

**THE
INTELLIGENT
& CONNECTED
ENTERPRISE**

Mark J. Barrenechea

The Intelligent and Connected Enterprise

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OpenText CEO

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Mark J. Barrenechea

Mark J. Barrenechea joined OpenText as President and Chief Executive Officer in January 2012, and also serves as a member of the Board. In January 2016, Mark took on the role of Chief Technology Officer.

Mark oversees the strategic direction of the organization. Under his direction, the Company has grown both organically and through strategic acquisitions, into a \$2.8 billion technology company and has successfully transformed into an Enterprise Information Management leader.

Mark has received many accolades recognizing his leadership and innovation over the years including the 2011 Best Large Company CEO from the San Francisco Business Times and the 2015 Results-Oriented CEO of the year by the CEO World Awards.

In addition, Mark has authored a number of books, including *Digital Manufacturing*, *The Golden Age of Innovation*, *On Digital*, *Digital Financial Services*, *Digital: Disrupt or Die*, *eGovernment or Out of Government*, *Enterprise Information Management: The Next Generation of Enterprise Software*, *Software Rules* and *e-Business or out of Business*.

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#1

The Intelligent and Connected Enterprise

Technology is pushing human limits. There are more machines than humans on the planet. Over half of the jobs we do will be automated, and every company will become a software company. The challenge will be to master the fine art of blending human intelligence with machine-enabled insights. For the Intelligent and Connected Enterprise, this is not science fiction, but the opportunity to reimagine business.

It is a new world. The Latin term for this is *Mundus Novus*.

In this *Mundus Novus*, industries are facing a series of challenging macro-trends. The demands of a Millennial workforce, the relentless threat of cyberattack, new ways to work, and complex regulatory environments are changing the ways that businesses operate. Industry 4.0 has introduced new business models, created cyber-currencies, and impacted the nature of conflict, society and security.

In fact, Augmented Intelligence is automating decisions and transforming our relationship with technology. The outcome of humans plus machines will be increased opportunities to change the world for good – something I like to call Augmented Humanity.

For organizations in all industries, technological changes are unstoppable. Digital makes running a global business very complex as the enterprise is dealing with facets that were not even in existence a decade ago. Achieving strategic priorities like reducing costs and increasing revenue are further complicated by the rise of a new workforce, the space-time-speed compression, technologies such as the cloud, the Internet of Things (IoT), mobility, artificial intelligence (AI), robotics, and issues around security and privacy.

The scale of technological change is larger than it has ever been. Consider the scale of a trillion devices generating a petabyte a second, or 40,000 robots constantly communicating on the factory floor.

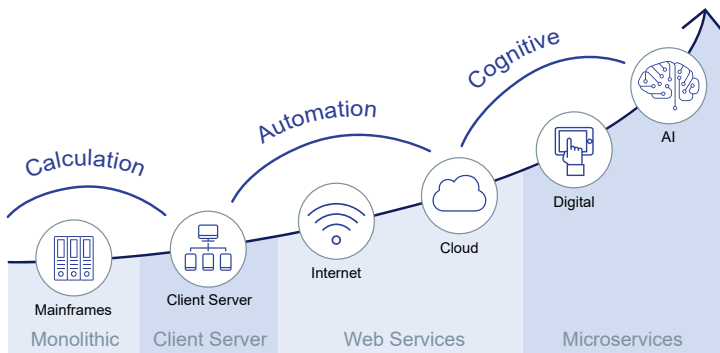


Figure 1: The Nature of Computing Has Changed

Eventually, there will be more machines than humans on this planet. While machines are built (and even self-replicate) to replace human functions, they will also make us smarter or force us to be more creative. Over the next few decades, there will be endless combinations of applications for both humans and machines.

We are no longer operating in the client-server era, or even the Internet era. We have moved into the cloud and cognitive eras. Digital technology is impacting every department in the enterprise, enabling the zero-length supply chain, cybercurrencies and new payment systems, cross-industry partnerships and emerging ecosystems, the subscription economy and much more.

At the same time, our capacity to generate and collect information is greater than at any time in human history. Deriving meaningful insight from this information is the next major transformative activity for businesses that will present new possibilities for growth and revenue.

To succeed, organizations must use new technologies to unlock the power of information, become more intelligent and connected, and drive engagement with customers, partners and employees.

Software will enable digital transformation and the rise of the Intelligent and Connected Enterprise.

The Intelligent and Connected Enterprise will leverage agile development to build apps in the cloud, automate processes and menial tasks to optimize efficiency, and explore data lakes for sophisticated insights and better decision making. Together, the cloud and edge computing will offer the benefits of agility and savings, while providing the infrastructure the enterprise needs to become part of the ever-expanding IoT universe. Every company will transform into a software company.

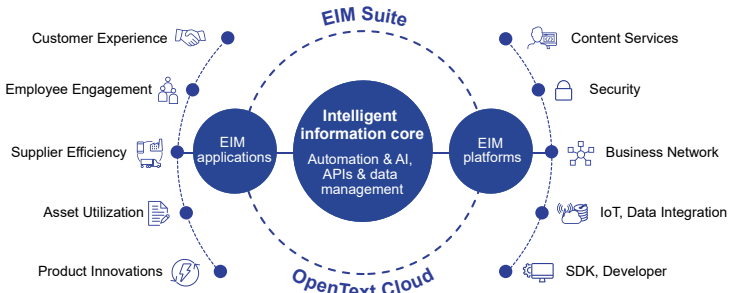


Figure 2: The Intelligent Information Core

Enterprise Information Management (EIM) is the software for the new world. It enables the Intelligent and Connected Enterprise with machines (automation), artificial intelligence (AI), Application Programming Interfaces (APIs) and data management combined into an intelligent information core.

These capabilities bring together information from both humans and machines, where it can be securely managed, stored, accessed and mined with analytics for actionable insights.

EIM follows the big data that is all of an organization's Intellectual Property (IP). It manages the unstructured content, from customer case files to employee records to data from transactions along the supply chain. EIM can also be used to manage information from assets such as planes, trains, automobiles, nuclear power plants, oil rigs, as well as from industry accelerators like IT and innovation platforms.

In the Intelligent and Connected Enterprise, EIM combines digital applications with an information platform, bringing together Content Services, Security, the Business Network, the IoT, and the Developer for optimized customer experience, employee engagement, asset utilization and supply chain efficiency.

Furthermore, EIM drives intelligent automation. Tens of thousands of processes running at any given time can be examined to find projects that are stalled, avoid costly bottlenecks, elevate priority processes or identify processes that are good candidates for automation.

Along with automation, the Intelligent and Connected Enterprise uses a cloud-based IoT platform to dynamically integrate supply chain communities and build solutions for greater efficiency, agility and new value-added services. Robust content services mean that information from any machine is supported, whether it is a smart machine, industrial machinery, or an automotive or medical device.

Connections are supported at a planetary scale. Ten million trading partners do business with one trillion machines using an intelligence that moves beyond automation to insight for incredible benefits across the business network.

And the edges are intelligent as well. With millions of endpoints, the perimeter of the Intelligent and Connected Enterprise is vast. Its endpoints are smart. They have logic and support transactions and interactions that number in the billions.

EIM delivers and enables the Intelligent and Connected Enterprise. Only EIM can help organizations in every industry collaborate with confidence, validate endpoints with machines and the IoT, stay ahead of the regulatory technology curve, identify threats that cross their networks, leverage discovery with information forensics and gain insight and action through AI and automation.

#2

An Information-Infused Future

Computing has changed, and we must think differently about how we write and deliver software. This is based on pertinent, evolving dynamics in the world, including four billion connected humans, a new Gen Y/Z workforce, 25 million developers and one trillion machines. When these forces combine, the amount of data produced will number in the yottabytes. How will the Intelligent and Connected Enterprise navigate, nurture and protect this information?

Humans are more connected to technology than ever before.

Twenty-five million developers are fueling the digital economy around the globe, designing software solutions and apps with emerging technologies. Over the next ten years, there will be four billion connected users on one high-speed, highly reliable network: The Internet. One trillion machines will also connect using this network: everything from our personal devices (wearable, implanted or otherwise) to health equipment, automobiles, thermostats, appliances and more. Humans will connect to each other, machines and business networks in a global ecosystem.

Another dynamic that is fueling the technological boom is our global and fluid workforce. Millennials (Generations Y and Z) are entering the workforce and phasing out Baby Boomers. They are the new guard. They have grown up using computers and mobile devices, and they are changing the way technology is being designed, accessed and purchased.

And finally, computing has evolved to become “wicked smart.” I call it the “Internet of Me.” We have all experienced how tailored and personalized our online interactions have become, whether in a business or consumer context. There is an algorithm for almost everything and each interaction is becoming smarter and learning, behind the scenes, as more data is collected.

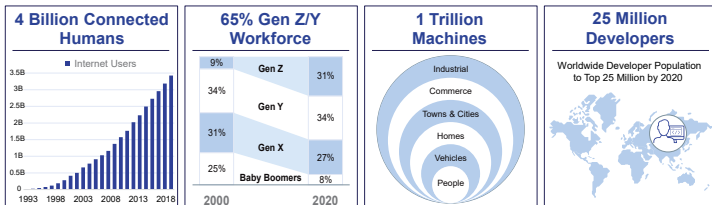


Figure 3: Trends Creating an Information-Infused Future

Algorithms run our lives. They are not new, but our reliance on them is unprecedented. It is driven by the need to understand and process the huge amounts of data we're generating. Most of us are not even aware of algorithms when we use them. Almost magically, they make things happen.

Basically, whenever you use computers, you are relying on algorithms.

Every time, you complete a web search, algorithms are working behind the scenes to determine your results in a fraction of a second. Algorithms power sites like TripAdvisor to find you the best ticket price or vacation packages available. When you purchase a book on Amazon, algorithms make additional recommendations or tell you what your colleagues are reading. Netflix knows exactly what the next show you want to watch will be.

Based on predicative software and the ability to process information in microseconds, algorithmic trading is driving many investment decisions. Algorithms make sure the pilot who flies your plane follows the best possible flight path, getting hundreds of planes where they need to go. And they boost security at airports, using facial recognition software.

