

INDUSTRY X.0  
**COMBINE AND  
CONQUER**

UNLOCKING THE POWER OF DIGITAL

**Gordon  
Institute  
of Business  
Science**  
University  
of Pretoria

# INDUSTRY X.O IN SOUTH AFRICA

## How digital reinvention can reignite industrial growth

South Africa's vibrant digital economy makes it stand out among its emerging-market peers (Figure 1). The nation now has the opportunity to use expertise in digital to reinvent how its industrial sector operates and reignite economic growth.

## South Africa's embrace of digital has not yet translated into industrial growth

South Africa ranks ahead of India, Brazil, and Russia on digital competitiveness (based on its strengths in areas such as technology skills, R&D expenditure, access to capital, regulatory frameworks, and even existing innovation ecosystems). It also leads those countries in terms of ICT exports as a share of overall exports. (see Figure 1). What's more, it leads in digital knowledge and attitudes (a measure of factors such as general digital savviness and willingness to try out new technologies). And our own research with GIBS reveals that business leaders in the South African industrial sector share a great appetite for digital adoption (See 'About the Research').

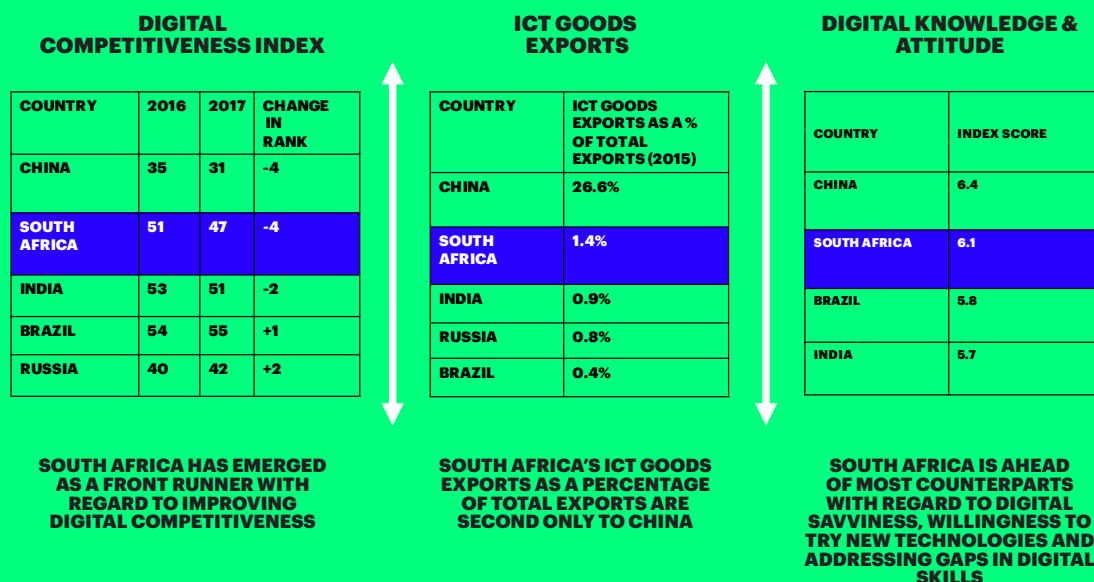
### Sidebar: About the research

In 2017, Accenture partnered with the Gordon Institute of Business Science (GIBS) to survey 28 senior executives from leading South African companies in 12 manufacturing and production industries. These 28 executives were part of a larger survey group of close to 1,000 senior executives from large industrial companies across 21 different nations, including South Africa. Moreover, we complemented the survey data with detailed anecdotal evidence from South African business leaders through roundtable discussions conducted by GIBS.

