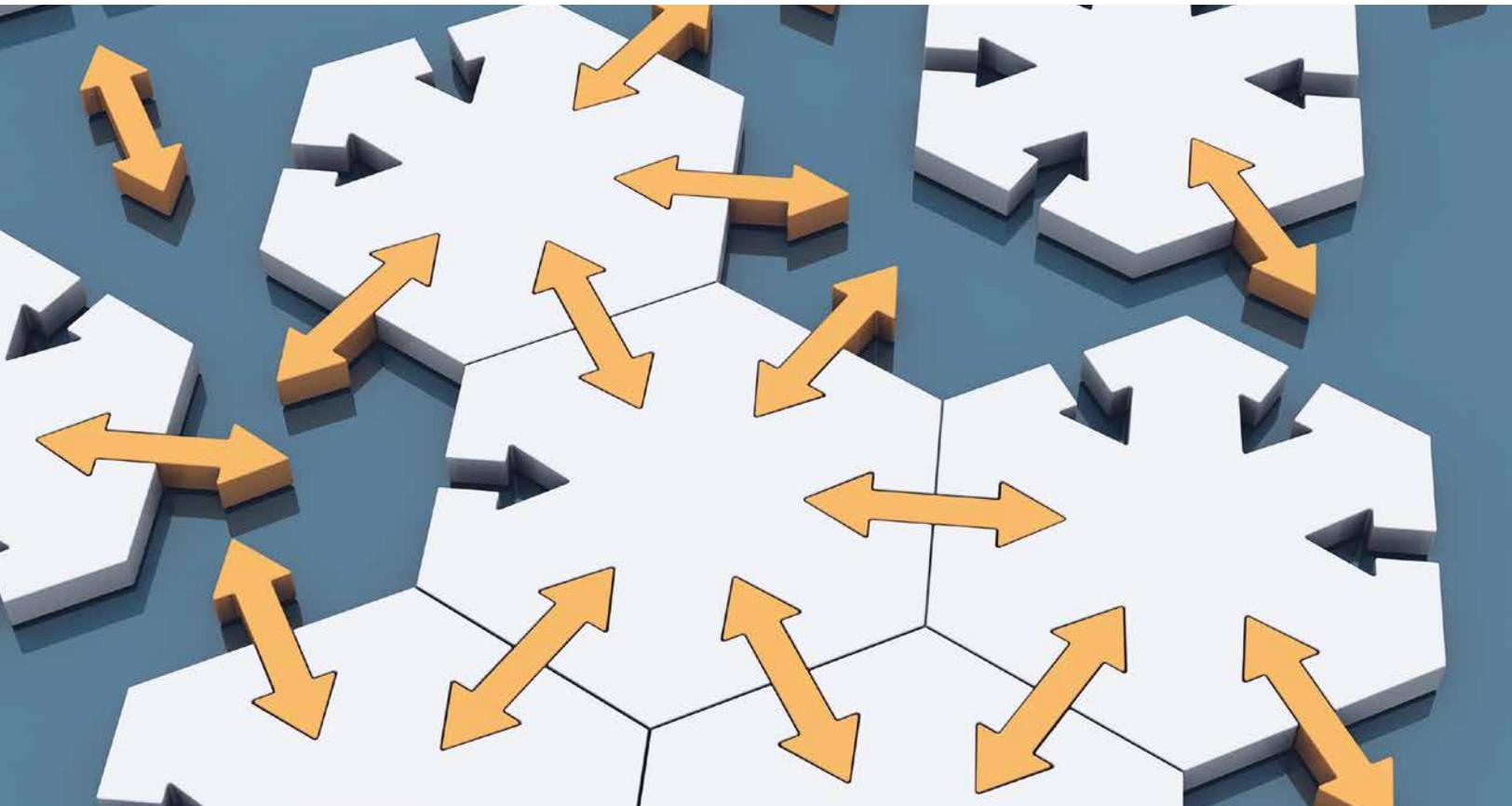
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Whether they choose to be faster, more innovative, or closer to customers, it's becoming increasingly difficult for manufacturers and retailers to launch new products and better services that react flexibly to shifting demand, while still maintaining (or even improving) their profitability.

It's no surprise that leading players are focused on improving their supply chain—especially when it comes to enhancing service levels, cutting costs, or optimizing inventory levels. An illustrative analysis of a retailer's income statement supports this approach, showing that practically every element is affected by the supply chain's performance (exhibit).

Many companies have tried to optimize their warehousing and shipping processes, improve their planning, and develop other core supply chain topics—but often with only modest success. And all too often operational improvement initiatives have failed to make any real impact on the P&L or balance sheet. Why? Organizations have neglected to evolve their supply chain operating model—its processes, structures, and people—resulting in it being unable to sustain changes once focus has shifted to another area.

A next-generation model stretches far beyond the mere organizational design of structures and workflows—it defines the ways and means by which a company operates its supply chain (see sidebar, "New supply chain operating model challenges all dimensions of the supply chain").

New trends, new challenges

To succeed in the digital age companies need a next-generation model for their supply chain. They must rethink their operating model, particularly in light of three dominant trends:

First, customer preferences have changed as the influence of digital sales channels has increased.

Exhibit

A close look at an income statement shows the impact of supply chain performance.

Income statement of superstore, illustrative
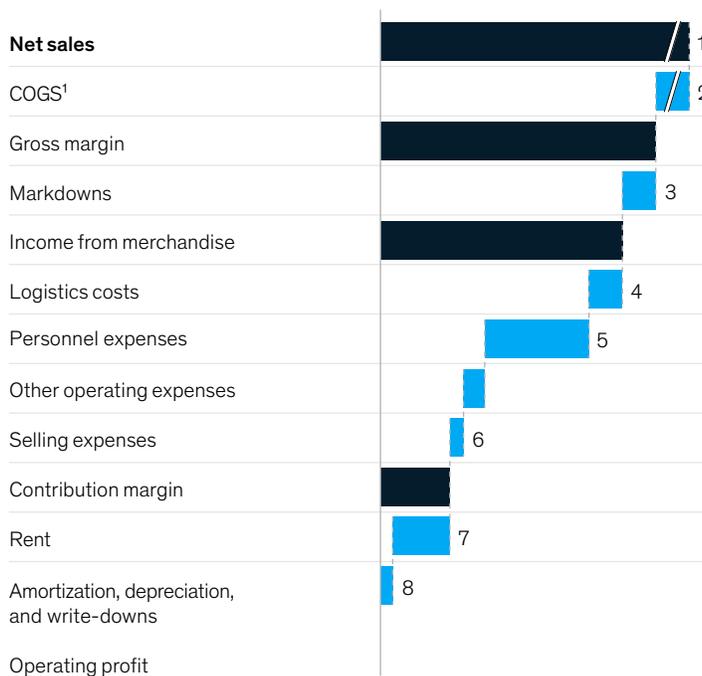
Supply chain's impact

1. Supply chain's service level largely determines the availability of goods on store shelves

2. Good supplier relationships help reduce COGS

3. Markdown amounts are primarily determined by delivery terms and planning accuracy

4. Shipping and warehousing are among the largest cost items

5. Delivery significantly influences personnel expenses for stocking and replenishing shelves

6. Precise volume forecasts increase returns on marketing investment

7. Branch and warehouse size can be reduced by cutting inventories

8. Right-sizing helps optimize depreciation and write-downs on warehouse and branch equipment, as well as on fleet vehicles

[1] Cost of goods sold.

New supply chain operating model challenges all dimensions of the supply chain

The strategic objective is clear: more revenue, lower costs, satisfied customers.

To get there, companies must align their operating model with the demands of the digital world, entailing scrutiny of all dimensions of the supply chain: structures, processes, and people. By asking core questions along these dimensions, it is possible to determine the cornerstones of a next–generation operating model.

Processes

— *Process design.* How should we design functional, cross-sector, and support processes? How can we best integrate innovations? How can we accelerate decisions?

— *Performance management.* What are our most important KPIs? How do we set and track targets? How do we encourage decision orientation and collaboration?

— *IT systems and technologies.* What technology infrastructure does the company need? What is the ideal IT organization and governance in an age of big data and analytics?

Structures

— *Roles and responsibilities.* Who is responsible for key processes and individual process levels?

— *Organizational structure.* What organizational form ensures stable day-to-day operations, yet agile development and innovation? How should reporting lines run?

— *Ecosystem.* Which capabilities are core competencies to keep in house, and which ones can we source from current partners or other external providers? How should the corresponding network be organized?

People

— *Skills.* What skills do our people need to do their job and how should we fill any gaps—M&A, recruitment, or internal capability building?

— *Corporate culture.* What elements of the corporate culture promote willingness to change—how can we foster openness and tolerance of mistakes?

— *Resource distribution.* How many employees and managers do we need, where, and what qualification profiles should they have? How can we deploy resources systematically?

Consideration is the increasing pressure on supply chain functions in terms of cost and productivity. New market conditions frequently result in a growing number of products, warehouses, and logistics service providers, requiring more frequent and more detailed planning. This also creates calls to scale up personnel resources in indirect functions like scheduling and distribution management.

Finally, the use of new digital technologies and advanced analytics also affect supply chains design, creating both opportunities and challenges. Advanced analytics allow more precise planning, and efficiency and effectiveness also rise when planners are freed up from repetitive tasks

and can concentrate on value-adding activities. McKinsey studies have shown that current technologies could automate an average of 45 percent of human activities.

However, innovative technologies and methods place new demands on the capabilities of employees, management, and IT infrastructure along the supply chain: all three elements need to be continually realigned to reflect the latest trends. Companies that do not respond to these challenges by radically reshaping the structures and processes of their supply chain will extract few of the benefits that the transformation promises.

Seven steps for tomorrow's operating model

To realign their supply chain operating model, leading consumer goods companies are following seven guidelines that could be beneficial for others.

1. *Challenge unconditionally.* Successful companies challenge all processes in their planning and logistics management and are not afraid to radically reinvent them. Predictive methods like machine-learning forecasting or supply-scenario planning will only reach their full potential if the entire planning cycle is shortened.

   Digitization enables a deeper integration of planning and management steps—e.g., joint optimization of tactical production planning and operational scheduling: not only does that lead to better planning results, it also makes it easier to automate processes end to end. As part of the review, the individual value contribution of all processes should be challenged, removing any steps that don't add value.

2. *Deploy cross-functional teams.* For years, tighter specialization of supply chain processes—from requirement planning to inventory management—was considered a determining factor of success. However, each unit attempting to optimize its own operations was often at the expense of others.

