Confidence in the future

How tomorrow's technologies can help the finance function of today

A practical guide to emerging technology

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The path to one of a company's most important assets runs straight through the Chief Financial Officer's office. We're not talking about the financial capital that sits on the balance sheet or the human capital that walks in the door every morning. Rather, we're talking about data—which has been called the world's most valuable resource.

CFOs are swamped in data coming from ERP, payment processing, business intelligence, and a host of other systems built on structured databases. The finance function owns that data on a transactional level, monitors the data for risk purposes, and turns those big data sets into insights for operational and strategic decision-making. Indeed, the ability to harness deeper, more real-time insights from that data is a competitive necessity; conclusions made in every function of the organization run the risk of being flawed without timely, detailed, and accurate financial information.

Added to that structured data are piles of unstructured data trapped in other digital and physical paperwork. From legal contracts and emails to videos and interview recordings, unstructured data represent a treasure trove of underutilized information.

CFOs have only begun to create as much value from data as some of their functional peers have created. The opportunities are numerous. Imagine if finance professionals weren't tied up with mundane transactional tasks—currently, when it comes to working with data, finance professionals spend only half the time on analysis; the rest is spent gathering that data, according to PwC's ***Finance Effectiveness Benchmark Report 2017***. Automation offers an alternative—potentially reducing by up to 46 percent the time and cost for key processes such as billing, management reporting, general accounting and budgeting, rather than, for example, modeling revenue forecasts based on the data already on hand.

Then imagine a finance function producing in-the-moment financial performance insights and connecting them to operational levers, rather than running reports on past periods. Or a finance function that could detect anomalies or trends embedded at a transaction level. Imagine a finance function that works seamlessly with tech-savvy functional peers to uncover new sources of value across corporate data silos. Or a finance function that has tax analytics to assist company-wide decision-making while responding to regulatory change. (See the ***PwC Tax Function of the Future*** series for deeper insight on emerging technology and the tax function.)

When it comes to working with data, finance professionals spend half their time gathering data. Automation offers an alternative—potentially reducing by 46% the time and cost for key processes.

To capture those opportunities, CFOs are adjusting their plans to deploy technologies that either are on the verge of becoming mainstream now or are ready for finance-focused experimentation. These technologies—including robotic process automation (RPA), artificial intelligence (AI), and blockchain—use data at their core to unlock enterprise value.

Robotic process automation

RPA doesn't mean actual robots. Rather, RPA simply automates processes across multiple systems by using software tools accessible to non-technical users.

Artificial intelligence

Artificial intelligence includes a set of technologies like machine learning that sense and analyze data, learn from it, and perform actions based on it. AI can attribute meaning to data—including unstructured data such as contracts or email text—to make intelligent recommendations or actions. This capability translates into helping people perform tasks faster and better, and automating certain decisions along the way.

Blockchain

Blockchain is a decentralized ledger, or list, of all transactions across a peer-to-peer network. While cryptocurrencies like bitcoin gather headlines, of great interest is the underlying blockchain technology because of how securely the blockchain can record transactions in a ledger. As such, it can replace processes where transactions need to be verified by a third party.

Only 16 percent of companies say finance is one of the top functions engaged in exploring emerging technologies like these, according to PwC's ***2017 Global Digital IQ Survey***. There's good reason CFOs have been cautious until now. The ability to affordably harness massive stores of information and extract insights was impossible until only a few years ago. And many organizations are hesitant to start large-scale, multi-year enterprise software implementations.

But RPA, AI, and blockchain have moved beyond those barriers and are worthy of the CFO's immediate attention. Successes have built experience; costs have come down. And "small automation" projects that use RPA and basic AI might require only a few weeks to automate discrete processes for quick wins. These small-scale projects put these technologies into action quickly, generating immediate benefits across a gamut of finance activities, from fraud detection and compliance reviews to order-to-cash processes and financial planning and analysis. Likewise, experimentation with blockchain and more advanced forms of AI in pilot projects can pave the way for future gains.

To take these small steps now—not to mention prepare for the giant leaps of the future such as a continuous audit—CFOs must address data challenges. (See the sidebar on page 4, "Overcoming data and IT barriers in finance.")

Overcoming data and IT barriers in finance

CFOs must reach across the enterprise to act as a catalyst for innovation, but many are hampered by fragmented, decentralized systems. Forty-eight percent of CFOs surveyed for PwC's *2017 Global Digital IQ Survey* cited outdated technology as an emerging barrier to successful digital initiatives, while 40 percent said data and technology integration would be the biggest challenge they would need to overcome. This IT fragmentation is in addition to the typical organizational and process issues most enterprise executives face.

