# THE RISE OF THE MACHINE

Automation Brings Game-Changing Capabilities

As we continue moving more and more swiftly into our new, digital world, the inexorable rise of the machine has seen job functions become performed at levels of speed and efficiency previously unimagined. Increasing numbers of tasks are now automated, tasks that in our lifetime it seemed only human beings would ever be able to do: think, reason, analyze, act. Now, computers can process massive amounts of data, continuously learn from it, and take action—in many cases, better than humans can.

In business, the explosive growth of digital empowers decisions that give a competitive edge:

Faster
DIGITAL AUTOMATION
More accurate
Lower costs
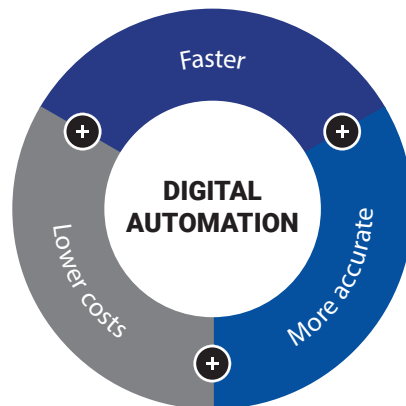
But analyzing the vast volume of complex data quickly enough is beyond mere mortals. And that's where the business world has changed radically. Although computers have been in use in business for a few decades now, we suddenly find that for the first time ever, we have abilities to collect, process, analyze, and communicate essentially unlimited amounts of information— instantly! And that fact completely changes business models and how business models operate.

But first, let's remind ourselves how we got this far.

A BRIEF HISTORY OF COMPUTING

Technological innovations that automate jobs are centuries old; Past technological revolutions including the invention of the steam engine, the use of electricity, and the advent of telecommunications put millions of laborers out of work. From agriculture to automotive, every industry has figured out how to do more with less.

And then computers came along. First adopted in business to simply carry out basic mathematical tasks, within 50 years innovations in the workplace had replaced all sorts of skills and now include flexible robots, voice technologies, and 3-D printing.

The evolution of software has been rapid (figure 1) through the decades.
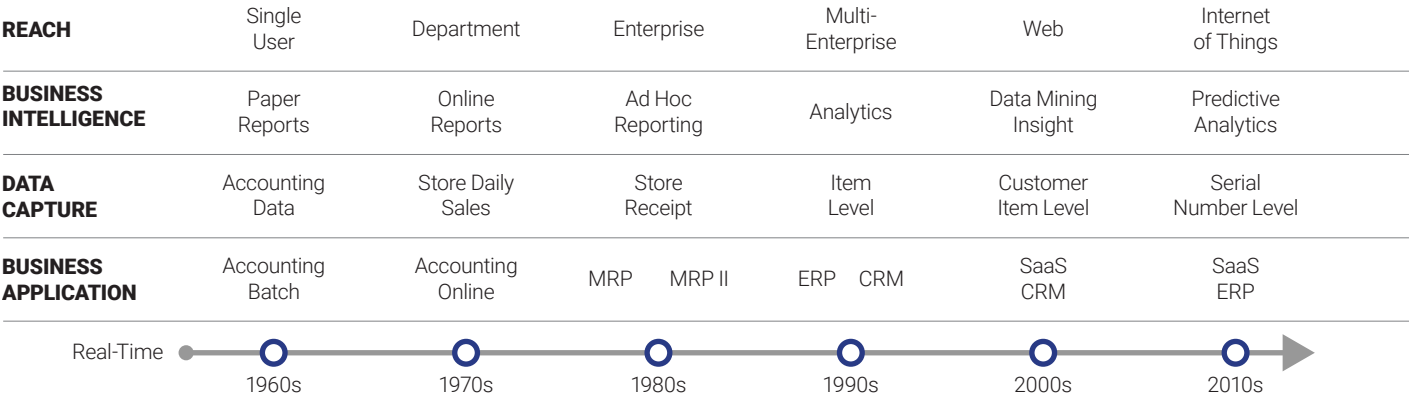
- 1960s: Batch accounting
- 1970s: Real-time accounting
- 1980s and '90s: Manufacturing resource planning and enterprise resource planning
- 2000s: Business intelligence and performance improvement technologies

So too has hardware evolved.

