NeMisa NPC
National Electronic Media Institute of South Africa

UNISA | university of south africa

A report on the

NEMISA 4IR Digital Skills Summit, Research Colloquium, Postgraduate Symposium and Data Science Innovation Hackathon

Enhancing Human Capacity for the 4IR: It is about people

Held at Birchwood Hotel and OR Tambo Conference Centre, organised by Knowledge for Innovation Unit (K4I) of the National Electronic Media Institute of South Africa (NEMISA). Hosted at the University of South Africa (UNISA)

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EXECUTIVE SUMMARY

The report reflects on the journey to the Summit and colocated events, the events themselves and the key recommendations. To sum up the outcomes of the Summit and the research K4I have been doing, and collected over the last one (1) year in one sentence:

There is an opportunity (and pressure) on NEMISA to create a radically unique educational digital model with clear entry-exit pathways into jobs using micro-credentials based on blockchain and enlivened with AI and IOT. In all the above, ensure to change mindsets of everyone in the skills value chain.

The eight (8) key messages and recommendations from the events in importance are:

1.   CHANGE MINDSETS (USE REMODELED HACKATHONS):

        This resonated as the top priority from all the deliberations. In as much as this is often mentioned, almost no organisation has in place a strategy for this. The hackathon model and environment are ideal but require a number of adjustments.

2.   RETHINK EDUCATION (ALTERNATIVE LEARNING MODELS AND SPACES ARE NEEDED)

        All conversations agree the way of education must change. From the VCs to the Industry panels this was a resounding message. NEMISA has an opportunity to propose a new education system based on micro-credentials.

3.   AI, BLOCKCHAIN AND IOT ARE THE TECHNOLOGIES & SKILLS TO LEVERAGE

        AI enables an automated skills recommender system for learners to identify what micro-credentials are needed. This recommender system continually updates based on data automatically fed to it from IoT systems; Blockchain to manage the micro-credentials (digital badges) which are linked to multiple educational value chains enabling accreditation and immediate job placements. Skills are needed in the three technologies.

4.   PREPARE GOVERNMENT AND SOCIETY FOR THE 4IR (DIGITAL TRANSFORMATION)

        Many organisations especially government are not ready and do not know where to start and end. NEMISA to provide leadership in the transition process.

5.   SOUTH AFRICA IS ON TRACK

        South Africa has the necessary infrastructure to take on the 4IR.

6.   FOCUS ON THE YOUTH

The youth must remain at the centre of the new approaches to education, skills development and job opportunities.

7.   CREATE BOLD NEW POLICIES

There is no other way unless many policies change. NEMISA to provide leadership in this regard.

8.   COLLABORATE, COLLABORATE, COLLABORATE

These efforts require all sectors to be involved. NEMISA to provide a catalytic and leadership role in collaborative efforts.

PUBLICATION CONTENT

FINANCIALS

BUDGET: R1,730, 550.25

- NEMISA: R1,130,550.25
- UNISA K4I: R600,000.00 (R450,000 - Colloquium; R150,000 Summit)

FINAL COST (MINUS OPEX): R 1,714,067.85

This figure is before Q4 financial reconciliation.

ACKNOWLEDGEMENTS

The coming together of the 4IR Digital Skills Summit acknowledges the eager contribution of several thought leaders from all sectors of society and from across the world. Their keenness and willingness to participate and offer practical experiences on how to prepare South Africa to participate in the 4IR through digital skills, despite the threat of the Corona Virus Pandemic (COVID-19), is very applaudable. The further commitment to collaborate with NEMISA on advancing the digital skills agenda is well noted and must be pursued.

1. INTRODUCTION AND BACKGROUND

The summit (along with the three collocated events of the Research Colloquium, the Postgraduate Symposium and the Data Science Innovation hackathon) was convened within the context of galvanizing and calling stakeholders into action for the creation of visible 4IR benefits for South Africans. The term, *4IR Digital Skills Summit*, represented the four events.

The summit had a particular focus on groups at risk of socio-economic exclusion, including the previously disadvantaged, elderly, unemployed, marginalised youth and women education and training (NEETs).

The purpose was to bring together policymakers, researchers, regulators, training providers and human capacity development stakeholders to discuss the human capacity development implications for digital transformation and the 4IR in South Africa.

The following overall questions guided the Summit:
- What are the real opportunities and challenges of the 4IR, and how can we (as South Africans from the different sectors) overcome these with digital skills?
- Which digital skills are lacking in South Africa right now?
- How can we work together in digital skilling initiatives?

