Dept. of Economic Development & Tourism
Western Cape Government

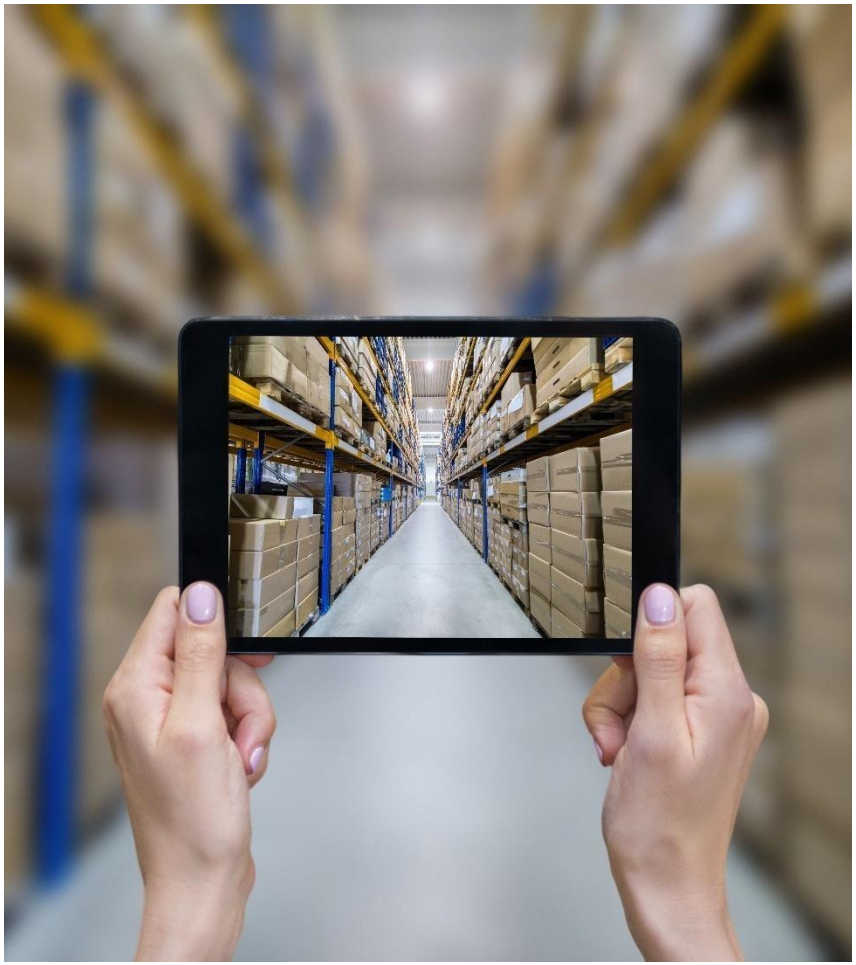
Sector Digital Disruption Impact Assessment

March 2017

Western Cape Government
Economic Development and Tourism

Report outline

Section



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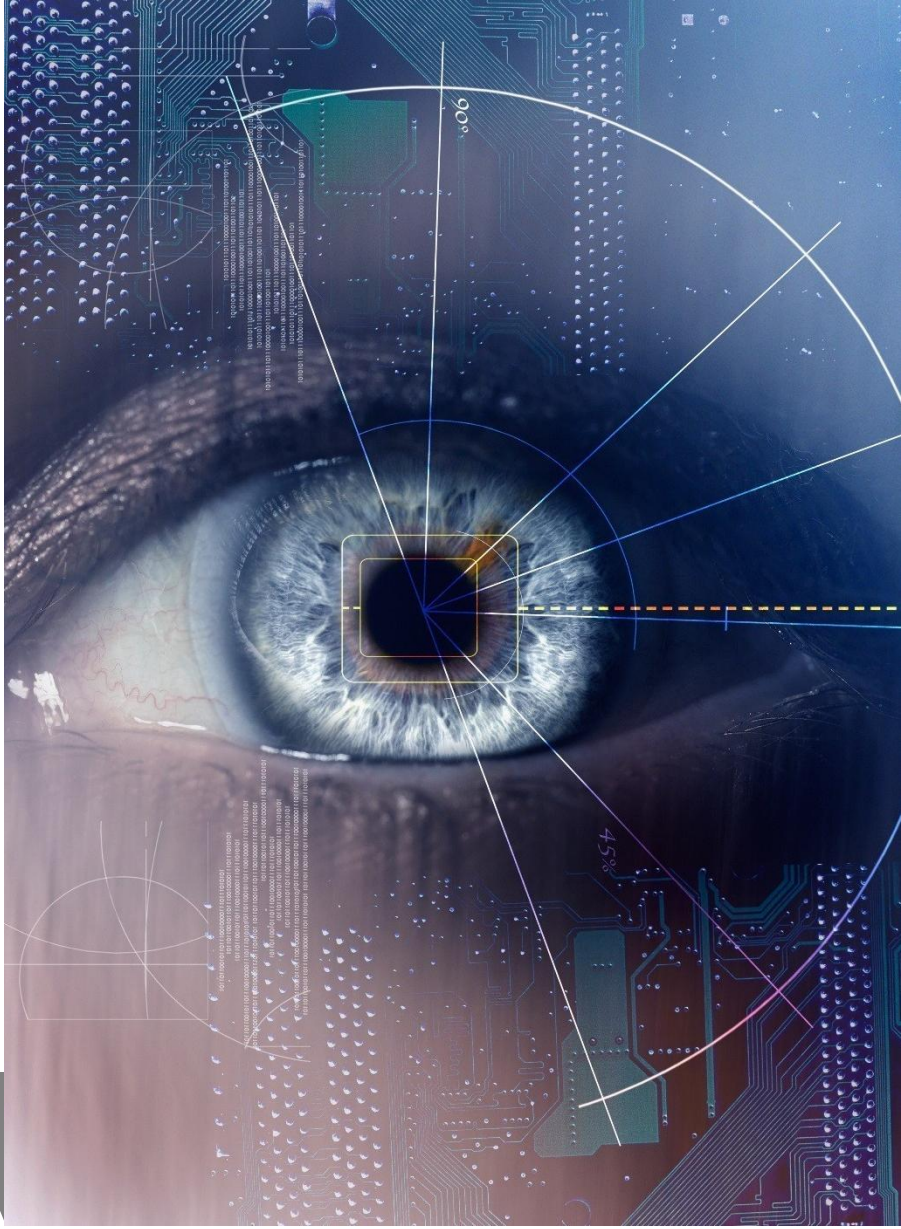
Section 1

Report objectives

Purpose of the report

A brief look at the Western Cape economy



Western Cape Government
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Purpose of the report

Supporting dialogue & strategy development around digital disruption within the Western Cape economy

Purpose of the report

The digital transformation of markets provide significant growth opportunities for the economy. Greater connectivity between all economic participants and the services it enables drive a more inclusive and prosperous nation. Digital transformation enables sophistication of all services within the economy and thus improves human development and citizens' lives.

The real imperative in a world which is increasingly digital, is that organisations need to embrace digital opportunities to disrupt their own business models before the competition does. Without a clear digital strategy, organisations risk losing their competitive advantage in an increasingly fast changing world. Furthermore, the expectations of the new 'digital customer' mean that organisations must keep up with the pace of change or risk losing relevance. The challenge will be the ability to successfully and effectively integrate new tools and capabilities into existing business and operating models. Organisations that achieve this will be positioned to capitalise on the newly acquired capabilities for sustainable and profitable growth.

Consequently, it is critical that all economic participants understand how the landscape is changing and how to respond to digital revolution, avoid the threat of disruption while making the most of the opportunities that digital enables.

Following the recently launched Western Cape Broadband initiative to provide high speed connectivity to citizens, businesses and Government, which will contribute to national and global competitiveness, DEDAT sought to investigate the scope and impact of digital disruption within various sectors in the Western Cape economy. It is the intention of this report to deliver such a view through an analysis of the forces of digital disruption that are transforming sectors across the economy, and an analysis of the potential for those forces to transform organisations and markets.

The objective of this report is to inform the participants in the Western Cape economy – citizens, business, Government and all civil society – of the potential changes that might effect their organisations and operations, and then provide guidance on how best to respond to such changes.

The pace of disruption is accelerating and impacting all sectors to varying extents. Through a series of sector snapshots, various sectors within the Western Cape economy are outlined in terms of the digital trends that are being affected and disrupted. An understanding of the changes taking place and what the future might look like for each sector enables citizens and businesses within the economy to better plan and adapt for change.

The analysis is outlined with a focus on the Western Cape context. The research conducted in the preparation of the report was predominantly qualitative and drawn from conversations with stakeholders from both private and Government organisations across all sectors of the Western Cape economy. It thus reflects the experience of local economic participants and provides a view of the digital forces that are truly guiding transformation locally, and the extent of that transformation.

The report aims to ultimately support the Digital Economy Strategy being developed by DEDAT, by providing insights and strategic responses regarding digital disruption within the economy and its potential affects.

The role of DEDAT

As a department of the Western Cape Government, the Department of Economic Development and Tourism (DEDAT) is responsible for facilitating and supporting Government function to deliver on the Provincial Strategic Objective 1: Increasing opportunities for growth and jobs. In order to deliver on this objective, DEDAT pays special attention to the following key areas:

- Development of strategic frameworks and policies to support economic growth and job creation
- Promoting a conducive regulatory and business environment to support economic growth, investment and job creation
- Ensuring that Government support is demand-led but private sector-driven
- Promoting infrastructure development to support economic growth and job creation
- Developing initiatives to ensure skills creation to match skills requirements within sectors of the economy

Purpose of the report

A report to support dialogue & strategy development around digital disruption within the Western Cape economy

Scope of the report

This report focuses on selected sectors in the Western Cape, identifying the impact of the digital revolution or transformation of each sector and the leading organisations operating within it.

Digital disruption is defined in the report to provide a narrower focus for the analysis within each sector.

The purpose of this report is to share an analysis of the impacts of digital disruption on selected sectors of the Western Cape economy.

Those sectors are:

- Tourism
- Agriculture
- Energy & Green Economy
- Construction
- Retail & Wholesale
- Transport
- Manufacturing
- Financial & Business Services
- Government (including Healthcare and Education)

The transformative changes that digital technologies & capabilities are bringing to each sector will be highlighted and framed through the following lenses of business:

- Customer expectations & value propositions
- Product enhancement
- Organisational forms & business models
- Collaborative innovation

With an understanding of the impact and transformation occurring and likely to occur across sectors, strategic responses are put forward that attempt to advise on how best to take advantage of the opportunities borne out of disruption, as well as mitigate against the risks associated with it.

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A brief look at the Western Cape economy

The strength of the Western Cape economy within South Africa makes it especially susceptible to the risks & opportunities that digital disruption may bring

The Western Cape economy

Forecasted provincial economic growth exceeds national forecasted growth

Over the past decade, the Western Cape has managed to maintain a marginally higher economic growth rate, when compared to the rest of the country. Despite slow national economic growth, the Western Cape economy grew by 0.4% higher than the national economy in 2014 and continues to grow above the national average. This indicates that the Western Cape is a strong economic hub within the country.

The province accounts for 14% of South Africa's total GDP, whilst only representing 11.2% of the population.

The Western Cape's GDP per capita is significantly higher than the average GDP per capita for the country. It also has a lower Gini coefficient than the country as a whole, indicating a lower disparity between the living conditions and income brackets within the province.

The Western Cape Government anticipates the provincial economy to grow 2.2% per year between 2015 and 2020, well above the national forecasted growth rate.

Sectoral drivers in the Western Cape economy

The Western Cape is a service driven economy with Financial & business services the biggest contributor to the region's GDP.

The Western Cape Government has a diverse portfolio of revenue steams, including national transfers in the form of conditional grants and provincial equitable shares, own financing and own revenues. This financial capability combined with the natural resources available and innovation create opportunity for a positive future for the economy and citizens of the Western Cape.

Cape Town has a relatively large capital budget compared to other South African metros, enabling it to invest in infrastructure to further develop strategic platforms such as transport, energy, and connectivity through broadband rollout, all critically supporting the Western Cape economy and the sectors within it.

These measures of economic strength profile the province as one of the strongest within the country. The impact of digital disruption on this strong economy is thus of great importance to the country, both in terms of the opportunities and the risks that it may bring.

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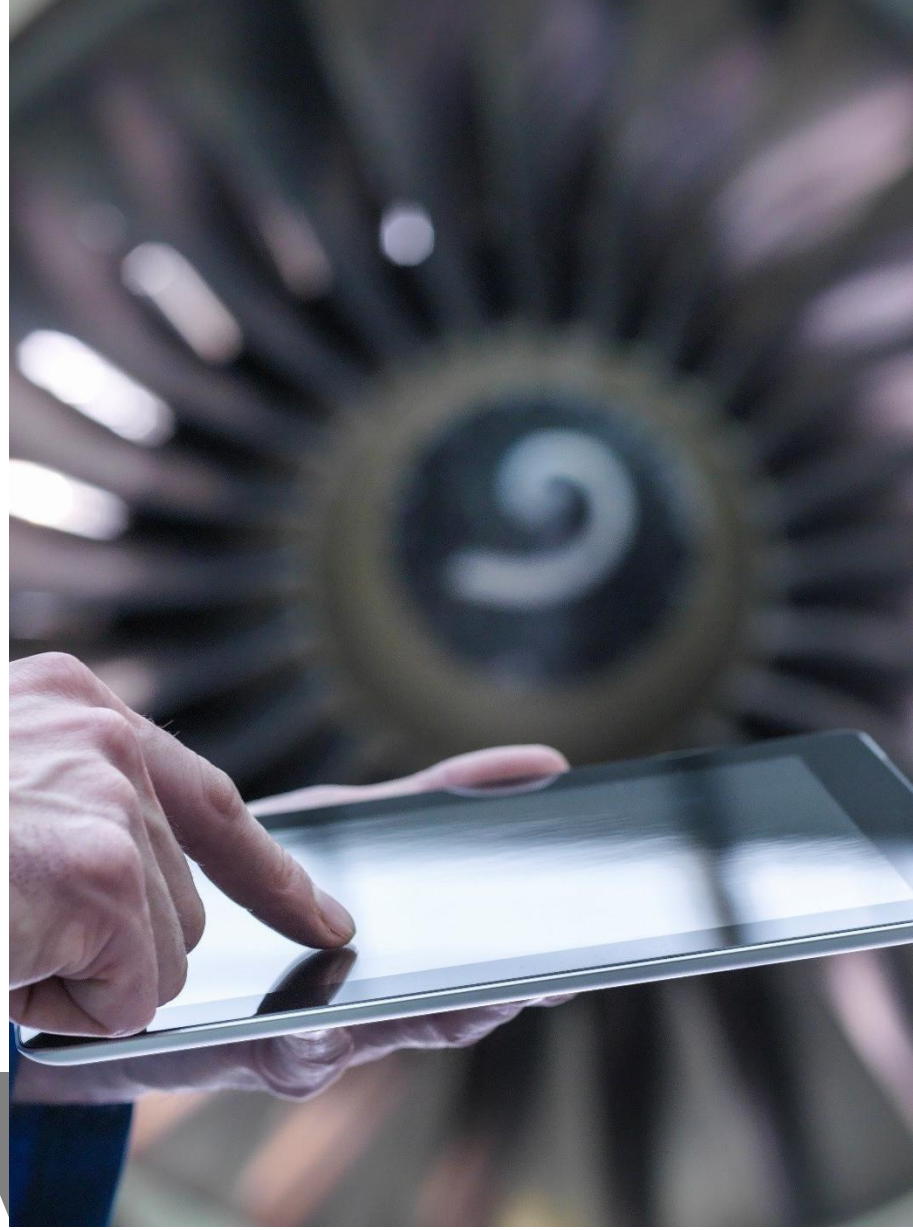
Source: WCG 2016 Budget
Provincial Economic Review and Outlook, 2016

Section 2

Glossary & terminology

Definition of terms



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Glossary & terminology

Definition of terms

These definitions of various terms used throughout the report are included to improve clarity and aid in understanding the report.
The terms are not necessarily formal industry wide definitions nor proposed as suggesting they should be used as industry definitions.

Business

Is usually used to mean formal commercial or corporate entities of any size, whether listed or not, operating in all sectors of the economy.

Business model

A business plan outlining the intended revenue streams, customer base, suppliers and other business functions.

Citizen

An inhabitant of a country or state who is legally obliged to abide by the laws enforced by the respective ruling Government.

Cyber

Relating to information technology systems.

Digital platform

An interactive online channel which allows the exchange of information to support business functions.

Digitisation

The conversion of analogue information into digital information which can be analysed and processed by computer systems.

Entrepreneur

An individual who assumes all of the financial and legal risks associated with starting a business from scratch.

E-commerce

The exchange of information, products or services over the internet.

GDP (Gross Domestic Product)

A measure that reflects the value of all goods and services produced by an economy in a given year. Gross domestic product is used as an indicator of the economic activity within a country.

Government

A regime elected by the citizens of a country to administer law and regulation with the purpose of economic and social wellbeing.

Informal business

Usually refers to commercial enterprises that are not formally registered with any regulatory authority or the tax authorities.

Glossary & terminology

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M-commerce

Mobile-commerce. The use of mobile devices for communication, banking, shopping etc.

Omni-channel

A catalogue of channels through which brands interact with consumers to provide a seamless customer experience.

Organisations

Is used to refer to private and public sector organisations of all types including non-Government organisations or non-profit organisations, in addition to corporate entities of all sizes and institutions of the Government or the state.

Sector

A segment within the economy contributing toward economic growth through similar practices and processes.

Smart

Technologies which are fitted with systems that enhance connectivity and communication, which elevates the ability to access, analyse and interpret information.

SMMEs

Small, medium and micro-enterprises are business ventures typically founded by entrepreneurs to drive economic and social growth.

Supply chain

The sequence of interactions and processes along the life cycle of a production process.

Trend

A general direction of movement and adoptions driving change within a sector.

Value chain

Interrelated activities within a business aimed at adding value and creating a competitive advantage.

Western Cape

A province situated on the south-western part of South Africa, known to be an economic hub driving economic and social growth within the country.

Section 3

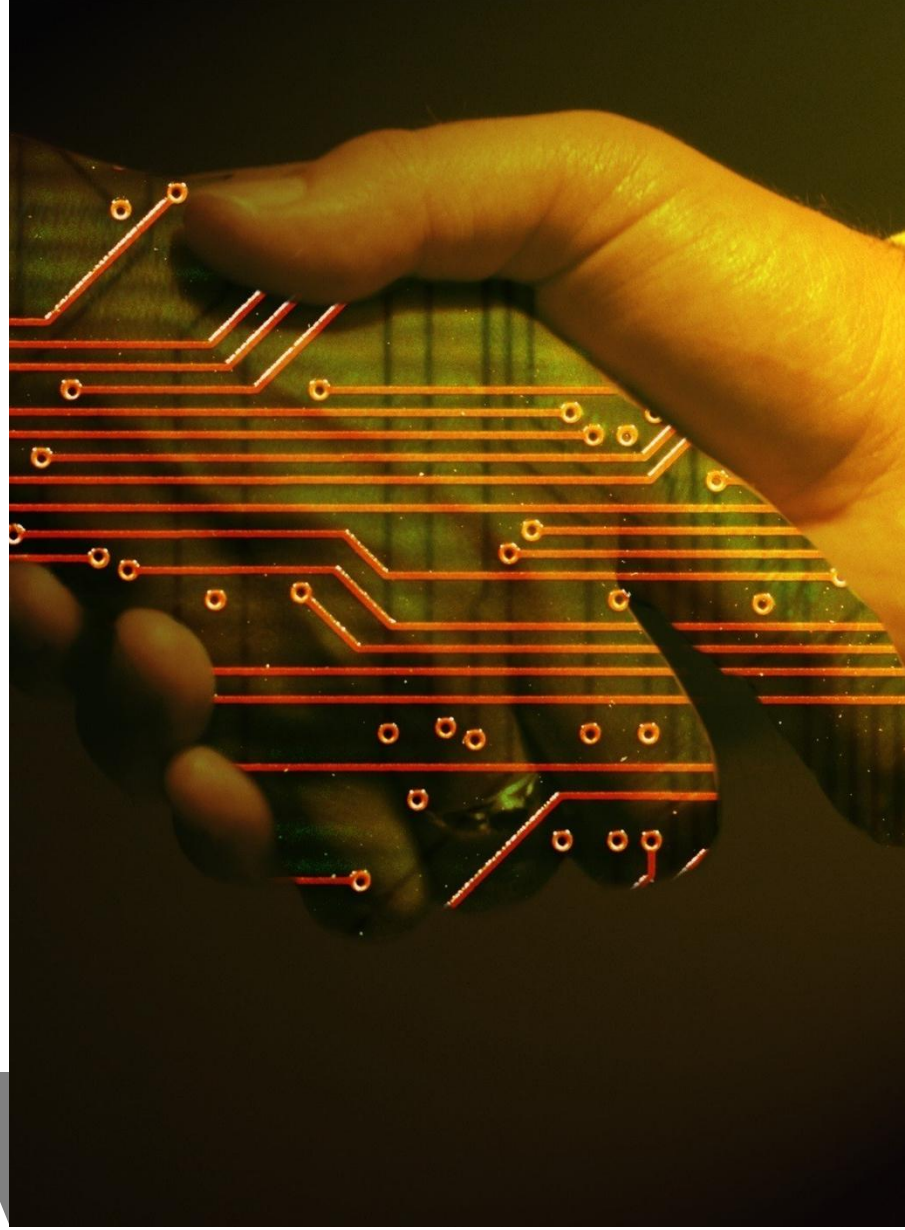
What is digital disruption?

Digital disruption is affecting business' & citizens' lives

Defining digital

Understanding disruption

Disruptive & transformative trends



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Digital disruption has affected the performance and value of 52% of the Fortune 500 since 2000

Digital disruption refers to the changes enabled by digital technologies and capabilities that occur at a pace and magnitude that disrupts established ways of value creation, social interaction, doing business and more generally our thinking. Digital disruption is a continuous form of disruption of business models, products, services or experiences, enabled by data and technology.

The impact of digital technology is increasingly disrupting organisations across all sectors, from the way that they manage their businesses and carry out their operations, to evolving customer expectations and to the changing nature of products and services. Responding to these forces, organisations develop the ability to be agile, flexible and adaptive in the way they define and execute plans to embrace the digital market.

It is important to understand where and how things are changing, and how best to address and embrace these changes. Business-to-consumer business models are experiencing an increasing demand for and reliance on e-commerce. The traditional brick and mortar models are either being supplemented or replaced all together.

Business-to-business models are experiencing an even greater disruption, whereby the products sold themselves are changing on account of the digital revolution. Data is a central driver of business-to-business transactions. Businesses are realising the value that data holds, and are increasingly becoming strategic in their sharing of this data. By either selling corporate data, withholding it altogether or sharing it to create strategic partnerships, data is driving business-to-business interactions.

The digital revolution is not complete. Digitisation will continue to evolve and continue to transform industries. Organisations across the economy need to understand the areas where digital technologies and capabilities might have the greatest impact, and the extent of that impact, in order to respond strategically and build competitive advantage that is sustainable in the future.

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Sources: 1. Constellation research
2. Agility in Action, Robotics Process Automation in Telecommunication, EY, 2017

Defining digital

Defining the technologies, attributes & capabilities that encompass 'digital'

Digital describes a way of doing business, rather than simply a set of technologies. The digital way of operating is enabled by the use of mobile, data-driven and customer-centric technologies that make use of greater technology capabilities at the edges of business processes, rather than only in the central back office of organisations. Digital goes beyond a set of leading technology (such as big data, cloud, social networking, and advanced analytics) to encompass the digital ecosystem where people, organisations and processes become connected through the use of technology.

Digital transformation has reshaped consumer experiences and expectations, leading to increased expectations of how institutions and businesses engage with their customers. Future digital customers expect more from the institutions they deal with.

A non-digital business becomes a digital business by using information technology to reshape it's infrastructure, operations, products, services and culture. To be digital is to be centred around the philosophy that the customer should be the focus of all activity, and that digital technology should enable this at every level of the organisation.

Digital should lead design in the back office, technology platforms, operating processes, product innovation and customer experience.
Digital experience is one of the biggest differentiators between organisations, and requires astute understanding of customer expectations and digital expertise to be able to apply digital solutions.

Attributes that define digital

Connectedness

The growth of the internet and other technologies has created a shift in the way people communicate and share information.

Empowered customer

The new segment of consumers expect organisations to understand them completely and to customise their journey with the organisation's product or service.

Consumers expect a fully interactive, consistent experience across multiple channels including digital ones.

Experience-driven

Organisations that are experience-driven capitalises on every touchpoint, both online and off, where their products or services reaches customers.

Additionally, organisations that are experience-driven add efficiency to all layers of their value chain.

Data

Explosion of data in every sector and function, is changing the way organisations use their business intelligence.

The use of non-transactional data to make better decisions is creating significant value for organisations to increase the quality of their service both internally and to customers.

Real-time

Having the ability to have data accessible for interaction with customers and organisations is key to being digital.

Analysing real-time digital data helps to improve decision-making and coordinate more agile responses.

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Sources: EY Thought Leadership 'The Upside of Disruption'

Understanding disruption

Today's businesses, Governments and individuals are responding to shifts that would have seemed unimaginable even a few years ago

Defining disruption

Disruption has commonly come to mean a transformation of business models and value networks driven by technology or business innovation[1]. Disruption upends more than business models and value networks; it can transform political systems, regulatory regimes, social compacts and much more.

The rapid acceptance of digital devices by citizens in their everyday lives, the changing demands of consumers, the emergence of new entrants into most sectors within economies, are all transformations leading to a growing awareness in the Government & private business communities that disruption is ubiquitous and accelerating.

The forces of disruption

The most visible examples of disruptive innovation have been in the area of technology, and so disruptive technologies are often seen to be synonymous with digital disruption. Disruptive technologies are however only one pillar driving disruption and the digital economy. It is increasingly evident that disruption (considered through a wider definition than originally laid out by Clayton Christensen) does not stem solely from technology or business innovations — it is also influenced by demographic shifts, globalisation, macroeconomic trends and more.

Seizing the upside of disruption

The perception of disruption is shifting from that of threat to opportunity. Incumbents have begun to embrace disruption to take advantage of the rapidly changing environment.

With the right response, disruption offers tremendous upside to businesses that can harness it's forces.

The causes of disruption and how they give rise to trends that are shaping our future

New technologies

Successive waves of the digital technology revolution (PC, online, mobile, social) have democratised data, empowered consumers and spawned scores of new industries. The next waves — the Internet of Things, virtual reality, AI, robotics — promise to be even more revolutionary.

Globalisation

Globalisation has accelerated in recent decades, thanks to trade liberalisation and emerging market growth. These trends amplify the disruption of existing business models by creating new competitors, reordering supply chains and lowering price points. Global shifts will increase complexity and require flexibility to respond. This global impact will continue to be felt even as some economies become more inward looking.

Changing demographics

In the decades ahead, relatively high population growth will make Africa an engine of economic opportunity.

Urbanisation will increase cities' economic and public policy influence, even as it strains their ability to grow in sustainable ways. Migration and immigration will have profound impacts on workforces and economic development creating greater diversity and integration, and increasing the flow of information.

Across the world, aging populations will transform everything from healthcare to real estate. Millennial-dominated workforces will reinvent the workplace. New generations are becoming 'digital natives' as they are born into a digital world and digital ways of operating and connecting is their norm. They themselves are drivers of disruption given their natural digital acumen and expectations of digital lives. All these demographic shifts will require new strategies and business models.

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Sources: EY Thought Leadership 'The Upside of Disruption'
1. Harvard Business School professor Clayton Christensen 1995

Disruptive & transformative trends

The trends, driven by digital, that define our present and are shaping our future

Transformative trends that define the present and shape the future by their impact on businesses, economies, industries, societies and individual lives.

Empowered customers

The rise of digital technologies have opened the gates to consumer access to knowledge, given customers a more powerful voice, allowed more informed decision-making, and enabled greater choice between providers.

The value of customer data

Today's individual customers understand their commercial value. Digital technologies and capabilities, and the data that they produce are enabling organisations to better track and understand customer behaviours. Better understanding of customer behaviour enables organisations to better serve customers, potentially better than their competitors. Customers are becoming cognisant of this value of data to organisations and expect certain levels of service in return. With the increasing depth of data available to organisations about customers, those customers now expect to be understood and appealed to in their full complexity.

"We are witnessing a seismic change in consumer behaviour. That change is being brought about by technology and the access people have to information."
Howard Shultz, CEO, Starbucks

Desire for personalised service

Customers today expect personalised products or services that reflect their individual needs and integrate with their lifestyle. To win over today's consumer, organisations need to understand personal preferences, shopping behaviours and decision paths. Companies leveraging digital technology, data and analytics to achieve these critical insights are winning in the market.

Differentiated interactions will be embedded in everything human-beings do - from dining to holidaying, to taking a taxi. And it is this differentiated and personalised service that will drive competitive advantage between organisations.

Customer empowerment is an opportunity for consumers and providers to realise greater value from a more intimate and trusted relationship.

"With digital technology, it's now possible to have a one-on-one relationship with every consumer in the world"
Robert MacDonald, former CEO, Procter & Gamble

Customers at the centre of business models

Empowered consumers with greater choices are helping redefine traditional markets and accelerate the elimination of traditional boundaries. They are becoming the centre of evolving industries. The growing primacy of delivering differentiated experiences will have profound effects on how value is created and measured - both for companies and economies.
Product-centric organisations might find that they are not flexible enough to meet the demands of empowered customers who are redefining their views on product-centric value propositions.

Evolving customer demands

The empowered customer demands convenience, transparency, integration across services. Service standards are rising by such demands and customers are often willing to pay a premium price for a product, if it means receiving premium customer service. The expectation of anytime, anywhere service is spreading across sectors, and demanding attention from businesses and Government.

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Sources: EY Thought Leadership 'The Upside of Disruption'

Disruptive & transformative trends

The trends, driven by digital, that define our present and are shaping our future

Evolving industries

Disruption is leading to the merging or convergence of industries, and also products and services. This is resulting in the emergence of new organisational forms often built off the collaborative innovation that flows from an open ecosystem of partners.

Redefining industries

Sectors are being redefined as information technology lowers barriers and challenges driven by changing customer expectations, demographic change and globalisation.

Traditional diversification or consolidation sees competitors enter new industry categories, even unrelated ones. These models allow a company to meet its business objectives, whether spreading risk, adding new revenue streams, gaining greater control over supply chains, or more. However, neither strategy alters the basic characteristics of the industries involved. Even though new competitors enter the space, the boundaries of the industry — key activities, value chain fundamentals, customer value proposition, and dominant economic characteristics — remain virtually the same.

Merging of industries

Industry convergence — the blurring of two or more previously distinct industries and sets of participants — is different. In turn, barriers to entry are lowered. Disruption dramatically alters the “invaded” industry’s basic and often long-held characteristics. The converged industry is redefined.

As boundaries break down, incumbent companies will face competitive threats from start-ups with disruptive business models and from formidable companies in previously unrelated sectors. Partnerships and alliances will become ever more important.

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Sources: EY Thought Leadership ‘The Upside of Disruption’

Disruptive & transformative trends

The trends, driven by digital, that define our present and are shaping our future

"The smartphone revolution is under-hyped, more people have access to phones than access to running water. We've never had anything like this before..."
Marc Andreessen, Co-Founder, Mosaic and Netscape

Smart

Smart is a term that has come to describe everything from health and banking to entire cities. It takes an asset, infrastructure, or even transaction, ensures it is connected, analyses the data it generates, makes it potentially autonomous and capable of lower cost delivery.

Smart is the layer of insight and decision-making above the interactions between connected things.

AI is integral to smart because it can autonomously assimilate inputs, perceive and understand a need and deliver the best possible decisions. It is hard to overstate the possibilities of AI. It is already being deployed in call centres to answer basic queries, in autonomous cars to transform mobility, and in smartphones as a personal assistant.

Together, AI and robotics will combine greater decision-making power with the ability to execute. Organisations could see exponential improvements as software and hardware develops, and costs decline.

The analytics enabled by these technologies is invaluable. The power of the analytics borne from these capabilities not only supports understanding customers, but aids in influencing them.

The ability to assimilate, analyse and make decisions in more complex and scalable ways than ever before enhances effectiveness. Smart is also empowering customers with more information and greater insight than ever before.

Smart cities

Multiple cities across the world are using ICT and IoT to better manage and optimize the city's assets, thereby improving the quality of life for it's citizens. By leveraging these technologies, Government is able to monitor, assess and respond accordingly, to create sustainable economic development and a thriving social environment.

Smart citizens

Connected citizens within a smart city who are dedicated to developing a thriving economy. Smart citizens welcome digital capabilities which improve operations, transportation and communication within the city, and make decision which will benefit the city. Smart citizens actively participate in enabling the city through energy conservation, safety, cleanliness and lawfulness.

Smart devices

The last decade has seen an explosion of mobile technologies, such as wearable devices and cloud services, which has disrupted the tech space. Consumers and businesses alike increasingly depend on devices which offer the most convenience, which prompts the demand for mobility and accessibility.

Apart from physical devices, those businesses which enable customers to access their products and services most conveniently, will see the greatest economic gains. This accounts for the outbreak of mobile applications from businesses across all sectors of the economy.

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Sources: EY Thought Leadership 'The Upside of Disruption'

Disruptive & transformative trends

The trends, driven by digital, that define our present and are shaping our future

"Computer is not a device anymore. It is an extension of your mind and your gateway to other people"
Mark Shuttleworth

"Today, companies have to radically revolutionize themselves every few years just to stay relevant… Technology and the Internet have transformed the business landscape forever."
Nolan Bushnell, Founder, Atari Inc

The future of work

Technologies and globalisation have been reshaping work and displacing labour for decades. Automation has long displaced workers in blue-collar jobs, from factory labourers to supermarket cashiers.

