DELIVERING ON DIGITAL PROCUREMENT'S PROMISE

By Martin Högel, Wolfgang Schnellbächer, Robert Tevelson, and Daniel Weise

DIGITAL TECHNOLOGIES ARE REVOLU-TIONIZING the procurement function. Major improvements in the cost and performance of computing power, in combination with emerging technologies such as blockchain, have created a whole new playing field. Machines are responsible for an increasingly wide variety of activities, running simple tasks such as invoice processing and reconciliation, as well as more sophisticated activities such as expenditure optimization and the monitoring of suppliers that are at risk of bankruptcy. Tracing products in real time across end-to-end supply chains is becoming easier, while the associated tracking and authenticating costs are decreasing.

Despite digital's promise, most companies' procurement functions still live in the analog past, performing tasks manually, making decisions without a comprehensive understanding of the data, and lacking visibility into the sources of product parts. Indeed, they are missing out on digital's key benefits: incremental material cost savings of 5% to 10%, productivity increases of 30% to 50%, and substantial improvements in innovation, quality, speed, and risk management.

The digital transformation of the procurement function requires much more than automating a few processes. Companies implementing digital technologies should be doing so with the goal of strengthening and sustaining their competitive position in the marketplace. Those that take this approach will likely surpass the competition by leaps and bounds; those that don't will fall further and further behind.

Digital and the Creation of Value for Procurement Operations

Although no one would deny that digital technologies are a great source of value for businesses, most people would find it difficult to articulate how digital creates value for procurement operations. Generally speaking, digital generates value in three distinct but interrelated ways.

Insights and Informed Decisions. Big data and advanced analytics—increasingly important weaponry in procurement arsenals—help create transparency across massive amounts of data, enhancing insights, decision making, and ultimately, performance.

Automated Processes. Robotic process automation (RPA), one of the most widely used automation technologies, automates and accelerates the completion of transactional tasks while enhancing accuracy and contract compliance. Artificial intelligence (AI), a more advanced technology, can augment high-value cognitive activities, improving speed, and productivity.

There is no question that automation and AI add considerable value to procurement processes. But it's important to keep in mind that these technologies are no replacement for people who can interact effectively with individuals with different areas of expertise, communicate about complex issues, recognize large-scale patterns, solve multilayered problems, and come up with new ideas. These cognitive skills, which are crucial for finding, creating, and realizing value opportunities across an extended value chain, will likely remain irreplaceable for at least another few decades.

Collaboration. Combinations of various digital technologies make it possible to conduct procurement work in real time with other functions, business units, and regions in the organization, as well as with external partners. For example, these technologies provide a better window into demand across the supply chain, allowing companies to avoid excessive inventories and inventory holding costs. They also are a real boon to product development because they allow companies to incorporate suppliers' ideas into new products at a time when shorter product cycles demand ever-faster innovation.

The Digital Procurement Technology Landscape

Although it's clear that technology is the foundation of every digital strategy, knowing which technologies a procurement func-

tion should deploy—and in what combinations—is anything but obvious. And, given the constantly growing number and types of available technologies and applications, the challenge is not going to fade away anytime soon. So companies must have a good understanding of the overall procurement technology and application landscape.
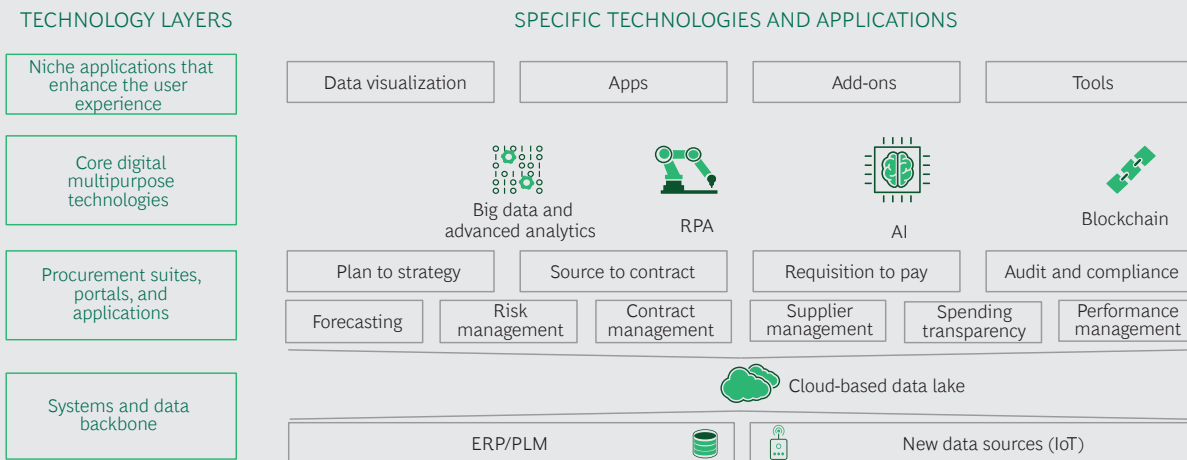
Procurement functions use four layers of technology in their implementation of digital strategies: the systems and data backbone; procurement suites, portals, and applications; core digital multipurpose technologies; and niche applications that enhance the user experience. Each serves a vital role. (See Exhibit 1.)