2. PARTICIPATION

OVERALL REGISTRATIONS BEFORE SUMMIT: 493
ATTENDED SUMMIT: 191 (DAY 1), 149 (DAY 2), 122 (DAY 3)
10 HACKATHON TEAMS

Cancellations: There were many last minute cancellations as a result of COVID. Ministry plenary participation was difficult to secure.

4IR COMMISSIONERS

- Prof Chris Adendorff (Keynote)
- Mr Joseph Ndaba (Hackathon Mentor and Judge)
- Ms Nomso Kana (Hackathon Judge)
- Dr Michael Graskow (Industry /International Plenary)

ACADEMIC

- 16 Universities represented.

THOUGHT LEADERS (EXECUTIVES)

- Industry
- Government
- Organised Labour (Unions)
- Not-for-profit organisations
- International representation
  - AfriExim Bank
  - Kenya
  - Belgium
  - Ghana

3. CONFERENCE COMMITTEE

- Programme Director: Prof H Twinomurinzi (UNISA)
- Marketing and Programme Liaison: Ms V Tau (NEMISA)
- Programme Coordinator: Ms NT Msweli (UNISA)
- Data Science Hackathon Lead: Ms B Filana (NEMISA Board Member)
- Summit Chair: Prof M Chaka (NWU)
- Research Colloquium Chair: Prof T Ngqondi (UMP)
- Data Science Hackathon Facilitators: Mr T Nghonyama & Mr M Ngoveni (Geek Kulcha)
- Web development: Mr S Russell (OpenUp.org.za)
- Logistics: Mr M Seoka (UNISA)
- Finance, Bookings and Registration: Ms H Kruger-Franck (UNISA)
- Graphic Design: Ms J Mahloele(NEMISA)
- Academic Proceedings Chair: Dr T Mawela (UP)
- Postgraduate Posters Chair: Prof A Jordaan (VUT)

4. DAY 1: SUMMIT

WELCOMING & OPENING ADDRESS: *NEMISA BOARD CHAIR: MS M LESHABANE*

NEMISA is repositioning as the 4IR Skills Institute for the Private and Public Sector

- **Focus**
  - Ensure that the Public Sector has the adequate skills and knowledge to be the catalyst for innovation internally within govt operations and also disrupt government operations
  - To influence the private sector to be innovative in the solutions they provide to government and the implementation thereof

- **Inclusive growth**
  - Leave no-one behind: Remember marginalised groups, the previously disadvantaged, the unemployed, older persons, people with disabilities and women.
  - Collaboration with other stakeholders is key

- **Locally relevant**
  - A digitally skilled South African citizenry that will stimulate economic development and create future jobs.
  - Implementable solutions that make an impact on South Africa

- **Globally competitive**
  - Culminate into the facilitation of new technology development in South Africa that can compete with the rest of the world.
  - Relevance to the 4IR despite the low rankings of South Africa in many educational sectors

- **Policy influencer**
  - NEMISA is positioned as one of the instrumental institutions for enhancing technology and innovation in South Africa
  - Innovate and create solutions that impacy policy
  - NEMISA takes the initiative of ensuring that policies are changed or adapted to usher South Africa into the 4IR

KEY RESEARCH FINDINGS ON DIGITAL SKILLS: PROF H TWINOMURINZI UNISA K4I

Let data lead by focusing on data and what data reveals

- **Context matters**
  - Digital behaviours are different based on the provinces or location.
  - Do not cluster people in one group and assume that their digital behaviours are all the same. This has an impact on scaling models for digital skills.
  - For example, in townships and rural areas, most people are only users of technologies and in Urban areas, they are participative and interrogative.
  - MOOCS are usually undertaken by people in the urban areas, who already possess postgraduate qualifications.

- **Shift mindsets**
  - Most of the Human Resources Managers prefer using traditional tools and do not see a need to conduct digital skills audits.
  - Most employees do not see a need for Artificial Intelligence / Blockchain.
  - The digital champions who are encouraging 4IR adoption are mainly managers YET in government, the digital champions are the IT department. This has implications for digital skills efforts.
  - The older generation are more cautious about cybersecurity compared to other age groups.

