



PROVINCE OF KWAZULU-NATAL
ISIFUNDAZWE SAKWAZULU-NATALI

OFFICE OF THE PREMIER



2020-2025
KwaZulu-Natal Provincial
**ICT Integration Plan for
Digital Transformation Strategy**

Amendment history

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0.1	August 2019	Created	Document created
1.0	Feb 2020	Versioning amendment	Updated V1 after consultations completed by KZN OTP
1.1	June 2020	Reference 24 added	Adjustment per S.Singh (KZN OTP)

References

Ref no	Reference	Chronology
1	Government Wide Enterprise Architecture Framework v12 (Government IT Officers Council (GITOC) of South Africa)	July 2019
2	GWEA Implementation Guide v12 (Government IT Officers Council (GITOC) of South Africa)	Jun 2010
3	The Open Group Architecture Framework (TOGAF 9; The Open Group; USA)	Jan 2009
4	The Open Group Architecture Framework (TOGAF 9.2; The Open Group; USA)	Apr 2018
8	Corporate Governance and Governance of ICT Policy Framework (DPSA)	Dec 2012
9	Corporate Governance of ICT Assessment Standard (DPSA)	Nov 2012
10	Implementation Guideline for Corporate Governance and Governance of ICT Policy Framework Version 2(DPSA)	Feb 2014
11	Corporate Governance of ICT Assessment Standard for MPAT 15 Draft for GITOC Consultation (DPSA)	Apr 2015
12	COBIT 5 - Business Framework for Governance and Management of Enterprise IT (ISACA)	2012
13	E-Agriculture Strategy Guide (Food and Agriculture Organisation of the United Nations and International Telecommunication Union)	2016
14	State of the Nation Address	2019, 2020
15	State of the Province Address	2019
16	State of the Province Address Budget	2019
19	KZN Provincial Growth and Development Plan 2035 v4	2019
20	DPSA Cloud First Policy (current version awaiting ratification)	2019
21	Nation e-Strategy	2017
22	National e-Gov Strategy	2017
23	ICT SMME Support Strategy	2017
24	Provincial Digital Transformation Strategy: ICT Implementation & Migration Plan	2020

Abbreviations

AG	Auditor General
CBT	Computer Based Training
CGICT	Corporate Governance of ICT
CGICTPF	Corporate Governance of Information and Communications Technology Policy Framework
COTS	Commercial Off The Shelf
DBMS	Database Management System
DPSA	Department of Public Service and Administration
DARD	Department of Agriculture and Rural Development
EA	Enterprise Architecture
ERP	Enterprise Resource Planning

CONFIDENTIAL

GICT	Governance of Information and Communications Technology
GITOC	Government Information Technology Officers Council
GITO	Government Information Technology Officer
GWEA	Government Wide Enterprise Architecture
ICT	Information Communications Technology
IT	Information Technology
KZN	KwaZulu-Natal
MANCO	Management Committee
OLA	Operational Level Agreement
RFC	Request for Change
SITA	State Information Technology Agency
SLA	Service Level Agreement
TOGAF	The Open Group Architecture Framework
4IR	4th Industrial Revolution
NPV	Net Present Value
IRR	Internal Rate of Return
TCO	Total Cost Of Ownership
MTEF	Medium Term Expenditure Framework
STEM	Science, Technology, Engineering and Maths

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- The Office of the Premier and members of the Provincial Executive Council of KZN;
- The KZN Provincial Planning Commissioners (KZN PPC) for their provincial impact and guidance that this plan seeks to align to;
- The KZN PPC Secretariat;
- The nominated representatives of the PGDP (Provincial Growth and Development Plan) Technical Committee from the KZN Provincial Departments, Provincial State-Owned Entities, National Departments, National State-Owned Entities, SALGA KZN and Municipalities;
These entities have periodically shared their voice that has helped provide insight into the catalytic projects required and the direction the province can take with ICT impact.
- Our stakeholders and partners who took time to comment on and give input into the plan from provincial departments, traditional councils, organised labour, organised business, the community sector and academic institutions.
- The constructive association and collaboration with the Moses Kotane Institute.
- The provincial GITO members and provincial ICT expertise.
- Commercial and global ICT partners.

Foreword by the Director General of KwaZulu Natal



The Province of KwaZulu Natal has embarked on a citizen centric strategy that will direct the digital transformation of the KZN Provincial Government into an all-inclusive digital Province where all citizens can benefit from the opportunities offered by technology.

The development of this strategy is a result of the 4th Industrial Revolution, and how the KZN Provincial Government can become a Digitally Transformed Province.

This will be done through the close partnerships with all Government departments within the Province, our commercial partners, universities, citizens and tourists alike.

This document defines a renewed approach and programme of action that will radically improve the digital transformation of the KZN Provincial Government.

As per the National e-Government Strategy and Roadmap of 2017, it was stated “that more focused attention will be given to infrastructure roll-out, the creation and acceleration of the expansion of e-Government services, as well as to develop e-Government platforms, for use by departments to deliver services online to citizens”.

Whilst we embrace digital transformation, we must also look to our existing ICT platforms that we must bring to end-of-life in a deliberate and safe manner.

This new consolidated approach and programme of action will require the KZN Provincial Government to unlock any challenges relating to institutional arrangements and request buy-in from respective public sector stakeholders, and information and communication technology industry participation to provide the requisite skills, technology and related investments to implement and support the digital transformation solutions.

Digital transformation is progressing at pace and the province acknowledges the continuous effort to plan, do as we say, check our compliant progress and act appropriately in context.

As such we will embrace engagement with our various departments, internal expertise, commercial partners, research institutes, universities and citizens alike.

This collaboration, insights and recommendations is the basis of Sukuma Sakhe and will undoubtedly lead the KZN Provincial Government to *harness the 4IR to create a Citizen Centric, Modern, Innovative and Digitally enabled KZN Province where technology uplifts human dignity, health, harmony, skills and safety whilst giving citizens a technological gateway to Africa and the World*”

Dr. Nonhlanhla O. Mkhize
Director General of The Province

GLOSSARY

Strategic Goal: A desired end result, which reflects the high-level ultimate change that is sought.

Strategic Objectives: Sub-goals that help to convert a mission statement from a broad vision into more specific strategic initiatives that contribute towards achieving the ultimate goal. These are likely to be applicable over longer periods, and are likely to remain quite stable over-time, though the targets will change. Strategic objectives are achieved through strategic projects and programmes that cumulatively contribute towards the goal. In the context of this document, such projects and programmes will find more detailed expression in the Provincial Growth and Development Plan with targets set for five-year intervals.

Interventions: Strategic project, programme or course of action dedicated to facilitating the most practical and effective forms of strategic action to effect change through strategic objectives.

Indicator: Measurable variable used to gauge current state/condition, project future trends and measure progress in achieving goals. It tracks and indicates how the Province is performing relative to its goals and whether the overall strategy has been accomplished.

Targets: A target extends the indicator by providing a measurement. An indicator describes what is to be measured, the target specifies how much, how many, how far, where (in spatial terms).

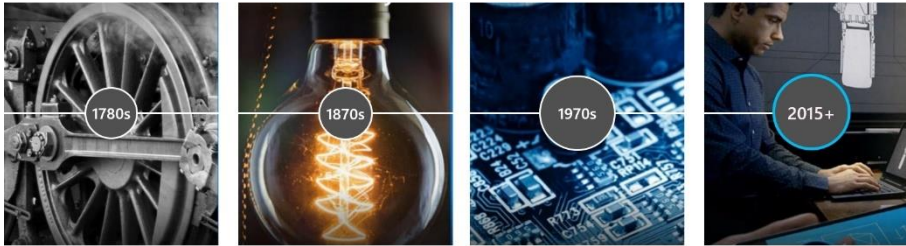
When we say	Think...
Quantum Computing	Quantum Physics, Fastest Computer Calculations, Faster Understanding to complex permutations, Unlock current best ICT security in minutes
Artificial Intelligence (AI)	Technology that aims at emulating human Cognitive capabilities like visual recognition, speech recognition and is trained by a human with algorithms.
Machine Learning	An Application of AI. Technology that can Learn and improve from experience without being explicitly coded.
Block Chain	A blockchain is a decentralized, distributed and public digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively withoutconsequences. Bitcoin is created using Block Chain Technology.
Big Data	Its BIG...by volume. Both structured and unstructured data. Analysed for insights that lead to better decisions and strategic business moves.

1. Background and Introduction

1.1 Digital Transformation

Digital transformation, also called digital disruption or digital business, is the integration of digital technology into all areas of execution - fundamentally changing how entities operate, engage their employees, citizens, stakeholders and how it delivers disruptive value to its customers.

Disruption is the 4th industrial revolution



STEAM

ELECTRICITY

ELECTRONICS & IT

DIGITAL

The digital embrace is changing the capability of departments, and this change is growing faster than the pace of transformation in organizations.

Digital transformation is not a new concept, but the conversation has shifted to how rather than why.



The 2030 National e-Strategy states its problem statement on Digital Transformation as “

“The Digital Industrial Revolution will have an impact on three segments of society, namely business, government and individuals. The African Continent has an opportunity to make a significant contribution to the success of the revolution, as it is likely that some of its biggest challenges can become unique opportunities.”

Digital business reached a tipping point since 2018 as organizations embrace and scale their digital capabilities. Enterprises around the world are making significant investments in the technologies and services that enable the digital transformation of their service delivery models, products, and services.

Strategic digital transformation started becoming more pervasive in 2019. Budgets are soaring in technology whilst over-all cost savings debunk the business case to invest in technology.

The list of disruptive technologies on the radar of stakeholders is expanding.

Ownership is now moving to the senior leadership and managed by cross-functional, collaborative groups.

The 2020 State of the Nation Address by President Ramaphosa, made a plea to embrace digital transformation to expedite citizen delivery and grow the economy.



Technohubs launch 2016

The Province of KwaZulu Natal, led by The Premier, is embarking on a number of technology investments that will contribute towards unlocking the province's potential via 4IR.

A citizen-centric experience continues to lead digital transformation investment priorities, but employee experience and organizational culture are also rising in importance to empower and accelerate change, growth, and innovation.

Ramaphosa's remarkably tech-focused Sona: what he said about ICT

By DUNCAN MCLEOD — 7 February 2019 1 Comment



Cyril Ramaphosa (photo: GCIS)

Ethics in 4IR is a growing focus area as more conscience-driven decisions are made on how far technology pervasiveness is allowed into human daily existence.

Hence, A unified province acting strategically in the choice of 4IR impact will expedite the radical provincial transformation being anticipated. This strategy is aimed towards guiding, creating a 4IR delivery capability and further focusing the 4IR potential towards the anticipated 2030 results for this province.

Quick Info

internet of things (IoT)



The internet of things, or IoT, is an orchestrated system of interrelated computing devices, mechanical and digital machines, general moving or static objects, animals or people that are uniquely identified and have the ability to transmit data to a decision-making platform that would render opportunities and insights not possible without them.

1.2 Situational Analysis

The summarised situational analysis presented here is not meant to replicate the depth of the analysis done by the planning and analysis teams of the province. The brevity here is intentional.

Stakeholder	Anticipated Impact
Political	<ul style="list-style-type: none"> ▪ The province is in its 6th Administration.
Social	<ul style="list-style-type: none"> ▪ KZN province is the second largest contributor to the economy of the Country, generating a percentage share of national GDP of 16 percent. ▪ It performs in all economic spheres most notable in agriculture, tourism, manufacturing, mining trade, construction, finance and community services. ▪ Owing to its strategic location along the east coast, the province has been provided with a competitive advantage in so far as tourism is concerned. ▪ The province has SEZ (special economic zones) located at Dube Trade port and Richards Bay are strategically positioned to drive foreign direct investment opportunities.
Social	<p>Despite the contribution the GDP, the province still suffers social ills which can be mitigated with the advent of the possibilities brought upon by 4IR.</p> <ul style="list-style-type: none"> • The factors include challenges in : <ul style="list-style-type: none"> • Education, • Unemployment • Health • HIV/AIDS <p>...and many more in context that will not be laboured.</p>
Technological	<ul style="list-style-type: none"> • There is huge emphasis on the implications of the 4th Industrial revolution and the impact to the KZN Province. • The KZN EDTEA launched the first 4th Industrial Revolution conference in 2018, where it was stated that the Moses Kotane Institute will be responsible for all 4IR initiatives in the Province. An engagement workshop was thereafter held in February 2020 also. • The EDTEA is also embarking on a Broadband Project that see the roll out of a high-quality fibre network across the Province. • Certain Cities and local departments have started to experiment with Cloud technology, IOT devices, Artificial intelligence, predictive analytics and drone technology. • There is hug emphasis on the implications of the 4th Industrial revolution and the impact to the KZN Province.
Legal	<ul style="list-style-type: none"> ▪ There is no finalisation of the Cloud Policy for National Government including KZN Provincial Government. This, however, does not indicate that KZN Provincial Government is restricted from investigating Cloud solutions. Local controls will need to be implemented to support the Premier's motion. ▪ There are multiple pieces of legislation that govern all activities with ICT and well as the citizens and KZN Governments data. ▪ Outdated ICT policies exist. ▪ ICT Governance requirements obscured. ▪ The province needs to embrace global ICT standards like GDPR etc and also ISO accreditation standards.

Finance	<ul style="list-style-type: none"> ▪ 4IR demands a higher focus from the finance department to ensure that investments and operational costs can lead to the radical economic transformation for the province. ▪ Financial business processes will have to re-focus traditional capex budgeting processes to opex focus areas. ▪ NPV, IRR and business cases with a higher accuracy will be pivotal.
HR	<ul style="list-style-type: none"> ▪ Modern Workplace implications need to be entrenched in Job profiles, performance indicators etc. ▪ Employee wellness and change management during the modernisation process will need to be planned. ▪ Digital Training initiatives executed for digital capability.
Administration	<ul style="list-style-type: none"> ▪ Administration will embrace democratised workflow capabilities. ▪ Artificial intelligence and machine learning will reduce manual interventions enabling greater citizen delivery resourcing.
Environmental	<ul style="list-style-type: none"> ▪ The KZN province has a detailed sustainable environmental management plan and Environmental Portfolio committees. ▪ The plan entails the conducting of environmental Impact assessments and awareness raising programs. ▪ This plan also includes Youth in Agriculture and Maritime initiatives. The KZN province also has a Provincial Climate Change council that will provide support for ongoing discourse in climate change. ▪ The KZN Province is also embarking on a creation of a Green Economy strategy with a number of e-Agriculture strategies associated.

