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Zone Pricing

- retailers generate a huge reservoir of rich transactional data from loyalty programs and credit cards
- together with geospatial analytics and competitor price shops -> understand local customer preferences

DETERMINE WILLINGNESS TO PAY What a customer is willing to pay for a product at a given store depends on a long array of factors, including disposable income, living costs, and the ease with which you can purchase the product elsewhere.

CONSIDER COMPETITOR ALTERNATIVES Once the drivers of willingness to pay are understood, the next dimension to consider is the competitor alternatives in the store's trade area.

INCORPORATE CATEGORY AND ITEM- SPECIFIC STRATEGIES Not all categories or items are created equal. Some react similarly to the same drivers such as customer characteristics and competitive alternatives in the trade area; others do not.

- In addition, customers may also have especially high price awareness on certain key value items (KVIs) where price levels will heavily influence total store value perception and customer tract.

Sharing Economy

- Sharing economy is powered by **declining transaction costs**:
 - Smartphones, internet connectivity, and the cloud allow consumers to efficiently search for their desired goods and services, understand the terms, ensure timely logistics, and enforce the agreed-upon contract. Formerly frustrating transactions have become hassle-free.
 - First, smartphone penetration is rising sharply, especially in emerging markets, providing a strong launch pad for sharing services
 - Second, transaction costs will continue to decrease as even more friction is removed from sharing platforms. RentSher solved the hassles of listing and logistics by relying on local labor
- Use Cases:
 - In India and Dubai, RentSher connects consumers who want to rent household

- As our colleague Philip Evans envisions in “Borges’ Map: Navigating a World of Digital Disruption,” “Every person and object of interest is connected to every other.”
- First, within the B2C market, sharing has definitively moved beyond rides and rooms. Startups offering shared workspaces, storage and delivery, and logistics (a category that includes pet sitting and parking spaces) are the third most popular targets of venture funding. Companies in this group, including WeWork and Vrumi, have received nearly \$2 billion in investments. **Vehicle sharing**, which includes peer-to-peer car rentals, centralized car rentals, and bicycle rentals, is the fourth most active group, with nearly **\$810 billion** in investments.
- Next come **fashion startups**, with more than **\$240 million** in funding
- Enforcement. **Blockchain, “smart contracts,” and other code innovations that regulate payment, enforcement, and terms and conditions are rapidly maturing.** A blockchain—a sort of distributed ledger—can help document asset provenance, usage history, and identity. The Ethereum blockchain—one of several competing ledgers—supports smart contracts that automatically release the payment when certain conditions are met.
- The second trend is the expansion of investment activity into the B2B market, with approximately \$150 million invested in new startup ventures, such as the construction-equipment rental business Yard Club. Few industries are immune to falling transaction costs and the rise of sharing-economy business models.
- **Product Design.** Sharing has the potential to reshape product design. Products that represent a compromise among multiple functions—like the minivan, crossover bicycle, or sit-on-top kayak—may fall out of favor, while niche products gain in popularity.
- Usage Patterns. In the case of products for which ownership has been out of reach for many users, sharing is likely to find fertile ground
- Many consumers in these markets have only recently started to have some disposable income, so their buying and ownership patterns are not firmly set. They are willing to rent certain items—such as household appliances (India’s Rentomojo)—that might be surprising to mature-market consumers.
- Could the current sharing economy be just an intermediate phase between a past of traditional ownership and a future of everything as a service (XaaS)?

SaaS

- By the end of 2016 SaaS represented 25% of the total enterprise software market Expected to reach 40% by 2021—a significant milestone to achieve in such a short period of time.
- Customers are enjoying increased flexibility and lower total cost of ownership
- Vendors are seeing a rejuvenation in core businesses and moving from stagnation to growth
- Investors are happy with higher returns as the market values SaaS companies two to three times higher than their on-premise equivalents

Software

Reducing functional, data, and technical complexity involves three key actions:

1. Identifying where redundancies reside
2. Assessing and improving key software characteristics (especially changeability) and risk factors
3. Measuring the impact of IT simplification activities in terms of systems processing capacity, frequency of operational or security failure, total cost of ownership, time to market, and business value.

Measuring the Impact Defining metrics is not enough. To be useful, the metrics must be collected, evaluated, and acted upon. Perhaps most important, they must be leveraged to track the ultimate goal of transforming the impact of a company's IT function throughout the organization.

Cloud Computing

- The cloud is increasingly where large enterprises should be hosting a wide range of applications and platforms, given its cost, capabilities, and flexibility.
 - By adopting the cloud for building and migrating business systems, large enterprises can free their IT teams from managing basic computing infrastructure, such as servers, storage devices, switches, and databases, and empower them to generate greater value by taking advantage of the latest technology and tools.
1. convince themselves of the need to maintain bespoke onpremises computing resources, but the reality is that many cloud providers have developed hyperscale capabilities and advanced technologies that offer a more secure and cost-effective platform than the computer rooms of most large enterprises.

2. To be sure, organizations must identify the right type of cloud—multitenanted public cloud, on-premises private cloud, or any of the many variations in between—for their specific applications and systems.
- While many large enterprises select the cloud to save money—and they do generally save 15% to 40% of IT operating costs—its primary benefits are increased agility and better performance.
 - Speed and Agility. BCG experience suggests that by turning to the cloud, large enterprises are often able to bring out services 30% to 60% faster, compared with creating bespoke in-house infrastructure.

For instance, cloud vendors have built global fiber networks that enable super-fast provisioning and nearly instantaneous access to limitless storage and computational power.

