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KWAZULU-NATAL
DIGITAL TRANSFORMATION STRATEGY
2020-2025

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PREAMBLE

The KwaZulu-Natal province presents a pool of economic opportunities in virtually every sector and department. Being the country's second-largest contributor to the economy after Gauteng with a percentage share of GDP of 35.2 percent demonstrates that the province plays a significant role in South Africa's economy and this presents an enormous opportunity in this digital era to gravitate towards a digitally enabled socio-economic development in the province.

Digital Transformation is a driving force for innovative, inclusive, and sustainable growth. This requires improving the standards of service quality and increasing the overall efficiencies of the government. Digital transformation and the quality of service delivery are inextricably intertwined, this is reaffirmed by the UN Department of Economic and Social Affairs (2005) that the application of Information and Communication Technology within the public administration enhances both the internal and external functions, thus providing government, business and the citizen with a set of tools that can potentially revolutionize the way in which interactions across departments take place, the manner in which services are delivered and how policy is developed and implemented. Additionally, digital transformation presents an opportunity for citizens to participate in governance and public administration reform to ensure good governance.

Recognising Government's current efforts in prioritising digital transformation tied with building an inclusive information society and knowledge economy that is based on the needs of the citizens, business and public sector, the KZN Digital Transformation Strategy seeks to accelerate and guide a common, coordinated response to reap the benefits of the current digital revolution. BRICS (Brazil, Russia, India, China, and South Africa) Summit 2019 represented by the President Cyril Ramaphosa agreed that the digital economy agenda for BRICS countries should include:

a) Digital literacy
b) Narrowing the social digital divide
c) Digital Skills Development
d) Digitalisation of small and medium enterprises
e) Expansion in the development of inclusive digital projects within rural communities.
f) Coordination of business activities between the public and private sectors.

g) Collaboration on knowledge and best practice sharing as well as enhancing digital connectivity.

h) 5G prioritisation

The province of KwaZulu-Natal, as a competitive province in many aspects, aims to fulfil these objectives through the development and implementation of the KwaZulu-Natal Digital Transformation Strategy, which is to be developed by government, business, academic, and civil society. The Digital Transformation Strategy will build on the existing initiatives and frameworks within the ICT and related sectors such as the National Development Plan (NDP), The National Integrated ICT policy white paper, the ICT RDI Roadmap to name a few.

1.   INTRODUCTION

The rapid advancement of technology and the Fourth Industrial Revolution(4IR) has transformed how government and industries conduct business. Organisations around the globe are leveraging newly digitised enterprise processes and advances in technology to implement automation solutions capable of replicating human actions, eliminating routine tasks, and thereby evolving employee tasks to a higher-value outcome. Artificial Intelligent (AI) and Machine Learning (ML) are technologically innovative systems that have become essential components of enhancing efficiency and increasing service delivery for organisations across the globe. AI technologies are becoming a major part of organisational work, just as the evolution of computer systems in the 19th century, (Dias, et al, 2019).

Government in South Africa undoubtedly faces numerous challenges in delivering services, this includes but not limited to the slow response to service delivery and citizen's needs, poor integration and coordination across sectors and government's departments, the absence of accountability, transparency, and efficiency (Nkosi & Mekuria, 2010). It is argued that provincial and local government is at the forefront of understanding citizen's needs and is the 'delivery arm' of government. It is the obligation of government to create an enabling environment with policies and regulations that promote digital transformation.

Preparation for digital transformation and emerging technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), Blockchain, e-commerce platforms, and other technological advancements is critical. All of these require a coordinated effort for digital transformation

strategy, which is essentially advanced Information and Communications Technology (ICT) Strategy for the province. Once the strategy is developed and implemented, KZN will be amongst the global regions in technological advancements. KZN has an opportunity to lead the country in as far as digital transformation is concerned.

As outlined by the National Development Plan that 'a single cohesive National e-Strategy is essential to ensure the diffusion of ICTs in all areas of society and the economy'. This necessitates government at a provincial level to redirect its efforts in ensuring that this vision is achieved provincially through harnessing opportunities for digital transformation in the public sector and private sector. Moving to the next level of digital government, calls for a more transformative set of changes to renew public sector service delivery. Within the digital government agenda, Government will make greater use of digital technology to achieve openness, transparency, engagement, and informed decision making and integrated services to citizens and businesses.

2.   PROBLEM STATEMENT

Government has a responsibility to create an enabling environment with policies and regulations that promote digital transformation. A conducive enabling environment across sectors for digital transformation is fundamental. Preparation for digital transformation and emerging technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), Blockchain, e-commerce platforms, and other technological advancements is critical. All of these require a coordinated effort for digital transformation strategy, which is essentially advanced Information and Communications Technology (ICT) Strategy for the province. Once the strategy is developed and implemented, KZN will be amongst the global regions in technological advancements. KZN has an opportunity to lead the country in as far as digital transformation is concerned. The province aims to address the following challenges:

- **The Digital Divide**: The disparity in Access to information and ICT as a result of the differences in terms of class, race, gender, age, and geographic location can effectively deprive citizens of the provincial economy.
- **Silos in government departments:** The noticeable growing culture of operating in silos which evident in some areas of government and this subsequently tends to fragment service delivery.

- **Lack of Innovation:** There are many barriers to innovation in the public sector as institutions responsible for service delivery. This directly affects the adoption of innovative technologies to improve service delivery in government.
- **Skills shortage:** One of the key challenges is the shortage of skilled ICT people in the country fueled by the "brain drain" of skilled ICT personnel and other professionals to developed countries, and from the public to the private sector.
- **Limited connectivity**: The province has about 11 million people and 7.8m are dependent on data, only 1.8 million people have access to the internet. The majority are living in under-serviced/unconnected areas.
- **No approved strategy**: There is no approved KZN Digital Transformation Strategy

3.   NATIONAL DIGITAL TRANSFORMATION STRATEGY: AN OVERVIEW

South Africa's National Digital Transformation Strategy was kickstarted in 2017. The purpose of this Strategy and Roadmap is to guide the digital transformation of public service in South Africa into an inclusive digital society where all citizens can benefit from the opportunities offered by digital technologies to improve their quality of life. The national digital/ e-strategy aims to position South Africa as a significant player in the development of ICTs throughout the value chain of the sector as well as accelerate the uptake and usage of ICTs in other social and economic sectors. This deals with the transformation of South Africa into a fully digital society marked by a widespread diffusion, uptake, and usage of ICTs within society. This is critical for the government and society-wide on-going interventions to accelerate growth and facilitate economic and social inclusion. The ICT sector has a significant role to play in driving and enabling the new growth and developmental trajectory (Nkuna, 2017).

According to Nkuna (2017) from the Department of Telecommunications and postal services, The National e-Strategy builds on various policies within the ICT and related sectors amongst them the Integrated ICT Policy White Paper and the ICT RDI Roadmap and the Industrial Policy Action Plan. It seeks to ensure a coordinated approach to the implementation of various initiatives arising from these and other government policies. The National e-Strategy should, therefore, be read together with these and other policies to establish an ecosystem as the basis of the digital society. In this context, by a digital society, we refer to a widespread diffusion, uptake, and usage of high-speed quality, secure and affordable ICTs by all segments of society

be they individuals or organisations and is underpinned by the effective coordination and building an ecosystem around the following critical issues:

- **Enabling policies**: South Africa's ICT and related policies should be forward-looking, transparent, and predictable ICT to enable inclusive growth and development.

- **Infrastructure**: the digital society will be underpinned by the availability of infrastructure throughout the country. Interventions are thus needed to stimulate both the public and private sector investments building on SA Connect and the introduction of supply-side interventions to promote competition and SMME development in the telecommunications and broadcasting industries.

- **Universal access**: all South Africans should have access to affordable user devices and high-quality services irrespective of geospatial location and social status.

- **Security**: citizens should trust the ICT environment knowing that their information and transactions are protected.

- **Content**: South Africans should be involved in the development of local content taking advantage of the ubiquitous nature of the ICT sector. There is a big scope for South Africa to emerge as one of the leading content industries on the continent and in the rest of the world. Strong and affordable content rights management and protection must support this.

- **Innovation**: the government and society should pay specific attention to the development of local intellectual property and knowledge to encourage and support local production and manufacturing. Importantly, innovations should be geared towards growing the ICT sector while at the same time introducing ICT enabled solutions in the other key sectors of the economy.

- **Skilling the nation**: a massive skills development programme to create awareness, demystify technologies, and extend the use of technology to embark on complex transactions should underpin the uptake and usage of ICTs in the whole society.

The national digital transformation strategy builds an ecosystem of the following issues:

- Enabling Policies
- Availability of ICT Infrastructure
- Universal Access to affordable use devices and quality services
- Building trust and security within the ICT environment
- Digital Content development
- Development of local intellectual property and knowledge to drive innovation
- Massive skills development within the society

4.   SITUATIONAL ANALYSIS

Innovative use of technologies improves internal functioning and the rendering of public services. South African Government has long recognised the importance of technology-enhanced service delivery with the history of e-government that dates to the mid-1990s. The table below highlights the evolution of digitally transforming government to e-government.