When finance professionals spend more time gathering data than analyzing it, or adjusting and reconciling entries manually rather than predicting future outcomes, they're experiencing the effects of fragmentation. Intelligent automation helps alleviate the symptoms of IT fragmentation in three ways:

- ***Within an ERP application:*** Agents in an application, for example, anticipate and suggest actions to take, such as invoice matching.
- ***Between applications:*** In a low- or no-code approach to automation, bots (software agents) embedded in a business process can learn by studying and replicating what users are doing. These agents work between enterprise applications to remove process bottlenecks.
- ***Across the enterprise:*** Automated data wrangling tools accelerate the process of standardizing data field by field, so it's groomed for reporting purposes.

These are all welcome and necessary ways to solve immediate, tactical problems. Over the longer term, however, companies must attack the challenge of a data-driven analytics culture strategically and determine how to achieve it more broadly. The finance function can be an ideal starting point, a place where the value of analytics and reporting is well known and appreciated.

A finance function's data and analytics maturity is about more than making tech-related efficiencies possible in small pockets or one-off projects. Large enterprises need to reap the benefits of new kinds of data insight wherever that insight is most relevant. To make these benefits possible and establish a base for innovation, CFOs must build an analytics-ready data infrastructure.

With agile data warehouses and semantic data lakes organizations can take the data and methods created for a specific purpose and reuse them later in other ways. Without the right data foundation and a workforce focused on continual, data-driven innovation, the efficiencies and effectiveness that emerging technology promise won't materialize. By considering its laser focus on reporting as a stepping stone to more advanced analytics, the finance function can build on its expertise to become a data-driven model for all functions across the enterprise.

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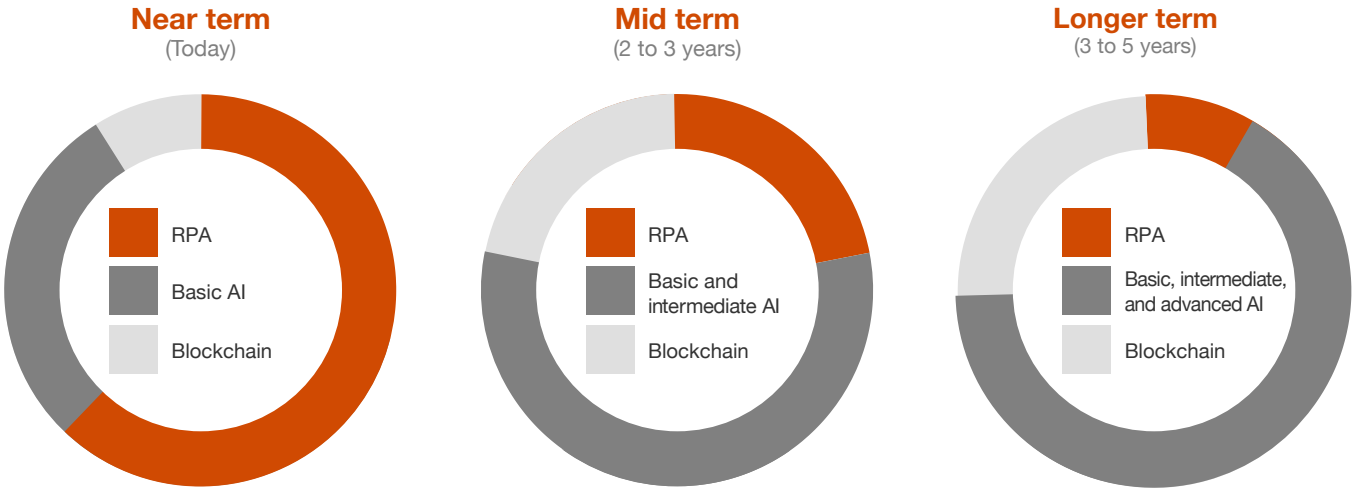
Immediate returns to long-term building blocks

In varying degrees, every CFO focuses on transactional cost efficiencies, risk mitigation (including internal audit processes), and value creation. Tangible cost efficiencies can be achieved through automation. A PwC benchmarking study found that the the leading finance performers expend much less effort than the average company on general accounting, financial reporting, and traditional transactional processes such as accounts payable and accounts receivable. Automating finance processes plays a major role in giving those leaders an advantage. Deploying RPA to automate a process, for example, is a manageable project that has a short timeframe and a visible payback in cost or cycle time.

Processing transactions more efficiently can produce immediate benefits on the cost side of the ledger. Finance professionals can think of this automation as outsourcing tasks to digital labor, rather than to an offshore firm. Through the efforts to increase efficiencies, organizations also can build the technology capabilities and infrastructure needed to better address risk and generate insights in the future. Gains from RPA and basic AI—and to a lesser degree blockchain—will free up your finance professionals for value-adding activities, for example.