The cloud vendor, rather than IT staff, also conducts automated end--to--end performance and security monitoring. Meanwhile, IT staff can access intuitive state-of-the-art development tools provided by the vendor and open -source community.

- Artificial Intelligence and Machine Learning. The major cloud vendors are among the leaders in scalable, commercial AI and machine learning offerings
- Stream Processing and Internet of Things Applications. The cloud is well suited for applications that identify patterns and insights from devices and sensors in real time.
- Extract, Transform, and Load Data Warehousing Applications. Large enterprises, including a large UK bank and a US telecommunications provider, are increasingly using the cloud to clean up large existing data sets and to host their traditional data platforms (such as Hadoop) in order to improve performance and throughput.

Value Chains Transformation

1. Goods-producing value chains have become less trade-intensive. Output and trade both continue to grow in absolute terms, but a smaller share of the goods rolling off the world's assembly lines is now traded across borders. Between 2007 and 2017, exports declined from 28.1 to 22.5 percent of gross output in goods-producing value chains.
 2. Cross-border services are growing more than 60 percent faster than trade in goods, and they generate far more economic value than traditional trade statistics capture.
 3. Less than 20 percent of goods trade is based on labor-cost arbitrage, and in many value chains, that share has been declining over the last decade
 4. Goods-producing value chains (particularly automotive as well as computers and electronics) are becoming more regionally concentrated, especially within Asia and Europe. Companies are increasingly establishing production in proximity to demand.
- Three forces explain these changes in value chains.
 - a. Emerging markets' share of global consumption has risen by roughly 50 percent over the past decade. China and other developing countries are consuming more of what they produce and exporting a smaller share.
 - b. Emerging economies are building more comprehensive domestic supply chains, reducing their reliance on imported intermediate inputs. Lower global trade intensity is a sign that these countries are reaching the next stage of economic development.
 - c. Global value chains are being reshaped by cross-border data flows and new technologies, including digital platforms, the Internet of Things, and automation and AI
 - **Speed to market is becoming a key battleground**, and many companies are localizing supply chains for better coordination. Rather than keeping suppliers at arm's length, companies can benefit from more collaborative relationships with those that are core to the business.
 - The trends we identify may favor advanced economies, given their strengths in innovation and services as well as their highly skilled workforces. Developing countries with geographic proximity to large consumer markets may benefit as production moves closer to consumers; those with strengths in traded services also stand to gain
 - As automation reduces the importance of labor costs, **the window is narrowing for low-income countries to use labor-intensive exports as a development strategy.**

- Two-thirds of world trade is in intermediate inputs, not final goods and services, underscoring the scale and intricacy of these cross-border production networks.
- Supply Chains:

GOODS

1. Global innovations. Industries including automotive, computers and electronics, and machinery have given rise to the **most valuable, highly traded, and knowledge-intensive of all goods-producing value chains**. They account for **13 percent of gross output but 35 percent of trade**. They involve many sequential steps and intricate components that may require subassembly; in fact, just over half of all trade within these value chains is in intermediate goods rather than finished products. **One-third of the workforce in these value chains is highly skilled**, a share that is second only to knowledge-intensive services. Spending on R&D and intangible assets averages 30 percent of revenues, two to three times the figure in other value chains. Participation in these value chains is highly concentrated in a small set of advanced economies, although China's role is growing. On average, just 12 countries account for 75 percent of exports.
2. Labor-intensive goods. These value chains, including textiles and apparel, toys, shoes, and furniture, are highly labor- and trade-intensive. **More than two-thirds of income goes to labor, most of which is low-skill**. Given their light weight, the products in these industries are highly tradable, and 28 percent of global output is exported.
3. Regional processing. Industries in this archetype include fabricated metals; rubber and plastics; glass, cement, and ceramics; and food and beverage. These value chains use relatively few intermediate goods. But with the exception of food and beverage, **more than two-thirds of the output they produce becomes intermediate input feeding into other value chains, particularly global innovations**.
4. Resource-intensive goods. This archetype includes agriculture, mining, energy, and basic metals. These value chains generate \$20 trillion of gross output annually, nearly as much as global innovations value chains

SERVICES

1. Labor-intensive services. **These value chains include retail and wholesale, transportation and storage, and healthcare**. Given the in-person nature of these services, trade intensity is low, but trade is growing faster than in any other archetype. Trade in transportation services, for example, has increased with the rise of goods trade, tourism, and business travel; rising trade in wholesale and retail reflects the global expansion of retailers such as Carrefour and Walmart.

These value chains are the largest job creators after agriculture, employing more than 740 million people (23 percent of the global workforce), two-thirds of whom are in wholesale and retail trade.

2. Knowledge-intensive services. These high-value industries include professional services, financial intermediation, and IT services. More than half of the people employed in knowledge-intensive services have bachelor's degrees or above. **Although they would seem to be inherently unconstrained by geography, these value chains have lower trade intensity than goods-producing industries, largely due to regulatory barriers.** The trade flows that do occur span the entire globe since costs are not directly related to distance.