Algorithms also simplify the complexity in our daily lives. They make us more efficient, and in some cases, safer. And all of this is happening without human intervention. The power of algorithms lies within the data and its many applications.

Every day, our interactions, transactions and connections are producing over 2.5 quintillion bytes of data.¹ As both consumers and professionals, we have to sift through a lot of digital “noise” to find meaning. Technologies like AI and analytics can help us to eliminate the noise and get to what we need.

The Intelligent and Connected Enterprise transforms its data into valuable information using AI and analytics-based algorithms by leveraging EIM. With increasing volumes of information, organizations will be required to comply with regulations to safeguard data, and particularly, personal information. OpenText EIM enables organizations to gain insight through market-leading information management solutions, on-premises or in the cloud. Innovative and automated tools like Information Lifecycle Management, Records Management, eDiscovery, AI, IoT, and Collaborative platforms help the enterprise to unlock the value of its information to differentiate itself from others and to compete with agility.

Ultimately, information is at the center of everything we do – from interactions, transactions and processes to our everyday digital experiences. It is shaping our lives across the planet and driving businesses, no matter what size an organization is and regardless of industry. For the Intelligent and Connected Enterprise, information is a strategic asset. The application of technology on such an asset has the capacity to enrich enterprise information beyond our wildest dreams and amazing things will happen. In fact, they already are.

#3

Amazing Things are Happening

It is an amazing time to be a Citizen of the World. Breakthroughs in technology are having a profound effect on our lives. Gene editing is redefining the prevention of disease and extending our life expectancy, quantum computing is available in the cloud, 3D metal printing could replace mass production and new techniques in AI are giving computers imagination and automating many aspects of our lives. CAVU: Ceiling and Visibility Unlimited.

I have been in the software industry for over 30 years and I've never seen changes like the ones that are happening today. Last year, the digital economy grew six times more than the growth of the total economy. Technology is pushing the limits on our abilities to impact our lives (mostly) for the good. Here are just a few examples of awe-inspiring technological advances that could change our lives in dramatic ways.

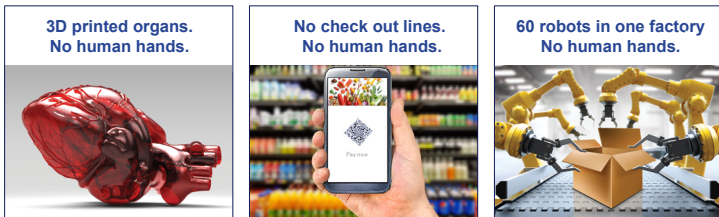


Figure 4: Impacting our Lives in Varied and Dramatic Ways

We are experiencing a global shortage of organs available for lifesaving transplants.² The concept of bio-printing, or the ability to three-dimensionally (3D) print living tissue and organs could save hundreds of thousands of lives every year. A startup in the U.S. is working on a way to print 3D hearts using an MRI scan of the patient's heart and a blood sample. Blood cells are converted into heart cells and fed into a 3D printer. Once the heart has been printed, it is placed in a bioreactor until it begins to beat.³ The 3D printed heart mimics the structure, property, and look and feel of a "normal" heart. Liver tissue is being reproduced in a similar fashion. Entire human organs will soon be available for transplant, built entirely from scratch by a 3D printer.

In manufacturing, 3D metal printing will change how we manufacture goods. Print-on-demand of large parts could become a reality, replacing mass production and reducing the requirement for factories to keep large inventories. Along with the ability to reproduce parts for less money, 3D metal printing also has the potential to produce more intricate, complex and higher performing, customized parts. As 3D metal printing becomes more common, software is already being developed to generate 3D print-ready designs.⁴

Over the last year, there have been breakthroughs in CRISPR (a technology for targeted gene editing) and CAR T-cell therapy to help combat diseases like Acute Lymphoblastic Leukemia (ALL) and advanced lymphomas. Over the next decade, technologies like these will help us live longer, healthier and happier lives. Research has been driven by supercomputers, clinical trials and clinical research, and these technologies are laying a path to cure everything from influenza to cancers, including leukemia.

Any discussion around technological breakthrough must include at least one reference to Artificial Intelligence, or AI. While it is currently the preoccupation of technology giants and research firms, advances in machine learning in the cloud will make AI and neural networks available to a wider user base. This will not only impact our daily lives, it will also make industries like healthcare, manufacturing and utilities much more productive and efficient.⁵

“Dueling neural networks” of AI are being developed with the ability to spar with each other. Simplified mathematical models of the human brain square off in a game that gives AI the ability to imagine and then generate images. Because it is an example of AI making sense of the world around it, this has been hailed as one of the most promising advances in AI in the past decade.⁶

On the consumer front, Amazon announced the opening of its first physical grocery store, Amazon Go, in January 2018. The shopping experience is fully AI-powered and automated. Shoppers scan their smartphone at a turnstile, cameras and sensors track the items they purchase, and they are billed after leaving the store based on credit card information.⁷ No cash, no checkout lines and no human cashiers required.

In addition to AI, the back end of technology has leapfrogged tremendously with quantum computing. Similar to AI, quantum computing can be accessed as a cloud service. The IBM Q systems is available to clients who have a 20 Qubit processor. The amount of time it takes to perform quantum computations is 90 microseconds. A prototype 50 Qubit processor has also been built.⁸ This is extreme computing, powered by the amazing capabilities of quantum computing and the Qubit. Calculations and applications that were beyond our reach are now closer to reality using quantum computing.

Advances in digital technology such as the ones above are already changing the way we live and work. Inside the Intelligent and Connected Enterprise, specific jobs will be automated for efficiency and productivity gains. The Changing Precision Technology Company (also known as China’s unmanned factory) in Shenzhen replaced 600 human assembly line workers with 60

robots. This resulted in a fivefold reduction in errors along with a 250% increase in production.⁹

These are all snapshots of the amazing places that technology can take us. I, for one, am optimistic about how we can use technology for the good (more on that later).

At the same time, however, technology can also be used to do bad (and stranger) things.

#4

... So Are Bad and Stranger Things

Every 39 seconds a company in the U.S. is hacked and one in three people are affected. Cyberspace is the new battlefield. Bits, bytes and botnets are the weapons of choice. From stolen Intellectual Property to personal accounts being compromised to ransomware Wannacry, all data is vulnerable. Can our social (media) status be as easily compromised? In the digital age, what does it mean to be a good digital citizen?

With the good, there is always the bad – and sometimes there is strange.

Cyberattacks and information breaches are happening every day, from influencing the outcomes of elections to bringing down businesses to massive data breaches of personal information. In fact, every 39 seconds a company in the U.S. is hacked and one in three people are affected.¹⁰

There are two types of companies: those that have been hacked and those that are about to be. Statistics show that every year the number of breaches increases. Current corporate security infrastructures, practices and policies are unable to keep pace with today's sophisticated hackers.

And the activity is only growing.

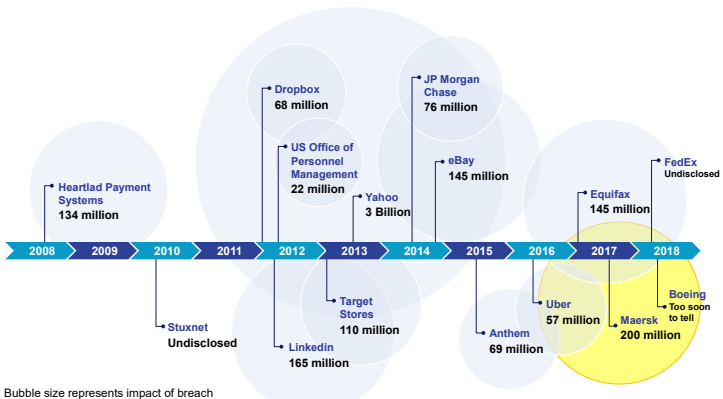


Figure 5: Cyberthreats Are on the Rise¹¹

Each year, the World Economic Forum releases its *Global Risks Report* to identify and analyze the most pressing risks that the world faces. In the 2018 report, the experts and decision makers surveyed were most concerned about the environment and cyberthreats over the next decade, along with geopolitical tensions. In short, in their view, future risk will be created by either “Acts of God” or machines.¹²

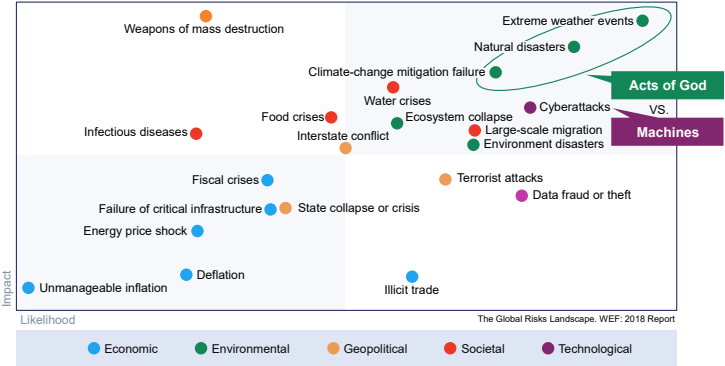


Figure 6: A Zero-Trust Environment

From stolen Intellectual Property (IP) to personal accounts being compromised to ransomware WannaCry, businesses are operating in a zero-trust environment.

In an example of how cyberthreat can destroy a company, a telecommunications company was breached by a nation-state when hackers stole the company’s design documents. The company ultimately went out of business, in part because the stolen documents were shared with a key competitor. This is an example of cyber espionage, with an attack originating from competitors or nation-states trying to steal business plans, trade secrets or IP – and it could happen to any company.

Malware is another example of a cyberbreach. A state-owned oil company was attacked through a phishing email scam that infected tens of thousands of workstations. As much as 75% of the infrastructure in the company was affected, and it shut the company down for two months.¹³

Not only are companies in danger, people's lives can also be threatened. WannaCry, the biggest ransomware attack in history, infected 300,000 computers across more than 150 countries. WannaCry's impact was particularly pronounced at hospitals in the U.K., where more than 19,000 appointments were cancelled and computers at 600 emergency departments were locked down. It was later discovered that with basic IT security, the attack could have been prevented.¹⁴

But not all breaches are a result of cyber espionage or hacking. Many are inadvertent and are the result of insider privilege and misuse. A series of cyberattacks have occurred using the SWIFT banking networks. In just hours, unknown hackers siphoned off \$81 million in funds. They used the SWIFT credentials of a bank to send fraudulent money transfers to be made to bank accounts in the Philippines, Sri Lanka and other parts of Asia. In this attack, the bad actor was an employee who knew the codes, what files to use, and how to request the transfers.¹⁵

There are many other examples of cyberbreaches.