- **Rethink Education**
  - The standard MOOC platform seriously needs to be adapted to suit South African needs.
  - Cross-accreditation (mutual recognition of learning credits across institutions) is a very important feature for South Africans
  - Digital technology infrastructure remains a challenge in certain population areas. Creative partnerships are called for.
  - Spaces for individuals to learn from in communities, e.g. telecentres, are needed.
  - Public internet is important and available but people are using mainly for entertainment
  - Innovate learning and learning spaces

PLENARY: INTERMINISTRY COLLABORATION (GOVERNMENT AND ORGANISED LABOUR): PROF MPHO CHAKA - PLENARY CHAIR

The plenary chair posed critical questions on how government can provide direction and how it can work with multiple stakeholders

PLENARY SPEAKERS

1. Ali Mashishi - ADDG - DTPS
2. Pierre Schoonraad - Chief Director CPSI
3. Mpho Tshabalala - Organisation Labour (APSA Union)
4. Tim Parle, Chief Director for the digital economy, Western Cape Province

Key messages and recommendations

- **Prepare government and society for the transition to 4IR**
  - Most public servants are not qualified for the skills we are going to need in the 4IR
  - Recruit people for the ability to relearn and reskill
  - Analog might have to work alongside the digital world for a season
  - Most govt systems are outdated and not 4IR ready
  - However, the majority of public servants are not skilled or qualified for the future that we are going into
  - How can government push for digital transformation when the digital resources are not available?
  - Skill public servants
  - Provide digital skills to the entire government sector
  - Upskill and reskill and embrace flexible working hours
  - The job security in the 4IR is a phenomenon that needs to be rethought
  - Prepare for quickly changing environments
  - However, the 4IR is a real possible threat that can cause rifts between social classes
  - Keep the young population engaged

- **Elevate the mindset in government and society**
  - Learn, unlearn and relearn is a critical skills today
  - Learn and unlearn rapidly
  - Move from consumerism to production
  - Need more creative content from the creative insuries
  - Need people to be secure and confident when using technology
  - How can government champion digital transformation while it lags behind the most?
  - Encourage the younger generation to create new digital media and content
  - The focus should be on the RSA we want to live in
  - Put aside political differences for the sake of the 4IR

- **Rethink digital skills and education**
  - Introduce and integrate 4IR skills from basic education, re-use TVET colleges and consider matriculants and school leavers, upskills and reskill others
  - The 4IR presents a new era which makes many old qualifications outdated
  - Advocacy on digital skills is needed in the communities
  - Empower from Basic Education with 4IR skills
  - Integrate the 4IR into the curriculum from an early age
  - Training and skills development is the best way to deal with the 4IR
  - Prioritise skills and training development

- **Create local interventions**
  - Adapt the 4IR to the needs of South Africa
  - Use the 4IR to deal with RSA issues such as crime, unemployment and electricity
  - Find ways in which the 4IR can guarantee that people will not lose their jobs but rather make them better employable.
  - The 4IR will be a curse if it is introduced as though South Africa is a 1st world country

- **South Africa is on track**
  - RSA has the necessary attributes to take advantage of the 4IR
  - There is optimism about the future for South Africa, the 4IR brings about more job opportunities than losses
  - The worlds economy is growing because of the 4IR

- **Create an enabling environment (catalyst)**
  - It is difficult for the government to reach every citizen in every corner of the country
  - Change policy on skills requirements
  - The issue of digital skills should not be politicised but move to transform South Africa
  - The digital economy will increasingly be the driver of the economy growth
  - Ensure online safety in the 4IR

- **Collaborate, collaborate, collaborate**
  - Collaboration requires a broad spectrum of ideas.
  - Partnerships between the public and private sector are necessary
  - Creating stronger collaboration between governmental departments
  - Be inclusive of other sectors and women in the digital transformation process

PLENARY: SOCIETAL INCLUSION AND SCALING MODELS (COLABS): DR LEONA CRAFFERT PLENARY CHAIR

The plenary presented what the NEMISA Colabs have been doing with regards social inclusion and digital skills training at NEMISA and in the different provinces of South Africa

PLENARY SPEAKERS

1. Dr Leona Craffert: Western Cape Colab
2. Antoinette Lombard: Northern Cape Colab
3. Sibukele Gumbo: Eastern Cape Colab
4. Doc Fick: NEMISA Training
5. Dr Farivar Rahimi: Limpopo Colab
6. Dr Bukelwa Ngoqo: Mpumalanga Colab
7. Prof Mpho Chaka: North West Colab

Key messages and recommendations

- **Roll out internet and digital infrastructure (Technology innovation hubs)**
  - Digital infrastructure and internet access are needed - strategic partnerships resolve this challenge.
  - The geographical distance between centres, for example, in the Northern Cape is great
  - Access to internet and digital exclusion are a challenge, while 85% have access to cellphones, access to the internet is still a challenge

- **Include behavioural change programmes**
  - Individuals have little hope and lack motivation. Some are unwilling to change
  - In order to change mindsets, it is necessary to put in place some behavioural programmes with associated incentives that encourage the adoption of 4IR technologies.

