

# Global Corporate & Investment Banking Insights

Number 1

July 2017

## Cognitive Technologies in Capital Markets

Cognitive technologies are transforming capital markets. Once the preserve of IT experts, they are now moving to center stage—offering enhanced speed, accuracy and efficiency, and creating 20 to 30 percent in additional capacity, as employees in areas such as post-trade processing are freed from automatable tasks to focus on higher-value activities. The challenge for market participants, facing an array of solutions, is to implement at scale and capture the maximum value at the lowest possible risk.

Cognitive technologies are applications and machines that perform tasks that previously required human intelligence. They include robotic process automation (RPA), machine learning and natural language processing, which reduce the need for human input and increase effectiveness through new insights and ways of working. Many of the technologies operate at the frontier of the technologically possible, but as the price of hardware falls the case for their use gets stronger. The question for many banks is not *whether* to engage but how to engage effectively.

McKinsey Global Institute research suggests that 60 percent of all occupations have at least 30 percent of activities that are technically automatable.<sup>1</sup> For capital markets banking, the strategic and implementation challenge is particularly complex, and programs often see efficiency gains offset by budget overruns and fewer-than-expected benefits. In addition, many banks struggle to balance the imperative to renew with cutting overall spending.

Cognitive technologies present the same challenges, and there is a puzzle to solve in securing value and achieving a coherent result across diverse processes and product lines, while remaining flexible enough to accommodate change.

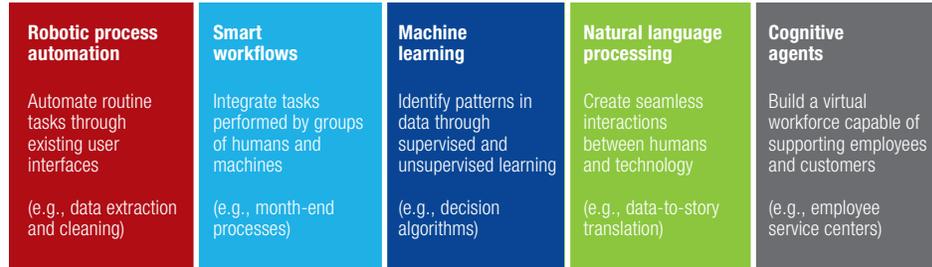
Still, as forward-looking capital market participants will testify, technology's steady drum beat is hard to ignore, and already there are numerous examples of cognitive

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<sup>1</sup> "A future that works: Automation, employment, and productivity," McKinsey Global Institute, January 2017.

Exhibit 1

## The cognitive technologies landscape in capital markets



Source: McKinsey & Company

technologies in action. In the trade lifecycle there are at least five either ready to roll out (with commercial solutions in place) or being piloted across the industry (Exhibit 1):

- **RPA:** Automation of routine tasks through existing interfaces, used for activities including data extraction and cleaning.
- **Smart workflows:** Routing and integration of tasks such as client on-boarding and month-end reporting (usually in combination with RPA).
- **Machine learning:** Application of advanced algorithms to large data sets to identify patterns, helping make decisions in areas such as idea presentment (CRM), product control and trade surveillance.
- **Natural language processing:** Turning speech and text including legal documentation and client service queries into structured, searchable data.
- **Cognitive agents:** Computerized interaction with humans, used for example in employee service centers, on help desks and in other internal contact centers.

New technologies do not guarantee double-digit uplifts in revenues. However, they offer significant opportunities to streamline operations, deliver products more efficiently and embed continuous improvement in business processes, leading to a lower marginal cost per trade. In embracing cognitive technologies banks will become agile and innovation-focused, making it easier to integrate technology, operations and business. The result should be better responsiveness to markets and customers, faster and more relevant innovation and a significant reduction in costs.

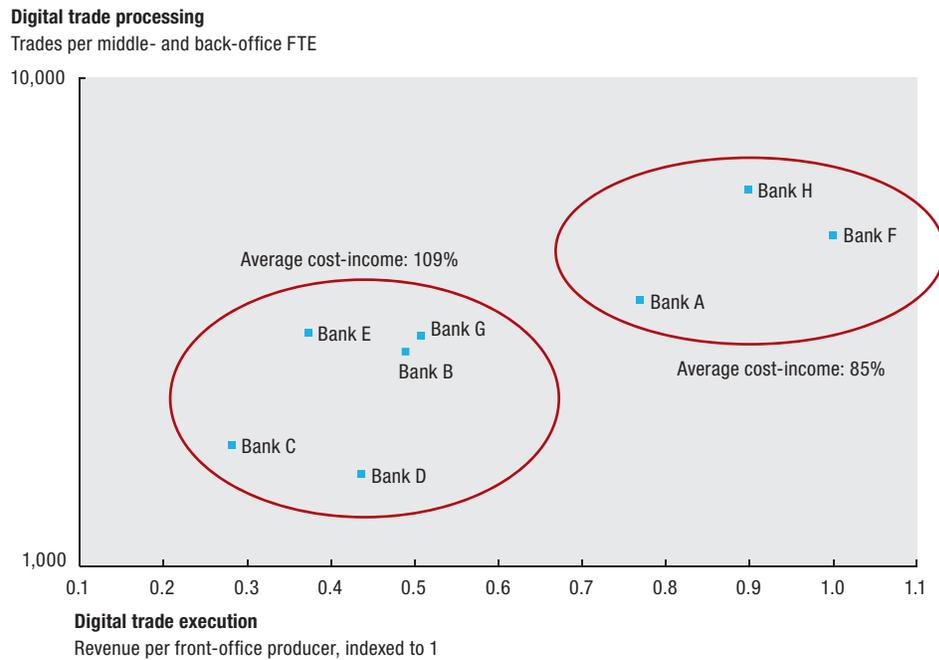
### Cognitive technologies in the front, middle and back offices