Technologies like AI will make cyberthreats more targeted and creative. Take image recognition, for example, used for identity theft. Over the past five years, AI has improved from correctly categorizing images with 70% accuracy to 98% (near perfect categorization), which exceeds the human benchmark of 95%.¹⁶

From the bad, there is the downright strange.

Our social media data determines our social status, or, at least, a portion of it. What happens when your social data can no longer be trusted as an accurate representation of yourself as a “good citizen” in society?

In Shanghai, for example, a government-backed company has legally collected data on every citizen. Honest Shanghai, a rating app for citizens, is one of many social credit systems run by local governments. It is part of China’s goal to establish a nationwide social credit system by 2020.¹⁷

Scores are very good, good or bad. Those with a very good score enjoy more government services or perks, like discounted flights or lower interest rates for loans.

If you want to go to college, your application is ranked based on your social score. If you want to travel outside of Shanghai, whether you can get a ticket or class service is determined by your social credit.

There are skeptics. If the government is watching everyone else, who is watching the government?

And on an even stranger note, to illustrate how data can truly be manipulated by technology today, researchers from the University of Washington have perfected a facial recognition algorithm and a mouth movement algorithm to precisely model how someone speaks. Using this technique with a video of President Barack Obama, they can literally put words into his mouth.¹⁸

In another example, Emma Gonzalez, Parkland shooting survivor, fell victim to the same kind of media manipulation when fake news published a tampered image of her tearing up the U.S. Constitution on social media sites.¹⁹

Welcome to the world of digital, as we sit on the cusp of the cognitive era, where good things, bad things and stranger things are happening.

And most of these are occurring at the intersection of technology and data.

#5

Information is At the Heart of Your Business

Even in the digital age, the world of business is document-centric. What sets the Intelligent and Connected Enterprise apart is a ready adoption of the tools and technologies needed to mine, model and analyze its data. And a cultural shift that values information as an asset. Together, these facets enable the nimble transformation of raw data into intelligent action.

Even though digital information is evolving at a rapid pace, the world is still document centric.

Documents, whether created by a human or generated by a machine, underpin every operation, communication exchange and innovation in the Intelligent and Connected Enterprise. What is changing, however, is how they are created, their levels of complexity and their collaborative nature.

Consider all the business documents that need to be managed, from invoices, payments, contracts, waybills, orders, etc., along with their differing formats: video, voice, JPGs, smartphone images, PDFs and more. OpenText has spent 20 years understanding all these formats and how to break them down effectively into metadata and other components.

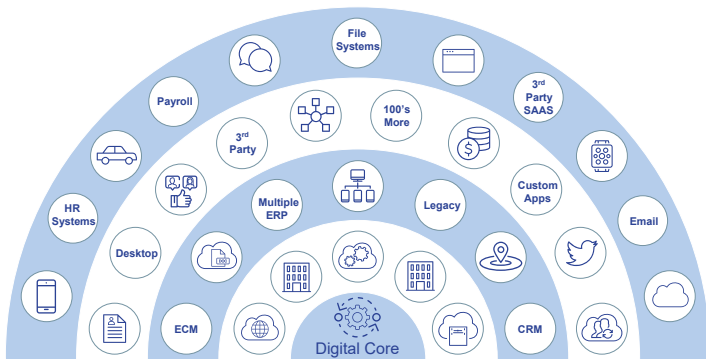


Figure 7: Information Across the Enterprise is Extensive

The dynamics surrounding many documents are changing, impacted by their context, whether it is the IoT, AI, AutoCAD, or XML. Since the world is document-centric, all the business classes of documents remain consistent. Even though the lifecycle of a contract or a transaction has changed considerably; in many cases, data is captured in the form of a document.

The vast majority of business information relates to employees, customers, suppliers, assets and products. But, for this information to provide business value, the Intelligent and Connected Enterprise must be able to engage with it in meaningful ways to uncover insights.

To help businesses connect with their information and unlock its potential, regardless of whether it resides behind the firewall or in the cloud, OpenText is continually developing information-based enterprise applications. These include departmental applications like accounts payable, case management and invoice management; industry-specific applications like claims processing and regulated documents; as well as active applications for supply chains.

These applications give the Intelligent and Connected Enterprise real-time access to information that has been enriched with analytics and AI. With the right, intelligence-infused information, users can make informed decisions. That same information can also be used to identify new opportunities, such as ways to optimize processes, improve products or services, or monetize data.

To rise to the challenges of a digital economy, organizations must digitize their business processes. This goes beyond converting paper records to electronic or automating process steps. Ideally, organizations should digitize core business processes from end-to-end, in their entirety.

The benefits of digitizing information-intensive processes are numerous. Costs can be reduced by up to 90%.²⁰ Errors can be minimized. New channels and new routes to the customer can be leveraged. Replacing manual paper-based processes with digitized processes and documents allows businesses to collect data to better understand process performance, costs, and risk factors.

When processes and data are fully integrated, analytics and AI can be applied to add value across the enterprise.

Analytics will be a mainstay in organizations of the future. Insights based on analyzing information empower businesses to act on this information and automate their decision-making processes. Applying advanced analytics provides a better understanding of transactions and interactions and can help improve outcomes.

Investing in the necessary infrastructure will help organizations capitalize on their information. This requires creating data lakes rather than storing information in data warehouses. In data warehouses, information is kept in large repository or folder format, whereas in data lakes, information is maintained in its most raw format. This kind of information makes analysis quicker and information more actionable as advances are made in computing, chipsets, real-time streaming and data pipelines.

Data lakes include information from every connected device and all this information (both structured and unstructured) can be remotely connected to an IoT platform. Organizations can leverage this information in different ways to help drive IoT-enabled processes and greater visibility. Deciding which systems and devices need to be connected to the IoT platform, what type of information needs to be obtained, what transactions need to be accessed, and what to measure will then determine the type of analysis and reporting that is required.

It is unsustainable for an organization to retain vast amounts of data from every connected device over a long period of time. By deploying edge analytics (analytics conducted at the device or network point level) in alignment with information governance policies, data with long-term strategic value can be identified.

To unlock the power of its information, the Intelligent and Connected Enterprise will plug into its customers' digital ecosystems. It will integrate technologies that enhance automation (like machine-to-machine communications, the IoT, AI and analytics) with legacy IT infrastructure, standardize its data across systems and create dynamic and flexible processes to support new technologies and devices.

In all its format, information beats at the heart of business. It drives digital transformation and maximizing its value will be the key differentiator for the Intelligent and Connected Enterprise. Yet, despite the benefits that access to great amounts of data offers, concerns around security are ever present. Security must be Job 1.

#6

Security is Job 1: Machines vs. Machines

According to business mogul Warren Buffett, cyberattacks are the biggest threat to humankind, even more so than nuclear weapons. Digital is redefining cybercrime and cyberwarfare. It is no longer human vs. human, or human vs. machine... it is machine vs. machine. The right tools must be in place to detect and protect. For the Intelligent and Connected Enterprise, Security is Job 1.

Digital is redefining cybercrime and cyberwarfare.

Cyberattacks today are multi-stage, hard to discover and highly targeted. Some security threats are accidental, stemming from unauthorized employee access. As much as 38% of attacks come from internal breaches.²¹

In other instances, hackers test perimeters, phishing, penetrate and lurk (sometimes with a dwell time of up to 100 days), locate weak information policies, procedures and systems, or breach the network laterally. Once inside, information can be leaked out slowly or exploited en masse.

You must assume the bad actors are already inside your network. What are these bad actors after? The most valuable enterprise resource: information.

For the Intelligent and Connected Enterprise, information security is Job 1.

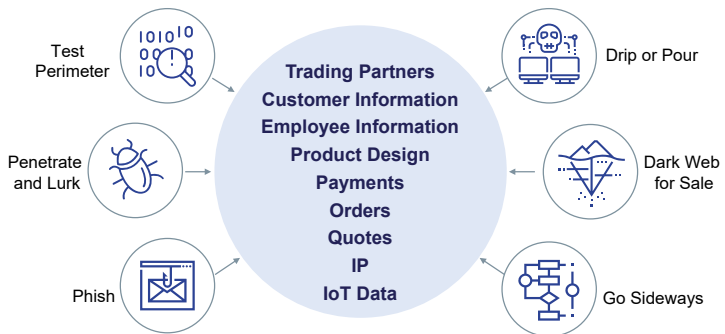


Figure 8: Information at Risk

Firewalls and other traditional security measures are no longer enough to secure enterprise information. Vulnerabilities permeate all levels of enterprise IT systems, and the Intelligent and Connected Enterprise must be prepared to deal with both internal and external security threats.

Now, more than ever, organizations require the latest information security tools to collect, analyze and remediate urgent threats.

There is an expanding window of exposure for breaches. On average, it takes almost 200 days to detect a breach, and then a month to resolution. The security of the future will combine knowledge (machine learning), insights (AI), and autonomic action (autonomous clouds) to compress the time it takes to detect a breach and move beyond resolution to learning.

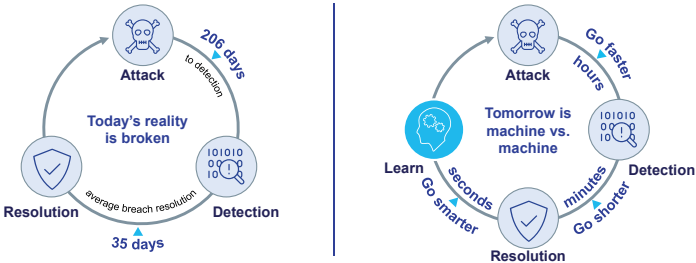


Figure 9: Windows of Exposure Need to Shrink

Machines are attacking humans, and we cannot fight them. We need to use machines to fight the machines.