- **Train and skill facilitators**
  - Facilitators who work directly with the communities need to be skilled.

- **Contextualise (invest in research)**
  - The realities of South Africa are complex unemployment, electricity challenges, and limited digital infrastructure
  - Understanding the context of the community and their needs is critical before digital skills interventions
  - For example, the Eastern Cape province economy was not growing. The research found that the workforce is mainly in the low-skilled category. A 4IR focus should rather target agriculture

- **Approve a framework for digital skills efforts**
  - The policy framework enables training and tracking of progress with transformation of digital skills efforts.
  - A framework provides for longer term planning especially with government partners. For example, by projecting what skills will be needed in 5 years.
  - Allows for informing other policy such as curriculum development and new curriculum e.g. the Postgraduate Diploma in Data Science at UWC is open to other student streams.

- **Partnerships as ideal scaling models**
  - There are formal partnerships with local government, other Universities, TVETs and non-profit organisations to reach communities. These partnerships are ideal for scaling
  - Branding of the partners and the Colab host Universities work to an advantage in the provinces. Communities recognise the brand and are more willing to participate.
  - Some partnerships are formal while others are not formal - what matters most is delivery.

- **Training requirements differ per context**
  - Data literacy and social media skills are basic foundational skills.
  - Cellphone repairs, fibre optics, robotics, coding, 3D printing are needed in the Northern Cape

- **Alternative learning models are required**
  - Moving from traditional classroom classes to blending some content has resulted in better time flexibility and higher learning retention at NEMISA as students worked at their own pace
  - On the other hand, in rural and remote areas, the face-to-face traditional classroom is preferred
  - Face-to-face remains relevant across all contexts: For remote and rural communities, this is the only way at the moment

PLENARY: TECHNOLOGY AND PEOPLE (INDUSTRY, GLOBAL AND AFRICA): DR LEONA CRAFFERT - PLENARY CHAIR

The plenary presented posed the following key questions: What is the impact of technology on people? What should we focus on as a collective in terms of ICT?

PLENARY SPEAKERS

1. Mr Emeka Onyia: Senior Manager - Product and Innovation Development - AfriExim Bank, Cairo Egypt
2. Hon Michael Onyongo: International consultant on the Future of Work and former Regional Minister of ICT in Kenya
3. Mr Kyle Parker: COO for Informed Decisions, South Africa
4. Dr Ilse Marien: Senior Researcher in Digital Transformation at IMEC SMIT Vrije Universiteit Brussel, Belgium
5. Dr Michael Gastrow: 4IR Commissioner and Senior Researcher from Human Science Research Council

African & Global Perspectives
- **Global pressures**
    - Digital pressure is rising - with a pressure to adopt digital tools
    - The protection of privacy data is an ongoing pressure by citizens
    - Basic data literacy is still a challenge globally
    - Resistance to the 4IR: The pressure caused by digital transformations is not always embraced. For example in Brazil, people are afraid of what the 4IR is bringing

- **Challenges in Africa**
    - Poor infrastructure:
        - There are some countries that are still only on 2G
        - Most technology solutions are imported

    - Low trade infrastructure
        - Africa produces what it does not consume and consumes what it does not produce
        - Poor trade facilitation between states. For example, 12 days to clear goods at African borders, is more expensive about $450 per day compared with 2 days for developed economies.
        - Intra-African exports and imports trade lags Europe, Asia and North America, but are comparable to Latin America and the Middle East

    - Underdeveloped cross border payment systems
        - Importing from Africa is more expensive that importing from outside Africa
        - Fragmented and undeveloped cross-border payment and settlement systems across the continent.
        - Difficulty to access and settle in foreign currency.
        - Limited intra-Africa trade compared with other continental regions
        - There is not enough money to drive trade

- o Little structure
    - ▪ Limited access to finance
    - ▪ Low levels of industrialisation in many African states.
    - ▪ Trade happens but it is mainly informal - about $170 billion in trade