The application of cognitive technologies to capital markets functions can reduce budgets and free up capacity for teams to focus on higher-value activities such as research, idea generation and client relationship management.

McKinsey recently compared the penetration of digital execution and trade processing of eight banks in the cash equities business, and found that those with the highest levels of digital execution saw front-office revenues per producer increase by as much as eight times, while those with the highest level of post-trade digitization posted four times more trades per middle- and back-office FTE than the bank with the weakest digital resources (Exhibit 2, page 3).

Exhibit 2

Digitization in cash equities correlates with increased revenues and trade processing



Source: McKinsey Capital Markets Trade Processing Survey; Coalition data; McKinsey research

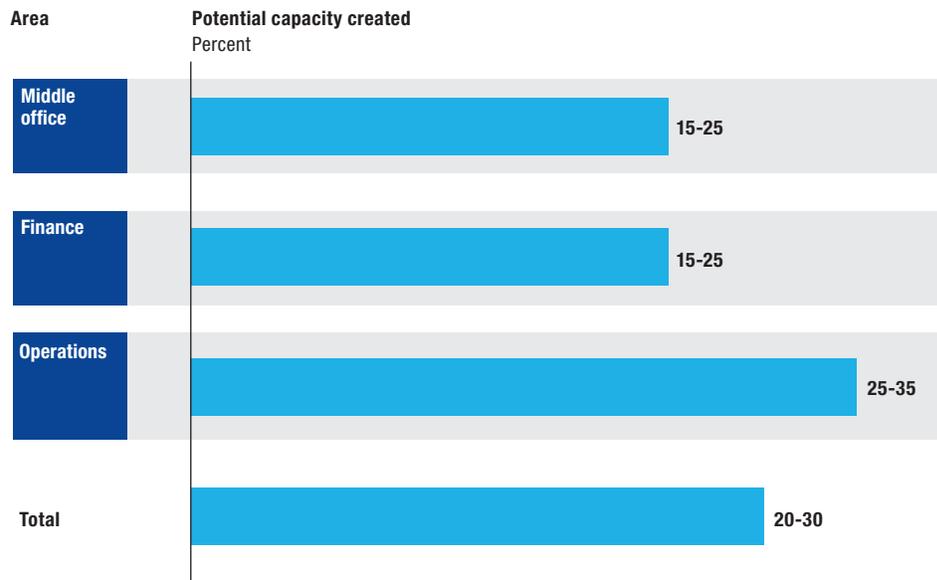
Cognitive technologies offer the potential for transformation across business lines and activities. Applications such as machine learning, in which algorithms detect patterns in transaction data, can revolutionize understanding of customer behaviors, leading to more effective digital sales and marketing. Smart workflows are process-management tools that integrate tasks performed by groups of humans and machines, enabling the tracking of end-to-end processes in real time. They can be used to automate activities such as trade lifecycle management or margin payments. Cognitive agents can combine machine learning and natural-language generation to build a virtual workforce, capable of executing tasks, communicating, learning from data sets and even making decisions based on “emotion detection.”

Often the efficiency impact of technology does not correlate directly with headcount reductions. This is because automation applies to tasks rather than positions. For example, RPA typically reduces an individual’s workload by 10 to 20 percent. Still, viewed through the lens of overall capacity creation, the impact of cognitive technologies is potentially significant. In the middle office, it may for example generate additional capacity of around 25 percent, while in an operations function, capacity can be increased by as much as a third (Exhibit 3, page 4).

Cognitive technologies can be useful as a stand-alone solution, but the impact is multiplied when applications are operated in combination. For example, RPA and machine learning have high utility for the correction of standard instructions in the settlement and payments function (Exhibit 4, page 5). Meanwhile cognitive agents, smart workflows and natural language processing are most useful in client services, for example for creating customized email responses. Machine learning and RPA are less so.

Exhibit 3

Cognitive technologies could free up 20-30% of capacity in capital markets post-trade processing



Source: McKinsey research

Some generalities can be extracted from the analysis. For example, relatively challenging activities such as same-day payments or profit and loss and risk reporting are probably best served by a combination of RPA and machine learning. More routine tasks such as reference data cleaning and normalization lend themselves to a combination of RPA and smart workflows.

