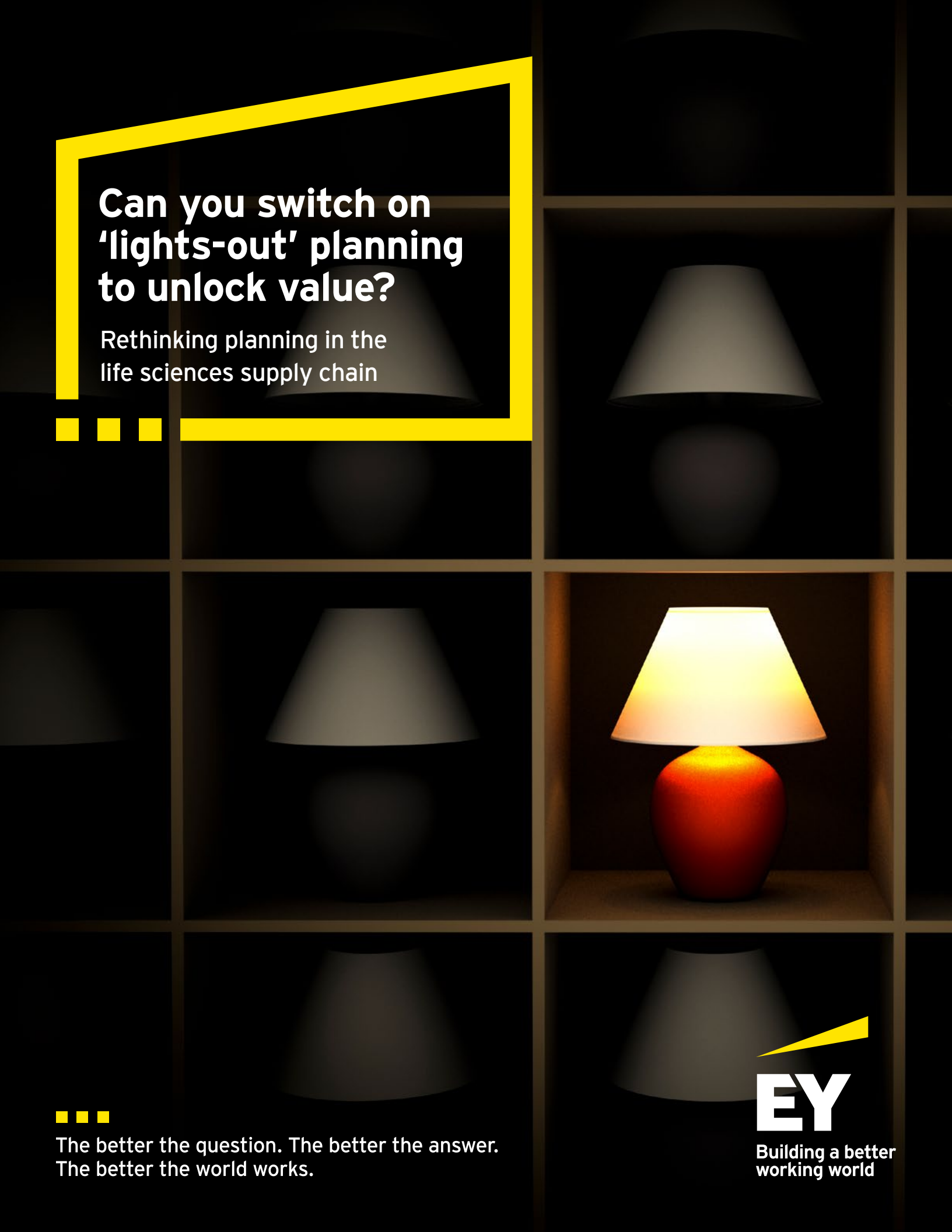
Can you switch on 'lights-out' planning to unlock value?

Rethinking planning in the life sciences supply chain



The better the question. The better the answer.
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Building a better working world