Artificial intelligence is now disrupting jobs long considered immune to technological displacement such as white-collar work and creative endeavours. Algorithms have uprooted white-collar work in the financial sector (for example high-frequency trading) and are starting to do so in healthcare (for example mobile health apps, robotic surgery and diagnosis by algorithm). They are even expanding into spaces once considered exclusively the domain of human creativity (such as film making and advanced analytics). The workforce of the future will likely see an increasing need for analytical skills, complex problem-solving skills and advanced digital experience.

Demographic and geopolitical trends also appear to be reshaping the workforce. With the rise of the middleclass and maturity of the millennial generation, a natural shift away from manual or routine work is evident.

Not all jobs will be affected and not all affected jobs will be eliminated — as in the past, automation will both replace and supplement human labour — but jobs that are truly untouched will be the exception rather than the norm.

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Sources: EY Thought Leadership 'The Upside of Disruption', World Economic Forum

Section 4

The impact of the digital revolution

The Fourth Industrial Revolution

Gartner Hype Cycle

Digital disruptive technologies

Cross-analysis of technologies and disruptive themes across sectors

The digital economy

The digital economy participants

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The fourth industrial revolution is the most fundamental transformation we will experience in our lifetime

Digital has defined the 4th Industrial Revolution creating a new norm of connected enablement

First Industrial Revolution	Second Industrial Revolution	Third Industrial Revolution	Fourth Industrial Revolution
1700's	**1800's**	**1900's**	**2000's**
Mechanical	**Electrical**	**Automated**	**Connected**
Technology was steam and water, powering the first factories	Electricity made possible the division of labour and mass production	IT enabled programmable work and an end to reliance on manual labour	Cyber-physical systems, powered by the Internet of Things, and fuelled by data, create a fully interconnected society

The fourth industrial revolution is centred around a connected world — connections within a digital ecosystem between all physical assets and industry value chain partners are using technology to shift the parameters in which stakeholders within the industry interact.

The fourth industrial revolution refers to the complete digitisation of value chains. Digital capabilities are influencing businesses across vertical and horizontal value chains, creating an integrated network of operations.

While capital expenditure investments by businesses are required, the fourth industrial revolution is anticipated to not be as radical a facelift to factories as the previous revolutions have been. Upgrades to factory machinery accounted for 80-90% of the changes made during the second and third industrial revolutions. Conversely, machinery upgrades are anticipated to account for around 40-50% of changes made during the fourth industrial revolution. Emphasis is placed on supplementing current technologies through alterations and retrofitting with disruptive technologies such as sensors. Despite the reduced investments, the changes made during the fourth industrial revolution is anticipated to yield higher returns and savings than any of the other revolutions.

Business models and value propositions are also anticipated to change due to the new capabilities and efficiencies introduced by digitisation.

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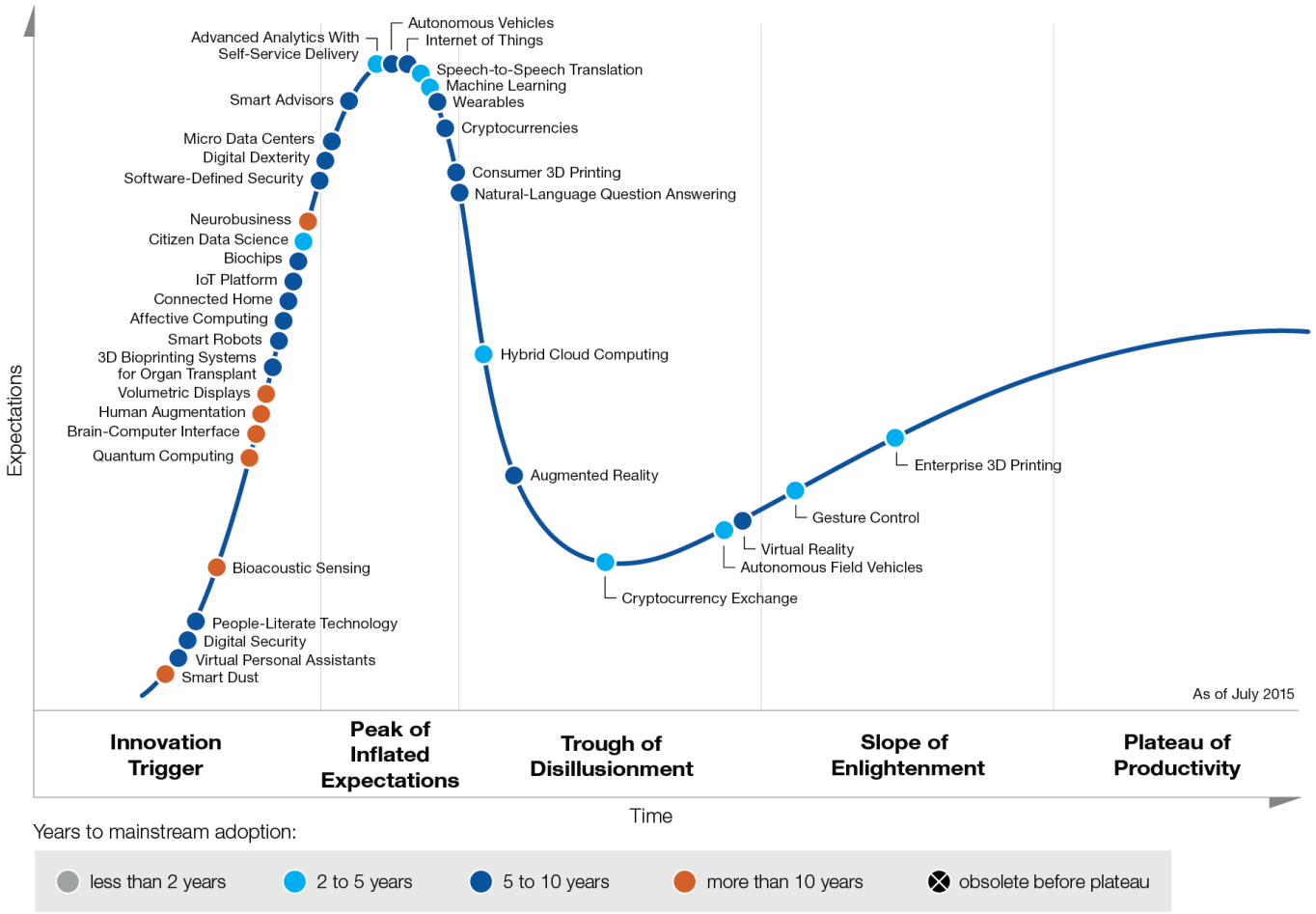
Sources: Caonstellation research, EY Robotics, McKinsey analyses

Gartner Hype Cycle

Technologies & trends that are creating a digital impact and how they are evolving

Gartner's Hype Cycle to reflect local digital maturity.

- Reflects high levels of uncertainty around emerging technologies.
- Requires adaptable response that isn't rooted in predicting the future.



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Digital disruptive technologies

Overview of technologies, and how the landscape will change materially in the future supported by these emerging technologies

The Internet of Things

The Internet of Things (IoT) is a set up in which objects or even living things are provided with unique identifiers and embedded computing devices with the ability to transfer data over a network without requiring human interaction.

When 'things' are connected in this way, they become Smart devices. Smart devices have nearly infinite potential applications and their adoption is becoming more widespread.

The embedded technology in these Smart devices is able to gather and act on information about the behaviours of suppliers and consumers. This changes the game of service delivery and customer service.

The IoT brings significant efficiencies in that it enables the tracking of when things need replacing, repairing or recalling and whether they are fresh or past their best. The value in these efficiencies is the saving of time, cost and waste.

Today this is widely used in high-value technology for machine-to-machine communication in manufacturing and power, oil and gas utilities.

To reach its full potential and connecting a global network will require the right software, business models and wireless networks that can easily cross national borders.

Mobile connectivity

There are cheaper and more direct ways to offer services, advertise and manage customer relationships than ever before. The digital economy is changing the nature of competition, business models, and goods and service offerings. Technological improvements (convergence of devices such as the phone, camera, TV, navigator, banking terminal to one mobile device) are enabling M-commerce, which is the use of mobile devices for communication, banking, shopping etc.

Poor infrastructure and the fact that most of Africa's population doesn't have access to computers means that mobile technology is the channel that has brought most Africans in touch with information that they previously have not had access to. Africa has more mobile phone users than both America and Europe. M-commerce has enabled Africans to extend their business and social networks which is opening up bigger markets and supporting increasing productivity and economic growth.

Improving telecoms infrastructure is enabling faster internet connections and creating more opportunities for mobile technology as a business channel. Examples of this are:

- Mobile banking that has taken off very quickly in Africa. It has been prevalent in Kenya for a while - The M-Pesa service allows the public to pay and receive money via their mobile phones
- Rwanda is using mobile phones to send medical reports from remote villages to track HIV/AIDS patients
- People can watch television on mobile phones today – this has been very successful in Nigeria
- Many people use their mobile phones as their source for receiving news updates
- Cell phones are used extensively as an advertising tool in Africa. Organisations can experience huge cost savings by using the internet and mobile phones to market and sell their offerings

Organisations needs to adapt to the requirements of the mobile user in diverse environments in order to stay relevant to their customers.

Digital disruptive technologies

Overview of technologies, and how the landscape will change materially in the future supported by these emerging technologies

Body — adapted wearable electronics

The growing and rapidly changing nature of technology has led to technological devices becoming increasingly smaller, faster and multi-functional. Improvements in processing speed, battery capacity and sensor technologies are enabling these changes. These changes are supporting the growth of devices that are adaptable to the human body.

Wearable computing technological devices are wearable in the way that accessories are. Devices generally fall under the category of a smart watch, smart glasses or body sensors.

There are many and varied applications for wearable electronics. This type of technology has expanded into applications in healthcare, emergency services, sport, fashion and entertainment. The majority of existing devices focus on monitoring a person's health and fitness levels. The devices help people to better understand their personal health and fitness by monitoring exercise, heart rate, weight, food consumption, sleep patterns etc. Other existing devices help a person to navigate, manage time and store information.

The security of private information has been the public's biggest cause for concern surrounding these devices. The data that can be collected about user behaviour from the devices would be very valuable information for companies in informing the development of new products and services.

The future of these devices is to become even less obtrusive and visible, and so they are becoming smaller and more multifunctional. They are becoming more common and affordable and the market for them is growing.

Wearable technology is not available on a large-scale in South Africa yet. South Africans are however very interested in them, which reflects the South African consumer's desire to be more digitally connected.
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Digital disruptive technologies

Overview of technologies, and how the landscape will change materially in the future supported by these emerging technologies

Big Data

Big data is an all-encompassing term for a set of technologies, skills, methods and processes for gaining insight from collections of data. The use of big data has become a basis of competition between firms, and an enabler of improved productivity and growth. Big data is creating new growth opportunities and sparking the set up of new firms.

The value in big data lies in:

- Transparency of information
- The collection of more accurate information in digital form enables better decision-making
- Greater understanding of customer wants
- Sophisticated analytics enables the minimising of risks and gleaning of insights
- Improvement of future product development

Big data refers to data sets so large and complex that it becomes difficult to process using traditional data processing application. Large enterprises worldwide are starting more and more to use the public cloud for their big data analytical needs, rather than private data centres. Cloud services make big data more accessible to smaller companies.

Technologies are needed to analyse big data. These are storage technologies, analytical tools, transport infrastructure etc. Legacy systems that are incompatible and so unable to integrate data will need to be replaced. The suppliers of this technology and firms that analyse this data will be in a good position. Skills to analyse big data will be in great demand.

Ingenious applications are being created from the ability to access information outside the confines of a company, and working that into a company's internal product development.

The biggest concerns that are holding enterprises back from moving big data loads to the public cloud are security, privacy and complexity.

New hardware and software development

In today's world where the mobile phone, social media, cloud, and big data are impacting business models and processes, application software needs to be developed and adapted at a fast rate. Hardware must also be designed in parallel to be capable of providing the technical support required by the software. Convergence of the design and development process of both hardware and software ensures the desired functionality of both digital capabilities.

Agile programming is critical in order to deliver the flexibility and adaptability required by the digital business world today. Software-defined networking, storage, data-centres and security are maturing. This is enabling IT to move from a function that constantly carries out routine tasks to one that acts as a broker of services for the organisation and that is far more focused on its business.

Hardware development is now occurring at an increased rate due to the emergence of other technologies such as 3D printing, which reduces the time to market and greatly reduces costs.

Gartner research group ranked South Africa as one of its Top 30 software development outsourcing destinations. The factors that support this ranking are South Africa's favourable exchange rate for most of the world, a high level of fluency in English, and strong service provider expertise. There were three African countries in the Top 30, only Egypt achieved a rating higher than “good” for Government support. This highlights that there is still work to be done to create a supportive business environment to make South Africa more attractive as an outsourcing destination.

Digital disruptive technologies

Overview of technologies, and how the landscape will change materially in the future supported by these emerging technologies

Artificial Intelligence and Robotics

Artificial intelligence (AI) is a label given to computing systems that exhibit some form of human intelligence. They are characterised by interacting in ways that seem 'natural' to humans, and learning from those interactions. Other labels and technologies that are used synonymously include smart machines and cognitive computing.

Advancements in a wide array of disciplines such as computer science and engineering have improved on the traditional industrial robot to make them safer to work with and more efficient in a wider array of tasks. The incorporation of advanced sensors and connectivity have equipped robots with an element of dexterity, communication skills and the acuity to learn. Through these mechanisms, AI is equipping robots with the skills required to perform more intellectually demanding tasks, rather than simply manual labour. AI is driving productivity improvements, as these systems replace or augment humans and disrupt traditional business models.

The functionality of AI extends beyond the factory. Businesses selling both products and services are anticipated to experience the effects of AI. This technology is making an impression in the medical field through robotic prosthetics and braces, and in the classroom through smart boards. AI is today, and increasingly will be, catalysing transformation of society and businesses across sectors.

Automation of Knowledge Work

The rise of AI is enabling smart machines to perform knowledge work previously reserved for skilled knowledge employees. Computers are now able to access, process and analyse relevant information to make judgements and solve unstructured problems creatively. Beyond the ability to 'learn', smart machines also have the capacity to communicate with knowledge workers and other smart machines. This allows for enhancement of employee skills to optimize business processes.

Business opportunities arise from the automation of knowledge work by creating an avenue of real-time information access to unskilled workers and consumers, which could be used to improve on service and product offerings.

Automation of knowledge work also holds the potential to fully automate certain tasks, thereby eliminating the need for certain knowledge employees. While this will certainly result in a degree of job cutting, the ultimate creation of value to the economy and society will compensate for this.

Digital disruptive technologies

Overview of technologies, and how the landscape will change materially in the future supported by these emerging technologies

Cloud Technology

Cloud technology refers to the ever-expanding service of storing and processing data on a network, rather than on physical infrastructure such as a hard drive. By storing data over a network, ubiquitous, on-demand access is ensured across the business. Businesses are also able to access advanced processing power without the need to make additional investments in such capabilities.

The rapid penetration of this technology has unveiled many market opportunities in the form of internet-based services. Such services include GPS navigation, video streaming and the storage of personal data. Self-service platforms and metered payment are also enabled through cloud technology. Many start-up businesses are founded on these opportunities, while multiple established businesses are adapting their business model to take advantage of this technology.

Cloud technology allows businesses to choose how they manage their resources on the cloud, through the use of public, private or hybrid cloud infrastructure. Through these choices, businesses can manage the level of security and speed of their information.

Cloud technology adds an element of security as data loss due to hardware crashes and theft is avoided, however the risk of cyber theft is introduced.

Cyber Security

Cyber security is the coordinated efforts of a body of technologies and processes aimed at protecting hardware, software and data from unauthorized access, attack and damage. It is no longer regarded as just an IT issue, but is recognized to be a much broader business issue.

Cyber security is relevant and necessary at all levels, from a personal capacity to protect personal information, to Government level to protect against cyber terrorism and the access of sensitive national information.

There is significant interest in the marketplace about business' abilities to appropriately deal with cyber attacks and breaches. Businesses within certain sectors of the economy, such as the financial sector, house sophisticated teams dedicated to building threat intelligence agendas and infrastructures. In such businesses, the strength of their cyber security capabilities provide a competitive advantage within the market.

Digital disruptive technologies

Overview of technologies, and how the landscape will change materially in the future supported by these emerging technologies

Additive manufacturing

Additive manufacturing refers to the process by which digital 3D design data is used to build up a component. Depending on the building process and material used, the way of manufacturing is either termed 3D printing, stereolithography or laser sintering. 3D printing is the most common method. It is a production technique that builds up an object, layer by layer, using materials in fine powder form. Metals, plastics and composite materials can be used in the process.

Using these additive manufacturing capabilities, products can be created to support individual needs rather than mass manufacturing of products, defined by the existing equipment. Products can also be made closer to the consumer and so existing supply chain restrictions can be overcome.

As the market grows, this way of manufacturing will eventually become cheaper than the cost of existing production methods. Use of the devices is expected to grow extensively in the industrial, biomedical and consumer spaces. Multinationals including Coca-Cola, Nokia and eBay are currently utilising 3D printing technologies.

There are a number of benefits that arise from this type of manufacturing:

- Quicker time to market
- Reduction in development costs
- Elimination of delivery costs
- Improved designs
- Shortened manufacturing time
- Customisation of products
- Little to no waste

Manufacturers across all industries are starting to make use of this type of manufacturing to create a wide range of products. The shift of production and distribution from existing models to localised production, based on demand and customised to a consumer's needs, could potentially reduce the imbalance between export and import in countries.

Additive manufacturing has the potential to create new industries and completely new professions.

3D Printing

3D printing is the process of creating a three dimensional object from a digital model. The design is created on a computerized system, which then relays instructions to the printer which assembles the object by printing successive layers at a time.

3D printing offers a range of benefits over traditional production techniques such as cost saving through shorter design and production times and reduced waste. Additionally, this technology allows for remote printing and development of parts which reduces long lead times and machine downtime. The ability to develop machine parts in-house is changing the supply chain and the efficiencies of businesses. An increasing range of materials can now be used for 3D printing which widens its potential applications.

This technology is being applied across sectors. Healthcare is using 3D printing to develop complex parts such as teeth and joints for replacements. Construction is 3D printing simple houses and parts such as pipes and plastic fittings. While considerations such as intellectual property rights and taxation implications exist, 3D printing presents many opportunities for economic and social growth.

Examples of disruptive technologies and themes across sectors

Sector	Tourism	Agriculture	Energy & green economy
Themes of business transformation ● Framing disruptive impacts within key pillars of all businesses			
Customer experience & value propositions	• Better understand customer behaviour through data & analytics, and so personalise service & offers • Self-service Self-service of the whole tourist experience including planning, booking et cetera • Virtual experiences to aid in purchase decisions • Increased likelihood of expectations being met	• Customer access to supply chain information, driven by expectations of sustainable production methods. • Customer ability to source directly from producers. • Ability to integrate into customer experience applications such as recipes or matching products.	• Awareness and management of consumption behaviour, including smart metering • Greater choice of sustainable services, presented on-demand and through self-service • Personalised pricing based on behaviour and usage patterns
Optimisation of operations	• Ratings and reviews shared through social media increase service level expectations. • Greater market access for tourism operators, since they are less dependent on physical presence and can access the global market. • Greater efficiency and scale of bookings and other business areas	• Smart metrics create opportunity for zero-loss operations • Simulation of production scenarios virtually enables rework to ensure best possible combination of inputs and best approaches before implementation, reducing risk of errors or poor yields	• Smart energy distribution management systems, including greater ability for small generators to contribute to the grid. • Reduced operating costs and fuel consumption. • Smart infrastructure that self-monitors and adjusts to energy use of environmental impact.
Nature of work	• Delivering work augmented by awareness of individual tourist situations and expectations. • Self-service travel arrangements displacing travel & tour operators, but enabling greater personalised service and individual experiences.	• Directed work ensures the workforce executes the right operations or maintenance tasks at the right time • Typical worker becoming an operator of smart machinery that requires increased digital literacy.	• Workers are mobile, not tethered to specific work locations • Directed work ensures the workforce executes the right operations or maintenance tasks at the right time • Smart Workforce members are fully engaged in a high performance work system and are focused on continuous improvement instead of reacting to upsets. • Energy users increasingly have some digitally managed self-generation.
Technology themes ● Identifying examples of uses and benefits to sectors across disruptive technologies & capabilities			
Internet of Things	• Monitoring of tourist traffic to create rich data analytics opportunities to optimise service and experience. • Integrated transport information optimising tourist movement & ticketing.	• Remotely monitored and managed agricultural equipment and machinery using internet & digital sensors	• Smart grids and meters capable of adapting to changing usage and environmental impact. • Production equipment uses on-board data, IoT and soft sensors to measure operating conditions, quality results, faults and environmental data
Big data	• Track customer interests, personalise offers and connect people anywhere, anytime • Using complex data streams from tourist information and movements to personalise service or offers.	• Enhanced farm management and decision-making regarding real-time operations, productivity and efficiency • Greater accuracy in assessments of the condition of assets enabling predictive maintenance • Opportunity to share or aggregate data across providers at a region or co-operative level.	• Production plans adjust dynamically based on real-time communication of machine status • Greater accuracy in assessments of the condition of assets, including assets that can self-monitor. • Environmental data enabling monitoring of change
Mobile connectivity	• Widespread Wi-Fi access for tourists, using common infrastructure (one login) • Constant access to tourist-relevant information, such as accommodation, food, weather and transport • Transport & destination ticket purchase	• Various apps for farm management, equipment inventory, improving crop productivity, tracking commodity prices & indicators etc. • Access to agricultural information	• Mobile apps available to consumers to monitor their home or business energy consumption, to make payments and queries • Constant communication with remote workers to increase productivity
Artificial intelligence	• Monitoring of search engine searches to identify trends and anticipate increases or decreases in demand • Advanced analytics on tourist geo-location, transaction and activity data	• Forecasting weather, crop yield, prices, pest, ,disease etc. • Precision quantification and application of nutrients & other inputs to improve yield and reduce waste	• Machine learning techniques improve productivity by continuously refining operating settings to eliminate losses as conditions vary
Automation, Robotics & 3D Printing	• Automated entry gates and security checks at venues. • Visual CCTV analysis of tourist traffic. • Personalised and immediate curio manufacture.	• Various applications and agribots – drones to survey fields and crop, robotic harvesters, virtual assistants • Partly 3D printed infrastructure and production equipment components supporting improved maintenance.	• Smart machines for resource exploration and extraction • Automated operation of machinery and processes • Partly 3D printed infrastructure and production equipment components • New types of materials that rely on robotic or 3D construction techniques

Cross-analysis of technologies and disruptive themes across sectors

Sector	Construction	Retail & wholesale	Manufacturing
Themes of business transformation ● Framing disruptive impacts within key pillars of all businesses			
Customer experience & value propositions	• Self-management of buildings • Virtual tours of infrastructure before construction begins which aids in selling ideas & designs and raising funds, enabling customers and investors to experience what finished products will look like and how they will operate	• Better understand customer behaviour through data & analytics, and so personalise services & offers • Improved in-store experiences • Increased e-commerce • Personalisation of the service experience • More payment options enabling easier transactions • Ability to service global customers through e-commerce	• Faster access to products due to improved production & distribution techniques • Virtual views of products and factory design aids in selling ideas & designs and raising funds, enabling customers and investors to experience what finished products will look like and how they will operate
Optimisation of operations	• More efficient design & optimisation of assets and infrastructure in other industries to consume less energy • Simulation and testing of design and approach virtually, enables rework to ensure best possible design before construction begins to reduce the risk of error	• Quick response to fluctuations in demand to optimise inventory management • Ability to integrate products & service to create a valued experience • Business intelligence from analytics to improve display & distribution	• Digitise processes to improve productivity • Improved asset utilisation • Smart monitoring and maintenance of equipment • Smart metrics refine models of zero-loss operations • Testing of design and approach virtually, enables rework to ensure best possible design before construction begins to reduce risk of error
Nature of work	• Workers are mobile, not tethered to specific work locations • Directed work ensures the workforce executes the right operations or maintenance tasks at the right time • Augmented reality will enable greater awareness of the built environment.	• Improved employee productivity in digitally enabled environment • Ability to create more responsive retail working environment • Increased need for workers to become "digital operators" using digital tools in the delivery of products or services.	• Workers can now be digitally enabled with tools and systems to assist them in their work to support improving their productivity and safety • Autonomous workshop monitoring & maintenance • Smart Workforce members are fully engaged in a high performance work system and focused on continuous improvements instead of reacting to upsets
Technology themes ● Identifying examples of uses and benefits to sectors across disruptive technologies & capabilities			
Internet of Things	• Smart lighting, water, power, fire, cooling, alarms and structural health systems • Production equipment uses on-board data, IoT and soft sensors to measure operating conditions, quality results, faults and environmental data	• Enhanced supply chain visibility leading to stock-out prevention etc. • Transparent supply chain enabling customers or wholesalers to track product flow • Connect infrastructure, stock and systems and for example create alerts when a product needs to be re-ordered or has perished • Location based offers and service customisation	• Quick response to fluctuations in demand; maximised operational efficiency, safety and reliability, using smart sensors and digital control systems • Production equipment uses on-board data, IoT and soft sensors to measure operating conditions, quality results, faults and environmental data
Big data	• Data and analytics of building usage and energy consumption enables better building management and waste savings • Greater accuracy in assessments of the condition of assets	• Merchandising and market analysis • Campaign management and customer loyalty programmes • Supply-chain management and analytics • Event and behaviour-based targeting • Market and consumer segmentations • Linking purchasing data, geo-location data with payment data through converged partnerships	• Production plans adjust dynamically based on real-time communication of machine status. Stock levels, genealogy and quality records are updated in real time, improving accuracy and order compliance • Greater accuracy in assessments of the condition of assets
Mobile connectivity	• Constant communication with remote workers to increase productivity	• Mobile point-of sales devices to improve payment process • Engagement of customers to provide detailed product information • Devices to assist with scanning and distribution of goods	• Constant communication between supervisors and floor staff, providing quick updates and feedback in real-time • Increased productivity through improved teamwork and collaboration.
Artificial intelligence	• Machine learning techniques improve productivity by continuously refining operating settings to eliminate losses as conditions vary	• Analytics & predictive models to help personalise experiences, enhance inventory demand visibility & forecasting • Automated packing and distribution of orders	• Augmented reality wearables which provide situational awareness and activity coaching
Automation, Robotics & 3D Printing	• Various applications – drones to survey sites and building progress, self-operating machines to lay bricks and assemble structures • Greater accuracy in assessments of the condition of assets, including assets that can self-monitor. • Environmental data enabling monitoring of change	• Various applications – drones to monitor stock levels, virtual assistants to place and receive orders, robotic product picking & packing • Partly 3D printed infrastructure and production equipment components • Automated inventory and warehouse management	• Smart machines which optimise and streamline the production line • Product design prototyping

Cross-analysis of technologies and disruptive themes across sectors

Sector	Transport	Financial & businesses services	Government
Themes of business transformation ● Framing disruptive impacts within key pillars of all businesses			
Customer experience & value propositions	• Improved experience • Customer in control • Safer operations • Digital payment mechanisms • Integrated ticketing across transport types and destinations delivered through an app.	• Increased convenience and access to financial services • Improved knowledge of product offerings & ability to compare prices – greater choice • Integration of banking into consumer lifestyles • More payment options enabling easier transactions	• Access to records and information provides better citizen engagement • Improved provision of services to citizens through improved citizen engagement • Personalised service delivery
Optimisation of operations	• Energy efficient operations. Reduction of waste & pollution • Demand management	• Increased efficiency and lower operational costs. • Ability to focus operations on customer service rather than back office processes.	• Smart metrics refine models of zero-loss operation in service delivery • Better measurement of service delivery
Nature of work	• Directed work ensures the workforce executes the right operations or maintenance tasks at the right time • Total situational awareness • Smart Workforce members are fully engaged in a high performance work system and is focused on continuous improvement instead of reacting to upsets	• Enable staff to work anytime, anywhere • Increased customer centricity • Less staff focused on administration & back office functions	• Smart Workforce members are fully engaged in a high performance work system and is focused on continuous improvement instead of reacting to upsets • Remote working
Technology themes ● Identifying examples of uses and benefits to sectors across disruptive technologies & capabilities			
Internet of Things	• In the longer term, driverless cars & autonomous vehicles that rely on sensors directions from connected systems • Infrastructure and asset maintenance alerts improves the productivity of assets and operations • Real-time monitoring of vehicles and other forms of transport enabling optimal routing and management	• Automated processes that trigger business rules and data analytics automatically. • Branches and ATMs that self-monitor and report status automatically • Ability to measure customer behaviour and develop product offers that respond to customised needs	• Infrastructure and asset maintenance alerts improves the productivity of assets and operations
Big data	• Real-time driving behaviour, traffic and vehicle diagnostics • Greater accuracy in assessments of the condition of assets • Open data sharing enable innovation and digital developments driven by the private sector	• Compliance and regulatory reporting • Risk analysis and management • Fraud detection and security analytics • CRM and customer loyalty programmes • Trade surveillance • Credit risk, scoring and analysis • High speed arbitrage trading • Personalised customer pricing & experience	• Fraud detection and cybersecurity • Compliance and regulatory analysis • Energy consumption and carbon footprint management • Smart metering results in extremely large flows of data • More sophisticated monitoring and performance measurement (especially of service delivery and the impact of government interventions_ • Open data sharing of government data sets for external analysis and innovation
Mobile connectivity	• Mobile apps to locate public transport providers or to request private transport from private service providers • Mobile based ticketing and payments integrated across all city transport	• Mobile apps for consumers to carry out banking activities & manage their profiles and products	• Mobile apps or websites for citizens to engage with their municipality or service provider
Artificial intelligence	• Machine learning techniques improve productivity by continuously refining operating settings to eliminate losses as conditions vary • Redirecting of assets as congestion or other disruptions arise to ensure most efficient route taken	• AI Legal assistant • Monitor online searches to anticipate trends in demand	• Monitor movement of crowds to help predict crowd behaviour • Surveillance to help eradicate crime
Automation, Robotics & 3D Printing	• Self-driving vehicles • Robotic processing of information and completion of routine processes	• Robotics process automation carries out routine and repetitive activities more accurately and quickly than a human. Main usage areas – audit, insurance claims approval, legal contract creation etc.	• Robotic process automation that automate or optimise routine processes

The digital economy

Digital disruption is re-shaping the business world. Traditional dynamics have changed forever and companies must evolve if they are to remain relevant

The digital economy is changing the nature of competition, business models, and goods & service offerings. Convergence of devices to one mobile device has facilitated mobile-commerce. M-commerce enables extending of business and social networks which has supported increased productivity and economic growth. It has formed a link between the informal and formal economies and created new ways for people to earn money. People now have access to a wider pool of products and services that previously were not available to them because they can receive advertising and make payments more easily. Mobile phones are often the first point of access to the internet, and their use and penetration into the market is a key enabler of the creation of a digital economy.

The digital economy is characterised by agility and innovation, making businesses across sectors more resilient and better able to adapt to rapidly changing customer expectations and regulatory environments. Digital capabilities strengthen employee engagement and effectiveness, empowering employees to serve customers more efficiently, and enabling a greater degree of collaboration and innovation within the organisation.

Digital technologies and capabilities enable blooming of the economy without the need to rework legacy infrastructure. The benefits of new technologies to leverage off broadband, such as smart meters, smart transport, integrated libraries, marketplace, schools, university campuses and clinics, lead to socio-economic growth and improvement.

The interface between urban growth, technology, connectivity, infrastructure and capital requirements presents a unique set of opportunities for socio-economic development.

The evolution of the digital enterprises also presents significant challenges, including new competition, changing customer engagement and business models, unprecedented transparency, privacy concerns and cybersecurity threats.

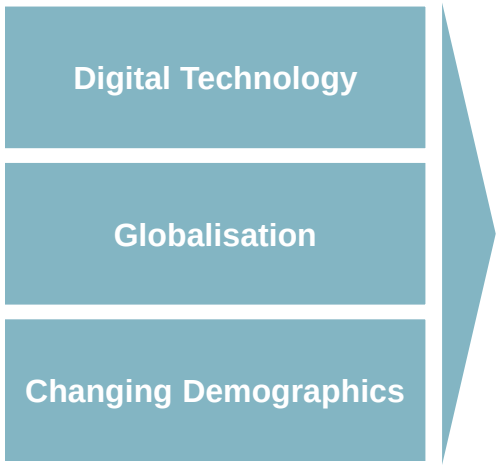
Government has a role within the digital economy to facilitate and enable the overcoming of such challenges so that participants within the digital economy can take full potential of the opportunities it provides.

Organisations and entrepreneurs that seize the opportunities offered by digital advances stand to gain significantly, while those who cannot may suffer serious losses.

The digital economy participants

The digital economy will disrupt business, Government and society

The disruptive & transformative trends that are forming the digital economy will affect businesses, Government and society in the following ways:



Disrupting business

The disruption of work is already spawning business model innovation. Ride-sharing platforms, which use transportation resources more efficiently, envisage a future with fewer vehicles. So, auto manufacturers are exploring ways to reinvent traditional models (GM's partnership with Lyft) while disruptive entrants (like Uber) are experimenting with multiple approaches.

In the future, the ultimate resource that companies will use more efficiently is the human resource. Labour-intensive firms everywhere will need to reinvent their business models, deploying smart technologies and using labour more productively. One result is that work will be unbundled. Just as disruption unbundled music albums into songs, it will unbundle jobs into tasks, with each task performed in the most efficient manner.

Digital technologies and capabilities enable organisations to gain tremendous increases in efficiency and productivity.

Disrupting society

Income inequality could be greatly exacerbated by labour displacement and by the dismantling of key elements of the social safety net such as healthcare benefits and retirement savings, which are often provided through the employer-employee relationship.

Disrupting Government

Start-ups and new innovative products & services are already challenging regulation across sectors. Entrepreneurs and even traditional institutions developing disruptive processes, products & services, generally site regulation as a hindrance to growth and innovation.