Key messages and recommendations

- **Champion digital innovation (especially in IoT, AI and Blockchain)**
  - o IoT presents greatest digital skilling opportunity & jobs
    - ▪ The internet of things provides many new opportunities for employment and contextualisation. For example, IoT uses low data which makes it affordable.
    - ▪ For example, what started out as tracking beer production processes resulted in a full fledged business in many other sectors
    - ▪ IOT does not even need batteries and needs limited infrastructure
    - ▪ It is possible to be operational despite the electricity issues
    - ▪ There are IOT encrypted standards that have been created that are low data usage and low maintenance usage
    - ▪ Digital skills opportunities with impact
      - • There are so many applications for IoT and people are needed to move the opportunities into those sectors
      - • Create new jobs and give them something that is still very important in the IoT space
      - • IoT solutions can be transferred between industries
      - • Data from IoT can be used to enhance many sectors
      - • Informed Decision has infact created new opportunities
      - • There are even new terms that they are creating for new types of jobs
  - o Do not compete with 4IR technologies, innovate with them
  - o Create digital innovations that can work even though you are not physically present. For example, Kenyan youth who develop for the Government of Estonia, or a blockchain that now eliminates the middle man in Kenya.
  - o We meed champions and innovators who can create things others cannot see
  - o Create the future that Africa deserves
  - o Look within in Africa for some African solutions
  - o Blockchain can actually eliminate the middle men and connect last of the mile producers with retailers such that as soon as money is paid, everyone in the value chain gets paid
  - o Create a digital ID (or plug into digital ID)
    - ▪ A digital ID enables a fundamental Know Your Customer (KYC) principle
    - ▪ This helps with identifiability and access to Finance
    - ▪ Create or plug into a digital identity that reflects the African lived experiences
  - o A bottom up approach where the context is first understood is critical. For example, farmers in Kenya who plant based on weather patterns using an app.

- **Prioritise the 4IR agenda**
  - o These negotiations are happening and 4IR needs to be included in those conversations
  - o The 4IR should be de-politicised and made technical
  - o Include design as a way of creating new products

- **Create partnerships**
  - Learn together with the practitioner community

- **Skill, upskill and reskill**
  - Without a University education, one can gain skills that are 4IR relevant
  - Our education systems are designed for the industrial revolution era
  - Some people skilled in Africa are exporting their skills and working in Europe
  - Show case capability in the 4IR
  - Change mindsets
    - The changing of mindsets is a societal need
    - Start at the level of basic education
    - Engage with the public sector thinking around the 4IR

- **Prepare for the 4IR risks**
  - Digital workers tend to not have any insurance
  - Create social security for digital workers

- **Boost intraAfrica trade**
  - Support the AfCFTA (African Continental Free Trade Area) using digital innovations such as payment gateways, digital regulatory platforms, trade information portal. Slated to start trading in July 2020.
  - Support the creation of the biggest trade zone
  - Create one African market
  - Opportunity to leap frog and have one African market
  - Promote secure digital platforms that allow for trade across Africa
  - Create an IntraAfrican Payment system
    - Rather than use foreign currencies, we can use an African currency
    - Pay with your currency and receive in your currency
    - A trusted entity to do KYC fast rather than go through Europe or New York
    - Linked to a digital Id: Know Your Customer
  - Create a financial platform
    - The platform offers guarantees for trade
    - A guarantee platform that can measure and track goods in transit between countries
    - Whatever you want about trade in Africa, you can get it from here
    - This application can show regulations for each country
  - Invest in creating an African digital currency

- **Invest in Technology Centres**
  - These centres should target the younger generation especially
  - Entrepreneurial skills are necessary to be taught

- **Rethink Education**
  - Use more online learning courses
  - A workable framework for accredited online courses is required.
  - Data analysis and coding are now central for the everyday person
  - Introduce 4IR skills at the basic education level.
  - Re-curriculate education for the different sectors of society
  - Getting education right is the key
  - More dynamic education

- o It is a lifelong effort to continue learning
- o The place to learn will no longer be a permanent fixture but dynamic
- o There must be a balance between technical and soft skills; rather than becoming more like a machine, we can leave machines to do these things and develop human traits that machines cannot do

- **Focus on the Youth**
  - o Median age in Africa is 19.7 years
  - o Changing the mindset in Africa needs to start with the youth.
  - o Africa has a young population
  - o Kenya, like most other African states, has a greater youth population, and expected to rise to 42% by 2030.