- 1950s: IBM mainframe
- 1970s: Personal computers
- 1981: IBM launch of a PC with a Microsoft operating system
- 1980s: Connection of multiple PCs to a central database
- Late 1980s: Microsoft development of graphical user interface
- 1990s: World Wide Web and Internet browser

Automation is now critical to competitiveness in today's digital business world. Automation is generally accomplished by developing business rules and embedding them into systems. Those concepts are now used regularly in many business functions, such as pricing products and ordering parts and supplies. Recent technologies have taken those capabilities to a whole new level. And all of it has led to a unique convergence of trends that presents for business certain opportunities not to be missed. Automation is one of the key levers (figure 2) that digitally transformed companies are pulling to significantly enhance performance.

FIGURE 1: EVOLUTION OF BUSINESS COMPUTING FUCTIONS

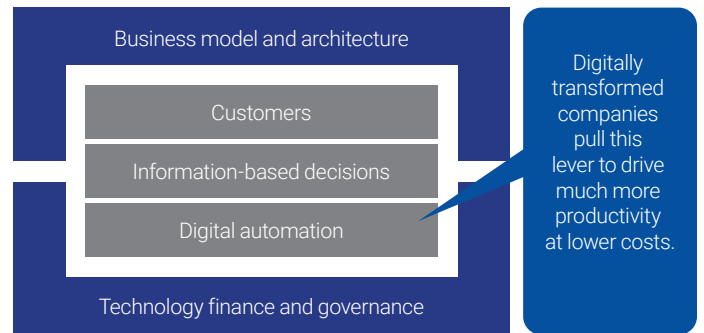| REACH	Single User	Department	Enterprise	Multi-Enterprise	Web	Internet of Things
BUSINESS INTELLIGENCE	Paper Reports	Online Reports	Ad Hoc Reporting	Analytics	Data Mining Insight	Predictive Analytics
DATA CAPTURE	Accounting Data	Store Daily Sales	Store Receipt	Item Level	Customer Item Level	Serial Number Level
BUSINESS APPLICATION	Accounting Batch	Accounting Online	MRP MRP II	ERP CRM	SaaS CRM	SaaS ERP
Real-Time	1960s	1970s	1980s	1990s	2000s	2010s

Source: AlixPartners

GAME CHANGERS: AUTOMATION AS A CRITICAL PIECE IN DIGITAL TRANSFORMATION

Cars without drivers, computers beating chess grandmasters, a machine replacing a human translator: new technological advancements automate brainwork. It took many different technology advancements to lead to those creative automation techniques. And although each new technology is amazing in its own right, it's the way business is using them together that makes unforeseen things happen. That unique confluence is transforming business. Companies that understand that idea go well beyond process improvements and rethink their whole approach.

Let's look at how new technologies in automation can change the way we work and the way we do business.

FIGURE 2: THE DIGITAL TRANSFORMATION FRAMEWORK

Business model and architecture

Customers

Information-based decisions

Digital automation

Technology finance and governance

Digitally transformed companies pull this lever to drive much more productivity at lower costs.

MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) attempts to mimic the human thought process.

Within AI, machine learning is a computer-based analytical process with behavior and actions that human observers consider intelligent. Computers use a complex set of algorithms that mimic human neural networks, and their abilities are phenomenal. For example, computers can detect complex data patterns that human viewers could never spot. Doctors use them to make difficult diagnoses, and lawyers use them in complex investigative work. Computers have proved to be better recruiters than human beings. And business forecasting is greatly enhanced by AI techniques—in such areas as product demand, customer attrition, and employee turnover.