### The survey sought to understand:

- How digital technologies are being deployed by South African companies to drive efficiencies and better customer experiences
- Challenges that South African businesses face in deploying digital technologies
- The maturity of capabilities in South African companies to use digital technologies to drive efficiency and serve customers better

Figure – 1: South Africa has a more advanced digital economy than its peers

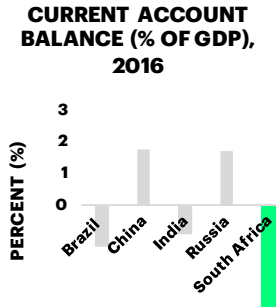
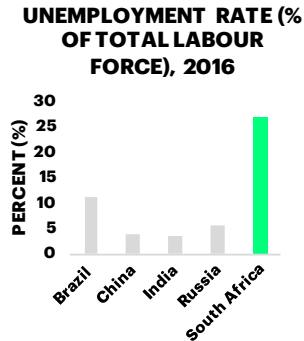
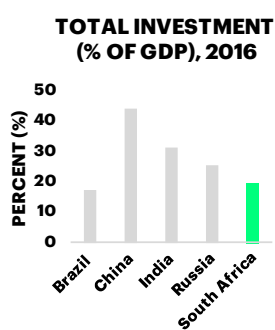
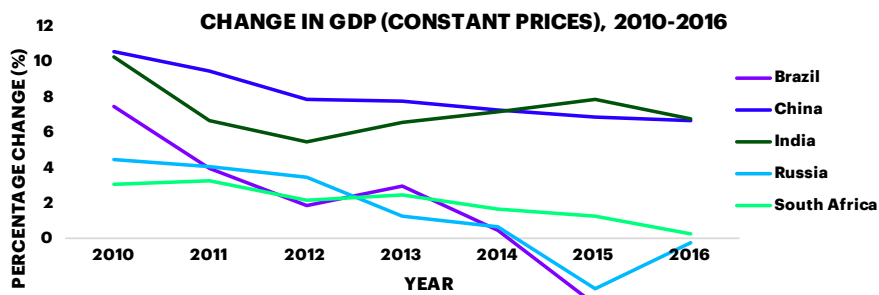


Sources: "IMD World Digital Rankings", IMD (2017)  
 "Digital Development Index", Barclays (2016);  
 "ICT Goods Exports", Worldbank (2015).

And yet, this potent mix of digital maturity and executive desire isn't delivering expected results in terms of economic growth. South Africa continues to grapple with decelerating GDP growth. Industrial output continues to decline, while unemployment remains high and levels of capital investment are much lower compared with emerging-market peers. (see Figure 2).

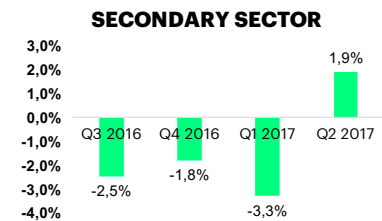
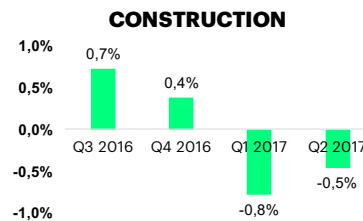
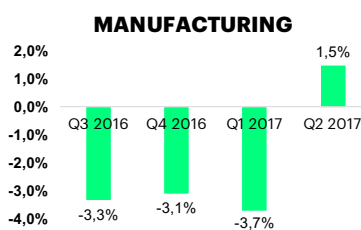
What is most troubling is the performance of South Africa's manufacturing sector, where growth has been flat for a decade and was negative for three consecutive quarters, falling an average of 3.3% beginning the third quarter of 2016, and expanded marginally (by 1.5%) in Q2 of 2017.<sup>i</sup> This stagnation has both economic and policy implications, given the role of manufacturing in the government's plans for economic transformation and job creation.<sup>ii</sup>

**Figure – 2: South Africa's digital prowess is yet to translate into industrial gain**



Source: "World Economic Outlook Database", International Monetary Fund, April 2017

**Quarter-on-Quarter change in sectoral GDP Q3 2016 to Q2 2017**



Source: Stats SA, Government of South Africa

# COMPANIES CAN'T WIN BY USING "ME-TOO" STRATEGIES

When we looked for explanations for the limited results from digitisation in South African industries, it quickly became clear that a major problem is that companies have been trying to mimic what leading corporations in advanced economies are doing. Using approaches employed by large organisations in advanced economies is not a recipe for success locally. South African companies continue to struggle with digitisation because "we try and follow companies such as Google, Amazon and Tesla with a 'me-too' mindset," says the chief information officer of a leading South African bank.

