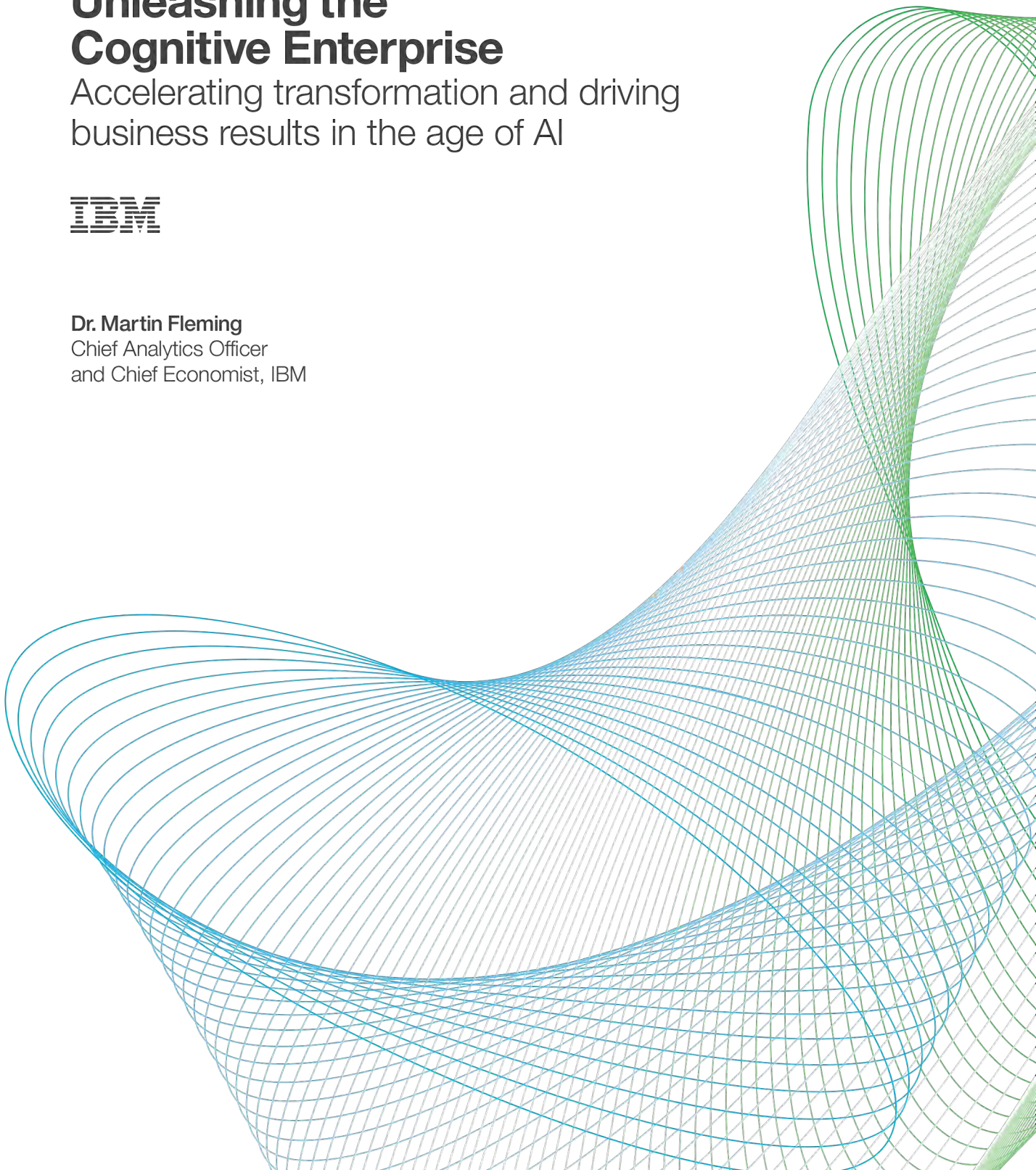


Unleashing the Cognitive Enterprise

Accelerating transformation and driving
business results in the age of AI



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Imagine a new type of enterprise. One where people and machines work side by side in partnership, drawing on the unique strengths of each to produce better business results. This organization is filled with empowered and engaged employees making smart and prompt decisions based on insights that were previously unavailable. It seizes opportunities before competitors have noticed. And it constantly learns, reinvents itself, and yields innovative products, improved profitability, and greater employee satisfaction.