Those initial projects are the building blocks for finance to later achieve more dramatic gains with advanced AI and a bigger dose of blockchain. Finance teams will build more rigor around managing data stores (that is, the databases and other collections of structured and unstructured data) in the finance function and across the enterprise. They'll promote a greater shift in the finance culture toward technology's innovative edge. And those initial projects can lead to a culture of cross-functional partnerships within the organization that can be real enablers of future technology-focused value creation.

Which technologies will have the biggest impact on finance?



Relative impact of each technology in the finance function for a typical enterprise

It won't all happen at once. While RPA and some basic AI can be implemented in the near-term, more advanced forms of AI and blockchain will take longer to roll out. In some cases, that's because the core technology still needs to improve. But in other cases, the time frame is extended because of non-technology factors, such as uncertainty about regulation, ethical concerns, inadequacy of available data, or the need for entire business value chains or ecosystems to advance in lockstep.

The organizations that begin to deploy emerging technologies now will be in position to exploit them when those barriers ease in the long term. And the near-term benefits pay off. Following are five approaches to getting near-term projects off the ground now. They are by no means the only approaches, but they offer distinctly different starting points that most organizations can take advantage of now, and also use to create paths to transform finance in the longer term with technology.

Five approaches to consider now

1 *Use RPA to make accounting more efficient—and open the door for more machine learning*

Finance professionals are adept at pulling data from different systems, manipulating data in a spreadsheet, and feeding the results into yet another system. It's not unusual for business units to run their own ERP and CRM systems, alongside some home-grown accounting software, with separate data stores. But it's also not very efficient.

This scenario is tailor-made for automation. For example, one manufacturer is streamlining portions of its buy-to-pay process within indirect sourcing. A simple application of RPA combined with machine learning will enable it to automate a process where a requisition turns into a purchase order, which is then sent to a vendor, and then authorized for payment. Each of those steps can be streamlined, so most transactions require no human interaction. A machine will look at a few fields, auto-populate other fields based on historic patterns, and automate the whole process for everyday purchases. It will take only a few months to implement, and invoice holds and manual journal entries should drop dramatically.

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Process improvements that include RPA and machine learning can be an eye-opener, leading to more ambitious projects. Some of the most successful finance automation projects have worked because the CFO and CIO together championed small pilot projects. The discovery that automation can deliver on promises—in the case mentioned above, roughly 30 to 40 percent process savings is also opening the door to more collaboration, more readiness to examine how technology can advance finance objectives, and more openness to applying advanced forms of machine learning to finance data.

2 *Enhance audit quality with machine learning—and enhance the audit experience*

Anomaly detection and machine learning can help analyze new kinds of transactions and scan more transactions. Scanning more transactions will open future possibilities to encompass all transactions for discrete portions of the audit, until eventually the ***audit will scan complete populations of transactions—rather than sampling.***

In the longer-term, the prospect of a continuous audit could provide real-time assurance and transaction verification, rather than a historical assessment. Real-time assurance provides input on key judgments—as decisions are made. The result could enhance audit quality—and provide a better audit experience for the finance team.

3 *Optimize strategy with machine learning—and generate more strategic insights*

The finance function feeds into strategic planning with critical information about a company and its portfolio of businesses. Getting to the ideal combination of performance and risk among many P&Ls is a difficult balancing act.

Banks, for example, are accustomed to setting targets related to different sections of their balance sheet, while also keeping in mind liquidity ratios for the overall business. When dozens of businesses are on the balance sheet, all competing for capital, coming up with the best targets for the portfolio is a complex optimization puzzle. By using machine learning and agent-based modeling techniques, a bank can determine what an optimal balance sheet would look like for a given quarter. The optimization would then inform operational decisions, such as changing prices to limit credit card exposure, while steering clear of regulatory limits and staying within the company's risk appetite.

That kind of optimization successfully demonstrates the potential for AI to create value through the finance function. Future insights can be derived from data that reaches beyond the historical scope of traditional financial reports. With enough data, AI tools will yield deeper insights about the organization and industry benchmarks—comparing inventory management capabilities across an industry for example—and their sensitivity to unexpected variables.

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4 *Examine contracts for compliance and risk—and learn to leverage unstructured data*

Rule changes present unexpected challenges. Case in point: Lease accounting standards changed in 2016, posing a big challenge for companies that have dozens or even hundreds of separate leases. In many cases, finance departments needed to re-review all of their contracts to bring them onto their central balance sheet.

Contracts are a form of unstructured data, however, and unstructured data can increasingly be analyzed by software. With natural language processing, RPA, and machine learning, a machine can ***automate lease accounting contract review*** and simplify compliance with the new lease accounting standards. Now, a job that required four to six hours or more per contract can be trimmed by two-thirds, with important exceptions flagged for review. As the algorithms learn, the time needed is significantly shorter—and the algorithms can even start to assess the contracts for other kinds of risk exposures.