One of the main issues with me-too strategies is that they do not allow South African businesses to use digital technologies to better understand and serve local customer needs—and find ways to accelerate growth. In our research, "a lack of intimate, accurate and continuous knowledge about their clients and context" was the most pressing concern. "Executives must firmly define and unpack what digitalisation truly means for their organisations and customise their offerings according to customer needs," says the chief operating officer of a major South African asset management firm.

# THE OPPORTUNITY:

## **Combining digital technologies to leapfrog emerging-market rivals**

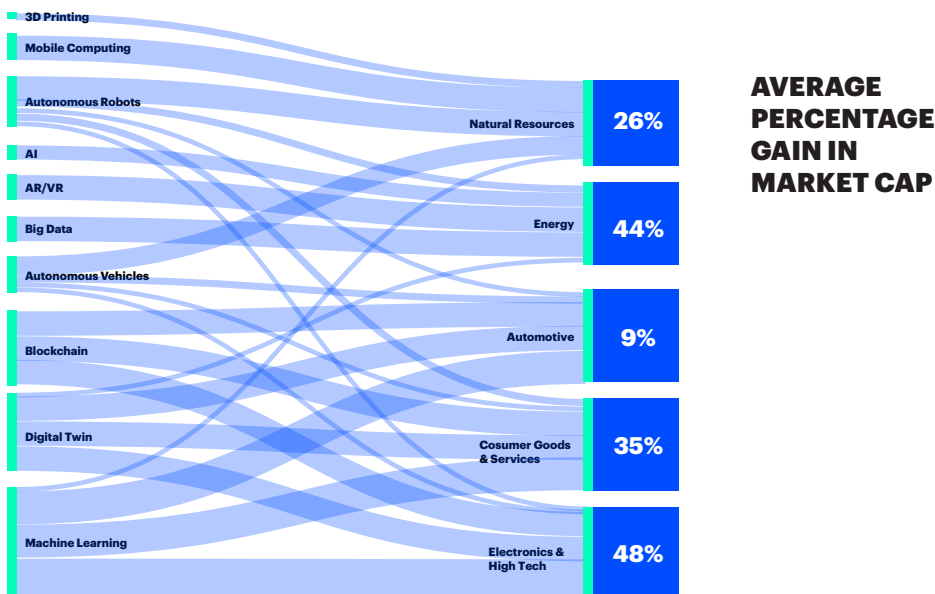
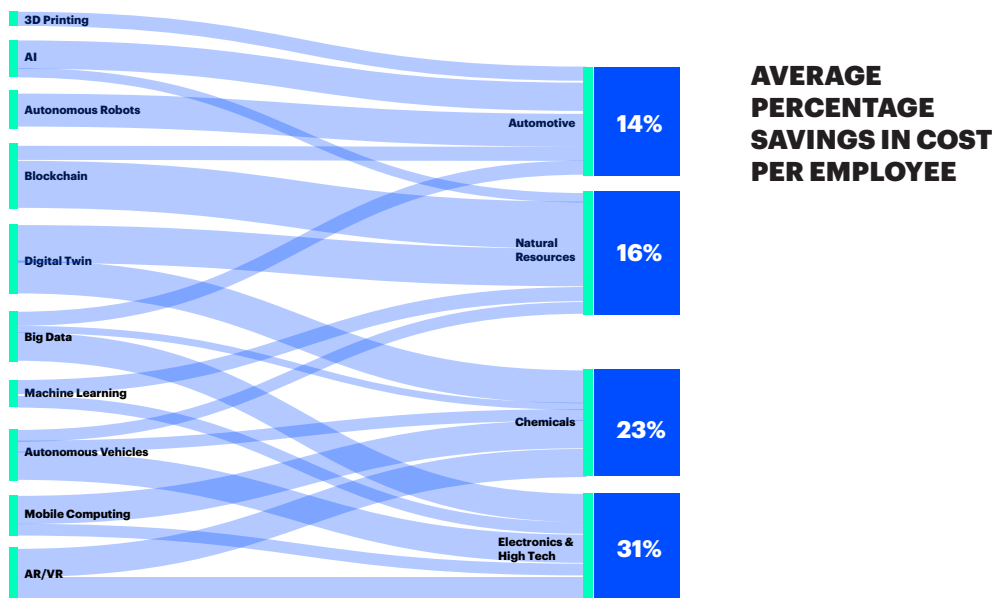
Nevertheless, there are also advantages in how South African companies are positioned: relatively smaller in size and not bound by massive legacy systems, they have an opportunity to be agile and leapfrog their competitors in the transition to digital-led growth. Also, they are embarking on the digital journey at a time when technology costs are plummeting. With relative ease, industrial companies in South Africa can now adopt a mix of advanced digital technologies such as artificial intelligence, 3D printing, blockchain, and big data analytics to create new customer experiences, develop new revenue streams, and increase operational efficiency.

