4IRSA REPORT SERIES

Workshop Report 1

GOVERNMENT & PUBLIC RESARCH BODIES
Amy Musgrave | BCX, 2 Lenchen Ave, Centurion | 16 November 2018

4IRSA is a partnership between the University of the Witwatersrand, University of Johannesburg, University of Fort Hare and Telkom SA SOC Ltd.

Table of Contents

1.	Introduction and Executive Summary	03
2.	List of Attendees	07
3.	Welcome and Purpose	09
4.	Input: Dept of Science and Technology	15
5.	Input: Dept of Trade and Industry	16
6.	Input: Dept of Telecoms and Postal Services	18
7.	Input: Dept of Public Service and Administration	25
8.	Input: CSIR	26
9.	Input: HSRC	28
10.	Input: WEF	31
11.	Input: SARB	34
12.	Input: IBM	35
13.	Input: 4IRSA Partnership	37
14.	Summary of Discussions	40
15.	Conclusion and Way Forward	45

Introduction and Executive Summary

The future has already arrived. The technological and digital revolution of economies – particularly the world of work - has been a reality since the dawn of the 21st century. But the pace of change accelerates with every passing year. This development has been dubbed the Fourth Industrial Revolution (4IR), and its impacts are both deep and wide-ranging.

The countries of the Global North are at the forefront of the changes taking place because of 4IR. However, developing economies, such as South Africa, can still find a niche by investing in the technologies and new skills that are essential for this new world. A national 4IR readiness plan is a necessary starting point.

This is where the Fourth Industrial Revolution Partnership for SA (4IRSA) comes in. 4IRSA is an initiative driven by some of South Africa's leading academic and research institutions, with the aim to produce a coherent and comprehensive national 4IR plan for the country. 4IRSA was founded by the Universities of Witwatersrand (Wits), Johannesburg (UJ), and Fort Hare (UFH), with support from Telkom SA SOC Ltd.

The partnership draws on the best South African traditions of dialogue, collaboration and negotiation to find lasting solutions. Though it is still at its infancy, the partnership will open its doors to all South African universities and research institutions, business, labour, government departments and civil society. 4IRSA is essentially the Codesa of the 21st century.

Ultimately 4IRSA will host two summits in 2019 where all the above stakeholders will have a chance to participate in producing a national plan for the digital economy of the future. The first of these, the Summit

of First Principles, is set to take place in March 2019. It will define the foundational rules and principles that should underpin a national response plan. The second gathering, the Summit of Declarations, will produce an implementable national action plan.

A series of sectoral workshops are currently underway with some of the identified stakeholders to prepare the way towards the summits. The first of these took place on 16 November 2018 and focused on government departments, public research institutions, and the World Economic Forum. The format of the workshop was simple and straightforward, given its status as the first and therefore the 'introductory' gathering. Because of 4IRSA's analysis that the SA landscape was full of as-yet uncoordinated efforts regarding for 4IR planning – many within government departments and institutions – the founders thought it best to start with the public sector. The objectives of this first workshop were:

- To share information on each party's broader work and importance in the economy
- To share what each party has done, is doing and is intending to do on 4IR
- To share, compare, and align the participants' visions for 4IR in South Africa
- To identify gaps and/or overlaps between what the parties are all doing
- To discuss possible alignment of activities
- To discuss how to bring other stakeholders into the process

Various government departments and agencies were invited to give account of their work to date relating to planning for 4IR. The government departments present were Science and Technology, Trade and Industry, Telecommunications and Postal Services, and Public Service and Administration. The Department of Higher Education and Training was invited by did not attend.

In addition, there was participation from the Human Sciences Research Council, the Council for Scientific and Industrial Research, the South African Reserve Bank, and the Innovation Hub.

Professor Zeblon Vilakazi, Deputy Vice Chancellor for Research at Wits University and a member of the 4IRSA steering committee, welcomed participants and explained the 4IRSA initiative.