   Leading companies have put an end to this overspecialization. They bundle responsibility for all supply chain processes throughout the value chain, from suppliers to customers, in cross-functional teams. They aim to ensure end-to-end responsibility for supply chain performance, while holistically optimizing service, costs, and inventories. Team affiliation (be it sales, production, or supply chain management) becomes irrelevant, as the whole group makes autonomous decisions and performance is assessed and incentivized as a whole.

3. *Centralize.* For many years, forerunners like Procter & Gamble or Unilever have been centralizing their planning and logistics management at a regional, sometimes even global, level. In more recent years consumer electronics players have also followed this method. Centralization efforts optimize volume flows across countries and regions, as well as allowing organizations to bundle resources and build centers of excellence to introduce advanced analytics.

4. *Assign technology development to project teams.* Digital forerunners like Amazon and Zalando have long pursued a policy of stacking commercial process ownership and technology development. Similarly, companies seeking to build a next–generation supply chain operating model should assign the development of new technology solutions to small, high-performance product teams, rather than central IT departments.

   With cross-functional staffing, such units can take responsibility for driving the evolution of innovative solutions, allowing new technologies to be developed and implemented far more efficiently. Using this approach, one retailer was able to take an order management module that had been plagued with delays, and complete it within budget in eight weeks.

5. *Accelerate decisions.* The flexible testing of digital supply chain innovations in pilot projects requires fast decision and release processes. Fast-track procedures are typically premised on business cases or risk assessments with a reduced number of criteria. In return, implementation of agile principles is associated with continuous control of progress made along with clear decisions to continue or abort the project.

6. *Adopt a zero-based approach.* Changing organizational structures and redistributing resources is not an easy undertaking; vested interests and resistance are often prevalent. Applying zero-based principles helps to objectively assess which structures, competencies, and capacities are needed. By reducing organizational components to the bare minimum for continued existence and then adding on the tasks, skills, and resources that have a clear added value and that meet

the digital requirements, companies can identify the most important roles in the company and staff them with the right amount of talent.

7. *Build up dynamic capabilities.* Capabilities and role profiles should be aligned to the requirements of new technologies and processes; particularly critical are data scientists (experts in the development of analytical solutions and algorithms) and digital translators (employees at the interface between business and analytics). Yet not all capabilities can be built up internally— partnerships can generate best-of-best solutions, allowing internal resources to be concentrated on company-specific competence areas, such as the development of forecasting software for special product groups or markets.

Following these seven guidelines can help manufacturers and retailers get their supply chain operating model in good shape for the future. A next-generation model creates the right preconditions to optimally benefit from the opportunities associated with digitizing the supply chain. Companies can thus obtain a lasting competitive edge.

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Beyond procurement: Transforming indirect spending in retail

If retailers treat indirect costs as an opportunity for business transformation rather than just a procurement matter, they can boost return on sales by as much as 2 percent.

by Stefon Burns, Ella Burroughes, Steve Hoffman, and Alexander Merklein

For retailers seeking to cut costs and generate cash for growth investments, indirect spending can be a big untapped opportunity. Indirect costs—the goods and services that retailers purchase but don't resell—are equivalent to 10 to 15 percent of sales on average, and most retailers know that their indirect spending is far from optimized. But while recognizing the potential is easy, capturing it has proven stubbornly difficult.

The challenges aren't new. They include a lack of spending visibility, fragmented ownership and spend authority, a dearth of incentives to reduce indirect spend, and a siloed approach to procurement of not-for-resale (NFR) categories. In addition, indirect procurement typically focuses on negotiations with suppliers over price, rather than on higher-impact opportunities to optimize what and how the retailer buys. Our research has also shown that capabilities and resourcing for NFR procurement in retail are significantly weaker than in many other sectors: NFR goods and services are viewed as much less important than goods for resale, so the NFR-sourcing staff tends to receive less management attention and less investment in talent. Furthermore, even NFR-sourcing professionals typically have little expertise in NFR categories. Rare is the procurement team that has deep knowledge of, for example, elevator maintenance or marketing—agency overhead costs.

Visionary retailers, however, are taking a radical new approach to indirect spending—and achieving radical results. These retailers aren't viewing indirect costs as a concern only for the procurement function. Instead, they're looking to transform indirect spending across the entire business. They're overcoming the challenges by leveraging three new ways of working: a cross-functional approach that incorporates category–specific demand levers, the use of digital and analytical tools, and stronger supplier collaboration. And they're taking specific actions to bring about lasting change in mind-sets and behaviors.

In doing so, retailers are shaving as much as 10 to 15 percent off their annual indirect spend, capturing impact worth 1 to 2 percent in return on sales, and seeing a more than 15-fold return on the cost of their NFR-sourcing team. We've found that the value at stake is remarkably consistent across retailers—even at those that have been working on reducing indirect costs for a long time, whether in-house or with external support.

A business transformation

To capture maximum value from a cost-reduction program, retailers must be deliberate about the program's scope and ambition level. A broad scope and high targets are indispensable elements of a transformative effort.

Historically, retailers have cut costs primarily by reducing store labor or travel expenses. Few retailers have tapped into the full potential of optimizing NFR spending (Exhibit 1). Furthermore, even retailers explicitly seeking to reduce indirect spending sometimes classify certain cost categories as "not addressable." For instance, some retailers consider marketing expenditures out of scope; their rationale is that marketing is critical to the core business of retail. Other retailers don't bother trying to lower rents because they assume that they can't renegotiate terms unless they're in financial distress. Some indirect costs—such as supplier-managed logistics—remain unchallenged because they're "hidden" in cost of goods sold. And some retailers look for cost-reduction opportunities only in operating expenses, leaving all capital expenditures untouched—even though the latter often has higher savings potential (as a percentage of costs).

In bypassing these categories, retailers forfeit more than half of the potential impact and miss out on the synergies that a large-scale program could bring. To achieve transformative change in indirect spending, nothing is off limits.

Exhibit 1

By addressing the full cost base, a retailer can double the scope and savings of its indirect-costs program.

Typical breakdown for a €10 billion retailer, € million
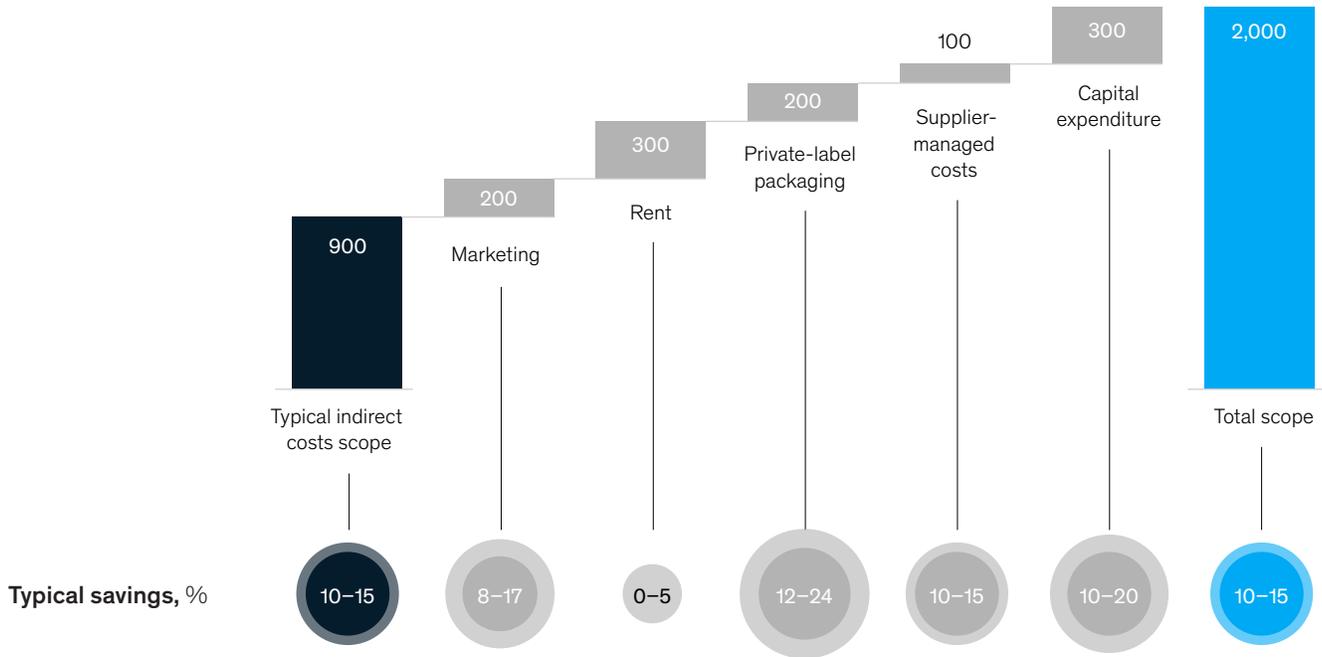
Another must-do for a transformation program: set stretch targets that inspire creativity and out-of-the-box thinking. To set its NFR targets, one retailer first conducted a fact-based diagnostic that was championed by senior leaders. This exercise helped the organization understand that the program was a priority, adopt a transformational rather than an incremental mind-set, and focus on how to achieve the targets rather than on trying to change them.

New ways of working

Seeing an NFR effort as a business transformation is a crucial first step. To maximize NFR savings, retailers then need to adopt three new ways of working.

A cross-functional approach incorporating category–specific demand levers

Transformation of indirect spend will require the involvement and commitment of more than just the procurement staff. A cross-functional team can break down silos, pose tough questions about what the business really needs, and make balanced trade-offs.

A cross-functional team can pull the basic supplier-management levers (such as competitive bids and supplier consolidation) that affect *who* the retailer buys from and *at what price.* The team can also pull process-management levers, which influence *how* a retailer buys: if the various functions comply with

procurement policies and use only preferred vendors, maverick spending will be reduced or even eliminated. Savings across the organization can be more easily tracked. The retailer can better negotiate vendor payment terms and cycles to its benefit.

Most important, a cross-functional team will be better placed to pull category-specific demand-management levers, which influence *what* the retailer buys. In our experience, these levers deliver as much as half of the potential savings—or even more for mature companies because negotiating for lower prices yields diminishing returns over time. The biggest opportunities are often in areas that many retailers consider out of scope, such as marketing (by using a return-on-investment approach, for instance) or logistics (using levers such as inventory reduction or network redesign).

A retailer seeking to optimize logistics spending tasked a cross-functional team with redesigning its distribution network. The team was able to reduce end-to-end costs by selectively increasing certain logistics costs. For example, it switched some deliveries from sea to air in order to gain sales and reduce markdowns. It also increased delivery frequency for some products and stores while decreasing it for others.