Table 1: Evolution of e-Government in South Africa

1995	White Paper on the transformation of public service was released. This White Paper proposed the creation of several new and additional structures, including the Presidential Review Commission (PRC).
1997	White Paper on transforming public service delivery was released labelled as the Batho Pele White Paper. The purpose of this White Paper was to provide a policy framework and a practical implementation strategy for the transformation of public service delivery. The DPSA was instrumental in the development of the eight Batho Pele (put the people first) guiding principles that should be taken into consideration in the implementation of eGovernment in South Africa.
1998	The Presidential Review Commission (PRC) released a report which detailed the PRC's main findings and recommendations concerning the operation, transformation, and development of the South African Public Service. Chapter 6 addressed the problems that were associated with Information Management, Information Systems, and Information Technology in the public service. As a consequence of the recommendations of the PRC, the DPSA was granted the administrative responsibility for ICT in government. The formal ICT governance framework of Office
1999	The Thusong Service Centre programme of government was initiated to extend services of government to outlying areas where people live. The primary focus has been rural and underserviced communities to provide citizens with access to government services and information.

2001	the DPSA produced an e-Government policy document entitled 'Electronic Government: The Digital Future – A Public Service IT Policy Framework'. The DPSA also released the first version of Minimum Interoperability Standards (MIOS). MIOS specifies the technical standards and policies required for the achievement of interoperability of ICT systems across the public sector.
2002	Electronic Communications and Transactions Act (ECTA) was promulgated.
2004	the DPSA established an e-Government Batho Pele Gateway which is a publicly accessible, central government services information portal.
2007	Information Society and Development (ISAD) Plan by DTPS adopted with emphasis on e-Government.
2011	NDP introduces a single cohesive strategy to ensure the diffusion of ICTs in all areas of society and the economy.
2012	SITA developed an e-Government Framework and started offering e-services.
2014	establishment of the new Department of Telecommunications and Postal Services and transfer of e-Government mandate from DTPS and SITA of the Government Chief Information Officer (OGCIO), SITA and Government Information Technology Officer's Council (GITOC) was established to proactively bring value to government in terms of ICT use for internal administrative applications and general government service provisioning to citizens and business entities in society
2015	Gauteng and Western Cape provinces developed their provincial e-Government Strategies.
2016	approval of the National ICT Integrated Policy White Paper, with emphasis on the digital transformation of public service and the need to develop a National e-Government Strategy and Roadmap.
2016	Development of the National eGovernment Strategy and Roadmap.

Adopted from the National e-Government Strategy and Roadmap (2017:8)

The Department of Telecommunications and Postal Services formulated a National e-Governance Strategy and Roadmap gazetted 10 November 2017 which proposed several initiatives to be implemented to improve the effectiveness and efficiency of government information systems, with emphasis on service delivery to business and citizens. Some of the initiatives that have been implemented:

- SARS e-filing
- Smart Identification Card System
- Integrated National Transport Information System (NATIS)
- National Health Normative Standards Framework (NHSF) for interoperability in e-Health.

ICT enabled government provides an opportunity to address the issues of poverty, inequality, and unemployment. However, South Africa is faced with challenges including poorly developed infrastructure in rural and township areas, connectivity and internet accessibility, high-cost upgrading existing IT infrastructure systems and replacing them, and energy instability are seen as an obstacle for the digital transformation.

At provincial level, different provinces had formulated and implemented e-government/ digital strategies with some level of success especially the Western Cape and Gauteng provinces. Currently. there is no e-government / digital transformation strategy in KwaZulu-Natal even though different departments have started implanting ICT solutions for service delivery.

By the year 2011, the KZN provincial government had realised the importance of ICT and the need to provide online services. The KZN Nerve Centre, situated at the Office of the Premier launched the KZNOnLine with the main aim of providing an automated and integrated information management system that will help in monitoring and evaluating government service delivery in KwaZulu-Natal, and the key objective was to meet provincial government statutory requirements for the implementation of the performance management system and to promote transparency and anticorruption (Thakur and Singh 2013:45).

The KZNOnLine is perceived to be largely static. The website is not interactive only providing digital content at present. Nevertheless, this is a necessary step towards an interactive interface. In general, there is little evidence of Gov 2.0 engagement, on this or any other site. The site displayed a hotline number and two Social Media links namely: a FaceBook link (www.FaceBook.com/KZNONLINE) as of July 2012 and a Twitter link @KZNGov as of October 2011. There were 30 Facebook posts, 33 tweets with 20 registered followers as of July 31, 2012 and as of April 2020, 22 694 Facebook and 22 400 Twitter followers, both platforms with the latest update. The Online portal does not display a traffic counter, which makes number-of-hits difficult to monitor.   As of April 2020, not much has changed on the website."

The KZN Provincial Treasury in collaboration with SITA, Datacentrix, and its business partner, L@Wtrust, collaborated to establish the Electronic Fraud Management system in 2010 (IT Web, 2010). The system operates and reduces significantly the risk of electronic fraud and" KZN Treasury wanted to implement a consistent and pragmatic approach to enable the proactive management of electronic fraud as fast as possible to more than 4 000 of its computer users scattered across the KZN province and operating from 16 federated government departments,"

explains Shakeel Jhazbhay, Enterprise Content Management (ECM) business unit manager for KwaZulu-Natal at Datacentrix (IT Wed, 29 Oct 2010).

In 2016, the revised Provincial Growth and Development Strategy (DGPS) articulated the vision for the province 2035 and beyond. In attaining the PGDS, goals number 4 articulated on infrastructure development with great emphasis on ICT infrastructure for the province. Goal number 6 specified that for governance and policy, the objectives of the province included the eradicate fraud and corruption and the promotion of participative, facilitative, and accountable governance.

In comparison, the Western Cape and Gauteng Provincial governments are way ahead of the KwaZulu Natal Province in the implantation of e-governance. The Gauteng provincial government even moved further as it established the Department of e-Government, which is part of a restructuring process to ensure departments in the province can talk to each other seamlessly. Last year, the Gauteng premier David Makhura said his administration would continue to invest in ICT infrastructure as the province positions itself as a driver of SA's digital economy, a hub of research and innovation in SA (IT Web. 2017).

Figure 1: United Nations (2001) proposed a five-stage model with a focus on web-based public service delivery.

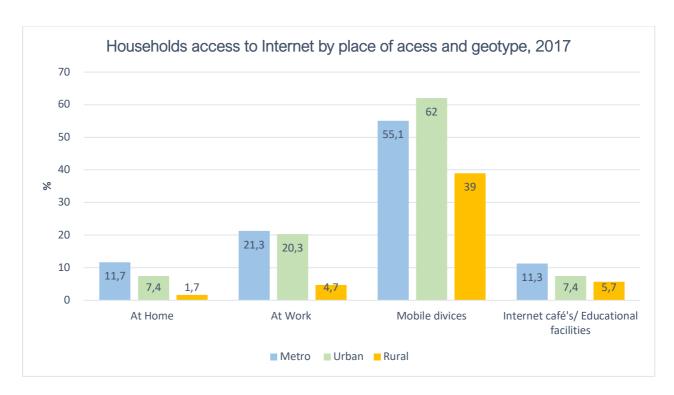| Step 1: Emerging web presence	Step 2: Enhanced web presence	Step 3: Intercative web Presence	Step 4: Transactional web presence	Seamlles/Networked web presence
• This is the initial stage were government websites provides mostly basic and limited static information with less options for citizens	• This is the second stage where there are improvement of government websites in-terms of providing dynamic, specialized and regularly updated information. Among the website features include search facilities, on-line help, and site maps	• Users and service providers are connected to government portals (websites); Interaction became more sophisticated than in the former stage. Services such as search facilities and accessibility of various forms are enhanced.	• This stage allows two-way interactions between the citizen and the government; users can conduct complete on-line transaction including buying and selling activities.	• This is the most sophisticated level of e-government service delivery; all services and functions across all government levels are integrated; citizens can access any kind of services from a central location at any given time.

KZNonline

In the process of digital transformation, the web presents the lowest level where government begins utilising the internet to interact, transact, and create a network with industries and citizens. In the application of the UN five-stage model, the KwaZulu-Natal KZNonline website indicates that the province is at stage 3, which is characterised by an interactive web presence. It is however clear that the KZNonline is nowhere close to stage 4 as the province is facing internal challenges in the form of departmental systems operating in silos, manual modes of operations in most departments making it difficult to load accurately, up to date information. External factors influencing the current status quo include ICT backbone infrastructure (broadband infrastructure), high levels of illiteracy including the digital divide.

The province of KwaZulu-Natal and Eastern Cape are amongst the provinces with the highest digital divide with digital and ICT infrastructure. KwaZulu-Natal had access to the Internet using mobile devices, with much of this access accounted for by Households living in urban areas seating at 62%. Mobile devices are also the most used means of accessing the Internet by Households in rural areas (39%) and this figure drops to 1.7% for rural Internet access at home. Lack of ICT infrastructure and access to internet another challenge as analysis shows that many South Africans continue to rely on internet cafes, educational facilities and workplaces to get online.

Households in rural areas had the least internet access figures, while those in metro areas generally had the best access.

Figure 2: Household access to the Internet by geospatial location and type of access

Households access to Internet by place of acess and geotype, 2017

Place of access	Metro	Urban	Rural
At Home	11,7	7,4	1,7
At Work	21,3	20,3	4,7
Mobile divices	55,1	62	39
Internet café's/ Educational facilities	11,3	7,4	5,7

The graph below presents the steps required to digitally transform government services with the initial phase being the web presence (KZN at step 3 of the UN 5 step e-government model), highlighting the technology jump. The province's aim to digitally transform implies that the transaction phase must be achieved parallel to the transformation phase. What the curve eloquently indicates that benefits /costs for digital transformation increase with the jump from one stage to another. What is clear is that once transforming government services has been reached, the amount of time to get to e-democracy is very short yet advancing the notion of democracy enabled by ICT.