Welcome to the cognitive enterprise.

How does an organization become a cognitive enterprise? The transformation is multifaceted: it will take equal parts bold and fervent leadership, a re-imagining of business strategy and processes, reeducation of employees, and a roll-up-the-sleeves mentality to tackle perceived limitations of existing data and systems.

The Vision of Augmented Intelligence

A cognitive enterprise augments and supports decision making across business processes by harnessing systems built from abundant and inexpensive computers, storage, and data. These capabilities are corralled to create cognitive solutions designed to adapt and make sense of the complexity and unpredictability of unstructured information. They can “read” text, “see” images, and “understand” natural speech while interpreting, organizing, and explaining the information, and providing an expanded body of knowledge. This, in turn, provides the power to enhance and scale expertise to help solve challenges and improve efficiencies across organizations and industries.

However, cognitive solutions do not “know” the answer. Rather, they are designed to weigh information and ideas from multiple sources, to reason, and then offer hypotheses for consideration. A cognitive system assigns a confidence level to each potential insight or answer. How and where to use its capability and proceed with its findings is entirely up to people. At its optimum, a cognitive enterprise espouses a balanced people + machine approach.

With an ability to learn behaviors and predict outcomes, cognitive systems enable leaders to reimagine functions and redefine how work is done. They also augment workers’ ability to conceive and launch new products and services quickly and successfully, and, perhaps, even invent new business models.

IBM already uses cognitive systems to forecast demand, price transactions, manage workforce, and assess risk. In other organizations, cognitive solutions help medical professionals identify, diagnose, and treat patients. In short, cognitive systems are transforming companies, jobs, and tasks across every industry around the world.

The Will to Change

“It’s not access to the new technologies themselves, or even to the best technologists, that separates winners from losers. Instead, it’s innovators who are open-minded enough to see past the status quo and envision very different approaches, and savvy enough to put them into place.”

— Erik Brynjolfsson, *Director of the MIT Initiative on the Digital Economy, Professor at MIT Sloan School*

First, transforming an organization into a cognitive enterprise starts with making certain that technology investments support business strategy. It also means embracing data-driven decision making. According to Erik Brynjolfsson, director of the MIT Initiative on the Digital Economy and professor at MIT Sloan School, who co-authored *Machine, Platform, Crowd*, 30,000 large American manufacturing plants have reported a three-fold increase in data-driven decision making because it is more productive and profitable.

Second, redefine jobs, redesign tasks, and transform workflow to get the most out of these systems. In fact, across IBM, every important business process or function is being transformed by cognitive systems, from procurement to supply chain to sales and human resources.

Third, establish aggressive targets. With the power of cognitive technologies, there is every reason to expect to see significant improvements in areas where these solutions are deployed. For example, in sales at IBM, the time it took from when a marketing lead appeared until a salesperson responded was reduced by 90 percent.

Fourth, invest in employees. The path to becoming a cognitive enterprise is rife with opposition stemming from fear of change and job loss. That’s why investing in the continuous reeducation, reskilling, and retraining of workers is essential to maximize the potential of cognitive solutions. Without employees trained to use cognitive solutions and systems, productivity gains and deep cost savings will not materialize.

Fifth, start at the top. There is no panacea for leaders who wish to transform their organizations into a cognitive enterprise. This commitment to transformation comes from the top and flows through senior leadership down to the lieutenants in the trenches.

While a cognitive solution now automatically routes marketing inquiries to the salesperson with the right expertise in IBM, sales leaders had to convince a highly skeptical audience to embrace a new way of doing things. No longer do leads materialize automatically in salespeople’s cues to languish until they are addressed. Now they are sent to the right person, along with a complete history of the relationship, and are quickly addressed.