1.3 The Provincial Digital Transformation Conceptual Difference

The public sector’s on-premise ICT infrastructure has grown over several decades to meet the increasing demand for the support of government processes, storage and management of government data, and provision of some online services to citizens.

This on-premise model has resulted in increasingly costly infrastructure proliferation, which has hindered the government’s ability to upgrade it, optimize its usage across government entities, and scale it up to address the expanding needs at the national level. A hyperscale cloud computing model provides an opportunity for the provincial government to deliver efficient, cost effective public services.

Cloud computing is creating a paradigm shift by delivering hosted services through the internet with recognized cost benefits and business innovation.

While the private sector is building on cloud computing’s numerous benefits, government organizations have also aggressively begun to capitalize on them. Accordingly, the KZN Provincial government sees the cloud computing technology and practices as an opportunity to improve citizen service delivery performance. The province intends to achieve this through eliminating redundancy, increasing agility, and providing information and communication technology services as a utility.

4IR Hyperscale Computing capabilities and the various opportunities it brings with Artificial Intelligence, Machine Learning, Internet of things, Big Data etc will move the current on-premises computing into another dimension of capability.

The difference thereof is tabulated below and will require a whole new paradigm shift to providing ICT services at within the province.

Characteristics	Current Traditional IT	Future Modern IT
DNA	Intermediation	Disintermediation
Service Delivery	Waterfall, Project-based	Agile, Product-based
Lifecycle	N-1, Legacy	Evergreen
Service Architecture	Design for Success	Design for Failure
Delegation Level	Functional	Service-Based
Processes	Manual	Automated
Automation	Rudimentary	Pervasive
Monitoring	Component-Level	Capability-Level
Configuration & Asset Management	Discovered, Manual	Declarative, Automated
Customer Experience	SLA-Based/End-User	XLA-Based/Service Consumer
Governance	Reactive	Proactive
Financial	CAPEX	OPEX
Culture	Wall of Confusion	DevOps
Ecosystem	Fragmented	Cohesive
Performance Management (KPI)	Siloed	Value Stream
Self-Service	Portal-Based	AI-Augmented

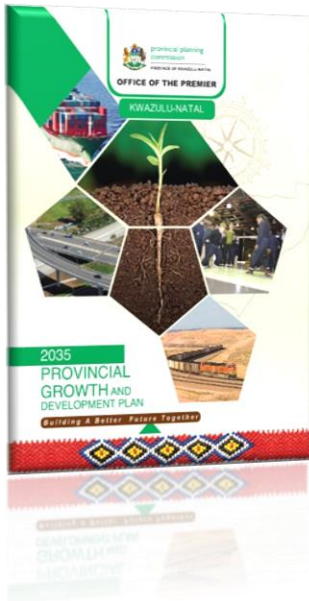
Modern IT Service Management therefore brings different value changes within the province that are tabulated below.

Characteristics	Modern IT	Value of Change
DNA	Disintermediation	+Agility, +Efficiency, -Cost
Service Delivery	Agile, Product-based	+Agility, -Operations, +Quality
Lifecycle	Evergreen	+Security, -Costs
Service Architecture	Design for Failure	+Resiliency, +Uptime
Delegation Level	Service-Based	+Agility, +Business Focus
Processes	Automated	+Quality, +Transparency, -Time
Automation	Pervasive	+Quality, +Transparency, -Time
Monitoring	Capability-Level	+Quality, +Transparency, -Lead Time
Configuration & Asset Management	Declarative, Automated	+Agility, +Security, +Quality, -Labor
Customer Experience	XLA-Based/Service Consumer	+Business Focus, +Quality
Governance	Proactive	+Speed (Engineered), Transparency
Financial	OPEX	+Transparency, +Accountability
Culture	DevOps	+Agility, +Quality, +Transparency, -Time
Ecosystem	Cohesive	+Agility, +Quality
Performance Management (KPI)	Value Stream	+Transparency, +Business Focus
Self-Service	AI-Augmented	+Business Focus, +Quality, -Time

2. One Province – One Plan – One Future

The Director General of the Province tasked the Provincial GITO council to prepare a 4IR ICT strategy mobilisation plan that is aligned to the Provincial Growth and Development Strategy.

We replicate the Provincial planning here for the reader to align their 4IR ideation towards the impact anticipated in the province.



1	Inclusive Economic Growth
2	Human Resource Development
3	Human and Community Development
4	Strategic Infrastructure
5	Environmental Sustainability
6	Governance and Policy
7	Spatial Equity

The **7 provincial goals** are the Province’s focus together with the associated **31 strategic objectives**.

High Impact, High Value Initiatives	
Inclusive Economic Growth	1.1 Develop and Promote the Agricultural Potential of KZN
	1.2 Enhance Sectoral Development through Trade Investment Business Retention
	1.3 Enhance Spatial Economic Development
	1.4 Improve the Efficiency, Innovation and Variety of Government-led Job Creation Programme
	1.5 Promote SMME and Entrepreneurial Development
	1.6 Enhance the Knowledge Economy
Human Resource Development	2.1 Improve Early Childhood Development, Primary and Secondary Education
	2.2 Support Skills alignment to Economic Growth
	2.3 Enhance Youth and Adult Skills development and Life-Long Learning
Human and Community Development	3.1 Eradicate Poverty and Social Welfare
	3.2 Enhance the health of communities and citizens
	3.3 Safeguard and enhance sustainable livelihoods and food security
	3.4 Promote sustainable human settlements
	3.5 Enhance safety and security
	3.6 Advance social cohesion and social capital
	3.7 Promote Youth, gender and disability advocacy and the advancement of women
Strategic Infrastructure	4.1 Development of Seaports and airports
	4.2 Develop Road and Rail networks
	4.3 Develop ICT Infrastructure
	4.4 Ensure Availability and sustainability management of water and sanitation for all.

	4.5 Ensure access to affordable, reliable, sustainable and modern energy for all
	4.6 Enhance KZN Waste management capacity
Environmental Sustainability	5.1 Enhancing Resilience of Ecosystem services
	5.2. Expand Application of Green Technologies
	5.3 Adapt and Respond to Climate Change
Governance and Policy	6.1 Strengthen policy and Strategy Coordination and inter-governmental relations
	6.2 Build Government Capacity
	6.3 Eradicate Fraud and Corruption
	6.4 Promote participative, facilitative and accountable governance
Spatial Equity	7.1 Enhance the resilience of new and existing cities, towns and rural nodes, ensuring equitable access to resources, social and economic activities
	7.2 Ensure integrated land use management across the Province, ensuring equitable access to goods and services, attracting social and financial investment

Provincial Priority Areas

1. Basic Services
2. Job Creation
3. Growing the Economy
4. Growing SMME's and Cooperative
5. Education and Skills Development
6. Human Settlement and sustainable livelihood
7. Build a caring and incorruptible government
8. Build a Peaceful Province

Eight priority focus areas also prevail whilst we seek to accomplish provincial success.

The provincial PGDP plan states : *“By 2035, the PROVINCE OF KWAZULU-NATAL should have maximized its position as a gateway to South and Southern Africa, as well as its human and natural resources so creating a safe, healthy and sustainable living environment. Abject poverty, inequality, unemployment and the current disease burden should be history, basic services must have reached all of its people, domestic and foreign investors are attracted by world class infrastructure and a skilled labour force. The people will have options on where and how they opt to live, work and play, where the principle of putting people first, living together in dignity and harmony, and where leadership, partnership and prosperity in action, has become a normal way of life.”*

The people of KwaZulu Natal have a vision, achieved together with one plan for a better, equitable future for all citizens.

The KwaZulu Natal Vision Statement

“KwaZulu-Natal’s Vision By 2035 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”

One Province – One Plan – One Future

This ICT plan aims to focus the 4IR effect towards the provincial business plans in order to harness the highest impact for the province.

3. Purpose of the Provincial Digital Transformation Strategy

Current insights from the province have established that one of the major stumbling blocks to service delivery is the lack of a modern approach to integrated e-government systems. The KwaZulu Office of The Premier is mobilising the Provincial Digital Transformation Strategy to address the imbalances caused by deficit on-premise ICT capabilities, provide guidelines on hyperscale cloud computing and help align the investments in 4IR to the provincial goals and objectives.

This strategy further introduces the KZN Cloud First Policy, Cloud investment business case template and the Cloud Legal and Privacy checklists that are to be read in conjunction with this document.

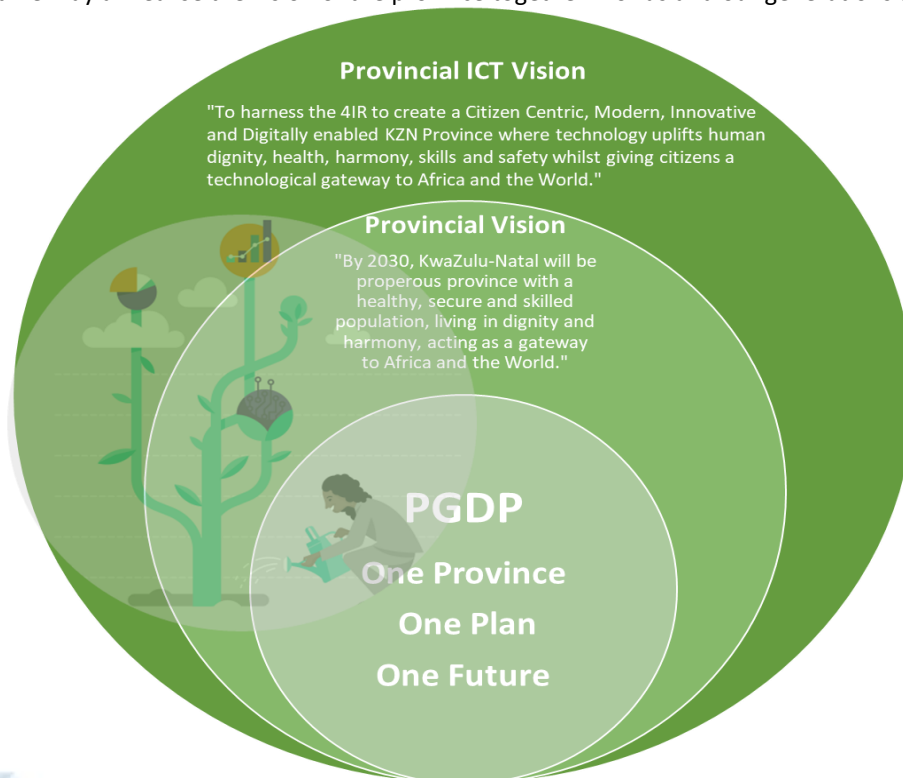
3.1 The ICT Vision to support provincial alignment

The ICT vision for the province, therefore, is purposely aligned to the provincial vision.

The KwaZulu Natal ICT Vision Statement

"To harness the 4IR to create a Citizen Centric, Modern, Innovative and Digitally enabled KZN Province where technology uplifts human dignity, health, harmony, skills and safety whilst giving citizens a technological gateway to Africa and the World."

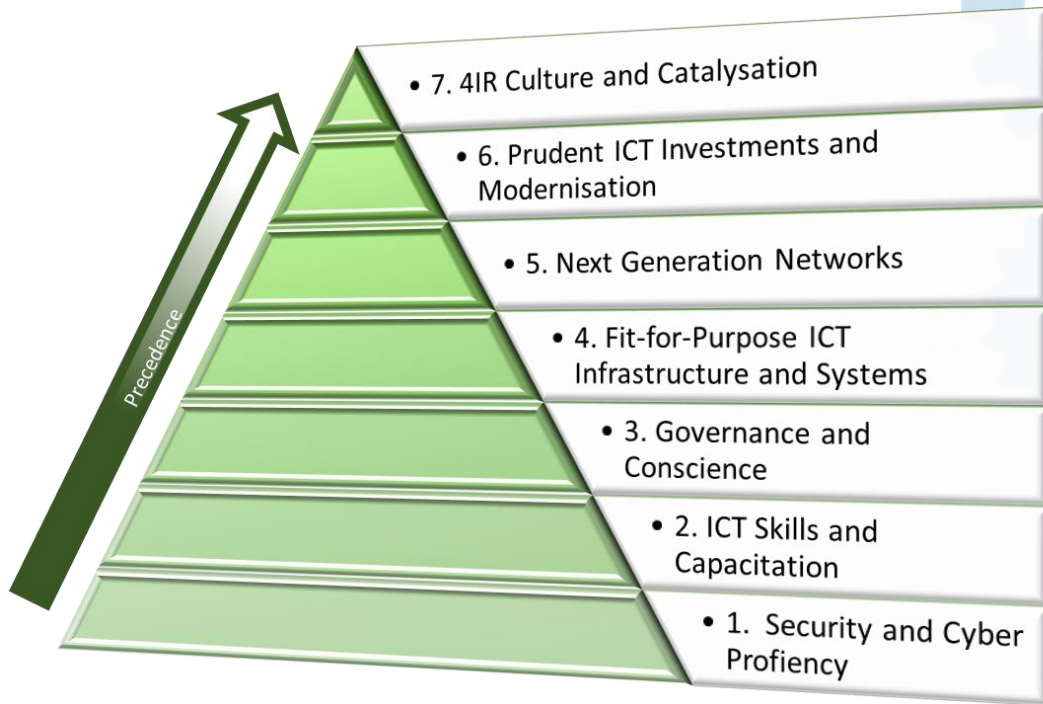
We encourage all entities within the KwaZulu Natal Province to align their 4IR ideation and execution to the provincial planning so that we may all realise the vision of the province together - for us and our generations ahead.