Figure 3: Graphical representation of steps required to digitally transform government services

5. SWOT ANALYSIS

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
• Skills (youth and institutions) • Progressive policies and strategies. • SA Connect Model • Political will • Change people's mentality/mindset • Young and dynamic populations. • High innovation and technology potential • Universities, research institutes, and the business sector developing high-quality technologies, processes, services, and innovative products. • Good entrepreneurial spirit • Good technological equipment • Process and incremental innovation	• KZN landscape-Deep rural areas that entrench the Digital Divide. • Poor implementation reactive not proactive governance. • Lack of incentives for innovation. • Lack of innovation. • Fund rationalisation/redirection of budget. • ICT is viewed as an expense. • Lack of digital skills • Corruption • Poor Governance • Corporate culture is not conducive to mitigating challenges. • Localisation (lack of buying local) • Cybersecurity • Digital colonisation • Over-representation of SMME's • Low breakthrough in innovation	• SA Connect partnerships to connect the province. • Strong ecosystem and network for efficient intermediations between demand and offer. • Digital skills development • The opportunity of specification due to the digitisation of low skilled workforce • Young and dynamic population with the potential to drive digital technology within the province. • Transfer research results into industrial value-added processes.	• The public as well as SMME's fear the implementation of the digital process because of suspected job loss. • Lack of digital education and ongoing training for marginalized communities. • Outsourcing • An increasing global competition • Lack of research/enterprise collaboration • Reduction of opportunities for high skilled jobs with high remuneration. • Cloud computing services remain marginal within the province, despite the technology credibility and maturity, the quality of the offers of the hosts.

	• Lack of strong relationships between research and business. • Lack of a strong management culture.		• Weak research in the private sector. • Lack of talents in the digital economy, especially developers and recruitment of suitable staff. • SME's lacking resources for the implementation of new technologies.

6.   NATIONAL DEVELOPMENT PLAN

The National Development Plan 2030 states that "a single cohesive National e-Strategy is essential to ensure the diffusion of ICT's in all areas of society and the economy". ICT as an enabler, can speed up delivery, support analysis, build intelligence, and create new ways to share, learn, and engage.

Goals:

- Create 11-million new jobs
- Building strong new infrastructure
- Economy using clean, renewable, energy
- Planning that includes everyone
- Quality education for all
- Quality healthcare for all
- Fight corruption
- A capable state serving its people
- Unite the nation

7.   PROVINCIAL GROWTH DEVELOPMENT STRATEGY

The Provincial Growth and Development Strategy states that *'By 2030 KwaZulu-Natal will be a prosperous Province with a healthy, secure and skilled population, living in dignity and harmony, acting as a gateway to Africa and the World'*

Goals:

- Inclusive Economic Growth
- Human Resource Development

- Human and Community Development

- Infrastructure Development

- Environment Sustainability

- Governance and Policy

- Spatial Equity

8. MEDIUM TERM STRATEGY FRAMEWORK 2020-2025

MTSF recognizes that:

Infrastructure investment faces growing hurdles and South Africa lags behind many of its counterparts for innovation around information and communications technology (ICT) systems, network connectivity, and more sustainable technologies. This limits the ability of businesses and the public sector to deploy new technologies and transition into the fourth industrial revolution (4IR) and the green economy and to strengthen South Africa's regional advantage. According to the Global Competitiveness Reports, South Africa was ranked 66th for ICT readiness and adoption in 2014 but has dropped to 89th position by 2019

MTSF outcomes and interventions for 2020-2025 directed at ICT are:
- A developmental and meritocratic state which must develop professional capabilities in ICT and modernizing business processes in the public sector in partnership with business, civil society, and labour;
- Improvement of competitiveness through ICT adoption. Interventions are:
- Industrialisation of the economy and emergence of globally competitive sectors – ICT as one of those sectors.
- Spectrum licensing, broadband rollout and reducing the cost of communications;
- Basic education infrastructure provision - (ICT identified as basic infrastructure);
- Universal Health Coverage –ICT as the basic requirement in achieving UHC;
- Equitable access to land reform, housing, safe living environment, universal access, and design and safe and affordable transport and ICT services.

9. APPLICABLE LEGISLATIVE FRAMEWORK AND POLICY

- Public Service Act 30 of 2007
- Public Service Regulations of 2001 as amended 16 July 2004

- Public Administration Management Act of 2014
- Promotion of Access to Information Act, No 2 of 2000
- State Information Technology Agency Act no 88 of 1998
- Intelligence Services Act 65 of 2002 - SSA
- National Archives of South Africa Act 43 of 1996
- The Protection of Personal Information Act no 4 of 2013(POPI)
- Government-Wide Enterprise Architecture Framework v12 (Government IT Officers Council (GITOC) of South Africa)
- July 2019
- GWEA Implementation Guide v12 (Government IT Officers Council (GITOC) of South Africa) Jun 2010
- The Open Group Architecture Framework (TOGAF 9; The Open Group; USA) Jan 2009
- The Open Group Architecture Framework (TOGAF 9.2; The Open Group; USA) Apr 2018
- Corporate Governance and Governance of ICT Policy Framework (DPSA) Dec 2012
- Corporate Governance of ICT Assessment Standard (DPSA) Nov 2012
- Implementation Guideline for Corporate Governance and Governance of ICT Policy Framework Version 2(DPSA) Feb 2014
- Corporate Governance of ICT Assessment Standard for MPAT 15 Draft for GITOC Consultation (DPSA) Apr 2015
- COBIT 5 - Business Framework for Governance and Management of Enterprise IT (ISACA) 2012
- E-Agriculture Strategy Guide (Food and Agriculture Organisation of the United Nations and International Telecommunication Union) 2016
- State of the Nation Address 2019, 2020
- State of the Province Address 2019
- State of the Province Address Budget 2019
- KZN Provincial Growth and Development Plan 2035 v4 2019
- DPSA Cloud-First Policy (current version awaiting ratification) 2019
- Nation e-Strategy 2017
- National e-Gov Strategy 2017

10. OBJECTIVES OF THE STRATEGY

The objective of the strategy is to identify priority areas of KwaZulu-Natal province digital transformation towards government automation, integration, and digitisation of services in a manner that will yield efficient service delivery, economic opportunities, and innovation. There are several elements adopted by different countries, and the province must identify what is applicable given the situational analysis and the needs o the province.

Figure 4: Steps towards Digital Transformation

Steps towards digital transformation

11.   WHO IS THIS STRATEGY FOR?

The Digital Transformation Strategy is for government, citizens, and business.

- Government-to-Government Interaction: This entails facilitating communication among government spheres (national, provincial, and local) to enhance interrelationships and intergovernmental access to government information systems.
- Government-to-Citizen Interaction: This entails encouraging citizens to become actively involved in governance and to enable information sharing between government and citizens.
- Government-to-Business Interaction: This entails delivering information and services relevant to specific business needs.

12.   VISION

To be the most digitally inclusive and transformed smart gateway to Africa

13.   MISSION

To leverage digital technologies and innovation in transforming the KwaZulu-Natal economy and society.

14. STRATEGIC PRIORITIES

The following elements were identified as the most immediate needs to be addressed by the province and were therefore elevated to the strategic priorities in order of preference for implementation. The priority focus in digitally transforming KwaZulu-Natal province includes connectivity, digital skilling, information management and security, process automation, systems integration, government's digitisation, and knowledge management.

14.1 STRATEGIC PRIORITY 1: CONNECTIVITY

This strategic priority responds to the challenge of lack of connectivity in the province which allows for efficient connection of government, citizens, and business. Connectivity refers to the means of connecting devices to each other to transfer data across multiple platforms, and this involves network connections, which embrace bridges, routers, switches, gateways, and backbone to networks.

The province can connect using different forms including fibre, radio microwave, or spectrum. Copper cable connectivity is NOT recommended. It was established that in 2020, the province was only at 27% connectivity. More urgent connectivity is required. There are different means of connecting as per Figure 5 below.

Figure 5: Different modes of broadband distribution

Fibre Connectivity	Radio Microwave	Copper cable Connectivity	Spectrum (TV Whitespace)	Satellite internet Connectivity
• Uses fibre cable to connect • Greater bandwidth • Up 40km • Data is safer • Reliable data transmission • Can be incorporated	•Wireless communication technology •Uses radio waves in the microwave frequency range •Can broadcast large quantities of information because of high frequencies •Transmits data over	•Uses copper cables (which in turn use electrons for data transmission) •Good for 100 m radius •Degradable •Currently being phased out	•Invisible radio frequency •Unused broadcasting frequencies/TV channels •Secure WiFi connection •Connects to hot spots for data usage •Faster connectivity for consumers and business (e.g. 5G) – electro magnetic frequencies •Excellent for rural areas	•Internet access through satellite (and therefore wireless) •Good for areas with limited or no internet coverage • Weather can disrupt connection

- **Fibre connectivity**: This connectivity is recommended as it connects a larger percentage (%). There is a tried and tested SA Connect model that is being deployed.
- **Radio microwave**: This connectivity is recommended for connecting areas where fibre connectivity cannot reach.
- **Copper cable connectivity**: This mode of connectivity is not recommended as it is being phased out and replaced by other modern forms.
- **Spectrum/TV WhiteSpace (TVWS)**: This connectivity is recommended. Once ICASA has clarified the licensing issue, this can become the most effective form of connectivity.
- **Satellite internet connectivity**: This connectivity can be used in extremely needy areas where fibre, radio, and TV whitespace has not been installed as a short-term to the medium-term solution.