- **Digitalise government**
  - o Some of these services are much needed
  - o But people do not know how to use some of the digital tools
  - o The opportunities from digitalising government are exponential
  - o
- **Introduce Data governance**
  - o Create data governance structures to ensure privacy rights are not infringed
  - o Understand how private data is being used by organisations
  - o Create a data literacy course and take it around so people can learn how to manage their own data
  - o Data literacy helps users understand how AI is affecting them as well

5. DAY 2: SUMMIT, COLLOQUIUM & HACKATHON

COLLOQUIUM: KEYNOTE BY 4IR COMMISSIONER AND NEMISA BOARD PAAC CHAIR: PROF C ADENDORFF

- **4IR Realities reflecting rapid flux**
  - Digital technology is making things faster
  - Some jobs are gone, new ones are being created
  - Changes will be most felt because of the changes in the technology
  - There is not much time
  - The technology will enhance our lives
  - It is a shift that is happening not jobs being lost
  - We are 8 years down the 4IR line
  - The number of devices are climbing
  - Data never sleeps
  - Global spending on AI is exponential
  - the 4IR will be at most 10-15 years, then the 5IR will be here

Key messages and recommendations

- **Rethink Education**
  - The new fundamental education skills
    - Tech Savvyness is required to combine different technologies
    - The STEM are the critical building blocks for the 4IR
    - Data literacy - data is the fuel of the 4IR, the ability to make better decisions using the data. Start by being curious about the data you sit with.
    - EQ is more important than IQ: IQ will in the future not be needed because machines will provide this
    - Creativity and foresight intelligence - the ability to be creative
    - Flexibility and adaptability - there are fewer jobs for life
  - New pedagogical models are needed using AI
    - Change the curriculum to include adaptive learning technologies
    - Take courses online to allow anytime / anywhere learning
    - Adaptive learning technologies - Adjust course content according to the client needs and skill levels automatically using AI making learning much more smart. AI allows all these options immediately.
    - Allow for flexible learning space - teachers will be monitors more than anything in the future
    - Smart teams will be required more than anything
    - Automatically be told by AI when we have mastered a topic
  - Create short manageable course
    - It shouldn't take 3 years to get a degree again
    - Some courses will be taken by smaller organisations
  - Enhance industry (employer) to University relationships
    - Universities and Employers must work together
    - Employers should tell Universities what they need
    - Industry does not care about SAQA

- o Retrain educators
  - ▪ The educators are the ones who need to change
  - ▪ The closure of Teacher Training Colleges was a mistake, they will be reopening soon

- **Invest in the Youth**
  - o Especially those born between 2010 and 2025
  - o Cater for the youth, their needs and demands are different

- **AI, Blockchain and IOT are the technologies to watch**
  - o Consider the plurality of things - blockchain connects these dots

- **Bold decisions are needed**
  - o Demands bold policy decisions
  - o We can leapfrog and we will leapfrog
  - o The real enemy is us as we are trying to accomodate existing systems with reskiliing
  - o True vision needed - no vision results in confusion
  - o Resources - no resources brings frustration
  - o Without an action plan for education, we shall have false starts
  - o Action plan for true change

- **Change mindsets**
  - o Positive thinking is crucial in such a changing world
  - o Emotional intelligence which is the ability to understand own emotions and that of others
  - o A strong sense of flexibility and adaptability to the rapid changes is required in society
  - o There is no room for negativity
  - o Get out of the comfort zones and into the learning zones
  - o We cannot afford to lose talent
  - o Managing people in conditions of flux will be on high demand
  - o Talent is more important
  - o EQ, Spiritual, Cultural and Foresight Intelligence that we need to develop
  - o How to stay learning even in the face of distractions
  - o If we don't have incentives, we have resistance
  - o Skills - no skills come anxiety
  - o Incentives - no incentives we get resistance

- **Collaborate**
  - o Identify shared possibilities for the 4IR

- **South Africa has the infrastructure (mine it)**
  - o South Africa is being used to benchmark how the 4IR is being tapped into
  - o The 4IR as defined for South Africa - categorised by the fusion of smart technology and has a direct impact on smart business systems

**PLENARY: VICE CHANCELLORS OF COLABS: PLENARY CHAIR:
          DR COLIN THAKUR**

SPEAKERS

1. Prof Rob Midgley: Vice Chancellor of Walter Sisulu University
2. Mr Isaac Maredi: Executive Director ICT University of Limpopo (VC Representative)
3. Ms Poppy Tshabalala: DVC and CIO of University of South Africa (VC Representative)