3.2 The Provincial One-ICT Goals and Objectives

Seven ICT Goals and their related objectives will be aspired to. We acknowledge that whilst 4IR is propagating at pace, we have to responsibly manage our existing technical debt for an optimal transition, invest in the correct technology at the correct time and understand our investment's tangible and intangible benefits thoroughly.

3.3 The Provincial ICT Goals



3.4 The ICT Objectives

The ICT goals are complemented with the following ICT Objectives.

Rank	Goals	Objectives
1	Security and Cyber Proficiency	1.1 Comprehensive Provincial Cyber Security Policy 1.2 Implement an end to end, robust digitally secure environment. 1.3 Prevent Cyber infiltration 1.4 Drive provincial security capability relevant in a hyper scale computing environment. 1.5 Establish Common Provincial Government identity management 1.6 Cyber Incident Management and Monitoring by the Department of Community Safety and Liaison
2	ICT Skills and Capacitation	2.1 Enable a fully IT skilled environment with adequate resource capacity 2.2 Incubate a 4IR learning culture
3	Governance and Conscience	3.1 Implementation of the Corporate Governance of ICT Framework 3.2 Creation of Ethical Technological practices that abides by the constitution 3.3 Create and mandate a Provincial Cloud Policy
4	Fit-for-Purpose ICT Infrastructure and Systems	4.1 Implementation of Hyper scale common computing Infrastructure 4.2 Implementation of effective and advanced Collaboration and decision-making platforms. 4.3 Establish secure Provincial Data lakes 4.4 Support Research initiatives 4.5 Strengthen collaboration with Academic institutes

5	Next Generation Networks	<p>5.1 Design and Implementation of a Heterogeneous scalable high-speed network.</p> <p>5.2 Implementation of a geographically encompassing citizen centric next generation network.</p>
6	ICT Investments and Modernisation	<p>6.1 Implementation of a digitally transformed working environment.</p> <p>6.2 Implementation of cost-effective ICT solutions</p>
7	4IR Culture and Catalysation	<p>7.1 Implementation of a DT Strategy to mobilise the radical economic Transformation of the Province.</p> <p>7.2 Creation of a digital platform to support catalysation</p> <p>7.3 Drive Human and Geographical Inclusivity</p> <p>7.4 Formulate a Digital Culture Change Management Strategy</p>

3.5 Provincial ICT Priorities

With the goals and objectives within this plan, the ICT expertise in the province of KwaZulu Natal is tasked with these priorities that are pivotal to both business’ and citizens’ hopes that arise from the 4IR capability :



- 1) **Achieve ICT and provincial alignment** – ICT to be a proactive business partner with the rest of the province in achieving the province’s business goals and objectives via modern technology capabilities
- 2) **Build a modern, trusted and capable technology architecture**
- 3) **Ensure appropriate cost-cutting and ICT Investments** is enabled via the emergence of hyper-scale computing
- 4) **Enable responsible citizen-centric, catalytic 4IR disruption possibilities**
- 5) **Radiate as the cyber gatekeepers** to the province by being the **trusted cyber security cadres**
- 6) **Unlock, preserve and grow the province’s data wealth**, enabling new insights and capabilities for enhanced data driven decision making, machine learning, artificial intelligence.. and more.
- 7) **Position the province as a global technology hub with a vibrant digital culture**
- 8) **Embody good ICT governance and conscience** whilst propagating the 4IR for citizen health, prosperity, security, dignity and harmony

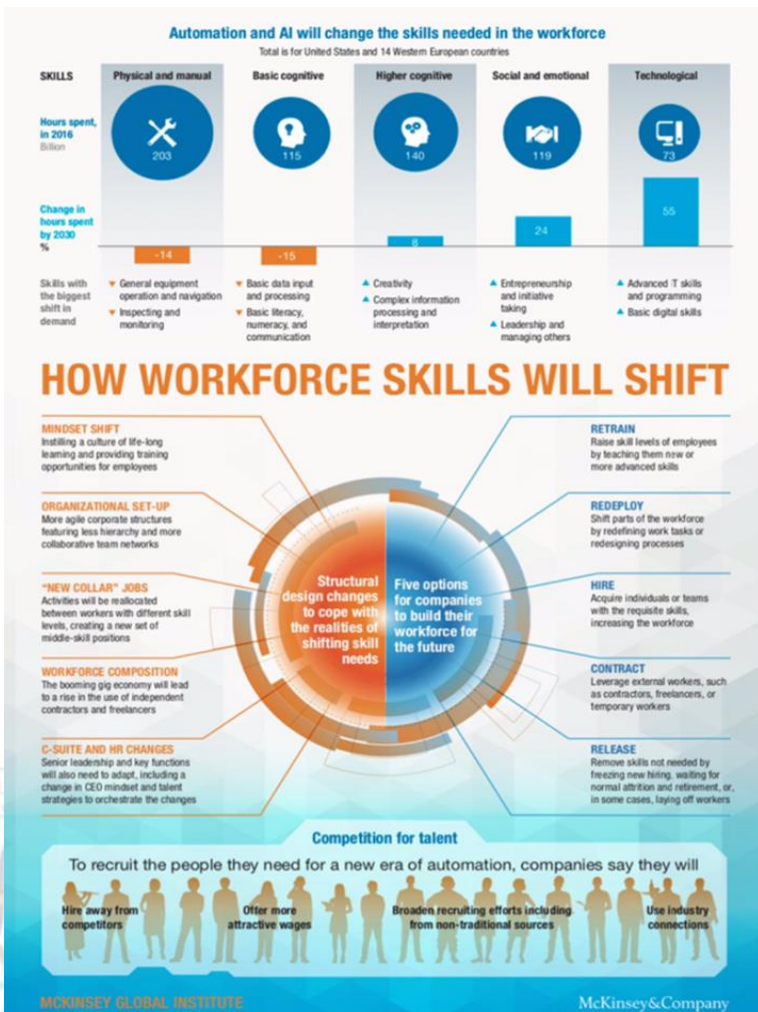
This understanding is critical and imperative analysis must be based on evidence and research.. and must further leverage the expertise of those in academia, the technical community experts and policymakers around the world.

By doing this, the provincial security ecosystem can help build a new generation of cybersecurity defences and partnerships that will enable provincial prosperity.

The province must then establish a detailed security operating model and governance environment for its modern 4IR ICT architecture that will include the implementation of Information Security International Standards, governance structures as per the DPSA Corporate Governance of ICT Policy Framework must be in place and operating optimally and a provincial cyber security task team that will ensure the province will work in a secure environment that is planned against security infringements and prepared against fraud or compromise via a cyber-attack.

4.1.2 ICT Skills and Capacitation

Rank	Goals	Objectives	Primary Indicators
2	ICT Skills and Capacitation	2.1 Enable a fully IT skilled environment with adequate resource capacity 2.2 Incubate a 4IR learning culture	1. Initiation of a provincial ICT Skills assessment 2. Implementation of ICT Training 3. E-learning platforms for citizens and employees



As the province starts to scale to embrace the 4th industrial revolution opportunities, digital transformation capability will require additional skills.

Provision of appropriate and adequate specialised technical skills to initiate, manage and drive the implementation of the systems and technology projects defined in this strategy, is required.

The existing provincial ICT departments will also need to be skilled, change managed and scaled adequately for embracing not only day-to-day operations but also the 4IR call to action.

It is important to also focus on non-technical training whilst the 4IR hype can overwhelm training initiatives towards technical requirements.

Our provincial capability must embrace the skills deficit to navigate global privacy laws like GDPR, Cloud ISO accreditations etc

4.1.3 Governance and Conscience

Rank	Goals	Objectives	Primary Indicators
3	Governance and Conscience	3.1 Implementation of the Corporate Governance of ICT Framework 3.2 Creation of Ethical Technological practices that abides by the constitution 3.3 Create and mandate a Provincial Cloud Policy	1. Establish a CGICT environment 2. Implement Business and ICT Strategic alignment. 3. Achieve continuous improvement of CGICGT. 4. Establish ICT Ethics competency 5. Provincial Cloud Policy

The purpose of corporate governance is to create value for the stakeholders of the Institution. It consists of a governance system that affects the way the Public Service Institutions are managed and controlled. It also defines the relationships between stakeholders and the strategic goals of the Public Service and Institutions.

Corporate governance is a vehicle through which value is created within Institutional context. Value creation means realising of benefits whilst optimising resources and risks. This value creation takes place within a governance system that is established by this framework. A governance system refers to all the means and mechanisms that enable the Accounting Officer and Executive Management of the Province to have a structured and organised say in:

- a) Evaluate internal and external context, strategic direction and risk to conceptualise the Institution’s strategic goals and how it will be measured;
- b) Direct the Institution in the execution of the strategic goals to ensure that value is realised, and risk is managed; and
- c) To monitor the execution of the strategic goals within an Institution against the measures identified for attaining the strategic goals.

4.1.3.1 Governance Overview

There are several levels of governance in an organisation:

- a) **Corporate governance:** The system by which businesses are directed and controlled;
- b) **ICT governance:** The leadership, organisational structures and processes which links an enterprise’s IT to the organisation’s objectives; and
- c) **Architecture governance:** Is a subset of ICT governance as shown in **Figure 1** and is the practise and orientation by which the enterprise architecture (EA) and other architectures are managed and controlled at an enterprise level (TOGAF 9.1, page 585).

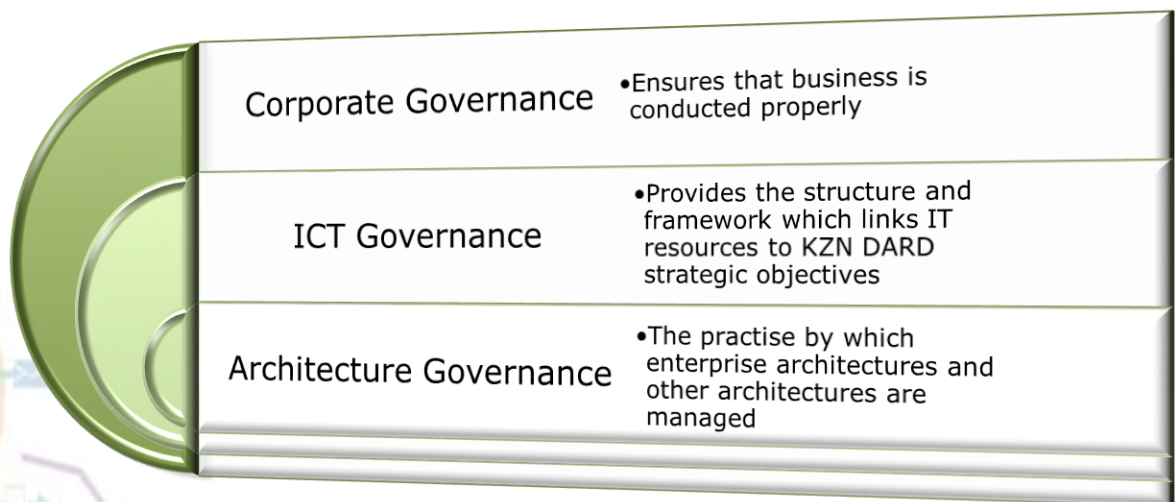


Figure 1 – Relationship between governance levels

The DPSA Corporate Governance of ICT Policy Framework further contextualises ICT Governance in the South African Public sector. A distinction is made between corporate governance, and corporate governance of ICT as described below and summarised in Figure 3.

Within the corporate governance system, the Executive Authority provides the political leadership, the HoD provides the strategic leadership and Executive Management ensures implementation and management. The Executive Authority is accountable to ensure that a corporate governance system is implemented in the department. Head of Department (HoD) is accountable for the corporate governance system whilst Executive Management is responsible for its implementation, management and continuous improvement. Within the corporate governance system of a province the Director General (DG) determines the strategy for the province and coordinates its efficient delivery.

The corporate governance of ICT is a subset of the Corporate Governance system, whilst the governance of ICT is a subset of the corporate governance of ICT. In this context the Political and Strategic leadership and Executive management is accountable / responsible for the corporate governance of ICT, whilst the GITO is responsible for the governance of ICT.

4.1.3.2 The tenets of ICT governance architecture

The tenets of ICT architecture are still expected to hold the province accountable during the 4IR embrace as 4IR creates hybrid cloud environments. We briefly summarise the tenets of the ICT architecture governance.

ICT governance function	Implication for architecture governance
ICT Strategic Alignment	Architecture governance must ensure alignment to business requirements.
ICT Resource Management	Adequate resourcing must be in place to develop and implement, as well as to support and maintain the architecture initiatives. This includes human resources as well as budget, infrastructure and any other resourcing required ensuring that the benefits from investments are derived.
ICT Performance and Conformance	Architecture governance must ensure that the solution's performance and conformance criteria are clearly defined, and that the solution is tested for performance and conformance against quality criteria.
ICT Value Delivery	The anticipated benefits from investments must be realised and architecture governance should ensure that these benefits are defined upfront, and that the solution architecture works towards achievement of the expected benefits.
Enterprise Architecture	Architecture governance must manage and control enterprise architecture
Information and Knowledge Management	Knowledge and information assets must be managed through the architecture governance process
ICT Risk Management	Architecture governance must consider risks inherent in architecture initiatives as well as the security requirements thereof. Appropriate risk controls must be built into initiatives, as well as risk management throughout the development and implementation of the initiative.
ICT Investment Management	Architecture governance must adhere to the budget allocated to the IT investments and projects.
General ICT management and administration	Architecture governance must ensure adequate structures are in place to manage the ICT environment
Creation of enabling environment CGICT and GICT	Successful architecture governance is dependent the development of policies, structures, the allocation of accountability and responsibility for the implementation of CGICT
ICT Compliance	Architecture governance must ensure compliance to internal and external standards and regulatory obligations;

ICT Service Management	<p>Architecture governance must ensure IT sourcing is aligned to business rules and regulations</p> <p>ICT Service delivery must not be negatively impacted by architecture initiatives.</p> <p>ICT Services may need to be reviewed and revised as part of new architecture initiatives implemented.</p>
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4.1.3.3 Global Cloud Provider Accreditations and Privacy Laws

There are over 70 trust accreditations globally including the following ISO accreditations which the cloud provider must have acquired.