Recommendation

In responding to the challenge of connectivity, it is recommended that the province prioritises connectivity immediately by pooling the existing connectivity related resources and reallocating them using an innovative method that achieves economies of scale through the Provincial Treasury.

14.2   STRATEGIC PRIORITY 2: DIGITAL SKILLING

This strategic priority seeks to draw a picture of the skills that would be required in order to ensure effective digital transformation of the KwaZulu Natal (KZN) province. These are digital skills that must be prioritised with respect to training and capacity development of the KZN population, thereby getting the population to be digitally ready. Digital readiness of the province requires all the citizens - students, workers, unemployed, businesses, and government - to have the ability to operate in a digital era for undertaking all activities ranging from the simple day to day tasks to the complex ones for operating businesses.

14.2.1 Defining Digital Skills

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) defines digital skills "as a range of abilities to use digital devices, communication applications, and networks to access and manage information. They enable people to create and share digital content,

communicate and collaborate, and solve problems for effective and creative self-fulfilment in life, learning, work, and social activities at large" (UNESCO, 2019, p. 1).

UNESCO classifies them as entry-level digital skills and advanced digital skills. Entry-level digital skills are "basic functional skills required to make basic use of digital devices and online applications" and the "advanced spectrum of digital skills are the higher-level abilities that allow users to make use of digital technologies in empowering and transformative ways such as professions in ICT. Major digital transformations such as Artificial Intelligence, machine learning, big data analytics, change skills requirements" are some of the advanced digital skills that the KZN population has to be capacitated on to operate effectively in the 21st-century digital economy (UNESCO, 2019, p. 1). Artificial intelligence is crucial for solving many real-world problems as it is used in the health sector for diagnosing diseases, education sectors for customising lesson plans for students with special learning needs, and the defence sector for developing autonomous weaponry.

14.2.2 Fourth Industrial Revolution's perspective on skills

South Africa is experiencing the metamorphosis of digital skills from being optional to being critical, hence the soaring demand for digital skills. This demand is characteristic of the Fourth Industrial Revolution (4IR) era.

The World Economic Forum (2020) emphatically notes that 4IR is "more than just technology-driven change". It "represents a fundamental change in the way we live, work, and relate to one another. It is a new chapter in human development, enabled by extraordinary technological advances. These advances are merging the physical, digital, and biological worlds in ways that create both massive promise and potential peril".

Given that 4IR impacts family, organisations, and communities, it is thus prudent for the KZN to be prepared for dealing with this phenomenon. The 4IR also impacts many aspects of life such as the labour market, education, health, transport, agriculture. For this reason, customised skilling, re-skilling, and up-skilling are required to develop the people's capacities for dealing with the new changes.

With respect to the labour market, 4IR is presenting new job opportunities while rendering others redundant. Therefore, 4IR has necessitated that in tackling the unemployment challenge, more attention must be paid to the provision of advanced digital skills. Several private and government

institutions could contribute to preparing the KZN population for this era. These include higher education institutions, secondary education institutions, government entities, and private training providers.

Digital skills are important for all economic sectors as they assist in the delivery of various services and the production of several products. This is also the case for all provinces whether they are rural or urban. The paucity of digital skills translates to limited access to information which is crucial for operating in the knowledge economy. A study conducted by Nkosana and Skinner indicated a clear correlation between the success of the business and the skilled workforce. A study conducted by the Moses Kotane Institute (MKI, 2020) on 'Skills in Demand - KZN Business' depicted a wide range of ICT requirements for operating the respective businesses in the province. This study found that 40.4% of informal businesses and 33% of formal businesses indicated computer operating skills as the most immediate requirement to run the business efficiently to deliver to customers and to complement business operations.

14.2.3 Who should be skilled?

The following groups must be prioritised by the province.

- Children – pre and schooling age groups
- Youth – groups between 18 to 35 years of age
- Workforce – public and private sector
- Entrepreneurs – all groups
- Citizens "at-will" – all other interested citizens not mentioned above, who are willing to be skilled

The groups above are inclusive of all races, people with disabilities, religions, and gender.

This strategic pillar responds to the challenge of the digital divide in the province brought about by lack of connectivity, digital illiteracy, lack of professional digital skills (this is scarce), and minimal digital skills reforms investments.

Recommendation

It is recommended that for KwaZulu-Natal to be a digitally transformed province, the following areas will have to addressed by this digital skilling:

- Promoting a commitment to ICT digital literacy as a basic skill offered for all citizens.
- Encouraging support of the incorporation of ICT digital literacy strategies in education, workforce preparation, and government services.
- Enhancing ICT digital literacy opportunities in technological innovation and workforce readiness.
- Promoting public workforce initiatives that encourage ICT digital literacy skills acquisition. Use the digital transformation strategy as a means for all KZN Provincial Administration departments to collaboratively transform learning through the innovative use of digital technologies and resources.
- Strengthen digital infrastructure at all educational levels: primary, secondary, vocational training, and university, and all spheres of government.

14.3 STRATEGIC PRIORITY 3: INFORMATION AND KNOWLEDGE MANAGEMENT & INFORMATION SECURITY

This strategic objective responds to the challenge of disintegrated information, lack of centralised data repository, information vulnerability to cyber threats, and attacks. The KwaZulu-Natal province MUST treat information is an invaluable asset, protect the rights, privacy, safety, and security in the digital environment.

14.3.1 Information Management (IM)

Information management is generally an enterprise information system concept, where an organisation produces, owns, and manages a suite of information. The information can be in the form of physical data (such as papers, documents, and books), or digital data assets. Information management deals with the level and control of an organisation's governance over its information assets. Information management is typically achieved through purpose-built information management systems and by supporting business processes and guidelines.

Information management also focuses on how that information is shared and delivered to various recipients, including individuals and different computing devices such as an organisation's website, computers, servers, applications, and/or mobile devices. Information management cycle involves the acquisition of information from one or more sources, the custodianship and the distribution of that information to those who need it, and its ultimate disposition through archiving or deletion. This cycle of information organisation involves

a variety of stakeholders, including those who are responsible for assuring the quality, accessibility, and utility of acquired information; those who are responsible for its safe storage and disposal; and those who need it for decision making.

Stakeholders might have the right to originate, change, distribute, or delete information according to organisational information management policies. Information management is closely related to, and overlaps with the management of data, systems, technology, processes, and where the availability of information is critical to KZN's provincial success strategy.

Information management environments are comprised of legacy information resident in line of business applications, Enterprise Content Management (ECM), Electronic Records Management (ERM), Business Process Management (BPM), Taxonomy and Metadata, Knowledge Management (KM), Web Content Management (WCM), Document Management (DM) and Social Media (AIIM, 2020). Governance technology solutions and best practices. Information management requires the adoption and adherence to guiding principles that include:

- Information assets are provincial assets. This principle has been acknowledged and agreed upon across all spheres of government, however, lack of tr\eating information as such weakens the provincial government.
- Information must be made available and shared within the categories and classifications of information access for government, and if this is not controlled, it may leave the provincial government vulnerable
- Information the organization needs to keep is managed and retained provincially. The retention and archiving, of information, must be enforced.

Recommended information management process:

Step 1: Develop objectives of why you want to manage information

Step 2: Decide on the information to be managed

Step 3: Who owns the information

Step 4: How must information be managed

Step 5: How long must information be managed, and what happens thereafter

Step 7: Where is this information stored

Step 6: Resources required to manage information

Step 7: Monitoring the quality and integrity of the information

14.3.2 Knowledge Management (KM)

The next step is knowledge management. Knowledge management is the systematic management of knowledge assets for the purpose of creating value and meeting tactical & strategic requirements; it consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge.

Knowledge management involves the understanding of:

Where and in what forms knowledge exists; what the organisation needs to know; how to promote a culture conducive to learning, sharing, and knowledge creation; how to make the right knowledge available to the right people at the right time; how to best generate or acquire new relevant knowledge; how to manage all of these factors to enhance performance in light of the provincial strategic goals and short term opportunities and threats.

KM must, therefore, create/provide the right tools, people, knowledge, structures (teams, etc.), culture, etc. to enhance learning; it must understand the value and applications of the new knowledge created; it must store this knowledge and make it readily available for the right people at the right time; and it must continuously assess, apply, refine, and remove organizational knowledge in conjunction with concrete long and short term factors. All this is dependent upon the management of the organization's knowledge creation and conversion mechanisms; organizational memory and retrieval facilities; organizational learning; and organizational culture (KMT, 2018).

Recommended knowledge management process:

Step 1: Decide how knowledge must be acquired by the province (e.g. research repository, business intelligence, citizen upload of information via dedicated platforms, links to other portals such as national, provincial and local governments, academia, etc.)

Step 2: Identify users of knowledge (e.g. decision-makers, citizens, business, etc)

Step 3: Decide on how this knowledge will be preserved.

Step 4: Decide on how knowledge will be developed

Step 5: Decide on how and when knowledge is disseminated.

14.3.3 Information Security

Information security often referred to as InfoSec, refers to the processes and tools designed and deployed to protect sensitive business information from modification, disruption, destruction, and inspection (Cisco, 2020). It is designed to protect the confidentiality, integrity, and availability of computer system data from those with malicious intentions.

Making the digitally transformed environment safe and reliable, to enable services and organisational transactions while upholding the rights of citizens. The colloquialism of "going online" permeates across generational and social divide, and digitalisation continues to expand its reach. This expansion of the digital environment translates into enormous opportunities for economic development, social inclusion, and technological innovation. It also affects the exercise of fundamental rights.