Start-ups argue that existing regulations were designed for another era and do not apply to the digital economy. There is validity in that, but regulation also protects consumers and workers in important ways.

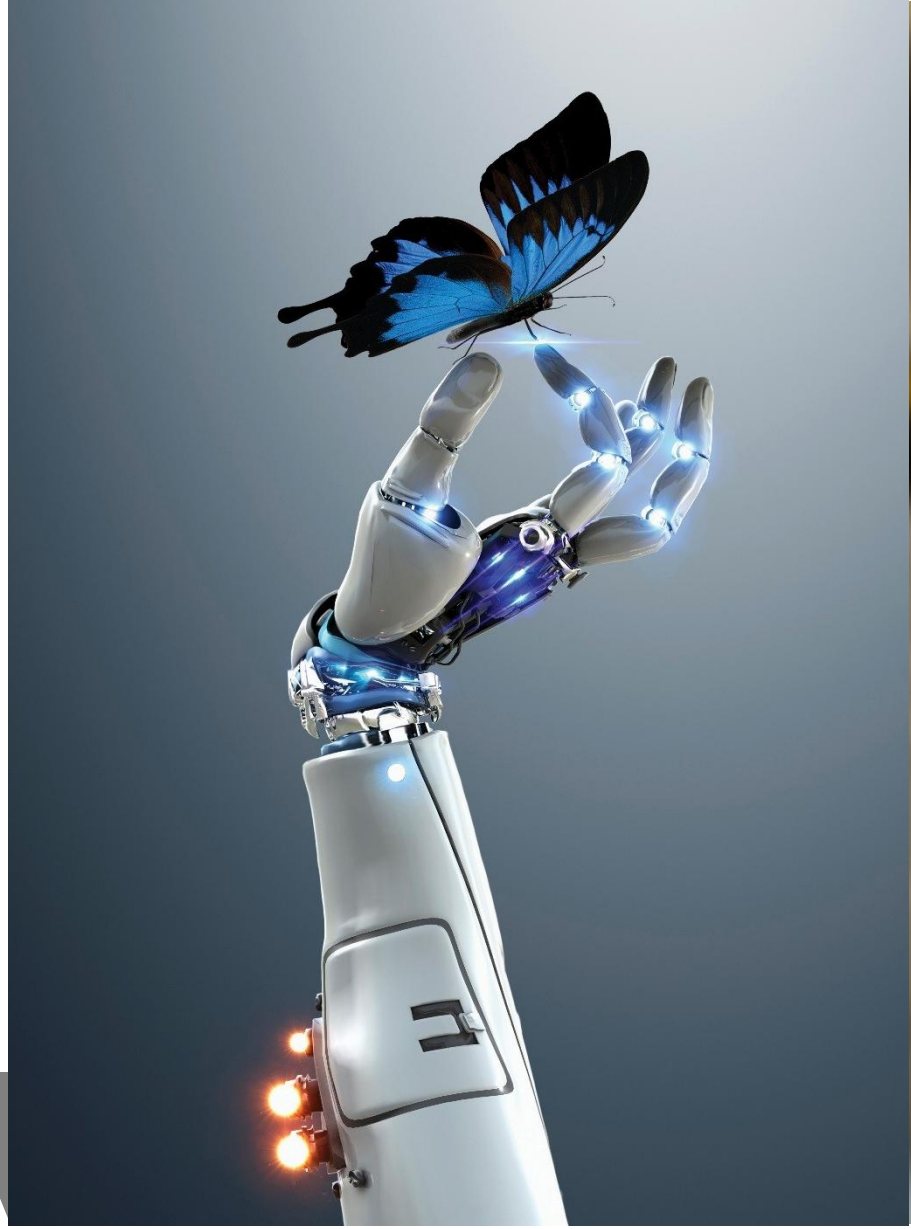
Governments will need to find the right balance, creating regulatory regimes designed for the future — nimble, real-time and powered by big data and smart technologies.

Section 5

The Digital Disruption horizon

Digital technologies impact horizon

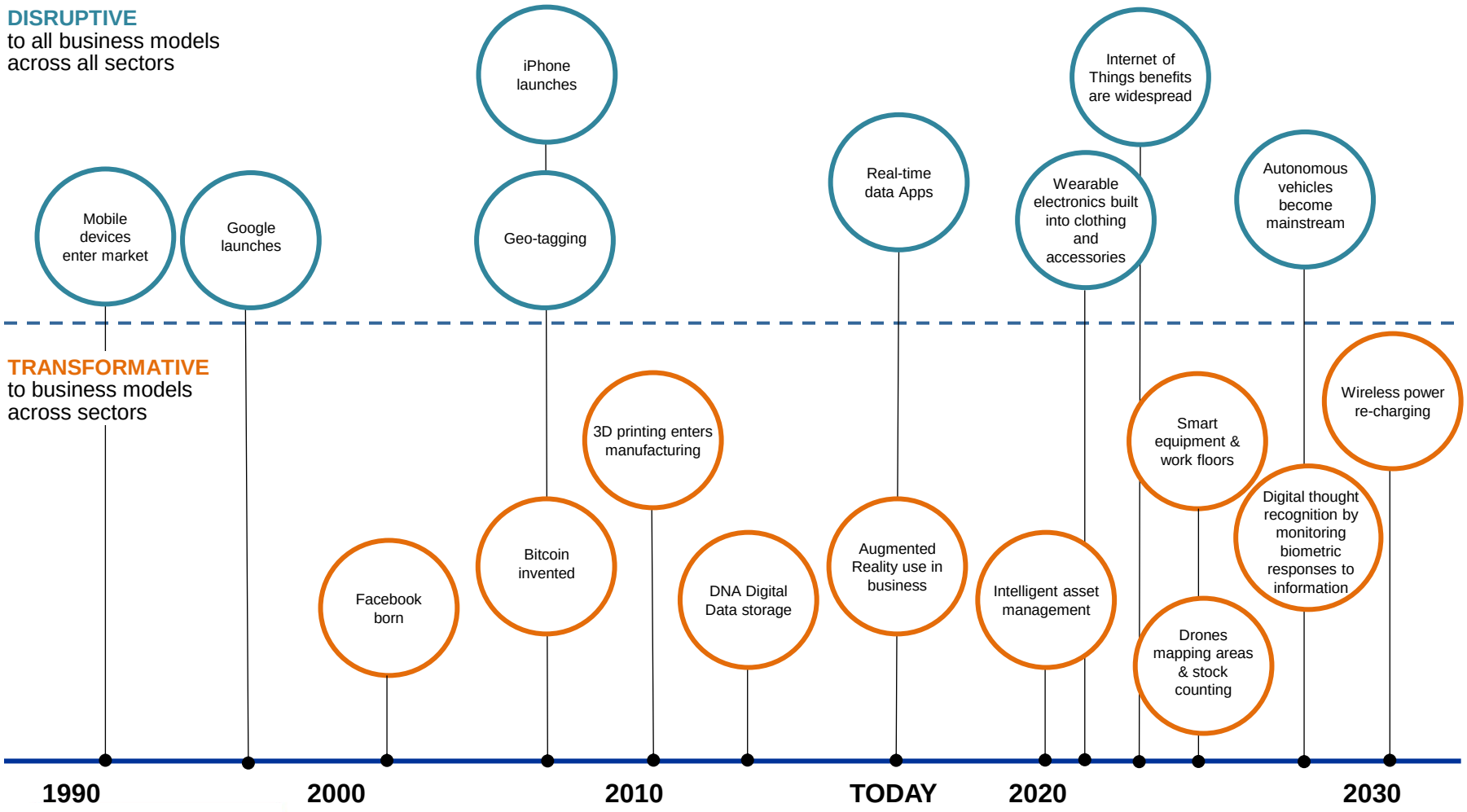
Sector impact roadmap



Western Cape Government
Economic Development and Tourism

Digital technologies impact horizon

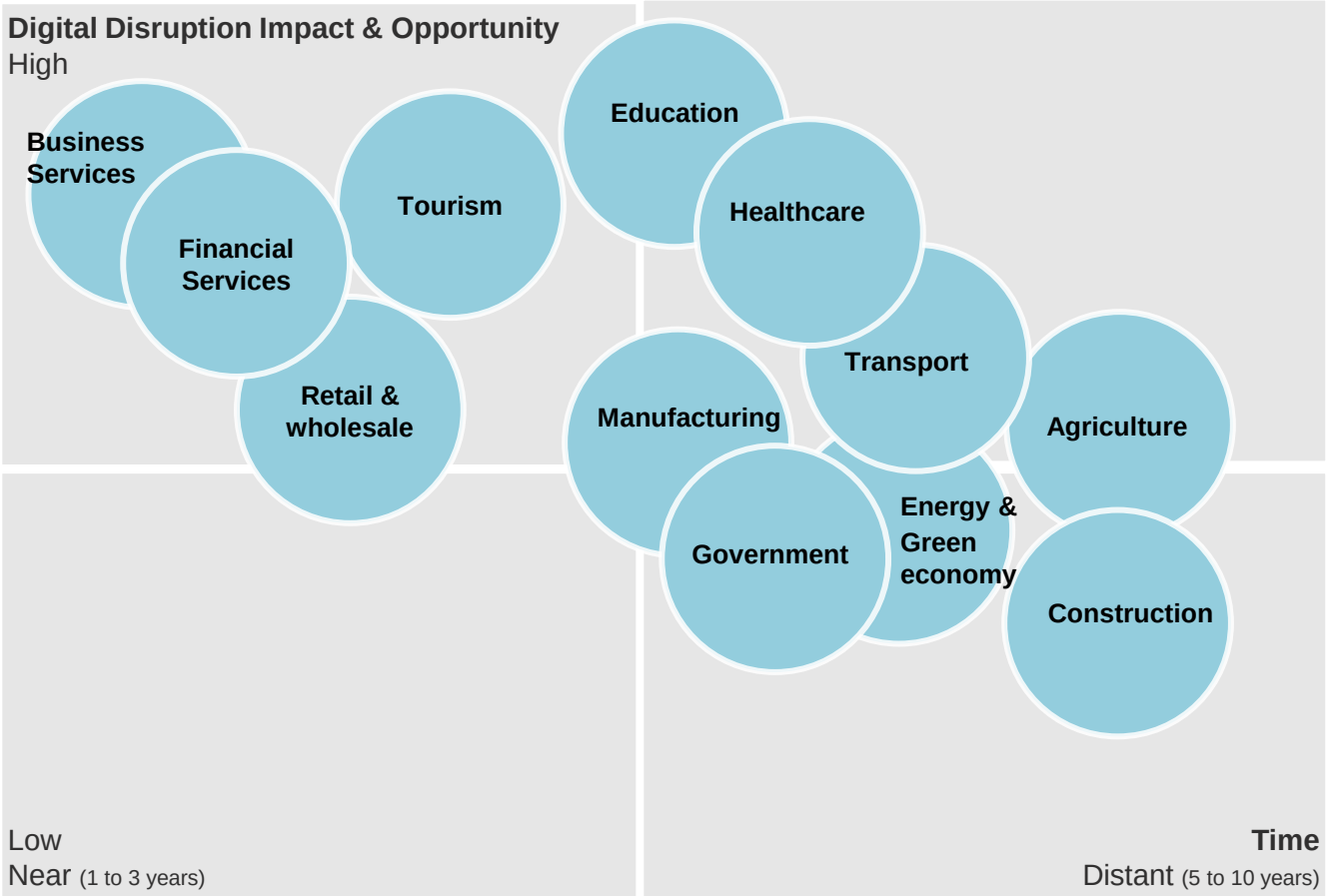
Selected digital technologies & capabilities that have emerged over time, and those that are forecast to enter markets



Western Cape Government
Economic Development and Tourism

Sector impact roadmap

The relative pace of disruption is accelerating and affecting sectors on different time horizons



Given a view of when digital technologies and disruptive activities have emerged, and are forecast to emerge, it is possible to plot sectors along a timeline in order to forecast when the most disruptive changes might be felt in terms of driving transformational change.

This is a relative and broad forecast of impact over time. Sectors appear on the timeline when it is forecast that digital technologies, capabilities and disruptive activities will become mainstream across markets and require transformation of businesses within organisations within each sector. High impact means that every aspect of the business will be transformed by digital capabilities. Every aspect of business being: Core competencies & resources, value propositions, distribution channels, customer segmentation & engagement product design & pricing, revenue & cost bases, and operating models.

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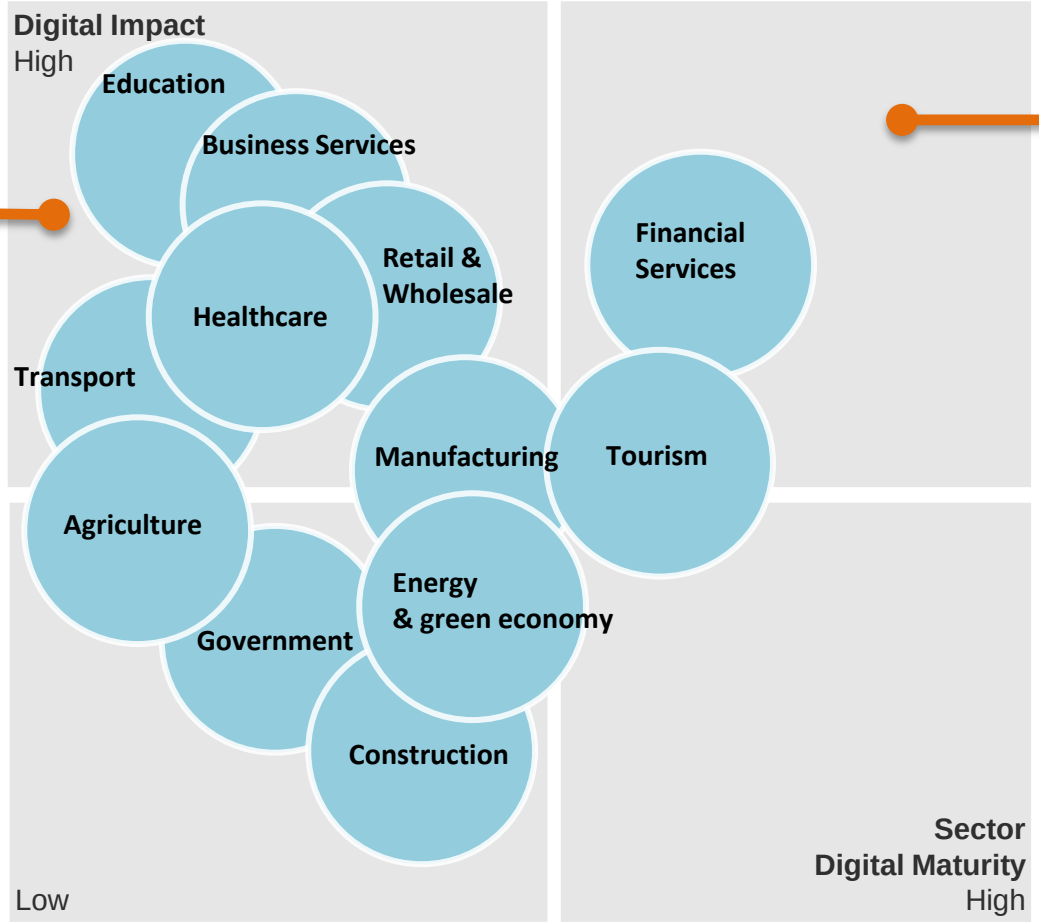
Potential of digital opportunity

Relative mapping & clustering of sectors

Zone of Opportunity
Enabling investment & growth in sectors with the most impact



Self Sufficient
Supporting organisations & sectors that are leading the way

Western Cape Government
Economic Development and Tourism

Defining maturity and impact

Gauging the extent to which digital technologies & capabilities have transformed the way organisations operate and organise themselves

Characteristics of digital maturity and impact

	Digital maturity	Digital impact

High	• Organisations within the sector exhibit the attributes of a leading digital organisation (as outlined in Section 10 of the report)
	• Digitally transformed and best in class
	• Infused digital throughout organisations within the sector
	• Leveraging digital for competitive advantage
	• Digitally sophisticated
	• Digital workforce excellence through extensive training at all levels of organisations in the sector
	• Industry policies and regulations promote transformation through minimal red tape and conditions
	• Sophisticated cyber security measures are available to all organisations is the sector to proactively garner trust between stakeholders and the freedom to innovate across the ecosystem
		High impact means that every aspect of the business will be transformed by digital capabilities. Every aspect of business being: core competencies & resources, value propositions, distribution channels, customer segmentation & engagement product design & pricing, revenue & cost bases, and operating models.
		• There is a fundamental transformation of business models and ways of working:
		  • Transformation of processes
		  • New culture
		  • Completely new services and products

Medium	• Leveraging digital successfully, driven by top leadership within organisations within the sector • Clear roadmap and on par with other regions around the world • Digitally aware • Digital capabilities exist within organisations in the sector with some reliance on outsourcing • Industry policies and regulations enable transformation through reasonably broad conditions • Strong risk management and cyber controls exist, and policies and procedures are in place to protect stakeholders in almost all organisations	• Digital transformation is starting to evolve the operations back office, technology platforms, operating processes, product innovation and customer experience • Impacts multiple strategic challenges - digital technologies & capabilities have a strong impact on important enterprise challenges
Low	• Progressing digital capabilities in pockets but not yet realising significant value from modest investments • No clear digital leadership in comparison to other regions • Lack of awareness & skills • Extensive reliance on outsourcing for digital capabilities by organisations within the sector • Transformation is adequately supported through permitting industry regulations and policies • Substandard consolidated view of cyber risks and partial availability of cyber security tools to organisations	• Core services and products are the same but enhanced and enabled by digital technologies & capabilities • Digital technologies & capabilities drive operational optimisation and efficiencies aren't likely to transform business models (as far as can be told today)

Western Cape Government
Economic Development and Tourism

Section 6

How does the Western Cape engage digital?

South Africa's digital profile

How the Western Cape engages digital

Western Cape Government
Economic Development and Tourism

South Africa's digital profile

Are sectors, and the organisations within those sectors, keeping up with the way South African's are embracing digital?

South African consumers' digital profiles continue to grow, driving a growing digital economy

The way in which people are using digital devices and engaging with organisations is constantly changing and expanding.

With mobile phone usage having penetrated almost the entire population, and the large majority of those using smartphones, it is clear that the country has become deeply mobile-centric.

South Africans are device-centric users and digitally engaged

Digital devise usage of the SA adult population
January 2017

92% of South African adults have a mobile phone

69% of South African adults have a smartphone

73% of mobile users say they use the internet from their phone every day

3h 03m is the average daily use of the internet via a mobile phone

27% of the population are active social media users

This digital profile of the population shows that the power of South Africa's digital economy is growing.

The rise in digital device usage is giving consumers the power to access information instantly, engage with organisations remotely, track the service they receive, and share their service experience with the rest of the market.

Consumer feedback about digital experience across organisations and sectors reveals that organisations have yet to acquire contemporary digital capabilities or to articulate their strategy for a digital market.

Consumers want quick and seamless services from organisations that they can engage with anytime, anywhere; and if they don't receive good service it has become practice to share poor experiences on social media platforms. People are increasingly relying on each others' ratings and reviews of products and services, as opposed to advertising and company information to make purchase decisions. Buying behaviour and sources of influence are changing. Power is shifting to consumers and through digital devices, they are able to share and grow this power.

Organisations are vulnerable to being excluded from the digital economy if they don't keep up with the digital market

Organisations need to understand the disruptive impacts that digital technologies and capabilities are having in their markets, and assess their digital readiness to respond to these. The ability to react with agility, and with the right response, is critical to ensuring survival in this time of significant disruption.

The success of companies such as Uber and Airbnb have demonstrated how quickly a digital disruptor can change a market – and with what scale. Every sector is vulnerable, and organisations need to start formulating a strategy before they lose relevancy and potentially get left behind.

Africa's emerging digital economy is ready to ignite

Compared to the digital maturity rating indices of other countries around the world, African countries are generally toward the bottom of the list. Penetration is however growing exceptionally quickly and innovative businesses are emerging to overcome Africa's socio-economic and infrastructure challenges.

Local organisations need to assess whether they are ready to respond to this.

Western Cape Government
Economic Development and Tourism

Sources: 'Digital in 2017: Southern Africa', We Are Social, Hootsuite

South Africa's digital profile

South Africa is relatively immature compared to other countries around the world in some critical enabling areas of the digital landscape

The Network Readiness Index (NRI) is a global metric derived by the World Economic Forum to help assess and rank markets on their ability to exploit opportunities afforded through information technology.

South Africa is ranked 65 out of 139 countries assessed on the NRI. This position is primarily driven by improvements in infrastructure and affordability.

These results highlight the critical areas that need attention and investment to improve the digital readiness of the country in comparison to other countries. Those are:

- Ease of starting up businesses
- Quality of Science & Maths which are critical in developing digital skills
- Affordability of connection

South Africa's ranking's across the pillars of the NRI:

1. Political & regulatory environment

Overall ranking

26 out of 139

South Africa's regulatory environment is relatively sophisticated, appearing to be driven by efficiency of legal frameworks.

2. Business & innovation environment

Overall ranking

65 out of 139

41 Availability of latest technologies

Businesses encounter substantial difficulty in terms of the time it takes to start a business. SA does however rank quite highly in terms of availability of latest technologies, and especially highly in quality of management schools.

3. Infrastructure & digital content

Overall ranking

44 out of 139

18 International internet bandwidth

The environment within SA is relatively established, although there is still room for significant improvement. The country does rank quite highly in terms of international internet bandwidth.

4. Affordability

Overall ranking

75 out of 139

112 Competition index for internet and telephony services

The costs of accessing ICT in SA is very high, which negatively affects the reach and usage of ICT systems in the country. This hampers the potential economic growth due to digital.

5. Skills

Overall ranking

95 out of 139

139 Quality of math and science education

SA scores very poorly in the standard of our education system, specifically the quality of math and science education. This illustrates the skills shortages which is experienced across the country for ICT-capable workers.

Western Cape Government
Economic Development and Tourism

Source: World Economic Forum

South Africa's digital profile

South Africa is relatively immature compared to other countries around the world in some critical enabling areas of the digital landscape

South Africa's ranking's across the pillars of the NRI:

6. Individual usage

Overall ranking

77 out of 139

20 Mobile cellular subscriptions

The South African population shows strong adoption of digital devices. Mobile-cellular penetration is exceptionally high and surpasses the population level.

7. Business usage

Overall ranking

32 out of 139

19 Extent of staff training

Businesses within SA show extensive adoption of technological systems, suggesting a highly tech savvy economy. South African businesses also show exceptional investment in staff training and development.

8. Government usage

Overall ranking

105 out of 139

116 Importance of ICT in future vision

The South African Government has been exceptionally slow in adopting ICT solutions to manage its assets and citizens. It also does not have a focused vision and strategy to adopt ICT systems in the future to improve the country's competitiveness.

9. Economic impacts

Overall ranking

57 out of 139

60 Impact of ICT on new products and services

SA shows a strong adoption of ICT systems, driven by the private business sector, which contributes significantly to economic growth of the country. Consequently, SA is highly competitive within the global economy wrt technological innovation and practice.

10. Social impact

Overall ranking

112 out of 139

119 Internet access in schools

SA displays inefficient utilization of ICT to improve the lives and wellbeing of citizens. Education, healthcare and energy consumption hold substantial potential for digital adoption, however inefficiencies from Government inhibit the potential gains. Through these inefficiencies, the social impact of digitization on majority of the population is minute in SA.

Western Cape Government
Economic Development and Tourism

Source: World Economic Forum

How the Western Cape engages digital

The Western Cape is leading in skills and citizens are digitally savvy, creating an environment ripe for digital transformation

The Western Cape is positioning itself as a strong competitor within South Africa with respect to the quality of education it provides and the annual churn of matriculates and graduates. The provincial matric pass rate is 85.1% as apposed to the national pass rate of 78.2%. A higher percentage of graduates is also housed at a provincial level than at a national level, consisting of 17.6% of individuals who hold a tertiary qualification compared to 13.2% nationally. These figures hint at a relatively strong environment that has the potential to take advantage of the upside of disruption.

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The extent of penetration and nature of personal mobile device use within the province indicates a digitally savvy population

The Western Cape has a higher percentage of mobile phone ownership when compared to the rest of South Africa.

93.8% of Western Cape mobile phone owners use it to access the internet as opposed to 70.8% at a national level.

Within the province, individuals use their mobile devices to:

- **50.3%** use their mobile devices to downloads applications
- **37.2%** use their mobile devices to access educational material
- **41.7%** use their mobile devices to purchase goods online
- **60.3%** use their mobile devices for health purposes

In order to drive higher levels of access, the provincial Government is very focused on providing broadband connection to areas which lack the finance and infrastructure to connect itself. Improving connectivity enables communities to access information and services elevating their participation in the digital economy.

The digital divide

The Western Cape population spends an average of 20% of their individual income on communication services. This is well above the 5% recommended by the United Nations, which suggests that Western Cape, and South African citizens alike, are prevented from fully immersing in digital due to high prices. The average cost for connectivity in South Africa is $19.48 for a speed of 6.9Mbps, as compared to $2.76 for 110.22Mbps in the highly advanced Singapore. This disparity serves as one of the road blocks to digitisation in South Africa.

Western Cape Government
Economic Development and Tourism

Source: Western Cape Digital Readiness Assessment Report

How the Western Cape engages digital

The strength of the Western Cape economy within the South African context makes it especially susceptible to the risks & opportunities that digital disruption may bring

Driving innovation to embrace digital disruption

The Western Cape provincial Government is focussed on driving innovation and enabling entrepreneurship to support economic growth and job creation.

As one of the six core values of the Western Cape Government, innovation is a chief focus to propel the region into the fourth industrial revolution. Emphasis is placed on driving innovation to support economic growth and job creation.

The Western Cape Government has an impressive repertoire of project roll-outs focussed on driving innovation, connectivity and economic growth.

To avoid a digital divide where people are excluded from mainstream economic and developing activities, the Western Cape Government is addressing disparity by assessing existing broadband infrastructure with a vision to enable economic developments such as entrepreneurship, and social benefits such as digital inclusion.

Provincial Government has invested R2.89bn to ensure quality broadband access across the province in an effort to expand connectivity and reduce digital disparity.

The Department of Economic Development and Tourism together with the Technology Innovation Agency set up the Design Innovation Seed Fund to support innovative solutions with a focus on agri-processing, health, bio-tech, and manufacturing sectors. It is this type of support and enabling of innovative solutions that testifies the Western Cape's drive to foster and focus on innovative business ideas that grow the economy.

The Western Cape economy as an innovation hub

The Western Cape is well-known for being a knowledge economy, and has become a hub for international industry conferences. The Cape Town International Convention Centre alone has hosted 502 large-scale international conferences in the 2014/5 financial year, demonstrating the strong foothold that the region has in the international knowledge economy.

The province houses multiple internationally acclaimed universities and research institutions. The University of Cape Town is ranked 148 by the World University Ranking, and houses majority of South Africa's A-rated scientists and research units. These institutions act as catalysts for innovation, which is demonstrated through the 111 patents registered by universities in the Western Cape between 2009 and 2014.

The Western Cape is also fast cementing its reputation as the tech start-up hub of Africa, with

59% of South Africa's tech start-ups

being based in this region. This is due to easier access to venture capital through both public and private enterprises, and the wide array of support structures available in the province.

Foreign Direct Investment (FDI) into Cape Town between the years 2003 and 2014 amounted to R59billion[1], with the largest recipient (R16billion) of this investment being in the information and communications technology area.

Western Cape Government
Economic Development and Tourism

Source: 1. State of Cape Town Report 2016
WCG 2016 Budget

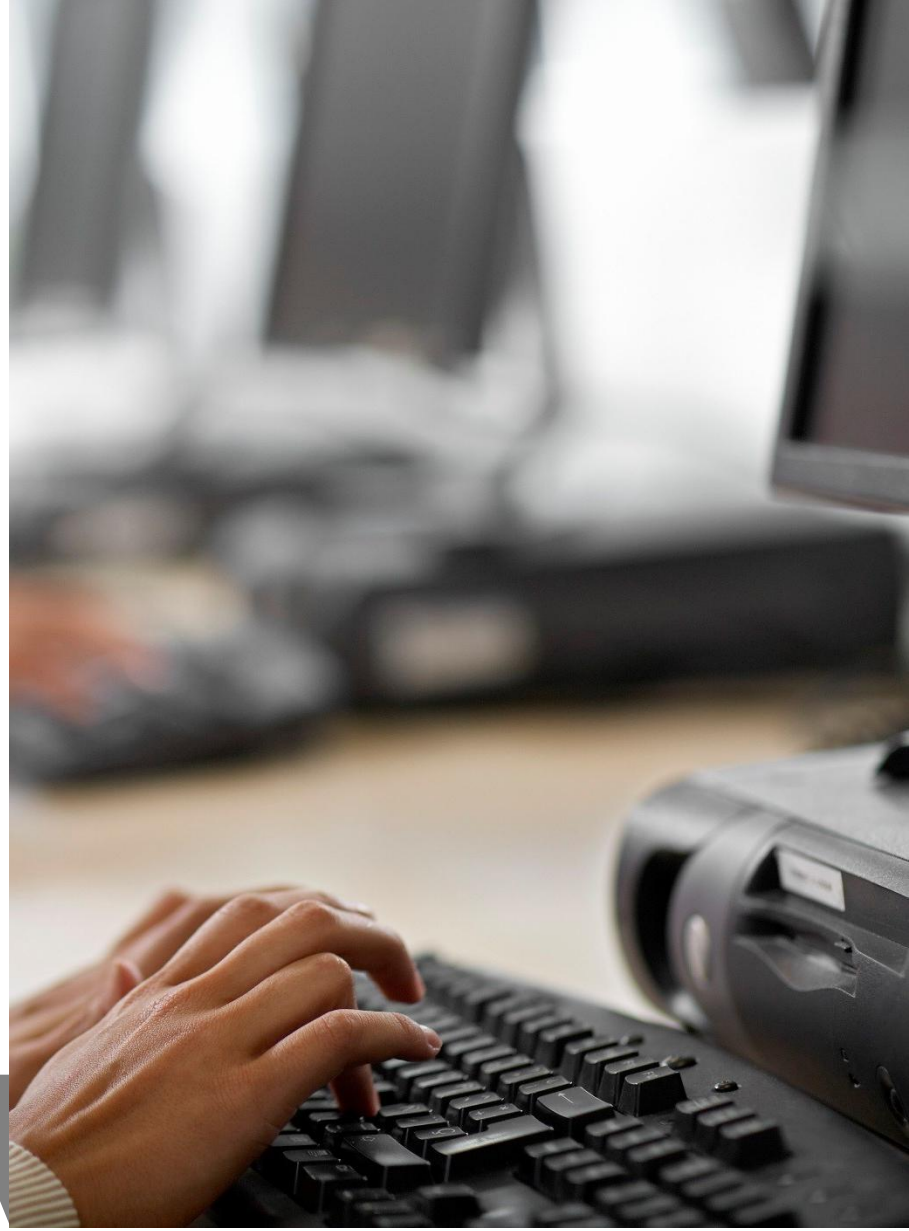
Section 7

The impact on sectors

The impact on sectors

Sector snapshots

- Tourism
- Agriculture
- Energy & green economy
- Construction
- Retail & Wholesale
- Manufacturing
- Transport
- Financial & Business Services
- Government
  - Healthcare
  - Education
  - SMMEs



Western Cape Government
Economic Development and Tourism

The impact on sectors

Introducing the sectors that are analysed in the sector snapshots that follow, in terms of the digital trends driving change within them

The pace of disruption is accelerating and impacting all sectors, to varying extents. In order to assess the extent of transformation taking place, certain sectors within the economy are explored. Sectors were selected based on current Western Cape Government focus as well as because of their significance to the Western Cape economy and economic development opportunities.

Some sectors are the focus of Project Khulisa, which is the Western Cape Government economic growth strategy which focuses on driving growth and job creation in targeted high-potential sectors through special projects. These priority sectors are Tourism, Agri-processing and Oil & Gas services. They fall within the Tourism, Agriculture and Energy & green economy sector snapshots respectively.

The sector snapshots cover the following sectors, within the context of the Western Cape economy:

Tourism

The Tourism sector is particularly successful within the Western Cape and is one of the largest employers in the region. The sector has been a large recipient of FDI over the last 10 years and the digital changes here have a significant impact on the local economy.

Agriculture

Agriculture is a sector which holds large potential for growth and development due to the unique climate and natural landscape of the Western Cape. Agri-processing is already a large contributor to the economy and has the potential to scale. This sector is of focus to the Western Cape Government due to the large absorption of unskilled labour which contributes to economic and social growth.

Energy & green economy

The Energy & green economy is a key sector for the Western Cape due to its size, extent of labour absorption and GDP contribution. The sector is a key interest to the Western Cape Government and improvements to infrastructure and skills is well underway to promote growth of the sector.

Construction

The construction sector is anticipated to contribute significantly to the growth of the economy due to the upcoming infrastructure projects in place. It also holds great potential for job creation, given that it was the third top job creator in the Western Cape in 2015.

Retail & wholesale

The retail and wholesale sector is a significant contributors to provincial GDP and acts as a thread, connecting other sectors within and outside the province and country.

Manufacturing

The manufacturing sector is a key sector for South Africa as a whole as it is a big generator of employment. It was the second biggest creator of employment in 2015 within the Western Cape, and is thus a driver of economic growth within the country. It is also an important means of import replacement and thus job creation locally.

Transport

Apart from being a key enabler and integral connector of all other sectors, the transport sector is of particular interest to the Western Cape Government in its focus on addressing the province's profound traffic congestion and carbon footprint.

Financial & business services

The financial & business sector of South Africa is impressively mature and requires continued attention to uphold and grow it's status. In 2015, the Western Cape finance sector was the top creator of employment.

Government

Government operation is the backbone of any economy. Efficiencies in this sector aim to improve service delivery, equality and opportunities to all citizens, which is likely to be reflected in the success of other sectors.