In the various departmental inputs, it emerges that each government department has not one but several units and programmes that interface with 4IR planning during their work. It is also clear that government departments collaborate with global partners, such as the World Economic Forum (WEF) and the International Telecommunications Union (ITU). While these collaborations are to be welcomed and may help establish South Africa as a centre of policy development and digital innovation, they may often increase rather than discourage fragmentation and silos. Many of the collaborations work based on exclusivity and often duplicate each other's efforts.

One such example is the Centre for the Fourth Industrial Revolution Network, which the government, through the DTI, is negotiating with WEF to make SA the first African affiliate of. Meanwhile, the DTPS is hard at work establishing South Africa's Digital Transformation Centre, in collaboration with the ITU. Other departments such as DOC and DHET (neither of whom were at the workshop) almost certainly have similar global collaborations in the pipeline. It is therefore imperative to establish a single centre, which may not necessarily control all the various efforts but will at least have sight of all of them to ensure they ultimately serve the same goal: to make South Africa 4IR-ready. In that regard, the decision to recognise DTPS as the lead 4IR

department (the department was chosen to constitute and oversee the work of the Presidential Commission on 4IR) will help. The department will also be merged with the DOC (they are already under a single ministry) to form one Digital Economy/Convergence entity.

November 16 Workshop List of Attendees

NAME	ORGANISATION	ATTENDANCE
Dr Daniel Visser	CSIR	Yes
Willis de Ronde	CSIR	Yes
Monique Schoombie	CSIR	Yes
Mariam Paul	CSIR	Yes
Tendani Malumedzha	CSIR	Yes
Fulufhelo Nelwamondo	CSIR	Yes
Jeanette Morwane	DPSA	Yes
Mandla Ngcobo	DPSA	Yes
Mr Imraan Patel	DST	Yes
Sechaba Tsubella	DST	Yes
Ilse Karg	DTI	Yes
Adelaide Masemola	DTPS	Yes
Alfred Mmoto	DTPS	Yes
Alfred Mashishi	DTPS	Yes
Professor Enyinna Nwauche	FH	Yes
Michael Gastrow	HSRC	Yes
Temba Masilela	HSRC	Yes
Hester du Plessis	HSRC	Yes
Dr Solomon Assefa	IBM	Yes
Matlala Malatjie	Innovation Hub	Yes
Amy Musgrave	Journalist	Yes
Anrich Daseman	SARB	Yes
Siyabonga Mahlangu	Telkom	Yes
Sarah Mtintso	Telkom	Yes

Vukani Mde	Telkom	Yes
Phindile Dyani	Telkom	Yes
Professor Paul Babu	UJ	Yes
Lebogang Seale	UJ	Yes
Dr Nolitha Vukuza	UJ	Yes
Elsie Kanza	WEF	Yes
Prof Zeblon Vilakazi	Wits	Yes
Tasneem Wadvalla	Wits	Yes
Shirona Patel	Wits	Yes
Reshma Lakha-Singh	Wits	Yes
Brian Armstrong	Wits	Yes
Erna van Wyk	Wits	Yes

*Apologies were received from the National Planning Commission.
**No response was received from the Department of Higher Education and Training

Welcome and Purpose

Input by: Zeblon Vilakazi

First, I would like to thank Brian, Reshma, Shirona and other team members.

Background

- President's SONA address highlighting the importance of the 4IR
- As University institutions we have all been addressing several elements relating to the 4IR
- Telkom CEO's open letter in June
  - Generated significant industry feedback to participate
  - Our three Universities felt it was a useful catalyst to start a dialogue
  - DTPS also engaged with Telkom and Wits independently to move the dialogue forward
  - The 4IRSA Partnership
  - Discussions culminated in signing a 4–way MOU, which now has been extended to include DTPS

Our Overarching Objective

- This is one of the most important conversations for the country to engage right now.
- But there are several unconnected and possibly divergent conversations going on in different government, institutional and business communities.
- This is frustrating the development of a common discourse and a coherent set of responses.
- It is compounded by a tendency for many discussions to be heavily opinion-based and emotional rather than fact-based and rational

Our Proposed Solution

- To stimulate and help shape an inclusive and diverse fact-based dialogue on the impact of the 4th Industrial Revolution on South Africa and appropriate response to it.