In the context of the digital transformation opportunities and challenges, coordinated action between governmental and private sectors is necessary to mitigate risks and to ensure the continued development of the digital economy in KwaZulu-Natal. This notion, presented in most digital strategies worldwide, can be translated as the idea of building trust and confidence in the digital environment. Ensuring that stakeholders in the private sector feel confident to develop their activities in the digital environment, involving different dimensions of public sector action, here grouped into broad categories of the NIST Cyber Security Framework.

Figure 6: NIST Cyber Security Framework

Recommended information security process for the province.

> Step 1: Develop an integrated information security policy and a provincial cybersecurity plan (this should be aligned with information and cybersecurity frameworks).
>
> Step 2: Identify areas and risks related to information security
>
> Step 3: Develop risk mitigation measures that cover all processes, with ICT strategy and plans being the priority.
>
> Step 4: Build a consensus between the governments' needs and security needs. This involves deciding on what should be readily available to stakeholders at different levels.
>
> Step 5: Educate stakeholders about information security.

Recommendations:

It is recommended that the

- province prioritises information and knowledge management, and information security as one of the strategic priorities.
- The Nerve Centre is reconfigured to accommodate information and knowledge management, and information security operations. The Nerve Centre will be operated by the Office of the Premier, be located at the Dube Trade Port, and operations be supported by the Moses Kotane Institute.
- Data security be detailed in the provincial ICT strategy and plan

14.4 STRATEGIC PRIORITY 4: PROCESS AUTOMATION

Process automation refers to the use of digital technology to perform a process to accomplish a workflow or function. Process automation is defined as the automation of business processes through technology, allowing businesses to cut costs & increase productivity (Deloitte, 2018). It is automating business processes to improve accuracy and speed, in the pursuit to gain efficiency. In the context of government, process automation involves data collection and digitisation through information and communication technologies (ICTs), artificial intelligence (AI), and sometimes also machine learning (ML), (Paul, Jolley & Anthony, 2018).

Service delivery in South Africa has been one of the most critically distressing things for government. According to the Public Service Commission (PSC) some government agencies

are taking up to 10 years to process service termination and pension pay-outs against the prescribed timeline of 60 days. Therefore, technological advancement in government processes is essential to combat those inefficiencies. Technology has always been at the forefront when it comes to gaining efficiencies and enhancing accuracy, hence the advent of process automation for government presents a huge opportunity to enhance service delivery. Automation is one of the critical steps driving cost savings in the current economic landscape across industries including the public sector, manufacturing, financial services, etc, (Deloitte, 2018).

The journey to digital transformation and process automation in the public sector has been slow, and this may be linked to limited IT infrastructure, budgetary constraints, and the digital divide. The Capgemini Research Institute, (2018) identified three major challenges for process automation among organizations.

- Talent related challenges:
    - Lack of talent skilled in automation technologies.
    - Internal resistance to change due to fear of job loss.
    - Lack of technological awareness in the mid-management level.
- Business-related challenges:
    - Lack of coordination across business units creating an incomplete process view.
    - Lack of a clear understanding of the benefits of automation.
    - Lack of the required budget to implement automation.
    - Lack of leadership commitment to advanced automation.
- Technology-related challenges:
    - Fear of cybersecurity.
    - Complex IT security requirements

14.4.1 Steps to process automation

Figure 7: Planning and implementation steps for process automation

Prepare	• Identify and document process
Eliminate	• Identify sources of effort and eliminate them at thier roots
Standardise	• Standardise operation process within provincial government
Optimize	• Reduce time spent in handling end-to-end work
Augment	• Add more intelligence and autonomy to processes
Re-imagine	• Apply AI-first approach to challenge the status quo
Automate	• Deploy technology to automate standardised processs
Robotise	• Use RPA for repetitice/rule-managed processes

Source: Capgemini's Research Institute, (2018)

14.4.2 The Benefits of Process Automation for KwaZulu-Natal Provincial Government

- Improves the efficiency, quality, and coverage of service delivery:
  - For government, process automation can improve the efficiency, quality, and coverage of service delivery.
- Improving public sector staff performance, monitoring, and recruitment:
  - Automation of aspects of public sector staff recruitment, performance review, management, and monitoring can address nepotistic practices leading efficiency and cost savings on the salary bill.
  - It can improve staff and institutional performance by increasing transparency and trust in departments.
- Decreased cycle times and improved throughput:
  - Tasks can be performed faster and from any location.
- Improved accuracy:
  - The process is systematic and accurate.
- Improved employee productivity and morale:
  - Once repeatable tasks are automated, the employees are relieved and can focus on rewarding and higher value activities increasing both productivity and morale.
- Detailed data capture:

- o The province can produce valuable data with an audit trail that can support further process improvement and help with regulatory compliance.

Opportunities that process automation offer:

- **Provincial Government** –Anti-fraud and anti-corruption checks, licensing application processing.
  - o **HR functions** – payroll, benefits management, education and training, recruitment, and new joiner processes.
  - o **IT functions** – infrastructure/application monitoring, folder and file management, user/directory and release management, network monitoring, and desktop support.
  - o **Finance functions** – Reconciliations, claims processing, expense payments, returns management, and inventory processing.

- **Local government** – Local Municipalities face different tasks including housing, education, and healthcare needs. Keeping up with all these diverse processes constitutes a significant challenge, especially where often convoluted administration processes are involved. Automation will enhance efficiencies in overall administration including revenue collection, permit applications, service delivery incidents reporting, case management, contract administration.
- **Policing** – fixed penalty processing, intelligence reporting, crime reporting, firearms license processing, and replacing the need for officers to double key the same information into different systems and effective police oversight.
- **Health** – coding, diagnostics, discharge processing, outpatient clinic outcomes, cashing up, medicine inventory control and one patient ID
- **Education** – managing admissions and enrolments, student timetabling, student finance management, course assessment data handling, alumni database maintenance accurate reporting.
- Examples of items to be included in the automation and workflow processes include documents such as submissions, route form elimination because the system should have trackability, report tracking, short message services SMS in bulk which is assisted by the availability of stored contact details in the database, bulk e-mailing, print, websites, data, secured electronic signatures and approvals, and a whole host of e-government features

including but not limited to e-recruitment, e-performance management, e-leave, e-training, e-services to citizens, business and other governments, and many more.

Recommendation:

It is recommended that the

- Province invests in the ICT infrastructure that will allow for automation faster automation of government processes and service delivery. This system should allow for the automation of all manual processes to be automated where possible.
- Province standardises administrative processes to allow for a seamless flow of information and integration in some instances.
- Fast tracks the process of converting all manual processes to automated processes

14.5   STRATEGIC PRIORITY 5: SYSTEMS INTEGRATION

This strategic objective is another priority that responds to the challenge of disintegrated provincial systems and information. The purpose of integration is to speed up information flow and reduce operational costs. Integration allows for the creation of central architecture that can seamlessly connect and pass data between systems and software. This also allows for faster service delivery and meeting annual provincial plans and targets efficiently.

This Digital Transformation Strategy recognises that for the successful implementation of an Integrated Information System, Enterprise Architecture that interrelates with other ICT Disciplines and capabilities. In the context of the "V" model for system engineering, Enterprise Architecture is positioned as the initial phase, *Architecture/Planning*, which is focused on two important processes:

1) The development of Business Architecture and IS/ICT Architecture Plans
2) Monitor and evaluate those systems that are acquired, integrated, and implemented according to the architectural plan.

Architecture planning is governed by GWEA Framework and MOIS and relevant IT Governance standards and best practices such as COBIT (Plan & Organise, Monitor & Evaluate) and ISO 38500 (Direct and Monitor). The life cycle of this phase concludes with an ICT capital investment plan (i.e. a list of prioritised ICT projects) to inform KZN Government investment cycle

The *Design/Development* phase, which focuses on the technical and management processes relating to project management, solutions architecture, solutions design, solutions development, sourcing, buys or procurement of integration of information components, is governed by standards such as ISO SANS 11207 "Software Development Life Cycle" (Acquire & Implement), PMBOK/Prince-II for project management and relevant procurement and sourcing policies. This phase – although not exclusive to the field of ICT also focuses on the processes of Organisational Development (OD), Public Service Design and Development, Business Process Re-engineering, and Change Management.

The *Production/Operational* phase focuses on the processes of Business Integration, Public Service Operations, and ICT Operations to improve performance and service delivery of the KZN Provincial Government. The ICT Operations are typically governed by standards such as ITIL (IT Infrastructure Library), COBIT (Deliver,& Support, Monitor & Evaluate), ISO SANS 27002 (Information technology – Security techniques – Code of Practice for information security management), and ISO 20000 (Information technology – Service management).

Digital transformation describes the changes associated with the application of digital technology in all aspects of the KZN Provincial Administration. This involves moving from digital competence to digital usage, to digital transformation, with usage and transformative ability informing digital literacy. The transformation stage means that digital usages inherently enable new types of innovation and creativity in a domain, rather than simply enhance and support the traditional methods.

The following model steps are proposed for systems integration.

- **Requirements gathering** - this involves deciding on which components to integrate. This should result in a thorough understanding of the systems requirement
- **Analysis** - Business analysts to conduct a thorough analysis to determine operational feasibility. A successful collaboration will lead to the best solution and this is where Chief Information Officers (CIOs) or Chief Technology Officers (CTOs) should invest time so that the outcome could be the desired result.
- **Architectural design** – this involves putting subsystems together to create a blueprint of integration by CIOs. This should result in productivity and improved workflow & seamless data.