By using these technologies in combination and implementing them broadly—not just in discrete functions—companies can multiply the financial gains. Our global research finds that if industrial companies combine digital technologies they can achieve significant top-line and bottom-line growth. For instance, we estimate that companies in the natural resources sector could cut down the total cost per employee by almost 16 percent, if they combine artificial intelligence, blockchain, digital twin, machine learning and autonomous vehicles. For South African natural resource companies, this would translate into total savings of over US\$972 million on average given their employee strength of just over 12,500 people.



We also estimated how similar technology combinations could boost market value for manufacturers across industries. Energy companies we surveyed globally, could grow their market value by almost 44 percent if they combined technologies such as virtual reality, big data and artificial intelligence. (See Figure 3).

**Figure – 3: Systematically combining digital technologies can help South African companies unlock significant gains**



# MOVING BUSINESSES TO INDUSTRY X.0

Selecting the appropriate combination of technologies for a particular type of business is only one part of the digital reinvention of industry. For South African companies to generate the improvements that will enable them to leapfrog to digital leadership, they also must completely reinvent their operating models and rethink production and value chains. To succeed, companies need to move to what we call Industry X.0, which is the full digital reinvention of how companies and industries work.

What's more, Industry X.0 isn't only meant for large industrial companies. It is relevant for companies of all sizes, across all industries. The only prerequisite is an ambition to lead in the new with digital.

Industry X.0 means moving beyond "digital transformation"—experimenting with technologies in specific functions and implementing digital solutions for the sake of digitisation. Industry X.0 businesses make almost every element of their production systems self-monitoring, data-generating, and "aware" of their context. These companies build digital architectures that enable adaptive interactions between machines, customers, and employees, which lead to ever-better user experiences. And Industry X.0 companies have distinctive cultures: they embrace continuous change.

There are six digital imperatives South African businesses must address to become Industry X.0 organisations. Each of these imperatives has three components, which we illustrate (where possible) with examples from South Africa.







## Transform the core

Industry X.0 companies build core engineering and production systems around digital technologies that drive new levels of efficiency. They ensure that physical machines and software systems are synchronised to unlock previously-unseen cost efficiencies—thus driving up investment capacity.

**Integrating for a connected value chain:** Integrate hardware and software to digitally connect processes, platforms, and people across the value chain. Collaborate with partners to digitally connect people and processes to find new value creation opportunities.

GE South Africa has partnered with a number of companies across industry sectors, not only to supply industrial equipment but also to provide software solutions that integrate the entire value chain. In power generation, while GE supplies mainstream equipment such as turbines for both coal-powered and gas-powered stations, it also extends technology solutions to ensure long-term reliability and plant performance. Working with Sasol, GE developed a novel waste-water cleaning technology which makes it reusable for industrial purposes.<sup>iii</sup> In Durban, GE installed gas engines at landfill sites to convert waste methane gas into electricity and supplies it back to the local power grid.<sup>iv</sup>

**Strategic digital alignment:** Ensuring consistent understanding and deployment of digital strategy across the company and ecosystem partners with enhanced focus on digital trust and security.