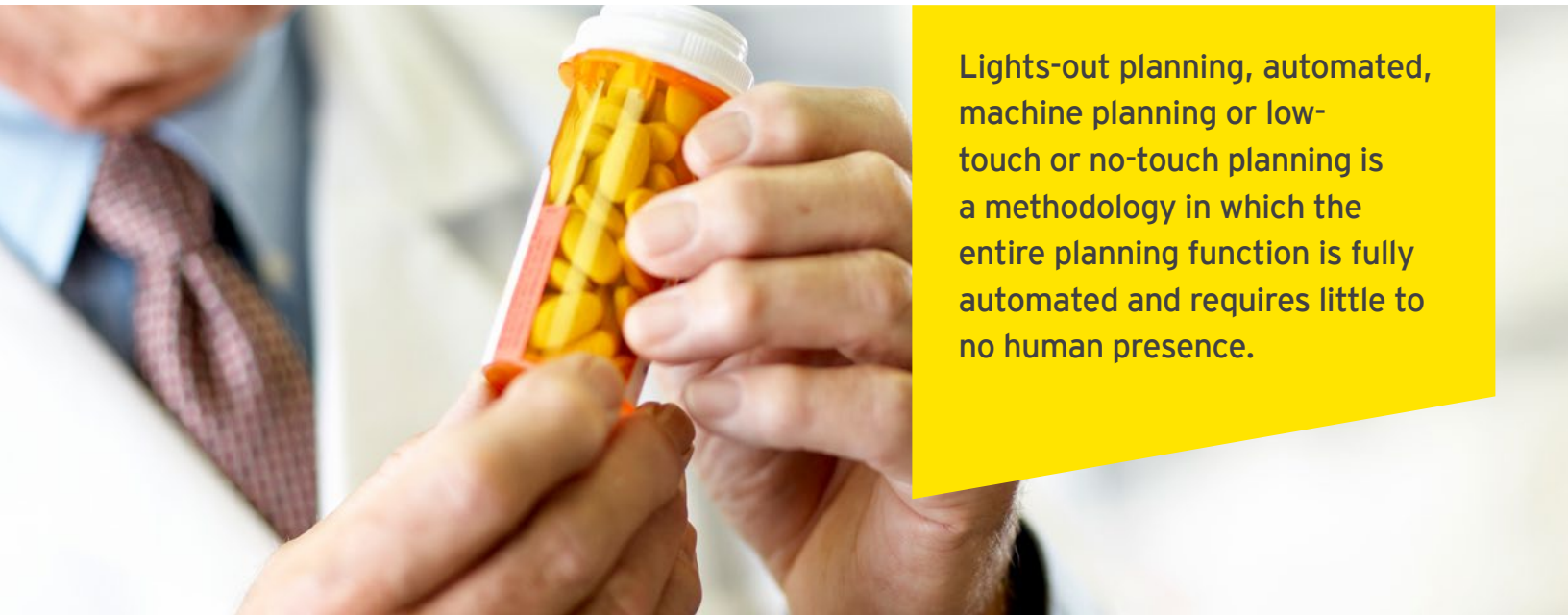
Introduction

As the life sciences industry moves from product-centric business models to data-centric models tied to improved health outcomes, companies must rethink every function of the value chain, from early-stage research to commercial activities. Companies should prioritize efforts to make their supply chain agile and data-centric. Intelligent automation, robotics and artificial intelligence can revamp the supply chain and unlock greater value for organizations. A shift to "lights-out planning" could bring efficiency and help achieve advanced supply chain competitiveness. However, a clear road map and robust governance structure are needed to maximize the potential of intelligent automation and address the key challenges that organizations face while implementing automation.

Technological advances and the ubiquity of mobile platforms have created new opportunities for value creation that take advantage of the Fourth Industrial Revolution now underway. This revolution builds upon the computational and connectivity advances of the internet age to fuse the physical, digital and biological worlds. The end result is a dramatic increase in the velocity, variety and volume of data to personalize and promote customer engagement. Outside life sciences, companies in the retail, banking and transportation sectors are using this data to create new business opportunities that remove inefficiencies and promote a seamless customer experience. As noted in our report, *Life Sciences 4.0: securing value through data-driven platforms*, life sciences companies must also embrace similar data-centric business models to optimally position themselves to create value. Indeed, life sciences companies that tap into a variety of data sources (e.g., environmental, behavioral) and use analytics can not only improve inventory management and demand forecasting. They can also improve efficiency and reduce costs at a time when product margins are being squeezed.

Life sciences supply chain — challenges galore

Even as life sciences companies embed digital, data-driven tools into their clinical trials and commercial activities, they haven't put the same emphasis on their supply chains. In most companies, low complexity tasks such as cleansing and harmonizing data, smoothing out forecasts and adding market intelligence are sourced manually. Processes are email-based and inconsistent. As a result, companies struggle to track orders in real time and have limited ability to accurately model product demand, especially when launching new drugs or devices in new markets. High "just in case" inventories are a dire reality in the industry: a majority of the life sciences companies still have low forecast accuracy rates, sometimes even below 50%. Given the highly regulated nature of the life sciences industry, several factors contribute to this below-par performance. Key issues include high variability in demand for products such as vaccines, uncertainties surrounding government tenders and external events such as the shutdown of a competitor's facility after a Food and Drug Administration audit. Advances in personalized medicine and the industry's shift away from blockbuster and specialty products toward outcome-based business models are only adding to this supply chain complexity.



Lights-out planning, automated, machine planning or low-touch or no-touch planning is a methodology in which the entire planning function is fully automated and requires little to no human presence.