- **Systems Integration Design** – this activity involves performing the actual integration which is physical and logical without losing data. This should result in automated business processes that provide accurate data.
- **Implementation** – This includes operational verification and testing. Once a stage of errorless has been reached, the system can go live. Officials should be at the point of enjoying the new system and users must be capacitated on the use of the system continuously.
- **Maintenance** – This involves maintaining the system and improving it with different versions periodically as and when the need arises.

Recommendation:

It is recommended that:

- a detailed architectural plan with the roadmap, timelines, roles and responsibilities, financial implications, and risk management be developed and submitted for approval.

14.6   STRATEGIC PRIORITY 6: GOVERNMENT'S DIGITISATION

This strategic priority responds to the push of the KwaZulu-Natal province to catch up with some elements of the 4th Industrial Revolution.

14.6.1 Digitisation

Digitisation is the networking of people and things and the convergence of the real and virtual worlds that is enabled by information and communication technology (ICT). The concept of digitisation has been around since the sixties when computer chips were invented. At that time, it only really meant the move from analogue to digital. These days it pertains to an increased movement of conducting more and more tasks via modern information systems. This has been made possible by the increased expansion and improved performance of the Internet. The interconnectedness of computing boosted by an exponential growth in processing power and other enhancements has increasingly given rise to the Fourth Industrial Revolution (4IR). Hence, digitisation allows us to perform tasks a lot more efficiently thus improving our lives tremendously.

14.6.2 Digitisation in government

Over the years, citizens' trust and confidence in their governments have continued to decline and the digital government is expected to reverse this trend. An enormous amount of money has been spent, worldwide, on electronic government initiatives that are focused on improving performance, reducing costs, and enhancing citizens' trust and confidence in their governments.

Governments can achieve three main benefits from digitisation: improved citizen experiences, higher productivity and efficiency, and better policy outcomes. Digitization can minimise public interactions with civil servants by digitising processes and making organisational changes. This will result in governments enhancing services, saving money, and improving citizens' quality of life. Digitisation, a benefit of 4IR, will result in faster turnaround for public services by allowing multiple members of the public to interact with government simultaneously, 24/7, and without leaving their homes. Subsequently civil servants will be able to oversee more transactions per individual.

14.6.3 Who must digitise?

Digitisation needs to happen in all levels of government, from national, to provincial and down to municipal levels. Given that individual departments are responsible for taking care of most citizen interactions and are looking for ways to transform to keep up with citizens' expectations and budget limitations, they need to be focal points of any digitisation measurement. The following are just some of the benefits of digitisation:

1) Digitisation greatly simplifies the process of information accumulation for citizens and businesses.
2) Empowers people to gather information regarding any department of government and get involved in the process of decision making.
3) Ensures greater citizen participation at all levels of governance.
4) Leads to automation of services, ensuring that information regarding every work of public welfare is easily available to all citizens, eliminating corruption.

Examples of digitisation

Digitisation is now seen as an amazing opportunity to use new technology to not only increase efficiency but also be seamlessly connected with citizens, companies, other public departments, and non-governmental organizations. Those public departments consider themselves part of an eco-system and open for collaboration with private and public partners to achieve more. Innovative services for and developed with citizens and other stakeholders move beyond the
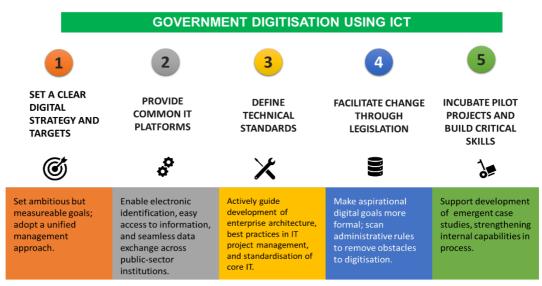
original service portfolio of the public department, supporting it to achieve mission-critical outcomes.

Two examples of good digital governance are Singapore, whose citizens get three text messages each month to remind them to do things like returning library books or renewing their driver's license or passport, and Ireland, where a rural street trader can get a license for a Christmas stall without leaving home.

14.6.4 Digitising government

McKinsey provides an excellent reference framework for digitisation of government services. The following is the practical model of digitising brings previous elements together and can be used to assess the stage of progress towards digitisation. The following guidelines produce a process that can produce tangible results.

Figure 8: McKinsey government digitisation reference model

GOVERNMENT DIGITISATION USING ICT

1 SET A CLEAR DIGITAL STRATEGY AND TARGETS	2 PROVIDE COMMON IT PLATFORMS	3 DEFINE TECHNICAL STANDARDS	4 FACILITATE CHANGE THROUGH LEGISLATION	5 INCUBATE PILOT PROJECTS AND BUILD CRITICAL SKILLS
Set ambitious but measureable goals; adopt a unified management approach.	Enable electronic identification, easy access to information, and seamless data exchange across public-sector institutions.	Actively guide development of enterprise architecture, best practices in IT project management, and standardisation of core IT.	Make aspirational digital goals more formal; scan administrative rules to remove obstacles to digitisation.	Support development of emergent case studies, strengthening internal capabilities in process.

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- **Set a clear digital strategy and targets:** Governments typically centre their digitisation efforts on four capabilities: services, processes, decisions, and data sharing. Government can use digital tools to improve their interactions with citizens and businesses by digitising a few high-volume activities. A useful first step to get things going can be to make a strategic decision to move as many existing public services online as possible and worry about other digitisation objectives later.

- **Provide common IT platforms:** A common government entity can establish common IT platforms that all public authorities can use. Managing electronic identity can be achieved by combining government ID with cell phone apps for access. Access to digital services can be eased by using portals that are based on life events parallel to public needs. Data owned by government can be mapped and provided via a branded, standardised environment.

- **Define technical standards:** Digital transformation need not involve major IT-architecture changes. Principles and reference architectures can be established for managing IT systems across the province and managing governance. The public sector can benefit from big data and analytics in education, public safety, healthcare, and other areas.

- **Facilitate change through legislation:** Set up a committee to identify problematic rules and suggest appropriate changes. Translate regulation into law without creating unnecessary obstacles for innovation. A public authority, for instance, may need explicit permission to use digital signatures in certain transactions, which may necessitate complex rule changes. The national government could help by scanning existing laws to identify problematic rules and suggesting appropriate changes, while also ensuring the "digital readiness" of new rules.

- **Incubate pilot projects and build critical skills:** Leaders can also push governments to mobilize technical workers and implementation specialists, both by investing in their human resources and by drawing on external support. Government leaders should play a meaningful role in digital initiatives by developing local talent.

14.6.5 Limitations of digitisation

One of the main problems that challenge governments in addressing their citizens' needs is the knowledge problem, i.e., pretending to have knowledge of the preferences of human beings without having it (von Hayek, 1989). In other words, will we be delivering on the actual needs of citizens by implementing digitisation? However, other questions may arise such as, will the citizens even be able to access these services? If these two issues are not investigated or resolved, the digitisation efforts may be wasted.

In a deeply unequal society such as South Africa, there will be those who will realise the immediate benefits of the system and those to whom it will mean nothing. Access and knowledgeability of the system may prove to be a breaking point for digitisation. Digitisation initiatives depend on physical infrastructure. **Unreliable electricity supply and lack of access to electricity, as well as low levels of internet connectivity and mobile phone penetration, may limit the utility of digitisation initiatives.**

Another main issue with digitisation may be project failure due to red tape and other problems that beset government project implementation. In addition, digital technology-focused projects are prone to run over budget and experience considerable delays.

Lastly, the political economy environment may affect how and by whom funds, and services are allocated. Digitisation initiatives, especially the ones that involve automation or a transfer of discretion, may be affected by this. This means that it may alter the allocation of power between actors.

Recommendations:

It is recommended that

- predetermined criteria and milestones towards digitisation are developed in the implementation plan.
- milestones towards implementation are measured quarterly
- municipalities prioritise matters of electricity supply to citizens
- elements of red tape and proposed counter-solutions towards digitisation be detailed in the plan

15.   SMART KWAZULU-NATAL ELEMENTS

This section paints a futuristic outlook of a smart KZN. A smart KZN should have smart cities, smart towns, and smart villages that deploy smart ICT technologies to collect data, enhance performance and quality of urban services such as energy, connectivity, transportation, utilities, and others. Cloud-based Internet of Things (IoT) applications receive and manage data in real-time to help enterprises and citizens make better decisions that improve quality of life.

15.1   Smart City

A smart city is a municipality that uses information and communication technologies (ICT) to increase operational efficiency, share information with the public, and improve both the quality of government services and citizen welfare. A smart city is characterised by:

- a technology-based infrastructure
- an environmental initiative
- a high functioning public transportation system
- a confidence sense of urban planning
- humans who live and work within the city and utilise its resources

A smart city's success depends on its ability to form a strong relationship between the government (bureaucracy and regulations), citizens, and the private sector. This relationship is necessary because most of the work that is done to create and maintain a digital, data-driven environment occurs outside of the government. Surveillance equipment symbolise another element of a smart city for busy streets, and these could include sensors from one company, cameras from another, and a server from yet another (Rouse, 2019).

Smart cities use a combination of the internet of things (IoT) devices, software solutions, user interfaces (UI), and communication networks. However, they rely first and foremost on the IoT. The IoT is a network of connected devices -- such as vehicles, sensors, or home appliances -- that can communicate and exchange data. Data collected and delivered by the IoT sensors and devices are stored in the cloud or on servers. The connection of these devices and the use of data analytics (DA) facilitates the convergence of the physical and digital city elements, thus improving both public and private sector efficiency, enabling economic benefits and improving citizen's lives.