- In all value chains, capitalized spending on R&D and intangible assets such as brands, software, and intellectual property (IP) is growing as a share of revenue. Overall, it rose from 5.4 percent of revenue in 2000 to 13.1 percent in 2016. This trend is most apparent in global innovations value chains.
- ONE OF THE FORCES RESHAPING VALUE CHAINS IS A CHANGE IN THE GEOGRAPHY OF GLOBAL DEMAND The map of global demand, once heavily tilted toward advanced economies, is being redrawn—and value chains are reconfiguring as companies decide how to compete in the many major consumer markets that are now dotted worldwide. According to current projections, emerging markets will consume almost two-thirds of the world's manufactured goods by 2025, with products such as cars, building products, and machinery leading the way. 1
- The biggest wave of growth has been happening in China, although there have been recent signs of slowing. Previous MGI research highlighted China's working-age population as one of the key global consumer segments; by 2030, they are projected to account for 12 cents of every \$1 of worldwide urban consumption. As it reaches the tipping point of having more millionaires than any other country in the world, China now represents roughly a third of the global market for luxury goods. In 2016, 40 percent more cars were sold in China than in all of Europe, and China also accounts for 40 percent of global textiles and apparel consumption.
- As consumption grows, more of what gets made in China is now sold in China (Exhibit E6). This trend is contributing to the decline in trade intensity. Within the industry value chains we studied, **China exported 17 percent of what it produced in 2007. By 2017, the share of exports was down to 9 percent.** This is on a par with the share in the United States but is far lower than the shares in **Germany (34 percent)**, South Korea (28 percent), and Japan (14 percent). This shift has been largely obscured because the country's output, imports, and exports have all been rising so dramatically in absolute terms. But overall, China is gradually rebalancing toward more domestic consumption.

- Automation and additive manufacturing change production processes and the relative importance of inputs. Previous MGI research has found that roughly half of the tasks that workers are paid to do could technically be automated, suggesting a profound shift in the importance of capital versus labor across industries.
- Service processes can also be automated by artificial intelligence (AI) and virtual agents. The addition of machine learning to these virtual assistants means they can perform a growing range of tasks. Companies in advanced economies are already automating some customer support services rather than offshoring them. This could reduce the \$160 billion global market for business process outsourcing (BPO), now one of the most heavily traded service sectors.
- Regardless of the strategy, a key point is to maintain control, trust, and collaboration in all parts of the value chain. For some companies, this might mean bringing more operations in-house. Those that outsource need to re-evaluate supplier relationships and management (see below).

STRATEGIES

1. Consider how to capture value from services. Across multiple value chains (including manufacturing), more value is coming from services, whether software, design, intellectual property, distribution, marketing, or after-sales services. Shifting to services can offer advantages: smoothing cyclicalities in sales, providing higher-margin revenue streams, and enabling new sales or design ideas due to closer interaction with customers.
2. At its extreme, entire business models shift from producing goods to delivering services (for example, from selling vehicles to offering transportation services, or from selling packaged software and servers to selling cloud subscriptions). To excel in services, companies need to gain insight into customer needs, invest in data and analytics, and develop the right subscription, per-use, or performance-based service contracts.
3. Reconsider your operational footprint to reflect new risks. One of the most important considerations is where to locate operations and invest in new capacity. The calculus that held in the past is different today. New automation technologies, changing factor costs, an expanding set of risks, and the need for speed and efficiency are all driving regionalization in many goods-producing value chains.
4. Be flexible and resilient. Today companies face a more complex set of unknowns as the postwar world order that held for decades seems to be giving way. There is a real chance that tariffs and nontariff barriers will continue to rise, reversing decades of trade liberalization. Tax codes are being reconsidered to account for flows of data and intangibles.
5. Prioritize speed to market and proximity to customers. Companies in all industries now have a wealth of real-time, granular sales and consumer behavior data at their disposal,

but it takes manufacturing and distribution excellence to capitalize on these insights. Speed to market enables faster responses to what customers want and less product waste from forecasting errors.

6. **Build closer supplier relationships. In the last era of globalization, the fragmentation of value chains and the trend toward offshoring led many companies into arm's-length relationships with suppliers across the globe. But that approach involved hidden risks and costs.** It makes sense to identify which suppliers are core to the business, then solicit their ideas and deepen relationships with them. With a growing share of product value being provided by the supply chain, firms that genuinely collaborate can secure preferred customer status and benefit from new product ideas or process efficiencies bubbling up from suppliers. Large firms can also bring about systemic changes along the value chain, improving labor and environmental standards.
- There is reason to believe many advanced economies may have already made it through the worst of the disruption stemming from the globalization of value chains. The structural shifts described in this research favor countries with skilled workforces, service capabilities, innovation ecosystems, and lucrative consumer markets—all of which line up with the comparative advantages of advanced economies. These countries will also benefit from the rise of consumers in developing countries if they can tap into export demand. These trends could be good news, especially for highly skilled workers and those in service industries.
- Across advanced economies, however, outlooks and priorities vary. Those with **strong service sectors and exports**, such as the United States, the United Kingdom, France, and Sweden, should be able to **capitalize on their existing strengths as trade grows** in industries such as IT services, business services, healthcare, and education. In contrast, **those that excel mainly in global innovations value chains**, such as Germany, Japan, and South Korea, may find a more **challenging environment** ahead as China expands its capabilities and surpluses in these industries.