Western Cape Government
Economic Development and Tourism

The future of Tourism

Tourism is one of the fastest growing sectors in the world, and this is certainly the case in Africa

Significant opportunities exist for tourism, travel and hospitality organisations to take advantage of connected devices to capture vast amounts of information, enter new markets, transform existing products and introduce new business and delivery models.

The local tourism sector is growing quickly and significantly, largely due to the following forces:

- Greater accessibility
- Emerging middle class & growth of emerging markets
- Instant access to options via digital solutions
- The importance of leisure for well-being

Tourism contributes to the Western Cape economy on a greater level than it does in other regions in South Africa. It is a sector that is especially emphasised within the province due to the Western Cape's popularity as a tourist destination. Compared to other sectors, tourism is relatively more likely to maintain its growth and competitive positon in the world regardless of its adoption of digital. It is other characteristics, such as its geography, that drives its popularity and attractiveness. Digital adoption and transformation within the sector is, however, still very important as it will optimise and maximise the Western Cape's role as a global player.

This is critical as tourism represents a powerful tool for social and economic development and the reduction of poverty. The sector's contribution to GDP and its strong growth forecasts indicate its potential in the creation of jobs and new businesses, infrastructure development and earning of export revenues.

LOCAL VIEW

The number of tourists visiting South Africa grew 14%1 in January 2017, on January 2016. This significant growth provides tremendous opportunity for the sector as a whole.

Tourism contributes

R17 billion

to the WC economy, and has **created** **204 000** formal jobs

in the region. 2014 figures

Tourism in Western Cape accounts for **14.9%** of **foreign tourists** visiting South Africa.

The Western Cape accounts for **21.8%** of **tourist spending** in South Africa.

50% of South Africa's Airbnb listings are in the Western Cape

GLOBAL VIEW

International tourist travel worldwide is projected to increase nearly **70%** by 2030[1].

Contribution to GDP growth is expected to be **4.3%** in the Western Cape

This growth spills over to other industries that are related, or rely on the tourism sector.

Large forces driving growth in tourism around the world:

- **Greater accessibility**

  Travel is becoming cheaper, and apps are dissolving language barriers

- **Business travel is growing**

  The number of multinational organisations is growing around the world and people resources deployed within those networks are increasing

- **Rising importance of leisure**

  Holidays and travel are increasingly being seen as important for one's wellbeing

Western Cape Government
Economic Development and Tourism

Sources: 1. Stats SA
UNWTO, PERO 2016
UNWTO (World Tourism Organisation), TrekkSoft, EY analyses

The future of Tourism

Digital transformation and a proliferation of data are fundamentally changing relationships between tourism companies and their guests

Trends driving change within the sector

Self-service channels

The tourism sector provides a perfect example of the disruptive force that digital channels and capabilities have enabled, and that is: customer empowerment.

Customers in control
Digital devices, channels and capabilities enable organisations to track customer interests, personalise offers and connect people across the world, anywhere, anytime. This has led to the rise of the 'DIY' (Do it yourself) traveller.

Mobile (and other digital device) booking is fast becoming one of the main channels for tourist bookings because it provides real-time pricing, puts the user in control to explore options and make decisions, and is instant and convenient.

Self-service channels have already penetrated the aviation industry which is an important participant in the tourism sector. Airports and airlines have adopted and established self-service platforms to drive efficiency of traveller transportation – online booking, self-service kiosks, and self-boarding services. This digital adoption enables quicker thoroughfare of passengers and so the opportunity to grow scale, reduce process, and improve access to more people.

Organisations are able to extend their involvement in customers' trips by regularly tracking their activity and communication with them, expanding the opportunities to provide further services and build customer relationships.

Re-focus of business operations
These direct channels also benefit tourism organisations in helping to predict preferences, take-up and financial metrics, enabling them to plan more efficiently and make better business decisions.

Companies are able to create strategic and operational dashboards to monitor customer feedback, receiving current & future financial indicators using predictive software.

Large sales forces are becoming less relevant as providers advertise information & engage with stakeholders/the market remotely on digital platforms, and users/customers self-service themselves. It is a different set of skills that is needed with this shifting focus from physical to digital channels.

Rise of ratings & changing spheres of influence

People are now able to share their experiences and opinions instantly and widely, and this power is increasingly able to drive the success or failure of a service provider, if not managed well. Ratings and reviews are raising the bar of service levels and keeping organisations on their toes.

Purchase drivers are no longer predominantly price or amenity based, but also rating and review based. Customers are able to share their experiences on ratings & reviews platforms which provide other customers with information they otherwise wouldn't have had access to in assessing options.

People are able to share authentic reviews, voluntarily. And the more people share these reviews, the more concrete the ratings become, producing a network effect that grows in value as the number of users do.

Customers are placing such high value on other customers' views that these become the factors driving purchase decisions, overriding price.

Western Cape Government
Economic Development and Tourism

Sources: UNWTO (World Tourism Organisation), TrekkSoft, EY analyses

Impact of digital trends on organisations

The areas of focus for organisations that need to drive strategic decisions in order to stay relevant & drive competitive advantage

The trends driving transformation in the sector have an impact across various areas of business, to a varying extent. It is important to understand where digital solutions are driving change and how significant a transformation they are driving in order to understand how best to respond. Disruptive impacts are framed within the following areas as they are key pillars of all businesses: Customer experience & value propositions, product enhancement, organisational forms & collaborative ecosystems.

All stakeholders across the tourism value chain need to understand how these areas of business are transforming in order to respond within their own business and remain competitive. Depending on a participant's role within the tourism value chain, a response might impact a core business capability and thus require significant focus and internalisation, or just require understanding of the consequences and changes to the sector to keep abreast and support those who are being more deeply impacted.

Customer experience & value propositions

Customers expect to be able to book services at anytime, from anywhere around the world.

Organisations and marketers need to understand the behaviours and preferences of customers and do their best to meet these demands in order to stay competitive.

The way that people manage their holidays has changed dramatically in the just the last few years. The most significant change for customers being that they manage their own bookings rather than going through a 'middle man'. And if they still go through agencies, the value proposition of those agencies has changed.

As customers become more accustomed to booking and managing their trips online, they become more demanding of service levels and real-time response. This requires a focus on improving customer services and a shift in service role. This is a shift in value proposition.

The 'battle for bookings' will be won by owning big data and interpreting it correctly to deliver a personalised and seamless experience for the customer.

Product enhancement

Organisations need to become user-centric and this requires a strong focus on the design of online booking experiences. Web and mobile design needs to be a key focus of providers in creating a visual, understandable, seamless and engaging digital experience. Travellers that manage their own bookings online, have less need for tour operators and concierge services. The emphasis on service offerings is thus changing and shifting from on-site assistance to virtual assistance.

Services need to extend beyond the completion of the booking in order to gather customer data that can be analysed to build profiles on customers/users in order to offer personalised offers and services. Personalised services that engage the customer through their preferred channels and offer customer services and experiences based on their past behaviours and feedback, makes the overall engagement with an organisation a convenient and pleasant experience.

The future of Tourism

Engaging & authentic customer experiences, that are relevant to people's preferences, built off digitally enabled platforms.

Western Cape Government
Economic Development and Tourism

Sources: UNWTO; e3: 'Digital Trends for the Travel Industry in 2015 and Beyond'

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Organisational forms/business models

New business models (such as the models of Airbnb and TripAdvisor) that are transforming the sector, whilst posing a threat to some players within the sector, create new employment opportunities locally and drive local business within and linked to the tourism sector.

Digital only entrants

Digital-only start-ups like Airbnb sell a travel experience without any physical human contact, taking advantage of (as well as enabling) the shift toward self-service travel. This is a significant move away from the business model of traditional travel providers.

This requires that organisations' employees need to be able to work within a digitally-enabled environment, and that peoples' job roles are likely to evolve. Some jobs within the sector may be disintermediated, but it is likely that new jobs will emerge (especially given the demand for authentic and personal experiences). Organisations need to respond to this transforming environment by addressing the changing nature of work and integrating new ways of working into their business models.

Changing revenue models

Online tourism sites have been able to tap into a new revenue stream, and that is advertising revenue. This has become the core of the business models.

TripAdvisor's business model, takes the use of social media and user-generated content to a new level - customer/user engagement and content is monetised, without the customer/user receiving anything in return. The customer/user is satisfied with the service they receive through the connection to sector participants, and the information shared about such participants.

Collaborative innovation

Travellers need a variety of services ranging from tour and accommodation bookings, to transport and restaurants. This means that these service providers from different sectors need to collaborate in order to provide customers with a holistic and seamless experience across industries and services. Value propositions need to combine the whole package of leisure activities and the services to enable those activities, such as transport, food & beverages, retail etc.

Customers want to manage their choices and bookings, but want information and offers to be consolidated, convenient and relevant to their preferences.

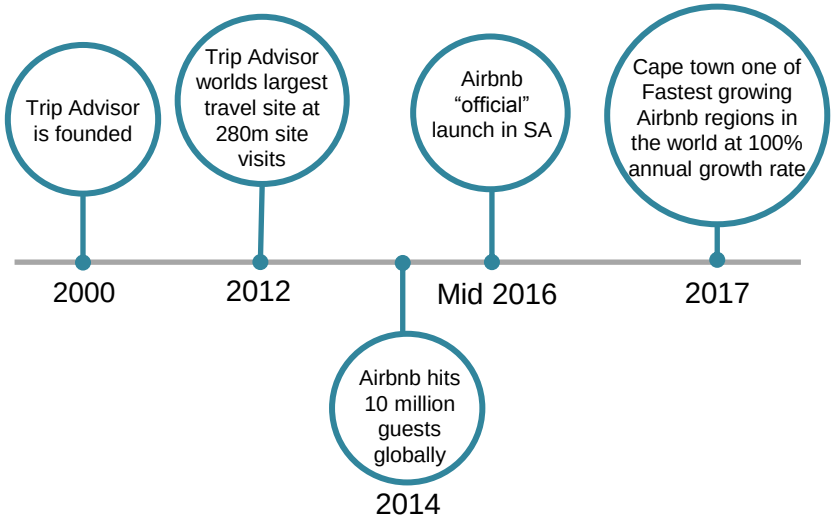
Western Cape Government
Economic Development and Tourism

Sources: UNWTO; e3: 'Digital Trends for the Travel Industry in 2015 and Beyond'

Tourism disruption horizon

The adoption of digital solutions is pervasive within the local market and driving growth and transformation of most of the organisations within it

The uptake of digital platforms has been incredibly fast in the tourism sector the world over, but the growth in the Western Cape has been exceptional.



The up-take of digital services in the Tourism sector has been fast and far-reaching. The use of global online platforms is pervasive in South Africa, and especially so in the Western Cape which is the most popular tourist destination in the country.

The impact of digital platforms and capabilities has driven change in customer experience and engagement, service offerings and the emergence of new organisational forms over the last decade already. Within the Western Cape the sector has kept up with digital trends and capabilities emerging around the world and many digital only organisations now exist.

Challenges for sector growth within the Western Cape, and South Africa more broadly that may hinder further digital transformation and growth in the sector:

- Accessibility - strict visa requirements
- No clear, unified brand - like the Incredible India campaign
- Unreliable connectivity for travellers
- Infrastructure for hosts – access to broadband for business
- Safety concerns
- Global benchmarking of experiences creates high standards for local providers to meet which can be costly

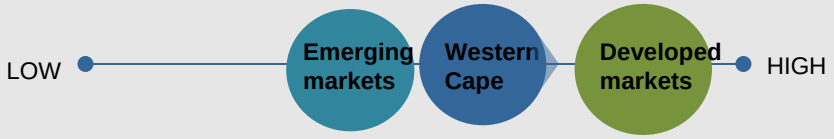
Improvement to some of these areas that represent challenges for organisations within the Western Cape – particularly infrastructure, would enable organisations to catch up with developed markets.

The adoption of certain digital capabilities by business and/or Government could address some of these challenges, such as the employment of digital visas and passports to simplify travel for international tourists.

Digital maturity comparison of the sector across global markets

The transformative impacts already felt in the sector locally places the Western Cape Tourism sector in a more competitive position compared to other emerging markets. Developed markets are still relatively more mature given the extent of their digital infrastructure and the fact that this is where platforms such as TripAdvisor and Airbnb are emerging from.

Relative digital maturity of the sector across markets



Western Cape Government
Economic Development and Tourism

Future outlook

Hypothesis-driven narrative describing a ‘day in the life’ in the future of the sector to bring to life the impact of digital on the practical activities and opportunities in the sector

EXPERIENCE OF A TOURIST VISITING THE WESTERN CAPE

Dolf from Germany wants to plan a holiday to the Western Cape because his friends have told him about the quality of the wine and culinary experiences on offer.

Dolf goes online to research the area. On travel sites he is able to see that other visitors from around the world have had wonderful things to say about visiting the winelands.

He wants to get a better idea of the experiences he might have before choosing the destination and spending his money. He puts on a pair of virtual reality goggles to experience what a wine tour might be like.

He decides to take the trip and so explores the best flight options via an online flight comparison site. Dolf then explores accommodation options through hotel comparison sites, comparing prices and guest feedback. He decides to book an apartment through Airbnb for a more homely experience. He is also able to identify places of interest based on his accommodation location, accessing information about pricing and open times to best plan his trip.

To better immerse himself into the local culture he downloads an app that will convert any local languages he hears into German and relay the meaning of foreign language words he’ll hear into his ears, via earphones.

He decides to book meals at certain restaurants ahead of time and compares restaurant ratings and comments made by customers at restaurants identified as being close to his Airbnb. He is able to see availability and make booking requests at his chosen restaurants on his phone.

Having organised his trip himself from his apartment in Germany, it’s time for Dolf to depart for his holiday. He checks into his flight via his mobile phone and later scans himself through customs using the self-service passport readers at the airport.

Dolf lands at Cape Town International airport and is able to immediately catch a taxi via an app on his mobile to his Airbnb. Payment for the taxi service doesn’t require him to have local currency on him but rather is immediately charged to his linked account in Germany.

During his stay, Dolf is able to navigate around the region using mapping apps and search for experiences on local and global sites in deciding which experiences he wants to engage in. He is able to do this all digitally without having to engage a tour operator.

Dolf wants to meet up with some locals to ensure that he is receiving an authentic experience and to fully immerse himself in the local culture. He makes contact with people who have similar interests to him through location-based social search mobile apps that facilitate communication between mutually interested users. His profile is shared via social media platforms to connect him with people who have similar interests, and are geographically relatively close by.

He himself rates and comments on his experiences to share his views with other visitors. He shares pictures and videos of his experiences on social media. Dolf and his location are recognised without him needing to tag them.

The future of Agriculture

The demand for food & other farmed materials is accelerating at huge speed, but demand is changing and growth in supply needs to be applied smartly

The world is very reliant on the agriculture sector to sustain the growing world population. New arable land is a significant constraint to the growth of the sector and it's production, and an important part of the solution to meeting growing market demand is to drive smart and more efficient farming activities. In order to do this and improve crop and livestock yield, digital technologies and capabilities are being employed to enable innovative farming methods.

The agriculture sector within the Western Cape is globally competitive, supported in part by the fact that it has always been a good adopter of the new technologies that are being used in global markets as they become available. These technologies are generally imported and adopted into the local market. It is international digital solutions and innovations that are impacting the agriculture sector locally.

Similarly, because the large majority of production in the Western Cape (of wine & fruit especially) is exported, changing customer expectations are driven by preferences and demands borne abroad. It is therefore important to understand the trends and areas of transformation that are affecting the sector the world over.

The majority of farms within South Africa are classified as small businesses which creates challenges in full-scale adoption of digital technologies & capabilities locally and so the impact of digital transformation is not being deeply felt.

LOCAL VIEW

The Western Cape's agricultural sector is unique from other provinces in South Africa, mostly in terms of physical resource differences. The winter rainfall region of the Winelands and the year-round rainfall of the Southern Cape enable a variety of crop mix, and production potential. The province's agricultural sector is known for its production stability and supported by well-developed infrastructure for input supply and output processing.

Contribution to GDP growth

is expected to be **3.3%** in the Western Cape.

The **forecasted average growth** between 2016 and 2021 is anticipated to be **0.7%** year-on-year.

Sector contribution to Western Cape's **GDPR** is **3.7%.**

Products from the agriculture sector account for 17.1% of the **province's exports**.

GLOBAL VIEW

Future food demand is driven by a world population estimated to increase

47%, to 8.9 billion

by 2050[1].

Large transformative forces are shaping and driving growth within the sector, and those are:

- Growing demand borne from a rapidly growing population
- Pressure of climate change & natural resource constraints
- Rising health concerns as healthy lifestyles drive consumer behaviour

Agri-tech investments growth:

$100 million
in 2005

$4.2 billion
in 2015

Western Cape Government
Economic Development and Tourism

Sources: 1. Food & Agriculture Organisation of the United Nations 2016
UK Food & Agriculture Association, Provincial Economic Review and Outlook, 2016

The future of Agriculture

Price, quality and ethics are driving demand by more informed & connected consumers

Trends driving change within the sector

The gap between consumers and farmers is closing

Growing knowledge of farming practices by the consuming public

Access to information about farming practices by the consuming public is putting pressure on players in the sector to ensure that their farming methods are ethical and sustainable. Retailers and consumers want to know about how products are grown, processed and distributed, and this is affecting their purchasing decisions — they are interested in the 'story' of products. It is no longer purely price driving product choice.

Digital devices, capabilities and the data they produce are giving customers along the value chain sight of operations to a greater extent than they've had before and they are now able to make more informed decisions. Traceability of final goods downstream to the farms of origin is also giving customers the power to demand good practice because producers & their operations are more visible. Players across the value chain are being held accountable to ensure that production and delivery methods have as little harmful impact on people, animals and the environment as possible.

New methods driven by informed customers

Informed consumers and their desire to lead healthy lifestyles that do not harm the environment, are demanding that farmers and processors produce more using less, and adhere to high quality production standards. This in turn puts pressure on organisations within the sector to adopt innovative processing methods to meet these quality demands. Digital solutions are enabling better waste management and other operations to drive better practices based on the data & understanding that these solutions produce. The pressure to follow sustainable practices is also increasingly becoming embedded in regulatory requirements, and it is digital solutions that assist producers to report on their operations.

New distribution methods are being enabled by digital platforms. Digital connections are bringing the consumer and farmer closer together, eliminating middle men and enabling direct communication and distribution of products between farmers and consumers.

The power of retailers to set standards is growing

Retailers are put under pressure and are seen by customers to be in some part responsible of ensuring that the products they sell originate from farms that are held to high quality standards.

Retailers are also expected to support the communities that are impacted by the various aspects of the agriculture value chain. This has led to the emergence of shared farming models that support and sustain the communities that are part of it.

Changing demands for products grown

Diets and tastes are changing and becoming more cosmopolitan as the world shares information and food trends like never before, driving shifts in demand for food types and processing methods. Greater access to information also leads to the boycotting of products that are harmful to the environment or harmful to animals, and so drives change towards consumption of more sustainable materials and products.

Similarly, there is a shift towards products that are seen to be healthier, changing the demand for certain products as more information about product make-up emerges.

The upside of this is that it provides growth opportunities for producers and retailers to expand the range of products they sell as demands and preferences evolve.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

The future of Agriculture

Producers are exploring ways to use digital solutions to re-engineer farming operations to better organise production to meet the demands of consumers

Trends driving change within the sector

Digital solutions accelerate growth

Digital capabilities provide critical data and insights that help farmers make meaningful and timely decisions that can improve yield and profitability.

Data & insights help with the management of input resources for better production and environmental outcomes

Digital tools and programmes are enabling cost and time savings for all players across the agriculture value chain. Digital solutions that produce and analyse data support better understanding of operations, as well as are able to predict future developments and yields, and so aid better decision-making today. Tools that evaluate efficiency and risk in a variety of production scenarios support farmers in making decisions that are low risk and result in good yields.

How products are processed is becoming as important to consumers as how they are grown and distributed, and so agri-processors are being held to the same standards that farmers are. Digital solutions are enabling redesign of processes to meet these changing quality expectations and stricter production standards.

Producers, processors and distributors can respond more quickly to market demand given greater access to information and instantaneous communication — the insights from real-time data enable producers to respond more quickly and flexibly to market demands. Producers are able to receive market feedback that they didn't have access to before, and with this insight they are able to better organise production.

Digital technologies driving production efficiency

Digital technologies & capabilities are already being used in many areas of the agriculture value chain, some examples are:

- In the precision quantification and application of nutrients & other inputs to improve yield and reduce waste
- Farm management and farm mapping by unmanned land and air vehicles that are faster and safer
- Management of animal genetics nutrition & health to improve productivity and meet customer demands relating to animal welfare standards
- Innovative infrastructure provision to support areas that are traditionally unproductive
- The use of AI, to detect crop disease for example
- The use of sensors to monitor change in environmental conditions
- And then more pervasively, autonomous machines that can be controlled remotely and carry out the repetitive tasks carried out by people are becoming more accessible and affordable. Machines for example that can load and unload materials, and plant, irrigate and harvest crops

Locally, in a sector that is dominated by small businesses, it is access to mobile phones that is driving change most pervasively. Digital devices provide a connection to information and expert advice anywhere around the world to provide guidance on how to improve yields in the absence of large funding and resources.

This connectivity and access to information is particularly important for small-scale farmers within Southern Africa who can now connect to other participants in the value chain and benefit from the networks created.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

Impact of digital trends on organisations

The areas of focus for organisations that need to drive strategic decisions in order to stay relevant & drive competitive advantage

The trends driving transformation in the sector have an impact across various areas of business. It is important to understand where digital solutions are driving change and how significant a transformation they are driving. Disruptive impacts are framed within the following areas as they are key pillars for all businesses: Customer experience & value propositions, product enhancement, organisational forms & collaborative ecosystems.

All stakeholders across the agriculture value chain need to understand how these areas of business are transforming in order to respond within their own business and remain competitive. Depending on a participant's role within the agriculture value chain, a response might impact a core business capability and thus require significant focus and internalisation, or just require understanding of the consequences and changes to the sector to keep abreast and support those who are being more deeply impacted.

Customer experience & value propositions

Access to information provided by digital technologies and capabilities is enabling stakeholders across the agriculture value chain to better understand the make-up of products, and production & distribution methods. This knowledge drives empowerment to all value chain players, and especially consumers which is leading to shifts in demand – purchasing decisions are no longer predominantly based on price, and so value propositions are evolving. All stakeholders are more cognisant of the impact of the collective decisions of value chain players on the environment and the final product delivered to the food market.

Strategic focus is shifting from being traditionally product and production-centric, to customer-centric in order to adapt to changing demand and expectations.

Product enhancement

It has become increasingly easier for the producers, sellers and buyers of farming materials to evaluate farming process inputs. Stakeholders are also better understanding the logistics within their supply chains.

Going beyond quality in terms of the input or output, but quality of the methods and procedures across the value chain.

The emergence of synthetic materials and alternative protein sources that might prove to be more sustainable for the environment and perhaps more healthy for consumers, have the potential to significantly transform the demand within the sector and so transform what it produces and how.

An example of a disruptor to the agriculture sector is the possibility of food printing where the sensory elements of food are replicated, but overcomes the challenges of producing the food. For example, producing food that looks and tastes like a steak, but is in fact not, so solving the challenges associated with beef farming.

This would be a real disruptor within the sector across the world because it would lead to the disintegration of demand for many traditional farming products and the loss of relevancy for many agriculture participants.

Such a disruption is likely to be very far off and so the impact & focus of digital solutions on businesses today and into the near future is rather the improvement of operations and expansion of product ranges.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

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Organisational forms/business models

Battle for distribution and relevancy

Digital devices such as the mobile phones have created new distribution models for agriculture products that connects consumers directly to producers, removing the role of wholesalers and retailers within the value chain.

People no longer need to visit retail shops but can order food and other products online to be delivered to their homes. The increasing demand for this service is placing less value in or need for physical stores as a channel to sell produce through. Such shifts in distribution will place great importance on ownership of customer relationships in order to stay relevant.

Urban farming

Farming is no longer confined to traditional farms and models, rather novel methods such as urban farms that use space differently are emerging. Such models bring products much closer to markets, providing sustainable solutions for local markets for perishable goods and creating a new form of competition to traditional large farms. They are enabled by new digitally supported farming methods that control environmental factors like monitoring and managing irrigation and lighting systems.

Collaborative innovation

There is an increasing number of partnerships between growers, advisers, suppliers, buyers, retailers, so that participants learn to deal with the massive complexities that emerge from rapid change and innovation.

Connecting to other industries provides input and support by enabling instant access to information, for example weather stations.

Digital platforms create virtual marketplaces that enable farmers to connect with buyers in markets around the world. This also requires that they collaborate to fulfil complex supply solutions which are required to get fresh foods around the world

The agriculture sector is one of the largest employers of labour in the Western Cape province, across all skill levels.

Organisations need to respond to a digitally transforming environment by understanding how to adopt new ways of working and address the changing nature of work within the sector.

Educational organisations will need to collaborate with agricultural organisations to ensure that the new generations of workforce emerging, are equipped to work in a digitally enabled environment. Processes within jobs are likely to be automated and improved with digital capabilities, not necessarily the jobs in their entirety.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

Agriculture disruption horizon

The potential that digital capabilities unlock in agriculture is largely untapped

The rate of emergence of digital capabilities is very fast. The rate at which organisations within the sector are taking them up however is very much slower.

The local agriculture sector has always been an adopter of new technologies and tools to drive greater productivity. These are usually technological advancements to production machinery. There are however many digital applications emerging that enable greater optimisation across all areas of production and management which are transforming farming methods. These digital technologies & capabilities are emerging at different rates and so will start to make impacts and only become mainstream quite far into the future. Examples of these are:

- Auto-steering tractors, robotic milking, autonomous spraying drones, data-mapping drones and robotic weeding implements are already penetrating markets and reaching maturity
- Manned robotic harvesting implements, robotic feed pushing and autonomous robotic weeding technologies are in trial and early commercial sales phases of digital maturity
- Autonomous robotic scouts, autonomous robotic harvesting and robotic fresh fruit picking technologies are in the proof of concept and early prototype phases

Large scale roll out of digital technologies & capabilities that transforms all areas of agricultural organisations' business models is still likely relatively far into the future. It is large-scale developed farms that can afford the rollout of the technologies that are able to make significant changes to operations and business models. However, as demand grows, producers are going to need to adopt digital solutions and new methods in order to produce more.

This is particularly the case in South Africa and reasons for this include:

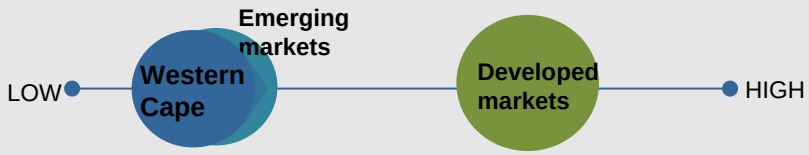
- The high cost of digital technologies and capabilities
- Connectivity challenges in rural areas
- Low willingness to change methods that have been followed for generations
- Unclear boundaries around data ownership
- Skills development requirements — skills gap within the workforce to operate digital applications
- Land ownership insecurity

Digital maturity comparison of the sector across global markets

Wide-scale use of digital capabilities is still a challenge and not accessible to the large majority of farmers in the Western Cape. The reality is that because the sector is made up of so many players of different sizes, the majority being small, these transformations are slow to be adopted. Small-scale farmers and other participants within the agricultural value chain are starting to adopt and benefit from greater access to information to inform their operations and improve output and so, transformation is starting. But the take-up of digital technologies & capabilities has yet to penetrate all aspects of business models in the Western Cape region and emerging markets generally.

In more developed markets, the maturity of infrastructure and level of investment available creates an environment where digital applications take-up is less challenging and so, is more advanced.

Relative digital maturity of the sector across markets



Western Cape Government
Economic Development and Tourism

Future outlook

Hypothesis-driven narrative describing a ‘day in the life’ in the future of the sector to bring to life the impact of digital on the practical activities and opportunities in the sector

EXPERIENCE OF A SMART FARM IN THE FUTURE

George is a large-scale fruit farmer in the Western Cape. George is sitting in his office at the homestead whilst there is lots of activity taking place on his farms.

He is receiving data from a worker who is remotely controlling drones that are surveying his fields. Using the footage that they provide, George is able to identify areas of his farm that need attention and he directs some of his farm workers to attend to these areas. The footage allows George to identify a wide range of problems from weed and disease infestation, too faulty irrigation systems.

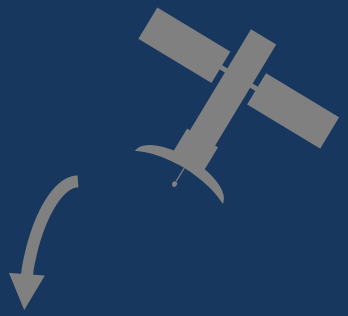
Agribots are at work in one of his fields, assisting workers in the picking of fruit. The productivity of the harvest and data on the yield of the field is flowing to George in real-time.

He is monitoring the market price of his produce and contacting suppliers about the quantity, quality and price that he is prepared to sell.

George is able to track where his herd of cattle are via the sensors they are wearing. It appears that a cow may be unwell and so he contacts the vet to come over. George doesn’t need to travel to the field to engage with the vet. The vet is able to track and locate the animal based on the tracking number George gives the vet. The vet is able to discuss his diagnosis with George on a video call and determine a course of treatment.

In another field a tractor is spraying crops. The tractor doesn’t have a driver in it as it is controlled by GPS steering. Afar, a worker is organising more pesticide because the tractor has alerted him to the fact that reserves need to be topped up.

George gets a notification saying that his advice is needed – he provides advice to small-scale farmers across Africa. A video is sent to him showing him a diseased leaf and he immediately responds to the farmer, advising him on how to address the problem.



George gets an update on the study of weather patterns over his farm from the weather update service he subscribes to.

Lastly he quickly checks up on the location of the truck delivering crates of his product to the market. He sees that it is making good time and so he happily goes off for a lunch break having been able to adequately monitor and manage his farm remotely.

The future of Energy & the green economy

Energy security is critical for growth. The level and quality of access to energy supply and uncertainty of prices needs to be addressed to drive economic growth in the country

Globally expanding populations and economic growth is resulting in a significant increase in the demand for energy. This, combined with the growing concerns around climate change and depleting fossil fuels is placing great pressure on the energy sector to develop innovative models to meet these growing demands.

The global movement to shift energy dependency from fossil fuels to renewable energy sources is prompting the development of new digitally-enabled technologies and ways of operating. Traditional business models are being disrupted by:

- New resources used to create energy
- Efficiency of production and distribution
- Consumption behaviour of business and consumers

Energy security has a strong focus within the National Development Plan with intentions to substantially improve infrastructure and support the integration of renewable resources to meet rising and changing patterns of demand. This has an impact on the development of every sector in the economy, and is a critical enabler of socio-economic development.

Green-energy and green-economy movement, enabled by digital capabilities is creating business opportunities within the sector. New renewable generators and smart grids are some of the technologies emerging which is seeing a rise of independent start-ups. This challenges established energy businesses to be more responsive, innovative and disruptive within the sector.

LOCAL VIEW

Average annual growth between 2010 and 2015 estimated to be between **4–5%**

Departmental budget allocation towards sector development for 2016–2017 is over **R13.5 billion**

The Western Cape government has invested **R73 million** toward a provincial medium-term expenditure framework aimed at **developing the Green Economy**.

Western Cape's household electrification status:

89.3% 2013

A 2030 goal of the National Development Plan is to reach 97% of households

*The Western Cape is comparatively advantaged in the Renewable Energy space and has made significant progress in competitively developing this sector through substantial investment which has resulted in an increase in employment opportunities in the Province — **Renewable Energy Investment Survey** 2013*

GLOBAL VIEW

Average growth of global energy consumption is anticipated to grow by **48%** between 2012 and 2040.

The **Paris Agreement on Climate Change** aims to have the following global energy profile by 2040:

- 37% of energy generated from renewable resources, as opposed to the 23% in 2016
- 150 million electric-powered vehicles in use, as opposed to the 1.3 million in use in 2016
- 50% growth in the demand for renewable natural gas to minimize the dependence on coal
- A maximum average annual growth of 0.5% of energy sector carbon emissions
- Oil consumption to rise to 103.5 million barrels per day, relative to the 92.5 million barrels per day used in 2015

South Africa is part of this agreement and so these goals will impact the outlook of the sector.

Western Cape Government
Economic Development and Tourism

The future of Energy & the green economy

Digital technologies and capabilities are supporting the supply of uninterrupted and affordable supply of energy

Trends driving change within the sector

Digital transformation is connecting the supply & demand of energy

The digital transformation of energy systems aid access to reliable and affordable sources of energy

The distributed nature of utility assets, combined with the dependency on efficient asset management and labour use, makes digital capabilities a high investment area for organisations within the sector.

Investment in digital capabilities produces data, and the analytics gleaned therefrom, enable the optimisation of assets that produce energy and also those that consume energy.

Smart energy distribution management systems

There is a smart grid drive toward better observability and management of the energy distribution network.

The rollout of Smart meters to consumers is accelerating and enabling two-way communication between consumers and producers.

Digital platforms are able to provide consumers with accessible personalised profiles and dashboards which allows them to track their usage, payments and status. More than empowering consumers to manage their own consumption, energy producers are enabled to manage and balance the energy supply across areas.
This technology enables efficient monitoring and collection of fees, coupled with the gathering of big data to drive improvements and efficiencies across the value chain.

Energy companies are increasingly investing in analytical and planning tools to process big data collected. This provides great insights into consumer behaviour and patterns which equips organisations with rich information in order to improve decision-making, planning and prediction.

Convergence of digital technologies leading to connected and optimised operations

Digital capabilities are enabling businesses to digitise their core processes across both back office and front office operations.