The IoT devices sometimes have processing capabilities called edge computing. Edge computing ensures that only the most important and relevant information is communicated over the communication network.

A firewall security system is also necessary for the protection, monitoring, and control of network traffic within a computing system. Firewalls ensure that the data constantly being transmitted within a smart city network is secure by preventing any unauthorized access to the IoT network or city-data. Other smart city technologies include application programming interfaces (APIs),

artificial intelligence (AI), cloud computing, dashboards, machine learning (ML), machine to machine (M2M), mesh network, and more (Rouse, 2019).

Smart traffic management is used to monitor and analyse traffic flows in order to optimise streetlights and prevent roadways from becoming too congested based on time of day or rush-hour schedules. Smart public transit is another facet of smart cities, used to ensure public transportation meets user demand. Smart transit companies are able to coordinate services and fulfil riders' needs in real-time, improving efficiency, and rider satisfaction. Ridesharing and bike-sharing are also common services in a smart city (Rouse, 2019).

15.2   Smart Towns and suburbs

Smart towns and suburbs are immediate density areas following cities that have enormous economic potential. These towns require innovation to make use of the potential of digitalization. Solutions based on innovative digital technologies are discussed in the broad context of smart cities, which is to say they do not necessarily fit the requirements of towns as well. Towns and suburbs have their challenges as, for instance, they are not equipped with wide availability of infrastructure services which brings along individual challenges to different application domains like logistics, mobility, or education, therefore the context has to be understood. The government needs to understand in which way a certain digital technology should be applied for towns to act "smart"

- It is crucial to bring intelligent solutions to smart towns that improve the quality of their citizens' lives.
- Smart towns can use an open innovation approach to identify suitable solutions.
- Towns with a strong focus on economic sectors must be prioritised in digitisation (Hosseini, Frank, Fridgen & Heger, 2018).
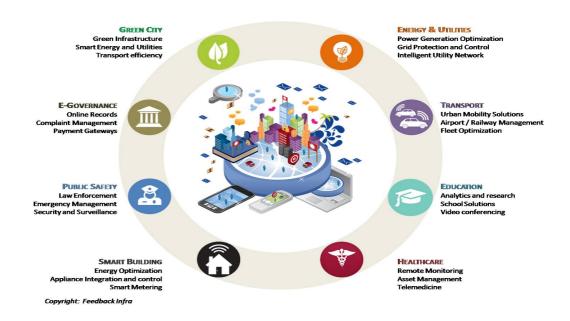
15.3   Smart Villages

'Smart Villages are communities in rural areas that use innovative solutions to improve their resilience, building on local strengths and opportunities. They rely on a participatory approach to develop and implement their strategy to improve their economic, social, and/or environmental conditions, by mobilising solutions offered by digital technologies. Smart Villages benefit from co-operation and alliances with other communities and actors in rural and urban areas. The initiation

and implementation of Smart Village strategies may build on existing initiatives and can be funded by a variety of public and private sources. (Nieto, 2019)'

A smart village's concept involves empowering rural communities to engage with their future, including the use (where appropriate) of digital technologies. Government is encouraged to support Smart Villages and adapt the available types of intervention to the specific needs of their territory. Smart villages' activities should include sustainable mobility, renewable energy, the bio, and circular economy, social innovation, and others (Nieto, 2019). The KwaZulu-Natal government must explore and strengthen the smart village initiatives as soon as possible in order to bridge the digital divide gap.

15.4 Elements of a Smart KwaZulu-Natal

Source: Smart City Kota (2020)

Recommendations:

It is recommended that:

- Provincial government forms a strong relationship between itself, citizens, and private sector, and for the private sector to donate equipment and installation required towards

smartness such as cameras, sensors, and related equipment using corporate social investment initiatives.

- KwaZulu-Natal government invests in the development and digitisation of towns with a strong focus on economic.
- The KwaZulu-Natal government must explore and strengthen the smart village initiatives as soon as possible in order to bridge the digital divide gap. This will encourage rural development and attract more economic activities in each village.

16.   GOVERNANCE

This strategy sets out what the KwaZulu-Natal set does to secure the province's future in the Fourth Industrial Revolution era and beyond. To oversee the implementation of this strategy and delivery of actions sets out, oversight structures are to be established at a senior level within the KwaZulu-Natal Provincial government. The role players in the strategy A multi-stakeholder partnership approach drives the development and implementation of the best digital strategy. This approach provides a way for all the relevant key stakeholder groups to be included in ways that not only demonstrate the value of their contributions but also provide for a synergistic impact that can be visible and that can be measured. Citizens are the center for any strategy in the province of KwaZulu-Natal.

16.4   Oversight structures

- The Cluster for Governance and Administration is responsible for fostering an integrated approach to governance and ensuring proper coordination.
- The Provincial Executive Council and Clusters to provide overall leadership in the strategy - public service and private sector, facilitating coordination of activities across government to ensure that a whole-of-government approach is applied and private sector partnerships.
- Monitoring and Evaluation by the Office of the Premier on the implementation of the strategy

16.2 Co-ordination

- The Provincial ICT Steering Committee, chaired by DG whose responsibility, amongst others, includes giving strategic direction for, amongst others, the electronic government in the provincial public service sphere in terms of section 7(3)(iii) of the Public Service Act. The Steering committee to consist of Heads of Departments, SITA, DTP, and Key ICT Managers) to provide support to the Executive, provide strategic guidance and co-ordination to issues of ICT.
- The Provincial Governmental Information Technology Office Council established as the principal inter-departmental forum to improve ICT practices of departments on such matters as the design, modernisation, use, sharing, and performance of information and ICT resources.

16.3 Implementation

- State entities shall be responsible for different aspects of implementation within their mandates.

In Departments and Municipalities:
- The Executive Authority shall provide political leadership.
- The Accounting Officers shall provide strategic leadership and is accountable for the implementation of the Corporate Governance of ICT; and
- Management shall be responsible for ensuring that the Corporate Governance of ICT is implemented and managed in the department.
- Private sector (corporate, Small, Micro and Medium Enterprises – SMMES) shall be responsible for elements of digitization, digitalization, and commercialization of certain elements towards digital transformation.
- Citizens shall be responsible for contributing information and usage of the products and services resulting from digitization.

17.   MONITORING AND EVALUATION (M&E)

Monitoring seeks to check progress against planned targets and can be defined as the formal reporting and evidencing that spend and outputs are successfully delivered, and milestones met (also providing a valuable source of evidence for evaluations); and evaluation is the assessment of the initiative's effectiveness and efficiency during and after implementation. It seeks to measure the causal effect of the scheme on planned outcomes and impacts and assessing whether the anticipated benefits have been realised, how this was achieved, or if not, why not.

17.1   Benefits of Monitoring and Evaluation

KZN Provincial Administration has the responsibility to support its citizens and deliver services end-to-end. The investment plan towards broadband infrastructure, information systems utilisation and efficiency to deliver high-quality service objectives, there is a responsibility of the largest and transformative investments needed to compete globally.

Evidence-based ethical monitoring and evaluation activities are an important vehicle to communicate informed decisions about where best to target public spending, demonstrating the value for money and benefits which are generated by investment in transport, design and delivery policies, programmes, communications, and regulations.

Adopting effective approaches for monitoring and evaluation can reduce the risks of:
- Poor decision making and inefficient delivery, by ensuring that valuable lessons are learned about what works and why / why not.
- Inability to demonstrate accountability, by providing greater transparency to taxpayers about how their money was spent; and,
- Unnecessary burdens being placed on businesses from regulatory activities.
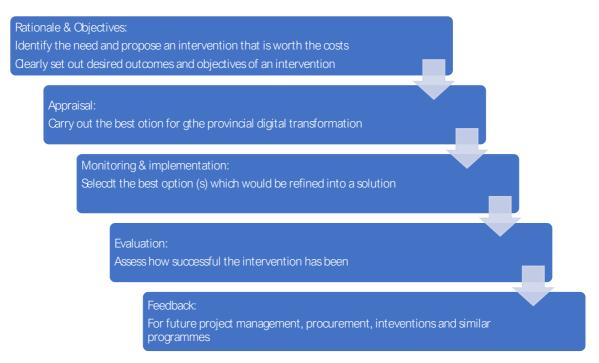
Monitoring and evaluation are not new to KZN Provincial Administration and over the years this type of evidence has been used to:
- Demonstrate the impacts of large-scale infrastructure projects.
- Test out pilot/demonstration projects.
- Improve the delivery of policies, programmes and communication activities and,
- Refine appraisal assessments and forecasts.

However, we wish to strengthen our framework for monitoring and evaluation to ensure that the coverage of activity is aligned to its priorities and that the plans for monitoring and evaluation are effectively delivered. We recognise the value of an increased focus on the evaluation of KZN Provincial Administration Activities, as digital transformation has become a focal point for service delivery objectives.
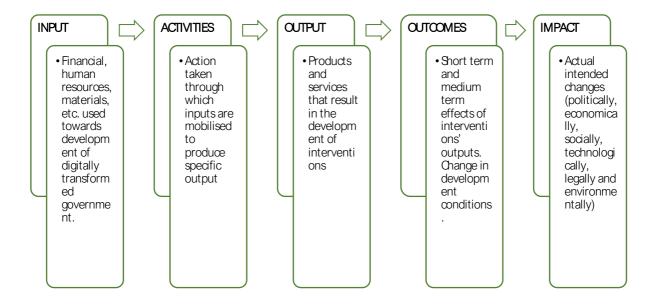
The digitisation implementation plan must cover all elements of the cycle as follows:

Figure 9: Digitisation implementation plan cycles

Rationale & Objectives:
Identify the need and propose an intervention that is worth the costs
Clearly set out desired outcomes and objectives of an intervention

Appraisal:
Carry out the best otion for gthe provincial digital transformation

Monitoring & implementation:
Selecdt the best option (s) which would be refined into a solution

Evaluation:
Assess how successful the intervention has been

Feedback:
For future project management, procurement, inteventions and similar programmes

In addition, the following model will be used to monitor and evaluate implementation.