The leading invention—so far—in machine learning is IBM's Watson, which learns, adapts, and keeps getting smarter, just like a person.[1] The difference is that Watson is faster and therefore capable of evaluating much, much more data than his human coworkers are.[2]

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1. http://www.ibm.com/watson/what-is-watson.htmlIBM Watson is a technology platform that uses natural language processing and machine learning to reveal insights from large amounts of unstructured data
2. https://www.research.ibm.com/software/IBMResearch/multimedia/Computing_Cognition_WhitePaper.pdf

SENSOR TECHNOLOGY AND THE INTERNET OF THINGS

Sensor technology has fueled the Internet of Things (IOT), linking the physical and the digital worlds. Sensors can be placed in a wide range of locations to collect extraordinary amounts of data: in trucks, to track information for supply chain improvements; in coffee vending machines, to check whether they're working; and in warehouses linked directly to inventory systems.

In the Internet of Things, objects, animals, or people can be tracked with unique digital identifiers with the ability to transfer data over a network without any human-to-human or human-to-computer interaction.

The IoT is bringing us rapidly into a new era of industrial development. Manufacturing processes as we know them are changing. Industry 4.0 is the new term for industry's adoption of the IoT. It's also the general term for factories with networked machines and products equipped with sensors and communication technologies that are interconnected with each other. Those types of factories, which are already in existence today, are fully networked with each machine and product having its own Internet protocol address, used for communicating with each other and controlling each other cooperatively.

Siemens presents a bottling plant example of Industry 4.0 that works as follows.[3]

- Each bottle contains a radio-frequency-identification chip storing a precise description of how it has to be processed.
  - Which liquid?
  - Which lid?
  - Which label?
- At each station, the bottle communicates directly with the machine telling it how it has to be processed.
- At the end, a computer checks to see if the bottle has been produced correctly.

ROBOTS

Although robots have been with us for many years, in recent times they've advanced to be able to carry out previously unimaginable tasks, such as bartending, farming, and drug dispensing. New innovations enable them to mimic human actions, monitor security cameras, investigate accordingly, and even roam the aisles of stores to help customers.

VOICE RECOGNITION

Voice recognition systems have become so sophisticated that they have led to the full automation of some jobs. Pharmacy and airline answering systems can understand and interpret the spoken word. New technologies can translate from one language to another and help market traders capture news reports and link them to trading decisions.

3-D PRINTING

The enormous potential of 3-D printing has yet to be realized, but already it is making the creation of complex structures possible in-house. 3-D printing eliminates many of the complexities of traditional design and production processes, and its inevitable wider adoption will likely facilitate innovation.

3. "Industry 4.0 - The Fourth Industrial Revolution." Online video clip, YouTube, December 5, 2013, https://www.youtube.com/watch?v=HPRURtORnis

AUTOMATION OF FUNCTIONAL AREAS

Many business functions have already been improved by confluences of technology advances. Following are some examples.

Production: Many factories now have fully networked machines and products equipped with sensors that connect with each other, and industrial companies are now looking at enhanced efficiency and profitability in other categories such as asset and operations optimization. As an example, predictive maintenance of assets can eliminate up to 70% of breakdowns.[4]

Supply chain: The Internet of Things has created a new way of managing the supply chain. Sensors, optical scanners, and automated storage and retrieval systems link highly informed and solidly connected networks. An additional phenomenon that is leading to significant performance improvements is total transparency across the supply chain. For example, insight into the status of every component in transit, enables adjustments to operations so as to optimize productivity.

Financial planning and analysis: Most organizations still over-rely on spreadsheets despite new technologies that could either replace or supplement them. To put it in perspective, some of the largest companies in the world continue to keep hundreds of people working with thousands of spreadsheets doing the same thing over and over again every month—an ideal opportunity for digital automation. Now there are quickly and cheaply implemented solutions that lead to performance improvements and labor cost reductions.