These digital systems change the way that employees connect with each other in plants, with back office systems when working remotely and with the machines which they now co-work with. Some examples of digital technologies & capabilities connecting and enabling various areas of organisations are:

- Wearables that aid workers in operating complex equipment by guiding them through procedures. This is also a method of up-skilling workers
- Predictive maintenance of machinery and other assets to extend their lives
- Remote control and operation of asset management to drive efficiency of production
- Waste management monitoring

The connectedness of these devices leads to real-time data which is used to optimise asset utilisation. This leads to improved efficiencies within administration, engineering and dispatching.

Coupled with the improved business efficiencies that digital capabilities introduce, is a shift in the spectrum of skills required within the sector to operate digital technologies and understand digital ways of working.

The future of Energy & the green economy

While the demand for energy increases globally, there is a rise in the demand for renewable energy sources

Trends driving change within the sector

Changing demand & supply routes

New sources and distribution methods of energy are changing the patterns of demand.

Energy efficient products are transforming the demand for energy

Technological advancements in the materials and design of products, aimed at conserving energy, will change the demand landscape for energy as well as the behaviour of consumers. Some examples of these in residential applications:

- The introduction of electric-powered and hybrid cars will impact the demand for both fuel and electricity
- Smart houses and appliances will enable more energy-efficient operation, which reduces the demand for electricity
- Battery units will enable homes & businesses to store energy sourced from different sources, thus reducing pressure on the national grid. These units reduce the reliance of homes on traditional fossil fuel-consuming electricity generation methods.

New technologies and digital ways of operating are generally able to improve the cost-effectiveness of operations, and this eventually gets passed on to consumers making energy more affordable. This in turn supports socio-economic development of economies.

Green energy generation methods are being demanded by consumers

Across the globe there is a focus on developing alternative ways of producing energy to reduce the reliance on national production of energy, as well as to move away from sources that are harmful to the environment and unsustainable. Alternative forms of electricity production, gaining great traction around the world include:

- Solar energy
- Nuclear energy
- Hydro energy
- Wind energy
- Biomass energy

These techniques make use of sophisticated technology and digital systems for electricity generation, storage and distribution. These methods hold great potential to not only reduce carbon emissions, but also to provide electricity to the most arid and deserted populations across the globe. In the past these sources of energy have been too expensive for widespread use, but as new digital techniques emerge, they are becoming more affordable and installations are beginning to be widespread.

Increasing investment in digital by Oil & Gas companies despite low price environment

Investment in digital technologies and capabilities is a key focus of Oil & Gas organisations in order to reduce costs, improve productivity and decision-making. These objectives are considered critical given the low oil price environment.

Some of the digital technologies and capabilities being employed within Oil & Gas to bring such benefits are:

- Drones to inspect infrastructure and equipment to improve productivity & safety
- Wearables that monitor workers' environments and health, and improve existing radio & communication devices
- Virtual reality for training is especially useful with Oil & Gas and aids training in simulating risky environments

These are examples of how workers are enabled digitally to work in a more informed and safe way.

Data and analytics across the Oil & Gas value chain assist in process improvement and better decision-making which is especially important in volatile price environments.

Impact of digital trends on organisations

The areas of focus for organisations that need to drive strategic decisions in order to stay relevant and drive competitive advantage

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Customer experience and value propositions

Never before have consumers had the experience of being able to so closely monitor, manage and affect their energy consumption behaviour.

The online customer engagement platforms present in other sectors are raising customer expectations within the energy sector. Utility companies are fast adopting online platforms to enhance the customer experience by offering billing, metering and payment services. While serving to provide insight and convenience to the customer, these platforms also benefit the utility company by ensuring accurate billing, tracking and payment collection.

In this way, they are creating new value propositions by building relationships with customers through digital capabilities that helps them manage their energy spend. New value propositions include expanded services for all customer groups including small businesses.

Product enhancement

Digital capabilities are bringing producers closer to consumers and enabling producers to expand their services to those consumers.

Sector players are also moving beyond asset-based strategies, to enable a more customer-centric strategy. Focus is being aimed at providing services to the customer beyond the meter. This is necessary to secure alternative revenue streams due to the impending decreased reliance on the national grid for electricity.

Also, the portfolio mix within the sector is changing as new renewable materials and methods emerge. New sources of energy and sustainable production methods mean a change from the traditional supply.

"DCD, a South African engineering company with its head office in Cape Town was the first local company to manufacture and assemble a 2.5MW wind power turbine in South Africa." - ***Made in Africa, Western Cape Metals and Engineering report*** *2013*

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

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Organisational forms/business models

The shifting of energy portfolios and demand patterns is bringing change to energy supply and distribution, affecting the traditional balance of power in the sector.

There is an opportunity to redefine the role of utilities companies as a system integrator of distributed energy resources as well as a provider of energy services, borne by the digital advancements transforming the sector.

Aggregation and centralisation management of distributed energy resources creates a form of virtual power plant with is quite a transformation to the sector.

The combined effect of national policies, technological advancements and customer change is forcing power utilities to explore alternative, environmentally-friendly power generation methods. In doing so, business models and value chain ecosystems are changing to embrace these new developments.

Some of the anticipated business model changes include parity of solar power on the grid and introduction of advanced storage systems at both the macro and micro level.

Technological capabilities, such as home battery units and power-generating units, which are becoming more and more accessible to the public is decreasing the dependence on utility companies and allowing for decentralisation. Customers can even sell surplus electricity back to utility companies. This trend is expected to have a significant impact on the stature of utility companies, even in monopolistic markets.

Collaborative innovation

Sector partnerships are being formed to reap a variety of benefits from collaborating with others. One area of benefit for large organisations is to collaborate with other organisations to bring in the higher levels of digital skills they are increasingly requiring in their workforces.

The relationships and partnerships between state-owned energy suppliers and independent energy producers will require regulation and facilitation, as the collaboration between these participants is critical to ensuring security of supply.

Collaboration between Government and business participants, facilitates the creation of an environment that drives and promotes sustainable approaches and behaviours — for example, an energy efficiency savings incentive has been introduced by government, providing tax allowances to businesses that follow energy savings activities.

Organisations across the energy value chain will also need to work closely with Green Economy groups to ensure that sustainable practices are built into every node of the value chain.

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

Energy & Green economy disruption horizon

The potential that digital capabilities unlock in Energy & the green economy is largely untapped and slow to implement over such a large scale

South Africa has a long way to go to reach the maturity of other countries in terms of pervasive, reliable, affordable and sustainable energy supply

76
out of
126

South Africa ranked 76/126 countries in the **World Economic Forum's Global Energy Architecture Performance Index 2016**. The index rates overall energy access and security of countries across the world.

South Africa has had a troubled time with energy supply reliability, and the exclusion of many within the population to energy access. Renewable options have been marginalised in the past, and this together with poor maintenance of existing energy infrastructure led to an energy crisis. It is in times like these that the opportunities of digital transformation become critical. Investment in renewable energies and digital capabilities have since been able to drive a more secure energy and green economy outlook for South Africa.

Locally, advancements in technology are being adopted into production methods as they emerge globally. More disruptive technologies and capabilities that are starting to impact the market is the rollout of smart metering and energy management systems. This has been done on a very small scale in South Africa and will be a long process if smart meters are to be installed across the country. The same goes for new sources of energy, like solar power. Installation is expensive and slowly becoming more pervasive in the market.

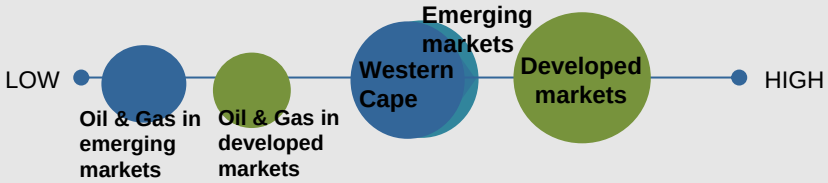
Green economy and a general focus on sustainability is permeating many areas of the sector in terms of resources use, material input and design. There are pockets within the sector where South Africa is relatively advanced and mature, but many areas fall behind especially because of the country's reliance on fossil fuels and its inexperience in renewable energy. Some of the challenges that slow the extent of disruptive impact within the sector are:

- Deployment of nuclear power safely and cost-effectively
- Energy storage systems becoming practical and affordable for business and residential consumers, enabling them to move off the grid is slow
- Slow progression of governance
- Political tensions
- Geographic size of the country, requiring energy to travel long distances

Digital maturity comparison of the sector across global markets

The sector is characterised by long-term capital outlooks and the digital transformation of infrastructure and operations generally requires large-scale, long-term projects and substantial investment to rollout. The sector is thus not as digitally mature as other sectors are, and the deep impacts of transformation are likely to be felt further into the future.

Relative digital maturity of the sector across markets



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Western Cape leading by example feature

The Western Cape is attracting investment and innovative activity within the sector, and this goes hand in hand with digital investment

The Western Cape is attracting investment by firms focussed in energy & green economy. The focus on innovation and technological advancement to overcome challenges, as well the stability of financial & legal institutions, has created an environment that businesses see as attractive – attractive as a place to establish a base for local activity, as well as for activity in the rest of Africa.

Western Cape is leading in its Green Economy investment & initiatives
Western Cape's goal to be the Green Economic Hub of Africa

The Western Cape Government, GreenCape, City of Cape Town & Wesgro work together to support this through GreenTech and the setting up a Special Economic Zone within the region — The Atlantis Green Technology Industrial Park (to manufacture components driven by the location advantage). 'GreenTech' companies that are supported and able to participate within this zone are companies that focus on "technologies that reduce the intensity of resource consumption and waste production in the economy, thereby reducing or preventing harmful impacts on the environment".
In this way, the province is able to drive transformation and disruption , improving/maturing it's global and regional competitive advantage.

The economic zone is receiving global attention and attracting investment:

- Tellumat invested in a manufacturing facility in Atlantis, where it produces technological goods that are exported
- Hisense invested in an electronics factory in Atlantis to manufacture flat screen televisions and refrigerators

Such clustering of activity promotes industrial development and drives innovation. This is a successful approach to fostering and stimulating innovation and disruption across sectors.

The Western Cape is ideally located to provide services within the Oil & Gas industry

The geographic location of the Western Cape in terms of its proximity to the oil and gas reserves (along the West & East coasts), and coastal position (and so good port facilities) makes it an attractive location for business from abroad to service their operations.

South Africa - Green economy leading example

PetroSA is the world-leader in Conversion of olefins to distillate (COD) technology, producing synthetic petrol and diesel of very high quality through environmentally-friendly processes. These fuels are considered to be the cleanest on the market and have multiple applications. Further research is being conducted into optimising the COD process to reduce costs, increase output and find greener ways of synthesising these fuels.

Western Cape Government
Economic Development and Tourism

Sources: EY, PWC, GreenCape analyses

Future outlook

Hypothesis-driven narrative describing a ‘day in the life’ in the future of the sector to bring to life the impact of digital on the practical activities and opportunities in the sector

EXPERIENCE OF A RESIDENTIAL CUSTOMER IN THE FUTURE

Tina is a homeowner within the Western Cape. She has just received a notification on her phone that her utilities bill for the month has been sent to her, and she is surprised to see an amount larger than what she pays on average. She wishes to query the inflated bill before paying it. Tina logs onto her local municipal utilities app on her mobile phone, and tries to track down the root of the higher expense.

By viewing the easy to understand dashboard of her electricity usage for the month, Tina identifies an inflated usage during the long weekend. She remembers that her 5 nieces and nephews stayed over for the weekend and recalls that they had the television on all day and night, enjoying movies and playing Playstation. She also recalls how hot it was that weekend, which resulted in them having to set the air conditioner at maximum for the whole duration of their stay. She had forgotten that she did indeed receive an app alert that her consumption was running higher than usual.

Satisfied with the reasoning for the increased bill, Tina makes the payment via the app directly from her bank account. She immediately receives confirmation of her payment from the municipality, and is asked to complete a survey on how they could possibly improve her user-experience.

Two weeks later, Tina receives a notification that her smart meter appears to be compromised and requires maintenance. Unaware of the issue, Tina tests her utility meter and acknowledges that it is faulty. She communicates with the smart meter maintenance crew via her mobile app, and schedules a time which is convenient for her. Upon their arrival, the maintenance crew explains to Tina that they are able to monitor the condition of all smart meters in the municipality from their back office, and that these smart meters alerts them when a problem is detected. Tina is left feeling very impressed by the efficiency of the system and grateful that the problem was detected and fixed without any downtime.

EXPERIENCE OF A UTILITY WORKER IN THE FUTURE

Thuli works for a large utility organisation. She is responsible for the back office monitoring and tracking to help the utility meet demands.

Residential properties are connected to a data network that enables tracking of power use. In this way she is able to balance grid load. She receives data from energy producers and users. She checks that independently produced energy is feeding into the supply network seamlessly. She analyses the data to monitor the level of energy being produced by the wind farms because output from wind turbines are subject to fluctuation and she needs to balance supply and demand.

She notices that factories have been able to better manage their demand and costs because their programming of machines to operate during off-peak times has been successful. She is also able to compare relative energy consumption between traditional factories and smart factories, and is able to gather data from these trends to better equip the utility to meet demand.

Through these capabilities, Thuli is able to ensure stability of the energy grid to avoid power cuts and blackouts.

The future of Construction

The sector is expected to experience accelerated growth fuelled by urbanisation, globalisation, infrastructure renewal and the emerging needs of smart cities

There are many factors that are leading to growth and increasing dependence on the construction sector. The growing population, accelerated industrialisation and the growing need for connectedness is demanding improved infrastructure and housing facilities across the globe. The construction sector serves as the backbone to economic and societal prosperity through job creation and investment, as well as the opportunities unlocked by the availability of infrastructure.

Despite this anticipated growth boost, the construction sector remains a relatively slow adopter of digital capabilities. On average, construction businesses spend less than 1% of revenues on IT systems despite software being developed specifically to cater to the needs within this sector. Spending on R&D in construction also remains well behind that of other sectors. The adoption of digital technologies requires up-front investments, which appears to deter businesses within the sector despite the long-term benefits.

The increasing complexity of projects, the growing demand for environmentally-conscious buildings and the skills shortages within the labour force are contributing factors to making traditional methods impractical and uneconomical. To be able to sustain the anticipated growth and demand for infrastructure, the construction sector will have to embrace digital capabilities.

LOCAL VIEW

Forecasted annual growth expected to be
2.3% between 2016 and 2021 within the Western Cape.

Average annual sector growth rate was
5.3% between 2005 and 2015.

Multiple projects within the province are acting as catalysts for growth within the sector, including:

- Provincial and municipal infrastructure investments eg. roads expansion
- Strong provincial housing market from both local and foreign buyers
- Public-private partnerships aimed at providing economical social housing solutions to low-middle income families

GLOBAL VIEW

Growth in the global output of the construction sector is forecasted to be **85% by 2030**, reaching an **estimated value** of **$15.5 trillion**.

Annual average growth is expected to be
3.9% per annum.

This growth is expected to be dominated by China, US and India, collectively contributing up to **57%** of the anticipated global growth.

The considerable sector growth is driven by emerging markets recovering from economic slumps and the accelerated industrialisation of these markets.

Western Cape Government
Economic Development and Tourism

Sources: PWC, WCG Budget 2016, Provincial Economic Review and Outlook, 2016

A brief look at the future of Construction

New approaches and operational efficiencies supported by digital capabilities are needed to deliver on accelerating growth

Trends driving change within the sector

Adopting digital capabilities to restructure the construction landscape

Digital technologies & capabilities are restructuring the landscape of the sector and transforming the nature of construction projects. Some of these technologies include:

- Building information modelling software
- Virtual & augmented reality simulations for planning & selling
- 3D scanning and aerial scanning to improve accuracy
- Smart construction equipment
- Robotics to execute routine or risky tasks

These capability advancements have applications along the life-cycle of a project and affect the value chain by transforming traditional ways of doing things. They present increasingly accurate, real-time data which allows for more informed decision-making which results in more efficient, safe and productive project landscapes.

By fully adopting these technologies and using them to their full potential, construction businesses will be able to cut costs and project duration. This translates to a more economically and socially rewarding sector.
Such new capabilities are enabling new agile sector entrants that are able to offer specialist services to meet the new standards.

New materials arising from technological advancements

The advent of new production techniques and scientific advancements, enabled by digital capabilities have resulted in novel building materials making an impact within the construction sector. These materials present safer, faster and cheaper alternatives to the traditional concrete and steel dominated market. Materials such as microfiber and geopolymer concrete are introducing new ways of building, and creating ample opportunity within the sector.

Demands to minimise energy usage is affecting the design and construction of buildings and other infrastructure

Energy-efficient building standards have been built into regulation and require adoption by organisations within the sector. Digital technologies and capabilities are significant enablers of energy efficient methods.

As most of the digital capabilities within this sector are focussed on improving operations during the project life-cycle, the digital focus on the customer remains relatively absent at this point in time. The customer does however benefit from the project improvements made, through shorter project duration, lower costs and improved relationship management.

While digital will not completely disrupt the end product within the construction sector, some improvements can be expected due to the introduction of new materials, techniques and design software. The combination of these digital capabilities allow for unconventional projects to be undertaken, resulting in novel designs and buildings. These technologies allow for innovation within the sector with respect to design and implementation.

Adoption of new business approaches is required to take full advantage of the opportunities borne from the forces fuelling growth in the sector. Construction companies will need to learn how to better position themselves to manage emerging demands and production methods.

South Africa leading by example feature

The South African construction sector makes use of innovative methodologies and technologies to improve integrity and deliver eco-friendly capabilities

Innovative mine shaft sinking methodology

Murray and Roberts has developed an innovative methodology transforming the way shafts are sunk for mines. The new methodology makes use of new techniques and digital equipment to deliver a faster, safer and cheaper mine shafting project within South Africa.

Smart cement technology

Scientists from Murray and Roberts have developed new technologies to reduce the amount of concrete required per cubic metre without compromising on strength and integrity. Through this technology, cement consumption on the Gautrain project was cut by approximately 110 000 tons of cement, saving a vast amount of money and environmental decay.

Cement-strengthening technology

South African construction scientists have developed a way to use biological processes to strengthen cement and prevent decay. The technology involve introducing a certain species of bacteria into cement, which strengthens the cement through it's regular metabolic processes. The bacteria consume chemicals which weaken concrete and release by-products which fill in cracks to restore the integrity of the cement.

Portside Development in Cape Town

This development project placed ample emphasis on sustainability through the use of eco-friendly construction material. Cement used comprised of up to 70% of waste material and the reinforced steel was manufactured with a 90% recycled material content, delivering a uniquely eco-friendly building.

Western Cape Government
Economic Development and Tourism

Source: Murray & Roberts Robust

Construction disruption horizon

Digital technologies and capabilities will unlock more efficient methods of designing, building and maintaining physical built assets in the future

Into the next decade, digital technologies & capabilities will lead to more effective new infrastructure planning, lower building costs and generally more efficient management and operations.

The uptake of digital capabilities is transforming parts of the value chain, especially in the design phase of projects. Additionally, the efficient management of projects, and then subsequent management of constructed property to run more efficiently. The transformation of the sector by disruptive technologies such as 3D printing of building components, or entire buildings and other property, is still relatively far off.

The rising pressure placed on the sector in the development of environmentally-friendly buildings and homes, in a sustainable manner, means that businesses within the sector will have to transform their traditional practices to cater to these changing regulations and requirements.

Locally, the sector is characterised by a large number of SMMEs which impacts the sector's digital maturity as a whole. SMMEs are subcontracted to perform tasks of varying levels of sophistication and scope. Low growth in the sector and volatility of business hampers SMME ability to scale and to invest in digital capabilities. This also creates a mismatch between the digital capabilities of large and smaller firms, hindering their ability to integrate operations on projects.

Although very reliant on machinery, the sector is a large employer of labour. There is still a strong reliance on manual labour and user-operated machines and equipment, rather than self-operating smart machines which introduce a human-machine co-working environment. Adoption of these smart machines remains low in mainstream markets until they become less expensive and more safe.

Digital maturity comparison of the sector across global markets

Fully digital construction is still relatively far off for markets globally. Construction projects are generally long term and require substantial capital outlay. The ability to integrate with existing mature infrastructure requires maintenance, upgrading and renewal of old infrastructure.

Locally, pressures of low economic growth have hindered the digital advancement of the sector and the investment of the infrastructure that supports it.

Relative digital maturity of the sector across markets

The future of Retail & Wholesale

Considerable growth in retail and wholesale is being experienced globally

Digital is having an impact on every node of the retail and wholesale sector value chain, creating opportunities for new market creation, market entry and innovation. Digital advancements are driving new capabilities and ways of operating, challenging traditional business models and transforming the traditional competitive landscape.

The extensive penetration of digital devices into the population has put consumers at the forefront of sector dynamics, giving them the power to influence the industry. The digitally-empowered consumer can now remain steadfast in his/her demand for speed, attractive prices, convenience and flexibility which is reshaping the dynamics and traditional operations of the sector.

Digital capabilities are unlocking opportunities for organisations within the sector to better understand their customers, as well as their own operations. These opportunities lie in the ability to improve relevancy and appeal of product offerings, drive sales and marketing effectiveness, and unlock supply chain efficiencies.

In this evolving competitive landscape, it is those organisations which best organise and adapt to serve changing expectations and ways of working that will thrive and dominate the market.

LOCAL VIEW

The retail and wholesale sector within the Western Cape contributes

13%

to **provincial GDP-R**

The sector contributes:

4.1%
to the **GDP of the Western Cape**

63.5%
to **agro-processing** within the Western Cape

18.6%
to **manufacturing** in the Western Cape

The retail and wholesale sector is thus a core sector of the Western Cape economy in terms of it's contribution to the economy as a whole, it's critical connection to other major sectors within the economy, as well as it's contribution to growth and employment within the region.

GLOBAL VIEW

The global retail sector has experienced an
annual growth rate of
3.8%
since 2008
As global markets recover from the 2009 economic crisis,

annual revenue is expected to reach
US$ 28 trillion by 2019,

due to macroeconomic and demographic forces such as:

- Increasing global GDP
- Increasing disposable income and consumer spending
- Growing population size
- Increasing digital penetration and mobile power
- Globalisation and connectedness

E-commerce in this sector is anticipated to show a
compound annual growth rate of 23% globally, between 2012 and 2019.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, KPMG, PWC, McKinsey analyses

The future of Retail & Wholesale

Connected consumers and businesses are able to engage more intimately driving greater convenience and personalisation of services

Trends driving change within the sector

Intimacy of customer relationships

Understanding customer behaviour

To win over today's consumer, organisations need to understand personal preferences, shopping behaviours and decision paths. Organisations leveraging digital technologies, data and analytics to achieve these critical insights are winning in the market.

New channels for customer insight and engagement

The 'intelligence' about customers that organisations are able to glean from the data captured from spending and payment records is enabling organisation to better serve customers. This 'intelligence' or insights emerge from:

- Monitoring consumer behaviour
- Identifying patterns and preferences
- Understanding decision processes
- Driving consumer engagement

Demand-driven forecasting solutions senses demand signals rather than trends and seasonality, thus identifying the true sensors influencing consumers' buying behaviour.

Social platforms are supporting better brand management. Digital solutions enable analytical tools which scan through social media to capture and categorise comments and reviews, allowing businesses to track and monitor brand reputation in real-time. This data is critical for quality assurance, and sales and marketing execution. Social platforms also act as a marketing medium to achieve a wider and deeper reach into a target market.

Personalisation of experience

Consumers are willing to share more information if they get some benefit in return.

Customer loyalty is being entrenched by better customer relationship management and retention through customer loyalty and rewards programs. Programmes such as these drive consumer engagement and intimacy of relationships. These capabilities are supported by digital solutions and enable customers to engage with an organisation on a personal level and engage with their own data and the personalised offers they are receiving.

Digital capabilities are supporting significant improvements in customer service and support requests. Customer assistance is able to be provided instantly, and via the channel that a customer prefers.

Changing expectations

Diversity of consumers is growing, which means that tastes, preferences and values are changing. Retailers need to satisfy these changing expectations in order to stay relevant.
Digital technologies and the access to information that they enable are driving changes in customer expectations, as customers become more empowered. Customers want:

- Freedom of choice in products, delivery and payment options
- Products and services that are tailored to their individual needs and preferences
- High quality products at reasonable prices
- Engaging shopping experiences that are informative, interactive and convenient
- Access to information on corporate profiles, products and other consumer reviews

Consumers are more selective about whom they do business with and which products they buy, and they can be due to the depth of information they now have access to.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, KPMG, PWC, McKinsey analyses

The future of Retail & Wholesale

The traditional landscape of retail and wholesale is becoming obsolete due to the empowered consumer that digital introduces

Trends driving change within the sector

Unified digital platforms are blurring channel boundaries

The empowered consumer is demanding agility from businesses within the sector to serve their expectations of convenience. Consumers now expect interactions with business to fit into their lifestyles.

The rise of omni-channel

Omni-channel provides a seamless and consistent shopping experience across different channels and devices.

Digital solutions are driving supply chain efficiency and sustainable cost-to-serve, which are essential parts of a successful omni-channel offering. Digital solutions that enable online ordering and immediate delivery have required that organisations expand their channel boundaries and adopt an omni-channel approach. To remain competitive, businesses must find a balance between their utilisation of physical and digital channels so that they don't lose customers by not offering new channels, but nor do they cannibalise their existing core operations.

Omni-channel capabilities are resulting in a subtle shift in the purpose and relevance of physical retail space to become product 'show-rooms' that lead to purchase of products through digital channels. Conversely, consumers may choose to view a product online before going in-store to make a purchase. These changing patterns in consumer behaviour, as consumers make more informed purchasing decisions, require that businesses provide a slick and seamless omni-channel experience.

While face-to-face sales representatives and assistants remain an important agent in the wholesale business, there is immense pressure to adopt technological platforms to compliment the process.

Integrated platforms boost value chain synergies enabling organisations to be more agile and responsive

Digital solutions enable organisations to have a single, complete and real-time view of stock and identify its location and other information of interest. Product is able to be moved to where the demand for it is, ensuring that stock is sold and ensuring that customer expectations for convenience are met.

Digital capabilities are making an impact on the back office operations for wholesale organisations - assisting in planning & forecasting, decision-making and tailoring services to meet demands.

Within retail and wholesale, digital advancements are starting to emerge that might significantly improve operational efficiencies and costs savings for businesses. Examples of these are:

- Robotic process automation (RPA) is able to produce operational cost savings by carrying out repetitive, high volume tasks
- Artificial intelligent (AI) virtual agents that can respond to customer service requests
- Augmented reality capabilities that can enhance shopping experiences
- The Internet of Things (IoT) is able to connect infrastructure, stock and systems, and for example create alerts when a product needs to be re-ordered or has perished

These digital technologies enable organisations to be more flexible and agile in responding to customer and business needs, and so aid them to remain relevant in a dynamic environment.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, KPMG, PWC, McKinsey analyses

Impact of digital trends on organisations

The areas of focus for organisations that need to drive strategic decisions in order to stay relevant and drive competitive advantage

The trends driving transformation in the sector have an impact across various areas of business. It is important to understand where digital solutions are driving change and how significant a transformation they are driving. Disruptive impacts are framed within the following areas as they are key pillars for all businesses: Customer experience & value propositions, product enhancement, organisational forms & collaborative ecosystems.

All stakeholders across the retail & wholesale value chain need to understand how these areas of business are transforming in order to respond within their own business and remain competitive. Depending on a participant's role within the retail & wholesale value chain, a response might impact a core business capability and thus require significant focus and internalisation, or just require understanding of the consequences and changes to the sector to keep abreast and support those who are being more deeply impacted.

Customer experience and value propositions

The changing expectations and empowerment of customers means that organisations need to persuade customers to make purchases by refining their value propositions. Experience design and value propositions are evolving as the factors that drive purchasing decisions are changing.

An understanding of customer purchasing behaviour and preferences enables organisations to better serve customers by ensuring that buying experiences align to what customers want. Within physical channels this is done in the design and organisation of stores. Across digital channels, this can be done by sharing offers relevant to a customer's preferences, via the channel they best prefer. Value propositions are thus changing to include experience rather than purely product features. Services are being extended beyond basic services.

South Africa has a comparatively low penetration of e-commerce, primarily due to the economic disparity of the population. While this does present as a challenge to digital disruption within the retail and wholesale sector, opportunities exist to access customers through different channels. Innovative payment methods are emerging due to the high percentage of unbanked citizens in the country to drive disruptive retail models.

Owning a strong relationship with each customer and meeting their subjective expectations of value needs to be a key strategic focus for organisations.

Product enhancement

Product search and assessment, enabled by digital devices, is putting pressure on organisations to ensure that product information and quality is at its best. Quality of customer engagement by businesses is also often under scrutiny through customer reviews, which drives the need to react to customer feedback and continuously improve customer service.

Understanding of customer behaviour and preferences enables personalised offers and pricing. Organisations are able to build profiles of their individual customers based on past buying behaviour and offer them discounts or specials based on this information. In this way the customer feels understood and valued. Loyalty programmes are part of this, and play an important role in attracting customers into physical and online stores.

Within an environment of growing competition, organisations within the sector are having to ensure uniqueness of product and experience, to attract customers. To enhance product offerings, organisations are digitally engaging customers to provide insights into their use and experience of products. Customers are able to influence product design by providing feedback through reviews, and can even be invited to co-develop products. In this way, organisations drive customer engagement and ensure that they are meeting customers' needs by including them in the product selection process.

Sources: EY, Accenture, Deloitte, KPMG, PWC, McKinsey analyses

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Organisational forms/business models

Empowerment of smaller businesses

The makeup of the retail and wholesale sector in terms of size of organisations is changing. Digital capabilities are empowering smaller organisations because they are now better able to compete with the larger market leaders. The improvements in supply chain that digital solutions, means that smaller shops can better manage ordering and stock to meet demand, and benefit from significantly more efficient goods delivery.

Smaller businesses generally have more intimate relationships with their customers and provide a level of convenience that large organisations cannot. Digital advancements are enabling smaller businesses to improve their services to better meet their customers' needs, improving their competitive position.

Untraditional business models and revenue streams

Growth and expansion of retail stores is no longer predominantly about physical expansion, but about re-structuring to take advantages of the opportunities borne by digital.

Online retailers have disrupted the traditional retail business model by simply acting as a platform which sells goods directly to consumers at small mark-ups. Some of these business models simply provide a safe and effective platform for the buying and selling of used goods, while making profits through commission, subscriptions or media and content.

Collaborative innovation

Disruption in the retail sector is primarily dominated by online marketing and selling platforms which allow customers to view, buy and sell products. To operate such a platform, collaboration from various sectors is required such as banking and financial services to handle transactions, and transport to handle distribution. Such expertise from different sectors need to be coordinated in an innovative way to productively manage these platforms.

Retailers and wholesalers are good partners for other sectors to build strategic partnerships with, because they generally have strong networks established. The extent of infrastructure of large organisations in the sector, the size of their market bases and their distribution systems are significant assets that others can tap into and so expand the services provided for customers.

Collaborations here are enabling organisation to serve customer needs, beyond the core capabilities and offerings of a single organisation. Collaboration supports the servicing of a collective of customer needs, and often does so to fill a gap in the market or make offerings more conveniently and cheaply. In this way, collaboration across sectors that provide products and service that people are dependent on, facilitates the economic and social development of the population.

Sources: EY, Accenture, Deloitte, KPMG, PWC, McKinsey analyses

Retail & wholesale disruption horizon

The impact of digital technologies and capabilities is already transforming the market and the way organisations operate within the sector

The adoption of digital capabilities by organisations within the sector are transforming shopping journeys through the digital channels in use.

It is the large companies within the sector that are able to invest in new digital capabilities to optimise all areas of their business operations and explore new service offerings to customers. Most large organisations within the sector have adopted digital applications that improve operations and management activities, create new distribution channels and build closer customer relationships. The wealth of lifestyle data that retailers have access to is substantial and they are starting to use this to transform customer buying experiences.

Large retailers have recognised the value of their size and networks within the country — country reach, extent of infrastructure, large market base and close customer relationships — and how that together with digital capabilities, there is significant potential to extend the services they offer to their customers.

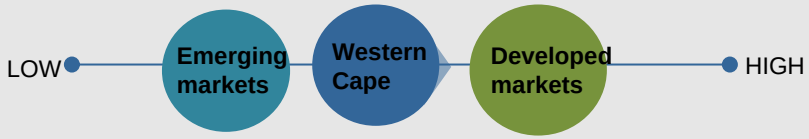
SMMEs within the sector are also benefiting from the improving sophistication of supply chains as they are able to tap into the distribution and logistics systems built up by large and digitally maturing companies. This is enabling wider and faster access to products for SMMEs and assisting them to better serve their customers and save costs in storage and shelf space. Demand forecasting and sales analytics applications are becoming widespread and assisting decision-making.

Some of South Africa's biggest e-commerce platforms are based in the Western Cape. These include online shopping giants Spree, Gumtree and Zando. These platforms operate across the country and are increasingly gaining popularity and scale. They are big employers and are showcasing the sophistication and potential of the local retail and wholesale supply chain. The presence of these capabilities within the province is a testament to the Western Cape's reputation of being an enabler and early adopter of innovation.

Digital maturity comparison of the sector across global markets

Digital technologies and capabilities are well adopted by organisations within the sector locally, however not to the extent that they are in large developed markets. There are greater levels of automation and use of AI systems and robotics in organisations in developed markets. Local organisations are especially choosing not to meet these levels, and rather retaining their staff and training them to work together with digital capabilities to improve optimisation.

Relative digital maturity of the sector across markets



Western Cape Government
Economic Development and Tourism

Future outlook

Hypothesis-driven narrative describing a ‘day in the life’ in the future of the sector to bring to life the impact of digital on the practical activities and opportunities in the sector

EXPERIENCE OF A SHOPPER IN THE FUTURE

With Winter approaching, Niki decides to invest in a coat to not only keep her warm but to also make a fashion statement. She uses her mobile phone to search through online stores and catalogues to identify the latest trends & designs for the season and to view prices & special offers, all in an attempt to find a coat that piques her interest. She is able to troll through retail store websites as well as online-only stores to view their ranges and prices.