The KZN Provincial Cloud First Policy details the minimum provincial requirements.

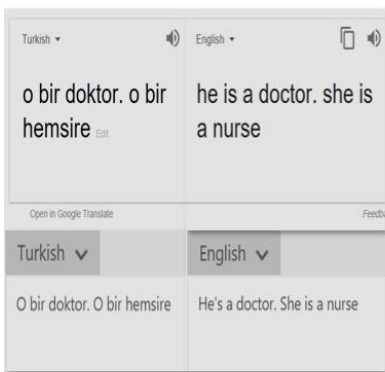
Global Privacy Laws like GDPR and POPI are legal obligations that need to be navigated as global citizens as well as KwaZulu Natal being positioned as the gateway to Africa and the world. The Province must have extensive expertise in protecting data, championing privacy, and complying with complex regulations.

The provincial governance expertise need to be trained and familiar with the global best practices to be able to guide both the provincial ICT architecture that will enable 4IR growth for the province as well as to cautiously screen the 4IR ideation that will bring many opportunities for the province to explore.

4.1.3.4 The Provincial ICT Conscience

4IR awakens technology that can replicate human traits and decision making upon how the technology is trained.

What ethical requirements will prevail ?



Gender unbalance translations

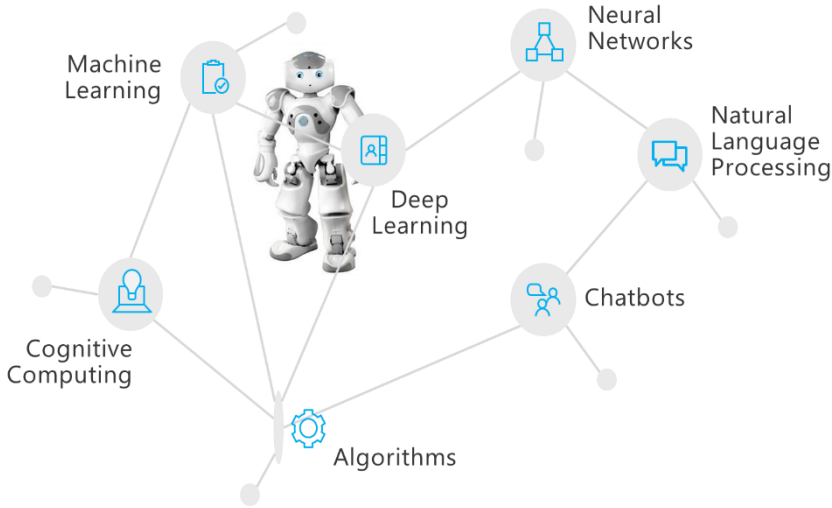


Re captcha test



Training App for Face recognition

As a provincial collective conscience using technology, we must guard against human bias being trained into the technology. The South African constitution acknowledges 11 languages apart from the languages that global citizens use when visiting our province.



Bias emanating within language translation, gender, age, culture and other subtle mechanisms should be guarded against when machine algorithms are being trained.

Ethics in technology use is expected to be a global area of study and focus as technology matures in the years ahead.

The province will do well to adopt its own ethical frameworks early in the technology adoption curve.

Quick Info The data lake

A data lake is a massive, easily accessible, centralized repository of large volumes of structured and unstructured data.



The data lake architecture is a store-everything approach to big data. Data are not classified when they are stored in the repository, as the value of the data is not clear at the outset. As a result, data preparation is eliminated. A data lake is thus less structured compared to a conventional data warehouse. When the data are accessed, only then are they classified, organized or analyzed.

<https://www.techopedia.com/definition/30172/data-lake>

What is Quantum computing ?

Quantum computing is the area of study focused on developing computer technology based on the principles of quantum theory, which explains the nature and behaviour of energy and matter on the quantum (atomic and subatomic) level.

<https://whatis.techtarget.com/definition/quantum-computing>

4.1.3.5 The South African Constitution and The Bill of Rights



Global privacy laws are gaining momentum, with a few passed already aligned to different global geographies. With the Province aspiring to be a global gateway, adherence to these international prescriptions is mandatory.

However, we have our own constitution that must be upheld also. KwaZulu Natal executing this purpose in a deliberate manner is an important aspect of the citizen-centric 4IR approach being aspired to.

The constitution has many statutes to uphold but the Bill of Rights, Privacy, Freedom of Expression, Freedom of movement and Residence speak to the citizen rights within the province.

The South African Constitution states :

“This Bill of Rights is a cornerstone of democracy in South Africa. It enshrines the rights of all people in our country and affirms the democratic values of human dignity, equality and freedom.”

Privacy :

“Everyone has the right to privacy, which includes the right not to have

- a. their person or home searched;*
- b. their property searched;*
- c. their possessions seized; or*
- d. the privacy of their communications infringed.”*

Freedom of Expression :

“Everyone has the right to freedom of expression, which includes -

- a. freedom of the press and other media;*
- b. freedom to receive or impart information or ideas;*
- c. freedom of artistic creativity; and*
- d. academic freedom and freedom of scientific research.*

2. The right in subsection (1) does not extend to -

- a. propaganda for war;*
- b. incitement of imminent violence; or*
- c. advocacy of hatred that is based on race, ethnicity, gender or religion, and that constitutes incitement to cause harm.”*

Freedom of movement and residence :

“1. Everyone has the right to freedom of movement.

2. Everyone has the right to leave the Republic.

3. Every citizen has the right to enter, to remain in and to reside anywhere in, the Republic.

4. Every citizen has the right to a passport.”

The ICT professionals of the province are cautioned to ensure that the constitutional rights of citizens are upheld in their 4IR initiatives; including the sourcing, handling, storage and use of citizen data behind the public eye. Emphasis is also placed on emerging technologies of machine learning and artificial intelligence within this context.

4.1.4 Fit-for-Purpose ICT Infrastructure and Systems

Rank	Goals	Objectives	Primary Indicators
4	Fit-for-Purpose ICT Infrastructure and Systems	4.1 Implementation of Hyper scale common computing Infrastructure 4.2 Implementation of effective and advanced Collaboration and decision-making platforms 4.3 Establish secure Provincial Data lakes 4.4 Support Research initiatives 4.5 Strengthen collaboration with Academic institutes 4.6 Create a citizen centric collaboration environment	1. Migration to a Hyper scale cloud with delineation to IAAS, PAAS an SAAS 2. Data driven executive reporting 3. IOT, machine learning, Robotics and Artificial Intelligence competencies 4. Unlock Quantum computing 5. Provincial Portfolio Management tool 6. Enterprise Content Management 7. Service Delivery Monitoring and Evaluation 8. Enable Collaboration systems 9. Common Provincial Identity Management system 10. Account for and eliminate duplication

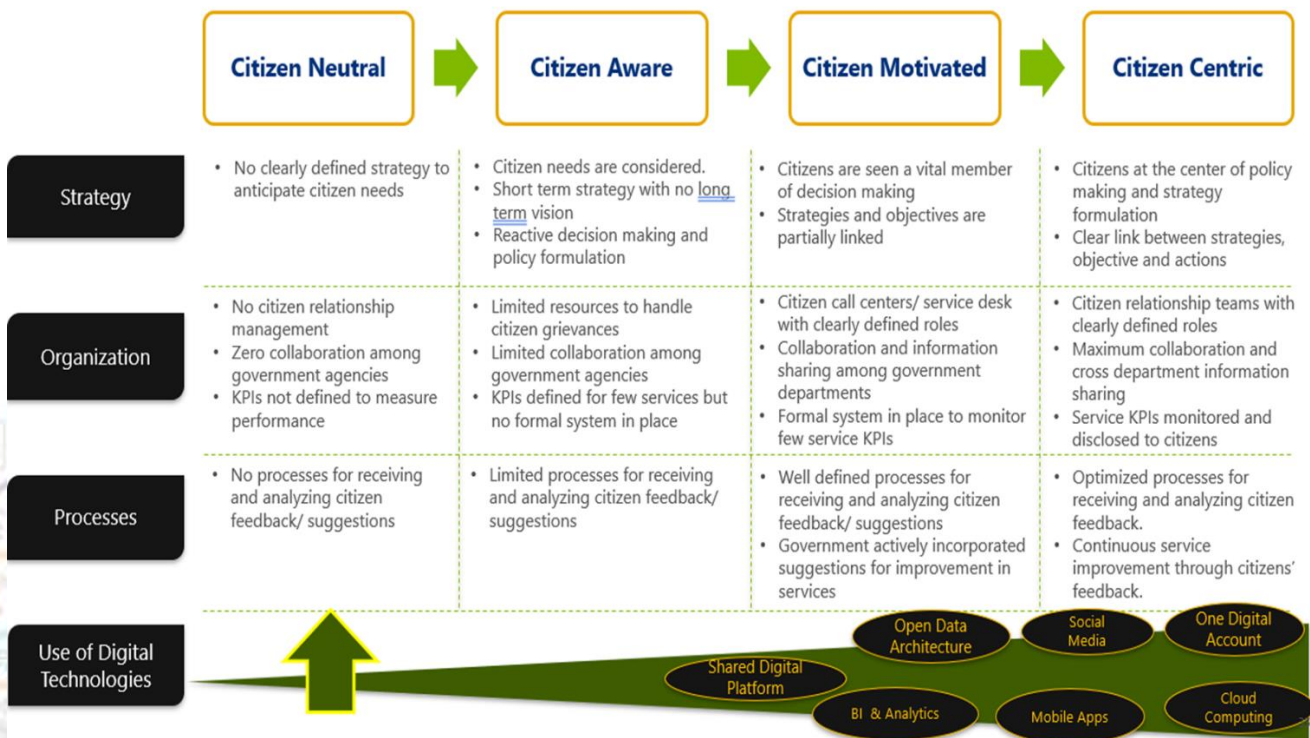
The province requires enabling, efficient and secure systems to support the Digital Transformation objectives and oriented towards a citizen-centric, service delivery enablement approach.

The purpose of this citizen centric strategy is to guide the digital transformation of the KZN Provincial Government into an all-inclusive digital Province where all citizens can benefit from the opportunities offered by technology.

Therefore, optimal investment in fit-for-purpose software that supports the vision of the Digital Transformation Strategy is paramount; these include but not limited to, investments in Hyper scale cloud, IOT, Robotics, Artificial Intelligence, Provincial Enterprise Content Management etc

The section remains brief as the ideation around the best fit-for-purpose systems is expected to emanate from the project that Moses Kotane will lead, detailed below.

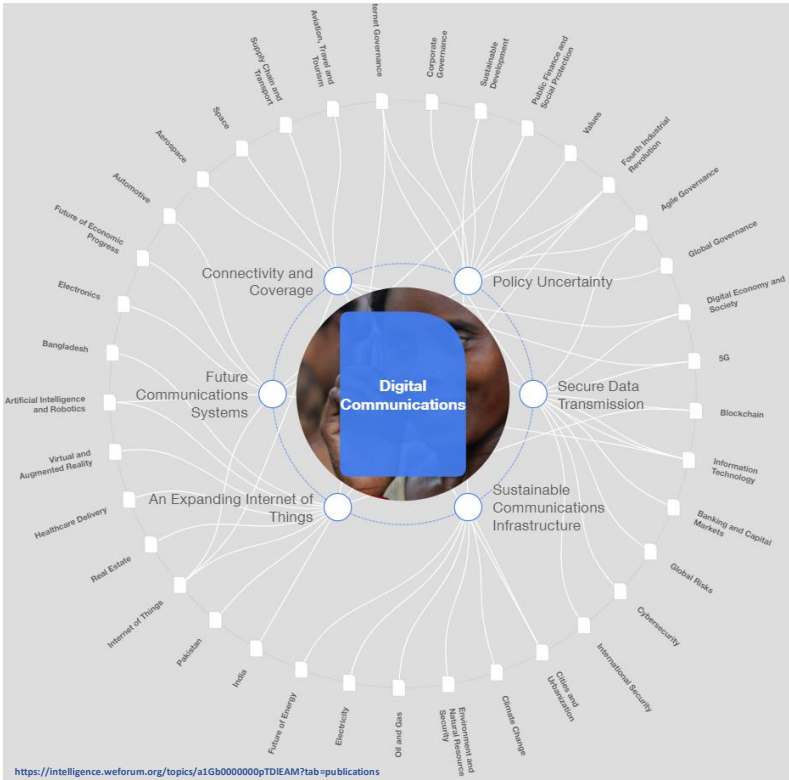
4.1.4.1 The Citizen Centric Benchmark



Currently, the province is propagating a Citizen Centric focus, but ICT capability remains Citizen Neutral.

4.1.5 Next Generation Networks

Rank	Goals	Objectives	Primary Indicators
5	Next Generation Networks	5.1 Design and Implementation of a Heterogeneous scalable high-speed network. 5.2 Implementation of a geographically encompassing citizen centric next generation network.	1. Upgrade or Replace aged networks 2. Broadband rollout 3. Airband Initiatives 4. 5G rollout 5. "Citizen One Number" contact for the Province. 6. Provincial Virtual-Private-Network



A next generation telecommunications network is required to support the vision of the Digital Communications.

The Province is currently platformed on an old network architecture design.

Provision of optimal WAN, LAN, broadband, LTE, Satellite, 5G, Airband and other mechanisms for an enhanced communications experience for the province needs to be orchestrated.

Emphasis is placed on the fact that 4IR cannot be effectively unlocked within the province without fast, efficient, reliable and cheap connectivity.

A provincially secure virtual private network is also a network configuration that is to be explored apart of the single provincial government platform envisaged.

4.1.5.1 Broadband rollout in progress

Having realised the 4IR reliance on connectivity, the province has mobilised the broadband roll out.