The use of digital and analytical tools

Digitization has revolutionized every business process and will continue to do so; indirect sourcing is no exception.[1] Today, leading retailers are using digital and analytical tools in the following areas to achieve dramatic reductions in indirect costs:

— *Spend visibility.* Advanced digital solutions, powered by artificial intelligence (AI) and machine learning, enable retailers to rapidly and accurately map the relevant spend base into granular categories, shedding light on exactly who spends how much on what. Cutting–edge digital procurement solutions can pull purchase-order (PO) and invoice data from multiple systems to create a "spend cube," automatically generating benchmarks on pricing and specs, as well as dashboards

and reports to help category managers monitor spending. One retailer had recently streamlined its headquarters organization but found through AI-supported spend mapping that many of the costs had crept back in through the use of contractors and temporary labor. Once the retailer generated the spend cube using an agreed taxonomy, it could lock down a baseline and see how much it was spending on contracted versus uncontracted vendors.

— *Consumer insights.* A retailer used digital consumer surveys and crowdsourced competitor benchmarks to understand, address, and retest consumer perceptions of store cleanliness. Which areas of the store did consumers notice most? Which areas did they hardly notice at all? Analysis showed that the parking lot and the sidewalks were perceived as clean enough, so instead of hiring a cleaner to do a thorough cleaning multiple times a day, the retailer cut back to once a day, with store associates doing spot checks every few hours. The surveys also revealed places—such as fitting rooms and the shoe department—where the retailer could invest in more frequent cleaning to boost customer satisfaction. The business-insights team then measured the exact impact of these adjustments on the retailer's sales.

— *Design to value.* A retailer reduced the cost of its paper shopping bags by 25 percent by redesigning them. Through digital analysis of basket size, product dimensions, and data from cashier surveys, the retailer determined the ideal dimensions of a shopping bag based on the distribution of physical volume and weight of products. Further digital analysis—along with input from cashiers, baggers, and vendors—helped the retailer arrive at the substrate composition that would give the shopping bags the right levels of puncture strength and tensile strength.

— *Clean sheeting.* Digital clean-sheeting tools can reduce indirect costs by as much as 40 percent in a category. Such tools typically feature algorithms for determining costs in various NFR areas, dynamic databases

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[1] For more on digital solutions in procurement, see Pierre de la Boulaye, Pieter Riedstra, and Peter Spiller, "Driving superior value through digital procurement," April 2017, McKinsey.com.

of input costs (such as raw–material index prices), and a sophisticated calculation engine. Through a clean-sheeting exercise, one retailer discovered that it was paying much more than the "should cost" for water-bottle labels (Exhibit 2).

— *Spend control.* Digital procure-to-pay tools give retailers better spend control by enforcing more discipline in how suppliers are set up and approved, and by supporting a more rigorous PO-approval process.

— *Zero-based budgeting (ZBB).* Using digital tools (and enabled by increased spend visibility), retailers can easily build detailed bottom-up budgets, detect the exact drivers of variances, and take swift action to close gaps. ZBB, which first gained traction in consumer-goods companies, can be powerful for retailers,

especially in store–related NFR categories. Determining the appropriate budget for each store and then tracking adherence to that budget can yield significant savings.

Closer collaboration with suppliers

Retailers should work with suppliers on cost improvements and innovations. Suppliers can be great idea generators because they know a retailer's bad habits better than the retailer itself does and would rather help change those habits than lose the business. Retailers can also invest in improving supplier capabilities in ways that will pay the investment back several times over. Among the benefits of stronger supplier relationships: better product quality and availability, faster responses to market needs, less administrative effort, greater efficiency, and lower total cost.

Exhibit 2

Through clean sheeting, a retailer saw that it was paying more than the 'should cost' for labels on its water bottles.

Key assumptions
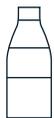
Profit of 5% included in price
Batch size of 2 million pieces (est.)
Yearly volume of 6 million pieces (est.)
Manufacturing location: Eastern Europe

Interest rate of 3%
Selling, general, and administrative (SG&A) costs of 5%
Range of labor rates in local currency depending on skill level
Selling tax and value-added tax not included

Label costs for 500ml bottle

■ Materials ■ Value add ■ Overhead and profit

To sustain behavioral change, retailers must use all four parts of the 'influence model.'

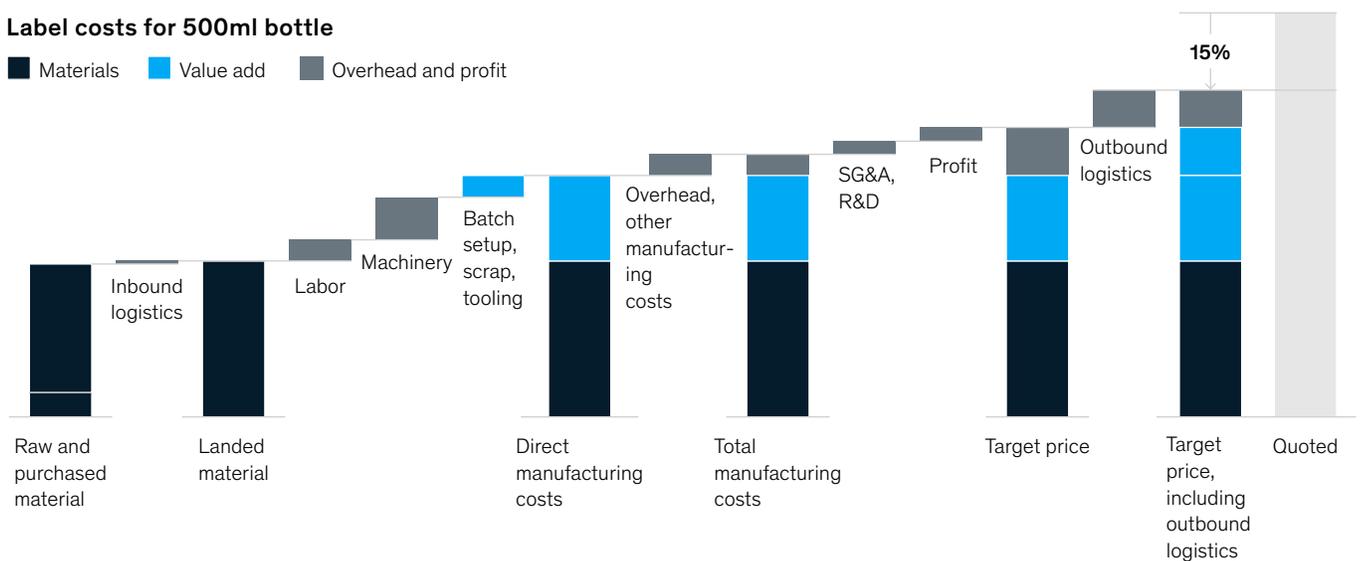The elements of successful supplier collaboration include focusing on a limited number of suppliers to deliver the highest return on investment, establishing a robust value-sharing agreement at the outset, creating a dedicated supplier-collaboration team separate from (but aligned with) category managers, and building a disciplined performance-management and benefits-tracking system.

One retailer, when retendering its contracts for outsourced warehousing, required suppliers to submit proposals for improving the joint warehousing operation. Based partly on these proposals, the retailer reduced its supplier count to two, allowing for closer collaboration while maintaining some competitive tension. The retailer built continuous-improvement targets into the contracts, with gainsharing incentives for the suppliers. It also invested in a "lean warehousing" team that works closely with the suppliers to build capabilities.

Getting it done

Retailers must embed these new ways of working into daily tasks. To sustain behavioral change, they must use all four parts of the "influence model" (Exhibit 3).[2]

Fostering understanding and conviction

Leading retailers should lay out a clear case for change and help each stakeholder connect to it on a personal level. An important aspect of the change story is communicating why savings are needed and what they will be used for. Allowing business units or functions to reinvest part of the savings can increase motivation. (One initiative leader at a retailer put it this way: "Half goes to the CFO, but the other half we get to keep.") The head office should, of course, have enough visibility into the reinvestments to ensure they align with corporate priorities and generate strong returns.

Intelligent target setting also helps foster understanding across the organization. Targets should be based on detailed diagnostics, including benchmarking against a relevant peer set. Otherwise, stakeholders will reject the targets as arbitrary; there's also a risk of damaging the business by pushing it into "slash and burn" cost cutting. The diagnostics should yield not just a single target—such as, $100 million in cost savings—but also a set of quantified initiatives. Targets should include cost ratios (for example, logistics spending as a percent of sales) rather than just absolute numbers to ensure that cost efficiency genuinely improves even when the category experiences tailwinds. (For example, a decline in logistics costs due to a decline in sales isn't really an improvement.)

Because indirect sourcing is typically perceived as a backwater and procurement staff can feel they're performing thankless work, external visibility can be highly motivating. When retail CEOs publicize their

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[2] For more on the influence model, see Tessa Basford and Bill Schaninger, "The four building blocks of change," *McKinsey Quarterly*, April 2016, McKinsey.com.

Exhibit 3

Retailers can use a range of tactics to change mind-sets and behaviors.

The influence model's four building blocks of change

ROLE MODELING

- Cross–functional steering committee
- Senior sponsorship of initiatives
- Early wins

UNDERSTANDING AND CONVICTION

- Case for change
- Intelligent target setting
- External visibility
- Test and learn

TALENT AND SKILLS

- Program leader and team
- Initiative resourcing
- Category experts
- Training

FORMAL MECHANISMS

- Personal targets
- Weekly program-management rhythm
- Implementation-level tracking

NFR initiatives and targets, the people involved in the initiatives see that their work matters and even has the power to influence their company's stock price.

Along the NFR journey, there will be times when stakeholders resist change for fear of negatively affecting sales. A test-and-learn culture can overcome this. A first step can be to show mock-ups or samples of proposed changes. One retailer's procurement team recommended using thinner, cheaper paper for marketing materials. It overcame resistance from the marketing department by having samples printed on the thinner paper and using blind testing to demonstrate that the materials were just as effective.

Reinforcing with formal mechanisms
Company goals should be translated into personal targets. One retailer created a simple timeline of when initiatives were expected to deliver impact, using the top end of the impact range estimated for each initiative. The resulting quarterly figures became targets for the relevant executives, whose bonuses were partly dependent on hitting those targets.

To follow up on progress against targets, many retailers instinctively go for a monthly cadence of follow-up meetings. But, in our experience, a weekly program-management rhythm is much more effective for driving the pace of initiatives and bringing about cultural change. During the weekly

meeting, the team reviews all initiatives but focuses on only a few, either on a rotating basis or to help those that need additional support.