Lean Production

- To address this imperative, many companies have started to explore the opportunities lean engineering offers: they are adapting lean methods that are used in production and administration and applying them to product development. The companies that were first to master lean engineering have gained significant competitive advantages by developing higher-quality products in up to six months less time, while reducing deviations from product target costs by more than 35 percent.
- Our analysis shows that automotive and engineered-product companies can successfully apply the “agile” methodology widely used by product development teams in software and IT industries. **Agile uses fast, iterative development cycles over the course of the project. The objective is to develop a viable product—often referred to as a “minimum viable product”—quickly and then to improve it through reiteration.**
- Engineering-specific KPIs—such as person hours or budget—are usually available but are not clear and meaningful enough to enable stringent, fact-based project steering. Design reviews occur too late in the process to allow for effective steering.
- **Modularization of product architecture**, platforms, and components has been on the automotive industry’s agenda for decades. Companies that capture product functionality in distinct modules and reuse them across products can reduce costs, improve quality, increase the number of potential products offered, and accelerate the speed of development.
- We found that the “true” degree of modularization—measured by the share of products built from a modular system—is less than 40 percent in the automotive industry. (See Exhibit 4.)
- Most machinery manufacturers employ modularization, but the best performers in this capability go one step further: **they maximize reutilization and synergies by creating optimal combinations and permutations of modules.** This allows them to utilize carryover parts not only within product groups but also among product lines and families.
- By employing a “fail fast” mentality in short cycles, the agile methodology enables teams to learn quickly from any missteps and apply the lessons to ensure that the development process stays on a path toward the “right” product for the market. Short cycles and iterative feedback loops enable fast recalibration and continual course correction at all stages of the development process.
- Teams employ a divide-and-conquer mind-set, splitting tasks into deliverables that are manageably produced within a short time frame.

- Scrum method, a project is divided into two- to four-week “sprints.” In each sprint, the team develops a potential prototype for the final product, integrating regular feedback. Roles are clearly defined: the “**product owner**” formulates and prioritizes product requirements and provides feedback; the development team works on designing the product; and the **ScrumMaster manages the process**. Scrum processes are designed to be **flexible and adaptable**. Rather than enforcing adherence to rigid processes, the goal is to empower people to collaborate and make decisions quickly and effectively.
- The use of Scrum can be complemented by the **kanban work-management system**, whereby the workflow is split into sequences—from the definition of a task to its completion. These sequences are publicly displayed on a kanban board

Starting the Journey

1. A lean transformation of the product development process requires a comprehensive program that builds capabilities in each dimension of lean engineering. Companies starting the journey should seek to emulate the approaches applied by lean champions.
2. Product. Lean champions design a modular, standard portfolio that spans all product lines. By designing reusable modules, or components, and facilitating their utilization, champions reduce the engineering effort and resources required for each project and product. They adjust their operating model
3. Processes. Lean champions embrace agile processes and a fail-fast mentality rather than waiting for market feedback at the end of a single, long development phase. They regularly visualize the entire engineering process to achieve a comprehensive understanding of the nature, timing, and interdependencies of all process steps.
4. Leadership and Behavior. Lean champions typically enable teams’ cross-functional collaboration by creating standard feedback loops and information flows.
5. Enablement and Tools. Lean champions create and implement tools that support their objectives for faster development processes.

Adaptive Supply Chains

- Tight alignment between business strategy and supply chain strategy is a hallmark of leading companies
- Burberry has reversed its fortunes in the past six years by focusing on **faster time-to-market, greater cost advantage**, innovative collections, new store layouts, and a synchronized monthly flow of new products, strongly supported by the company's considerable investment of time and money in its IT systems and its supply chain

The result is a confluence of trends in eight areas that are affecting how companies design and operate their supply chains:

1. Customization and Diversity. Increased customization and personalization of product and service offerings are boosting supply chain complexity.
 2. Consumer Connectivity. Social media and mobile commerce are driving multiple new channels and greater volatility in consumer demand.
 3. Differential Growth and Inflation. Growth in developed markets and China is slowing down whereas other markets are aptly described as rapidly developing economies; differential trends in global labor costs are shifting the sources of low-cost production.
 4. Margin Pressure. Slowing growth in many industries and regions is driving a greater focus on containing costs and reducing working capital.
 5. Information Economics. Technologies such as sensors, big data, and analytics are making it easier to coordinate supply chain activities across regional and company boundaries.
- More and more companies—including Kraft Foods Group, Mars, Wm. Wrigley Jr., Nike, Adidas America, Dell, Ford Motor, BMW, and Apple—are launching customized products. The Internet is now peppered with mass-customization providers across a variety of sectors, but the trend extends to the physical world as well.
 - In the past, settling on a supply chain strategy typically meant that a company made tradeoffs among costs, assets, speed, and service levels and then hard-wired those tradeoffs into its supply-chain operations in pursuit of performance improvements

Supply Chain

1. Strategic Intent

This first element involves determining and regularly reviewing how the supply chain will support and reinforce a company's competitive advantage. The demands that the

business places on the supply chain are normally a combination of service, agility and speed, and cost and capital requirements, and they will vary within each location, market, product segment, and sales channel in which the business operates. Finally, the strategic intent must be clearly translated into specific objectives and targets, which are agreed on and communicated throughout the supply chain.

2. The second key element of an appropriate strategic response is a clearly designed and fully engaged end-to-end supply chain ecosystem: the universe of participants required to execute and deliver on the business's supply-chain intent. All the key players must understand the part each plays in the whole.

Supply Chain Execution Capabilities

If companies are to respond to the trends transforming supply chain operations, they need to develop a rich and diverse set of capabilities, in three areas.

1. First, companies need to build high-definition demand responsiveness into their supply chains to clearly and transparently identify and analyze rapidly changing market signals and respond to them quickly.
2. Second, smart deployment is critical if supply chains are to be organized in a way that helps companies win in their various markets.
3. Third, supply chains need to incorporate the planned resilience necessary to respond to external shocks without disrupting operations.

Nike, for instance, designs its supply chain differently depending on the type of shoe being made. At the high end, it collaborates with its suppliers to ensure quality and speed to market and then hands over manufacturing to the supplier, while carefully coordinating supply through monthly orders. At the low end, Nike allows very little involvement of suppliers in the design, preferring to drive out costs by using several suppliers, and leaves suppliers to cope with spikes in demand through their own production planning.