Pricing: So-called dynamic pricing lets digitally mature companies change prices minute by minute to optimize revenue. Data on consumer purchase habits, competitors' prices, and the weather, among other factors, can all feed into analytical digital price-setting. The airline and hotel industries have mastered dynamic pricing, and recently, so has Uber.[5]

Many companies are already reaping the rewards.

- Allstate Corporation has automated its claims processing with digital business rules, based on past claims data. It can now process claims in one day instead of 40.[6]

- Schindler Holding AG's commitment to the Internet of Things has helped the elevator and escalator manufacturer achieve a profit margin of 10%, compared with an industry average of 7%, and a return on assets that is double the average. The company's impressive capabilities include sensors that send 200 million messages a day on elevator performance.[7]

- Codelco, the world's largest copper producer, automated its mining operation and now uses driverless mining trucks, which are controlled remotely based on real-time information.[8]

- Wealthfront and Betterment are two wealth management firms using roboadvisors to replace human financial planners. The firms use complex investment algorithms that can process huge volumes of information to automate investing, and they are challenging traditional brokerage firms.[9]

4. US Department of Energy – Federal Energy Management Program Operations and Maintenance Technology Report, July 2008, http://www1.eere.energy.gov/femp/operations

5. http://www.latimes.com/business/la-fi-agenda-dynamic-pricing-20160314-story.html

6. MIT Center for Information Systems Research, MIT CISR Value Framework, March 2011. Retrieved from http://cisr.mit.edu/blog/blogs/2014/07/08/business-rules/

7. P. Weill, MIT CISR International Research Forum, December 3, 2015, Sydney

8. George Westerman et al., "The Digital Advantage: How Digital Leaders Outperform Their Peers in Every Industry," Capgemini Consulting, https://www.capgemini.com/resource-file-access/resource/pdf/The_Digital_Advantage__How_Digital_Leaders_Outperform_their_Peers_in_Every_Industry.pdf

9. Trevir Nath, "The Future of Robo-Advisors: Future Advisor," Investopedia, April 10, 2015. Retrieved from http://www.investopedia.com/articles/investing/041015/future-roboadvisors-future-advisor.asp?header_alt=c

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SUMMARY

Game-changing digital capabilities have a ready transformed millions of jobs, but many more stand ready for transformation.

The University of Oxford predicted that about 47% of the total US workforce is at risk of losing employment due to digitization, after it looked at 702 occupations, from watch repairers to insurance appraisers. The report's authors argue that if enough data can be gathered for pattern recognition, it is possible to automate virtually any task. These possibilities are realistic given that complex, voluminous information can be accessed, stored, and processed, analyzed, and communicated instantly.[10]

Businesses should ensure that they are making the most of digital automation's rich potential to enhance performance through significant productivity improvements and reduced costs. Digital automation can enable businesses to survive and thrive during the latest industrial revolution.

10. Carl Benedikt Frey and Michael A. Osborne, The Future of Employment: How Susceptible Are Jobs to Computerisation? September 17, 2013, http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf

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ABOUT US

For nearly forty years, AlixPartners has helped businesses around the world respond quickly and decisively to their most critical challenges – circumstances as diverse as urgent performance improvement, accelerated transformation, complex restructuring and risk mitigation.

These are the moments when everything is on the line – a sudden shift in the market, an unexpected performance decline, a time-sensitive deal, a fork-in-the-road decision. But it's not what we do that makes a difference, it's how we do it.

Tackling situations when time is of the essence is part of our DNA – so we adopt an action-oriented approach at all times. We work in small, highly qualified teams with specific industry and functional expertise, and we operate at pace, moving quickly from analysis to implementation. We stand shoulder to shoulder with our clients until the job is done, and only measure our success in terms of the results we deliver.

Our approach enables us to help our clients confront and overcome truly future-defining challenges. We partner with you to make the right decisions and take the right actions. And we are right by your side. When it really matters.