Niki finds numerous coats from various stores and websites that she likes and are within her budget. Niki decides that she wants her friend’s help to decide on which coat to purchase, so she tags her selections or adds them to a wish list for later viewing. The next day during lunch, Niki meets her friend in the office canteen and shows her the coats that she is interested in. They upload a picture of her and use a virtual reality headset to view the coat on her.

After some deliberation, they decide on the coat that Niki should purchase. She immediately selects the size and colour of her preference, makes the purchase using her banking details and the secure online

payment options, and indicates that the coat should be delivered to her home address.

Niki also sees a pair of boots she wants to go with the coat, but they are too expensive to be paid out of her current month’s budget. Niki identifies the pair she wants and runs a price comparison across stores. She applies for finance from the retailer. The retailer is able to quickly rank Niki’s credit profile quite highly because of her previous spending behaviour with them. The retailer’s spending analytics on Niki’s buying behaviour shows that she is healthy eater, a regular shopper at their store, and has paid off her past finance with the store when due. The retailer offers Niki a personalised repayment rate based on this.

Niki is able to track the movement of her package using a unique tracking code provided to her by the courier company, and her cell phone.

One day later, Niki receives a notification indicating that her package has been delivered to her home. When she gets home from work, the package is waiting for her. She enthusiastically unwrapped the package and tries on her new coat and boots. Pleased with her purchases, Niki takes a few pictures and uploads them onto her social media accounts, raving about the exceptional products and service on offer by the retailer. Many of her friends view her posts, and visit the retailer’s website to view their offerings. The retailer analytics systems identifies these positive sentiments and feeds them into the retailer’s performance dashboard, building a real-time view of the company’s positioning in the market. The coat has also been identified as a quick seller which is built into demand forecasts and more orders are automatically placed with the supplier.

Niki also fills out a quick online survey about her purchase experience and receives loyalty points towards her next purchase.

The future of Manufacturing

Transformation in manufacturing is being experienced globally as digital capabilities drive new ways of operating to promote operational excellence

The nature of manufacturing is rapidly being disrupted by digital technologies and capabilities, which is affecting every node along the value chain, including research and development, factory design and operations, marketing, supply chain management and logistics. Digital manufacturing technologies are introducing new, faster and cheaper ways of doing things while maintaining or improving the quality of products.

Manufacturers are increasingly embracing digital as a value driver to embrace the opportunities and address the threats arising in the sector. Manufacturers can gain a competitive advantage by optimising processes and operations through the use of digital technologies and intelligence.

The manufacturing sector within the Western Cape has the particular advantage of ease of access and integration into other markets, given it's coastal position.

The sector in the Western Cape has however not escaped the national manufacturing slump experienced due to cheaper labour and materials offered in other emerging markets. The textile industry was hit particularly hard by these economic conditions. This makes the efficiencies borne from digital capabilities especially critical to pursue.

LOCAL VIEW

The manufacturing sector contributes **6.9%** to the **GDP** of the Western Cape.
Contributes on average **13.1%** to the **GDP-R** of the province.
The sector has a **forecasted growth rate** of **1.7%** for the period 2016–2021.

Manufacturing makes up **13.9%** of **formal employment** within the Western Cape - the sector is a prominent labour-absorber within the low skilled and low educated population, and will likely remain so through digitisation. The sector also has an impact on many other sectors, in that it produces its products for them, and in this way passes on the benefits and potential borne within it into other sectors in the economy.

GLOBAL VIEW

This sector accounts for

16% of **global GDP** and
14% of **global employment**.
Global growth projected to be **3.7%** for 2017.
World trade in manufactured goods has more than doubled after 2000 – from **$4.8 trillion** to **$12.2 trillion**

The top 6 manufacturing countries in the world which collectively contribute **60%** of global manufacturing GDP are:

- Unites States
- China
- Japan
- Germany
- South Korea
- India

The global manufacturing output depends largely on the political, economic and social situation within these countries.

Relationships and affiliations between countries and regions largely dictate trade agreements, which directly impacts the manufacturing environment within countries through demand and supply.

Western Cape Government
Economic Development and Tourism

Sources: Provincial Economic Review and Outlook 2016, Invest in WC, Strategy &, McKinsey, United Nations Industrial Development Organization

The future of Manufacturing

Digital capabilities are enabling asset and resource management & optimisation and product quality improvement, thus accelerating the achievement of manufacturing operational excellence

Trends driving change within the sector

The rise of smart factories

Connected devices, assets and people are able to drive operational excellence. Data provided insight to existing operations, identifying underperforming areas and enables better decision-making and efficiency improvements.

A key component of the industry 4.0 revolution is the proliferation of smart machines, which merges production equipment, connectedness and virtual data. Production equipment uses on-board data, IoT and soft sensors to measure operating conditions, quality results, faults and environmental data. Machine learning techniques improve productivity by continuously refining operating settings to eliminate losses as conditions vary. These cognitive smart machines have the capacity to streamline production processes, repairs, orders and deliveries which translate to reduced costs, increased efficiency and reduced downtime. Through the optimisation of these processes, considerable economic gains are realised while helping manufacturers achieve scale and reach.

Digital technologies and capabilities are enabling:

- Machines and other equipment can produce products more quickly and accurately
- Shrinking product lifecycles
- Preferences for products that can be customised
- Preferences for products that are easy to use and are reliable

Workers can now be digitally enabled with tools and systems to assist them in their work and support improving their productivity and safety. Workers are mobile, not tethered to specific work locations. Work tasks are able to be more directed, ensuring the workforce executes the right operations or maintenance tasks at the right time, supported by augmented reality wearables which provide situational awareness and activity coaching.

Supply chain management can become proactive rather reactive

Digital technologies and capabilities enable the quicker reaction of managers and machinery to unexpected events.

Digital capabilities are present across processes, requiring workers to engage differently than they have before, as there is greater oversight across the supply chain. Technologies and systems provide higher levels of monitoring and accuracy of production, reducing idle time and waste which are big cost drivers within manufacturing. Examples of such reducing losses are:

- Less equipment downtime
- Less waste in materials, product, energy & water consumption, etc.
- Better utilisation of assets: running longer, smarter and more efficiently.

Intelligent asset tracking and smart inspection enables manufacturers to identify and attend to issues proactively rather than reactively, as they are able to predict or identify where a disruptive event might occur. This provides significant cost and time savings.

The future of Manufacturing

Digital capabilities are enabling asset and resource management & optimisation and product quality improvement, thus accelerating the achievement of manufacturing operational excellence

Trends driving change within the sector

Accelerated new product development

The accessibility and affordability of 3D printing is contributing to the accelerated pace of new product development. This technology now allows prototypes to be produced within a few hours as opposed to the traditional methods which could take up to a month to produce. Additionally, 3D printing also cuts cost and can allow prototypes to be developed with much more detail.

This technology not only challenges manufacturers to be innovative with their product offerings, but also benefits society by having more products to choose from.

Building connections with consumers

The manufacturing sector has the opportunity to interact directly with consumers through digital platforms, thus creating personal interactions and creating opportunities for new revenue streams through direct sales. Such innovation will provide the seamless experience sought after by customers.

Consumer input into design

Manufacturing companies are seeing the value in building close relationships with consumers, not only for marketing and sales purposes, but for realising the innovative ideas which arise from hearing their demands and opinions. Digital capabilities are increasingly being used to capture big data from social media, apps and digital sensors for analysis and action.

Such information can also be used for more accurate forecasts regarding demand, sales and other trends which enables management to make more informed decisions and to gain a competitive advantage.

Consumer demand for sustainable & ethical operations

Access to information about product genealogy is driving expectations of quality. Customers want to be assured that the products they consume are sustainable. Organisations are now better able to report on areas like energy management, materials sources and labour use. Such reporting is increasingly built into regulation and the information available to consumers across the value chain.

Impact of digital trends on organisations

The areas of focus for organisations that need to drive strategic decisions in order to stay relevant and drive competitive advantage

The trends driving transformation in the sector have an impact across various areas of business. It is important to understand where digital solutions are driving change and how significant a transformation they are driving. Disruptive impacts are framed within the following areas as they are key pillars for all businesses: Customer experience & value propositions, product enhancement, organisational forms & collaborative ecosystems.

All stakeholders across the manufacturing value chain need to understand how these areas of business are transforming in order to respond within their own business and remain competitive. Depending on a participant's role within the manufacturing value chain, a response might impact a core business capability and thus require significant focus and internalisation, or just require understanding of the consequences and changes to the sector to keep abreast and support those who are being more deeply impacted.

Customer experience and value propositions

Within manufacturing, customers can expect to enjoy more personalised service by being able to customise products to a greater extent than what is possible today. The cognitive ability and programming power of smart machines will allow manufacturers to respond to personalised orders much faster, cheaper and accurately. Manufacturers are now focussing on investing in the capabilities needed to build, manage and leverage stakeholder relationships throughout the supply chain. It is necessary to strengthen these relationships which are long-term and mutually beneficial. Manufacturers are acknowledging that in today's hyper-connected world, finding an alternative supplier or buyer is relatively straightforward. Loyalty and buy-in depends largely on the relationships established.

Increased speed will also enhance the customer experience not only through improved manufacturing abilities, but also through the reduction in administrative lag time and faster distribution methods.

Digital also enhances the customer experience through improved engagement with the customer along the supply chain as customers have access to information about the processes involved in the products they consume. Customers are expecting smart use of resources and waste management to ensure the products they use are sustainable.

The tighter management and accuracy of operations enabled by digital technologies and capabilities is driving new standards and expectations of quality. Where quality was once core to value propositions, it is now a basic expectation, and value propositions need to evolve to offer the customer more.

Product enhancement

Automation of machines and processes are able to reduce waste significantly. This results in improved quality of products and reduced losses due to the element of human error. In addition to cost savings, this could be leveraged to add to the value proposition offered to customers through reduced prices and guarantees.

Improved efficiencies within the factory add to the economic gains to both the manufacturer and economy.

The evolution of smart products calls on a complete rethink in design, which requires interdisciplinary expertise. Smart products now contain 3 key elements:

1. The mechanism — core function of the product, such as washing clothes
2. The smart component — sensors, user interfaces, operator interfaces
3. The connection — network connection, antennae, ports

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Organisational forms/business models

E-commerce is empowering manufacturers with direct to consumer capabilities. This creates business opportunities for manufacturers to expand their business models to include direct digital sales and marketing, which holds the potential for considerable economic gains.

Distribution channels are evolving as connectivity with suppliers and customers grows.

Digital capabilities are driving the design of digital or smart factories, which requires the design of new operating models and plant layouts to transform and adopt new methods.

Collaborative innovation

Greater collaboration driven by higher levels of connectedness between participants such as scientists, designers, machines and consumers are changing the landscape of manufacturing and creating economic, social and environmental growth opportunities.

Collaboration within the manufacturing sector is becoming common practice between businesses operating in different markets with different product and service offerings. These collaborations are entered into as a mutually beneficial relationship to add value to each of the individual offerings, such as medical device manufacturers collaborating with mobile device software businesses to complement their offerings through their service.

Such collaborations results in innovative digital capabilities, market share capture and strong economic growth.

Manufacturing disruption horizon

The impact of digital technologies and capabilities is already transforming ways of operating within the sector

Digital transformation is already having an impact within the sector in the optimisation of operations, the impact of deeply disruptive technologies such as 3D printing lie further into the future.

The manufacturing sector has experienced and continues to experience strong automation and mechanisation as technological advancements emerge. Automation has impacted the sector for decades, the transformation brought by digital capabilities however is more recent and more disruptive to the business models of organisations within the sector. Digital technologies and capabilities are becoming more mainstream as they become more affordable and more practical. Disruptive technologies such as 3D printing will have to advance to be incorporated into manufacturing, but will have a significant impact if it does. Organisations within the sector therefore need to focus on how they will respond to such transformation, and develop digital strategies in order to remain relevant in a changing environment.

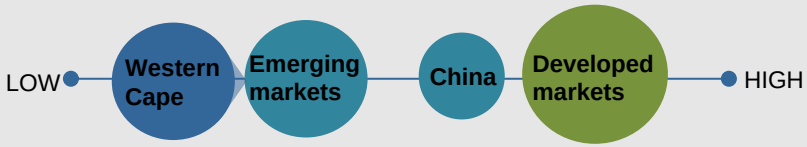
Adoption of digital capabilities is locally prevalent to some extent as factories and operations in general are driven to become 'smarter' in order to remain globally competitive. The extent of digital adoption is however relatively low/immature compared to other markets. Challenges for sector growth within the Western Cape, and South Africa more broadly, that hinders digital investment and the maturity of the sector are the following:

- The manufacturing sector is downstream along the value chain from other primary sectors in the economy such as agriculture and mining. In South Africa, these primary sectors are plagued by labour unrest which affects all participants along value chains. Such disturbances hinder growth within the manufacturing sector in terms of production loss from unpredictable access to resources, as well as its deterring effect on investment.
- Labour laws and other regulatory requirements within South Africa, intended to protect and nurture the labour force, adds to the cost and complexity of operating locally. Minimum pay grades, BBBEE requirements and other formalities make the local environment a relatively expensive and bureaucratically onerous environment to operate in, when compared to other markets. Operating a local manufacturing business can prove unaffordable as importers can find cheaper goods manufactured elsewhere. This is particularly challenging for SMMEs who can't achieve the cost benefits of large scale operations.
- The unreliability of electricity and water supply diminishes the competitive ability of the sector within the global market.
- Skills shortages within the manufacturing sector are often cited as a challenge to digital maturity and growth. The digitisation of factories creates the need for a digitally savvy workforce that can work within a digitally enabled environment.

Digital maturity comparison of the sector across global markets

The Western Cape manufacturing sector is relatively less digitally mature than other markets, largely due to of the lack of investment in digital capabilities, which is a result of the region's challenges which deter investment. The Western Cape manufacturing sector is moving in the direction of greater digital maturity, however emphasis is still placed on import replacement and job creation.

Relative digital maturity of the sector across markets



Western Cape Government
Economic Development and Tourism

Future outlook

Hypothesis-driven narrative describing a ‘day in the life’ in the future of the sector to bring to life the impact of digital on the practical activities and opportunities in the sector

EXPERIENCE OF A WORKER IN A SMART FACTORY

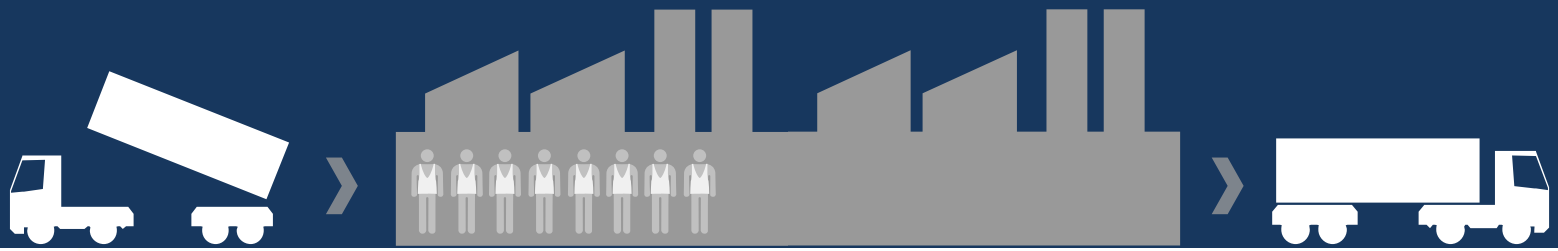
Anne is a floor worker at a smart factory which uses smart mobile devices to connect the human workforce and the smart factory.

Everyday when Anne enters the factory, sensors at the door check her in by detecting her unique smart device identity. Her team leader is immediately identified of her arrival and electronically sends her the task list for the day. Additionally, Anne receives detailed information of the previous shift on her smart mobile device from the previous shift worker. With this real-time information, Anne takes over.

During her shift, the smart machine that she is using detects an impending problem and sends her and the team leader a notification detailing the problem. The team leader notifies the nearest maintenance worker, Ted, with the exact details of the problem. Through this notification, Ted knows exactly what the problem is, what tools he would need and where to find the machine. Upon arrival at the machine, Ted wears his augmented reality headset which instructs him on how to fix the problem by highlighting the wires and parts which are causing the problem. The headset also allows Ted to connect to a specialist in real-time to support him through the repair procedure. Once complete, the smart machine notifies Anne and the team leader that the problem has been resolved. Anne can continue with her tasks as usual without any delay or machine downtime.

The smart machine keeps stringent records of it’s output, the number of defected products produced, energy consumption and levels of raw material consumed. This data is sent to the team leader on an hourly basis for monitoring and decision making.

At the end of the shift, Anne’s mobile device transfers the information of her shift to the next worker, Lisa. Lisa can now take over without any delay or downtime.



Western Cape Government
Economic Development and Tourism

The future of Transport

Pressure for faster, cheaper and more reliable transport networks is increasing globally. Transport has an important role in creating an enabling economic environment for citizens and business

As the global population and urbanisation increases, so does the pressure placed on transport infrastructure, operations and efficiencies.

Cities across the world are designing strategies which utilise digital capabilities to improve transport systems to produce real benefits to the economy and society. Digital adoption within the transport sector represents a powerful tool for economic and social growth through employment, direct GDP contribution and downstream GDP growth due to the resulting increase in distribution and logistic efficiencies.

This is especially important in the Western Cape where the majority of citizens rely on public transport infrastructure and systems for their daily commute.

- Approximately 60%[1] of people travelling to and from Cape Town do so using public transport and non-motorised modes, with 40% using private cars.

The Western Cape, and the City of Cape Town specifically, experiences significant transport challenges - challenges of congestion and poor public transport infrastructure (when compared to other countries around the world). There has been focus and investment toward improved provision of public and non-motorised transport infrastructure with the aim of building a smarter and more sustainable city. As part of this, the Integrated Rapid Transit initiative and its MyCiTi bus service has been a leading example within the country of a successful transformation initiative within the sector.

LOCAL VIEW

Average forecasted growth within the sector anticipated to be **2.1%** for the period 2016 to 2021.

The **average growth rate** between 2004 and 2014 within the transport sector of Western Cape was **3.8%**

The sector accounts for **5.4%** of **formal employment** in the province

Cape Town International Airport was voted the best airport in Africa in 2015 and is the second-busiest airport in South Africa.

As part of the service sector of the Western Cape, transport is a a key contributor to the provincial and national economy. Slow growth in this sector was experienced in recent years due to the global economic crisis. The Western Cape Government has multiple projects and initiatives in the pipeline to facilitate growth within the sector.

GLOBAL VIEW

The 2016 **global transportation revenue** of

US$ 4.7 trillion

made up **6%** of **global GDP**.

Investment in transport infrastructure is expected to grow at an average annual rate of

5% between 2014 – 2025.

Investment in transport infrastructure is necessary for social and economic growth due to these general factors:

- Urbanisation is growing at a concerning rate; cities all over the world are forecasted to collectively house 5.2 billion residents by 2050
- Rapid motorisation is expected, whereby automobile manufacturers are anticipated to manufacture more cars over the next 20 years, than have been built over its 110 year history
- Mobility is important to consumers which increases the demand for easy access to road, railway, aviation and sea travel

Western Cape Government
Economic Development and Tourism

Sources: 2016 Municipal Economic Review and Outlook, Deloitte, Plunkett Research, PWC

The future of Transport

While digitisation may not radically replace current transport systems, it must be adopted to achieve smart mobility which will enable efficiency and growth in the sector

Trends driving change within the sector

The adoption of digital technologies and capabilities leads to improvements in the efficiency, safety and reliability of transport networks.

Digital applications are influencing the transport sector through the rise and penetration of smart phones, real-time monitoring & response systems and big data.

Smart mobility

Through the adoption of digital systems, cities are improving the efficiency and reliability of public transport networks. This is creating an increase in the utilisation of public transport which has many benefits to the economy, environment and society.

Smart mobility is enabled by integrated and intelligent systems which monitor the current traffic conditions with respect to congestion and demand, and make real-time suggestions as to how to alleviate and avoid such problems. Digital capabilities are able to:

- Sense demand
- Measure performance
- Monitor the state of assets
- Respond in real-time to manage capacity

Payment methods for public transport are also being digitised to increase convenience, safety and speed. Metro services and taxis are adopting e-tickets as a way to offer convenience to travellers.

Transformation of operations and management

Automation and digital management of operations within the sector is becoming pervasive due to the potential it holds to increase safety across all modes of transport. While it is not a new concept to the automotive, aviation and railroad industries, the relevance and penetration of automation is now gaining momentum.

Advances in science, engineering and computer programming have given rise to cognitive technologies which are capable of learning, predicting and making suggestions in real-time. This progression has the potential to disrupt the transport sector by enhancing the vehicles used across all modes of transport to be smarter, safer and greener.

Other sectors like the financial services sector will be impacted by transformation here – for example by changing vehicle ownership models, as well as changes to the structure of liability related to vehicles and safety.

The future of Transport

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Empowered travellers driving greater user-centricity

User choices are driving changes in approaches to operations and planning within the sector. Travellers now have access to more real-time data regarding routes, arrival times, delays and capacity through their smartphones than they have ever had before, empowering them to be more in control of their own travel. Digital applications enable travellers to select the fastest route which provides the greatest convenience – driving expectations of anytime, anywhere service.

Multi-modal solutions

Beyond this, the expectations of travellers are growing to a point where real-time data is demanded across all modes of transport simultaneously, to allow them to choose not only the fastest route, but also which mode of transport to use at a specific point in time to get to a specific end point. By doing so, travellers are seeking to create a seamless end to end travel experience. This is only possible through digital solutions.

This shift in power is driving organisations within the transport sector to adopt more user-centric mind sets. Engagement with users is becoming a critical focus point to remain competitive.

Integration of systems

The traditional environment of individualist transport systems is transforming towards an integrated 'digital transport system', a world where data and connectivity will lead to an optimised system for both individual commuters and society as a whole.

Connectivity between vehicles and users is growing. Connected vehicles are able to access and share data between organisations and users.

Impact of digital trends on organisations

The areas of focus for organisations that need to drive strategic decisions in order to stay relevant and drive competitive advantage

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All stakeholders across the transport value chain need to understand how these areas of business are transforming in order to respond within their own business and remain competitive. Depending on a participant's role within the transport value chain, a response might impact a core business capability and thus require significant focus and internalisation, or just require understanding of the consequences and changes to the sector to keep abreast and support those who are being more deeply impacted.

Customer experience and value propositions

Transport operators are responding to these demands by adopting digital capabilities to create a user-centric environment within the transport sector. The adoption of digital systems by the transport sector is enabling greater customer/user access to relevant information, which in turn empowers them to make informed decisions. These systems are available in both the private and public transport systems, which widens the range of choice for the traveller. Smartphones are enabling travellers to manage their journey better, in terms of planning the timing of trips and the costs of travelling.

The experience of vehicle sales is being transformed from a physical to virtual experience, making marketing and selling a more interactive experience for customers. The experience of being in and driving a vehicle can be shared virtually, and purchasing decisions made on this before even physically being in the vehicle being bought. Customer experience is transforming to become a much more intimate, long lasting, and personalised relationship. Digital engagement is driving this, and is critically important to building brand loyalty in a very competitive market.

Product enhancement

Digital capabilities have amplified the competitive landscape across all modes of transport, which puts pressure on operators to respond promptly to remain relevant. Operators have to respond through innovation in both their business models and value propositions to offer customers the most convenient, safe, cost effective and reliable transport structures.

Emphasis is being placed on the creation of user-friendly, interactive and informative websites and apps to create an engaging travel experience, going beyond just transportation between two points.

The future of Transport

Transport operators have to utilize digital systems to adopt customer-centric business models to remain relevant within the sector.

Impact of digital trends on organisations

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Organisational forms/business models

Digital only entrants

The sector has been dominated by new entrants which centres their business model around a digital only interface. These businesses use digital to disrupt traditional business models by creating a community of members who provide a service for them. Through innovation and expertise, they have been able to thrive within the transport sector by simply acting as a reliable platform and agent, without having to physically engage in the movement of people.

Customer-centric business models

Transport operators are increasingly adopting customer-centric business models as an approach to identify and satisfy the growing demands of the empowered consumer. Digital plays a significant role in this transition through engagements, data collection, analysis and quick response.

Collaborative innovation

Public and private transport networks need to work together to meet the changing mobility environment and meet the demands of more empowered customers. Varied transport systems will need to integrate and so need to collaborate closely.

The relationship between sectors is important as they all interlink and are reliant on each other. Digital is leading to the blurring of boundaries between sectors, and sectors need to collaborate to understand and address the impact of digital transformation amongst them.

Transport is the largest consumer of energy in the region by far – transport used 64% of energy compared to residential, commercial, industrial, Government and agriculture.

Optimisation of operations and services, and more energy efficient use in the transport sector will place less pressure on the energy sector – this will create risks and opportunities for both sectors that need to be understood and managed.

Transport disruption horizon

Digital disruption of the sector is relatively far off because of the high costs and long timelines that characterise transport infrastructure projects

Digital transformation of the sector requires substantial investment, and implementation of infrastructure projects are characteristically long term

Transformation within the sector has begun, and digital applications are being adopted very quickly by users.

- Uber has disrupted the transportation ecosystem locally - uptake of Uber has been fast and wide-reaching within the country and continues to grow. It is driving digital development locally as similar new local platforms are emerging successfully. The system has also led to the creation of small businesses in the provision of cars and partner-drivers.
- Navigational systems are used widely and are reliant on the network effect of greater benefits for users, as the number of users grow. Such systems are connecting into other systems to offer customers personalised offers and services based on their location.

The overall transport infrastructure network in the country however requires substantial improvement to support greater digital integration, and to host new smarter modes of transport.

While the South African Government does have infrastructure improvement strategies in place, the economic, political and social circumstances of the country are hindering implementation. Infrastructure improvement projects are also generally very capital intensive and have long implementation timelines.

Some of the challenges facing the sector within the Western Cape, and South Africa more broadly, which may hinder the implementation and impact of digital transformation are:

- Labour unrest is rife within South Africa which affects the implementation and completion of infrastructure improvement projects. Much needed foreign direct investment is also deterred due to this challenge
- Resistance to new competition within the industry as it transforms the demand for existing transport services
- The cost of transportation in South Africa is high due to the volatile cost of fuel. Further factors inflating costs is the need for regular vehicle maintenance due to rough roads, theft of railway and electric cables, and traffic congestion within cities and the major national roads. These growing costs place pressure on transport operators to be innovative in their business models and value propositions to keep prices low
- The integration of digital systems into the operations of the transport sector creates the need for an digitally-literate workforce

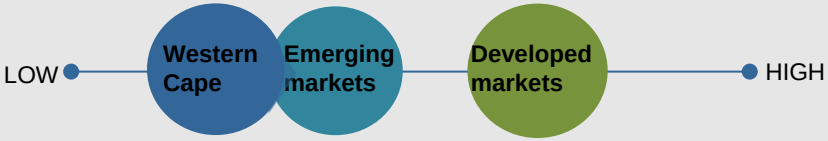
Extensive transformation of the sector is viewed to be relatively far off as integration of networks and the establishment of smart systems are complex and substantial projects. Transformation of vehicles that might remove the need for a driver is an advancement that will likely only become mainstream in the far future.

Digital maturity comparison of the sector across global markets

The sector locally is relatively immature compared to other countries globally that have much more digitally advanced and integrated public transport infrastructure and networks. Although organisations and citizens are adopting new digital platforms and so changing their behaviours, these platforms were borne in developed markets.

South Africa has a relatively poor standard of public transport infrastructure in place to delivery transport services to the public. A large proportion of the population relies on private transport which adds to the cost of living for citizens.

Relative digital maturity of the sector across markets



Western Cape Government
Economic Development and Tourism

Future outlook

Hypothesis-driven narrative describing a ‘day in the life’ in the future of the sector to bring to life the impact of digital on the practical activities and opportunities in the sector

EXPERIENCE OF A TRAVELLER IN THE FUTURE

Deon works from his home office and travels to client locations for meetings quite regularly.

For his morning meeting he does a quick comparison online of the cost, time, health-analysis etc. of the various modes of transport he can use to get to his meetings. He receives a traffic alert of congestion close to the client site. Based on this information about the client office site and the notification which shows that it has bike racks available, he decides to use a bike-share. He uses the mobile app to establish where the closest bike station is from his home and to determine the availability, sophistication of bikes and price ranges available.

Before he returns home he does some shopping and so decides to take a car home. He hails a taxi which arrives in a few minutes and chooses the fastest route based on current route conditions. As a frequent user of the taxi service, Deon is notified that he will receive a discount on his next trip. He is also asked to rate the taxi service provider and the driver, and to provide suggestions on how to improve the service.

At the end of the day he receives a break down of the travel costs he incurred which were automatically paid for by systems linked to his bank accounts. He also sees data about the heath benefits he achieved from his cycle and receives points from his health insurer.

Deon wants to buy a car for his parents so that night he is paging through a car magazine and sees a car he likes. He takes a picture/scan of the page of the magazine with his mobile phone, and a 3D model of the car appears so that he get a better view of the car’s shape and form. He is also able to hear the sound of the car’s engine. He likes what he sees and so clicks on the link provided on his phone and an appointment is setup for him at his nearest dealership.

Western Cape leading by example feature

Western Cape has a transport system which is embracing digital technologies to improve efficiencies

Convenient payment cards

The Western Cape has launched the application of smart chip technology that allows passengers to load money onto a traveller's card which can be used to pay for trips across different modes of public transport. This increases convenience for residents and tourists, and encourages the use of public transport. An example includes the MyConnect cards used for convenient payment when using the MyCiTi bus system.

Electric-powered public buses

The Western Cape is integrating buses which run on electricity into the public transport system in an attempt to reduce the carbon footprint of the region.
MyCiti is launching the pilot in June 2017 in an attempt to reduce Cape Town's carbon footprint. A fleet of 10 buses will be introduced.

Web-based transport updates

This entails online platforms or apps which provide real-time information regarding the availability, capacity and current status of a selected transport network, such as Go Metro which provides status updates of the public railway system in the Western Cape. Live status updates are also available at bus stops within the province.

Web-based carpooling system

The University of Cape Town has employed a carpooling database, RideLink, which allows staff and students to search for lifts with people who live in their area. It is being employed to reduce congestion caused by students and staff traveling to the university, thereby reducing the carbon footprint of the city.

The future of Financial & Business Services

Banks in South Africa have faced slowing economic growth over the past few years, but they have nevertheless reported sound profit growth

Digital technologies and capabilities are changing the way business is done. Organisations are able to optimise operations, save costs, follow new routes to market, offer new products and services, develop new skills and drive competitive advantage.
Financial and business service organisations are transforming globally as a result of digital advancements and the increased international competition that globalisation has supported. Digital technologies and capabilities have a significant impact on the processing of information and distribution of services, creating disruptive effects on the financial services, and wider business services sector.

Digital strategies are receiving great focus in this sector in an effort to reduce the cost of expensive legacy systems and to enhance customer value.
Changing consumer expectations for hassle-free, frictionless services, able to be accessed anywhere, anytime, are driving change in the sector.

South Africa's financial and business services sector is mature and sophisticated, which can be accredited to the sound legal and regulatory foundations that underpin it.

The sector is made up of many local and international players and the playing field is very competitive. This increasingly competitive environment has led to a strong focus of efforts on client-centricity and focusing on unique selling points. Organisations that do this successfully are able to benefit from stronger profit growth, higher returns and larger customer numbers.

LOCAL VIEW

Drivers of growth

The financial & business services sector in South Africa continues to grow despite a number of challenges that the market faces. The drivers of this growth include:

- Economic expansion across Africa
- Consumer demand for value
- Population growth
- Urbanisation
- A changing demographic to a younger population
- A growing middle class

Bank earnings outpace GDP growth
The banking sector gains a greater share of the economy when it's growth outpaces GDP growth. South Africa's longer-term average is a multiple of **5.1%,** indicating that bank earnings are rising above average growth rates. Introducing digital payment platforms could grow country GDP by **0.5% per annum**.

GLOBAL VIEW

Financial services is the **third most profitable sector globally**, delivering an estimated **net margin of 17.14%** in 2016.

Trends driving sector growth

- Demographic changes such as the growing population and the rising middle class result in an increasing demand for financial and business services
- Digitisation results in the creation of new opportunities and needs such as cyber security, regulation and developers which increases the sector size.
- Creation of new markets through the introduction of new products channels
- New FinTech entrants operating in the fields of money transfer, online lending and credit ratings are widening market reach and scope

Due to the efficiencies of **blockchain**, it is anticipated to cut costs within the financial industry by

US$20 billion

by 2022.

Western Cape Government
Economic Development and Tourism

Sources: Strategy &, Business Insider

The future of Financial & Business Services

The ability to analyse mass data to deliver mass personalisation is a critical point of differentiation for organisations in the sector

Trends driving change within the sector

Traditional experiences are being transformed

Digital device ownership is transforming customer expectations

Customer expectations continue to change rapidly, with expectations that financial and business services are consumed on customers' terms, and not the service providers' terms.

People no longer think of all the various channels of internet, mobile, tablet and other technology platforms as different components, but rather just as life.

The millennial and digitally savvy generations expect more of institutions that they engage with
In banking and insurance, they expect that banks and insurers understand their needs and are flexible enough to meet their specific requirements. This is a significant change for modern financial service providers, which are more familiar with approaches based on business rules and consistent service.

The implications for financial and business service providers are the following, at the least:

- Financial and business service providers are expected to provide online services that are available on demand, anywhere
- An increasing number of consumers expect to be able to engage their bank and other business service providers without needing to enter a physical branch or office
- Customers are better informed about fees, rewards and service experiences of competitors

Digital devices enable greater market penetration

Mobile payments in Africa are overcoming infrastructure challenges

Organisations have had varied levels of success in mobile banking, mobile payments and mobile money across Sub-Saharan Africa. While east Africa (specifically Kenya) has had tremendous success in mobile money (using a mobile device to transfer funds across distances), South Africa has largely seen greater success in launching mobile banking, allowing clients to access their bank accounts on a 24-hour basis. Mobile payments have very quickly gained traction, with a variety of banks and non-banks providing platforms to process payments using remote devices.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

The future of Financial & Business Services

The ability to analyse mass data to deliver mass personalisation is a critical point of differentiation for organisations in the sector

Trends driving change within the sector

Traditional experiences are being transformed

Decreasing levels of trust in big business and demand for transparency
Trust is multi-faceted and is most frequently associated with the stability of an institution and the customer experience, with "the way I am treated" being of great importance, followed closely by communications, advice and problem resolution.