Key messages and recommendations

- **Structural change is needed at HEIs**
  - Follow the sources of innovation
    - Universities are following rather than leading
    - Universities are more reactive rather than innovating
    - Change is happening in the streets
  - Engage with the 4IR and its complexities
  - Move away from mundane tasks and the traditions of the past, and prepare society to be ready for the 4IR
  - Start looking at micro-credentials and rethink the credibility of short learning courses
  - Broaden ICT curricula
    - Invest in more ICT courses
    - Data literacy is key
    - Ethics, regulation and privacy are important
  - Gaps between sciences and arts are closing and calling for much more interdisciplinarity

- **Collaborate**
  - Across disciplines
  - With government and the private sector
  - Open up research data
  - Use the SDGs as the collaborating glue
  - Create systems that allow more time to interact and collaborate

- **Rethink and digitize the Education Sector**
  - Localise the digital innovations for Universities
  - Be careful not to imitate the Financial sector - the education sector is different
  - Work together as HEIs rather than continue working in silos
  - Improve online learning methods
  - Remain pragmatic about the digital divide that will be created
  - Review qualifications at Universities
  - Innovations happens in the street and not at the University - Universities are more reactive rather than proactive - be more entrepreneurial
  - Ensure that everyone in the community has access to and can use the digital tools now available.
  - Make the digital tools to study available as well
  - The role of ICT has changed, cloud services have changed to online.
  - Include more age groups beyond the 19-25 age group

- **Change mindsets**
  - South African society are still over focused on degrees
  - The 4IR is more about digital opportunities more than the digital divide
  - Be cognisant of the human element irrespective of the change
  - Teach educators and people to not be scared but to embrace
  - One needs to be more than a CIO but rather be a business person with IT skills.
  - Reskill academics of HEIs so they promote digital transformation
  - A new culture that prioritizes a new way of thinking
  - Most in the education sector are not transformed, not ready and willing

BEST PAPER AWARDS: DR TENDANI MAWELA: UNIVERSITY OF PRETORIA

- **Best paper**
  - Lovemore Khambane from University of Cape Town
  - Takalani Rasalanavho and Hossana Twinomurinzi from University of South Africa

- **Best short paper**
  - Winner: Gugulethu Bhaduza and Caroline Khene from Rhodes University
  - Runner up: Rebecca Nguna and Adheesh Badree from UCT

- **Best poster award**
  - Runnerup: Emil van der Poel from University of South Africa
  - Winner: Zizipho Magcebo from Magcebo Media

Academic paper summaries

  - 29 academic submissions
  - 5 papers rejected
  - 12 full papers accepted
  - 4 Short papers / abstracts
  - 8 Masters / PhD Posters
  - Preface

MINISTER'S ADDRESS: HON MRS STELLA NDABENI-ABRAHAMS: MINISTER OF COMMUNICATIONS AND DIGITAL TECHNOLOGIES (DCDT)

It is about people

  - The focus is on assisting people to change their social and economic status
  - Leave no one behind

RSA must be at the forefront of Digital Innovation

  - South Africa must become a global player
  - Move from consuming to innovating 4IR technologies. Examples include solutions for load shedding

- the 4IR needs faster systems with 5G - hence 5G is necessary
- NEMISA needs to be repositioned to expand on the programmes they are involved in
- SITA to become a digital services agency
- Such innovation calls for resourcefulness rather than the usual clamour for more resources

- Also the jobs of the future and the future of work are realities
- We are the only continent that is still lagging behind

DCDT is creating an enabling environment for digital transformation

- **Collaboration**
  - Allow spaces for different sectors to meet and innovate
  - Working with the Human Sciences Development Council to influence digital transformation
  - Partnerships with the Department of Education is important to promote the use of digital technologies for learning
  - We need constructive collaboration and not destructive competition.
  - DCDT not undermining DHET and DBE - but there is a skills mismatch in the skills, one of the issues is understanding what these issues are.
  - All stakeholders are needed in this effort
  - The Private sector needs to make the services and products available for everyone
  - Departmental responsibilities remain national and private sector needs to innovate in an enabling environment

- **Enablers**
  - The decreased data costs are one step towards creating such an enabling environment
  - Create an enabling environment and get digital skills strategy approved by cabinet
  - Providing digital skills to society and also to the public servants who are entrusted to creating an enabling environment for all to thrive
  - Budget constraints are a reality - how then do we migrate people to a new way of working
  - Resistance is expected but we should not deprive those who are ready of the opportunity

- **Policy changes**
  - Change labour laws around the use of digital technologies in government despite the slowness of such changes. Examples include working from home and using laptops.
  - Policy needs to be changed to move from 8 hour jobs and no access to laptops
  - In order to create the necessary digital transformation in government

- **Rethink and digitize Skills Development**
  - We are still producing graduates that are unemployable and unemployed
  - Introduce robotics & coding at the basic level of education
  - Remodel the SETA framework to make it relevant to the 4IR
  - Review University curricula urgently
  - How to introduce this yet Educators don't know where to start?