Becoming a cognitive enterprise takes a fierce resolve in the face of results that have yet to materialize, and recognition that there will be resistance to taking on new and different approaches. Yet as each functional area is reinvented with the help of augmented decision making, an organization emerges that is much stronger than the sum of its parts.

Rip Up the Playbook

“Whenever these technological revolutions have occurred in the past, the initial response has always been to try to shoehorn the new technology into old lifestyles and ways of thinking. The result is a failure to capture the full benefit of the new technology.”

— Carlota Perez, *Centennial Professor at the London School of Economics*

Many have expected technology, and technology alone, to immediately transform organizations into lean, mean, fighting machines, and some have been disappointed. As was learned in the internet gold rush of a generation ago, as well as in other epochs where a transformational technology was introduced, machines cannot do it alone.

In fact, thirty years after the deployment of electricity, only 50 percent of manufacturers were electrified. Initially, adoption was driven by simple cost savings over the steam engines or watermills that provided power. However, the greatest benefits came after factory managers began to fundamentally re-organize workflow. By decentralizing a factory’s power source and giving every individual machine its own electric motor, more efficient assembly could be designed. Factory layouts and employee tasks needed to adapt and work with the new technologies to prosper. Why did it take thirty years to adopt? Because incumbents were so proficient at the existing ways of doing things that they were loath to look for new approaches or embrace innovation.

It takes leaders who willingly tear up and rewrite their business playbooks to harness new technology. The transformation starts by focusing on how to help the workforce make better decisions that lead to improved business results by evaluating every business process and function.

To increase the efficiency of its shipping containers, bring trust and transparency to its international trade network, and digitize its cross-border supply chain process, global shipping giant Maersk partnered with IBM to develop a cognitive solution. It’s expected to save billions of dollars when adopted at scale by the ecosystem of shippers, freight forwarders, ocean carriers, ports, and customs authorities.

The cognitive system will optimize and increase the speed of shipping processes, potentially reduce shipping fraud, and even begin to disrupt traditional trade finance. “We expect the solutions we are working on will not only reduce the cost of goods for consumers, but also make global trade more accessible to a much larger number of players from both emerging and developed countries,” said Ibrahim Gokcen, Chief Digital Officer of Maersk United States.

The cognitive enterprise is characterized by business process transformation that is continually being refined and continuously adapting, leading to improved decision making and the creation of new products and services.

Workforce Future State

“Cognitive systems are to workers what GPS is to drivers: both enhance the expertise of the user.”

— Jesus Mantas,
Managing partner, IBM Consulting Services

While cognitive systems are making great strides, they are not designed to replace people. However, they will eliminate certain tasks and tedious jobs currently performed by humans. In other cases, cognitive systems will force a reexamination of functions, roles, and processes. Thus, along with new business processes and new business models, some entirely new skills will be required.

Many necessary skills already exist within organizations, others will be acquired through recruiting and hiring, and some simply require retraining existing workers. As Boston University School of Law professor James Bessen, who researches technology and innovation, notes, “From the beginning, social experiments have been integral to the introduction of major new technologies, which require new skills learned through experience. And learning on the job often requires new ways of organizing a workforce, new occupations, and new labor markets.”

In other words, becoming a cognitive enterprise isn’t about automating jobs. Rather, it’s about automating one or two steps of a 10-step process, while the rest of the steps become more important for people to do.

For instance, in the legal world, ‘discovery,’ or the process of searching legal documents for specific information, is tedious, inefficient, and expensive. When discovery software was introduced in the late 1990s, many believed paralegal and legal-support

jobs would be imperiled. Instead, as discovery became inexpensive and much more efficient, demand for this service grew and so did jobs. Between 2000 and 2005, 50,000 paralegals and legal support positions with more valuable skills were added. What’s more, the number of lawyers grew by 250,000.