There is a trend toward greater transparency in financial and business services the world over. Making practices, policies, algorithms, operating data, and future plans available to customers, employees, or business partners is not something that businesses have traditionally done, and so are cautious about doing so now.

Although there is this greater pressure on business to be open in communicating both their prices and the services that they provide, there is no universal definition of when or at which level prices are perceived as transparent by consumers, and it is some part subjective. Customers are demanding transparency in order to better comprehend offerings and the value they offer, as well as in order to compare offerings in the market.

Behavioural economics to support customer understanding and drive engagement

The digital revolution is catalysing the deployment of behavioural economics. Smartphones and sensors can monitor behaviour and adapt incentives in real-time, real-world conditions. In addition, social media can tap the immensely motivating power of social norms and gamification — harnessing game-playing principles such as competition, to motivate human behaviour.

Incentives to act rationally are being built into products and services, and general company propositions - from legal restrictions to the ways in which companies price goods and motivate workers.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

The future of Financial & Business Services

Business structures need to be lean and flexible, and it is digital technologies and capabilities that enable this

Trends driving change within the sector

Structural changes in business operations

Businesses are scaling back in areas of the business that do not create value. This requires examination of what is core to the business and where genuine value is created. Channels, products or core banking systems that don't provide value have to be improved.

Investment in digital technologies, capabilities and skills is substantial

Digital technologies and capabilities are changing the costs, scale and possibilities of operational processes.

Investment in omni-channel capabilities and core operating systems is taking place within the financial services sector in an effort to meet customer demands for anytime, anywhere service provision, as well as to reduce the high costs to serve those customers.

Changes in customer expectations will force an investment in core systems and processes to make them fit for purpose. To ensure real change and create value, investment in technology must be strategic rather than purely tactical fixes.

Automating process will improve efficiency ratios.

- Real-time, straight through processing of transactions
- Integrated information that can break down the traditional operational silos and create a single view of the customer
- The cost of processing power continues to decline, enabling more cost efficient automation
- Technology, especially without a legacy, can drive down cost to income ratios

This use of technologies will not replace people; it will change the way customers and staff interact and will turn the customer journey into something that is highly personalised.

New distribution and customer engagement channels

Businesses within the sector are investing in their digital presence to disrupt the traditional methods of engaging with customers and evolve customer interfaces.

This is seen in the:

- Significant investment in business apps and online services to modernise presence
- Innovation is integrating social media into businesses
- Digital task completion through the use of blockchain, robotics and artificial intelligence

The investment and prevalence of online channels and their features are however decreasingly a differentiator for South African businesses as these channels become widespread.

There has been a shift in the function of business branches to become primarily a sales and advisory service platform, or disappear all together and be replaced by online channels.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

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Upgrading or replacement of core operating systems

Core operating systems are under-development across most organisations, or it is an upcoming focus. Some of the most disruptive improvements that digital technologies and capabilities are enabling in the sector are:

- Increased automation of processes that can handle larger transaction volumes
- Real-time processing of transactions to provide fast and seamless service
- Improved data management and analytics capabilities to better understand customer behaviour and internal operations
- Improved risk management from centrally managed data and information, and better customer risk profiling
- Enhanced process execution and monitoring
- Many “branch and workplace of the future” investments are underway. Globally, there has been a shift in the function of business branches over recent years to become primarily a sales and advisory service platform

Omni-channel driving change in Business Process Outsourcing

South Africa is an attractive location for BPO by international organisations because of it’s relatively low labour costs, English fluency, stable environment and widely convenient time zone. BPO is especially large and an important source of job creation in the Western Cape:

> **11 000** jobs were created in the Western Cape over the last 3 years, which is expected to grow by **6 500** in the next year.

Digital transformation is having an impact in this area of business services which means that there needs to be action to adopt change to meet this transformation to remain globally competitive and continue to contribute to economic growth locally. Customer engagement methods are transforming, and this requires that all the business service providers that service leading digital and omni-channel organisations need to adapt as well. This will require the upskilling of people to ensure that they can engage and deliver along the new digital channels that are emerging.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

The future of Financial & Business Services

The extent of digital impact and opportunity varies across financial and business services and functions

Some professional services business/functions are impacted by digital capabilities to a greater extent than others, depending largely on the extent of a subject matter expert's judgement required in carrying out a task.

High impact is where digital technologies and capabilities are materially impacting operating models and operations. The transformative impact that digital is having within finance and accounting, banking, risk and insurance is relatively substantial. Impact is being felt in organisations in these areas in every aspect of business: core competencies & resources, value propositions, distribution channels, customer segmentation & engagement product design & pricing, revenue & cost bases, and operating models. Digital capabilities are having a significant impact in the transformation and operations of these large scale organisations in some of the following ways:

- Automated transaction fulfilment
- Automated claims processing
- Payment processing
- Reporting
- Omni-channel servicing
- Risk management

Digital capabilities within marketing, BPO, procurement and social sciences have a less transformative impact on organisation in these business functions. Digital capabilities are certainly having a positive impact in parts of these businesses, for example in:

- New channels to market
- New ways of engaging with the market
- Market analytics
- More efficient payment methods etc.

The disruption of business models hasn't yet been the case.

It is repetitive, rules based, routine tasks that digital capabilities are able to transform and drive significant efficiency. It is in these areas where jobs, or the role of a human, will transform. Where the knowledge and expertise of a human is needed to make decisions or carry out a service, the digital transformation of that service is harder and less valuable.

Overall however, the transformative impact of the adoption of digital capabilities is positive. It is shifting the landscape, quickly. Organisations that exist today might not exist in the next five years if they don't keep abreast with digital transformation, or integrate with those that are.

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

Impact of digital trends on organisations

Banking innovation is taking place at the fringes of customer experience and digital products or services

The trends driving transformation in the sector have an impact across various areas of business. It is important to understand where digital solutions are driving change and how significant a transformation they are driving. Disruptive impacts are framed within the following areas as they are key pillars for all businesses: Customer experience & value propositions, product enhancement, organisational forms & collaborative ecosystems.

All stakeholders across the financial & business services value chain need to understand how these areas of business are transforming in order to respond within their own business and remain competitive. Depending on a participant's role within the financial & business services value chain, a response might impact a core business capability and thus require significant focus and internalisation, or just require understanding of the consequences and changes to the sector to keep abreast and support those who are being more deeply impacted.

Customer experience and value propositions

Financial and business service providers generally have a common strategic goal of enhancing customer-centricity to ensure that they stay relevant to their customers and their customers' changing expectations.

Customer journeys are becoming more broadly defined to include other lifestyle areas, and changing the traditional bank's agenda of being product-focused. Organisations have to build customer experiences to appeal to the customer behaviours of their targeted audience.

Only by transforming customer experiences will banks be able to materially grow share of wallet. Revenue growth will come from increasing share of wallet if customer propositions can be improved.

If the value in data can be unlocked and customers convinced that it is in their best interests to let businesses share and use their data, then business can offer:

- Anywhere, anytime service
- Seamless experience between delivery channels
- Security of transactions and personal information

From the customer's point of view, often there is a trade-off between convenience and security. In the financial services sector, trust is critical, and lack of trust is a key barrier to engaging with a financial services organisation.

Digital technologies and capabilities are critical to source, organise and analyse customer data. And using these insights to better serve customers over digital channels also requires digital technologies and capabilities.

Product enhancement

Businesses can achieve growth by developing products that cater to new customer needs.

Customer insights provide an opportunity to understand where value is created for the customer, tailor products, as well as understand the value of products over it's lifecycle. Businesses need a clear understanding of the value of their products across it's lifecycle.

Products need to be customer-driven. This involves simplifying product sets and better tailoring products to meet customer needs. This will require reform of internal systems, processes and operations.

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Organisational forms/Business model

New entrants into the sector are bringing service and experience innovation to a range of banking, payment and lending products, threatening the primacy of traditional banking relationships.

Digital platforms and capabilities are enabling the building of less complex organisations that are free of the legacy of the large traditional institutions who require large investment to organise around the opportunities digital provides.

Customers are turning to other organisations to meet their banking needs, particularly to finance small and medium-sized businesses.

New and innovative banking products coming to market around the world are most often led by digital technology, meaning that digital businesses have a potentially broader set of revenue streams.

Banks will need to maintain ownership of the mobile financial transactions market

Traditionally, banks have owned the financial payments and transactions space. The launch of the internet, made banking more accessible, both in terms of reach and in terms of hours during which one can transact.

More recently, ownership of this space is under threat; mobile operators and technology upstarts are encroaching, seeking additional revenue flows in response to slowing voice and data revenue growth. Retail, telecommunications and insurance organisations are exploring and trying to enter financial services although have not yet successfully created comprehensive financial services despite several efforts.

Businesses will need to re-engineer business models to optimise efficiency and productivity. Businesses that take the opportunity to simplify their structures will benefit from increased operational efficiency, cost savings and compliance benefits.

Going more digital will require smooth and fast cross-functional collaboration.

Data will be the foundation for better business models as it provides better understanding of core competencies and where additional value can be created.

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Collaborative innovation

Customer expectations have moved beyond omni-channel. As customers expect greater real-time services, cross-industry collaboration is needed.

Partnerships between organisations that are inter- and intra-industry are creating ecosystems that provide customers with broader services and value, and open up new customer bases for the partners.

Regulation has become more receptive to mobile banking due to the consumer benefits it provides, as security enhancements limit fraud and provide greater consumer confidence. Even so, the risks of cybercrime remain prevalent and are constantly shifting, requiring ongoing initiatives to secure mobile platforms.

Regulatory requirements and the cost of compliance are large barriers to entry to new entrants.

Continued development of the regulatory environment such as the Twin Peaks regulations or enhancements to Basel requirements are continuing to increase the cost of compliance and take significant management focus.

Data and artificial intelligence driven compliance and monitoring is likely to grow.

The concerns over the exploitation of customer data and privacy boundaries are high enough to hinder complete trust by customers. Cyber-attacks and fraudulent activities are still prevalent in this sector.

Banking is no longer about money, but about banking data and keeping that data secure

Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

Financial & business services disruption horizon

Digital impacts are pervasive already, however there are challenges to progression hindering the extent of the full effects that digital disruption could have

The sector is relatively digitally mature compared to the sectors with transformation taking place in all areas of businesses

The digital revolution is going to bring the most profound change to the financial and business sector over the next decade, making banking in the future unrecognisable when compared to banking today.

Digital channels and capabilities are the primary enablers of better customer service experiences within this sector, creating a significant change in the direction of investments, engagements of customers and organisation of the operation within businesses in this sector. The disruptive impact of digital is thus relatively large and has many touch points.

There is generally strong investment in digital capabilities within this sector which is leading to faster digital transformation here, than perhaps is the case in other sectors.

The fact that many traditional organisations have grown to be large, cumbersome organisations has meant that innovation within the sector and the emergence of new entrants is high.

Regulatory requirements and the cost of compliance are however, starting to hinder further advancements. Regulatory bodies are slowly becoming more receptive to digital transformation due to the consumer benefits it provides, as security enhancements limit fraud and provide greater consumer confidence. Even so, the risks of cybercrime remain prevalent and are constantly shifting, requiring ongoing initiatives to secure mobile platforms and data.

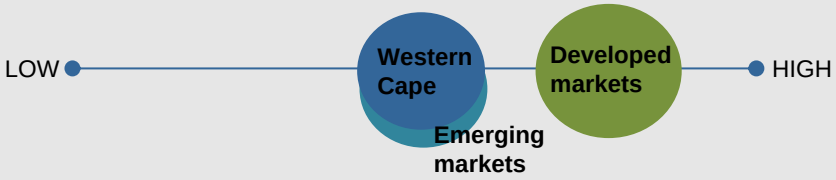
Locally, continued development of the regulatory environment such as the Twin Peaks regulations or enhancements to Basel requirements are continuing to increase the cost of compliance and take significant management focus.

The concerns over the exploitation of customer data and privacy boundaries are a big challenge that is hindering complete trust by customers.

Digital maturity comparison of the sector across global markets

The Western Cape, and South Africa as a whole, is maturing quickly within the sector. Local challenges to access of banking and business services are being overcome by digital capabilities. The speed of change is fast within such a competitive landscape, and the local sector is not too far behind the maturity of developed markets.

Relative digital maturity of the sector across markets



Western Cape Government
Economic Development and Tourism

Sources: EY, Accenture, Deloitte, Kpmg, PWC, McKinsey analyses

Future outlook

Hypothesis-driven narrative describing a ‘day in the life’ in the future of the sector to bring to life the impact of digital on the practical activities and opportunities in the sector

EXPERIENCE OF A BANKING CUSTOMER IN THE FUTURE

Mary will be going on holiday abroad at the end of the month. She wants to ensure that her financial affairs will be in order while she is away. Mary opens her banking app on her smartphone where she can see a complete and integrated view of her balances, savings goals, rewards and monthly payment commitments. One of her savings goals was spending money for her trip abroad. With the helpful advice and savings incentives from Discovery Bank, she can see she is 95% towards achieving her goal.

Mary would like to apply for a credit card to use while she is away. She is able to apply through her banking app. Her application form is pre-populated with her details, which she just has to verify. In real-time, Mary’s credit risk profile is determined, and the appropriate anti-money laundering and sanction list procedures are carried out. Mary is asked to upload 3 months of her pay-slips so the bank can complete the required Know Your Customer (KYC) process. Instantly, Mary receives a quote providing details of fees, limits and T&Cs. Mary agrees and selects a PIN and the location and time for the delivery of her new card. Within days her bank produces and activates the card as per FICA, NCA and PCI requirements, and Mary receives her card in time for her holiday.

Mary would like to understand whether she qualifies for airport lounge access as part of her rewards package. She is able to check this through the bank app, but is short of time and would prefer a service agent to answer her specific questions. Mary works in an open plan office, so chooses to use the online chat facility, to have her queries answered in real-time through web chat.

When Mary gets back from her holiday, she knows that her next important financial goal is to buy a house with her fiancé. Mary and her fiancé both have transaction accounts and would like to receive personalised advice about how much they need to save to be able to afford a deposit. They decide to go to the bank’s Service Centre where they can talk to a savings consultant together. They book an appointment online before they go to avoid queuing. In a private booth, the consultant is able to show them their respective financial positions. Using the bank’s built-in analytics capabilities, the consultant can show them how quickly they will be able to reach their minimum deposit amount, factoring in their earnings and spending patterns. While they are there, they agree on their respective savings goals, and are able to set them using the store’s self-service iPads.

The future of Government

There is significant opportunity for improvements in public infrastructure, facilities and services within the existing environment, and digital can accelerate this

The expectations and demands of citizens, as well as cost and budget pressures are two significant forces driving the need for Governments to transform themselves digitally.

As customers, citizens are becoming more empowered and have expectations of anytime digital device access to products and services. These expectations are being shaped by their experience as customers within other sectors in the economy. Governments have a role to play in enabling the connectivity between customers and businesses, but also in their own smart engagement of citizens and businesses in order to keep up with the changing expectations that comes with greater connectivity.

Connectivity is critical

There has been substantial investment in connectivity and communications by the Western Cape Government over the last few years, most significantly in the rollout of broadband infrastructure. This is critically important in enabling the digital advancements and forces that are driving transformation across the economy, as well in ensuring that the region is globally competitive.

In 2015, **29.36%** of households had no access to internet. Such a high level of exclusion as this is a significant growth challenge for the Western Cape. This essentially limits the consumer market for many businesses wanting to engage with customers through digital channels, as well as hinders the access to information and the access-related opportunities by these citizens.

Improving connectivity is critical in improving the life of citizens and the business environment in order for all participants within the economy to thrive.

Smart citizen engagement

A large amount of information flows between citizens and Government, and digital capabilities can enhance this information exchange significantly. Digital platforms and capabilities are providing new channels for citizen engagement that are much more efficient than traditional ways of operating. In turn, Government is able to be much more responsive if systems and the digital capabilities to enable those systems, are much more accurate, up to date and easy to access.

The City of Cape Town does engage with citizens and businesses across multiple channels and systems, and strives to consistently improve this engagement and its responsiveness. Some examples of the existing approaches are:

- Technical Operations Centres that are call centres for emergency, electricity, water, transport queries etc.
- Close to 200 FreeCall lines available in the city
- Enterprise Resource Planning via SAP
- Service notification systems to track and resolve citizen complaints and requests across different departments. This system enables the understanding of service delivery trends
- e-Services is an online platform that enables citizens, businesses and Government to engage remotely

These are examples of multiple channels, but omni-channel capability requires investment and new ways of operating. Enhancing multichannel capabilities and implementing omni-channel operations enables citizens and businesses to start and fulfil interactions with Government across different channels. Governments around the world are implementing omni-channel capability to enable becoming citizen-centric.

By engaging with citizens seamlessly across channels, Governments are able to meet citizen expectations, track and deliver services more efficiently, and gather data and insights about how best to execute services and engage with economic participants.

Western Cape Government
Economic Development and Tourism

Sources: EY Digital Government, United Nations, and Deloitte and pwc analyses

The future of Government

There is significant opportunity for improvements in public infrastructure, facilities and services within the existing environment, and digital can accelerate this

There many areas where Government can succeed digitally to create benefits for all participants in the economy

The Government's central role within countries gives it the ability to transform the governance of the entire country through digital interventions. Every area of Government is able adopt digital capabilities and ways of working to improve service-level standards, improve engagement with citizens, and drive efficiency.

Reshaping service delivery

There has been continuous improvement in the provision of basic services within the City of Cape Town. By 2014, Cape Town's population had:

99.8% household access to **water**

98.4% household access to **electricity**

99.5% household access to **refuse removal**

98.2% household access to **sanitation**

Although household access is above 98% across basic services, informal settlements and rural areas are serviced more poorly. Digital technologies and capabilities are able to improve the distribution and management of such services within urban and rural areas to ensure basic service access to all citizens and businesses.

Digital capabilities enable Governments to redefine service delivery in a smart and cost efficient manner.

Digital platforms and capabilities can assist and improve the collection of taxes, issuing of documents, recording of properties and assuring the supply chain of goods and the integrity of Government records and services.

Some examples of digital capabilities that Governments are implementing around the world are:

- Digital records of birth and death certificates for access to public services
- Students can create, hold and distribute a digital academic record with their academic credits, accomplishments and experiences
- Digital applications, authentications and approvals
- Any transactions that accumulate over time with a specific land can be tracked
- Robotic and/or AI systems could enable the autonomous execution, management and reporting of basic services in water, electricity, sanitation and sewage to communities, and also extended to police services, healthcare, emergency services and education
- A digital solution like Blockchain will enable a wider variety of transactions, such as collecting taxes, delivering benefits, issuing documents and recording properties. Governments can use Blockchain in sectors such as public safety, social services and identity management

Such digital capabilities are able to assist Governments improve effectiveness and efficiency in several areas, such as operational costs, contract execution, customer service and experience, risk management, and transparency and fraud.

Western Cape Government
Economic Development and Tourism

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The future of Government

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Smart cities

What makes a city 'smarter' is the ability to capture, integrate, enrich, store, and share data in a way that dramatically improves the decision-making abilities of the city.

Smart cities leverage the IoT to enhance the data collected from traditional systems, and improve a city's ability to 'sense and respond'. Analytics and cognitive tools are also leveraged to transform data into information for better decision-making.

City employees, and citizens, are joined together to operate more collaboratively. Transparency is a key principle, ensuring that data is open and distributed outward. Systems of engagement are reworked to reduce the barriers between the 'governing' and the 'governed' by engaging citizens on multiple platforms and reducing complexity.

Examples of Smart city initiatives

By the year 2050, 66% of the world's population is expected to reside within urban areas due to the availability of employment, services and resources. Cities across the globe are taking strides towards developing efficiencies to sustain this anticipated influx of residents.

Singapore is a prominent leader among smart cities across the globe. Recent efforts by the Government of Singapore was the initiation of an extensive city-wide data gathering program. This included the installation of an undetermined number of sensors and cameras across the city to thoroughly monitor everything from crowd movements to cleanliness. Among other uses, this data will allow Government to predict crowd behaviour for disaster management.

In it's efforts to drive progression and inclusion of all citizens, the City of Cape Town and a local private business have adopted Microsoft capabilities to create a public transport management system. This system streamlines, simplifies and encourages the use of public transport by residents and tourists within the city. This example displays one of the many initiatives within the Western Cape to create a smart city.

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Western Cape Government
Economic Development and Tourism

Sources: EY Digital Government, United Nations, and Deloitte and pwc analyses

Government disruption horizon

Truly transforming Government through the support of digital technologies and capabilities will be a journey

City of Cape Town's annual Community Satisfaction Survey
Level of satisfaction regarding Government services rendered

BY RESIDENTS

2007/8: 2.4/5 → 2015/16: 2.8/5

BY BUSINESS

2007/8: 2.9/5 → 2015/16: 3.5/5

These indicators reflect that there has been improvement in service delivery and engagement over the years, as experienced by residents and business within the region. The opportunity to further improve this to high levels of satisfaction, away from these relatively neutral positions, lies in the adoption of digital ways of operating.

The Government has started a journey toward transformation, but the truly disruptive impacts of digital to the sector are relatively far off

There is evidence of a drive for new ways of working and focus on digital transformation within the Western Cape Government.

Over the last few years there has been a shift within Government to working in a less silo'd and independent manner — for example, the Strategic Policy Unit in the Office of the Executive Mayor working within the city has driven a Transversal Management System to improve cross-directorate communication and decision-making.

Such an integrated, collaborative and agile culture and ways of working are critical enabling factors in adopting digital transformation.

Investment in technologies has to be accompanied by investment in the capabilities and new operating models to suit the technologies. Such fundamental changes to ways of operating and cultures are generally long term journeys and thus the greater impacts of digital transformation will be felt further into the future. This is the case for Government as well as the Health and Education sectors.

There are many challenges facing the Government in ensuring the nation is digitally competitive on a global scale, but there are challenges that slow progress

South Africa is in danger of being left behind due to the Government's digital policies. Private sector take-up of digital is generally ahead of Government.

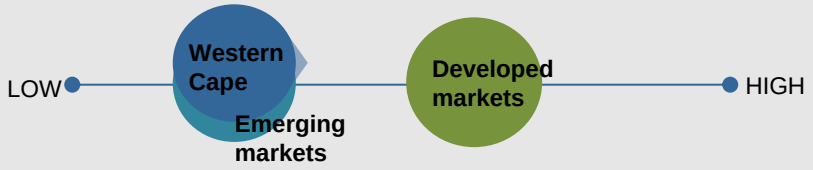
Lack of competition in service delivery, as well as the complexity of Government as an organisation means that implementing digital solution and ways of operating in Government is generally slower than in the private sector.

Examples of challenges that are hindering the extent and potential of digital impact within the Government sector locally:

- Funding and procurement processes
- Policy and regulatory uncertainties
- Constrained budgets
- Low-risk appetites by Government and business
- Competing priorities

An important step along the journey to digital transformation is the creation of an enabling environment, and these challenges will need to be addressed and overcome to do so.

Relative digital maturity of the sector across markets



Western Cape Government
Economic Development and Tourism

A brief look at the future of Healthcare as a pillar of Government

Digital is transforming healthcare to deliver improved care with a wider reach

Digital capabilities within the healthcare sector are able to significantly escalate access to safe, quality healthcare to all citizens.

Digitisation within the healthcare sector is leading to more effective service delivery. Easy access to a single view of patient information by doctors, as well greater connectivity between experts, is enabling the provision of better medical treatment.

Investment in digital health has soared over the last decade leading to the emergence of innovative treatment and diagnostic tools, all enabled by digital technologies and capabilities. These are able to improve access to quality care, reduce costs, improve administrative efficiencies and deliver personalised experiences. Some examples of such emerging digital technologies and capabilities are:

- Robotics enable doctors to perform intricate surgeries with more precision
- Digital technologies and systems enable exoskeletons to improve paraplegic mobility
- Robots deliver medication and monitor the living conditions of patients
- Mobile applications to educate or assist in emergencies
- The prediction and prevention of disease onset through improved diagnostic, imaging and research instruments is a significant benefit enabled by digital capabilities
- People are able to actively engage with their health and monitor themselves through wearable devices and mobile applications

All these examples of digital advancements and capabilities reduce the strain on healthcare organisations (and so drive efficiency) because capabilities such as medication reminders, remote monitoring and emergency detection reduce the demand for hospitalisation, reduce loss due to misdiagnosis, and contribute toward the accumulation of big data. Improved medical devices within hospitals will assist in patient care, allowing doctors to work more efficiently.

Digital healthcare in the Western Cape

The Western Cape experiences a number of challenges in service delivery within healthcare:

- Inaccurate or missing data, lost records and generally poor sight of patient information, history and behaviour
- Regulation is slow to keep up with digital, for example archiving and record keeping requirements of legislation
- Access to funding
- Scale of implementations

These are challenges that are able to be overcome by digital technologies and systems and there is focus to do so in the region.

The Western Cape's Healthcare 2030: Road to Wellness initiative is a strong example of how adoption of digital capabilities can improve functions within the sector. The success of the province's strategy is gaining national acclaim, specifically the policy and planning, business intelligence, mHealth, implementation and monitoring topics. The Western Cape Department of Health has successfully employed digital solutions to streamline the patient experience while also improving on the quality of care provided.

Future outlook

Hypothesis-driven narrative describing a ‘day in the life’ in the future of the sector to bring to life the impact of digital on the practical activities and opportunities in the sector

EXPERIENCE OF A PATIENT IN THE FUTURE

Ben has recently been diagnosed with HIV and has consequently sought ARV treatment from the government to manage his disease. He was diagnosed using the latest detection methods at a major academic hospital within Cape Town. He now wishes to move back to Limpopo to live closer to his family as he needs their support to get through this difficult time.

Ben consults his doctors at the hospital, and they assure him that he will still be able to receive his ARV treatment at his local clinics. The nurses at the hospital explain to him that the South African Government has implemented an HIV/AIDS data monitoring system which allows medical practitioners at all levels to have access to online dashboards which provide real-time data on patient viral loads to allow monitoring, planning and reporting. Access to this information will enable his local doctor to appropriately prescribe medication based on his viral load history. His local doctor will be able to upload his health statistics during his stay to ensure continuous tracking of his medical condition.

They assure him that Government has also improved on distribution channels of ARV drugs to ensure access across the country, and have developed mobile Apps in clinics to monitor drug stock levels to avoid shortages. They show him videos and pictures of robots employed by the Government to deliver medication to remote villages across the country in a timely and accurate manner.

Ben recalls reading about an SMS notification system used to remind registered HIV positive patients to take their medication, as ARV treatment is time sensitive and medication must be taken at specific time intervals to ensure the best results.

The nurses also encourage Ben to visit Government websites to educate himself on the disease and how to protect his family members by preventing transmission of the virus.

Ben is satisfied in knowing that these improvements, made possible by digital capabilities, will allow him to move back to his family home without compromising his access to medication and the associated healthcare.

A brief look at the future of Education as a pillar of Government

Digital is able to accelerate and improve delivery of education which is critical in laying the platform for economic growth

Digital technologies and capabilities are enabling students, teachers and parents to connect in new ways

Students are able to connect from anywhere in the world, and to access information and media which stimulates their personal learning experience. Teachers are able to share content and skills to ensure that they are equipped to deliver updated knowledge in a captivating manner. Parents are able to connect with each other and with teachers through social media and other platforms to encourage participation and garner healthy relationships.

Digital literacy is increasingly becoming an important part of the education system to equip the future workforce with the technical skills required to remain relevant during the fourth industrial revolution. ICT skills are becoming imperative for both white-collar and blue-collar jobs due to the increasing reliance on human-machine interaction.

Raising standards and improving delivery channels and methods

The potential of digital extends beyond the use of tablets and smart boards at a classroom level, to the administrative level. Learning management systems provide platforms to manage students and curriculums through allocation, tracking and reporting. It allows teachers and administrators to optimise efficiencies by streamlining such routine tasks. Remote and collaborative learning is also accomplished through these platforms.

The incorporation of technological devices in the classroom allows for easier access to textbooks, modules and training courses which enhances the learning experience and encourages participation. A big shift witnessed through the integration of digital technologies into the classroom is the active role that students now play in their own knowledge accumulation and creation. The role of the teacher is shifting from knowledge provider to a knowledge facilitator.

Significant transformation to traditional learning methods is enabled by digital capabilities. The benefits of such transformation comes in the following forms:

- Adaptation to the diverse learning styles of students
- Greater student motivation & participation
- Higher quality standards of learning material

Digital education in the Western Cape

South Africa was among the first countries to commit to digital education transformation, whereby ICT systems are encouraged to be adopted to improve traditional teaching methods. This was done in an attempt to empower the future workforce of the country. By joining the programme and attending multiple international educational technology exhibitions, the Department of Basic Education is well equipped to supplement the national curriculum with these capabilities to drive transformation and progression.

The Western Cape Education Department has committed to a five year E-learning project which aims to improve access to quality education to underprivileged communities.

The strategy of the project is to provide high speed internet connection to public schools, revamp existing computer laboratories, improve online resources for students, teachers and parents, and to provide quality ICT training to teachers.

Future outlook

Hypothesis-driven narrative describing a ‘day in the life’ in the future of the sector to bring to life the impact of digital on the practical activities and opportunities in the sector

EXPERIENCE OF A TEACHER IN THE FUTURE

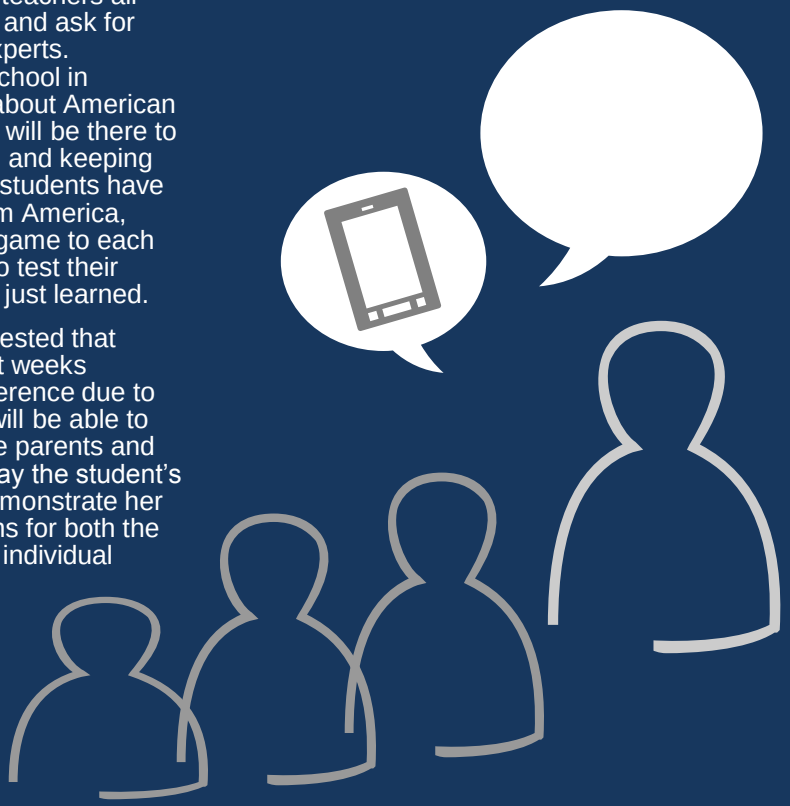
Cindy is a dedicated teacher to a grade 11 class in a public school in Khayelitsha. The school provides students with tablets to take home which contain all of their prescribed learning content. Cindy is able to communicate with her students after school hours to answer questions, give advice and to give reminders to her students.

Smart boards and desks have been introduced within the school. There are a number of devices that accompany this equipment so that the student’s learning experiences engage all the senses. They can listen to foreign languages for example, or take a tour of a country they are learning about through 3D glasses for example.

Such desks support individual learning styles. Cindy is able to upload material, manage experiences and assign work from her smart desk. Analytics systems are able to assist Cindy in identifying students that might need greater assistance or attention and alert her to students misusing the connectivity devices that they have access to.

Cindy can communicate with teachers all over the world to share ideas and ask for advice from subject matter experts. Tomorrow a teacher from a school in America will teach the class about American history via a video call. Cindy will be there to assist in answering questions and keeping the class discipline. After the students have engaged with the teacher from America, Cindy will release a learning game to each student via their smart desk to test their knowledge of what they have just learned.

Numerous parents have requested that Cindy video call them for next weeks biannual parent-teacher conference due to their busy schedules. Cindy will be able to adequately engage with these parents and use the smart boards to display the student’s work and progress, and to demonstrate her focus for the upcoming months for both the collective class as well as for individual students.