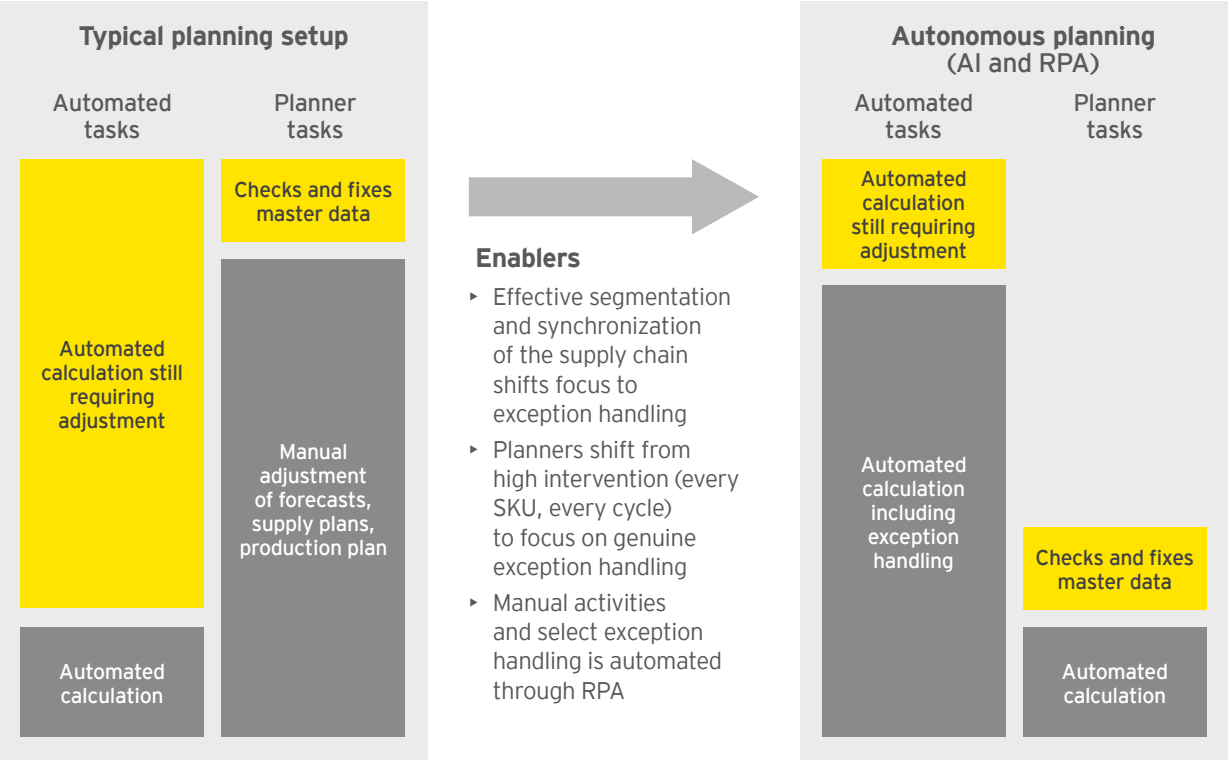
‘Lights-out’ planning – helping supply chains unlock value

Automation has the potential to solve several pain points across life sciences supply chains while delivering value to the business. For instance, robotic process automation (RPA) and artificial intelligence (AI) could transform supply chain planning from a highly manual process to an automated, self-learning process. These technologies can help life sciences companies use geographic and patient-linked data to optimize aspects of the supply chain. For instance, companies routinely track prescription data as well as macroeconomic indicators linked to supply chain stability, such as inflation or environmental data. Such data is difficult to incorporate into inventory forecasts. New advances in machine learning and AI can help break these constraints and allow life sciences companies to automate their supply chain and simplify ways of working.

RPA, AI and machine learning provide more than just improved forecasts. By integrating forecast data with order management information, these technologies could drive automated order placing. Meanwhile, automated monitoring of inventory levels and real-time sourcing and delivery decisions could keep stocks from running out.

As manual activities and select exception handling are automated, planners can focus on genuine exception handling and carry out more value-added tasks, such as product planning and exclusive brand management (Figure 1). The key is proper segmentation and synchronization of the end-to-end supply chain, allowing a shift to genuine exception handling that RPA can increasingly automate. However, these automation technologies do not serve as a single “silver bullet”; change comes from combining them with the right digital technology.

Figure 1. Typical changes in work patterns through application of RPA and AI to supply chain planning



Source: EY analysis

Demand forecasting is one area that is ripe for the application of AI and machine learning and where most of the first pilots are being conducted (Figure 2). These technologies take into account multiple variables that go beyond historical data, including social media signals, weather data and channel-specific data. They are also able to determine which of these matter most, by geography, by market and by product type.