It is no longer human vs. human, or human vs. machine... it is machine vs. machine. In a digital economy, organizations will rely on machines to help manage data, intellectual property (IP) and the growing number of digital identities associated with connected technologies. Also, organizations will use machines to battle other machines in a cyberattack.

Information lies at the heart of these attacks. This includes everything from customer information to employee information, product designs, payments, orders, invoices, machine-to-machine or IoT data and more.

As the lifeblood of business, information needs to be protected. Enterprise Information Management (EIM) is a digital platform that helps to ensure the integrity, accuracy, compliance and protection of information throughout its lifecycle – whether it is design documents for a fighter jet, trading partner information in a SWIFT network, payment information in a bank or employee information in a government database.

Statistics show that data breaches will continue to accelerate. In the first half of 2017 alone, there were nearly 2 billion records lost or stolen in a breach.²²

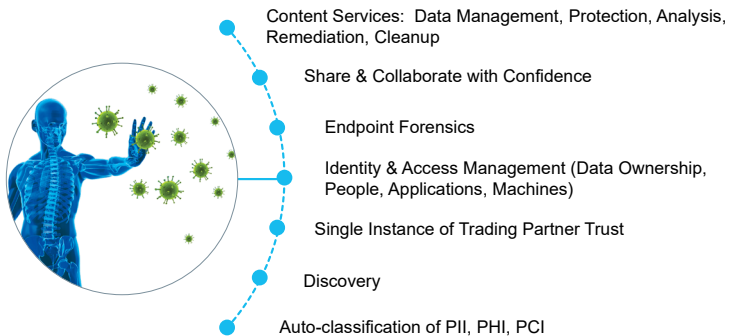


Figure 10: Total Security - The Immune System for Business

Information, security and compliance requirements are merging into a single challenge that must be fought on multiple fronts.

Comprehensive information security is the immune system for business. EIM arms the Intelligent and Connected Enterprise with the security tools and approaches it needs to discover and recover from information breaches.

As a critical aspect of a complete security platform, endpoint forensics collect information, monitor behavior, send notifications and help to automate incident response to minimize risk.

As digital extends business into a global ecosystem, the need to manage and protect multiple systems, relationships and identities is growing. An Identity and Access Management (IAM) platform enables organizations to centrally manage the entire identity lifecycle of their users, as well as their access to critical resources across their business ecosystems.

Discovery solutions deliver the gold-standard of digital forensics and unstructured data analytics for searching, collecting and investigating enterprise data to manage legal obligations and risk.

New regulations will require new ways to classify data. Auto-Classification is the next-generation solution that combines industry-leading records management with semantic capabilities for classification of content.

As the immune system for business, EIM ensures that Security is Job 1 for the Intelligent and Connected Enterprise. It helps organizations all over the world to manage data, IP and the explosion of digital identities and endpoints associated with connected technologies.

#7

We All Have an Endpoint Responsibility

The IoT will push the number of endpoints into the trillions. As the size and complexity of endpoint environments grow, how can the Intelligent and Connected Enterprise subdue the juggernaut of cyberattack? By securing all the endpoints – laptops, smartphones, printers, POS terminals, medical devices, smart sensors, etc. Information is everywhere; we all have an endpoint responsibility to protect it.

By 2025, there will be 80 billion devices worldwide connecting to the Internet of Things (IoT). That's the equivalent of 152,000 devices connecting every minute.²³

These connections will push the number of endpoints into the trillions.

Our cars, homes and offices will be equipped with IoT gateways. With all these devices (and embedded sensors) exchanging information, the amount of digital data will balloon to 180 zettabytes.²⁴

Information will be everywhere.

In addition to the ubiquity of information, the nature of the workforce has also changed. Whether they are working remotely from a hotel room, at a coffee shop, commuting to work, or in the office, your employees are always “on” – sharing information, Wi-Fi jumping, toggling between apps or posting on social media.

Wherever your employees go, if their device has a signal or an address, it can be found or exploited.

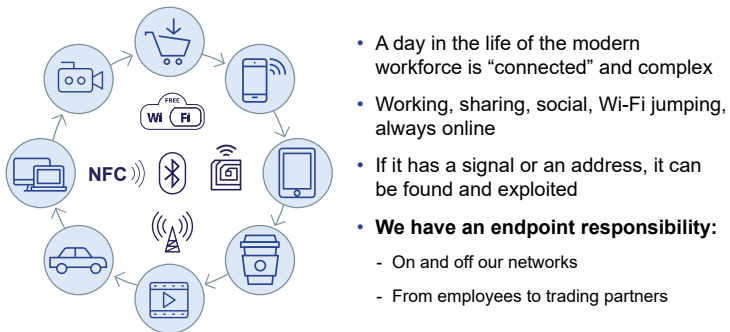


Figure 11: Employees - Always “On,” Always Connected

A day in the life of the modern workforce is technologically complex.

Globalization necessitates that digital assets and resources, once secure behind firewalls, need to be made accessible to a distributed workforce. This information extends to an ecosystem made up of suppliers, distributors, logistics providers and other partners. Information is extended across firewalls, networks and borders.

These endpoints can expose confidential information contained in nuclear power plant designs, an employee's personnel file or the software program that a developer is writing to control an autonomous car.

While we will have greater capabilities to collect this data, analyze it for insights and create a range of new services based on it, an increase in connections means that more endpoints, identities and data will need to be protected.

As the size and complexity of endpoint environments grow, we all have a responsibility to protect the endpoints.

Just as every company will become a software company, every company needs to be a security expert in the digital economy. The enterprise has a responsibility to protect intelligent endpoints, whether they are medical devices, engines, sensors, laptops or mobile phones.

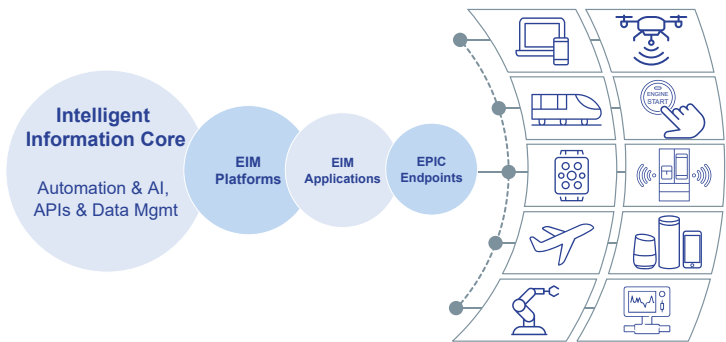


Figure 12: OpenText EIM Secures Epic Endpoints

The OpenText EIM platform integrates multi-level, multi-role, multi-context security into its intelligent information core, enabling organizations in every industry to manage and protect their epic endpoints.

Identity and Access Management (IAM) “wraps” a security layer around connected devices, helping to ensure the appropriate level of access to resources across virtually any combination of internal or external systems.

Endpoint solutions integrate into existing IT infrastructures and operating centers to help organizations protect data, comply with regulations and perform discovery when required. Information forensics can be completed on a laptop or a mobile device. Data from drones or security cameras can be collected to complete video inspections or pipeline analysis. The solution works across fleets as well – buses, cars, planes, or trains. Organizations in the transport industry are connecting the flow of IoT information from component parts (like brake systems) into the EIM platform’s intelligent and connected core.

As part of the OpenText EIM platform, IAM protects 35 million endpoints, with support for more than 26,000 mobile device profiles. It collects information, monitors behavior, sends notifications, uses advanced analytics and machine learning to detect abnormalities and feed them into our AI platform Magellan for detection, resolution and learning.

We have moved beyond our focus on human-generated data to incorporate machine-generated data, bringing together structured and unstructured information.

EIM secures intelligent endpoints. It helps organizations all over the world to manage data, IP and the explosion of digital identities associated with connected technologies.

#8

OpenText EIM – the Platform for Innovation

OpenText EIM fulfills on the vision of the Intelligent and Connected Enterprise. Intelligent insights are driven by AI to enable governance and discovery. Connections are secured with validated endpoints and identities, so that the enterprise can share content and collaborate with confidence. Agility and flexibility are achieved through automation and a unified application development environment, designed for the developer – who makes all things possible.

Today’s disruptive digital technologies are transforming both enterprise and consumer spaces, re-shaping our expectations about how people work, collaborate and conduct business.

Our vision is to enable the Intelligent and Connected Enterprise and to inspire new ways to work inside the enterprise.

The latest release of OpenText Enterprise Information Management (EIM), named Release 16 Enhancement Pack (EP) 5, is the digital platform for innovation. It is also our blueprint for the future. To date, we have been releasing enhancement packs slated to run through to the spring of 2020.

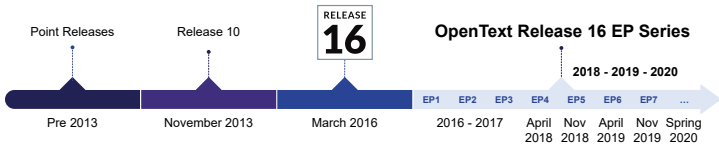


Figure 13: OpenText Release 16 EP5

Release 16 EP5 features deeper integration, increased AI and automation capabilities, enhanced security offerings, richer user experiences and cloud optimization.

Innovations across our EIM platform suites – Content Services, Artificial Intelligence, Discovery, Business Network, Experience, Security and AppWorks – have been designed to drive insights, user adoption and more secure connections between humans, processes and machines.

Release 16 EP5 enables the Intelligent Enterprise.

It does so through our next-generation Content Services platform, which connects information across and between organizations to accelerate productivity, improve governance and drive digital transformation. Deeper integration connects users

to information from multiple sources, empowering them to work in lead applications (like SAP and Salesforce) and access relevant information when they need it.

To successfully transform their business operations, organizations need unparalleled access to business insights. AI brings new information onstream along with the ability to analyze it. Release 16 EP5 increases the machine-learning power of OpenText Magellan, our analytics and AI platform.

OpenText combines leading EIM platforms with applications that solve business problems, infusing them with AI and analytics. Both capabilities are expanded in Release 16 EP5 to include predictive metrics for optimized supply chain performance; increased language and big data support; greater machine learning power with Apache Spark™; and rich media analytics within the OpenText Experience Suite.