HACKATHON

- o Presentation 1: Data stories (Adi Eyal | OpenUp.org.za)
- o Presentation 2: Data driven policy (Pierre Schoonraad | Chief Director for Research | CPSI)

6. DAY 3: HACKATHON & POSTGRADUATE SYMPOSIUM

HACKATHON: 10 TEAMS

- **EC4IR TEAM**
  - o The degrading position of old human resources utilities in South Africa through the immersion and upscale of these utilities in 4IR supportable environments in order to reskill and upgrade the standard of lacking digital literacy in them, through immersive work systems that impact not only professions but personal lives.

- **Vidly IT (Agri Code)**
  - o We are creating a platform help farmers access real time data and historical data, with the info given they will know the temperature, soil moist so they will be able to plant their crops at a specific time and they will know what kind of crops they can plant

- **The Guardian**
  - o Recommendation system to help with inclusivity in policy decision making in the health sector

- **SMU-Hack**
  - o To create an awareness for digital skills in the stokvel community in SA

- **Limpopo Colab/Deviare**
  - o Analysing and finding insight from individual digital behaviours survey, then giving solutions using it

- **Futuristic Kids**
  - FEDE4IR is an educational application(App) which educates you not only about the basics but applications of a computer, the app will provide lessons on Artificial Intelligence, Coding, Robotics etc

- **Naki Technologies**
  - We are exploring the data set to see the best platforms we could utilize to deliver new ways to teach 4IR soft skills.

- **Khabubu Brothers**
  - Providing A Digital Tool To Access The Inclusion and Demographics of creating a mooc considering individual's behaviour.

- **African Humanist**
  - Introduction of data driven smart farming. To use the current dataset then extract and analyse the information about availability of land and what people use it. How IoT and machine learning may be used to improve farming with the current climate change and water issues.

- **Alpha Labs**
  - A soil monitoring device with web app, helping farmers make better decisions when planting crops and maintaining them. Also providing digital skills for previously disadvantaged farmers.

WINNING TEAMS

- **Winning team: The Guardian**
  - Prototype for NEMISA: Intelligent multi-lingual Chatbot for digital courses

- **Runner up: Vidly IT (Agri Code)**
  - Prototype for NEMISA: IoT solution for digital agriculture

- **2nd runner up: Naki Technologies**
  - Prototype for NEMISA: Pending

- **Best Presenter: Naki Technologies**

- **Best Woman: The Guardian**

JUDGES

1. Ms Bongekile Filana: NEMISA Board Member
2. Dr Sunet Eybers: Data Scientist | University of Pretoria
3. Mr Adi Eyal: Founder & CEO: OpenUp
4. Mr Makibinyane Mohapeloa: CEO
5. Dr Charlotte Wu: Geek Kulcha
6. Ms Nomso Kana: 4IR Commissioner & Nuclear Scientist
7. Ms Tumediso Lobelo: CEO

8. Mr Joseph Ndaba: 4IR Commissioner | North West Province

MENTORS

1. Ms Nozipho Sihlahla: DTPS
2. Mr Pierre Schoonraad: CPSI
3. Dr Paul Plantinga: OpenData & HSRC
4. Mr Muzi Ntombela: CPSI
5. Councillor Joseph Ndaba: 4IR Commissioner – North West
6. Mr Emeka Onyia: Product Innovation – AfriExim Bank, Cairo Egypt
7. Mr Michael Onyango: Future of Work, Kenya

POSTGRADUATE SYMPOSIUM:
Keynote: Dr Colin Thakur: Director KwaZulu Natal Colab

Unveiling 4IR data driven digital skills platform:
Mr Adi Eyal: Founder and CEO of OpenUp.org.za

Key messages and recommendations

- **Data Intuition**
  - Data should be seen as a crude oil to be mined
  - Social media data can be used to understand behavioural patterns
  - Intuition is still required when doing data analysis
  - Data also needs to be kept open so that others can leverage it

- **Democratize data**
  - Make data accessible to the society and make it understandable. Examples were offered of the Vulekamali where individuals can see how their salary is spent in government
  - Social development can then be targeted
  - People want access to data but access to the internet is the first challenge
  - Encourage innovation around data
  - Access to data requires different levels of sign offs
  - Digital transformation is required in government to appreciate the power of government data online