It's not mainly about the tech:

- 95% of our economy is not ICT. ICT enables the rest of industry, but it is not THE industry. We need to formulate responses which address the entire economy
- It's about human impact: social, political, ethical, and economical.
- It's about Inclusivity

Purpose for Today

- Sharing Information on our Respective Activities:
- Share what each party has done, is doing and is intending to do w.r.t. the 4IR
- Share our objectives
- Share our visions for the South African response to the 4IR
- Identify gaps and/or overlaps between what we are all doing
- Discuss if and how we should and can align our activities
- Discuss how to bring other stakeholders into the process

Defining Revolution

- A tumultuous and transformative event that attempts to change a nation, a region or society – and, in some cases, even the world:
  - *scientific revolution* refers to the rapid advances in European scientific, mathematical, and political thought, based on a new philosophy of empiricism and a faith in progress

- that defined Europe in the 16th and 17th centuries – Claudio Montervedi (1567 1643)
- Rationalist, Positivist world view – Optimism about mankind's abilities – led by the rising middle classes
  - *political revolution*, in the Trotskyist theory, is an upheaval in which the government is replaced, or the form of government altered, but in which property relations are predominantly left intact. Often under-girded by a political theory: Enlightenment, Marxism etc and punctuated by an event -> storming of the Bastille, Winter Palace, etc.
  - *industrial revolutions*: Follow above trends -> Also built upon a fundamental scientific theory and punctuated by events

So, for SA to thrive in the 4th Industrial Revolution....
We need to understand all of the components of these, and excel in selected areas of each, e.g.:

- Software sciences
- Data Science (big data, AI,)
- Robotics
- Virtual Reality
- Entrepreneurship & innovation
- Genetics
- Bioinformatics
- Language studies

But we also need to understand and excel in the sciences and arts in the intersection:

- Integrative, trans-disciplinary theory and practices
- Systems thinking and complexity
- Design-thinking sciences

Convergent applications: → fintech, → digital government, → e-commerce, → new media, → e-health, → e-education, → Manufacturing 4.0, → digital mining, → digital arts ...

Components of the 4th Industrial Revolution

- Customer & citizen activism
- Populism & digital attention economy
- Aging societies/young societies
- Always-on, personalised, instant-gratification engagement
- Individualisation, the market of "me"
- Privacy and personal freedoms
- Changing patterns of Ownership
- Changing nature of work and jobs and purpose
- Identity in a digital, cyber-physical world
- Physical disconnectedness and alienation
- Virtual connectedness and Social networks
- Economic concentration, Inequality and exclusion

Some thoughts on a Strategic South African response to the “4th Industrial Revolution”

– catalysed through the following initiatives in preparation for a digital future

Online Education

– Full Online programmes (2 new launched in Aug 2018 PDBA, PDM) *https://online.wits.ac.za HEPSA*
– Core Business (Contact/Blended Programmes) SAKAI, CANVAS
– Massive Open Online Courses (MOOCS) (9 MOOCS live) *https:www.edx.org/school/witsx*
– Online/Blended Short courses (21 fully online) *https:digitalcampus.co.za/*

Smart Classroom

– More than ever, the role of ICT in teaching is of great importance because of its ability to enhance the relationship between academics and students. When academics effectively integrate ICT tools into subject areas
– it becomes a catalyst that allows them to grow into roles of adviser, content expert and coach.
– Wits University has embarked on an initiative to use educational technology coupled with the changing needs of students and academics which gave rise to technologically enhanced teaching and learning in a “smart” classroom.
– This concept aims to create a blue-print for the roll-out of “smart” classrooms in line with the university’s Digital Learning and vision 2022 strategies to ensure that academics are skilled in using technology to enhance

Our Big Challenge:
How can we play a role in the transformation of the global knowledge generation given current challenges?