The Systems and Data Backbone. The foundation of all IT systems, the systems and data backbone consists of enterprise resource planning (ERP) and product life cycle management (PLM) data along with specific data from the various procurement applications. In-field data from smart sensors provides additional critical information on the actual operating environment—information that the procurement function can leverage. Stored in the cloud, this data is easily accessible and available for real-time updates.

Many companies maintain multiple databases as a result of M&A activity or legacy purchases made by individual functions. The quality of each legacy system can have an impact on the effectiveness of new applications. For example, RPA effectiveness varies greatly with the performance and availability of the system infrastructure. Likewise, real-time data transparency and the associated diagnostics require that systems be thoroughly integrated—at a significant one-off cost. Although it's possible to harness considerable value with smart bolt-on niche applications—for example, Alteryx, for powerful data analytics—a more fundamental systems integration and upgrade will likely become necessary as companies progress in their digital procurement ambitions.

Procurement Suites, Portals, and Applications. Wide-ranging customizable procure-

EXHIBIT 1 The Four Layers of Digital Technology

TECHNOLOGY LAYERS	SPECIFIC TECHNOLOGIES AND APPLICATIONS			
Niche applications that enhance the user experience	Data visualization	Apps	Add-ons	Tools
Core digital multipurpose technologies	Big data and advanced analytics	RPA	AI	Blockchain
Procurement suites, portals, and applications	Plan to strategy / Forecasting / Risk management	Source to contract / Contract management	Requisition to pay / Supplier management / Spending transparency	Audit and compliance / Performance management
	Cloud-based data lake			
Systems and data backbone	ERP/PLM		New data sources (IoT)	

Source: BCG analysis.
Note: AI = artificial intelligence; RPA = robotic process automation; ERP = enterprise resource planning; PLM = product life cycle management; IoT = Internet of Things.

ment suites and applications are on the market from large systems providers such as SAP Ariba as well as niche players. The more sophisticated spend cube applications, for example, now deploy advanced algorithms that automatically classify spending data.

Built on top of procurement suites, three key technologies—big data and advanced analytics, RPA, and AI—can be deployed across many areas of procurement operations. These technologies and their ability to create incremental value vary in maturity:

- **Big Data and Advanced Analytics.** Big data and analytics, a mature technology, can provide insights and inform decisions across a wide range of procurement activities. These technologies can help in standardizing parts, consolidating tail spending, and providing transparency into customer demand.

  For example, an automotive manufacturer needed a better understanding of the costs of the machined parts it purchased from suppliers. The company collected data from 15 million production orders in ERP across 20 global sites, specification data for more than 1 million parts from the PLM product data management system, and invoice prices from more than 250,000 invoice records

from the FICO credit score system. Analysis of changes in unit prices and volumes over the previous three years made it possible to discover suppliers' failure to provide the appropriate volume discounts. With this information, the company was able to renegotiate with some suppliers and, in some cases, find new ones. Consequently, the manufacturer realized associated material cost savings of 5% to 10% on the relevant spending volumes.

- **RPA.** Companies can use RPA to reduce many kinds of manual processes. A construction materials manufacturer, for example, used RPA to compare purchase orders (POs) and invoices to determine whether suppliers were charging more for their products than the prices listed on the POs. This process uncovered some substantial overcharges, and the company used the information to recover 2% of total spending.

- **AI.** The advanced algorithms behind AI make it possible, for example, to quickly identify the best solution in instances of complex negotiations that involve a number of different suppliers or scenarios. AI is useful also for collecting supply market intelligence, automating distinctive cognitive parts of the tender

process, and improving demand forecasting.

Blockchain is quickly becoming the fourth major multipurpose technology. Known primarily for its ability to authenticate financial transactions, this emerging technology can be used also to verify product legitimacy and origins, eliminating the costs of inspection and certification. De Beers, with BCG support, built a blockchain for tracking diamonds throughout the supply chain to assure consumers that the company's gems are natural and ethically sourced. (See "Does Your Supply Chain Need a Blockchain?" BCG article, March 2018.)