Initiatives should be tracked not only against milestones but also on progression through "implementation levels": an initiative begins as an idea, matures to a business case, becomes an approved decision, gets implemented, and is ultimately converted to "money in the bank." The expected impact of initiatives can be appropriately "discounted" when they are in earlier stages. Implementation-level tracking gives the program leader and steering committee a more accurate picture of when impact will be delivered and which initiatives need what kind of support. Linking this tracking to ongoing budgeting, forecasting, and performance-management processes yields greater transparency in profit-and-loss performance.

Developing talent and skills

An NFR program needs a capable program leader and a supporting team. The program leader, who will likely come from a line role, should know the business well and have the respect of top management. Given this individual's talent and leadership skills, it won't be an easy decision for senior executives to free him or her up to lead the program. But the sacrifice will pay off.

Still, without sufficient resources for each initiative, the program will struggle. Colleagues from each function or cost category will need to dedicate 10 to 20 percent of their time to the effort. For one $10 billion retailer, delivering $200 million in savings required a program leader and about 40 full-time equivalents (FTEs) working for 12 months. Company leadership had to stop or pause other initiatives to create the required capacity. While 40 FTEs might sound like an enormous investment, the retailer recouped the cost of those employees' yearlong efforts about 50 times over in recurring savings.

Neither the program leader nor the team members can be expected to have all the relevant category-specific expertise. Our research shows that retailers have eight times the indirect spend per procurement professional compared with other sectors, which means their level of expertise in any particular category will be relatively shallow. Therefore, tapping into internal and external category experts is crucial. One grocery retailer discovered that one of its project managers had been a refrigeration engineer for 25 years. The company brought him into a team tasked with reducing the life-cycle cost of refrigeration, heating, and cooling assets by 30 percent in two years. The team achieved the goal in six months and did so with simple solutions—for example, changing the type of price tags used in refrigerated shelves so that the tags wouldn't fall off and clog the drain. This change saved the retailer more than $600,000 a year.

Capability building is also key. The best companies use a combination of classroom training, e-learning tools, and on-the-job coaching. In our experience, many NFR professionals who receive functional and category-specific training and mentoring immediately double or triple their effectiveness. A phased train-the-trainer approach—in which the sourcing team receives training during a pilot

Many NFR professionals who receive functional and category-specific training and mentoring immediately double or triple their effectiveness.

phase, applies the learnings to an initial set of categories, then trains others in the next phase—has proven effective in many cases.

Role modeling

The CEO, CFO, and the rest of the management team must work together to communicate the case for change and role model the desired mind-sets and behaviors. Working as a cross-functional steering committee, they can remove roadblocks, surface and capture cross-functional opportunities, and allocate enough resources to them, thereby sending an unmistakable message to the organization about the importance of these initiatives.

Another powerful role-modeling lever is senior sponsorship of initiatives. Senior leaders can serve as coaches for the owners of individual category initiatives, whether those owners are within or outside the senior leaders' respective functions.

Helping to secure—and then celebrate—early wins is also a form of role modeling. It lets the entire organization see that senior leaders are committed to ensuring the NFR program's success and that they recognize its impact.

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Most retailers have significant opportunities to reduce indirect costs. The first step is to acknowledge that the potential exists, then conduct a thorough diagnostic to quantify it. Though challenging, a transformation in indirect spending can yield greater profitability, funding for growth, and competitive advantage.

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Rethinking procurement in retail

For retailers, procurement is no longer solely a matter of negotiating "A" brands. Private labels and verticalization are trending. Advanced approaches and tools help get procurement in shape for the future.

by Patricio Ibáñez, Alexander Merklein, and Daniel Rexhausen

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The days in which brick-and-mortar retail monopolized customer touchpoints are gone. Alongside internet retailers such as Amazon and Zalando, and start-ups such as the beverage-delivery service Flaschenpost, brand manufacturers are increasingly seeking to gain direct access to consumers—whether online or through ultramodern flagship stores in premium city-center locations. Aside from pioneers like Apple, many categories are encroaching on the final consumer business, from coffee brands (such as Nespresso) through to cosmetic lines such as Kiehl's and NYX Professional Makeup by L'Oréal. As a result, traditional retailers not only face intensified pressure on margins but also unrelenting pressure to innovate.

The retail sector is mounting a response. By increasing its share of private brands, it is endeavoring to win the loyalty of customers and set itself apart from the growing competition. Some retailers, among them the French sports equipment discounter Decathlon, are already aiming to increase their share of private labels to 100 percent. Those who can afford it pursue verticalization and set up in-house production facilities for their private labels. Leading grocery retailers such as Edeka, Migros, Morrisons, and Kroger have long produced much of their assortment themselves— from beverages to meat to baked goods. Even coffee roasters, ice cream factories, or potting-soil producers have since been added to the vertically integrated portfolios of retail chains.

These trends do more than simply change the face of retail: they are also making a deep impact on procurement management. The procurement function is now not solely fixated on annual negotiations with manufacturers of "A" brands. Instead, the focus is increasingly turning to the procurement of private labels and purchasing of raw materials for in-house production. At the same time, this approach is changing the entire

procurement organization. New team structures and skills are needed, as are new approaches and tools.

Priorities are shifting

For years, procurement officers in the retail sector primarily focused on premium brands and their suppliers; little effort was dedicated to the procurement of private labels, which was sidelined as an activity of less importance. That is fundamentally changing with the emergence of new competitors and sales channels. Meanwhile, the share of private labels in the portfolio of many brick-and-mortar retailers is very close to 50 percent. Private labels have long since outgrown their original function as entry-level products. Today, private labels assume quality leadership positions (take for instance REWE Feine Welt, Tesco Finest, or President's Choice at Loblaw), address popular niches such as organic food and vegan cosmetics, or serve special customer groups (consider children's brands at Tesco like Fred & Flo baby care and Tesco Goodness for kid's food, or at Asda like Little Kids food and Little Angels baby care). In the meantime, there is barely any market segment that the retail sector has not conquered with its in-house products—through to the branding of complete categories such as EDEKA zuhause, under which the retail chain sells its home products.

As they expand their portfolio of private labels, retailers are not merely focusing on securing their position in the face of often limited supply sources. Particularly in the premium segment, their aim is to systematically improve margins and strengthen their negotiating position against brand suppliers. At the same time, their high-quality in-house products set a counterpoint to the design-to-cost programs of many "A" brands that seek to improve their own margins with cheaper components and packaging. Against this backdrop, the private label is set to become an unprecedented strategic competitive

advantage—vis-à-vis brand manufacturers but also other retailers.

As verticalization increases, so too does the importance of procuring resources and raw materials. Retailers with in–house manufacturing capacity can no longer simply pass on prices to their customers. Instead, they have to ensure the supply and capacity utilization of their production facilities. Not only does that make the task of procurement more demanding, it also involves far more complex processes.

Agile work structures are needed

The new trends have a wide-ranging impact on the procurement function. Established power plays in negotiations with brand suppliers have become more difficult. Indeed, as retailers have lost their ability to monopolize touchpoints to customers, they have also lost their most powerful negotiation argument in some areas. Brand manufacturers have known how to take advantage of this opportunity: they have professionalized their customer management and today have access to data–based customer knowledge that had long been exclusively controlled by the retail sector. In contrast, many retailers have changed little in the way they manage their procurement activities and are seeing their past negotiation power dwindle. In order to restore the level playing field with manufacturers, they have to revolutionize their procurement functions at multiple levels simultaneously:

— *Organization.* Conventional procurement management dependent on a few core suppliers is no longer enough. Clever retailers set their procurement organizations on a far broader footing and, in particular, endow them with greater agility. Category specialists are replaced by agile, cross-functional teams that link procurement to other functions, such as product development, category management, and supply chain management, and that set the foundations for successful procurement based on sprints.

— *Capabilities.* Agile procurement teams need a broader range of competencies. Negotiation tactics are no longer such a decisive factor; more important are analytical skills, especially in the disciplines of advanced analytics and machine learning, coupled with an extensive understanding of products.

— *Tools.* Retailers have long operated with sell-off and margin analytics that ideally also factor in additional agreements such as advertising subsidies. However, that's not enough in the current environment: procurement officers need a detailed understanding of how much value can be created with each product and what prices are actually feasible in the market, including for well-established products beyond their "brand bonus." Also needed are highly professional requests for quotations for product development, manufacturing, or collaboration agreements with suppliers. This is only possible with the assistance of digital processes and a toolbox that supports procurement in the retail sector with new procedures and technologies.

New tools for every purpose: From the parametric cleansheet to the negotiation cockpit

As they seek to optimize their procurement functions, today's retailers have at their disposal a large spectrum of methodological approaches and digital analytics tools—not just for the procurement of private labels but also for products produced in house, for nonretail goods, and for the procurement of industrial brands. Some of these tools should be standard equipment in every retailer's toolbox, given that they provide the fact base needed for making the best possible procurement decisions. Such tools include analytics tools for determining spending and price variance, a supplier positioning matrix, and the cleansheet—an essential tool for shedding transparency on complex product categories. Beyond that, tried-and-true tools are also used as needed, such as guidelines for

optimizing negotiation tactics or contractual terms and conditions, presentation playbooks, or aids for global procurement (Exhibit 1).

A closer look at a cleansheet analysis helps illustrate the benefits of using digital tools. It sheds light on the dense undergrowth of product components and specifications: it is not unusual for categories to have an excess of 1,000 stock-keeping units (SKUs) and a correspondingly large number of suppliers. That said, many articles within a category are often manufactured and assembled in similar ways—suggesting that considerable savings potential lurks below the surface, and a parametric model could help uncover it. Such a model would help combine similarly manufactured products into clusters and transpose the cost information on individual parts to all others within the product cluster. In this way, the retailer can

quickly calculate the costs for hundreds of products and thereby determine competitive pricing.

Another helpful approach to improve internally manufactured brands in particular is the design-to-value (DTV) method. Innovative tools such as ethnographic consumer research or industry-wide design trend analytics today provide even more detailed insights into what truly drives customers' purchase decisions and what designs are in demand in the market. Equipped with these and other DTV tools, retailers can boost sales, optimize prices, and simultaneously reduce costs—thus ratcheting up value creation for each and every product.

Generally speaking, no procurement officer looking for the best product at the best price can afford to bypass advanced analytics anymore. Take for instance today's grocery sector, where

Exhibit 1

For each step in the procurement process, there are approaches and tools for optimization— both digital and classic ones.