New Global Centres established to study megatrends in global shifts (from an African perspective) to allow for evidence-based approaches to these new challenges:

- Southern Study of Inequality and Cities
- Global Climate change and human genetics
- Study of the United States
- Data Sciences [Wits is a national node]
- WITS/MIT IBM-Africa research lab
- Artificial Intelligence, Quantum Computing & Robotics to gear up for the new economy
- “Whoever leads Artificial Intelligence will rule the world” – Vladimir Putin

Department of Science and Technology

Input by: Imraan Patel

1. The DST has just finalised a new white paper on science, technology and innovation *(https://www.dst.gov.za/images/2018/white-pate-on-STI-7_09-FINAL.pdf)* so many things that we need to do whether we have a Fourth Industrial Revolution or not, is captured in that paper. We still need to deal with human capital development etc
2. Currently there are two platforms in the department's response: A Converging Technologies Platform and a Network of Outreach Centres in the National Integrated Cyber Infrastructure System (NICIS)
3. The National Advisory Council on Innovation (Naci) is helping the department to build these platforms and initiate a "community of practice"
4. The Converging Technologies Platform will collate information and strategies on the 4IR to help guide and inform strategic investment. It includes information and resource on: robotics, AI, blockchain, quantum computing, additive manufacturing, nanotechnology, mining, agriculture, health, education, cities, services, transport, and general manufacturing
5. One of the main concerns that the department has expressed is the silo-like nature of 4IR responses. It is keen to pursue a more integrated approach within the government and society at large
6. Three major problems the department is grappling with are: major spatial imbalances, operations that are not data-driven, and operations are still small scale
7. To address these concerns, it is looking at building broad-based centres, a suitable partnership institutional model, consolidating the research network and database into a cohesive system, and ensuring the NICIS remains cutting edge

Department of Trade and Industry

Input by: Ilse Karg

1. The department is focusing on two workstreams on 4IR. The first is to develop policy, and the second is running projects as it says industry is "very impatient with government... (and) can't wait for government to come up with a policy and a strategy"
2. Currently it has 25 interventions that will be implemented over the next three years
3. The preliminary stage focuses on building capacity in the government with help from the World Economic Forum (WEF). An update on South Africa's readiness is expected to be released in early 2019
4. The department is also working closely with the Trade and Industrial Policy Strategies (TIPS) and UJ on industrial development, as well as specific sector research
5. It is participating in the government's national coordinating committee on 4IR, which is was recently set up by the departments of Higher Education, Science and Technology, Telecommunications and Postal Service and Trade and Industry
6. The preliminary phase also includes establishing a BRICS partnership.
7. The second phase includes policy dialogues and engaging with labour, industry, academics and international partners. The department is currently discussing how to solve the country's skills shortage with the manufacturing industry and is engaging Higher Education on how to adjust school curriculums accordingly. It is also working closely with international partners and organisations, including some in Germany and the US

8. Part of its policy formulation will include four themes. They are industrial capacity by developing skills for the future of work, improving ICT infrastructure for the manufacturing industry, and financing tools to build industrial capacity
9. Secondly, it is looking at trade regulation and competition, including e-commerce and regulation on data. It believes the future of industry is clusters so there will be several challenges in terms of competition and its laws
10. The department is also focusing on digital transformation, which has been lagging much of the world for the last 20 to 30 years, and how this transformation will fit into broad-based black economic empowerment.
11. Lastly it will help with policy coherence on 4IR, which President Cyril Ramaphosa already called for in his State of the Nation address in 2018

Department of Telecommunications and Postal Services

Input by: Jeanette Morwane

There are challenges as well as opportunities associated with the 4IR:

1. Potential to raise global income levels and improve the quality of life for populations around the world
2. Technology has made possible new products and services that increase the efficiency and pleasure of our personal lives
3. Technological innovation will also lead to efficiency and productivity which will open new markets and drive economic growth
4. Impact of 4IR on governments:
5. New technologies and platforms will increasingly enable citizens to engage with governments, voice their opinions, coordinate their efforts, and even circumvent the supervision of public authorities
6. Governments will increasingly face pressure to change their current approach to public engagement and policymaking.
7. Legislators and regulators must continuously adapt to a new, fast-changing environment, reinventing themselves so they can truly understand what it is they are regulating
8. Governments and regulatory agencies will need to collaborate closely with business and civil society
9. Governments will not be able to address the emergence of the digital economy in isolation, but must build and develop capacity to drive the process robustly

Impact of 4IR on business:

1. New patterns of consumer behaviour are forcing companies to adapt the way they design, market, and deliver products and services

2. Access to global digital platforms for research, development, marketing, sales, and distribution, can oust well-established incumbents faster than ever before
3. Forcing companies to re-examine the way they do business as business leaders need to understand their changing environment, challenge the assumptions of their operating teams, and relentlessly and continuously innovate

Impact of 4IR on people:

1. It will change not only what we do but also who we are: our sense of privacy, our notions of ownership, our consumption patterns, the time we devote to work and leisure, and how we develop our careers, cultivate our skills, meet people, and nurture relationships
2. One of the greatest individual challenges posed by new information technologies is privacy

South Africa Country Report: in its input the DTPS shared the findings of a World Economic Forum report on various countries' readiness for 4IR changes *(http://www3.weforum.org/docs/FOP_Readiness_Report_2018.pdf)*

1. South Africa is ranked as a nascent (limited production base and at risk for the future) and within the top 50 countries, Leading countries include China, Japan, Germany, South Korea and the USA
2. South Africa's manufacturing share of GDP has decreased to 12% since early 1990s
3. South Africa has the strongest structure of production in Africa
4. South Africa can innovate with a strong innovation culture. Entrepreneurial activities are supported by a sophisticated financial sector

5. Human capital remains the most pressing challenge, with shortage of engineers, scientists and digital skills
6. There is a stable policy environment, but there is a need to improve its institutional frameworks to respond to change
7. The DTPS is the lead government department on 4IR and has been tasked with putting together the Presidential Commission on 4IR. The Commission shall consider the following issues in developing a National

Action Plan on the Fourth Industrial Revolution:

- How should South Africa characterise 4IR with regards to its social and economic aspirations and priorities?
- What is South Africa's state of readiness towards the 4IR? What are South Africa's unique competitive advantages (local and international) in these areas: developments in Internet of Things, genetics, artificial intelligence, robotics, nanotechnology, 3D printing and biotechnology?
- What will be the impact of the revolution on government, business and society as a whole?
- What are the opportunities and threats presented by 4IR?
- Does South Africa have adequate skills, if so, in which areas, and where are the gaps as well as the skills that will be required going forward?
- How do we prepare the workforce for multiple career changes that cut across occupational boundaries?
- What are South Africa's Research and Development (R&D) capabilities to support the 4IR?
- What technologies should be manufactured locally to grow the ICT and related 4IR industries?
- What strategies are needed to ensure the uptake and usage of ICTs and other 4IR technologies in other sectors of the economy to drive innovation,

SMME participation and job creation?
- What are the likely unintended consequences (such as job losses) and how to mitigate them?
- What mechanisms are needed to ensure effective coordination and collaboration amongst all stakeholders?