South Africa's leading cement company, PPC, deployed a firm-wide IT control framework called COBIT 5 (control objectives for information and related technologies) to improve digital governance. It has allowed PPC's CIO to streamline and standardise all digital technology investments.<sup>v</sup> Moreover, it not only enables easy financial audit of digital/IT systems, but also regularly updates protocols for maintaining information security and digital trust.<sup>vi</sup>

**Automation at scale:** Automate at scale to optimise production runs and improve overall equipment effectiveness (OEE). Invest in automation not only to reduce run times but also to enhance customer and workforce experiences.

Sasol, an integrated chemicals and energy company, recently piloted a digital customer experience platform called the Digital Catalyst. The platform is designed to help the chemicals business improve customer experiences by automating many planning, scheduling, and order-management processes. In addition, Sasol is also deploying smart sensors in its warehouses to reduce time needed to conduct quality assurances, thereby improving warehouse efficiency.<sup>vii</sup>

## 2

### Focus on customer experiences and outcomes

Industry X.O companies invest in creating hyper-personalised experience for customers using multiple “smart” touchpoints. This helps grow core businesses by enhancing customer engagement.

**Big data analytics:** Using big data as the foundation for real-time insight generation and decision support across organisational levels—from shop floor operators right up to the board of directors.

In 2014, MTN, a South African telecom operator, partnered with Flytxt, a big data solutions provider. Together, they deployed Flytxt’s real-time decision making and customer engagement solution across MTN’s network. The tool enables MTN to respond to subscriber’s actions and requests instantaneously. The system can detect meaningful customer-initiated events (such as service requests) across the network and trigger relevant actions in real time, thereby enhancing customer experience.<sup>viii</sup>

**Hyper-personalisation:** Designing and deploying products/services/platforms that constantly adapt to meet changing customer needs. Use technologies such as sensors, analytics and AI to sense, understand and react to customer needs.

To build stronger customer engagement, insurance provider Discovery introduced Vitality Active Rewards, a program that rewards its customers for staying active and maintaining a healthy lifestyle. The app uses 35 million patient-years of health data, to recommend personalised fitness goals based on the customer’s age, fitness, and medical history. The app works with various mobile devices and fitness trackers to monitor progress toward goals. The program also includes incentives such as cash-back rewards on purchases of flights, food, shoes etc.<sup>x</sup>

**Smart touchpoints:** Enhancing customer experience through the use of digital interfaces that allow for smart touchpoints throughout the product lifecycle. Multi, smart touchpoints allow companies to track a variety of user interactions be it at the time of purchase, during usage, at the time of repair, or even at end-of-product life.

One of South Africa’s largest banks, FNB, has used mobile apps to expand its customer base and enhance customer experience. Its mobile banking program goes well beyond standard functions such as account management, online transfers, and service requests. For example, the mobile app now has an AR (augmented reality) platform which uses the phone’s camera to overlay information about partner retail stores onto actual physical surroundings and project it on the phone’s screen. Customer passing by storefronts can check the app to find stores that accept FNB’s eBucks rewards points, and can also see opening and closing times and store contact details instantly. Customers can also take pictures of their cars and get resale value estimates via the mobile phone app. And, customers can also use the app to pay traffic fines and renew driving licenses.<sup>xi</sup>

# 3

## Innovate business models

Industry X.0 companies ideate and create new business models to drive differentiated value for their clients and new revenue streams for themselves. Such companies inculcate an innovation mindset across the organisation, allowing every employee to contribute ideas towards enhancing customer experience.

**Incubating as-a-service business model:** Incubating as-a-service business models, by leveraging software-based-services and pay-per-use revenue models.

Industrial equipment companies have an opportunity to transition from simply selling equipment to selling equipment-as-a-service. The original model for this is the “power by the hour” approach pioneered by jet engine manufacturers. With IoT sensors embedded in their equipment, suppliers of all sorts of industrial equipment can create similar offerings, which reduces capital investment for customers and expands markets to smaller customers— or even one-time users. Equipment makers can generate additional revenue streams by offering predictive maintenance and other services, while also creating a better customer experience.

**Machine to machine synergies:** Leveraging the Industrial Internet to extract sharper insights and find new sources of value, at the level of the workforce and/or customers.