Enhancements to AI also include improved predictive research to reduce the time of discovery of information, litigation costs and time of trial.

Discovery is a critical component of EIM. Intelligent and Connected Enterprises are managing the entire e-discovery lifecycle with OpenText Discovery.



Figure 14: OpenText Discovery for Speed-to-Resolution

OpenText Discovery is the gold-standard in legal technology designed for eDiscovery, forensic data collection, contract analysis, and legal knowledge and process management. It helps organizations protect data, comply with regulations, perform discovery when required and speed time from detection to resolution and learning.

Along with discovery, OpenText Security protects the Intelligent and Connected Enterprise's most sensitive information. Release 16 is a multifaceted platform that offers multi-level security, on premises or in the OpenText Enterprise Cloud. Advanced AI and Security integration helps organizations build threat-hunting dashboards and other visualizations to maintain a focus on Security as Job 1.

New innovations in EP5 enable agentless, cloud-based, multi-disciplined threat detection as well as the detection of internal security breaches. A combination of EnCase EndPoint Security and Logical Imaging delivers continuous monitoring and detection capabilities.

Release 16 EP5 enables the Connected Enterprise.

Our latest EIM platform combines structured and unstructured information to enable tighter connections. Humans and machines come together on a secure system to automate information-infused processes.

The OpenText Business Network powers the seamless, secure flow of information across an extended business ecosystem of people, systems, and things. Enterprises use it to simplify inherent B2B complexities and gain insights to drive efficiencies and speed time-to-revenue.

OpenText Business Network, Cloud 16, makes it easier than ever to connect any trading partner, regardless of their technical capabilities. The EP5 release features extended predictive metrics, priority transaction processing, expanded self-service capabilities, high volume notifications and improved usability, as well as support for direct connect outsourcing. Upgrades to Identity and Access Management (IAM) help to ensure the exchange of information and transactions that occur in the cloud network are secure.

Deeper integration allows for better end user experiences. Release 16 EP5 offers a richer, end-user experience with enhanced developer controls and self-service capabilities. Advancements include the ability to interact with workspaces using a mobile device, a unified dashboard to simplify content mining with Magellan, and integration with OpenText Documentum.

OpenText Experience empowers marketing, line of business users and developers to transform and optimize customer experiences. Release 16 EP5 includes customer journey mappings to orchestrate customer interactions across every touchpoint. Along with multi-channel content publishing, this enables the Intelligent and Connected Enterprise to digitize the customer journey from end to end for a more consistent brand experience.

To unlock the potential of their information, intelligent enterprises are automating complex business processes. OpenText AppWorks provides a single platform for process automation, case management and low-code application development.

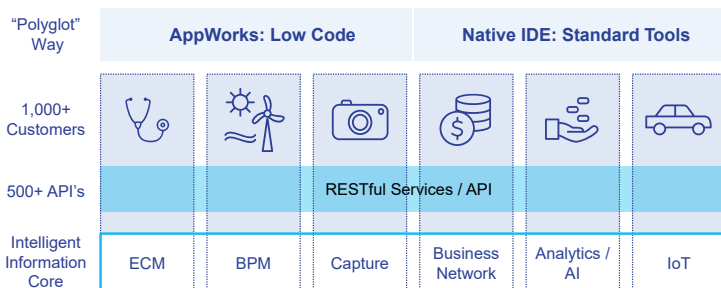


Figure 15: OpenText EIM is the Platform for Innovation

The developer is critical to the development of secure-from-day-1 applications. Release 16 expands its low-code development capabilities with additional out-of-the-box integrations designed for the developer. Greater functionality and efficiency is promoted through the “polyglot way” – the ability to write code in multiple languages.

It is a hybrid world. Release 16 and the EP series together, along with the OpenText enterprise cloud strategy, delivers the most comprehensive EIM suite on the market.

Running on premise, in the OpenText Cloud or in the public cloud, OpenText Release 16 EP5 is the platform for innovation, bringing to life thousands of content applications – across all industries – to transform organizations into Intelligent and Connected Enterprises.

#9

The OpenText Enterprise Cloud

It is a hybrid world. Businesses should be able to choose where they want to run their information-based applications: off-cloud, in the private cloud, in public clouds, as managed services or Software-as-a-Service (SaaS). As aviators say, Ceiling and Visibility Unlimited (CAVU) and this is what our hybrid, hyper-scale cloud infrastructure offers the Intelligent and Connected Enterprise – increased visibility and unlimited potential and options to perform, innovate and succeed.

Everything is more efficient in the cloud. It keeps overhead lean and storage requirements even leaner. It has given us the foundation for new business models and whole economies (like the subscription economy).

The cloud offers the benefits of flexibility and savings, while providing the infrastructure required to support transformation, along with emerging technologies like mobile devices and the IoT.

To optimize performance, the Intelligent and Connected Enterprise needs flexible options for public, private, or hybrid cloud deployments. With our latest developments in the enterprise cloud, we are re-defining the future of EIM and completing the need for our customers by simplifying their access to business-critical information in the most convenient, secure and agile methods available.

The OpenText Cloud is an integrated platform that spans off-cloud, business networks, private and public clouds to provide unprecedented customer transformation capabilities for the Fourth Industrial Revolution.

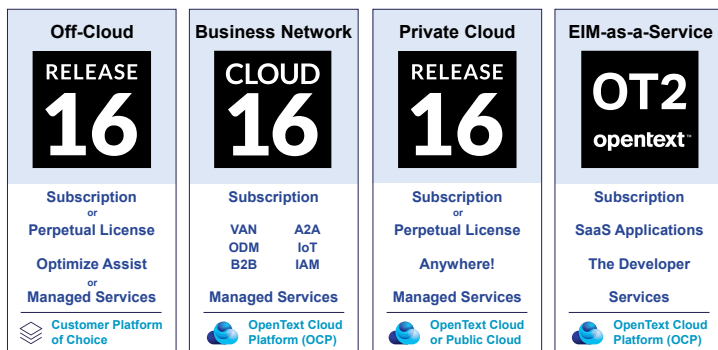


Figure 16: The OpenText Cloud – An Integrated Platform

Keeping up with the evolution of technology, plus the skills required to manage it, can drive up cost and uncertainty. A managed service procured via subscription and delivered by experts reduces the burden on IT staff, so that they can focus on more strategic initiatives.

Supported by a global, scalable, and secure infrastructure, the OpenText Cloud includes a foundational platform of technology services and packaged business applications for industry and business processes, with comprehensive OpenText Managed Services at its core.

Approximately 2,000 organizations are using our managed services to secure their information. With one contract and one SLA, they will never have to upgrade again. Business continuity is guaranteed, along with faster implementation and rollout, while overall risk and cost of ownership is reduced.

A key benefit of outsourcing is scale. OpenText Anywhere delivers hyper-scale hosting functionality, giving our customers the flexibility to manage their information securely at planetary scale. This “run anywhere” approach enables businesses to run their workloads in any cloud, whether it’s the OpenText Cloud, Google Cloud, Amazon Web Services or Microsoft Azure. Our partnership with Google Cloud demonstrates our commitment to offering our EIM solutions on public cloud infrastructures.

The cloud has introduced new complexities in technology investment. Inside the Intelligent and Connected Enterprise, lines of business are empowered to buy their own solutions while developers build their own inhouse applications and the IT department is under pressure to simplify and standardize.

There are many opportunities to extend processes and workflows to employees, customers and partners using cloud services. While we have been developing applications in the cloud to deliver on these use cases, we are also making more applications available with our next-generation, hybrid platform, OpenText OT2.

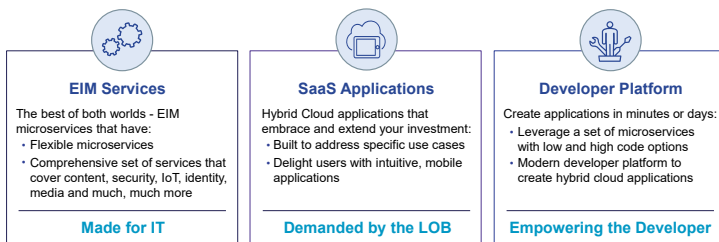


Figure 17: OpenText OT2 – The Next-Generation Hybrid Cloud Platform

Built from the ground up on a microservices architecture, OT2 simplifies an organization’s technology investment decision by delivering compelling applications for business users, a modern developer platform, and hybrid EIM services – all on a single Software-as-a-Service (SaaS) platform.

Made for IT, OT2 delivers a set of services that cover content, security, IoT, identity and media. A modern developer platform allows our customers to create hybrid cloud applications in minutes or days, using a set of microservices with low and high code options. Both on-premise and cloud applications work together seamlessly on a common framework.

OT2 opens our cloud infrastructure to our customers and partner ecosystem, enabling them to rapidly develop and deploy powerful business applications in the OpenText Cloud to drive digital transformation further into their operations.

Developing applications on OT2 (such as OpenText Legal Center and OpenText Quality Center) extends the value of our customers' investment in key OpenText platforms. This approach gives our customers a graceful path to the cloud.

OpenText is helping the world's largest businesses reinvent themselves with powerful business information applications on any cloud infrastructure for optimized customer experience, operational excellence and transformational business models.

Like cloud computing, AI gives organizations the ability to innovate and compete with agility in an information-infused future.

As the next frontier in the evolution of the Intelligent and Connected Enterprise, the impact of AI on business will be significant.

#10

AI – Four Key Ingredients

I like to say that autonomy is the mother of AI. There are four essential AI ingredients that every enterprise needs. Here is the recipe for AI success: Combine digital maturity with data ecosystems, add a good quantity of tools and techniques, and infuse with a rich array of use case scenarios. Mix well (by mainstreaming your machines and data). Now you are ready to build out key algorithms for your business.

Artificial intelligence is the great hope of software today: it can do everything.

At OpenText, we have developed a low cost, easy to use AI tool called OpenText Magellan. We want to make its application practical, so that it adds value instantly.

There are four key ingredients required for AI to add real business value: digital maturity, data ecosystems, tools and techniques and use case scenarios.