Figure 2. Use cases: RPA within demand planning

	Demand planning			
	Forecast preparation	Baseline/statistical forecast	Consensus forecast generation	Exception management
Process applicability	‣ Adjust history for non-repeatable events ‣ Perform realignment/ SKU linkage ‣ Perform phase-in/ phaseout and new product introductions	‣ Maintain forecast strategy/ parameters/profiles ‣ Perform model-fit analysis ‣ Generate statistical forecast for finished goods	‣ Incorporate sales and marketing inputs on events ‣ Finalize forecast/consensus forecast generation (mid- to long-term) ‣ Release of final forecast for operations	‣ Review/manage alerts ‣ Weekly adjustments to final forecast (mid-term)
Digital automation opportunities	‣ Track history points of class A, B, C ‣ Determine which product needs additional history data in the "cleansed history" key figure to meet a specific forecast model's history data requirements ‣ Adds/extrapolates data points in the past based on planner-determined forecast pattern for new/ realigned SKUs	‣ Extract multiple history values ‣ Generate multiple forecasting scenarios for saving ‣ Compare models and select the best model/level for each product ‣ Update future model selection	‣ Extract sales data in various formats from multiple systems ‣ Consolidate data based on pre-set business rules ‣ Send communication to operations	‣ Collect weekly/monthly alerts ‣ Prioritize and escalate identified alerts based on pre-selected criteria ‣ Extract relevant data to help model root cause and resolution ‣ Send data to plan for action ‣ Track and analyze resolution effectiveness
Benefits	‣ Improve reporting timeliness ‣ Reduce risk of errors ‣ Reduce human effort	‣ Shorten processing time ‣ Increase accuracy ‣ Reduce human effort	‣ Streamline data collection and cleansing process ‣ Improve data quality ‣ Reduce risk of errors	‣ Increase process efficiency ‣ Reduce response time ‣ Reduce human effort ‣ Reduce risk of errors

Source: EY analysis

Some life sciences companies are starting to recognize the power of automating the supply chain planning process. Merck KGaA, for instance, has launched a multiyear supply chain automation effort to set up a self-driving supply chain powered by AI.[1] The German group is deploying "sensors" coupled with machine learning programs throughout its supply chain to gather data about inventory distribution practices and availability for every SKU, thereby providing end-to-end visibility and improving agility in its inventory and distribution processes.

The drive for information transparency and better forecasting in the life sciences supply chain is not limited to manufacturers alone; downstream partners are also working to excel in a complex and competitive business of channeling numerous products. One of the leading independent pharmacy distributors in the US has deployed an AI-driven data analytics platform on top of its existing cloud-based data warehouse. The technology has helped the company better predict customer demand and improve its customer service, leading to reduced working capital and reallocation of supply chain staff from repetitive tasks to more value-added activities.

Learning from other industries

Leading companies are using digital disruption to move toward increasingly autonomous planning (Figure 3).

Danone, the multinational food products company, has already achieved significant gains by using machine learning to automate demand planning.[2] The enhanced capability helped the organization improve the forecasting process and create an effective planning process among marketing, sales, account management, supply chain and finance. Danone was able to achieve a dramatic 20% reduction in forecast error, increasing forecast accuracy to 92%, and a 30% reduction in lost sales, increasing service levels to 98.6%. Moreover, demand planners' workload decreased by 50%, and they were refocused to higher value-added activities.

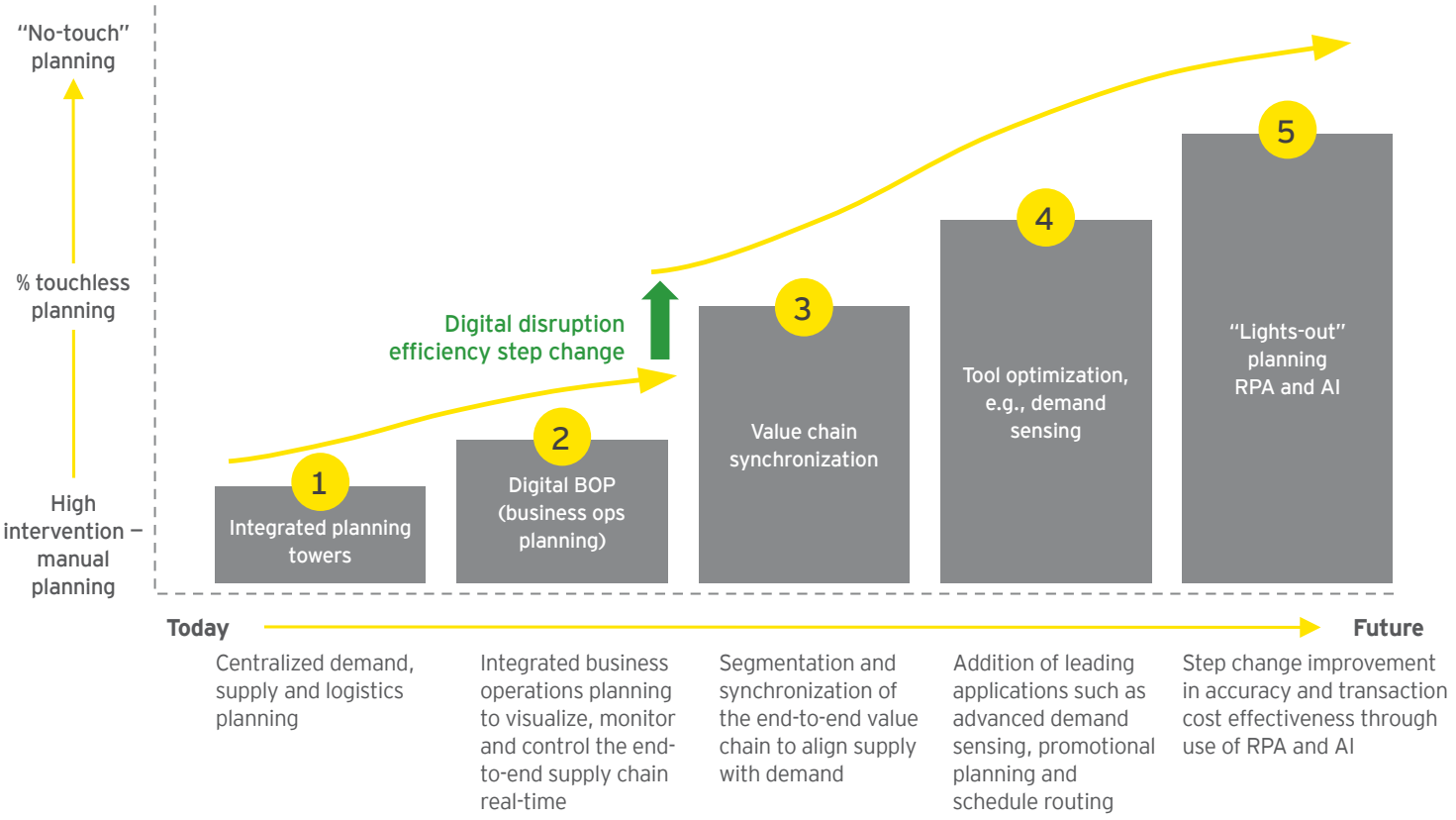
One of the leading supermarkets in the UK, Morrisons, has adopted AI to improve stock availability, which has reduced shelf gaps by up to 30%.[3] The supermarket introduced a new cloud-based automated ordering system in 2016 that uses AI and machine learning to predict which products are needed in each of its 491 stores. Machine learning technology is enabling Morrisons to automatically analyze its sales data and other data sources and combine this with external information such as weather forecasts and public holidays to automate more than 13 million ordering decisions a day.