IoT.nxt, a Pretoria-based IoT company is helping clients connect disparate installed digital and IT systems. The technology-agnostic Raptor 1000 gateway platform, connects both IP-based as well as analog devices, drastically reducing costs of deploying IoT systems compared with “rip and replace” approaches. South African meat producer Cavalier is using the platform to monitor previously siloed, sensor data from feedlots, abattoirs, and packaging plants, as well as from security and access-control systems. Employees can see what’s happening with a mobile app. IoT.nxt has already deployed the same IoT platform at a correctional facility, an automotive plant, and at a large coal mine.<sup>xii</sup>

**Reinvention of the product:** Building connected, intelligent products from scratch, and embedding intelligence into existing products, to allow for adaptive ecosystem interactions.

Homefarm has created a hydroponic appliance that makes it possible for city dwellers to grow fresh produce, all year round in their homes. Users can grow household plants and herbs inside the climate-controlled box, which automatically regulates the environment depending on whether the crop is a winter or a summer crop. The Homefarm also connects to the owner’s smartphone over wi-fi and issues reminders when to add water and notifies owners when it is time to harvest.<sup>xiii</sup>

# 4

## Build a digital-ready workforce

Industry X.O companies recruit, train, and retain talent with skills for the digital enterprise and encourage collaboration between people and machines. Digital skills are not limited to knowledge of using digital tools or software programs, but also includes intuitive knowhow of how to apply those tools to solve real business problems.

**Training for digital:** Training employees on software engineering, machine learning skills, and other digital skills.

To develop the digital skills that were in short supply in its South African operations, Barclay's and other employers such as ABSA Bank and Empire State, a technology consulting firm, supported the launch of "The Digital Academy". The academy aims to create learning opportunities for South African youth. As a part of the program, interns learn practical software development skills which helps them build commercial products.<sup>XIV</sup>

**Defining digital roles:** Redesigning jobs to include tasks that require employees to use digital tools. Such a redesign must always be done in consultation with the job-holder, to ensure that human-machine synergies are leveraged, without jeopardising human safety or motivation levels.

Digital skills are increasingly needed across functions and levels in any corporation. For example, a utility company that wants to digitise its production lines may require workers to execute new tasks using new digital tools such as robotic arms or virtual reality glasses. Similarly, middle management positions in functions such as finance may also require employees to learn new software programs or data visualisation techniques.

**Encouraging human-machine collaboration:** Redesigning job roles to encourage collaboration between humans and robots and other machines to carry out day-to-day tasks.

Over the years, Kumba Iron Ore, a subsidiary of Anglo American, has introduced many technological innovations at its Kolomela mine in the Northern Cape. By 2016, Kumba was operating six automated drills in Kolomela, which are expected to reduce drilling costs by 15%. Rather than laying off drill operators, the company has trained them to operate the automated drills remotely, resulting in greater efficiency and lower workplace risks.<sup>XV</sup>

# 5

## Build new ecosystems

An Industry X.O company builds an ecosystem of suppliers, distributors, start-ups, and customers, which allows it to scale new business models rapidly.

**Ecosystem orchestration:** Combining efforts of different business partners (suppliers, peers, distribution) to create a digital value chain. Large industrial companies must assume a collaborative approach to innovation. Despite their size and technological prowess, they must act with empathy and allow creative freedom to smaller ecosystem partners.

Telkom, is investing in local enterprises, new suppliers, and existing partners through its FutureMakers program. Since May 2015, the telecom carrier has invested in strategic start-ups and small businesses that develop relevant technologies. The program provides risk capital, physical space and connectivity solutions, and technical expertise for startups.<sup>xvi</sup>

**Tech incubation centers and centers of excellence:** Industry X.O companies nurture innovation clusters that design and prototype early-stage technology use cases.