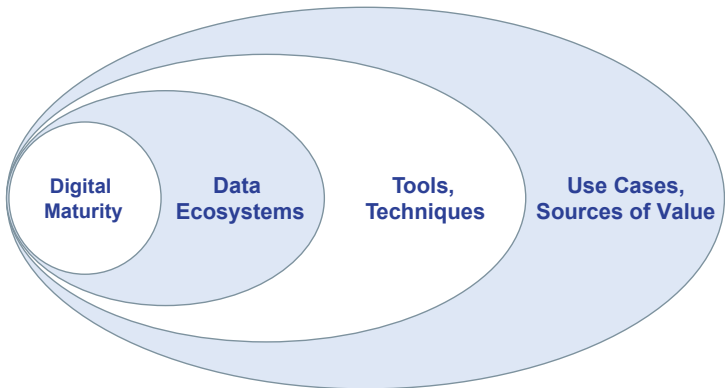


Figure 18: AI - Four Key Ingredients

The first ingredient is digital maturity, and this is wholly dependent on having mature processes. If the process is mature, chances are good that the data will be good. Quality data will provide better outcomes for AI. With mature processes in place, you can develop a business case for your AI application. The business case should be based on existing processes, industry best-practices and the positive impact or valued outcome.

With digital maturity in place, the next key requirement is data ecosystems. To help our customers develop compelling AI algorithms, we have standardized our AI platform, OpenText Magellan, on Apache Spark so that it can “talk” to smart meters, other devices, applications like Google® Maps or platforms like EIM and Twitter.

Magellan transforms enterprise information into active data by enabling machine-assisted decision making, automation and business optimization. It brings information to life to empower the Intelligent and Connected Enterprise. Data can be collected, fed into other applications, algorithms applied, information exchanged through deep learning and insights discovered to improve decision-making.

It supports innumerable use cases on a cohesive infrastructure that is equipped for handling massive amounts of structured and unstructured data. It integrates voice, video, text and natural language processing, and it supports multiple data formats.

With Magellan, our customers own the data and the associated IP. We are currently having hundreds of conversations with our customers at varying stages of adoption of Magellan, from RFP to use case analysis to proof of concept and deployment.

Customers are applying Magellan in inspiring ways to change the nature of work. In asset-intensive industries, our customers are using it for predictive maintenance and resource scheduling. HR departments are using it for hiring analysis to fill roles with the best candidates. Algorithms are being applied to help find ways to retain top talent based on measuring potential.

We have a public-sector customer with 100,000 employees, and they get fined if they fail to respond to an employee case in an allotted period of time. In fact, in the past, they have been fined \$15M a year. They are using Magellan to prioritize employee cases. Their goal is to avoid these charges by applying an algorithm based on employee complaints to a content system that is integrated with Magellan.

Another example is a global wine company with 6,000 employees and \$2B in revenue. They have standardized on Magellan to analyze their brand. Because of multi-tier distribution, the company often loses sight of the customer or where their product ends up. They may get some feedback from their website but ultimately, they lose control. As a result, the company cannot complete sales forecasting because they are unable to determine where customer demand comes from. The company is using Magellan to better understand the customer experience all the way along their distribution chain. Based on this, they can complete more accurate sales forecasting which will result in better Manufacturing Resource Planning (MRP).

The outcomes of AI platforms like Magellan will be significant. Better efficiencies and performances. Hundreds of thousands of dollars in cost savings. More innovative products and services. Smart homes, factories and cities. Improved health. Lives saved. A higher quality of living. Based on these, I encourage every company to place a no-regrets bet on AI and start today on the journey to becoming an Intelligent and Connected Enterprise.

The outcomes of AI are also creating new ways to work.

#11

New Ways to Work

The average Gen Z'er has the attention span of about eight seconds. I'll let that sink in (for a few more seconds). As the Digital Elite, Generation Z is causing a seismic shift in the workplace through new technologies, values, work ethics and expectations. They are creating new ways to work and these will call for entirely new skillsets, approaches and management styles.

Say goodbye to the 9-to-5 workday.

In the Gig Economy, every company will be a software company. Every employee will work as a data scientist. Work will be less permanent and more flexible. Co-bots (AI-driven robots) will infiltrate the workforce. The Intelligent and Connected Enterprise will draw on niche experiences, broad-based knowledge and content curation in the human cloud.

The employment landscape is in flux, impacted by forces that are transforming the workplace and introducing new ways to work. The most powerful of these forces? Shifting demographics in the workplace, digital technology and globalization.



Figure 19: Forces Are Transforming the Employment Landscape

For the first time in history, there are five demographics in the workforce: Traditionalists, Baby Boomers, Gen X, Gen Y and Gen Z. We are at a tipping point where in the next three to five years, the workforce will be predominantly made up of Millennials (Gen Y and Gen Z).

Millennials are reshaping the workplace. They have expectations and entitlements that are radically different to their predecessors. They march to the beat of a different drum, and the enterprise will have to embrace their work habits.

Together, these demographics form the “digital elite.”

Gen Z’ers multitask across at least five screens a day and spend 41% of their free time on computers or mobile devices.²⁵

They expect to use the same tools in the office that they use in their leisure time, like social media, mobile connectivity, gesture-based interfaces and wearable devices.

Mobility and flexibility guide this workforce. Self-reliance and personal freedom are non-negotiable. Gen Z’ers are attracted to organizations that are entrepreneurial in nature or function like a startup with more freedom and much less control.

Organizations will need to support diversity and equality to stimulate productivity as well as a highly evolving and inclusive workforce.

The new infrastructure will be fluid, dynamic, global and diverse.

In the workplace, hierarchies will flatten, organizational structures will decentralize, and the work environment will be collaborative and highly social.

Employees will expect easy and open access to information, knowledge and expertise. Large volumes of data will lead to greater insights. Information will drive intelligent action in the enterprise.

As mobile “eats the world,” offices and physical workplaces will disappear. Many employees will work remotely.

HR practices will also transform to support recruitment and retention of top talent in this new workplace model. The entire hiring process will become digitized from end to end. Video resumes will feature prominently while interviews, onboarding and training will occur via video conferencing.

Managing the Millennial workforce, the new skillsets they bring, and new job functions will also require new leadership qualities with flexible approaches and attitudes. Gen Z values transparency with clear expectations on performance, strategy and accountability. They want to be set up for success, not failure and will respect strong leaders who mentor, coach and direct them successfully, each step of the way.

Truth and integrity are important characteristics that both Gen Y and Gen Z hold in high esteem. They prefer honesty and tact over marketing spin and corporate speak and respect upfront feedback.

Digital technologies will support new ways to work.

Over the next few years, open communication platforms, collaborative technologies, video conferencing, sophisticated machine-language translation technologies, virtual and augmented reality (VR/AR) and holographic technology will fuel a global workplace.

The pace of work will be faster (powered by extreme connectivity, extreme automation and extreme computing power).

As workloads and data moves to the cloud, people will follow.

In what has been referred to as the “human cloud” – sites like Amazon’s Mechanical Turk are matching freelancers with employees to complete projects and tasks. The demand for these kinds of workers is growing. McKinsey estimates that by 2025, there will be 540 million workers in the human cloud.²⁶

As access to technology becomes increasingly subscription-based, so will access to talent.

Inside the enterprise, crowdsourcing will deliver competitive advantage like faster time-to-market and lower development costs. On-demand, high value connections with consumers will help organizations produce better products and services.

The Intelligent and Connected Enterprise will rely on data, AI and analytics. Many routine, repetitive and even white-collar administrative tasks will be replaced by computers and robots. Co-bots will work alongside humans, allowing people to program machines to do the tasks they do not want to do.

People will engage with each other and machines to innovate in ways not previously possible or even imaginable.

Integration of technology will give rise to jobs such as human and technology integration specialists, super-specialized data interpreters (like an interpreter for CRISPR), augmented reality architects, 3D printing engineers, nano-medics, organ agents, wind turbine techs, autonomous transportation mechanics and specialists, and drone dispatchers or operators.

As the population ages, the demand for healthcare workers (healthcare, personal care and social assistance), will also increase.

No matter what their occupation is, chances are good that future generations will work longer hours.

With growing life expectancy, we may even see the end of retirement. For those who cannot work past a certain age, this could lead to a loss of economic security.

As our work personas move out of the private sphere and into the public, our personal data will become more exposed. In the future, we could be more closely monitored in the workplace and rated using advanced technologies like wearables and AI.

The Intelligent and Connected Enterprise will need to embrace the forces transforming the workplace and create an infrastructure that supports connectivity, collaboration and compliance. There will be a critical requirement for organizations and governments to protect our personal data and use information for the good.

#12

Information is for the Good

I would like to change the narrative that information is bad. It is not inherently bad. In fact, it has the power to change the way we think, work, give back and live. Inspiring applications are being developed to address some of the most important global social and economic issues, such as disease, starvation, refugee displacement and poverty. It is time to focus on using information for the good.

Information is for the Good.

Information is to a business or to an individual as blood is to the body. Its foundation: Trust. Banish information, or the trust to protect it, and the world falls apart: All commerce would cease; bank accounts would have balances of zero; planes would fall out of the sky; cars would halt in their tracks; power and water would stop flowing. Information, business and life are inseparable and as indispensable as water, air and electricity.

More profoundly, information and systems are so advanced that we can begin to see our human and cognitive form in our own digital data trails. Every day we are building, brick by brick and bit by bit, a digital copy of ourselves, whether we are aware of it or not. This topic is personal, and now, inalienable from the human condition.

Data breaches, thefts and manipulations are headline news today and will not be going away anytime soon. Also, the nature of the information has changed, moving well beyond what you could find in the phone book of a decade ago. In this digital era, your modern (phone-book like) information now includes your behaviors (friends list, what you read, pictures, what you buy, etc.).

What is the real difference between a bad actor stealing 135 million people's data from a credit aggregator or when a social media company sells 85 million personal accounts to a political consulting firm? The actors are different, but the consumer impact is the same. Trust is broken, and your information is used for the bad.

OpenText would like to offer a radical idea: that “Information is for the Good.” And that it needs to transcend people, organizations, companies and nation states – to improve businesses and the world. This is not marketing; it is a new way of working and a new way of thinking. It starts with the premise that you own your information and it is not for sale. OpenText will never sell your information; we value your trust. And we advocate that information is for the good. Our opinion has been forged through 25 years of experience and over one Exabyte of information under our management.