As per the Electronic Communications ACT, 2005 (ACT NO. 36 OF 2005), the national Broadband policy gives expression to South Africa’s vision in the NDP of “a seamless information infrastructure by 2030 that will underpin a dynamic and connected vibrant information society and a knowledge economy that is more inclusive equitable and prosperous”.

The intention in the 2010 KZN Broadband strategy is to create a provincial fibre optic network interconnecting the seats of the provincial government, district municipalities and local municipalities. The expectation is to create an open access network which could be used by all licensed network operators.

A joint technical team has been established, which includes Office of the Premier, Economic Development, Tourism and Environmental Affairs and state entities involved in the rollout of the broadband, and is chaired by the Economic Development, Tourism and Environmental Affairs Head of Department.

This project will be embraced via the 4IR working structures mentioned below.

4.1.6 ICT Investments and Modernisation

Rank	Goals	Objectives	Primary Indicators
6	ICT Investments and Modernisation	6.1 Implementation of a digitally transformed working environment. 6.2 Implementation of cost-effective ICT solutions	1. Development of a Provincial Cloud Policy with business realisation benefit. 2. Orchestrating Public and Private Cloud partnerships 3. Creation of Digital SMME enterprises. 4. Modern-Mobile Workplace 5. Smart Province-Smart City initiative

4IR brings opportunity to invest in new technology that will empower the province considerably long-term and simultaneously bring enablers that could not be realised with the traditional approach to ICT.

The investment focus denotes an orchestrated financial approach to unlocking 4IR initiatives amongst other primary indicators listed here :

1. Screen investments
2. Utilise financial metrics for measuring the expected economic impact (NPV, IRR, TCO)
3. Measure the economic impact via project management, change management and other tools
4. Ensure lessons learnt impact new initiatives positively
5. Remain accountable to the citizens and taxpayers with the 4IR initiatives mobilised and provincial value anticipated

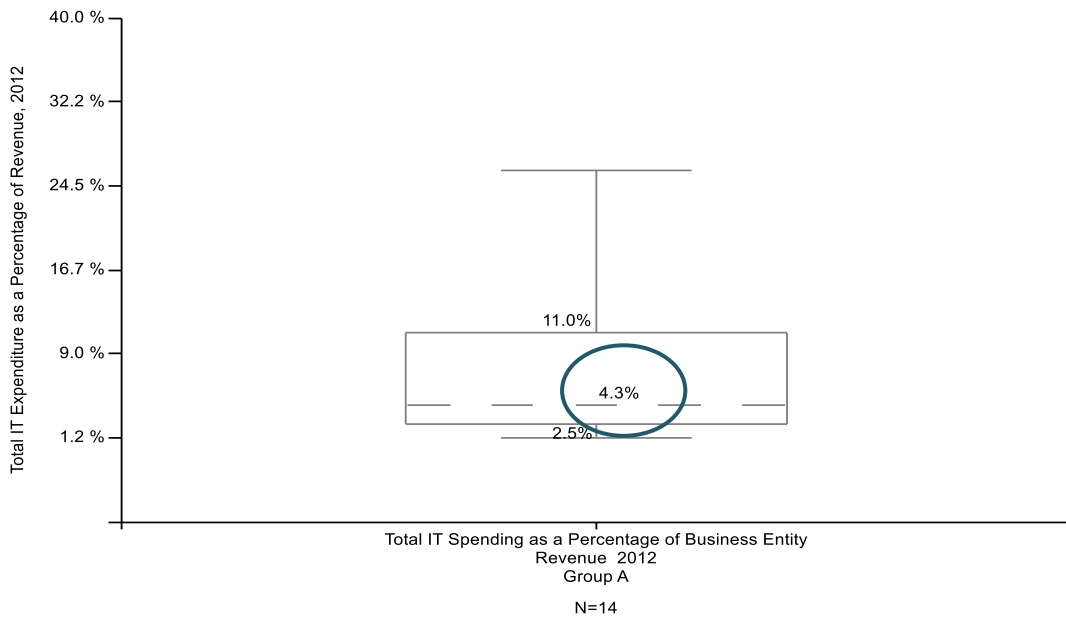
This all aggregates to modern innovation with a purpose, however, the provincial budget allocated to 4IR ICT initiatives should match the expectations of the 4IR impact on the province.

4.1.6.1 APQC 2016 Projection

In 2016, Provincial ICT plans were benchmarked against APQC global financial research for total ICT spend against budget. The figure below highlights that according to APQC (2016) an average ICT spend in governments was 4.8% of total annual revenue/income.

Measure Category	Measure Name	Industry: Government/Military			
		Sample Size	Bottom	Median	Top
Supplemental Information	Percentage of IT budget for process group "manage the business of information technology"	6	3.52%	4.81%	7.69%

APQC benchmark of Government IT Spend (Source: APQC)



CIO Executive Board benchmark of Government IT Budget spend (2016)

Similarly, in the same time period, the CIO Executive board research benchmark, highlighted that according to the CIO Executive Board an average ICT spend in government is 4.3% of total annual revenue/income.

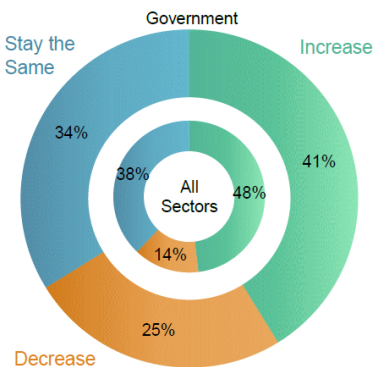
The provincial departments spent far less than this.

4.1.6.2 ICT Budget driven by 4IR

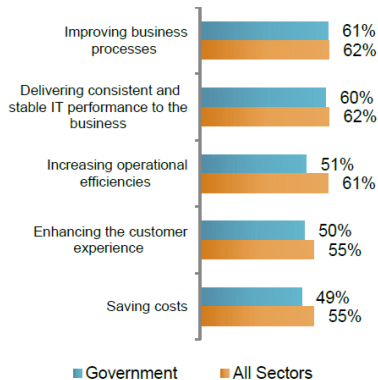
The possibility brought by 4IR has seen a further increase in ICT spend. The 2018 KPMG global CIO survey shows that 41% of CIO's are expecting budget increases to mitigate the call to embrace digital transformation for citizen/customer service delivery.

Budget/Priorities

Looking forward, over the next 12 months, what do you expect your IT budget to do?

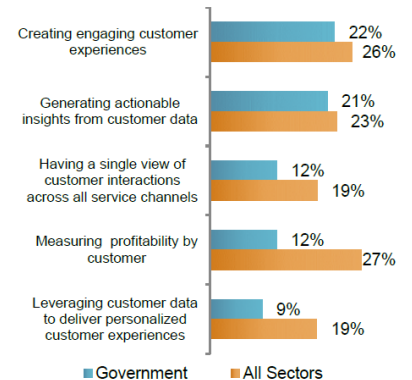


What are the key business issues that your management Board are looking for IT to address? (top 5)



Customer Capabilities

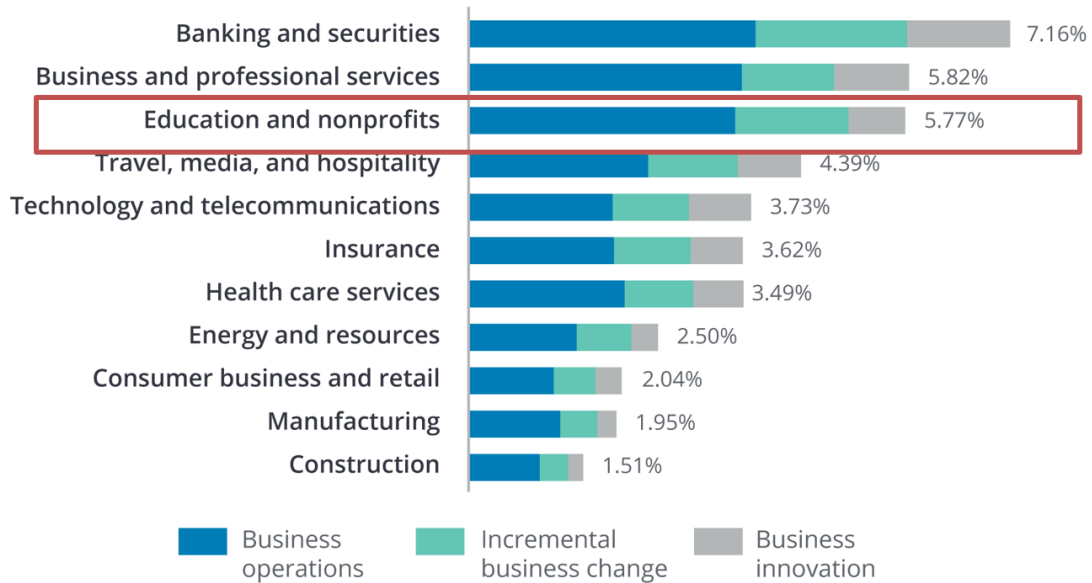
How effective is your organization at each of the following capabilities? (Very/Extremely Effective)



<https://assets.kpmg/content/dam/kpmg/xx/pdf/2018/11/harvey-nash-kpmg-cio-survey-2018-central-federal-government-findings.pdf>

The Deloitte global survey in 2017/2018 shows yet further increased ICT spending – a trend expected to continue during the projected years of this strategy.

Figure 4. Allocation of technology budgets by industry



Source: 2016–2017 Global CIO Survey, N=1,081.

Deloitte Insights | deloitte.com/insights

Similar research was conducted apart of the National 2030 e-Strategy, but within specific sectors of the economy and with similar focus required to spend-vs-expectation parameters of the 4IR context.

South Africa's ICT R&D spend as a percentage of GERD needs to at least increase fivefold to have a noticeable impact on competitiveness at a global scale. The need for increasing the ICT R&D spend will even be higher for transitioning the country's economy to the Digital Industrial revolution.

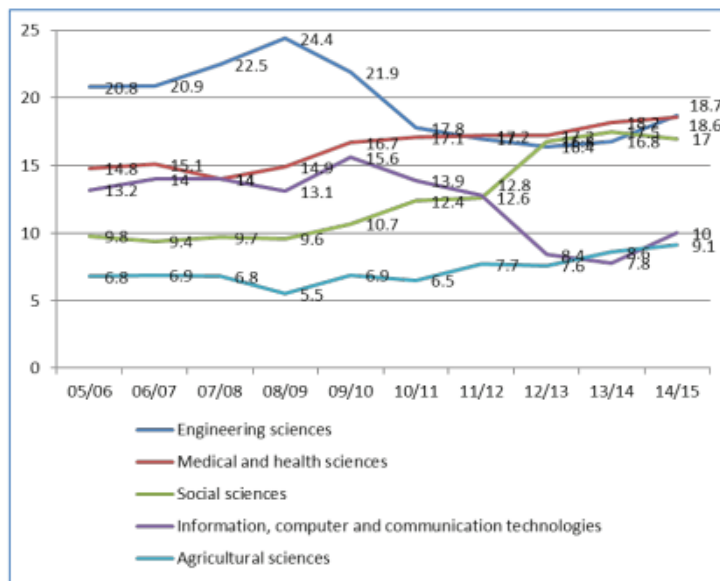
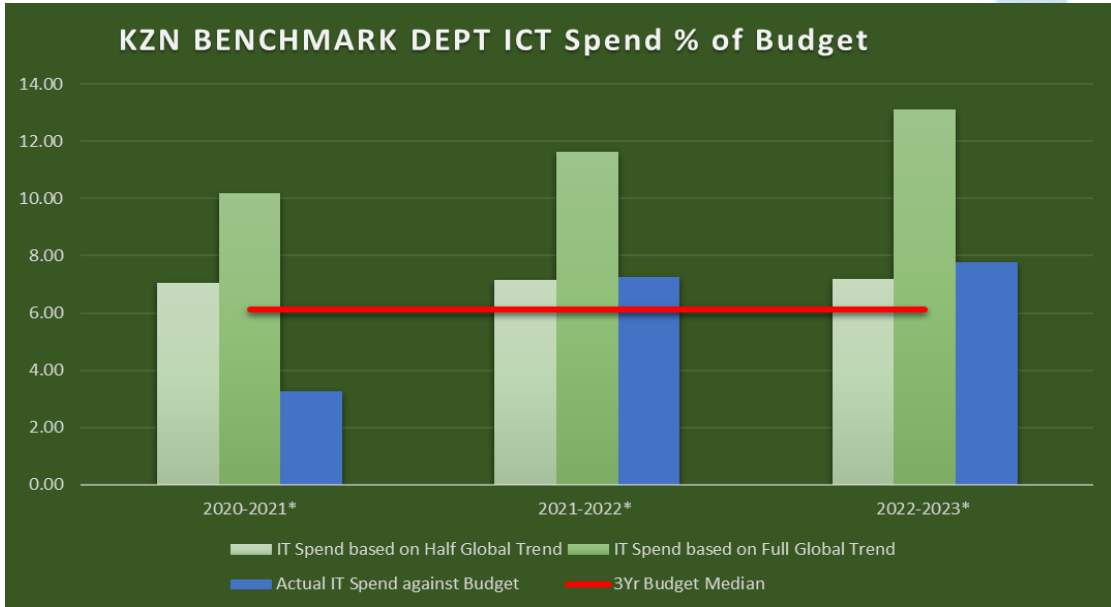


Figure 1 Top 5 R&D investments per research field in South Africa

The provincial digital transformation strategy expects to align to global trends driving towards similar citizen-centric objectives of service delivery.

4.1.6.3 KZN Benchmark Department 4IR ICT Spend % of MTEF Budget

The approach of this strategy was benchmarked against an existing KZN provincial department. The Digital Transformation roadmap was integrated with the GWEA and first order of magnitude spend estimated against initiatives. The risk understood in that exercise was that the 4IR impact would be materially under-realised due to the under-spend in ICT. This was further evident against financial benchmarking against the half and full global trend.