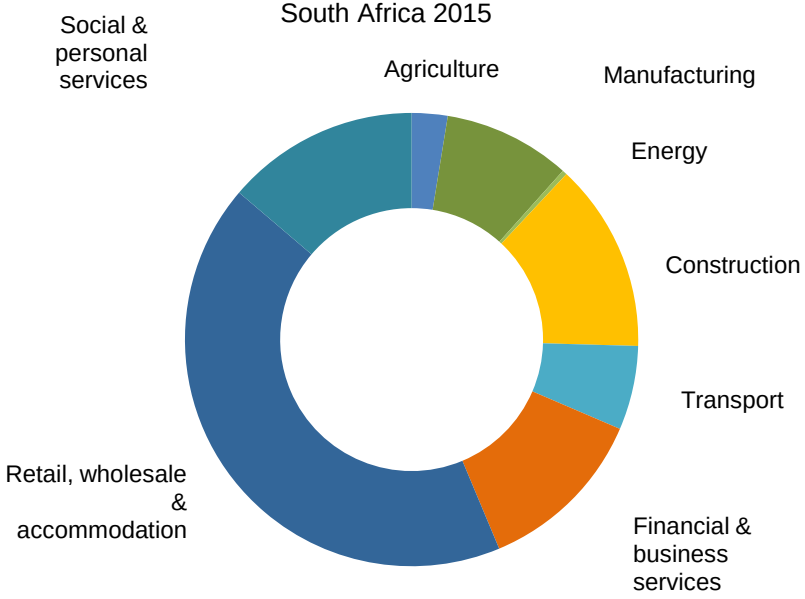


A brief look at the impact of digital on SMMEs

Digital offers many opportunities for SMME's to accelerate growth and optimise their business

SMMEs are pivotal players within the economy, in their capacity to contribute toward economic development and job creation. SMME owners constitute 14% of South Africa's employment.
The Western Cape's SMME sector is not as large as it is in Gauteng and Kwa-Zulu Natal, nor has it had relatively high growth over the last decade. This suggests that there is significant need to improve the environment in terms of fostering growth of SMMEs in the Western Cape.

SMMEs across sectors
South Africa 2015



The biggest proportion of SMMEs fall within the retail trade sector. The retail and wholesale sector is being quite significantly transformed by digital capabilities, and SMMEs are starting to benefit from this.

SMMEs stand to gain significantly from the adoption of digital capabilities through increased access to market information and enablement of more efficient operations.

Digital capabilities aid the overcoming of challenges specific to SMMEs

SMMEs often have the challenge of not having access to all the business functions that large organisations generally do. Digital capabilities are emerging that are enabling the overcoming of such challenges. The emergence of online systems such as bookkeeping and HR management tools for example, aid SMMEs in carrying out these necessary business functions, without actually having to have a large team and associated costs to do so. Online crowdsourcing of funds also acts as a useful tool for SMMEs to gather funds, expertise and support for business operations.

Having a strong online presence allows businesses to access vast amounts of data from their customers, which could be used internally or could be shared or sold, creating further business opportunities for SMMEs.

Many SMME's sell services through online platforms, which forms the basis of their business model. Whether selling information or contracting for tasks, the internet presents a multitude of business opportunities for SMMEs to capture.

Western Cape Government
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Sources: PWC and EY analyses

A brief look at the impact of digital on SMMEs

Digital offers many opportunities for SMMEs to accelerate growth and optimise their business

Digital can aid core business operations optimisation for SMMEs

Knowledge of consumer and competitor trends is an essential part of any business. By embracing mobile technologies and the internet, SMMEs will be able to make use of search engines, social media and other platforms to keep abreast of industry trends. Consumer relationships are also easily built through these platforms and by having an online presence, which acts as a marketing tool and possibly a sales tool. Knowledge gathered through this medium can be used to aid in decision-making and to remain relevant within the market.

Connectivity provides greater access to resources and aids ability to collaborate

Digital capabilities make innovation and new business development easier by connecting stakeholders, making access to technical expertise and other resources to support projects and launch business ventures easier.

SMMEs can improve their supply chains with greater access to information

Access to the internet allows SMMEs to explore all potential suppliers and distributors, resulting in multiple options from which to choose from. This enables businesses to design the most competitive supply chain to deliver the greatest economic returns. Interaction with stakeholders within the supply chain is also aided by the use of internet, which increases speed and decision-making to deliver optimal results.

The process of finding new employees is also optimised through the use of online platforms by reducing time spent searching, and cutting costs by eliminating the need for recruiters.

Digital can improve access to customers

The empowered consumer depends on the internet for information around products and services, whether through business websites, social media or review columns. In order for SMMEs to reach potential consumers, they must ensure that they have a strong and accurate online presence. A competent, user-friendly website is especially important for SMMEs due to the rising popularity of online shopping across industries. Large businesses and SMMEs alike are fast latching onto this trend to capture this market trend and to drive sales.

Many SMMEs operate their business solely through an online platform due to the benefits that such a business model presents. Such benefits include reduced costs, wider reach and easier distribution.

Relationship building with customers is also facilitated by the internet. Whether through the creation of communities via social media or the exchange of feedback and ideas, personal acknowledgement and connection creates brand loyalty which drives sales. This is a fast and effective way for SMMEs to market themselves and gain market share.

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Sources: PWC and EY analyses

Section 8

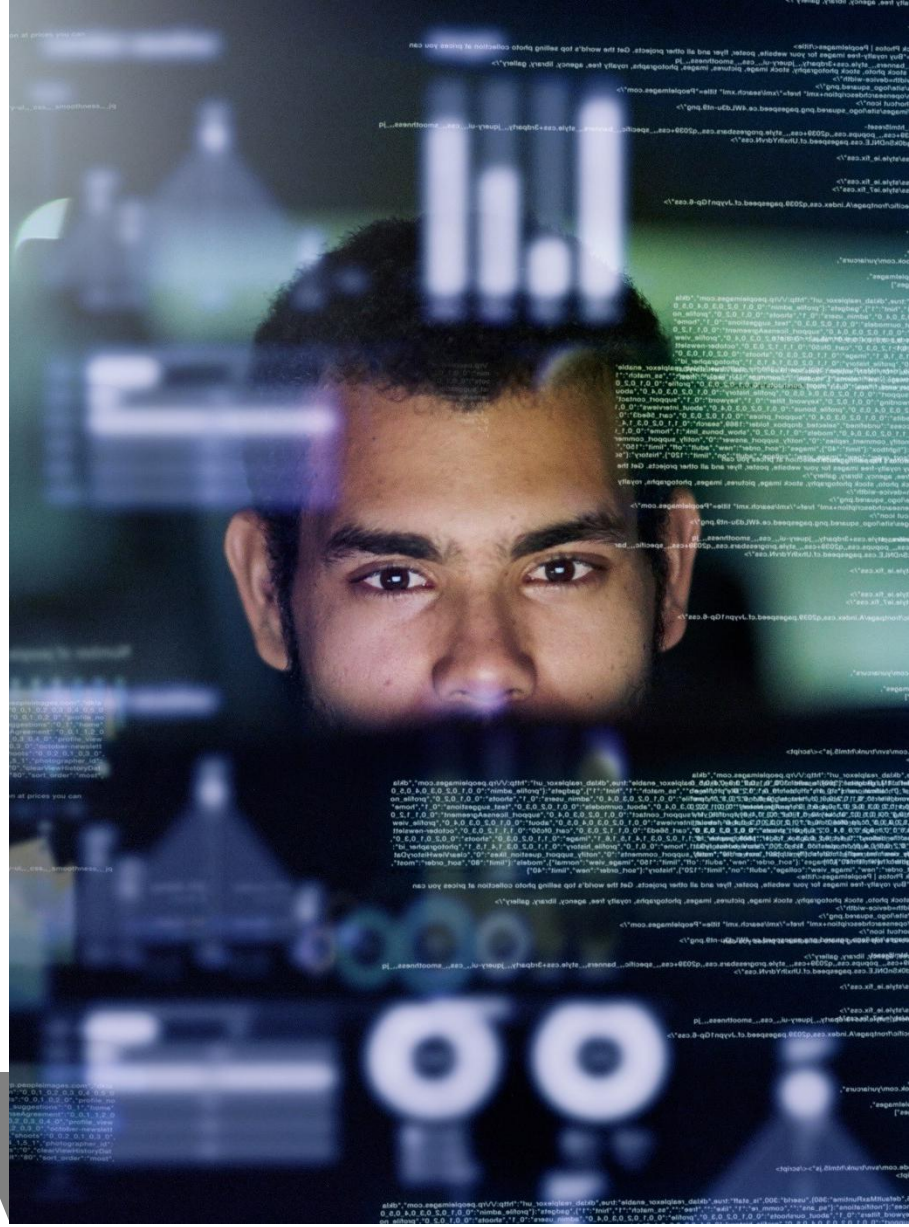
Strategic responses to digital disruption

Strategic responses to digital disruption

The characteristics of digital organisations

Strategic response themes

Government responses



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Strategic responses to digital disruption

Responding to disruption has become a central issue for organisations everywhere

In responding to the relentless pace of digital advances, businesses and Government agencies must meet the challenges of leading smart transformations to co-create a more mature digital economy.

Organisations looking to take advantage of the opportunities borne from the digital trends outlined in the previous sections of this report, need to begin the process of rigorous self-interrogation and consider the themes of response explored in this section of the report. Attributes that characterise leading digital organisations are laid out in order to understand what drives success in digital organisations.

Many large established organisations are undertaking formal transformation projects to organise themselves around a digital way of operating. The first step in beginning a digital journey is developing a digital strategy. Digital maturity is significantly influenced by digital strategy. A digital strategy to fundamentally transform ways of operating, together with the culture, leadership and operational capabilities to deliver that strategy is what drives real transformation.

Becoming a digitally savvy organisation is about embedding digital capabilities into the core of a business. It is also about instilling a culture that embraces creativity, entrepreneurial spirit, diversity and inclusivity that will enable businesses to challenge the prevailing paradigm and create new business models.

It is important to understand that becoming digitally savvy is not just about creating a website or app, nor is it just selling existing products and services in a new way. Digital is no longer just a channel, it is the foundation to an organisation's very existence. Organisations that simply try to close the digital gap on competitors run the risk of being blind-sided, and so they need to get ahead of the curve by focusing on what their strategic responses need to be and by outlining their own digital strategy.

Firms need to develop a digital strategy, manage digital activities across all parts of their business, and ensure that this is driving optimisation of operations and stronger customer relationships. Part of this requires building robust and responsive ecosystems, and driving collaboration in previously unexpected places to meet evolving demands of customers. The first step on a journey to doing this is to understand the organisation's requirements for digitising both front and back end operations. This understanding will guide how to establish the right mix of automated and human touch points across processes.

The real imperative in a world where 'everything' is becoming digitised is that organisations need to pursue transformation to disrupt their own business model, before the competition does. Without digital strategies, organisations will lose their competitive advantage in an increasingly commoditised world. There is no time to lose as technology change accelerates exponentially and new digital platforms and devices are emerging.

Furthermore, the expectations of the new 'digital customer' mean that organisations must keep up with the pace of change or lose relevance.

The challenge will be the ability to successfully and effectively integrate new tools and capabilities into existing operating environments. Organisations that achieve this will best be positioned to capitalise on the newly acquired capabilities for sustainable and profitable growth. To this end, this section of the report outlines themes of responses to consider, characteristics to aspire to, and the key questions to ask along a journey of transformation.

Organisations must take caution that the difficulty with the rapidly changing digital landscape, is that although technology is evolving exponentially fast, a number of these new technologies are too recent in their deployment to be able to predict its long-term viability.

As companies evaluate their future business strategies, they will need to weigh up a multitude of factors, when selecting the 'right' technologies to pursue/utilise, not the least of which is the risk of not embracing a digital outlook.

In such uncertain times, sound business acumen and digital leadership by companies, governments and citizens will increasingly become the single biggest attribute for successfully navigating in the new era/economy.

Sources: EY analyses

The characteristics of digital organisations

Attributes that define digital leaders, and that should be embraced by others to truly become leading digital organisations

All organisations in the public and private sector will need to become 'digital organisations' to remain competitive and win in the future customer-led market. This requires certain strategic responses to be considered and characteristics to be internalised.

Paradigm shift

Digital leaders think about the potential for digital to enable a paradigm shift, rather than a channel shift. Becoming a digital organisation requires an evolution of capabilities. Digital transformation is reinvention, not incremental enhancement of existing offerings. A paradigm shift is a structural change where processes and operating models are re-engineered based on the possibilities that digital presents. It is not about applying technological applications to operations, but rather improving and transforming operations with technology.

Vision and purpose

Digital leaders tend to have an overall vision and purpose that transcends everything. Purpose galvanizes people to ignite long-lasting, positive change and transform a business. To become a truly digital business often requires a new vision and purpose, as well as a change in mind-set. This is because digital transformation is reinvention, not incremental enhancement of existing offerings.

A holistic view

Digital leaders have a holistic view of digital innovation covering the end to end value chain. A digital organisation is built on the philosophy that the customer should be the focus of all activity, and that digital technology should be leveraged to enable this, at every level of the organisation. This digital-led design has an impact in the back office, technology platforms, operating processes, product innovation and customer experience i.e. covering the end to end value chain.

Experience focus

Digital, done right, makes service experience more personalised and proactive by allowing the right discussion to be had with the customer in real-time on the right channel. Digital core operations can create a lean and efficient operating model, and this value can be shared with the customer.

Fast and agile

Digital organisations need to have access to, and provide, more information and options in a more dynamic manner. They need agile strategy execution and they need to prioritise ruthlessly. In many industries, becoming digital means replacing middlemen with technology intermediaries. The pace at which digital technologies are evolving means that digital organisations need skilled staff and advisors who give technology investment constant focus.

Leading organisations have built agile models to deliver digital products — with customer insight embedded throughout the process

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Sources: EY analyses

The characteristics of digital organisations

Attributes that define digital leaders, and that should be embraced by others to truly become leading digital organisations

All organisations in the public and private sector will need to become 'digital organisations' to remain competitive and win in the future customer-led market. This requires certain strategic responses to be considered and characteristics to be internalised.

Data, data, data

Digital leaders recognise the value of data. Data analytics enables mass personalisation which enables organisations to meet changing customer expectations. Organisations need to source data and track the digital footprint of customers (on a privacy and permissions basis) in order to offer customers personal and relevant services. The ability to gather and use data to provide customised advice and service to clients is a creator of competitive advantage in today's world. Customer confidence and regulatory compliance is built on data quality and effective data management processes.

Legal and security

The occurrence of cybersecurity incidents and the concern of customers over their information is driving the need for business process and technology improvements to protect assets and data from cyber threats. Investments to protect infrastructure, enable compliance and optimise on-going security management processes require re-tooling the business's security processes and technologies.

Communities

Customer expectations have moved beyond omni-channel. As customers expect greater real-time services, cross-industry collaboration might be needed. By working together with other communities, data points can be sourced from a much deeper pool to create real insights that can be used in creating value for consumers, businesses, employees and society in general.

Portfolio approach

Digital leaders think like venture capitalists, and take a portfolio approach to digital innovation initiatives.

A number (or portfolio) of digital projects should be embarked upon simultaneously, rather than one by one in an incremental approach, in order to have a transformative effect in an organisation. This also spreads the risk of failures as some digital transformation activities succeed and integrate better than others.

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Sources: EY analyses

Strategic response themes

Organisations should consider their position within the digital economy, and their responses to transformation of their environment across the following themes

Overarching response themes Themes are applicable across all sectors	**Develop a digital strategy** Organisations need a long term digital strategy that not only aligns with their business strategy, but strengthens it	**Address and articulate how you will operate in the digital market**
Guiding Characteristics To manage and ride the transformations borne by digital, guiding characteristics are outlined to direct organisational focus. These characteristics are drawn from the attributes of leading digital organisations, and broken down to guide the action that organisations should contemplate implementing in order to guide them through transformation to becoming a digital organisation.	**Develop a vision for the future** The first step in beginning a digital journey is developing a digital strategy. A digital strategy to fundamentally transform ways of operating, together with the culture, leadership and operational capabilities to deliver that strategy is what drives real transformation. **Insight** A deep understanding of customers', citizens' and business digital behaviours and beliefs is fundamental to getting transformation right.	Clear and transparent objectives enable the optimal strategic response to be executed. **Incubating** Incubating ideas needs to be an iterative process so that unbounded outcomes are generated. Embed mechanisms to quickly learn from experiences and be prepared to course correct and pivot. **Accept and adapt** Build a roadmap that addresses the various dimensions of digital transformation. Track and measure progress against strategic goals.
Key questions Organisations looking to seize the upside of disruption and transform their business models can start by asking important questions.	Where is the market going and what will the future look like? What are the key trends and disruptions driving change? (outlined in previous sections of the report) How is the organisation positioned against these trends?	How should the organisation evolve to reach it's goals, manage risk and continuously meet customer needs? What guidelines are needed to align organisational activities and support transformation? What investment is needed to align organisational activities and support decisions?

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Sources: EY analyses

Strategic response themes

Organisations should consider their position within the digital economy, and their responses to transformation of their environment across the following themes

Overarching response themes Themes are applicable across all sectors.	**Be user focused** Be driven by customers/users demand for digital transformation	**Understand your requirements for digitising both front and back end operations**
Guiding Characteristics To manage and ride the transformations borne by digital, guiding characteristics are outlined to direct organisational focus. These characteristics are drawn from the attributes of leading digital organisations and broken down to guide the action that organisations should contemplate implementing in order to guide them through transformation to becoming a digital organisation.	**Make users the focal point** Mature digital organisations have a digital strategy that has the improvement of user experience and engagement as a central focus. **Differentiate** Expectations of digital experience are escalating and so it can be wise to involve users at each point of development of user experience to build in feedback and ensure that expectations are being met. Follow a user/customer-centric approach. **Re-imagine** Re-imagine the roles of channels, distribution and segmentation. Define a new vision of customer experience supported by straight through processing approaches for all customer propositions and interactions.	**Activate** Activating ideas needs to be an iterative process so that unbounded outcomes are generated. Embed mechanisms to quickly learn from experiences and be prepared to course correct and pivot. Effective data management – customer confidence and regulatory compliance is built on data quality and effective data management processes. **Challenge** Challenge existing operating assumptions.
Key questions Organisations looking to seize the upside of disruption and transform their business models can start by asking important questions.	Who are the organisation's future customers/users? What will the future customer experience be for the organisation? How can customer experience be kept consistent in a multi-channel environment?	Is the technology in the organisation positioned to support digital transformation? What digital technologies and capabilities investment does the organisation need to make? Where are the gaps in the organisation's ability to address the potential roles for digital?

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Sources: EY analyses

Strategic response themes

Organisations should consider their position within the digital economy, and their responses to transformation of their environment across the following themes

Overarching response themes Themes are applicable across all sectors.	**Follow an agile execution model** Agile implies an iterative process of prioritisation, learning, adapting and executing.	**Adopt new ways of working** Organisations should create and nurture an environment supporting agility and transformation.
Guiding Characteristics To manage and ride the transformations borne by digital, guiding characteristics are outlined to direct organisational focus. These characteristics are drawn from the attributes of leading digital organisations and broken down to guide the action that organisations should contemplate implementing in order to guide them through transformation to becoming a digital organisation.	Leading organisations have built agile models to deliver digital products, with customer insights embedded throughout the process. **Courageous leadership** Leadership must be the catalyst for change and ensure that the business is willing to rally around new ideas and drive action. **Rapid adaption** Rapid adaptation is required in response to unexpected and unpredicted changes, market opportunities, and customer requirements. Processes and structures must facilitate speed, adaptation and robustness. **Action orientated** An efficient approach is necessary in identifying, discarding or pursuing ideas. Avoid rigidity in planning.	**New culture and mind set** Digital transformation is much more than digital technology implementation, it requires a new mind set – it is new ways of thinking about products and services, stakeholders, problems, processes, and interacting within an organisation. This mind set requires a strong focus on customers/users and different ways of working. Organisational culture is often cited as a particularly challenging dimension of digital transformation. Organisations need a culture that stimulates digital transformation. A culture that: • Fosters collaborative work environments • Operates in an agile manner • Is more adept at taking risks • Values entrepreneurial spirit
Key questions Organisations looking to seize the upside of disruption and transform their business models can start by asking important questions.	Are there functions or channels that are bottlenecks to progress? Does the organisation prioritise and invest in creating a more agile organisation to support the demands of a digital world?	Is the organisation positioned to support transformation? Where are the gaps in the organisation's ability to address the potential roles for digital?

Western Cape Government
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Sources: EY analyses

Strategic response themes

Organisations should consider their position within the digital economy, and their responses to transformation of their environment across the following themes

Overarching responses Themes are applicable across all sectors.	**Keep up with the changing nature of work** Not all jobs will be affected by digital disruption, and not all jobs affected will be eliminated. Digital capabilities will supplement human labour. Jobs that are truly untouched by digital will be the exception rather than the norm.	
Guiding Characteristics To manage and ride the transformations borne by digital, guiding characteristics are outlined to direct organisational focus. These characteristics are drawn from the attributes of leading digital organisations and broken down to guide the action that organisations should contemplate implementing in order to guide them through transformation to becoming a digital organisation.	**Create new jobs** Digital technologies and capabilities generate new jobs related to, for example, IT infrastructure and data management. The skills that will have a competitive advantage in an increasingly digital world are fluency in ICT, data management and the skills to make decisions based on interpreting data and analytics. **Constantly develop** A digitally savvy workforce is an integral part of a digital organisation. This is one of the biggest obstacles that faces sectors and the organisations within them. Academic institutions and organisations have a role to play in developing the skills required to run new business models and fit into the new ways of working that digital transformation requires. **Enable** Digital technologies and capabilities enable employees to work better with customers/users, and each other. People expect to work in a digitally enabled environment, and the sophistication of the environment is rising rapidly.	**Close the skills gap** Workforce skills are a challenging dimension of digital transformation. Recruiting new people with the necessary skills or developing existing employees can address skills gaps. Guidance here is to include the people involved in the digital transformation of the organisation in the recruitment process, rather than purely the HR department carrying out recruitment of digital talent. The people working closely on digital transformation know what skills are required. The skills that are required aren't limited to technical IT skills. And it is not purely Maths and Science subjects at school level that are sufficient. The skills that will be required by people include, but are not limited to: • Technological literacy • Business acumen • Fluency in data management • Decision-making based on interpreting data and analytics • Logic • Willingness to work collaboratively, and as part of a team • Agility
Key questions Organisations looking to seize the upside of disruption and transform their business models can start by asking important questions.	Do the origination's skillsets align to the changing environment? Does the organisation know what skills it needs to transform?	Does the organisation have a value proposition that speaks to the next generation of talent? Where are the gaps in people's ability to address the new roles borne from digital?

Western Cape Government
Economic Development and Tourism

Sources: EY analyses

Government responses

Government's ability to lead economic growth and socio-economic development can be significantly supported by digital. Government should provide a stimulating environment for citizens and business

Observer
Present without actively participating

Enabler
Supply the means, knowledge or opportunity

Facilitator
Make progress easier

Stimulator
Commit resources or endow power

Active Participant
Share and be actively involved

Government as an enabler

Provide incentives and rewards to ensure investment and growth across sectors.

Provide sound and affordable service delivery.

Promote skills development, education and training.

Ensure Government support in research and development programmes and initiatives.

Government as a facilitator

Ensure that the regulatory environment is supportive of growth.

Endeavour to establish favourable labour regulation.

Ensure sound IP, content and cyber law protection exists.

Contribute to SMME development and growth, and regulate the lowering of barriers for entrepreneurship within the sector.

Design monitoring and evaluation systems to implement up-skilling.

Government as an stimulator

Provide investment into sector initiatives through programmes and funds.

State investment in ICT infrastructure.

SOE investment in the ICT sector businesses.

Investment in training institutions and faculties covering the various sub-sectors included in ICT.

Government as an active participant

Develop public-private partnerships that are jointly responsible for delivery.

Collaborate with private sector organisations, academic institutions, industry associations and donor foundations.

Government employment of human resources with digital skills.

Entering bi-lateral support agreements with countries that can provide ICT skills, services and investments

Western Cape Government
Economic Development and Tourism

Government responses

Responding to digital forces and the citizen & business expectations they're shaping, to build a digital Government

Observer	Enabler	Facilitator	Stimulator	Active Participant
Present without actively participating	Supply the means, knowledge or opportunity	Make progress easier	Commit resources or endow power	Share and be actively involved

How Government should respond to digital transformation forces in order to take full advantage of the opportunities they bear, as well as to become a leading digital organisation.

Participate digitally — engage and operate digitally, and be driven by a citizen-centric culture

The elevated experiences of customers from digitisation in other sectors spills over into the expectations of citizens in the way that Government interacts with and serves them. As a result, Government must welcome digital capabilities to enhance not only citizen engagement, but to also improve on internal operations to drive economic and societal prosperity. Some of the ways to do this are:

- The Government needs to become mobile-centric to align to citizen expectations of being able to access services anytime, anywhere. Services from accessing information to submitting applications
- Omni-channel capability will enable seamless service delivery across engagement channels. Interactions can be started and fulfilled on different channels
- Use citizen data to glean insights in order to better serve and engage with citizens. Access to better information and insights enables greater transparency on the parts of both Government and citizens, enabling improvement to service delivery and communication across transactions. At the same time it is critical to establish cyber security capabilities in order to protect citizen data
- More effective collection, analysis and sharing of data is able to improve the efficiency of public services
- Adopt appropriate digital technologies and capabilities to drive efficiency and operational excellence across all parts of the organisation

These are some of the key responses that Government should be driving within it's organisations to fully participate in digital and so remain relevant, and further than that, lead as a digital organisation within the economy.

Drive new ways of working within Government to facilitate digital

Developing a digital strategy to participate digitally needs to be supported by an operating environment that supports and enables such a strategy. Hierarchies and governance structures are more pronounced in Government than in the private sector. These structures will need to become more agile.

Over the last few years, there has been a shift within the Western Cape Government to working in a less silo'd and independent manner – the Strategic Policy Unit in the Office of the Executive Mayor working within the city drove a Transversal Management System to improve cross-directorate communication and decision-making.

This integration and collaboration is a leading example of the type of culture and practice that creates an enabling environment for digital transformation.

Western Cape Government
Economic Development and Tourism

Government responses

Responding to digital forces and citizen & business expectations they're shaping, to build a digital Government

Observer	Enabler	Facilitator	Stimulator	Active Participant
Present without actively participating	Supply the means, knowledge or opportunity	Make progress easier	Commit resources or endow power	Share and be actively involved

Promote digital skills development to stimulate

Workforce skills are often cited as the most challenging dimension of digital transformation. The skills required to embrace and operate within digital environments require identification and development because digital systems are being integrated into everyday tasks at all levels, affecting most staff to varying degrees.

The Government has a role to play in providing resources or opportunities to develop the skills necessary to take advantage of digital trends.
A key part in this is in persuading the leadership of organisations to actively focus on up-skilling people, and Government could lead by example in order to do this.

Co-operation between universities, start-ups and local Government can lead to mutually beneficial objectives that develop future generations with the relevant skills to flourish in the digital economy.

Focus on access to enable

Digital technologies and capabilities have the potential to open up new markets and create new channels of service and delivery.

Connectivity is key. Connectivity is the platform that supports the inclusion of the informal economy into the mainstream, formal economy. In the Western Cape, the access to internet connectivity is relatively low, and the cost relatively high, compared to in mature developed markets
Connectivity enables the creation of thriving ecosystems of creativity and organisations.

Government focus and rollout of initiatives that improve connectivity and greater access to services, is critical in creating an environment that enables and stimulates growth.

SMMEs are important contributors of the economy, yet many are starved of the credit they need to trade and grow. Government should consider how to help SMMEs gain access to lending facilities and how it can support this with appropriate regulation.

Western Cape Government
Economic Development and Tourism

Sources: EY, PW, Deloitte analyses

Government responses

Responding to digital forces and the citizen & business expectations they're shaping, to build a digital Government

Observer	Enabler	Facilitator	Stimulator	Active Participant
Present without actively participating	Supply the means, knowledge or opportunity	Make progress easier	Commit resources or endow power	Share and be actively involved

Facilitate enhancements to regulation

Ensure regulation promotes trust in organisations.

Governments have the ability to drive organisations to be more transparent or upfront about how they use the consumer information they capture. This is one of the most significant concerns that citizens have, and therefore also a significant concern for Governments.

Regulatory frameworks required by Government in order to help build the digital economy are:

- Regulation of latest technologies in terms of
  - cyber security
  - privacy
  - data protection
- E-commerce regulations aiming at boosting consumer confidence
- Regulation to promote investments and innovation
- Ease of doing business for ICT-related businesses
- Platforms for regulation to better adapt to the data economy and interoperability, openness considerations

Facilitate opportunities through open data

Organisations of all sizes across the globe are increasingly relying on open data to aid in the development of innovative strategies to fill gaps in markets, grow profits and bring about social, economical and environmental prosperity.

Approximately 70% of businesses using open data in the UK, use open data supplied by the Government to support their business function. These businesses span across all sectors of the economy, with the greatest use belonging to the transport and green economy sectors.

Government has a responsibility to drive business growth and opportunities within the economy, by improving public access to data through archives and open data portals.

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Economic Development and Tourism

Sources: EY, PW, Deloitte analyses, Geospatial World

Section 9

Appendices

Sector definitions

Underlying themes

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Sectors definitions

Defining sectors to ensure alignment on what falls within the boundaries of a sector category

Tourism

Tourism describes the commercial organisation & execution of holidays and visits to places of interest for people's pleasure.

The business activities herein include attracting, accommodating, transporting, entertaining, and operating tours. The sector encompasses a variety of organisations that conduct these activities for visitors, such as:

- Hotel groups
- Accommodation, transport & entertainment booking websites and agents
- Recreation and entertainment providers
- National parks and game reserves
- Heritage sites
- Cultural attractions
- Event and conference planning organisations and venues

Services cover both domestic and international visitors who tour for less than a year for a variety of reasons, covering both business and leisure.

Agriculture, fishing & forestry
Including agri-processing

Agriculture, fishing & forestry together form a sector of activities centred around farming & agri-processing to meet food & other product demands. Agri-processing is the transforming of products that originate from agriculture, forestry and fisheries.

These activities are performed by organisations which practice:

- Food farming (maize, oilseeds, fruits, vegetables and nuts)
- Resource farming (cotton and tobacco)
- Animal and livestock farming (cattle, pigs, honey bees, poultry, horses, goats and sheep)
- Aqua farming (fresh water farming, mariculture & artificial fish farming)
- Timber farming (wood & sap)
- Agri-processing (processing, manufacturing & packaging of harvested/farmed produce)
- Agribusiness (distribution, facilitated market access and marketing of fresh and processed produce, licensing and permits)
- Sector-related research and management institutions (conservation, pest-control, animal welfare, food safety, veterinary services, soil, water & plant diagnostics)

Energy & the Green Economy
Including Construction and Oil & Gas

The sector term 'Energy' includes the creation, distribution and management of power, as well as the management of the natural resources required to carry out these activities.
The Green Economy covers activities in the sector that promote sustainable development of scarce resources, and manage environmental risks & conservation.

Organisations in this sector are involved in:

- Upstream (exploration), midstream (extraction) and downstream (refining and purifying) processes of oil & natural shale gas extraction
- Solar power farming
- Wind farming
- Off-shore gas exploration
- Wave and hydropower
- Distribution, marketing & management of power generated through these methods
- Sector-related research & management institutions (universities, government, private institutions)
- Infrastructure construction & maintenance

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Sources: Government sites & publications; Business sites; Business dictionaries

Sector definitions

Defining sectors to ensure alignment on what falls within the boundaries of a sector category

Retail & Wholesale	Transport	Manufacturing
The Retail & Wholesale sector includes organisations that sell and distribute products through both business-to-business and business-to-customer channels. Products fall into general or specialty categories, such as: • Food & beverages • Pharmaceuticals • Motor vehicles, boats & parts • Textiles • Furniture The sector includes organisations with a variety of business models, such as: • Cash-and-carry • Contractual • Online distributors	Transport is the movement of people or goods from one point to another. The Transport sector thus includes all logistics, courier and freight organisations involved in the planning, management and execution of this function. Both public and private organisations offer these transport services within the following modes of transport: • Rail • Road • Air • Port	Manufacturing refers to the processing and conversion of raw materials, components or parts, adding value to turn them into intermediaries or finished goods. Merchandise manufactured may be general or specialty, such as: • Pharmaceuticals • Motor vehicles and parts • Clothing and Textiles • Furniture • Boats and yachts • Food & beverage machinery • Oil and gas machinery • Metals, metal products, machinery and equipment

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Sources: Government sites & publications; Business sites; Business dictionaries

Sector definitions

Defining sectors to ensure alignment on what falls within the boundaries of a sector category

Financial & Business Services	Government

Financial services includes licenced firms which offer financial services to retail and commercial customers, including:
• Banks
• Investment funds
• Insurance companies
• Asset management
• Real estate agencies
• Government bonds
• Stokvels
 	
Business Services cover a broad range of activities that support the operating of a business. Some of these activities include:
• Technology software & hardware development and support services
• Professional services
• Business process outsourcing
• Personnel supply & management
• Facilities management
	The Government sector encompasses all activities executed and/or managed by Provincial governments to deliver services, facilities and information to all citizens.
	
	This sector is further broken down into the following key areas:
	• Citizen engagement
	  • Initiatives undertaken to improve service delivery, responsiveness & communication between respective government bodies and the citizens.
	• Service delivery
	  • The standard, relevance and effectiveness of the services delivered to citizens by provincial government.
	• Basic services
	  • The duty of government to provide free basic services (water, electricity, sanitation and sewage) to poor communities, in conjunction with providing police services, healthcare, emergency services and education to the community.
	• Regulation
	• Processes

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Sources: Government sites & publications; Business sites; Business dictionaries

Underlying themes

The Education & Healthcare sectors are not included in the core analysis but rather commented on in broader trend terms, as areas of impact.

Skills development & mobilisation	Healthcare
Skills development covers all training and development initiatives. The Education sector encompasses both formal private and public institutions which offer education, training and development at all levels. These institutions include: • Pre-primary schools • Primary schools • High schools • Universities • Technicons • Technical colleges/ vocational training centres • Centres of excellence	Healthcare covers all activities involved in the provision of quality medical attention, care and assistance to communities. Activities cover the provision of diagnostic, preventive, remedial, and therapeutic services by doctors, nurses, hospitals and other organisations. Medical equipment and pharmaceutical are also included within the sector. The sector includes both public and private healthcare facilities, including: • District hospitals • Regional hospitals • Tertiary hospitals • Central hospitals • Specialised hospitals • Profit private hospitals • Not-for-profit private hospitals • Clinics • Medical diagnostic centres • Private practices • Pharmacies

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Sources: Government sites & publications; Business sites; Business dictionaries

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