“Information is for the Good” can be present in many forms. First, we can utilize data and insights to unlock the potential of people. We can also use information to produce a more educated world by increasing college or trade degrees. On the world stage, information can be used to eliminate extreme poverty and eradicate diseases.

“Information is for the Good” begins with big ideas for change. Consider the following:

In “Launching the Data-Driven Justice Initiative,” 67 city, county and state governments are committed to disrupting the cycle of incarceration. They are using data-driven strategies to divert low-level offenders with mental illness out of the criminal justice system and change approaches to pre-trial incarceration, so that low-risk offenders no longer stay in jail simply because they can’t afford a bond.²⁷

The report “Social Media and Forced Displacement: Big Data Analytics & Machine-Learning” summarizes the findings and lessons learned on the viability and value of social media analytics to complement understandings of the Europe Refugee Emergency.²⁸

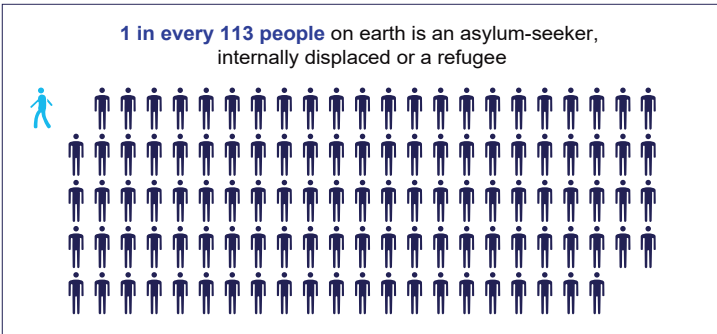


Figure 20: UNHCR - Using Big Data to Understand Forced Displacement

The project, conducted by UNHCR’s Innovation Service and UN Global Pulse, focuses on how content from social media could be parsed to better understand what people think and how they feel about things affecting their lives, including the displacement and movement of large volumes of people. This content can be used by researchers to inform topics of interest and by decision makers as evidence on which to inform programmatic responses and alterations.

Sergey Brin, co-founder of Google, carries a LRRK2 mutation (variants of this gene are associated with an increased risk of Parkinson’s and Crohn’s diseases). While he has made significant donations to research into combating Parkinson’s disease, perhaps his most compelling contribution has been through data. While discovery in causes and cures of Parkinson’s relies on the classic method of the scientific research, Brin has taken a different approach using massive data sets and analytics.²⁹ Brin is using data and algorithms to bypass the scientific method and find patterns in informaton that could lead to a potential cure for Parkinson’s disease – and this approach could be applied to finding cures for other diseases.

Using information for good is also present in building the world's best businesses and can be leveraged to help companies develop talent, build great products, as well as improve quality, safety and efficiencies for their customers.

Our customer deployments of EIM are advancing this concept every day.

A not-for-profit organization and advocate for the ocean is using an EIM digital asset management system to manage all information associated with the yearly International Coastal Cleanup. The repository provides secure storage of all images of marine debris – an index that ultimately becomes a report shared with the public, industry and government officials to help advance awareness and protect marine life.

A leading international humanitarian organization is connecting an employee base of 10,000+ across 90 countries to enable its rapid response team to share information on the ground in the first 24 hours of a crisis. Critical information is fed back into the organization in real time, enabling them to develop collaborative solutions efficiently and refocus on better serving their key beneficiaries.

The world's top manufacturer of braking systems for rail and commercial vehicles, such as freight trucks and metro lines, is using big data analytics to help ensure safety for millions of trains and vehicles across the globe. Wireless sensors on trains are connected to a back-office, cloud-based network using an IoT model. The platform transmits detailed information and reporting that can help predict repair and replacement needs, aiding in fleet management and ultimately, reducing the likelihood of component failures and accidents.

I can say with confidence, whether it be governments, individuals, or businesses, when they entrust you with their information – their lifeblood – it is critical to defend and protect that which is entrusted. This trust transcends your product or service. It is at the heart of your culture, ethics and purpose.

It is time to advance the narrative, as we are championing trust as the foundation of information. It is an inalienable right and “Information is for the Good.”

It is use-case examples like the ones mentioned in this chapter that make me optimistic for the future.

#13

Why I Am an Optimist

Our common purpose is humanity. Together, we can achieve great things. We are already making great strides in creating a safer and healthier planet. Children are living longer and healthier lives, and more women and children are going to school. Education and literacy rates are rising while extreme poverty is declining. There is cause for optimism rooted in these positive global trends. And the tremendous promise of technology to transform our world, using information for the good.

We are just at the beginning of the Fourth Industrial Revolution. Few things have the power to transform our world as rapidly and radically as digital technology.

This makes me an optimist.

One of the world's most important achievements to date is the decline in child mortality.

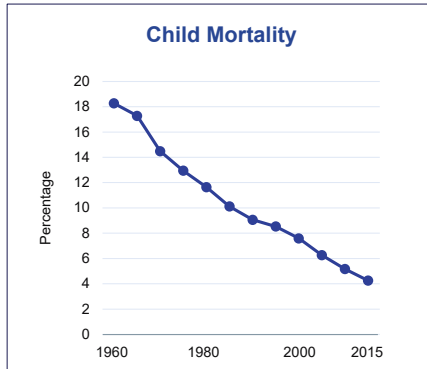


Figure 21: Decline in Child Mortality

In just over 50 years, the rate has decreased from 18% to 4%, despite the population growth in developing regions. Since 1990, the number of children who die each year has been cut in half and is still declining.³⁰

The United Nations' (UN) launch of the 17 Sustainable Development Goals (SDGs) have been critical in putting effective strategies, resources and policies in place to combat the causes of child mortality. These development goals were made possible through the efforts of Child Hunger and Undernutrition (REACH), World Health Organization (WHO), World Food Programme (WFP) and UNICEF, under the directive of UN's Millennium Development Goals.³¹

The eradication of diseases like measles, smallpox and polio through vaccinations has been credited for rapidly reducing deaths. The measles vaccination helped prevent over 15 million deaths between 2000 and 2013, inciting a 67 percent decline in the reported cases of measles globally.³²

Along with the decline in child mortality, we are living longer lives. This is another reason to be optimistic.

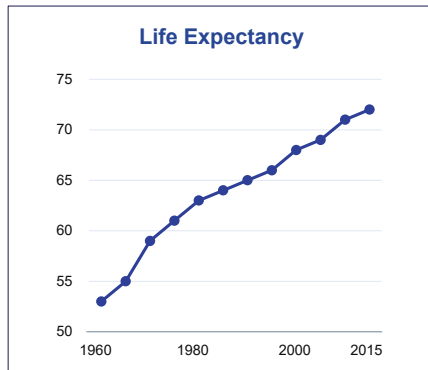


Figure 22: Increase in Life Expectancy

Our life expectancy has been on an upward trend. Better living conditions caused the average lifespan to cross the 70-year mark in the 21st century. Over the last 55 years, global life expectancy has risen by almost 20 years.³³

While the average North American might expect to live to be 80, many of our children will live to see 100. Advanced medical technologies are helping us live longer without experiencing prolonged physical and mental decline. We are not just increasing lifespans; we are increasing “health spans” as well.

Economic growth has transformed our world, with poverty falling consistently over the last two centuries. It is amazing to think that, at a time when the population has grown sevenfold, we are lifting more and more people out of poverty.

Over one billion people have moved out of extreme poverty since 1990.³⁴ This trend of decreasing poverty – both in absolute numbers and as a share of the world population – has been a constant during the last three decades.

A sevenfold increase in the world population would be enough to potentially drive almost everyone into extreme poverty. Imagine how many people would live in extreme poverty today without economic growth.

Fewer countries than ever are in the world’s lowest income bracket. Since 1981, the proportion of people living under the poverty line (on \$1.25 a day) has decreased by 65%.³⁵ That equates to over 700 million fewer people living in poverty in 2010 than in 1981.

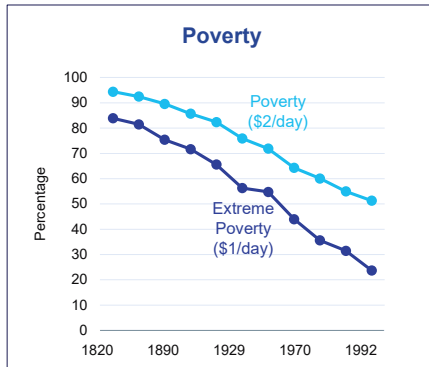


Figure 23: Percent of Global Population Living on Less Than \$1.25 a Day

Over the past two decades, more than two dozen low-income countries moved to middle-income status. This was achieved, in part, by investing in sectors such as infrastructure, education and health.³⁶

Poor people in low-income countries suffer from high rates of infectious diseases and malnutrition. These conditions are brought on by limited access to food, clean water, sanitation, electricity and shelter.

Without these basic needs, the lives of millions of children are at risk. Today, there are around 2.4 billion people who do not have access to improved sanitation, and 663 million without access to improved water sources.³⁷ WHO estimates that in 2015, the deaths of 361,000 children under five years old could have been avoided by addressing water and sanitation risks.³⁸

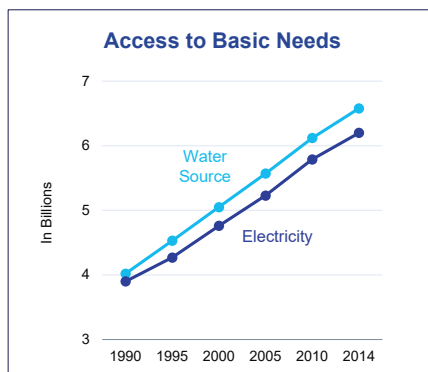


Figure 24: Improved Access to Water and Electricity

Despite these figures, millions of people have been given greater access to water, electricity and sanitation since 1990. Great progress has been made on improving access to water: 91% of the global population has access to better quality water (that is protected from contamination), up from 76% in 1990. Last year, UNICEF's efforts provided nearly 14 million people with clean water and over 11 million with basic toilets.³⁹

While this progress is heartening, the poorest people in sub-Saharan African and South Asia are being left behind. Progress needs to be made in these countries to give more people access to basic needs.