The 4IR working structures will be responsible to generate a similar provincial view so that the risk of 4IR impact versus the required realisation spend is understood and mitigated appropriately.

4.1.7 4IR Culture and Catalysation

Rank	Goals	Objectives	Primary Indicators
7	4IR Culture and Catalysation	7.1 Implementation of a DT Strategy to mobilise the radical economic Transformation of the Province. 7.2 Creation of a digital platform to support catalysation 7.3 Drive Human and Geographical Inclusivity 7.4 Formulate a Digital Culture Change Management Strategy	1. Drive a digital culture within the province 2. Mobilise and deliver high quality 4IR catalytic projects: <ul style="list-style-type: none"> ▪ Techno-hubs ▪ E-Government ▪ E-agriculture ▪ E-citizen services ▪ Township Economy ▪ Nerve Centre ▪ Omni-channel Collaboration ▪ Smart Provincial Infrastructure ▪ Digital Literacy and Academia ▪ Digital Museum ▪ E-Policing ▪ E-Tourism ▪ E-Health ▪ Sustainability and Smart buildings ▪ Treasury Block Chain ▪ Social Engagement Platform ▪ E-Gaming ▪ Smart logistics

PGDP 2030 remains the north star target and the 4IR technology allows the province to expedite results against the PGDP 2030 plan and drive the many goals of the province. Providing a detailed explanation for each of the primary indicators is not the focus in context as much as how the catalytic mobilisation will start.



*How then do we start this 4IR transformation?
What you must get right from the start?*

In the very near future, every successful entity will become a digital business. But not every entity making the attempt will be successful. It's hard to predict the winners, and the companies who won't make it, because every situation is unique.

Over the years, many entities fail in their digital transformation efforts.

While there are many reasons why this happens, four big reasons stand out:

- *First, they too often get stuck with simply optimizing their operations. They modernize only their business applications, data centers or network infrastructure — and then they stop. Optimizing operations and creating*

efficiency is just one of the core enablers for a digital roadmap – it's not all, and won't take them on their digital journey, where you have to rethink everything from how we work and the future of citizen experiences, to products and business models.

- *Second, they haven't aggregated their data estate : or all the data from across the organization – into a single, cohesive data strategy with clear goals. This leaves them making decisions from fragmented data and can lead to disastrous results.*
- *The third, and most critical, element is not establishing a digital culture that prepares for micro-revolutions (rapid experimentations) by operationalizing the shared accountabilities of teams to adjust for rapid change. To avoid these pitfalls, there are few important things you should do if you want to start a true digital transformation.*
- *And fourth, is to create a robust, secure ICT architecture that will support the many 4IR opportunities that will avail whilst considering the least technical debt implications, long term. (This will be generated via the Moses Kotane GWEA project)*

Have a cyber-secure first mindset

Mobilizing a cyber-secure culture in design, execution and awareness is as important as physical security – policing, army and other initiatives. The change management of both the government officials as well as the citizens will be a core change management focus area as the 4IR journey is navigated.

Create a digital culture

Culture is a multi-layered core at the heart of every successful digital transformation. For a change in digital culture, you must begin thinking in a “boundary-less” way across your internal organizations. Your work needs to be measured with real data, and that data needs to be used to equip employees in ways that let them truly understand and serve their customers.

Have a strategy for your data

In a digital world, you have more data being captured from more sources than ever before. The opportunity and challenge are to bring all that data together, analyze it and use it in a way that's contributing to better decision making and better outcomes. Too often data is fragmented, with limited effort going into aggregating the data estate into a single, cohesive asset. Data is said to be the new oil – monetise it wisely.

Embrace micro-revolutions

The reality for business leaders today is that you can't future-proof your entity. The truth is the pace of technological change is leading us into a period of rapid, continuous evolution. In a world where more disruptions are possible, there is a lot of opportunity. It starts with building your digital dream, which comes down to identifying your desired business outcome.

Adapted from [this web publication](#)

The working structures that will be mobilised is expected to drive these primary indicators and more, after a careful selection process taking into account both the tangible (financial) and in-tangible benefits of the initiatives. Change Management interventions is expected to feature highly as we drive a provincial 4IR culture – applicable both to citizens, government employees and visitors alike.

4.1.7.1 Women in ICT



The province recognises the immense value diversity adds to the workplace and province. **Women and girls** have always played an important role in science and technology. But despite this, **women and girls** are still underrepresented in science, technology, engineering and maths (STEM) education and careers.

Current insights reveal that approximately only 35% of girls enter further education in STEM subjects and many have little encouragement to equip themselves with the skills to thrive in these industries.

Existing initiatives to increase the **female** prevalence of **women** in the ICT sector are lauded. However, the province acknowledges the significant effort required to increase the representative of **girls and women** in the ICT sector.

The 4IR trajectory provides an opportunity to simultaneously address this gender divide. The fourth industrial revolution can provide **women** with broader access to online services such as healthcare, policing, counselling and education. It can eliminate the gender digital divide which remains most severe in rural areas. Lack of awareness about ICT benefits for **women and girls** is a significant barrier to entry for **women empowerment**.

4.1.7.2 Youth STEM, Social and Financial Education



STEM (science, technology, engineering and mathematics) is a buzzword associated with economic development and growth. Often it is touted as a multi-fold solution to prepare youth for employment, support of the national workforce, promotion of innovation and to explore methods for accelerating future economic disruption.

Heavy emphasis on supporting STEM education continues as an option to contributing to educational opportunities, strengthening the workforce and supporting the economy.

The province will continue its efforts to encourage STEM education, however, focusing on STEM is not enough. Educating the youth in STEM may ensure they are knowledgeable in these topics, but it does not proliferate conscientious citizens who are capable of making responsible social and financial decisions.

Children and youth represent the future economic actors that will influence the future of local and global economies through their financial decisions. A holistic approach is key to allowing children and youth to become more aware, empowered, responsible and integrated into the socio-economic life of their community.

Promoting economic citizenship for youth inclusive of STEM, social education, financial education and financial inclusion should be considered a long-term strategy for sustainable youth development and one that can fit within the framework of the 2030 Development Agenda.

The 4IR brings an opportunity to digitally expedite such educational intentions and will remain an agenda for our change management working structure.

4.1.7.3 Human Impediment and Impairment Upliftment

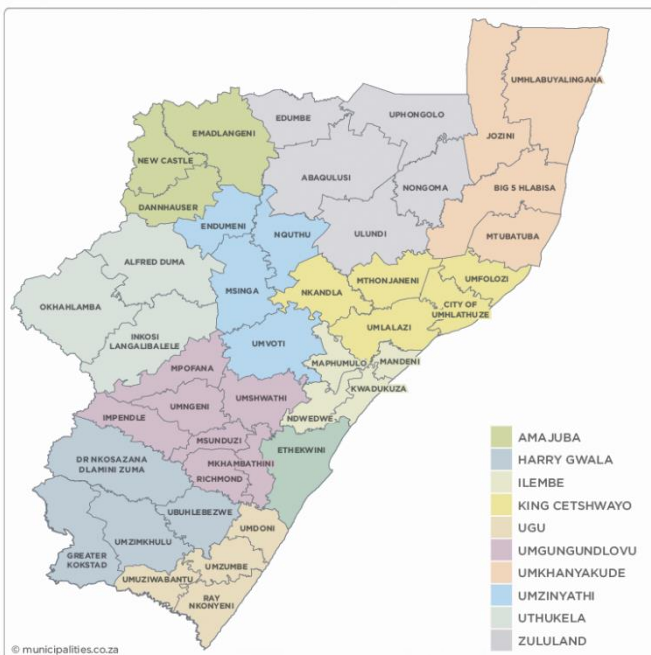
The emerging 4IR technology has the ability to uplift human existence by aiding humans in a manner never possible in historically.

We encourage the province to consider technological upliftment within the daily lives of its citizens with specific consideration areas being :

- Vision – assisting the blind, colour blind and low vision citizens
- Hearing – assisting the hearing impaired with closed captioning, mono sound and live transcription in different languages
- Neurodiversity – enabling the digital world accessibility for those that live with dyslexia, autism and other cognitive differences
- Learning – help those with learning disabilities focus, concentrate and understand with technology enablers
- Mobility – literally mobilise those with arthritis, quadriplegia, spinal cord injuries, and other mobility impediments with robotics and other capabilities
- Mental Health - enable assistive technologies for people living with issues such as bipolar disorder, anxiety, PTSD, depression, ADHD etc

This list is by no means fully reflective of all the various possibilities that 4IR can catalyse as we encourage the ideation of all possibilities within context.

4.1.7.4 Human and Geographical Inclusivity



The province of KwaZulu Natal has 54 Municipalities, 10 Districts and one major metro – eThekweni municipality that has the highest population density.

The province has vast spatial assets from mountains, coastlines, nature reserves and much more.

The people diversity is even more vast with bustling cultures, multiple languages and many race groups.

The scope of this 4IR strategy aims to embrace all citizens in the province, all government service delivery entities and across the geographical divide as the strategy aims to break down barriers with technological capabilities. Our rural areas are not without due consideration.

4.1.7.5 Provincial TechnoHubs

The province has started to develop state of the art Technology Hubs in four key areas across the province where companies, specialised suppliers, service providers, and associated institutions in a specific industry can collaborate to foster innovation, growth and increase their competitiveness.

These centres are considered to be key to the citizen 4IR digital culture embrace.



The KwaZulu-Natal provincial government seeks to call on high-tech entrepreneurs, researchers, property developers, business leaders and academics to join them in their efforts to kick-start job creation and attract investment via the technology hubs initiative.

It is envisaged that the regional hubs will be used and supported by technology and innovation “clusters” comprising interconnected companies, specialised suppliers, service providers, and associated institutions in a specific sector or industry.

4.1.7.6 The Provincial Software Development Community



The province of KwaZulu Natal has a wealthy software development community inclusive of global software development entities, academics, SMME’s and more.

The province will seek to embrace this expertise as the province aims to retain and attract more technical capabilities within the province. The software development experts are encouraged to pass their skills to the youth and future generations as the provincial leadership continues to propagate this vital asset also.

4.1.7.7 The KZN Province Intelligent Platform

The KZN Province Intelligent Platform is prioritised for creating a common gateway amongst provincial departments and entities.

The “One Province-One Plan-One Future” aspiration supports a One-Platform call to action.

This platform is briefly depicted in Modern Architecture Appendix Example and will need the provincial ICT expertise to work with global expertise to craft a One-Platform that will not only support provincial modernisation efforts but propagate the citizen centric efforts via the common One-Platform.

4.1.7.8 The Provincial One-Number

During the last 2016 provincial census, the official citizen count was 11, 065, 241. With 54 different municipalities and different provincial departments, one can easily deduce the effort that citizens have in order to elicit service delivery at a standard that is imagined.

Further, as citizens traverse the province geographically, connecting to service delivery mechanisms change as their journey unfolds. The same would apply to tourists.

With only the 11, 065, 241 citizens in the province, the communication channels possible amount to 61 219 773 661 420. During times of emergency and driving awareness related to citizen eminent risk, the efficacy of the current status quo need not be described.

It is within this challenging context that the Premier of this province imagines a single provincial omni-channel contact mechanism for the citizens of this province, via which citizen-centric service delivery reaches new heights.

Now, more than ever, this can be unlocked with the 4IR technology enablers.

5. The South African E Government Strategy Context

The below context provided has been derived from the National e- Government Strategy and Roadmap.



“The National Development Plan Vision 2030 states that “a single cohesive National eStrategy is essential to ensure the diffusion of ICTs 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”.

“e- Government” or “Digital Government” is the innovative use of communications technologies (including mobile devices, websites, applications and other ICT services and platforms to link citizens and the public sector and facilitate collaborative and efficient governance. “

“e-Government includes:

- *Government to Government programmes (G2G) – is concerned with interaction between different levels of government and collaboration with government agencies.*
- *Government to Citizen programs (G2C) – involves an interaction between government and its citizens.*
- *Government to Employee programmes (C2G) – this involves the relationship between government and its employees. This form is considered as an effective way of bringing employees together and promoting knowledge sharing among them; and*
- *Government to Business programmes (G2B) – this is concerned with supporting business activities.*

e-Government in South Africa include the use of ICT to automate internal processes of Government (G2G systems) as well as external processes of Government (G2C and G2B). G2G systems are used across all departments or used for a specific government sector, such as Basic Accounting System (BAS), Logistic Management Information System (LOGIS), Social Pension Fund (SOCPEN) etc.

E-Government service is about transforming government to become more citizen centered. Technology is therefore a tool in this effort. E- government services success requires changing how government works, how it deals with information, how officials view their jobs and interact with the public.

Achieving e-Government services also requires active partnerships between government departments, citizens and the private sector. The e-Government process needs continuous input and feedback from “customers” - the public, business and officials who use e-Government services. Their voices and ideas are essential to making e-Government services work.

During the early years of introducing ICT systems in the working environment especially to government, initial attempts towards e-Government were made with a focus on networking government departments and developing in-house government applications in the areas of defence, economic monitoring, planning and the deployment of ICT to manage data-intensive functions. These applications focused on automation of internal government functions rather than on improving service delivery to citizens.”

The province is cognisant of this national strategy, with further consideration during the provincial GWEA project to not duplicate nor infringe on national initiatives.

6. Catalytic Digital Transformation

The fourth industrial revolution has a mass of opportunities and possibilities, comprehensively depicted below by the world economic forum. The scope of this document is not to re-state 4IR definitions and terminology to create a bloated rhetoric. The intent is to mobilise a provincial engine via which the provincials 4IR opportunities can be identified, selected and managed for the best possible outcome.