Overview of key tools along the purchasing value chain

Create a fact basis	Conduct request for quotation	Generate ideas and derive positioning	Prepare and conduct negotiations	Document and follow up on negotiation results	Monitor changes and measure impact
● Spend analysis	● Request for quotation	● Defining specifications	● Global sourcing	● Negotiation notes	● Performance tracking
● Price-variance analysis	● E-auction	● Linear performance pricing	● Negotiating tactics		
● Supplier profiles		● Internal idea generation workshop	● Contract terms and conditions		
● Cleansheet		● Global sourcing	● Playbook for presentation		
● Supplier positioning matrix		● Supplier workshop			

algorithm-based machine learning is used to develop complex demand forecasts or agronomic predictive models, compile global cost curves, or analyze market conditions based on geodata. To this end, the tools combine an array of data on market trends or developments in the weather and commodities markets that procurement officers can use to predict the purchasing prices of wheat, for instance.
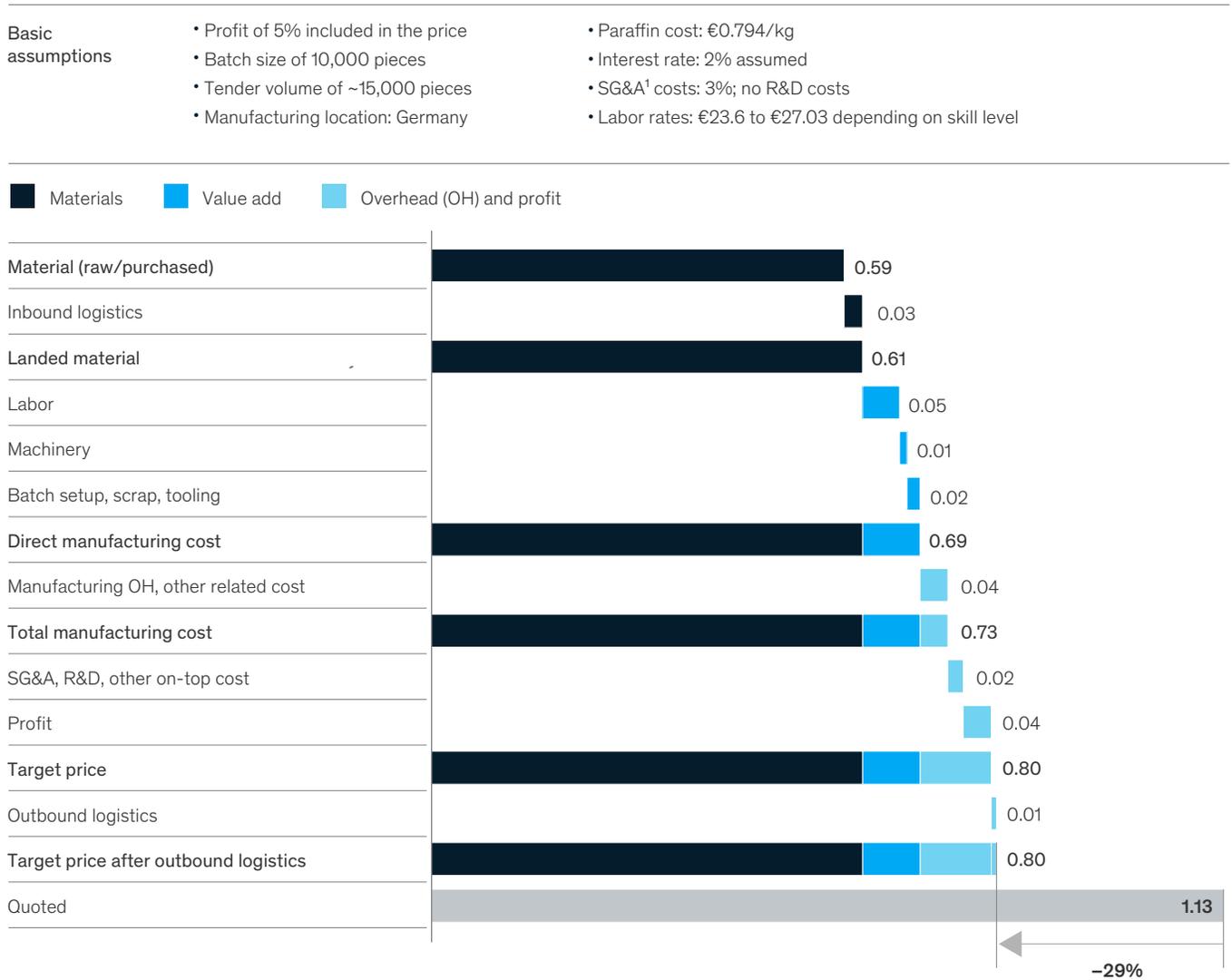
Many tools touched on here can be used both in contract manufacturing and in the in-house production of private-label goods. However, they differ in terms of their range of influence. They

Exhibit 2

Cleansheet analysis reveals high cost-savings potential—especially in procurement of commodity products.

Cleansheet cost calculation for a high-volume candle (private label), € per piece

Basic assumptions	• Profit of 5% included in the price	• Paraffin cost: €0.794/kg
	• Batch size of 10,000 pieces	• Interest rate: 2% assumed
	• Tender volume of ~15,000 pieces	• SG&A[1] costs: 3%; no R&D costs
	• Manufacturing location: Germany	• Labor rates: €23.6 to €27.03 depending on skill level

■ Materials   ■ Value add   ■ Overhead (OH) and profit

Material (raw/purchased)	0.59
Inbound logistics	0.03
Landed material	0.61
Labor	0.05
Machinery	0.01
Batch setup, scrap, tooling	0.02
Direct manufacturing cost	0.69
Manufacturing OH, other related cost	0.04
Total manufacturing cost	0.73
SG&A, R&D, other on-top cost	0.02
Profit	0.04
Target price	0.80
Outbound logistics	0.01
Target price after outbound logistics	0.80
Quoted	1.13

−29%

[1] Sales, general, and administrative expenses.

Source: McKinsey analysis

offer the greatest leverage effect for in-house production, as they can impact the selection of raw materials, the manufacturing process, and even the deployment of personnel. A number of levers are also available for the procurement of private labels. For instance, DTV can be used to manage a product's exact specifications, while procurement tools and e-auctions help find the best suppliers.

Why the effort pays: Big savings potential

A closer look at the levers in procurement clearly shows that private labels offer procurement officers substantially more opportunities for influencing the product than industrial brands. Accordingly, there are greater opportunities for reducing costs and widening margins. It is possible to capture quick savings through the procurement price alone. A cleansheet analysis again helps determine the extent of the potential: in the procurement of a mass article—in the illustrated example, a candle for home use—the difference between the determined target price and the supplier's offer was almost 30 percent (Exhibit 2).

Cost savings can be captured in the medium term by combining procurement sources, switching to other suppliers, or adjusting volumes. By contrast, changing the content or packaging requires more time, although it can likewise prove an effective means of long-term savings.

The effort is certainly worth it. After all, the costs of procurement or manufacture of articles make up as much as 75 percent of the retail price. Professional procurement management with advanced method-ologies and smart tools can make a substantial contribution toward cutting these costs—by more than 10 percent in the case of private labels. Retailers should not miss this opportunity to stretch their margins and maneuver into a stronger market position—because the competition does not sleep.

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Six emerging trends in facilities management

Outsourcing, workplace strategies, and technology innovations hold immense potential for companies seeking to reduce costs and improve productivity in facilities management.

by Stefon Burns, Ella Burroughes, Steve Hoffman, and Alexander Merklein

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For companies with distributed operations— retailers, manufacturers, transportation and logistics—facilities management can represent 10 to 25 percent of total indirect spending. Several recent developments, including fears of a recession, trade conflicts, tech disruption, and rising wages, have made cost cutting a higher priority in this area. But business leaders must strike a tricky balance to reduce noncore costs without affecting the performance of core operations.

Companies have no shortage of options at their disposal to optimize facilities-management expenditures. Outsourcing is a well-established strategy that's on the rise thanks to an influx of vendors, while integrated approaches to facilities management, workplace strategy, and technology all hold promise. The global market for in-house and outsourced facilities management is estimated to reach $1.9 trillion by 2024. The outsourced segment accounts for more than half the total and has attracted a growing number of vendors with new service offerings. Still, charting a clear path forward—one that enables companies to extract the most value—is an increasingly complex task.

How should companies proceed? As a first step, executives must familiarize themselves with how six emerging trends could reduce facilities-management costs and improve productivity. The first three involve the application of existing strategies and approaches; the second three involve using technology to transform the way companies complete tasks. However, these trends aren't plug and play; companies must have the right strategy and capabilities to get the most from them. Facilities management and sourcing leaders should focus on several immediate steps to mobilize their organization and pursue these trends.

The evolution of facilities management strategy

When facing ongoing pressure to reduce operating costs, companies tends to look for savings without giving much thought to the long-term repercussions. This dynamic makes facilities management a particularly ripe target. During challenging economic times, companies trim facilities-management budgets; once the outlook rebounds, spending levels often remain low. This pattern can lead to deteriorating conditions of buildings and equipment, potentially costing more in the long run.

Over the years, industries have accepted outsourcing as a viable option to noncore operations, including facilities management. Companies typically follow a progression that begins with outsourcing noncore activities at individual locations (Exhibit 1). The consolidation, standardization, and bundling of these tasks across facilities over time results in the outsourcing of a comprehensive set of noncore services and management to third parties.

Several economic factors have made outsourcing more relevant for facilities management. Growth is slowing across several large countries as they reach the tail end of the current economic cycle. Far–reaching global trade conflicts have created unexpected changes in commodity and finished product prices. Meanwhile, increased tech disruptions in a handful of industries are pushing legacy companies to free up cash for technology investments. Last, lower unemployment rates are pushing wage rates higher for the best talent. Thanks to these developments, the total market for facilities management (both in-house and outsourced) is expected to grow at more than 6 percent a year from 2018 to 2024, hitting nearly $1.9 trillion (Exhibit 2).

Companies have no shortage of options at their disposal to optimize facilities management expenditures.