[1] "Merck Deploys AI for 'Self-Driving' Supply Chain," *Dow Jones Institutional News*, 20 December 2016, via Dow Jones Factiva, ©2016, Dow Jones & Company, Inc.

[2] "Machine learning: A new tool for better forecasting," Supply Chain Quarterly, Quarter 4, 2014 issue.

[3] IGD Research, Morrisons and Blue Yonder, 2017.

Figure 3. Autonomous value chain five-step journey



Source: EY analysis

EY's experience

EY worked with a global life sciences company on a machine learning program focused on supporting an automated, consistent, quantitative approach to its Consensus Demand Forecast (CDF). With 18 markets as potential candidates, the project identified 6 markets as initial candidates. In the markets identified, approximately 25 SKUs were evaluated and the forecast accuracy improved by an average of 20 percentage points, from 75% to 95%.

EY also worked with a global automotive manufacturer to improve demand planning and to deploy machine learning to enable planning as a service. All key SKUs were forecasted using an advanced algorithm for the pilot business unit. The forecast accuracy improved by an average of 26 percentage points, from 65% to 91%.

Why do companies currently have a low appetite for adoption?

Despite the great potential of automation technologies, limited case examples of enterprise-level application today underscore the various barriers that organizations face while adopting them.

1. **Lack of trust in the machines** — complex algorithms are applied to derive insights from several streams of data sets. Generally, business planning professionals' lack of technical know-how makes them skeptical of the insights.
2. **Lack of skills to execute** — more than just data is needed to automate supply chain planning. Lack of skills in data science within the organization can impede consideration and effective implementation. Limited knowledge of the logic and interrelationships between planning parameters, in the context of a dynamic business environment, can also severely affect realization of the project goals.
3. **Limited executive buy-in** — limited understanding of the benefits of these technologies, difficulty in tracking ROI, and change and people management aspects are big roadblocks in getting sponsorship from leaders.
4. **Unstructured and incomplete data sets** — harmonizing and analyzing the unstructured and incomplete data sets is another big hurdle. Currently, 70% to 80% of all data in an organization is unstructured and siloed in different parts of the organization. The presence of data in different formats hinders not only data sharing, but also limits the use of intelligent automation to analyze that data and make decisions from it. For example, many supply chain organizations do not have full visibility into the customer data collected and stored in different formats by their sales department. They simply rely on the sales forecasts produced in each region to make decisions.
5. **Concerns about scalability of the solution** — some industry executives worry about the scalability of the solution and the technology. The current pilots and proofs of concept will need to be developed into scalable solutions, and that will raise other challenges. How will they get up the maturity curve? Will the current automation technology be able to connect with other technologies in the future? What will be needed to go beyond the pilots? These are some valid concerns that need to be addressed to make the leap forward.

Making the leap

A clear journey toward "lights-out" planning is needed, starting with value chain segmentation and synchronization and culminating in full use of AI and RPA. Organizations can start small and adopt these steps while moving toward the vision of self-driving supply chains.