Niche Applications That Enhance the User Experience. Specific apps, tools, and data visualization technologies enhance the function of core technologies, procurement suites, portals, and applications. Mobile apps, for example, now allow people in any location to work with confidence that they will have the process speed and access to information that they need for real-time decision making.

Developing a Compelling Digital Strategy
What is the best way to realize digital's full procurement potential? As we illustrate in Exhibit 2, three mutually reinforcing sets of practices are essential.

Focus on creating business value. The digital approach developed for the procurement function must support the focus areas of the overall procurement strategy, which itself supports the company's supply chain and overall business strategy.

Companies also need to identify where their core competencies fall short and determine the best opportunities for applying digital solutions for creating value. In some cases, strategic gaps are already obvious. But more often, it's necessary to examine the process level first to locate the key pain points. Focusing on the following can provide guidance on the specific situations in which digital can add value:

- **Savings.** Reducing costs is, by default, the main focus of procurement departments. Digital technologies can enhance savings in a variety of areas. For example, automated parametric should-cost modeling can provide visibility into product despecification opportunities as well as suppliers' margins to improve negotiating power. Data analytics can improve management of tail spending at scale or help exploit demand pattern peculiarities.


EXHIBIT 2 | The Three Aspects of Digital Value Creation

Focus on creating business value
- The strategic direction of procurement sets the digital focal areas
- Pain points along an end-to-end process define digital value opportunities

Make sure that the necessary procurement roles and capabilities are in place
- Ascertain current procurement maturity
- Build out critical skills
- Create new roles
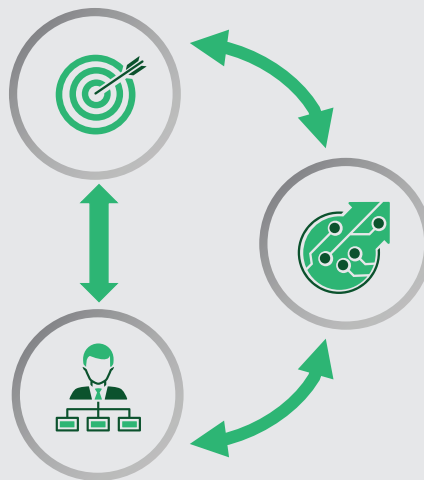
Dive into digital transformation
- Big data, RPA, AI, and blockchain
- Legacy systems and data infrastructure
- A broad range of procurement suites, portals, and applications
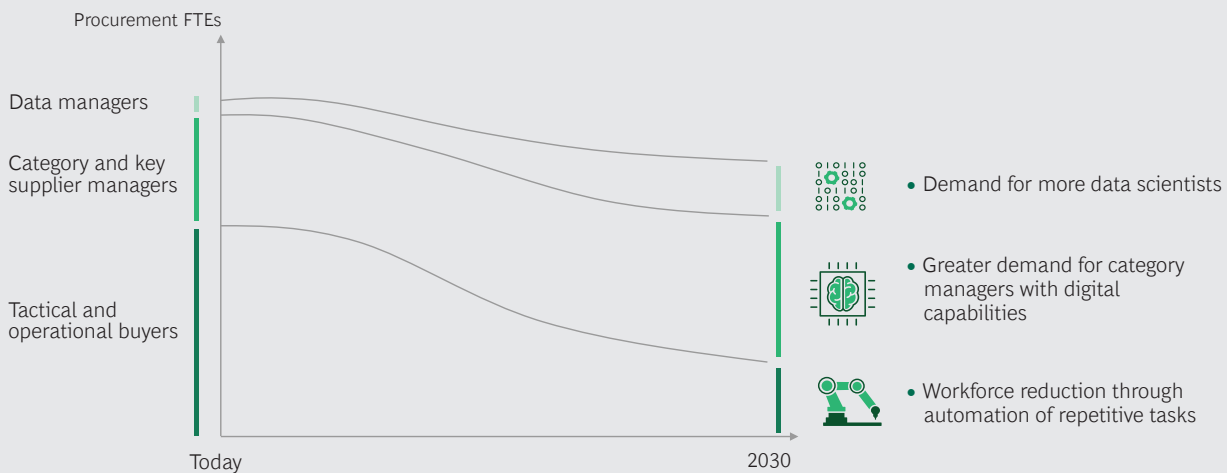
Source: BCG analysis.
Note: AI = artificial intelligence; RPA = robotic process automation.