Exhibit 1

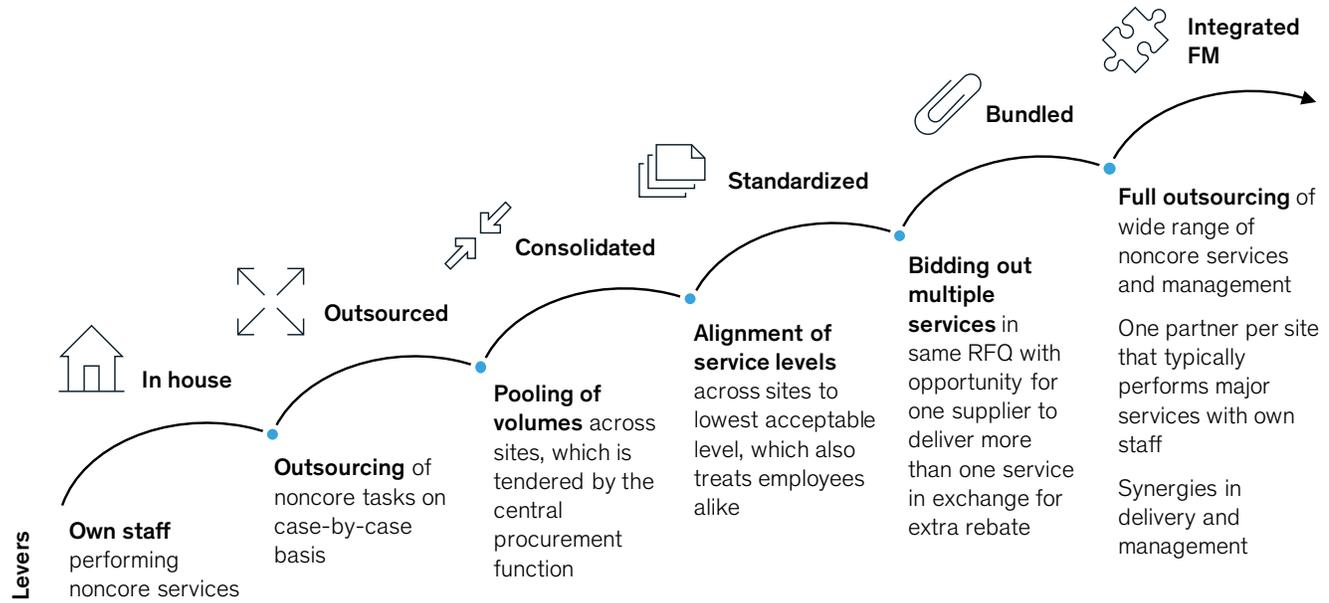# Typical evolution of facilities management (FM) over time.

Savings

In house

Own staff performing noncore services

Outsourced

Outsourcing of noncore tasks on case-by-case basis

Consolidated

Pooling of volumes across sites, which is tendered by the central procurement function

Standardized

Alignment of service levels across sites to lowest acceptable level, which also treats employees alike

Bundled

Bidding out multiple services in same RFQ with opportunity for one supplier to deliver more than one service in exchange for extra rebate

Integrated FM

Full outsourcing of wide range of noncore services and management

One partner per site that typically performs major services with own staff

Synergies in delivery and management

Levers

Exhibit 2

Companies are increasingly outsourcing facilities management (FM).

Global market outlook (in-house and outsourced FM spend), USD billions

6.2% p.a.

Year	Value
2009	846
2012	972
2015	1,134
2018	1,314
2021E	1,599
2024E	1,884
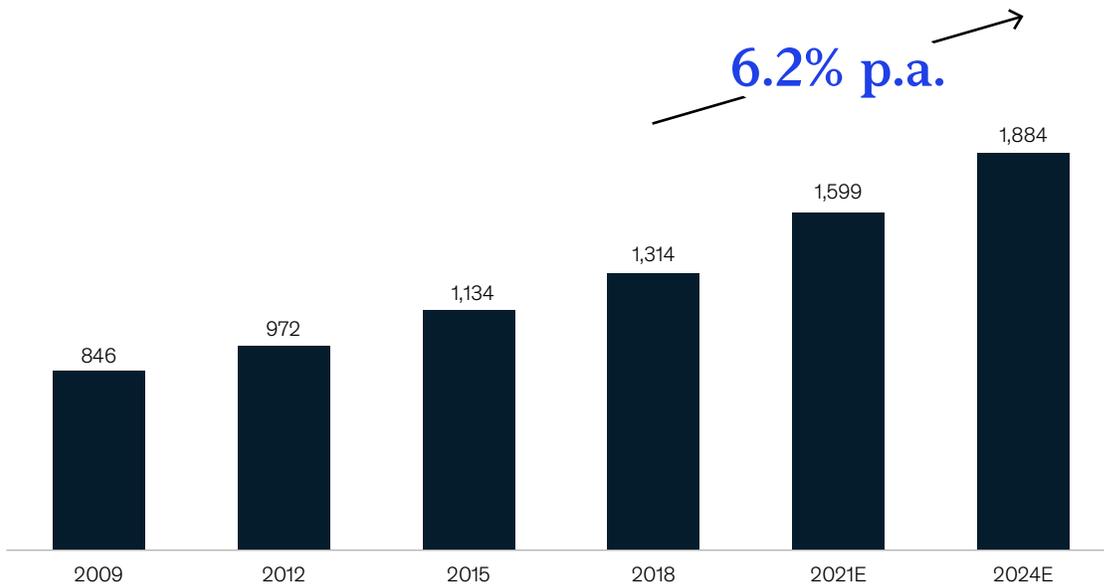
Facilities management is ripe for disruption: it lags behind other functions such as production equipment maintenance by both digital maturity and penetration of technology. Although technology is available for facilities management, several obstacles have inhibited adoption, such as a lack of digital skills within the function, other priorities for leadership, and a focus on continuous cost cutting. These factors have made the facilities management outsourcing market attractive for leading vendors that were already engaged directly or indirectly with this function. Several incumbents have developed an integrated facilities management offering in an effort to capture a greater market share.

Six emerging trends

We have identified six trends that offer cost savings or productivity-improvement opportunities now or that could transform facilities management over the next decade. Since the attractiveness of each trend will depend on an organization's needs and capabilities, the trends are presented in a manner to facilitate evaluation and comparison.

1. Outsourcing facilities management

Organizations are evaluating their operating model to maximize value creation. Before they outsource facility management to third parties, however, they review the appropriate mix of insourcing and outsourcing based on capability, cost, and coverage. Several factors are altering the equation.

— **Growth in outsourcing.** Outsourcing has now surpassed 50 percent of the total facilities management market in several regions, including Europe, the Middle East, and North America.

— **Industry-based adoption.** In manufacturing companies, soft services such as landscaping and janitorial are preferred categories for outsourcing. Hard services such as utility equipment maintenance are typically still insourced. Meanwhile, retail, banking, and other nonmanufacturing industries are looking to first optimize their operating model by balancing insourcing and outsourcing. If the benefits they achieve are not significant, some players in these industries have opted to fully outsource facility management.

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Case study

One large retailer was seeking to prioritize tasks that could be handled more cost-effectively by a third-party vendor. Its team compiled a list of categories that should be kept in house as well as those to outsource. In-house categories were determined based on which tasks could be handled through a shared-services model with high utilization of internal labor. Outsourced categories were defined by current specifications and, separately, by the essential level of service for the organization. It put out an RFP for the outsourced categories with two types of specifications and then selected suppliers that best matched the retailer's needs. This approach reduced facilities-management spending by 15 percent, which was reallocated to support the organization's investment strategy.

— Penetration of integrated facility management (IFM). IFMs are capturing increased market share in outsourcing, particularly in North America, where IFMs are close to 20 percent of the outsourced category.

Implications

— **Cost:** Is your operating model optimized, and do still have better cost performance?

— **Competitive advantage:** Does facilities management provide a competitive advantage over peers?

— **Organizational capability:** Does the company have experienced personnel in facilities management with intrinsic knowledge of the location as well as highly efficient internal technicians that would be challenging for a third party to match?

2. Integrated value and related services

Companies are exploring the integration of facilities management and related services in an effort to streamline management and improve performance. This offering can include the following functions:

— **Real estate.** This category includes all services related to transaction management, project management, and other services.

— **Facilities management.** All of the tasks that are involved in maintaining a facility, such as equipment maintenance and building services.

— **Energy management.** Activities focus on the conservation of energy, including retrofits and procedural changes.

— **Production maintenance.** The maintenance of production equipment comprises areas such as assembly stations, process equipment, and testing stations.

— **Employee services.** Services for employees could include mailroom, fitness center, and cafeteria and food.

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Case study

A global financial institution was spending $450 million annually to maintain its thousands of locations around the world. Its fragmented supplier base included more than 10,000 vendors across about a dozen categories. To assess opportunities for outsourcing, the institution undertook a scoping and prioritization exercise, sought to gain greater transparency into spending categories, applied advanced sourcing techniques, and invested in stakeholder management. With the insights gained from this process, the company was able to consolidate its facilities-management spending from dozens of suppliers to just one vendor, while standardizing business processes and service quality. Adopting integrated facilities management helped reduce costs by more than $150 million over three years.

Implications

— Decision making is easier, as fewer people are involved.

— A comprehensive view of all services with fewer providers eases the management of these categories.

— Suppliers that provide integrated services can become strategic partners for organizations.

Factors to evaluate if the organization should pursue an arrangement with an outsourcing integrator:

— **Cost:** Are costs higher than benchmarks for peers?

— **Geographic portfolio:** Does the company have a diverse geographic footprint?

— **Property portfolio:** Is the property portfolio diverse?

— **Organizational capability:** Does the real estate function have limited capacity or capability?

3. Workplace strategy

Workplace strategy is becoming a key tool to enhance employee engagement and retention. It includes several different categories:

— **Modular work space.** Work spaces can become more modular and activity-based to increase agility and flexibility with the changing workforce while decreasing total square footage.

— **Coworking.** Coworking provides flexibility in selecting the type of space and period of occupancy, which can offer cost savings.

— **Lifestyle amenities.** Lifestyle amenities such as yoga, meditation, day care, recreation rooms, and nap areas have become common features to enhance employee experience.

— **Wellness designs.** Companies can invest in work spaces with appealing acoustics, lighting, furniture, and flooring, among other features.

© Luis Alvarez/Getty Images

Case study

One energy company sought to trim its real estate costs while implementing workplace strategies that would maximize its use of space and accommodate evolving employee needs. It pursued a range of densification initiatives, including doubling up offices for employees of specific positions, converting excess conference rooms to offices, and reducing office sizes for certain functions, such as accounting or reception. It also created "hoteling" zones, where employees could secure work spaces on an as-needed basis.

Through these approaches, it increased the number of available seats by nearly 60 percent without expanding its footprint. As important, an internal survey found that employees viewed this reconfiguration favorably.

Together, these categories form options along the continuums of space and well-being (Exhibit 3).