- None of these practices would be possible without the ability to integrate real-time data on demand with information about inventory levels and then to share the results with suppliers and others to optimize planning, procurement, replenishment, and other processes.
- Few industries have been more affected by the rapid changes in the nature of consumer demand, or by the resulting need for accurate and transparent data, than makers of consumer goods. That's why, as early as 2007, U.S.-based Kimberly-Clark began transforming its supply chain, with the help of Terra Technology, from the traditional model, where demand data followed the physical flow of material, to a much more responsive, demand-driven model in which real-time data are available at any point in the supply chain simultaneously.

Most supply-chain executives we have spoken with recently have pointed to scarcity of talent as a serious challenge. Supply chains are complex organisms. They play a vital enabling role in

rapidly evolving business models, even as they are becoming more exposed to a barrage of external forces, from increased volatility in inputs and demand to the use of new technologies such as big data, cloud computing, and 3-D printing; from more and more product variants to evolving macroeconomic maps and increased spread across locations.

Managing the supply chain effectively requires not only technical skills but a holistic and systematic business approach, a real understanding of how all the pieces fit together, and an ability to adapt as the environment and technology change.

Sustained supply-chain excellence, however, is not only about effective design and execution. The name of the game is adaptability: recognizing and responding to changing conditions.

Leading companies don't simply wind up their supply chains and let them run. Instead, they regularly review their supply chains' strategic intent, understand the impact of that intent on their newly implemented and ever-evolving supply-chain ecosystems, and continually adapt—and sometimes rip out and replace—elements of the supply chain in the relentless pursuit of business advantage.

Questions

1. How well will your supply chain support your business strategy in an uncertain world?
2. Is the role that the supply chain needs to play in order to support your business strategy clearly and explicitly understood?
3. Is this understanding shared across management, and is it reviewed regularly?
4. Does your supply-chain ecosystem give your company the right performance across cost, speed, service quality, and risk?
5. Have you identified the key partners outside your company and the relationships you need to develop with them?
6. Are the roles of the end-to-end supply-chain ecosystem mapped and understood?
7. Are key suppliers and channel partners involved and incentivized in line with the strategy?
8. How well does your company's supply chain identify, analyze, and respond to signals from the market? What is the level of end-to-end data integration?
9. Does your company understand the potential external shocks that present the most significant risk to its business?
10. Is there a response strategy in place for each area of risk?
11. Are the supply chain's capabilities and infrastructure sufficiently adaptive—able to respond quickly to changing business needs and risks?
12. Is there a process in place to systematically review alignment on a regular basis?

Pre-emptive Transformation

- “Cure the disease that has not yet happened” —Chinese saying vs. “If it ain't broke, don't fix it.”

- If a company embarks on a transformation when it is outperforming its industry (as measured by TSR over the past year), the transformation can be described as preemptive
- Even though Taobao was highly successful, Alibaba in order to participate in three possible futures for e-commerce: one for consumer-to-consumer transactions (Taobao), one for business-to-consumer transactions (Tmall), and one for product search (Etao)
- The results show that transforming preemptively as opposed to reactively is actually the most important success factor—in other words, timing is the best predictor of success. (For preemptive transformations, R&D spending is the second-most-important success factor; for reactive transformations, leadership change is the second factor.)
- In preemptive transformations, R&D expenditure and capex are the next-most-decisive factors, reflecting a need to properly understand and invest in the future

Six Steps to Successful Preemptive Change

1. Constantly explore
2. Create a sense of urgency
When a company is doing well, danger lies in self-satisfaction. Leaders shouldn't wait for an actual crisis to mobilize. Creating a sense of is the best way for leaders to preempt the risk of complacency
3. Watch out for early-warning signals
Most financial metrics, such as earnings, profits, or cash flow, are backward looking
4. Create transformation capabilities
Moving quickly against risks and opportunities is essential. This requires building permanent transformation capabilities and strengthening the adaptability of the organization.
5. Control the narrative
Preemptive change may generate frictions with stakeholders who believe that prudence and continuity are the best policies. Leaders should take control of the investor narrative and actively manage investor expectations in order to make preemptive transformation feasible
6. Choose the right approaches to change. Companies tend to drive change with a monolithic, linear project-management mindset. But there is no universal form of change. In reality, a complex business transformation, each requiring a different mindset and different change management mechanisms.

Gig Economy

- gig economy is often perceived as a fast-growing threat to employment stability and labor rights, promoting low-grade, low-paid jobs that offer workers little of the appeal or

dignity of traditional employment

- Public policy discussions and media articles often portray digital labor-sharing platforms—such as Uber, TaskRabbit, and Upwork—as a rapidly expanding source of real or potential exploitation, undermining the job and social security infrastructure established in mature economies a century ago.
- Often they freelance in addition to other work or full-time employment. For many freelancers, gig platforms fulfil goals, preferences, and needs beyond compensation. Those benefits, they said, include greater autonomy and flexibility in their work and private lives and better choices of work projects.
- Twago grew to become Europe's largest freelance marketplace, with over 500,000 ready-to-work freelancers, before being acquired in 2016 by Randstad, the large Dutch temporary-work company. In 2018, with Randstad's support, the company added a second solution: twago Talent Pool, which creates and manages bespoke gig labor platforms under the brands of its corporate clients.
- Embrace gig work and labor-sharing platforms to increase your company's flexibility. When it comes to sourcing scarce skills and talent, and responding to changing customer demands, these platforms can be valuable tools. Gig platforms already offer access to significant parts of the workforce in all industries.
- Map the skills your organization has and those it lacks. Our client work in re-skilling has taught us that many companies lack the basic data needed to map current skills and a foresight function to determine future skill requirements. Those tools would enable leaders to source critical skills and determine where and why freelancers fit into the picture—for flexibility, speed, cost arbitration, or talent access.
- Define your freelance sourcing strategy. You can either tap into existing labor-sharing platforms and networks or build your own. When using existing networks, companies should be deliberate in choosing those affiliated with high-quality freelancers who know the company's work processes and procedures.
- Don't just hire freelancers—integrate them. To get the most out of freelancers and make them want a return engagement—companies need to adopt new capabilities, support systems, and ways of working.