<https://intelligence.weforum.org/topics/a1Gb0000001RihBEAW?tab=publications>

6.1 Establishment of the 4IR ICT Working Committees and Partnerships

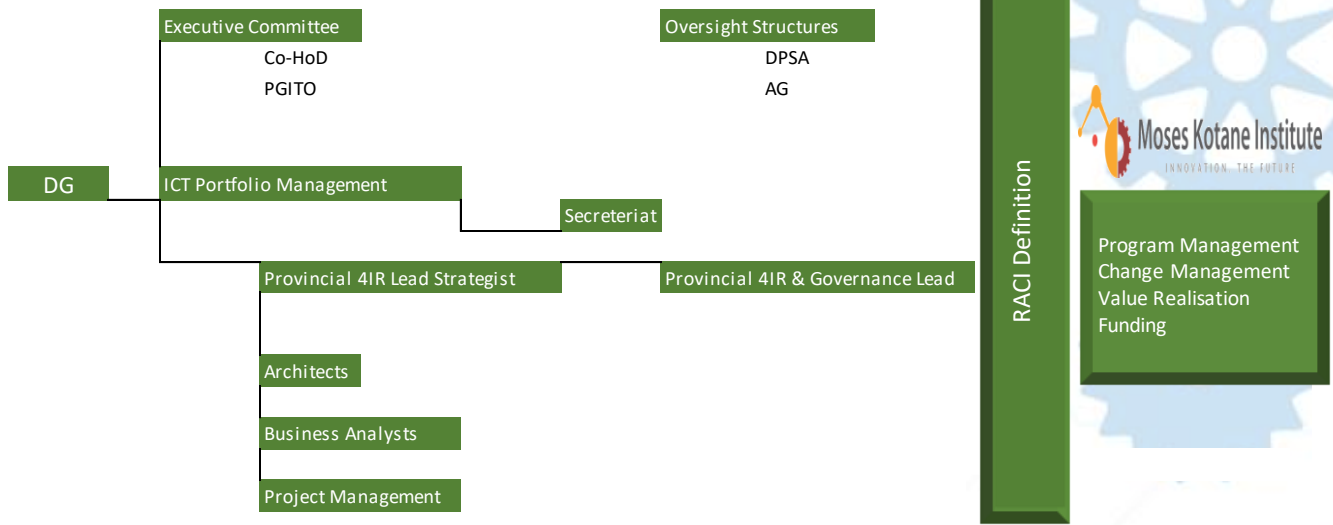
6.1.1 Moses Kotane Institute



The Moses Kotane Institute will play a pivotal role together with The Office Of The Premier to drive the Provincial DT GWEA. This initiative is not just 4IR related but pursuant to the AG and DPSA compliance responsibilities.

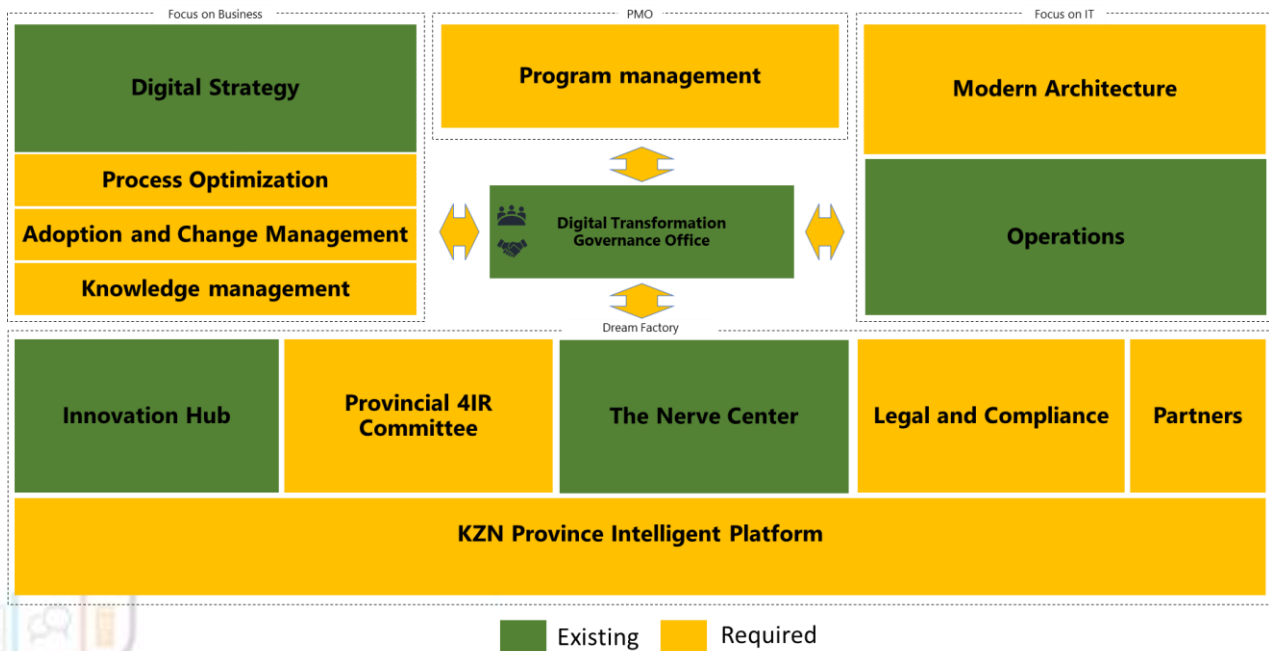
MKI will orchestrate and project manage this important 4IR foundation-building capability for the province. Execution will include engagement with all the different provincial entities as well as being accountable for the compliance and AG requirements.

The following working organogram is envisaged.



6.1.2 The 4IR Working Engine Structures

The 4IR mobilisation is a multi-stakeholder teaming, engaging expertise across the province and globally to establish and realise the provincial aspirations.



These working committees and partnerships will be mobilised via the Government Enterprise Architecture project being chartered by the Moses Kotane Institute. During that initiation, the RACI and definition of success will also be defined.

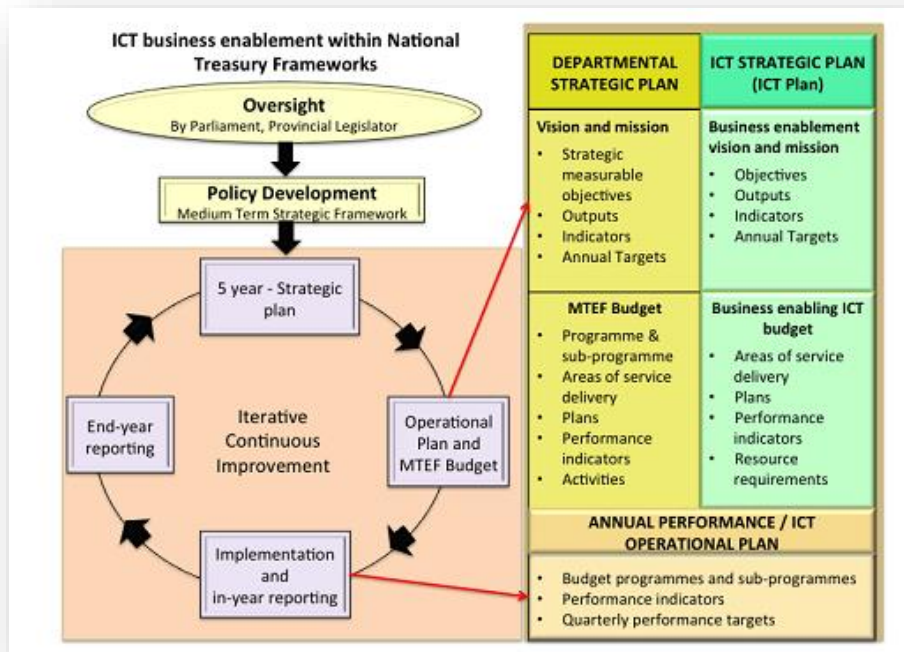
Each working committee is expected to have a chair that will account for the deliverables, its quality and against project timelines generated.

6.2 The Working Structure Compliance

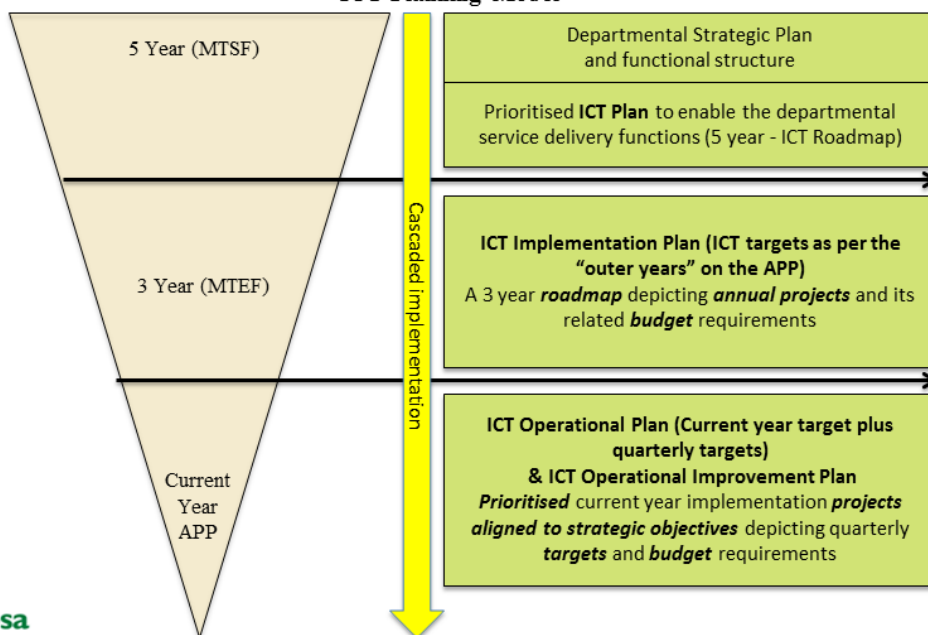
The 4IR motion is thought of no differently from transitioning the province's as-is state to a 4IR to-be state via the existing compliance structures and processes of government.

The DPSA depiction below shows the 5 year and annual planning and reporting cycles of Government and how the provincial 4IR strategic plan must be cascaded for implementation in an Annual Performance Plan. Related to this cascade, it shows the ICT Plan that is informed by the provincial to departmental strategic ICT plan and cascaded into the MTEF and APP for implementation.

The cascade from ICT Plan to ICT Implementation Plan to ICT Operational Plan is also elaborated on.



ICT Planning Model



6.2.1 MTSF Alignment

The ICT Goals represent portfolios of change within the province and will align to the MTSF and MTEF cycles. The working groups are still expected to comply with government MTEF and MTSF planning cycles with Annual Performance Plans aligned to reflect the success of key delivery milestones being achieved.

The Implementation plan, Section 4, depicts the anticipated timelines for the portfolio envisaged.

Hence, whilst we await the DPSA to revise the current version of the GWEA framework to take into account 4IR concepts, the province will seek to integrate 4IR deliverables into the existing ICT business processes and structures, noting that hybrid capability still needs to conform to DPSA measurables when on-premise and hyperscale computing still needs to be managed via existing government structures.

Further, the province is mandating a provincial cloud first policy that will help de-risk initiatives that could mobilise and realise significant technical debt to the province.

This document is, therefore, to be read in conjunction with the following documents as appendices to this document :

1. KZN Provincial Cloud First Policy
2. KZN Cloud First Business Case Template
3. KZN Cloud First Privacy and Legal Checklist



6.2.2 Working Structure Methodology

- a) The Working group shall undertake high level research where necessary, international and regional benchmarking, and engage stakeholders within and outside government in meetings and other fora with a view to consider the views of a cross section of societal role players in the development of the Provincial 4IR Government Wide Enterprise Architecture.
- b) The Working Structures shall collaborate with the National Entities like the DPSA to ensure alignment and effective planning.
- c) ICT Technical standards and interventions must ascribe to international standards which are further elaborated upon in the KZN 4IR Cloud First Policy.
- d) The monthly 4IR SteerCo under the leadership structures detailed will articulate progress, timelines and other programme management specific metrics.

6.2.3 Membership of the Working Structure Groups

- a) Viewed collectively, the work group structures may be constituted of no more than 20 (twenty) stakeholders with recognised expertise within the domain of the group.
- b) At least 15 (fifteen) people must be from within the province of KwaZulu Natal, with the remaining seats deemed appropriate to external expertise not easily available within the province.
- c) Training and long-term succession plans is expected to be effected for skills obtained outside the provincial human capital expertise.
- d) Each working group must have a Chair and nominated second. At least one of these two representatives must be from within the province.
- e) Women and diversity stakeholder inclusions is expected to be top of mind for the group nominees.
- f) The Working group members serve at the invitation of the provincial government, which can appoint or replace members in the interest of the work being conducted by the group.
- g) Non-attendance of two successive working group sessions will be given due consideration by the 4IR SteerCo.
- h) The Province through the relevant governance structures shall issue an invitation for people to be nominated as Working Group members although the provincial government reserves the right to approach people directly (especially international experts).

6.2.4 Working Group Proprietary Rights

- a) The proprietary rights with regard to copyright, patents and any other similar rights that may arise from the work of the Working Group belong to the KwaZulu Natal Provincial Government.
- b) The final product of all work done shall, on completion of the brief of the assignment of work, be delivered to the 4IR ICT SteerCo Chair on behalf of Director General of the Province.

- c) The 4IR Digital Transformation Governance and Legal Committees shall have unrestricted access to all material, data and information of the work packages of the group.
- d) The output of the Working Group may be announced to the necessary provincial stakeholders by the Director General or Premier of the province, post necessary internal consultation required.

6.3 Generating the trusted provincial government 4IR wide enterprise architecture plan

The provincial 4IR GWEA plan will execute via the below envisaged framework. The ICT vision, objectives, primary indicators and priorities are provided via the provincial executive. The working structures will now start the bottom up planning and execution via a project approach, orchestrated by the Moses Kotane Institute.