- **Quality.** In today's regulatory environment, maintaining certain quality levels in global supply chains has become a critical concern. Companies can use algorithms to analyze data relating to past failures and identify the areas in which quality management efforts with suppliers should be intensified.

- **Innovation.** As product cycles accelerate, securing the next generation of technology solutions has become a paramount focus of companies that compete on the basis of innovation. Feeling the pressure to switch to e-mobility, automotive OEMs can engage the entire ecosystem to enhance innovation outcomes. BMW, for example, uses its Virtual Innovation Agency collaboration platform to develop new offerings with suppliers.

- **Speed.** Procurement business partners' satisfaction is increasingly dependent on the speed with which the procurement function executes. RPA can help cut the time considerably for converting a purchase requisition (PR) to a purchase order (PO). A dairy company that recently automated its PR-to-PO conversion process reduced the average cycle time from ten days to three.

- **Risk.** Companies expect the procurement function to avoid risks to supply chain continuity and environmental sustainability. Procurement needs to anticipate and manage disruptions due to the loss of a critical-component supplier. For example, using algorithms, companies can examine a supplier's financial performance to detect signs of potential default and identify suppliers that use so-called conflict minerals in their products.

Make sure that the necessary procurement roles and capabilities are in place. In general, the greater the procurement organization's maturity, the more value the digital strategy can realize. In mature organizations, there is a high level of cross-functional collaboration, which is critical for leveraging the value-creating opportunities afforded by digital technologies. A mature organization that has the necessary cross-functional collaboration between procurement and engineering in place will likely derive value from, say, a parts standardization opportunity identified through advanced analytics.

No matter what the digital strategy aims to achieve, to be effective, it should be in sync with the procurement organization's current level of maturity. Exhibit 3 illustrates the potential impact of digital technologies

EXHIBIT 3 | The Impact of Digital Technologies on Procurement Roles

Procurement FTEs

Data managers

Category and key supplier managers

Tactical and operational buyers

Today   2030

- Demand for more data scientists
- Greater demand for category managers with digital capabilities
- Workforce reduction through automation of repetitive tasks

Source: BCG analysis.
Note: FTE = full-time equivalent.

on procurement roles. Companies must understand how each of those roles should change:

- **Tactical and Operational Buyers.** With the increased use of automating technologies, the demand for buyers who perform predictable and low-value cognitive tasks will fall. Chief procurement officers have a responsibility either to help buyers migrate to other jobs or to upgrade their skills for the jobs that remain.

- **Category and Key Supplier Managers.** The best managers are familiar with digital technologies and able to use them in the specific context of their category to create value. As expectations for greater value creation rise, so will the demand for digitally astute managers.

- **Data Scientists.** Companies should create new roles and organizational entities around data—the core of procurement value creation—and hire data scientists who can extract value from large data lakes and develop advanced algorithms for procurement purposes.

Dive into Digital Transformation. Such a transformation is a major undertaking that requires a great deal of time and considerable resources. To facilitate the effort and ultimately realize the full potential of digital, companies need to take the following steps at the outset:

- **Treat digital as the strategic weapon it is.** Procurement organizations need to conceive of and develop their digital initiatives with one goal in mind: enhancing value creation.

- **Establish a digital support team.** This team will supply digital expertise and look for digital opportunities across the procurement organization.

- **Anticipate workforce shifts.** Senior procurement leaders need to manage required changes in roles and skillsets proactively. This is essential both for managers who wish to exploit value-creating opportunities and for tactical operators who want to find new positions in the organization.

- **Encourage experimentation.** In a fast-changing technology landscape, there is still considerable uncertainty as to which digital technologies will create the greatest value for procurement. It is essential to promote an agile culture that encourages people to try new ideas, test the data, and adapt quickly.

- **Be on the lookout for new opportunities.** Digitally driven developments such as Industry 4.0 and Service 4.0 will bring about large-scale changes in companies' operations and supply markets and will provide new ways to create value. (See *The Factory of the Future,* BCG Focus, December 2016, and *Tapping into the Transformative Power of Service 4.0,* BCG Focus, December 2016.) Procurement functions will need to be ready to exploit these opportunities as suppliers improve their own capabilities and cost structures.

A LTHOUGH DIGITAL TECHNOLOGIES are still evolving, one thing is clear. Companies that have a good understanding of digital procurement's potential will be well prepared to develop a digital strategy tailored to their competitive context.

Strategy, however, is only the first step. Our next article will discuss the overall framework for successful digital execution. These articles are part of the ongoing BCG series Strategic Procurement in the Digital Age, a comprehensive discussion of the various practices companies need to follow for top procurement performance.

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