Data Driven Transformation

- There is a better way to approach data transformation

- In our experience, these initiatives can succeed only if they are **cost effective, incremental, and sustainable**.
- Transformations should start with pilots that pay off in weeks or months, followed by a plan for tackling high-priority use cases, and finishing with a program for building long-term capabilities. Working with clients across industries, we have developed a three-phase approach to data-driven transformation.

Five critical steps for a successful data transformation

1. Build a vision. When planning a data-driven transformation, a company must set the appropriate vision for its business.
2. Select the portfolio of initiatives. Using its vision and its list of macro projects for reference, companies can create a full list of transformational initiatives.
3. Devise an analytics operating model. Before investing in new data analytics capabilities, a company should specify how it wants the data analytics function to work.
4. Establish data governance. To ensure the quality and integrity of the data it will use for business decisions—with and without human intervention—a company must have strict governance rules and a data governance structure.
5. Define data infrastructure. A company moving toward data transformation should address the following questions: Can our current infrastructure support our future data value map? Should we make or buy?
6. Define new roles and governance rules. To ensure the sustainability of the benefits it obtains through the adoption of new digital processes, a company needs to make clear who has responsibility for building and running new systems and maintaining specific types of data—and how to manage those people.
7. Build a data-first culture. Not everyone needs to become steeped in data analytics or learn to code in order for digital transformation to work. However, everyone does need to adopt a less risk-averse attitude.
8. Adopt agile ways of working. The entire organization does not have to become expert in agile, but the company can adopt many of the tactics of the agile method and use them in everyday operations to increase the organization's responsiveness and adaptability.
9. Cultivate the necessary talent and skills. For data-based transformation to work, the company must have talent with the right skills to execute data-driven strategies and manage data-based operations.

Using Agile to Fix Big Data's Problem

- Organizations can overcome these challenges, however, by incorporating agile practices throughout big data analytics projects. If they do, they can better focus on both their internal and external customers
- At their best, big data analytics detect patterns that would require considerably more time and effort to uncover using traditional analytics tools
- The heart of the problem is the manner in which big data analytics are developed. Most are built sequentially, applying the waterfall method of project management traditionally used in software development. In the waterfall method, data scientists acquire, verify, and integrate data; develop a model or algorithm to test it; run the test; and then either act on the results or continue refining the model. Work on one task waits until the preceding task is finished.
- Frustrations with the waterfall method eventually led software developers to improve the process by adopting agile ways of working. Agile calls for working in a way that is iterative, empirical, cross-functional, focused, and continually improving
- Common agile methods include assembling cross-functional teams, which improve communications and reduce handoffs, especially when team members work in the same location. They also include developing minimum viable products (MVPs), rapid updates, and frequent feedback to ensure that the finished product delivers on expectations and goals.

Features:

1. Rapid Experimentation. Historically, testing occurs near the end of big data projects, which means that business executives might not see results until then.
2. Early Customer Feedback. The overriding goal of big data projects is not to build brilliant mathematical models but to solve practical business challenges or discover insights leading to actions that could benefit customers
3. Cross-Functionality. Traditional big data projects fail most often for reasons that are largely unrelated to data analysis. In our experience working with clients, 70% of a cross-functional team's efforts reach beyond strict analytics into the business processes, operational behaviors, and types of decision making that the analytics suggest.
4. People Empowerment. In a traditional big data project, a project manager decides which priorities are most important and how they will be met—even though he or she may not understand the development process

- The algorithm is not the finished product. An algorithm can be a thing of beauty or a waste if it cannot deliver results-oriented output in a way that a business department or organization can understand
- MVPs are distinct from prototypes. Prototypes come first and generally are built with historical data in order to verify that an algorithm can do what it is supposed to do. If a prototype works, it is used as the frame for a more all-encompassing MVP that could potentially be released to end users. An MVP also includes up-to-date data, a user-friendly interface, core features, and operating instructions.
- Stakeholders must accept imperfection. The iterative nature of agile development means that works in progress might not look great or perform as well as possible.
- Include more than just data science personnel. Agile teams should include a mix of talent assembled on the basis of need rather than on a standard structure or past experience. **As a general rule, it makes sense to staff a project team with data engineers who can prepare the data, data scientists who can conduct the analysis, designers who know how to present the data, and a variety of business personnel who are familiar with the project's business objectives and implications for existing processes.** The goal is to blend people's talents into a whole that is greater than the sum of its parts.

Additive Manufacturing

Additive manufacturing—also known as 3-D printing—certainly represents a significant change in the way items can be produced.