Although contracts are unstructured, they tend to use unambiguous language with similar clauses and phrases, lending themselves better to natural language processing than a Twitter stream, for example. But AI is becoming more capable of parsing sarcasm and slang in the different contexts of social media, email, or other written or spoken media. This means that greater amounts of unstructured data—even media such as video footage of remote inspections—can be "ingested" by AI engines, offering new forms of assurance and insights.

5 *Assure the blockchain—and build trust in emerging technologies*

Innovators are pushing the boundaries of how emerging technologies such as AI and blockchain can boost productivity and provide insights for decision-making. In the real world, however, businesses face additional considerations related to contractual agreements, regulation and risk. For example, a blockchain public ledger is so secure that after a transaction is added, it is immutable, potentially rendering moot the audit processes that look back at historical transactions.

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Even so, organizations will also turn to ***real-time, transaction-level assurance***, which can assess the blockchain infrastructure as well as individual transactions—before they are written to the ledger. Both assessments are needed to provide the necessary transparency that key stakeholders will expect. With 62 percent of finance executives telling us that their organizations are making significant investments in AI over the next three years, and 13 percent in blockchain, according to PwC's Digital IQ research, more assurance innovation likely will accompany emerging technologies.

Blockchain isn't the only emerging technology that will require more assurance. Legal, compliance, and risk teams need to know how emerging technologies work—in each and every instance. For example, are an organization's deep learning algorithms making decisions based on cultural biases that are legally proscribed? A person can't just open up a file and review a document, because deep learning is based on many hidden layers of training that are not easily peeled back and exposed. The need for assurance is not always on the radar of innovators. It pays to bring the CFO and internal audit teams into the conversation early, so process changes will address compliance and risk considerations.

Creating the future now

While there isn't a single pathway for implementing advanced technologies in finance, there are certain catalysts that will help to facilitate their adoption.

Start small

Begin with discrete projects or pilots that deliver quick returns and don't require capex investments. This approach can help to prove the viability of new technology, and the organization will become comfortable with using it to automate routine tasks. Starting small will also help you identify which areas of know-how and technology need to be addressed for longer-term, more complex solutions.

Draft your vision

Outline your finance function's desired capabilities, without considering budget or capacity constraints, over the next three to five years. This exercise will help you prioritize activities, enabling you to identify projects that provide short-term payback and provide a foundation for more sweeping innovation. Working with your organization's CIO and other leaders, you'll ultimately translate those priorities into technical requirements that become part of your roadmap.

Consider near-term (1 to 12 months), midterm (2 to 3 years), and longer term (3 to 5 years) objectives. Near-term projects might include advanced reporting, visualization, and automation via RPA while mid-term ones might look at applying AI-driven decision-support. A longer-term initiative might include how the organization uses smart contracts based on blockchain. You might prioritize efforts according to return on investment, strategic priority, capability, or capacity.

Develop a data governance strategy

At the same time, you will also need to assess data flows and governance requirements for each of your projects, as well as the finance function overall. In most organizations, data stores have typically evolved in an ad hoc fashion, as a reaction to the needs of individual functions and their applications. As a result, data administration is often highly decentralized and lacks a coordinated strategy. Such a strategy ensures data from multiple sources is available to combine and analyze; establishes protocols to preserve the security and compliance of data assets; and creates a common standard for sourcing required technology components. Organizations must address basic questions:

- ***What are our key data assets?***
- ***Who has access to them today?***
- ***Who should have access to them tomorrow?***

Get involved in enterprise analytics initiatives

As the flow of data continues to rise in volume and velocity, every function in the organization will seek to tap into this rich resource. However, operational metrics without a financial component will be only partially useful and approximately accurate. CFOs will want to build awareness of analytics goals across the enterprise and consider business data across the enterprise, so they can supply financial measures that correspond to the detail and timing of the operational metrics followed by other functions.

Bringing data science, visualization, and programming skills into the fold of a finance organization will be important to uncover opportunities and achieve value.

Hire talent and promote innovation

Data and tech skills have been hired and housed in the IT function for years, but they will increasingly become integral to finance and other functions. PwC's 2017 research on ***data analytics and science skills***, for example, forecasts five-year growth of 16 percent in the number of finance manager and finance analyst positions that will require data science and analytics skills. Finance functions will also benefit from interdisciplinary teams that have the ability to put forth creative ideas and test alternative approaches to solving business challenges. Bringing data science, visualization, and programming skills into the fold of a finance organization will be important to uncover opportunities and achieve value. Looking more broadly, you'll also want to work with other leaders to identify and bring together the company's scattered analytics, AI, and other emerging tech talent, which is often siloed.

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