Notably, trends in this category can increase facilities management costs (for companies that choose to invest more in workspace design), but they could also indirectly compensate for these outlays with higher employee productivity.
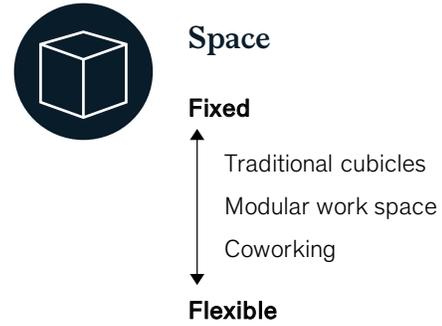
Implications

— When considering workforce strategies, companies need to balance employee engagement and workplace investment.

— Organizations are increasingly looking for suppliers that are capable of maintaining an evolving workplace.

Factors to help organizations determine if revamping the workplace is the right choice:

— **Geographic portfolio:** Is the geographic portfolio of facilities fragmented and consistently changing with customer location?

— **Employee productivity:** Is current employee productivity lower than peer benchmarked levels, and would wellness design and lifestyle amenities have an impact?

Exhibit 3

Space

Fixed

Traditional cubicles
Modular work space
Coworking

Flexible

Wellbeing

Not explicitly considered

Traditional setup
Lifestyle amenities
Wellbeing designs

Addressed through REFM

© yoh4nn/Getty Images

Case study

A mining company sought to increase rig uptime and reduce maintenance spending, which accounted for 25 percent of operating expenses. An analysis determined that top drive and pipe handling accounted for 40 percent of all downtime and 10 percent of all maintenance spending. It then conducted a thorough "digital teardown" to estimate specific opportunities in predictive main-tenance for each component. To support a predictive maintenance deployment, the company focused on five building blocks:

— Strategy
— Technology
— Capabilities
— Organization
— Processes and procedures

Its efforts paid off handsomely: the company created an end-to-end system with real-time data collection, storage, and pro-cessing to enable predictive maintenance. These capabilities enabled it to reduce maintenance spending by 27 percent while increasing revenue from services thanks to higher reliability.

Through these approaches, it increased the number of available seats by nearly 60 percent without expanding its footprint. As important, an internal survey found that employees viewed this reconfiguration favorably.

4. The Internet of Things (IoT) evolution
A number of trends and developments are spurring the adoption of equipment enabled by the IoT by facilities management across a range of applications.

— **Energy efficiency.** The implementation of IoT devices, such as motion sensors for lights and automated temperature controls, enabling more visibility into energy usage and management.

— **Occupant experience.** This factor could be a contributor to the adoption of the IoT.

— **Computing.** Data transmission costs are determining whether edge, cloud, or hybrid computing approach will prevail.

— **Stack ownership.** Companies are trying to own multiple layers of the IoT stack. Hardware infrastructure and software are emerging as preferred ownership models.

— **IoT security.** Security is lagging behind the development of IoT devices and platforms.

Implications

— Companies have to upgrade or retrofit legacy systems before facilities can benefit from the IoT.

— Lingering skepticism about the IoT's impact means that organizations will have to develop multiple use cases to demonstrate the impact of these technologies on occupant experience.

— Companies should consider partnering with suppliers that have an end-to-end vision of the IoT and the capabilities required to convert this vision into reality.

Executives should consider the following factors to determine if now is the right time to adopt the IoT for facilities management:

— **Cost:** Is the cost of IoT conversion in facilities comparable to current expense of maintenance and operations?

— **Change champion:** Do IoT initiatives have C-level sponsors beyond the CIO?

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Case study

Leading companies are in the process of integrating robotics into their facilities-management operations for tasks such as floor cleaning, window washing, and power washing. Innovations in early stages of development include robots for security patrol, lawn mowing, and snow removal, among other tasks. The promise of such robots is threefold: beyond the opportunity to reduce operating expenses, these machines could free up existing staff to focus on higher-value activities while mitigating some of the risk associated with these tasks.

— **Device compatibility:** Can systems be retrofitted with IoT technology?

— **System compatibility:** Is the building-management system (BMS) capable of integrating with devices and software? Does the organization have the data management and security capabilities necessary to support devices equipped by the IoT?

5. Advent of robots

Robotic automation is well suited to take over repetitive and hazardous tasks. Thus far, Asian and European companies are leading in the adoption of robotics for services such as cleaning and security; widespread adoption could occur within the next decade.

— **Repetitive tasks.** Activities that follow the same process every time, such as sweeping a floor, are prime opportunities to integrate robots into operations. Several companies are currently designing and building robots to automate repetitive tasks such as power washing and lawn mowing.

— **Hazardous tasks.** The use of robots for certain jobs—for example, security patrol or HVAC duct cleaning—could enable companies to reduce costs and risk.

Implications

— Applications of robotic process automation are still in the early stages for facilities management.

— Repetitive and hazardous facility-management tasks are prime for disruption by robots.

— Organizations can pilot robots for repetitive tasks or partner with suppliers that have expertise in the deployment and maintenance of robots.

Factors to evaluate if now is the right time to invest in robotic automation:

— **Cost:** Is the cost of owning or leasing a robot less than current costs?

— **Market support:** Has a service supply chain for the equipment been established?

— **Effectiveness:** Is the quality of work similar or better than current processes?

— **Technology maturity:** Will current technology change dramatically in the short term?

Case study

Companies are experimenting with various applications of AR to support workers in selected tasks. A remote assisted maintenance tool kit, for example, includes endoscopic and thermal cameras, a microphone, and a portable computer. With these tools, the equipment operator can connect remotely to an expert, who can guide him through the maintenance procedure. AR maintenance also offers operators support through an integrated helmet with special glasses and software that details proper maintenance procedures.

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Technology players are developing end-to-end AR solutions that have the potential to transform facilities management.

6. Augmented reality

Technology players are developing end-to-end AR solutions that have the potential to transform facilities management.

— **Hardware.** Smartphones and tablets are dominant in the hardware market, while wearables are still in low levels of market penetration.

— **Content source.** Information is limited to content pulled from maintenance manuals and through user interaction. Content sources from devices based in the IoT are also in the early stages and would ideally be enhanced further by data collected from IoT sensors.

— **Interaction.** Information can be visual, instructive, or interactive. Technologies are developing across all areas, but visualization is currently the most mature.

— **Mapping.** While mapping is still limited to spatial tracking, marker-based and shape-imposition technologies are being developed.

— **Software development kit (SDK).** SDKs are well developed for consumer applications such as gaming but are still in the early stages for facility management applications.

Implications

— Augmented reality is still in the early stages of development for facilities management.

— Organizations would have to coordinate across several functions to use AR effectively.

— Companies should work with partners that are actively engaged with AR providers and pilot technology when the market is ready with a solution.

Factors to evaluate if now is the right time to implement AR:

— **Market support:** Has the service supply chain of hardware, software, and content been established?

— **IT infrastructure:** Has IT infrastructure been developed to support AR on a few controlled applications?

— **ROI:** Does technology have a good ROI when considering technician time, number of visits, safety, and ease of process use?

— **Workforce skill level:** Is the current workforce sufficiently technology savvy?

Actions companies can take now

Facilities management leaders can't simply flip a switch to harness these trends. Some companies will need to adjust their strategy, organizational capabilities, and culture. And considering that a few of these trends are still in their infancy, executives should focus on laying the foundation. Several actions can help.

Elevate facilities management to a C-level priority (with a focus on COO/CFO engagement)

Many industries have traditionally kept facilities management on the back burner, but this category can be a gold mine of savings. One company, for example, was under pressure to reduce costs, but the procurement team was skeptical of addressing facilities management because of sensitivities within the organization. The indirect procurement team asked for support from the CPO and COO to back a transformation of facilities management, and this support created an actionable pipeline of savings for the next three years.

Establish a cross-functional team

True cross-functional collaboration between procurement and operations is required to create sustainable impact. Companies should form a team that includes the COO, CIO, a facilities-management leader, a strategic-sourcing leader (for facilities management or innovation), and a project–management office leader, among others. Without alignment, facility-management initiatives face a difficult path. One company's procurement team identified savings during the RFP process and moved to adopt integrated facilities management, but some stakeholders were not on board. During implementation, an operations team found that the prescribed specifications were not aligned with its equipment. Within a few months, the IFM contract was nullified after disagreement between procurement and operations. In another company, procurement leaders were adamant about pursuing IFM. Although it was the right strategy, they first sought to gain alignment and support from the operations team before the process kicked off.

Assess the organizational maturity and capabilities needed to manage vendors and support digital technologies

Capabilities, both from a relationship and content standpoint, are important. Vendor relationships can be built by acting on stakeholder satisfaction surveys, organizing joint meetings with suppliers, and managing supplier performance as a team. Organizations can develop content-based capabilities by introducing supplier-led training on digital technologies and investing in external expert trainings. For instance, a client set up a meeting cadence between suppliers and stakeholders to identify and address issues every quarter.

Build the business case for investment in selected trends

Companies can support the adoption of emerging technologies by doing controlled pilots. Projects that apply AR to simple tasks and experiment with the IoT can get the organization acclimated to technology. Successful pilots can provide the business case for scaling; a similar rationale can be used for opportunities to integrate robots. The hotel industry, for example, is adopting robots for bell service and housekeeping through pilots in certain hotels.

Partner with IFMs, and set up a robust governance mechanism

A company can view IFM suppliers as a partner to achieve savings and manage portfolio, but it must first establish a robust governance mechanism to maintain trust with suppliers. A regular auditing cadence can ensure that any savings are contributing to the bottom line. In addition, companies should make decisions collaboratively with IFMs on topics such as specification standardization and computerized maintenance management system (CMMS) technology. At one manufacturer, a factory manager set up a regular auditing cadence to review IFM initiatives with the finance team to ensure that savings flowed to the bottom line.

Design an implementation road map
Companies should develop a comprehensive, long-term category strategy to incorporate all facilities-management trends. A sequencing exercise can help companies prioritize initiatives. Since technologies will continue to evolve, facilities management leaders should establish a regular strategy review process of all categories to refine and hone their vision.

Traditionally overlooked, facilities management is on the cusp of disruption. Companies that track emerging trends and invest in the right organizational capabilities will be well positioned to reduce costs and increase the impact of their facilities-management spending.

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The end of IT?