Similarly, after the introduction of computerized spreadsheets, the number of bookkeepers fell by 45 percent. However, the fall off was more than offset by the growth in the number of financial managers, accountants, and management analysts, who became more valuable to the enterprise than bookkeepers ever were.

Yet retraining workers is just one part of the transformation to a cognitive enterprise.

Both the users and producers of technology must embrace empathetic design, which emphasizes understanding the needs and beliefs of the customer and iterating until a solution is created. This is far from the old siloed way of product development, when ‘if we built it, they will come’ pervaded. Cognitive solutions can sharply shrink R&D time, and potentially discover solutions once thought unfathomable.

While there is a significant need to recruit and hire data scientists, employees with keen critical thinking and communications skills are just as essential. Moreover, it is imperative to cultivate employees with varied disciplines, backgrounds, ethnicities, and ages, and whose interactions tend to spark innovation and creativity, and ultimately, concrete business results in the cognitive enterprise.

Cognitive systems are not competing with people. Rather, they are giving workers the ability to reach new heights, solve previously unsolvable problems, and chart a new course for the successful enterprises of tomorrow. It is crucial, though, that employees are properly skilled to harness them.

All Data Are Valuable

“When data initiatives are so closely aligned to business strategy, data become strategic.”

— Inderpal Bhandari, *IBM's chief global data officer*

If asked for their views about their corporate data, non-technology executives might provide an answer akin to being thirsty at sea: there's lots of water, but none good enough to drink. On the path to becoming a cognitive enterprise, data are always problematic because there's so much of it but little seems useful. And the reservation is that until the data are effectively managed, it's not worthwhile to invest in cognitive systems to make sense of it all.

But just like any precious resource, data must be mined, sorted, and refined to realize its value. And unless a company is new and systems can be designed from scratch, cognitive solutions must optimize data as it exists. Thus, there needs to be parallel paths of improving the management and governance of existing data while implementing cognitive solutions. Working with bad or wrong data is a problem, but often it's possible to make use of existing data even if it might not be in the format needed or wanted.

In fact, cognitive systems can make sense of unstructured data, which constitutes 80 percent of the world's information. They enable keeping pace with the volume, complexity, and unpredictability of information and systems. What's more, using new tools and techniques, cognitive systems can now quickly come to conclusions with relatively small amounts of data.

The key to using data that exists is to find business processes where change can deliver meaningful results. The best place to start is with a business problem. Then find a senior leader who understands the value of analytics, machine learning systems, and software tools, and who has a demonstrated ability to be a disruptor in the organization.

But to truly become a cognitive enterprise, a change in the culture of the organization is required. The change starts with tying the business blueprint to the data game plan.

New Era of Business

A technological revolution is underway that is driven not just by the vast amounts of data, reduced cost of computing, and technology that discovers, understands, and reasons, but also by critical business and societal needs. Cognitive solutions will help solve what seem like insurmountable challenges in healthcare, finance, education, security, and many other pressing areas.

At IBM, the development of cognitive systems, methodologies, and tools is a critical element of business strategy. Across the enterprise, cognitive systems are embraced to reimagine functions, reinvent processes, and drive outcomes in every function including human resources, supply chain management, and real estate operations, to name a few. Insight that was previously unavailable can now be brought to professionals at precisely the right steps in their processes to fundamentally change the way tasks are performed and decisions are made.

Traditionally, for example, IBM's buildings were programmed to operate under assumed conditions. Over time, facilities are rearranged to accommodate the changing mission of their occupants, though often not reprogrammed to the best use of the current state. IBM is using cognitive systems to generate new insights into worldwide facilities. The result is altering current methods of building control, maintenance, and coordination, helping managers improve efficiency and optimize the workplace experience.

The cognitive era is a new era of technology, a new era of business, and most importantly a new era of thinking. The cognitive enterprise will evolve to where cognitive solutions are integrated into all processes and decision points, continuously overcoming technology limitations and data availability. However, the true potential of the cognitive enterprise will be realized when the unique talents of those whose common sense, ethics, and creative abilities are augmented by the insights generated from cognitive computing.

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