- As opposed to traditional injection molding, casting, or other “subtractive” manufacturing processes, additive manufacturing takes a digital file and creates three-dimensional objects by printing successive layers of materials that are then modified slightly to create the desired end product
- The enthusiasm about additive manufacturing does have merit. In recent years, rapid technological advances have driven down the costs of equipment and materials, making 3-D printing increasingly accessible.
- The fast-growing market for additive manufacturing is projected to exceed \$5 billion by 2016, according to Credit Suisse.
- Additive-manufacturing materials are prohibitively expensive for most high-volume manufacturing applications, often more than offsetting any benefits that may be derived from any reduced labor that additive manufacturing confers.
- Prototyping and Tooling. Additive manufacturing is most established in the area of prototype development and specialized tooling. These applications are uniquely suited to additive manufacturing: they require a high degree of customization, their production volumes are low, the performance and durability requirements of the materials they use are relatively modest, and their lead-time requirements tend not to be stringent.
- Mass Customization. For custom-made products that can command premium prices from buyers, additive manufacturing offers advantages over traditional manufacturing.
- Cutting-Edge Manufacturing. A third cluster of applications in which additive manufacturing is being adopted is high-value, complex end-use parts. Such cutting-edge manufacturing operations are primarily found in the aerospace and defense sectors. In many ways, cutting-edge manufacturing is the “sweet spot” of additive-manufacturing technology.
- To identify opportunities to use additive manufacturing to create and capture value, companies should first assess which aspects of their operation fall within the current clusters of adoption.
A next step is to determine whether additive manufacturing, in instances where it makes sense, is consistent with an organization’s future manufacturing strategy

Industry 4.0

- **Big Data and Analytics** Analytics based on large data sets has emerged only recently in the manufacturing world, where it optimizes production quality, saves energy, and improves equipment service. In an Industry 4.0 context, the collection and comprehensive evaluation of data from many different sources—production equipment and systems as well as enterprise- and customer-management systems—will become standard to support real-time decision making.
- **Autonomous Robots** Manufacturers in many industries have long used robots to tackle complex assignments, but robots are evolving for even greater utility. They are becoming more autonomous, flexible, and cooperative. Eventually, they will interact with one another and work safely side by side with humans and learn from them. These robots will cost less and have a greater range of capabilities than those used in manufacturing today.
- **Simulation** In the engineering phase, 3-D simulations of products, materials, and production processes are already used, but in the future, simulations will be used more extensively in plant operations as well. These simulations will leverage real-time data to mirror the physical world in a virtual model, which can include machines, products, and humans. This allows operators to test and optimize the machine settings for the next product in line in the virtual world before the physical changeover, thereby driving down machine setup times and increasing quality.
- **Horizontal and Vertical System Integration** Most of today's IT systems are not fully integrated. Companies, suppliers, and customers are rarely closely linked. Nor are departments such as engineering, production, and service.
- For instance, Dassault Systèmes and BoostAeroSpace launched a collaboration platform for the European aerospace and defense industry. The platform, AirDesign, serves as a common workspace for design and manufacturing collaboration and is available as a service on a private cloud. It manages the complex task of exchanging product and production data among multiple partners.
- **The Industrial Internet of Things** Today, only some of a manufacturer's sensors and machines are networked and make use of embedded computing. They are typically organized in a vertical automation pyramid in which sensors and field devices with limited intelligence and automation controllers feed into an overarching manufacturing-process control system. But with the Industrial Internet of Things, more devices—sometimes including even unfinished products—will be enriched with embedded computing and connected using standard technologies.

- **Cybersecurity** Many companies still rely on management and production systems that are unconnected or closed. With the increased connectivity and use of standard communications protocols that come with Industry 4.0, the need to protect critical industrial systems and manufacturing lines from cybersecurity threats increases dramatically. As a result, secure, reliable communications as well as sophisticated identity and access management of machines and users are essential.
- **The Cloud** Companies are already using cloud-based software for some enterprise and analytics applications, but with Industry 4.0, more production-related undertakings will require increased data sharing across sites and company boundaries.
- **Additive Manufacturing** Companies have just begun to adopt additive manufacturing, such as 3-D printing, which they use mostly to prototype and produce individual components. With Industry 4.0, these additive-manufacturing methods will be widely used to produce small batches of customized products that offer construction advantages, such as complex, lightweight designs. High-performance, decentralized additive manufacturing systems will reduce transport distances and stock on hand.
- **Augmented Reality** Augmented-reality-based systems support a variety of services, such as selecting parts in a warehouse and sending repair instructions over mobile devices. These systems are currently in their infancy, but in the future, companies will make much broader use of augmented reality to provide workers with real-time information to improve decision making and work procedures.
- **Quantifying the Impact: Germany As an Example**
 - **Productivity.** During the next five to ten years, Industry 4.0 will be embraced by more companies, boosting productivity across all German manufacturing sectors by €90 billion to €150 billion.
 - **Revenue Growth.** Industry 4.0 will also drive revenue growth. Manufacturers' demand for enhanced equipment and new data applications, as well as consumer demand for a wider variety of increasingly customized products, will drive additional revenue growth of about €30 billion a year, or roughly 1 percent of Germany's GDP.
- Along the value chain, production processes will be optimized through integrated IT systems. As a result, today's insular manufacturing cells will be replaced by fully automated, integrated production lines.
- As manufacturers demand the greater connectivity and interaction of Industry 4.0-capable machines and systems in their factories, manufacturing-system suppliers will have to expand the role of IT in their products. Changes will likely include a greater modularization of functionality with deployments in the cloud and on embedded devices. With increases in the overall functionality and complexity of systems comes the need for a greater distribution of decision making.