- **Align strategically.** Automation-led transformation requires strong sponsorship and support. Aligning automation strategies with business objectives and closely working with senior leadership are critical. At the same time, recognizing the limitations of RPA, AI and machine learning and clearly communicating them to the business leaders will help all stakeholders agree on goals, expected results and any roadblocks.
- **Set up a robust governance model, with a strong focus on change management.** Any organizational change is challenging; particularly with the automation technologies, there is significant "automation anxiety" and the fear of losing jobs. It is critical to set up a robust governance model and an infrastructure for talent and change management at the beginning of the automation process. Proper communication with the workforce with respect to its role and the role of automation will be critical in achieving efficient human-machine interaction.

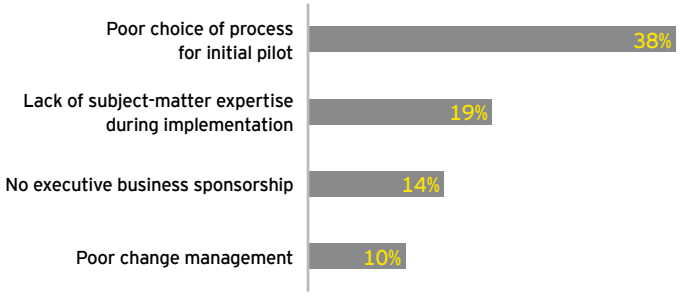
> *" Automation may be transforming virtually every industry, but the reality is that, in most cases, it's not jobs that are going away – it's tasks. In general, it's the more repetitive, mundane tasks that are being affected. That means the jobs of the future will be more engaging, more flexible, and more globally oriented than ever before."*
>
> ***– Mark A. Weinberger, EY Global Chairman and CEO***

- **Invest in data literacy and management.** As the pace of change continues to accelerate, the companies most likely to succeed are those that can intelligently work with data to predict key market trends. As such, data literacy is essential to moving from managing data to using it to make business decisions. Life sciences companies inclined toward automating their supply chains must create a data strategy and harmonize their current data.

> *" The success of any intelligent automation initiative hinges on the 5Rs of data, according to David Shrier from MIT. If you start with the 5Rs (relevancy, recency, range, robustness and reliability), you are off to a good start in unlocking the value companies are striving to achieve."*
>
> ***– Weston Jones, Partner – Ernst & Young LLP***
> ***EY Global and EY Americas Robotic and Intelligent Automation Leader,***
> ***EY Advisory Services***

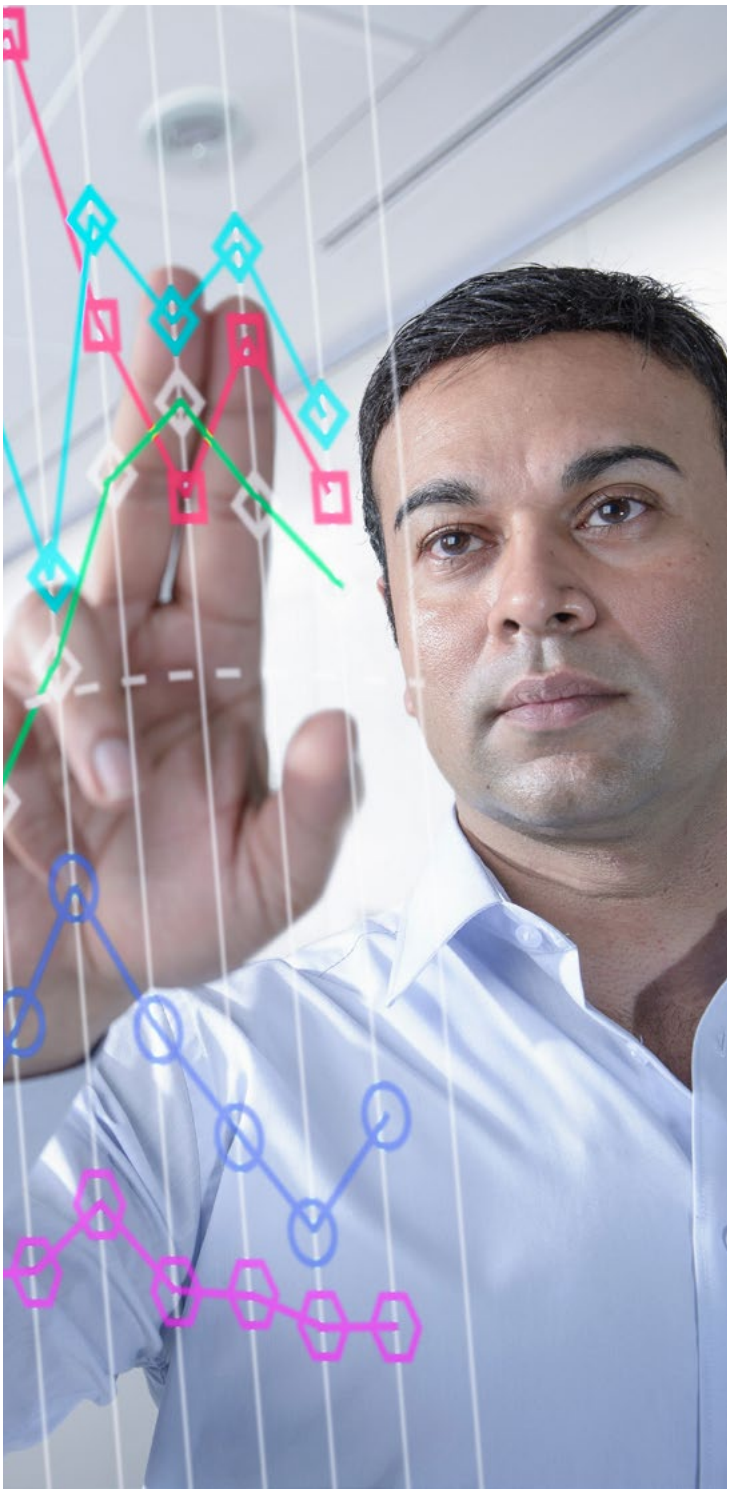
- **Start with small proof of "value."** A majority of life sciences organizations are still in the pilot stages. To create management buy-in and demonstrate a return on investment, companies should conduct a machine planning proof of "value" exercise that draws on the strength of an experienced partner. Select the correct scope — right products or brands, right functional areas (demand planning, supply planning, distribution planning, procurement, etc.) and right geography. According to Shared Services & Outsourcing Network, the largest and most established community of shared services and outsourcing professionals in the world, nearly 40% of intelligent automation implementations fail because of the "poor choice of process for initial pilot" — the process is generally characterized as being too complex or showing too many exceptions, among other issues (Figure 4).[4] Selecting the right technology (RPA, AI, machine learning, as well as other heuristic methods) that matches the need could also be the game changer for a proof of value.