I am also optimistic because over the past two centuries, global education and literacy rates have risen, predominantly due to an increase in enrollment in primary education.⁴⁰

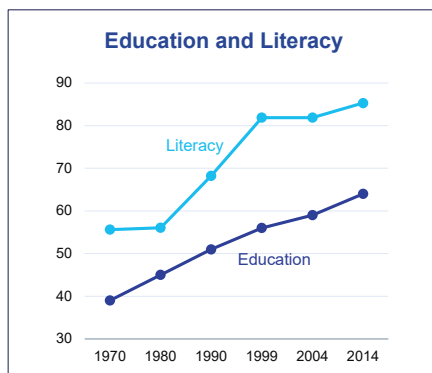


Figure 25: Education and Literacy Are on the Rise

Access to basic education is perceived as a right provided and protected by the government in many countries. A higher quality of education results in lower levels of poverty (through higher individual income) and helps to build social capital and long-term economic growth.

Despite these worldwide improvements, in some countries, the literacy rate of youths has fallen below 50%.⁴¹ The gap between the educated and uneducated will lessen if governments continue to fund education and literacy. According to recent studies, as GDP per capita increases, global resources spent on education are increasing.

The Empowerment of Women is a trend that makes me optimistic for the future.

As a global movement, empowering girls and women results in economic growth, political stability and societal transformation. The good news is that women's participation in the workforce is on the upswing. In the last ten years, an extra quarter of a billion women have entered the workforce.⁴² As far as gender parity is concerned – equal pay for equal work – the greatest progress made has been in the political world.⁴³ While more women are graduating from universities, they still make up the majority of skilled workers in only 68 countries and leaders in only four.⁴⁴

Today, in 83% of all countries, women have the right to vote.⁴⁵ While there is progress to be made, the achievements to date for women's rights can be celebrated. Young women have greater choices and control over their lives, though more so in education than their careers.

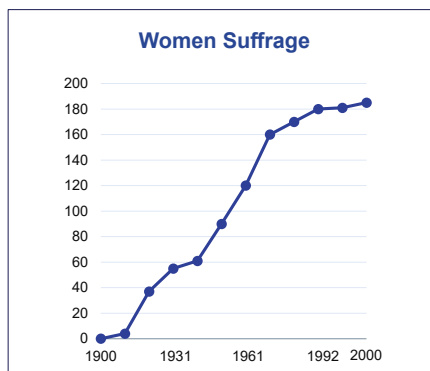


Figure 26: Increase in Countries with Female Suffrage

Empowered women and girls are the potential leaders of tomorrow and have the power to transform our world.

Another reason I am optimistic: most of the world's countries are governed by democratic regimes. These are defined as “systems with citizen political participation, constraints on the power of the executive, and a guarantee of civil liberties.”⁴⁶

At the end of 2016, 97 out of 167 countries (58%) with populations of at least 500,000 were democracies.⁴⁷ Most countries in Europe and the Americas have become democracies. Some parts of Africa have been democratized, along with countries in Asia. India is the world's largest democracy. Australia, New Zealand, Japan and Mongolia are also full democracies.⁴⁸

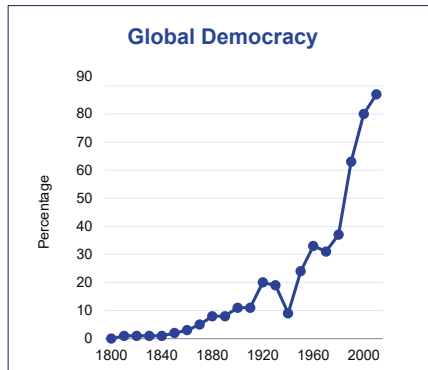


Figure 27: Number of Democracies Worldwide is Growing

Democratic countries are typically more open, healthier, have higher educational attainment and human rights are better protected.

A democratic world is a very recent achievement. While there is much room for improvement, democracy overall has made significant progress over the last 40 years. Based on current trends, the rates of economic growth in the poorer countries of the world give hope for further democratization around the world.

It has been rumored that French economist Claude-Frédéric Bastiat once said, “When goods don’t cross borders, soldiers will.”⁴⁹ International trade has followed an exponential growth path in the years between 1800 and 2010, with a rising proportion of goods and services (rather than soldiers) crossing borders.⁵⁰

Global changes like rapid urbanization, the rise of a consuming middle class in emerging economies, geopolitical complexities, and the evolution of international financial flows are shaping the long-term future of global trade.⁵¹ Transformative technologies like 3D printing, automation, e-commerce platforms and a changing international trade policy climate are having the greatest impact on trade.

While trade was once confined to large multinational companies of advanced economies, data flows have opened the door to developing countries. Small companies and startups are turning themselves into exporters by joining e-commerce marketplaces. Approximately 12% of global goods trade is conducted via international e-commerce.⁵² It is also allowing large companies to manage their international operations in leaner, more efficient ways. Using digital platforms, they are able to sell in fast-growing markets.

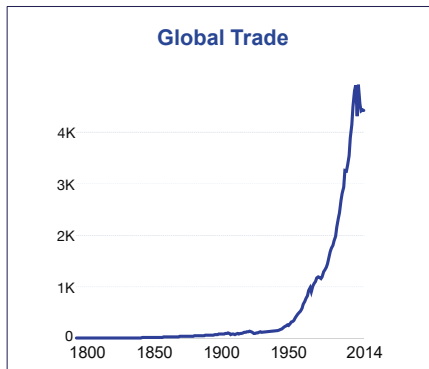


Figure 28: Global Trade has followed an Exponential Growth Path

A presence in the global market creates opportunities for growth outside of the domestic market, which can lead to economies of scale. As global trade intensifies, capital, economic power and influence will shift from established economies to emerging economies. In fact, most preferential trade agreements are between emerging economies like Mexico, Indonesia, Nigeria and Turkey (“MINT” countries).

Planetary connectivity with three billion users also gives me hope for the future.

Around 40% of the world has Internet connection today, in 1995, it was less than one percent. The number of Internet users has increased tenfold from 1999 to 2013.⁵³

There are enough mobile phones available for over 99% of the world’s population.⁵⁴ More than two thirds of the world’s population is connected by mobile devices.⁵⁵

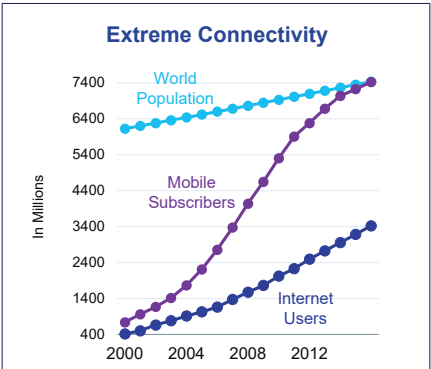


Figure 29: Number of Internet Users Worldwide Has Risen

Technological advances are built on seamless connectivity – between people, places and things. Improved connectivity gives us the ability to apply technologies like machine-to-machine (M2M) communications and the Internet of Things (IoT) to address global issues such as poverty, climate change and infectious diseases.

Despite these achievements, we still have work to do in the Climate and Food Quality / Waste.

One in nine people on earth do not have access to the nutrients they need for proper development and health. As with many issues that are exacerbated by extreme poverty, it is often the youngest who are the most vulnerable. According to UNICEF, there are 11 children dying each minute around the world.⁵⁶

Climate change and wars are escalating the refugee crisis. Global food loss and waste costs up to \$940 billion per year and generates 8% of global greenhouse gas emissions.⁵⁷

While the hurdles to overcome are high, digital technology and the data it produces, keeps me optimistic.

Digital technology is driving a renewed environmentalism. As far as climate change is concerned, it is possible to limit the increase in global mean temperature to 2 degrees Celsius, but this will involve a variety of technological measures.

A focus on affordable clean energy will also help offset climate change. Some organizations are transforming research into marketable products. Canadian company General Fusion aims to be the first in the world to create a commercially viable nuclear-fusion-energy power plant.⁵⁸ Carbon Engineering is a start-up that is taking carbon dioxide directly from the atmosphere and

using it to produce fuel.⁵⁹ At a general level, automation is giving major retailers the ability to cut billions of tons of carbon dioxide from their global supply chain – more than the annual emissions of Germany.⁶⁰ All these endeavors contribute to preserving our planet.

One of the UN's SDGs is to halve global food waste and reduce food losses along production and supply chains by 2030. To achieve this, they plan to help developing countries strengthen their scientific and technological capacity to move them toward more sustainable consumption and production.

The Fourth Industrial Revolution is changing how we grow, buy and choose what we eat. In 2017, a robotic farm in the U.K. harvested its first fully machine-operated crop.⁶¹ Five tons of barley were sown, fertilized and harvested by autonomous vehicles. In the next two-to-three years, digital technologies in agriculture will have a sizeable market coverage around the world.⁶²

Advances in IoT-related technologies can help eliminate key causes of food waste. Using sensor data, AI and analytics, the IoT can improve the yield from both harvesting and storage and streamline distribution networks. As a 24/7 monitoring system of perishable and sensitive foods, the IoT extends the shelf life of produce and enables surplus foods to be shared.⁶³ Information related to consumption and waste can be collected, monitored and analyzed for optimized agriculture systems that help eliminate food waste and combat world hunger.

In context of these technological advances, humanity is our greatest enterprise. The word “enterprise” by definition means a great undertaking or project. One that is important or difficult and requires a great boldness of energy. The achievements I discuss in this chapter are based on a tremendous enterprise of spirit.

An enterprise also describes a company typically organized to fulfill a specific purpose. The Intelligent and Connected Enterprise of the future has a significant role to play in helping to eradicate disease, poverty and suffering.

It is up to all of us to take responsibility – as individuals, corporations and nations – to be a driving force for change. To promote prosperity. And protect each other and earth’s great bounty.

At OpenText, we share a common conviction rooted in universal principles to create a more stable and inclusive global market, and to help build prosperous, thriving societies where citizens can succeed.

Our Enterprise Information Management (EIM) solutions will continue to equip the Intelligent and Connected Enterprise to use information for the good – to create the world’s best businesses, design and market lifechanging products, fuel top talent and empowerment, and improve health, safety and quality of life.

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