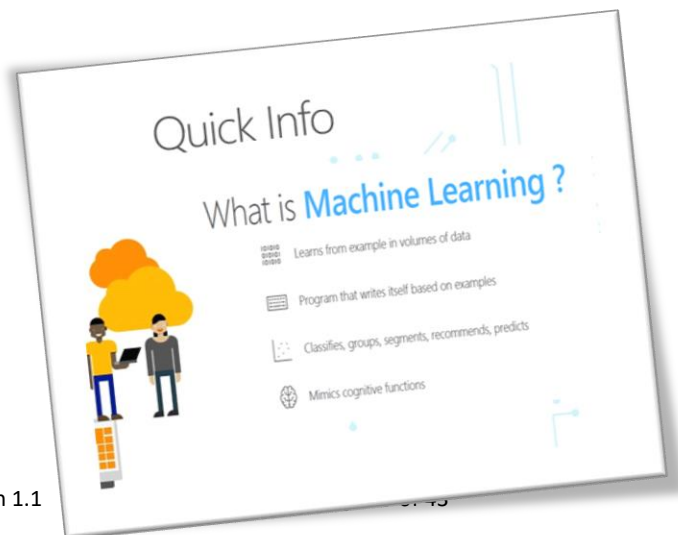


6.3.1 Registration of all Catalytic 4IR projects

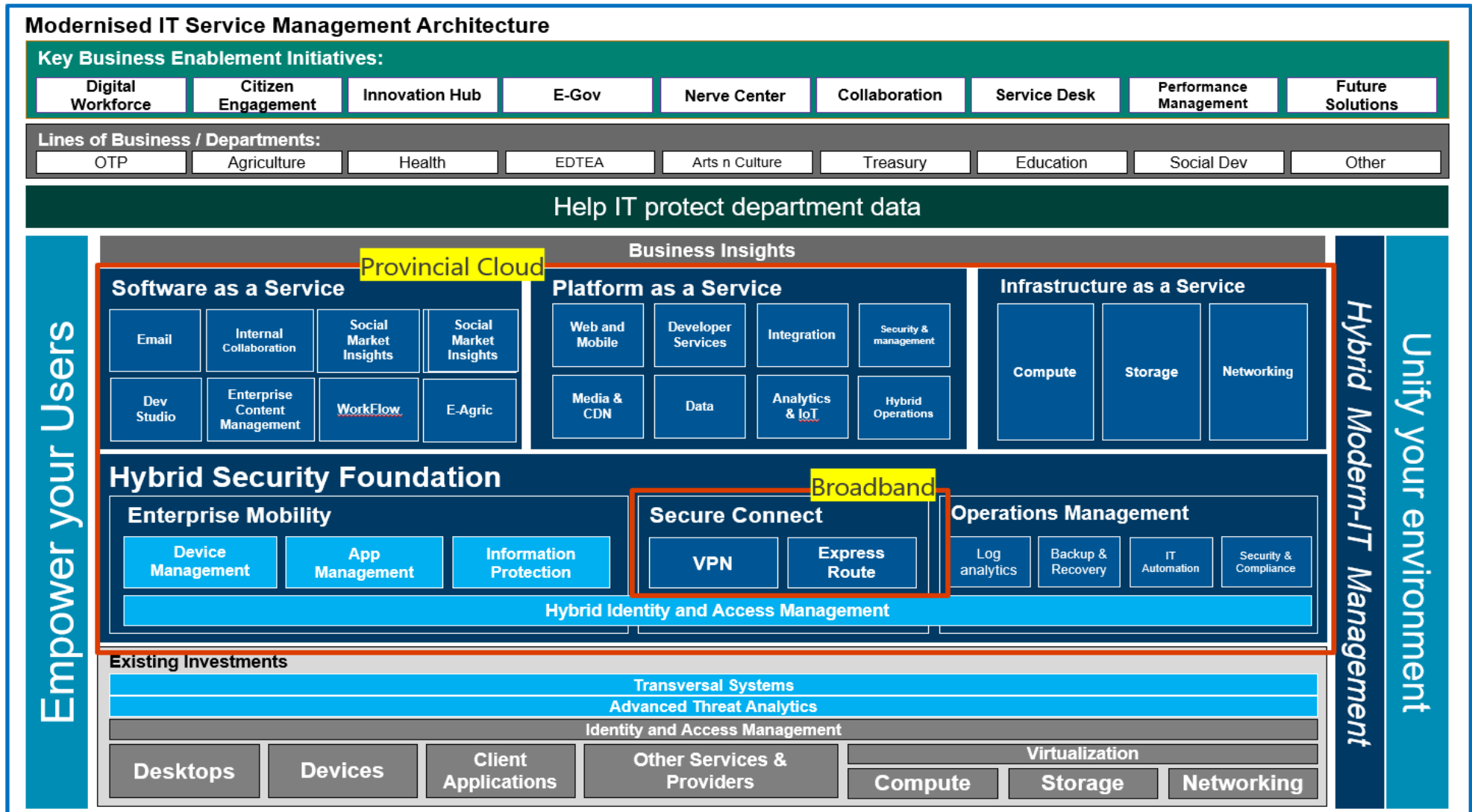
All 4IR Catalytic projects that emanate from the Moses Kotane and Provincial GWEA Project is to be registered with the Office Of the Premier.

The registration of projects is aimed at driving efficiency and collaboration amongst 4IR initiatives, apart from the obvious compliance and governance measures associated.

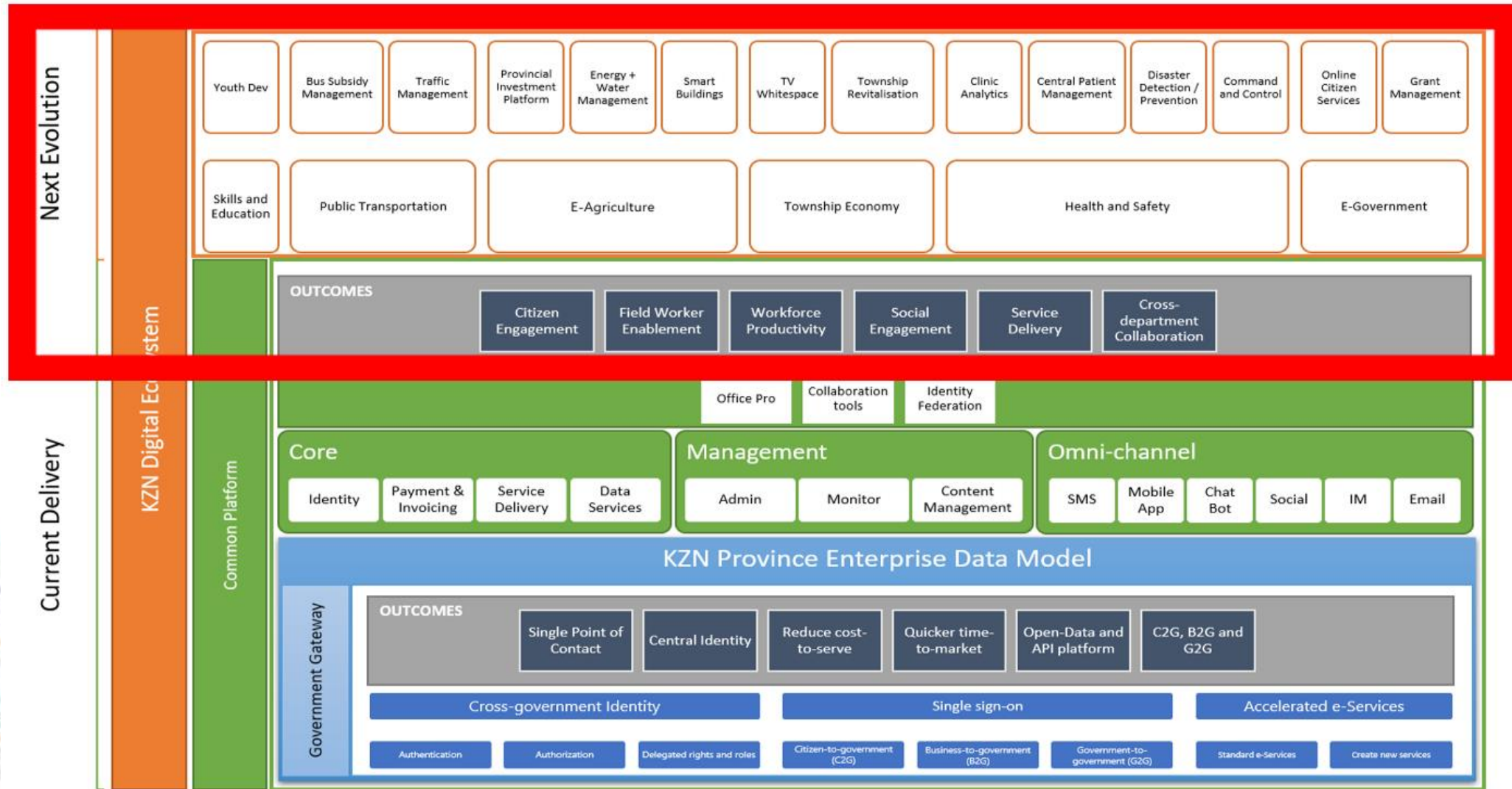
The Registration site for these projects will be announced shortly.



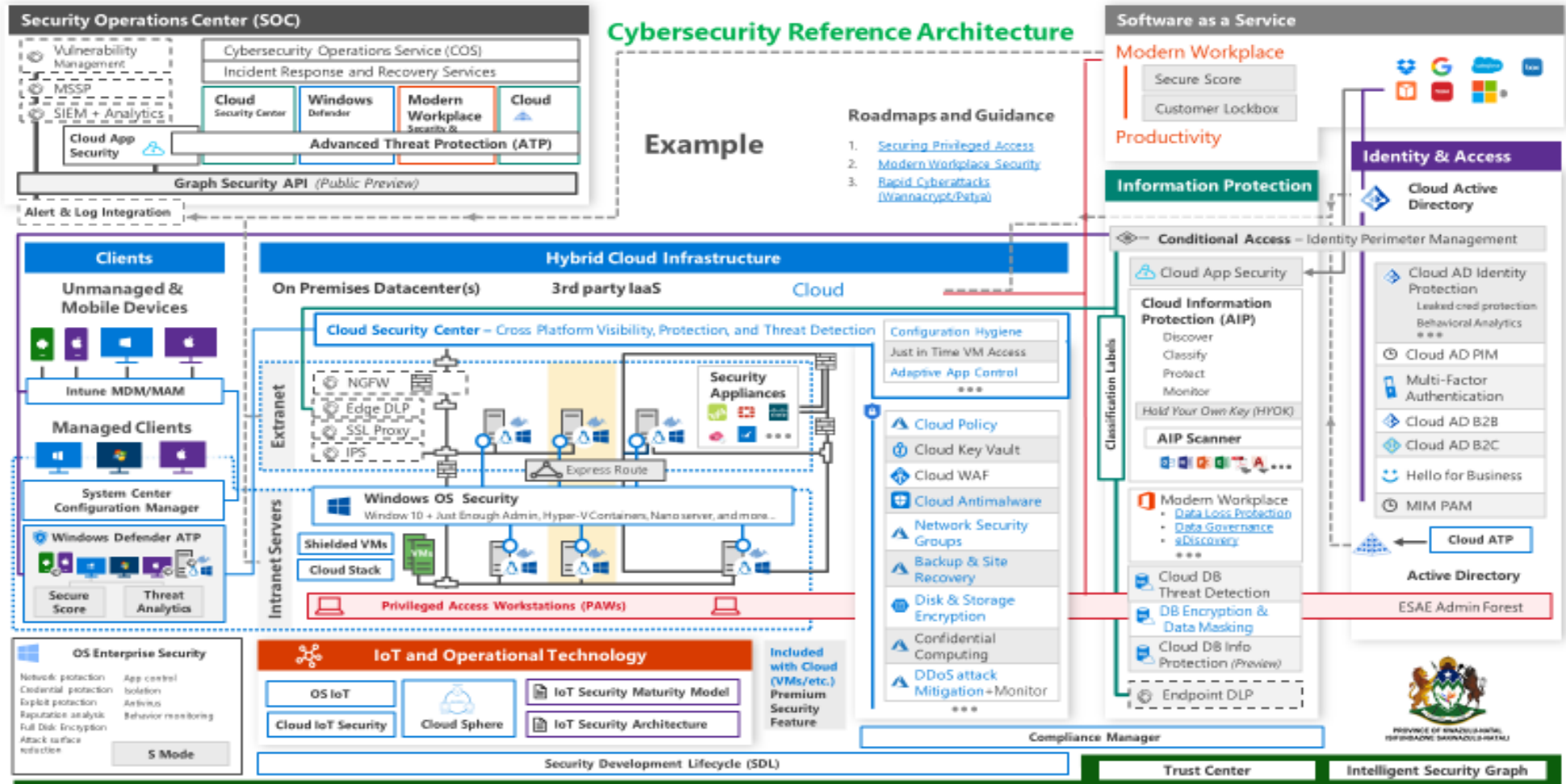
Appendix - Potential Modern-IT application architecture



Appendix - Potential of integrated 4IR scenarios into a modern architecture



Appendix – Potential cyber-security reference architecture





Appendix – KwaZulu Natal Cloud First Policy

Whilst we await the DPSA to revise the current version of the GWEA framework to take into account 4IR concepts, the province will seek to integrate 4IR deliverables into the existing ICT business processes and structures, noting that hybrid capability still needs to conform to DPSA measurables when on-premise and hyperscale computing still needs to be managed via existing government structures.

Further, the province is mandating a provincial cloud first policy that will help de-risk initiatives that could mobilise and realise significant technical debt to the province.



Appendix – KwaZulu Natal Cloud First Business Case Template

The Business case template prescribes how the 4IR initiative needs to be financially assessed prior to selecting and executing on the project. Both the tangible and intangible benefits are to be clearly analysed for the impact envisaged.

This document is to be presented to the working structures for final selection and approval to proceed.



Appendix – KwaZulu Natal Cloud Privacy and Legal Checklist

Hyperscale Cloud computing provides a scalable computing environment that unlocks capability that cannot be realised with on-premises datacentres. The required privacy and legal capabilities of the service provider must meet the minimum compliance and global standards of cloud service provider.

This checklist must accompany the business case for the initiative being mobilised via the provincial 4IR working structures.

One Province – One Plan – One Future....together!

*** End ***