Figure 4. Leading root causes for intelligent automation failures



Source: Shared Services & Outsourcing Network (SSON); survey question — "During Q4 2017, what was the LEADING root cause for IA implementations failing to match clients' expectations?" (Responses from software vendors in SSON's Intelligent Automation Universe. Vendors could select one option only)

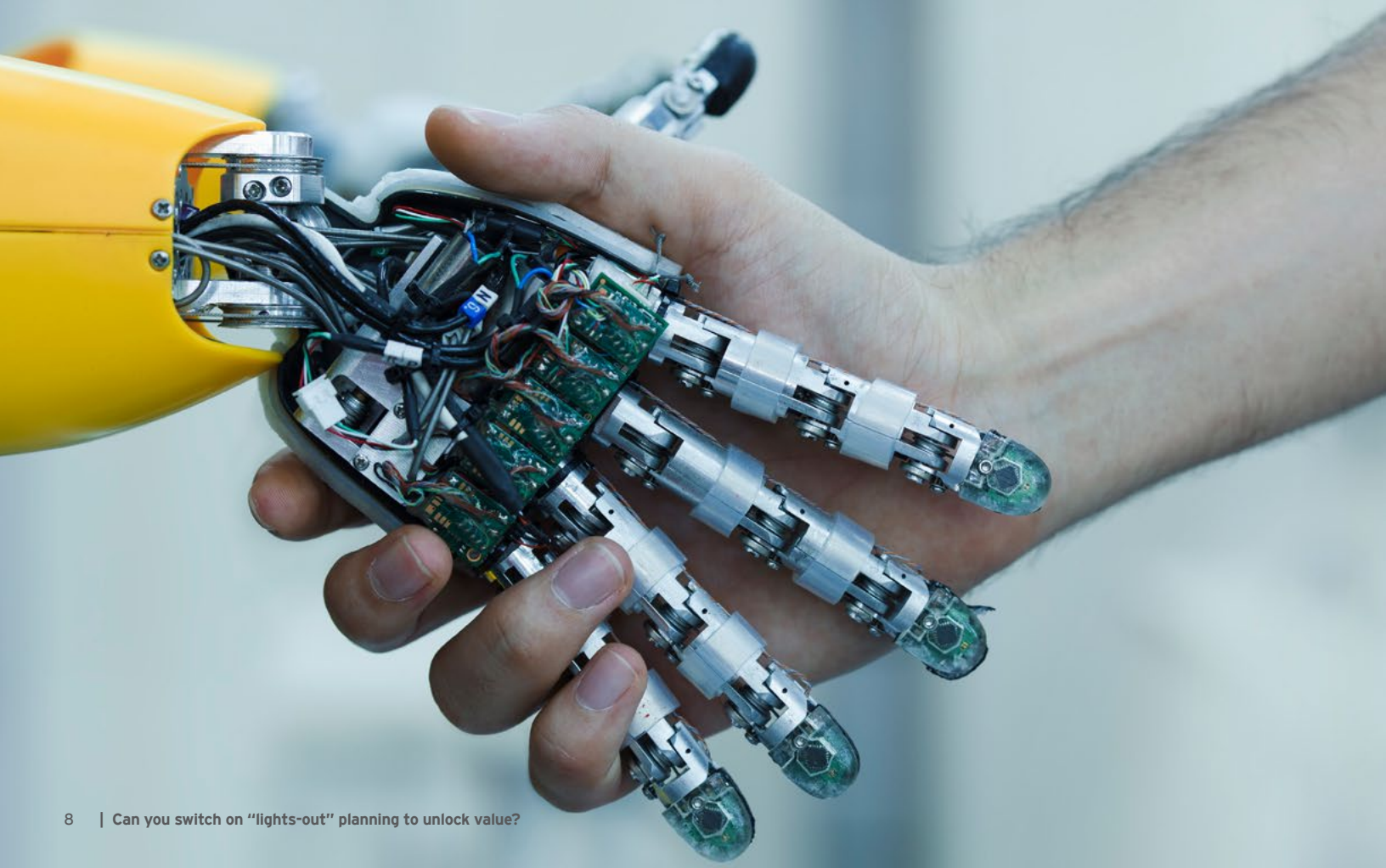
- **Start small, but have a mid- to long-term vision.** Making the shift toward autonomous planning in the truest sense would require a sustainable vision for change. Driving innovation and continuous improvement beyond the initial proof of "value" and pilots would enable life sciences companies to achieve the much-needed supply chain competitiveness. To sustain it, they must have agile change management frameworks and build a support team that could reconfigure processes when needed and could handle technology changes.