Figure 10: Monitoring and Evaluation Framework

INPUT	ACTIVITIES	OUTPUT	OUTCOMES	IMPACT
• Financial, human resources, materials, etc. used towards development of digitally transformed government.	• Action taken through which inputs are mobilised to produce specific output	• Products and services that result in the development of interventions	• Short term and medium term effects of interventions' outputs. Change in development conditions.	• Actual intended changes (politically, economically, socially, technologically, legally and environmentally)

18.   RISK MANAGEMENT

This section acknowledges that in the process of digitisation, there will be risks involved. The developers of the digitisation plan must develop a risk management strategy that will eliminate or minimise potential risks. Risk management refers to the practice of identifying potential risks in advance, analysing them, and taking precautionary steps to reduce/curb the risk.

Risk management is important in this provincial initiative because, without it, the province cannot possibly define its objectives for the future. If the province defines objectives without considering the risks, chances are that a direction will be lost once any of these risks emerge.

Essentially, the goal of risk management is to identify potential problems before they occur and have a plan for addressing them. Risk management looks at internal and external risks that could negatively impact an organization.

Digital risk management is an essential part of business management. It is focused on the threats and risks for enterprise information and the underlying IT systems processing them as they are implementing the full set of business processes.

Risks related to digital transformation include technology-related risks that have an impact on systems, people, and processes. Key risk areas may include scalability, compatibility, and accuracy of the functionality of the implemented technology. Third-party risks comprise of risks arising due to inappropriate controls at vendors/third party operating environment.

Further to that, when embarking on such an important digital transformation project, companies must remain cognizant of the risks of intelligent automation, which can include:
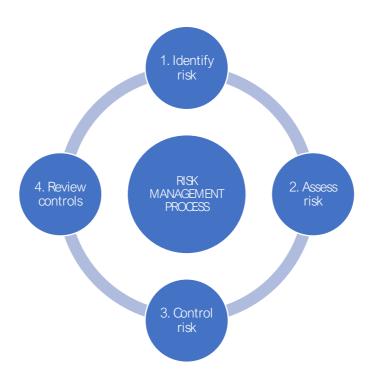
Operations disruptions

- Skills gap
- Inconsistent developer training
- Lack of change management processes
- Insufficient cybersecurity
- Ineffective controls

18.1 Risk Management Model

The risk management model to be affected for each step of implementation is the following:

Figure 11: Risk Management Framework

18.2 Identified risks

The table below denotes the generic risks that are linked to digital transformation. It is important to note that risk mitigation strategies for these risks must be detailed in the digitisation implementation plan.

RISK	DESCRIPTION	RISK	DESCRIPTION
Strategic	Usually derives from the government's goals and objectives. It can be external to the government and, on the occurrence, forces a change in the strategic direction of the organization. Typically, it would have an impact on customer experience, brand value, reputation, and competitive advantage in the marketplace.	Data leakage	Ensuring protection of data across the digital ecosystem at various stages of data life-cycle–data in use, data in transit, and data at rest. Key focus control areas would be around data classification, data retention, data processing, data encryption, etc.
Operations	An event, internal or external, that impacts the government's ability to achieve the business objectives through its defined operations. Includes risks arising due to inadequate controls in the operating procedures.	Third-party	Comprises of risks arising due to inappropriate controls at vendors/third party operating environment. Key controls would be around data sharing, technology integration, operations dependency, vendor resiliency, etc.
Regulatory	Adherence to statutory requirements including technology laws, sectoral laws, and regulations.	Privacy	Risk arising due to inappropriate handling of personal and sensitive personal data of customer/employee, which may impact the privacy of the individual. Key controls include notice, choice, consent, accuracy, and other privacy principles.
Technology	Potential for losses due to technical failures or obsolete technologies. Technology-related risks have an impact on systems, people, and processes. Key risk areas may include scalability, compatibility, and accuracy of the functionality of the implemented technology	Forensics	Digital environment's capability to enable investigation in the event of a fraud or security breach, including capturing of data evidence which is presentable in the court of law.
Cyber	Protection of the digital environment from unauthorized access/usage and ensuring the confidentiality and integrity of the technology systems. Key controls may include platform hardening, network architecture, application security, vulnerability management, and security monitoring.	Resilience	Risk of disruption in operations or unavailability of services, due to high dependency on tightly coupled technology. Key areas of consideration would include business continuity, IT/Network disaster recovery, cyber resiliency, and crisis management.

Recommendations:

It is recommended that:

- the digitisation plan must outline detailed risk mitigation strategies that will be employed throughout the process of the digital transformation strategy.

19.   LIMITATIONS

Limitations refer to limiting factors or circumstances that could hinder or slow down the implementation of the digital transformation strategy in the province. The following potential limitations were identified. The solutions were also proposed.

Limitations	Proposed solutions
Minimum participation from government spheres	Workshops to announce the provincial digital transformation plans and to educate officials about expectations from each sphere.
Lack of buy-in from decision-makers	Get buy-in from the executives of the province by hosting workshops to table the roadmap to the digital transformation of the province.
Employee push-back	Empower employees with information and always and ensure they are part of the process
Limited or no budget	The province has to prioritise resources towards this process as it will contribute towards efficient service delivery and possibly reduce complaints against government from stakeholders. These budget allocations could be done in % milestones.
Limited knowledge of digitization from ICT officials	Capacity building programmes must be undertaken by the province.
Change management / cultural change resistance	Empowerment and workshops to clear out concerns will be necessary.
Lack of departmental change	Digital Transformation is necessary; therefore, a provincial instruction shall be nece3ssary to kick start this process. The province needs to be decisive about this transformation.
Slow pace / no implementation	Identify causes during monitoring and recommend practical solutions.
Heavy reliance on service providers/consultants	Use in-house capacity as far as possible, and only where there are lack skills for this provincial intervention can elements of this be outsourced. This could be included in certain officials' performance agreements for the year.
Negative attitude	People shall be informed of the steps towards implementation – through the implementation plan and must raise concerns then. The province must be non-tolerant of deliberate negativity and sabotage of such an intervention.

20.   WAY FORWARD

It is noted that this document presents the strategic priority areas for the provincial Digital Transformation. The six strategic priorities identified are:

- Connectivity
- Digital skilling
- Information management, knowledge management, and security

- Process automation
- Systems Integration
- Digitisation of the province

There are steps to be followed towards digitisation. Immediate steps include the following:

Step 1:   Approval of the KwaZulu-Natal ICT Integration Plan for the Digital Transformation Strategy, with its relevant appendices.

Step 2:   Development of a digitisation (ICT) plan with financial and human resources implications, implementation timelines, impact, risk management strategy, stakeholder matrix and analysis, mode of implementation, ICT governance and architecture, names of implementation champions, and roadmap to the finalisation of the project.

Step 3:   Approval of the digitisation plan

Step 4:   Allocate immediate resources and implement, starting with easier tasks and quick wins that can be implemented in parallel.

Step 5:   Report progress on implementation monthly, quarterly, and annually.

21.   RECOMMENDATIONS

It is hereby recommended that the Executive:

21.2.1 approves the Digital Transformation Strategy;

21.2.2 approves that Treasury to redirect and avail budget for connectivity and digitization of the province;

21.2.3 Approves that the Departments and municipalities collaborate on resources such as budget to leverage on economies of scale

21.2.4 Tasks the relevant MECs and their Heads of Departments be the champions of digitization in their respective departments

21.2.5 Approves reporting on implementation progress within the existing structures such as PIGITOC, Action Working Group quarterly, ICT Steering Committee and other relevant structures as may be deemed necessary by the province.
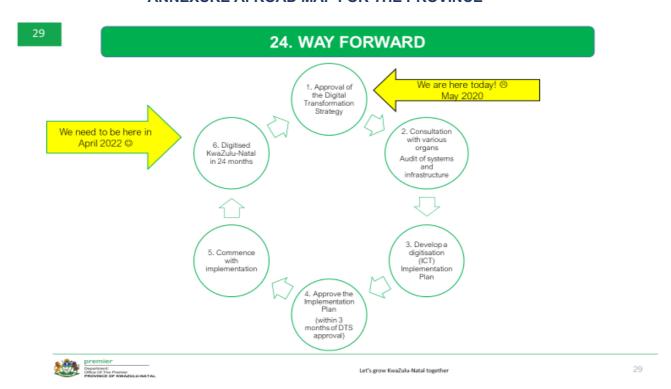
It is hereby recommended that the Executive notes:

21.2.6 the roadmap on as presented on Annexure A; and

21.2.7 that an implementation plan with timelines will be developed once the strategy has been approved.

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ANNEXURE A: ROAD MAP FOR THE PROVINCE

DETAIL	ACTION
Timeline to finalise the plan	30 may 2020
Digitisation Plan content	• ICT governance and architecture • Systems implications • Financial resources implications • Human resources implications • Implementation timelines • Impact on the province • Risk management strategy • Stakeholder matrix and analysis • Mode of implementation • Implementation champions • Roadmap to finalisation of the project
Milestone reporting	Quarterly to the Province
Consideration	KZN to be fully digitised in the next 24 months

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