In the product control area, machine learning can be used to identify regular exceptions that can be auto-compressed. RPA can then be applied to the remainder of the exceptions set. Over time, machine learning software can “learn” what is driving exceptions and fix the underlying cause.

Most banks are in the early stages of engaging with and understanding the potential offered by cognitive technologies, but some are moving ahead and ramping up investment. A few have gone on to elevate capital markets functions into strategic assets, redesigning operational frameworks and organizational structures around new technologies.

Cognitive technologies can be applied to a range of work streams. One large capital markets participant installed more than 50 RPA “bots” to automate previously manual activities including data cleaning and break matching. Another used machine learning to eliminate product control exceptions in the finance function. A third applied cognitive agents to respond to client emails and for level 1 help-desk tasks related to technology.

### Questions for market participants

While some firms are seeing early benefits from cognitive technologies, others face challenges, including understanding the process landscape, building capabilities and

Exhibit 4

## The impact of cognitive technologies in middle and back office

		Robotic process automation	Machine learning	Smart workflows	Natural language processing	Cognitive agents	Overall impact	
Middle office	Trade enrichment, allocation	High	High	High	High	Med	High	Examples being piloted/applied
	T+0 activities (P&L, risk)	Med	High	Med	Low	Low	Med	
Finance	Product control	High	High	High	Low	Low	High	FO:BO exception normalization
	Reporting and analysis	High	High	Med	Med	Low	Med	Ad-hoc report creation and commentary
Operations	Confirmations	High	High	High	Med	Med	High	Exception handling; paper confirmations
	Settlement/ payments	High	High	Med	Med	Med	High	Auto-correction of SSIs
	Collateral and valuations	Med	High	Med	Med	Med	Med	Margin calculation; client communications
	Reference data	High	High	High	Med	Low	Med	Cleaning and normalization of instrument data
	Reconciliations	High	High	High	Med	Low	High	L1 reconciliation activities (break fix, triage)
	Custodian and asset services	Med	Med	High	High	Med	Med	Corporate action data cleaning
	Operations client service	Med	Med	High	High	High	High	Customised client/counterparty email responses
Operations risk/ control	Low	High	Med	Low	Low	Low	Trade, operator surveillance	

Source: McKinsey & Company

scaling up. There are also issues around assimilating cognitive technologies and managing the likely considerable impact on the workforce. Market participants should address questions including:

- How should we map the process landscape and identify areas that carry the most potential?
- How can we scale from proof of concept to significant impact? Should we set up a cognitive technologies center of excellence, and where?
- Do we have the capabilities to reap the full benefits of cognitive technologies? If not, how can we address this gap?
- How do technologies like RPA and machine learning fit with our application architecture? What is the long-term approach to maintaining and enhancing the code base?
- What is the impact of automation on the workforce, both in terms of number of FTEs and capabilities required?
- What is the impact on the firm's operating model?

Individual bank responses to these questions will depend on their starting points and business priorities, but in all cases better answers will be obtained by those that take a strategic approach, including performing a top-down assessment of current capabilities and available technologies and creating a project roadmap. Centers of excellence can provide a lever for orchestration of pilots and implementation programs, and offer

an independent view across business lines. They can help integrate best-of-breed systems with existing architectures and galvanize synergies between technology and business functions. Cognitive technologies must be supported by modern IT architectures and an appropriate talent strategy, both for coding of new applications and to manage the workforce as automation is applied to more tasks and processes. From an operating perspective, cognitive technologies should enable a more agile way of working and likely require new governance structures to reflect increasingly automated decision-making.

### Principles for moving forward

Market participants must align their approach to cognitive technologies with their circumstances, but in almost every case the environmental context should provide an imperative to drive the process forward—in a world of increased competition, entrenched high costs and low returns on equity, the efficiency and service potential offered by cutting edge automation is compelling.

Banks and others must grapple with complex implementation challenges and aim to build a cognitive technologies platform that operates effectively on a reasonable budget and is flexible enough to adapt to innovation.

McKinsey suggests three actions for banks addressing these challenges:

- Create a view on applicability through the trade lifecycle and support functions. Apply consistent criteria to evaluation of activities. Pockets of value will be discovered across the business, from risk management to compliance and HR.
- Treat cognitive technologies “like any other code” and build an architecture to ensure consistency, re-use and maximum value.
- Set up a center of excellence to drive development and ensure consistency in application. Effective centers create user-friendly playbooks, contribute advanced expertise, build business cases, manage vendor relationships, track the impact of changes and develop new capabilities. Over time, the cognitive technologies skill set will need to be decentralized and embedded in individual functions (e.g., operations, finance, risk), with technical skills forming a central plank of the future operating model.



Cognitive technologies are powerful tools that can help improve decision-making, reduce costs and help capital markets employees work more effectively. Market participants that best capture the value opportunity will likely outpace rivals in terms of cost-per-trade efficiency, client and counterparty service and time-to-market. Based on experience to date, those that successfully implement cognitive technologies can expect to create 20 to 30 percent in additional capacity.

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