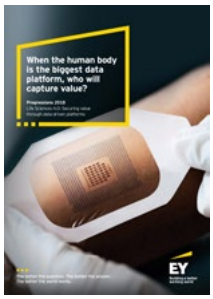
[4] Shared Services and Outsourcing Network's Global Intelligent Automation Market Report (H2 2017).

Conclusion

Life sciences supply chains face enormous pressures today. Creating an autonomous, self-thinking supply chain that can utilize the variety of data available and act on it could be a major strategic differentiator. "Lights-out planning" could enable life sciences companies to unlock significant value by improving productivity, reducing working capital and improving efficiency. To realize the significant benefits offered by the breakthrough technologies, companies must begin to take small steps now; for example, assessing the right scope for machine planning proof of "value," aligning key stakeholders on a common vision, focusing on data harmonization and training the workforce. Companies must act now to address the bigger cultural challenges and to set the foundation so that machines could be trusted with running the multibillion-dollar supply chains.



Further reading from EY Life Sciences



Progressions 2018
Life Sciences 4.0: securing value through data-driven platforms

Increased customer expectations and rapid technological advances are disrupting the health care industry, causing power to shift across traditional stakeholder groups and creating opportunities for new entrants. As the data and algorithms that drive patient-centric health outcomes become the ultimate health care products, organizations that harness data-fueled insights will lead in this new industry paradigm.

Life Sciences 4.0 examines this power shift, creates a future vision for the health care industry and suggests how life sciences companies should respond.

To create value now and in the future, biopharmas and medtechs must adopt agile, data-centric business models presently only seen in other industries. That means life sciences companies must build — or participate in — interoperable information systems that deliver data-driven improvements to health outcomes. And they must form agile, often short-term, partnerships and collaborations.

As competition increases and capital becomes scarcer, we expect to see companies narrowing their focus from diversified business models.

A new equation for delivering value

Future value (FV) is driven by innovation (I)
that focuses on outcomes with a high degree of personalization
and is fueled by unlocking the power of data (D).

$$FV = I^{D}$$

Future value = [**Innovation** Outcomes x Personalization] **Data** (Connect + Combine + Share)

- Outcomes: For people / For physicians / For payors / For policymakers
- Personalization: Participatory / Precise / Predictive / Proactive
- Data: Data streams / Traditional and nontraditional partners / Platforms of care

Source: EY analysis

> *"Embracing Life Sciences 4.0 is both a global urgent need and an opportunity. If companies leverage technology to create platform interfaces and combine their proprietary data with those from other health stakeholders, they can position themselves as powerful leaders and capture sustainable future value."*
>
> *— Pamela Spence, EY Global Life Sciences Industry Leader*

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How EY's Global Life Sciences Sector can help your business
As populations age and chronic diseases become commonplace, health care will take an ever larger share of GDP. Scientific progress, augmented intelligence and a more empowered patient are driving changes in the delivery of health care to a personalized experience that demands health outcomes as the core metric. This is causing a power shift among traditional stakeholder groups, with new entrants (often not driven by profit) disrupting incumbents. Innovation, productivity and access to patients remain the industry's biggest challenges. These trends challenge the capital strategy of every link in the life sciences value chain, from R&D and product supply to product launch and patient-centric operating models.

Our Global Life Sciences Sector brings together a worldwide network of nearly 17,000 sector-focused professionals to anticipate trends, identify their implications and help our clients create competitive advantage. We can help you navigate your way forward and achieve sustainable success in the new health-outcomes-driven ecosystem.

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