In 2016, GE launched its first Africa Innovation Center (AIC) in Johannesburg, with the aim of incubating sustainable local innovations for the Sub-Saharan region. Within a year of its inception, it was already making commercial impact. Together with GE's mining division, the University of Pretoria, and a sensor manufacturer, the AIC ran a pilot program for a mining equipment manufacturer to deliver a remote-monitoring software platform. The platform would enable remote monitoring of equipment condition and wear and tear, allowing for timely maintenance and replacement.<sup>xvii</sup>

**Open innovation and co-creation:** Obtaining and developing ideas for new products or services from a wide variety of sources, both internal and external. Open innovation and co-creation works best when it is not a one-time engagement. Ongoing investment in co-created idea development is an imperative.

In 2017, the South African National Space Agency (Sansa) and Airbus launched an open innovation challenge for entrepreneurs, universities, and start-ups. The goal was to develop novel uses for earth observation data obtained by satellites. Finalists in the competition will work with specialists from Airbus and will be given access to observation data to develop their ideas.<sup>xviii</sup>



## Pivot wisely

Industry X.0 companies are moving into the future, but as they do so, they carefully balance investment and resource allocation between the core business and new businesses to synchronise innovation and growth.

**Digital native c-suite:** Building a leadership team, that is passionate about and is capable of envisioning the use of advanced digital tools in a variety of strategic and tactical initiatives.

In late 2016, telecom operator MTN positively reacted to its poor financial performance by adding a new C-level position through the appointment of a new Chief Digital Officer. Hired from outside the firm, the appointment reflected the increasing demand for candidates who have a cross-industry perspective along with a robust experience in defining and deploying digital strategies. The move seems to have paid off, as MTN experienced a 3.1% growth in earnings for the first half of 2017, performing especially well in digital services such as Mobile Money.<sup>xx</sup>

**Establishing a cadence for digital investment:** Systematically and continuously investing in digital technologies and injecting digital tools into mainstream operations.

South African banking major Capitec invested close to US\$22 million to acquire 40 percent stake in Latvian online lending platform Cream Finance. Thinking ahead of the curve, Capitec expects to build digital-only, international banking operations through this strategic investment. This move may further enhance its existing position as South Africa's best digital bank.<sup>xxii</sup>

**Digital performance management:** Updating performance metrics for the digital enterprise.

To succeed as digital enterprises, companies must look beyond traditional productivity and efficiency measures, and identify new ones that make the most of the big data and advanced analytics capabilities available to them. In Industry X.0 organisations performance metrics should measure the abilities of digital technology as well as the digital workforce to improve both the top and bottom line.

\* \* \*

## Industry X.0 businesses are best positioned to combine digital technologies:

To drive new levels of efficiency, new sources of growth, and deliver new customer experiences. Becoming an Industry X.0 business is a journey. It starts by taking steps to become smart, connected, living and learning. And it culminates in the digital reinvention of industry.

For South Africa, the Industry X.0 journey holds out even greater promise—to reignite industrial growth that is needed to keep steady on the path of development. South African companies must learn from their peers; some of whom have already begun their Industry X.0 journeys. It is imperative to embark on this journey today to emerge as digital winners of tomorrow.

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Founded in 2000, the University of Pretoria's Gordon Institute of Business Science (GIBS) is an internationally accredited business school, based in Johannesburg, South Africa's economic hub. As the business school for business, we focus on general management in dynamic markets to significantly improve responsible individual and organisational performance, primarily in the South African environment and increasingly in our broader African environment, through the provision of high quality business and management education.

In May 2017, the annual UK Financial Times Executive Education rankings, a global benchmark for providers of executive education, once again ranked GIBS as the top South African and African business school. This is the 14th year running that GIBS has been ranked among the top business schools worldwide. In October 2016 the GIBS MBA was ranked among the top 100 business schools globally in the prestigious Financial Times Executive MBA Rankings. GIBS is the only business school in Africa to appear in this ranking. GIBS is accredited by the Association of MBAs (AMBA), the Association to Advance Collegiate Schools of Business (AACSB), the Council on Higher Education (CHE) and is a member of the South African Business Schools Association (SABSA), and the Association of African Business Schools (AABS).

For more information, visit [www.gibs.co.za](http://www.gibs.co.za)

## Acknowledgements

Ntombi Mhangwani, Christine Yiannakis,  
Udit Sabharwal, Devashni Murugan, Jeffrey Yates

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