- In addition, online portals for downloading software and collaborative partner relationships may offer more flexible and adaptable equipment configurations. Automation architectures will also evolve for different use cases. Suppliers will have to prepare for these various scenarios and support these shifts.
- The Way Forward Industries and countries will embrace Industry 4.0 at different rates and in different ways. Industries with a high level of product variants, such as the automotive and food-and-beverage industries, will benefit from a greater degree of flexibility that can generate productivity gains, for example, and industries that demand high quality, such as semiconductors and pharmaceuticals, will benefit from data-analytics-driven improvements that reduce error rates.

Strategy

Producers Must Set Priorities and Upgrade the Workforce Producers have to set priorities among their production processes and enhance their workforce's competencies, as follows:

1. Identify key areas for improvement, such as flexibility, speed, productivity, and quality. Then, consider how the nine pillars of technological advancement can drive improvement in the designated areas. Avoid becoming stuck in incremental approaches; instead, consider more fundamental changes enabled by a combination of the nine technologies. Analyze the long-term impact on the workforce and conduct strategic workforce planning. Adapt roles, recruiting, and vocational training to prepare the workforce with the additional IT skills that will be required.
2. Manufacturing-System Suppliers Must Leverage Technologies Manufacturing-system suppliers need to understand how they can employ technologies in new use cases to offer the greatest benefits to their customers. These technologies can be leveraged for different offerings, such as the enhancement of networked embedded systems and automation, the development of new software products, and the delivery of new services, such as analytics-driven services. To build these offers, they must put the right foundations in place:
 - a. Define which business model to leverage for their enhanced or new offers.
 - b. Build the technological foundation, such as the tool base for analytics. Build the right organization structure and capabilities.
 - c. Develop partnerships that are essential in the digital world. Participate in and shape technological standardization.
 - d. Smart Supply Network. By using technology to monitor its entire supply network, an international consumer-goods company has enabled better supply decisions.
 - e. Predictive Maintenance. A wind turbine manufacturer offers its customers real-time remote monitoring of equipment and 24-7 access to a diagnostic center. Alarms are automatically generated if one of the vibration-monitoring sensors in a turbine indicates that an abnormality has occurred.

- **Machines as a Service.** A German compressor manufacturer sells compressed air as a service instead of selling the machinery itself. The company installs a compressor at a client's site and maintains and upgrades the equipment as required. In addition to fostering job growth in production and service, this business model requires manufacturers to expand their sales force.
- **Self-Organizing Production.** A producer of gears has designed its production lines to automatically coordinate and optimize the utilization of each asset. Although the use of this type of automation will reduce the demand for workers in production planning, it will increase the demand for specialists in data modeling and interpretation.
- **Additive Manufacturing of Complex Parts.** Techniques such as selective laser sintering and 3-D printing enable manufacturers to create complex parts in one step, eliminating the need for assembly and inventories of individual parts.
- **Augmented Work, Maintenance, and Service.** Workers at a German logistics company use augmented-reality glasses to see dispatch information and navigation instructions, including the exact location of an item on a shelf, and to automatically scan bar codes. The system is also designed to enable remote assistance with basic maintenance tasks and provide customer-specific packaging instructions. The use of augmented reality is significantly increasing process efficiency for service technicians, while requiring companies to build extensive new capabilities in R&D, IT, and digital assistance systems.

Manufacturers can generate revenue growth by taking one or more routes:

1. Adopting more flexible production lines, robotics, and 3-D printing to offer products with higher levels of customization
2. Implementing innovative business models, such as machines as a service, to tap into new markets
3. Deploying augmented reality in the field to expand after-sales service and to develop new services
4. Expanding their efforts to meet increased demand for Industry 4.0 technologies, such as autonomous robots

To perform effectively with Industry 4.0, workers will need to apply a variety of “hard” skills. They will have to combine know-how related to a specific job or process, such as techniques for working with robots or changing tools on machines, with IT competencies that range from basic (using spreadsheets and accessing interfaces) to advanced (applying advanced programming and analytics skills)

Engage in Strategic Workforce Planning. In addition to transforming the frontline industrial workforce, Industry 4.0 accelerates the need for new types of leadership skills and intensifies the competition for talent in many countries

Omnichannel

- As omnichannel retail increasingly moves from concept to reality, consumers are sending a clear message: Convenience is king.
- The Rise of click-and-collect Retail
- The emergence and growth of click-and-collect retail—which allows shoppers to order an item online and then go get it at a nearby store location or pick-up point—is evidence of the power of convenience in the omnichannel world. For many shoppers, the click-and-collect experience offers a more convenient mix of speed, quality, and flexibility than either traditional shopping or standard home delivery.
- Done right, click-and-collect retail can be a way for brick-and-mortar retailers to differentiate themselves from pure-play e-tailers by leveraging their existing store assets to offer fast delivery, low prices, and even greater convenience. That's why many traditional retailers are eager to capitalize on this opportunity.
- So, for retailers that seek to make click-and-collect retail a core component of their omnichannel-retail strategy, many specific supply-chain capabilities are required. All are important, but in our experience, it all begins with providing shoppers—and store associates—with accurate, real-time information on product availability.
- And many retailers' legacy distribution networks are ill equipped to fulfill customer orders from existing distribution centers, which are typically designed to pick large orders for stores.
- For many retailers, then, a better solution is to pick click-and-collect orders from store stock. But getting the basics of in-store inventory management right presents a real challenge in terms of meeting customers' expectations about availability.
- Why the poor performance? In support of their initial omnichannel offers, many retailers have chosen to focus first on building new infrastructure—pick-up points, distribution centers, delivery networks, IT systems, and even new stores.

No doubt, these solutions can be critical components of a successful long-term omnichannel strategy, but getting the basics right, including in-store inventory, is often the most important first step to creating immediate impact and options for the future.