Retailers who want to stay ahead of the pack and drive business results through technology innovation are rethinking the setup of their IT departments.

by Marcus Keutel, Gautam Lunawat, and Markus Schmid

"The IT is the problem—as usual!" This complaint is a constant refrain whenever retailers with brick-and-mortar beginnings realize that desired process improvements or (tech) product innovations will be delayed, must take a different form than planned, or won't be realized at all. Usually this statement is true and false in equal measure. It's true because today nearly every change a retailer might make depends on technological solutions—and they often fall below expectations. But it's false as well because the business side often is the root cause. In fact, a joint study by Oxford University and McKinsey of more than 5,000 IT projects identified three reasons behind most failures: inadequate management of the many people involved, investment that is not aligned to business needs, and a lack of transparency regarding the project portfolio.

The biggest stumbling block: Silo structures

Invisible trenches between the IT department and the rest of the company constitute one of the main reasons why brick-and-mortar retailers often struggle far more with technology than their digitally grown counterparts. Many decision makers in traditional companies still see IT as an administrative function positioned somewhere below the CFO, far away from the operative business owners. IT departments like this tend to be places where countless people toil on large monolithic projects and political criteria rather than arguments that help determine how resources are allocated. Business-side practitioners and developers seldom share ideas directly. As a result, this type of IT function is generally unattractive for digital talents, and commercially successful retailers often struggle to build the internal technology competence that they need.

The technological shortcomings that result from this silo structure can threaten retailers' very existence—especially as the demands they face multiply dramatically in the age of digitization, and the digital disruptors like Amazon continue to invest and innovate aggressively. Over the last few years, leading retailers such as Walmart, Tesco, Kroger, and John Lewis have significantly boosted their technology investments in response. However, many retailers still continue to devote less than 1.5 percent of revenue to developing their technology assets.

While higher investment is essential, stationary retailers cannot close the gap to the industry's technology leaders by simply throwing more money on the table. Choosing the right digital model and continuously developing it in a test-and-learn process are far more important. The company must build a modern technology organization supporting the delivery of the best business results. In the end, transforming mind-sets, capabilities, and ways of working is critical not only in classical IT areas such as application development and infrastructure but also in core commercial divisions like sales, merchandising, supply chain, and marketing.

Paths to a modern technology organization

When it comes to organizing IT, stationary retailers might look to digital pioneers such as Amazon or Zalando. They are good role models based on one organizational commitment in particular: for them, joint responsibility for commercial processes and technology development has always been the rule.

Retailers can consider this basic idea and optimize their technological performance in six steps:

1. **Entrust responsibility to small, effective product teams**
    The modern technology organization is not a large IT department organized by systems anymore. Instead, small teams of developers provide technical support for specific business processes, known as "products." For example, individual teams could be built around various products, such as assortment planning (in sales or purchasing), promotions and pricing (marketing), or inventory management (supply chain). The individual products are defined

at such a granular level that a small team of developers can support the process from beginning to end. This approach obviously enables "tearing down the walls" between business and IT. The granular structure also creates an opportunity to connect each of these products and development teams with a counterpart from the business. This type of connection typically increases the effectiveness of the product teams. Thanks to their cross-functional staff, such teams can drive further development independently and be measured against the concrete business results of their work. An overview from one retailer, which has been transforming toward such a structure with approximately 90 product teams, shows just how differentiated the new structure can be (Exhibit 1).

2. **Set up "tech chapters" as new structures within IT**

    The establishment of product teams usually requires a change of the classical IT structures with leaders at the division, department, and team levels. One option that is currently used by many companies is to replace the classical structure with so-called "tech chapters" that manage the professional development of employees in the product teams and recruit new tech specialists. Typically, chapter leads do not influence the content of product development (the "what"). They focus on the methodology and

Exhibit 1

The end of centralized IT: small, effective product teams handle technological development in each business unit.

Allocation of product teams to a retailer's commercial units

1st level	2nd level	Allocated IT product teams (selected)		
Customer	Acquisition			
	Product search and advising	Product presentation	Electronic price display	
	Checkout	Recommendation engine	Web landing pages	
	Service	Product search	Product configurator	
	Loyalty			
Products and services	Assortment management			
	Pricing	Sales forecasts	Order management	
	Supplier management	Demand planning	Availability management	
	Inventory management	Replenishment	Stocktaking	
Supply chain	Warehousing			
	Transport			
	Service fulfillment			
Support	Finance			
	HR	IT security	Identity management	
	IT platform	Data warehousing and reporting	User support	
	Analytics		Development support	

technology (the "how"). In large IT organizations (1,000 employees and more) retailers typically break up the tech chapters, as otherwise the resulting organizational units would become too big and thereby the responsibilities would become unclear. One possibility is to break the tech chapters into domains. For example, one doman, titled "customer," focuses on all customer-facing products. This is an effective way to create meaningful groups of employees that benefit the most from knowledge sharing.

3. **Assign product ownership to the business**
    Instead of throwing requirements from the business over the wall to the IT department, in this model each product team has a product owner in one of the business divisions, such as purchasing, sales, or finance. He or she leads the content of the team's work and, in contrast to most of today's models, is not limited to defining requirements. They determine what their teams work on and initiate the development of further technological solutions that can improve the company's performance in their respective business area. In concrete terms, this means that the head of sales, for example, is responsible for the checkout product team or the head of purchasing has responsibility for the demand planning/forecasting product team. Product owners work with their product teams using agile methods. In such a modern technology organization, product teams and tech chapters work together as needed: product owners directly drive development with a business mind-set, while chapter leads contribute technological know-how (Exhibit 2).

4. **Specify KPIs as standards of success for each team**
    Binding KPIs let product owners and their teams know how their performance is measured and where it needs to improve. Digital retailers have long used this approach to steer their teams: instead of a single target for everyone based on an indicator like overall sales development, each team has its own set of KPIs linked to business performance. This ensures that developers are incentivized in the same way as their colleagues in the corresponding business area. For the marketing team, for example, a KPI could be transaction cost per website visitor, for the search team, the share of search results that result in a purchase, for the recommendation team, sales due to recommendations. By setting targets for indicators like these, retailers ensure that the team's objectives are in line with those of the company as a whole. The KPIs themselves are not new, but using them to explicitly evaluate the content of technology development inspires a much stronger commitment to them—they essentially become the currency that product teams use to both prioritize their activities and demonstrate their usefulness.

5. **Add sponsors at the top management level**
    Ideally, each business division will have a sponsor on the executive board whose involvement includes setting priorities for his or her area. This close connection to top management helps resolve cross-divisional conflicts regarding development priorities early on and reduce the need for coordination at the expert level. Another welcome side effect: technological questions and their prioritization become consequential not only for product owners but for nearly every manager in the company.

6. **Implement a state-of-the-art tech stack**
    To realize the maximum benefit from such a transformation, it is crucial to enable the product teams by reviewing and updating the tech stack in the company. Typically, the result is a rather intensive modernization with a higher degree of modularization. To ensure scalability and allow for rapid change, a shift to cloud platforms and SaaS solutions is inevitable. Further, most companies are working on breaking up their monolithic architecture and moving to microservices with a clear API-first strategy. This will at the same time decrease

Exhibit 2

The technology-driven organization lives from the close interplay between product owners, which determine "what" development will entail, and the tech chapters, which determine "how" it will be done.

Target structure of a technology–based retail company, illustrative example

Product teams		Product owner	Product owner	Product owner
Tech chapter	Agile coach	●		●
	UX[1] designer		●	●
	Architect	●	●	●
	Developer	●	●	●
	. . .	●	●	●

[1] User experience.

the need for manual operations and pave the way to migrate to a DevOps setup, where most product teams are responsible not only for developing their products but also for running them.

In general, we see two alternatives for how companies have implemented a modern technology organization:

"Big bang" refers to changing the full setup all at once. This approach has the advantage of a short implementation timeline; however, it also requires a huge amount of preparation and bears a high risk of disrupting daily operations.

"Step by step" starts with selected domains and is followed by a sequential roll out. This approach enables a test-and-learn environment and provides enough time for the affected employees from the business functions to understand and adapt to the required changes. In most cases the step-by-step approach will be the preferred choice.

New organization, new challenges

Tearing down the walls between business and IT by implementing the transformation steps described here can unleash vast potential. Experience shows that the resulting setup enables companies to develop and use new technologies much more efficiently (see sidebar, "Suddenly fast and reliable: How two retailers benefit from restructuring their IT setup"). At the same time, it frees the classical IT function to focus exclusively on cross-cutting technology topics. Central-expert teams therefore coexist alongside the tech-chapter leads to make decisions on system architecture, ensure data security, and manage relationships with major technology partners. Responsibility for infrastructure, such as cloud computing and data pipes, is another overarching concern that is an important enabler function.

Demands on the CTO as the organization's ultimate technology authority increase as well. The new model requires far greater business foresight, since the CTO must provide the right impetus for

Suddenly fast and reliable: How two retailers benefit from restructuring their IT setup

The experiences of two European retailers show the potential that reorganizing technology structures can set free:

— After making the organizational changes, a housewares retailer was able to complete an order-management module, which had fallen months behind schedule, within budget and in less than two months.

— A food retailer using the new structure managed to develop an entire

technical solution for deliveries to end customers—from the online shop to the management of merchandise, inventories, and the delivery fleet—within ten months. The solution went live on schedule as a result.

In both cases, the key to success was entrusting operational decision makers from the business with the product owner role working with their product teams. It quickly became clear that they could be far more targeted in identifying and

prioritizing requirements when their responsibility expanded from simply operating solutions to shaping them as well. At the same time, this put the responsibility of deciding on potential benefits and costs in one place—an important prerequisite for making technology decisions from a business perspective.

potential digitization initiatives in the organization. Doing so requires not only a person with outstanding capabilities but also one positioned at eye level with the other business unit leaders and top managers. That's why retailers that move towards this structure often decide to make the CTO a board-level role.

The changes laid out here are immense: decades-old structures disappear, hundreds of employees must learn new ways of working, and many managers on the business side become responsible for technology development. Implementing this takes time. Companies may be able to set up business-led product teams in a matter of months, but fully learning the corresponding new behaviors and ways of working can take years. Transformation toward modern technology organizations will only be successful if the top management team wholeheartedly stands behind the journey. Transforming from a classical IT department to a modern technology organization can be a radical step, but taking it can mean the difference between a retailer struggling to survive and one that translates digitization into genuine business success.

Key takeaways
1. For many traditional retailers, digitization and the shift towards omnichannel requires a change from a classical IT function to a modern technology organization.

2. Effective technological development requires many small teams who are responsible for supporting individual business processes (products) end to end.

3. Connecting development teams to the business divisions responsible for the business process in question, including connected KPIs, tears down the walls between business and IT—business and IT have to create impact together.

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