A National Digital Skills Revolution

The department is also working to drive a revolution in skills acquisition to equip SA for the digital economy. It has identified the core of main skills and competencies and put them in four main groups, namely:

1. Knowledge about ICT: Basic IT knowledge, ability to use and interact with computers and smart machines, understanding machine to machine communication, IT security and data protection
2. Ability to work with data: ability to process and analyse data and machine information, understanding visual data output and decision making, basic statistical knowledge
3. Technical know-how: inter-disciplinary and generic knowledge about tech, specialised knowledge about manufacturing activities and processes, technical machine knowledge for maintenance
4. Personal skills: adaptability and ability to change, decision making, teamwork, communication skills, mindset change for lifelong learning

The department's national digital skills strategy will aim to produce (Pyramid of Digital Skills):

- Sophisticated programming skills
- Knowledge of complex algorithms
- Computing skills
- Familiarity with algorithms

- Basic understanding of tech, software, and applications
- Knowledge of digital rights, privacy, security and permanence of data
- Ability to communicate, collaborate and create using technology
- Basic education and literacy
- Familiarity with tech devices and services

A National Fourth Industrial Revolution Framework

The national 4IR framework is led by the Presidential Commission on 4IR and has six main pillars:

1. Digital Society
2. R&D and Innovation
3. Skills Development
4. Industry and Manufacturing
5. Economic Policy
6. Inclusive Growth

Scope of the Presidential Commission on 4IR

- The commission will undertake high level research, international and regional benchmarking, and engage stakeholders within and outside government in meetings and other fora with a view to obtain and consider the views of a cross section of societal role players in the development of the Fourth Industrial Revolution National Action Plan.

The department has an integrated ICT policy framework. The vision for the framework is to: “ensure universal service and access to all ICT networks, platforms, content and services so that all South Africans regardless of who they are, where they live, their social or economic status, benefit from the opportunities offered by the ICT sector to improve their quality of life.”

Four Pillars of the ICT policy framework:

- Supply-side Measures
- Open access regime policy
- Radio frequency spectrum policy
- Rapid deployment policy
- New licensing framework for the Internet

Demand-side Measures

- Digital transformation of government
- Digital access to promote trust and security in the use of ICTs
- Digital inclusion to create an enabling environment to promote e-commerce

Postal sector reform

- Defines new role of the postal sector and SA Post Office in terms of universal access
- Delineates new market structure, competition and licensing frameworks, and expands role and obligations of Postbank

Institutional frameworks

- Ikamva National e-Skills Institute
- Evolution of USAASA and USAF into Digital Development Fund
- ICT Sector Commission and Tribunal
- SOC rationalisation

The department has been hard at work establishing South Africa's Digital Transformation Centre, in collaboration with the International Telecommunications Union (ITU)

Barriers to digital transformation:

- Lack of coordination or of mechanisms to develop contextual and relevant policies supporting digital innovation and entrepreneurship;
- Unclear roles or engagement of stakeholders in developing their innovation ecosystem;
- Missing innovation capabilities, especially soft infrastructure;
- Suboptimal integration of innovation ecosystems into key sectors of the economy; and
- The impact of the fast-changing ICT/telecommunication environment.

Department of Public Sevice and Administration

Input by: Mandla Ngcobo

1. The department has a draft digital transformation strategy for the public service to ensure that it digitally transforms
2. Once the public service has fully embraced the concept of an e-government, service delivery will improve because the more data that can be leveraged, the more divisions can be simplified. The department is, therefore, less focussed on technology, but more on data
3. One of its main concerns is that despite it having a vast amount of data, “it does not liberate it to take decisions and put plans together”
4. It is also o concerned about the current silo approach in the government on 4IR and says integration is urgent
5. It specifically wants government departments and institutions to use a similar approach when interacting with the public, as different technologies can lead to confusion and delays in service delivery
6. The department wants this uniformity to be addressed by the Presidential Commission on 4IR as it will help give direction to the Government IT Officers Council
7. It says that while the use of digital platforms will become more crucial, if connectivity remains an issue, the public service will not be able to operate at its optimum.
8. The department’s cloud policy is near finalisation.
9. It is also in the process of amending the public service regulations to make it easier for departments to share information on citizens, but at the same time ensuring that identity security is not breached.

Council for Scientific and Industrial Research

Input by: Daniel Visser

1. The CSIR has already done a fair amount of work on 4IR technology areas. They include advance manufacturing, nanotechnology, and large-scale 3D printing using titanium
2. The council believes that artificial intelligence should be combined with big data and analytics because they mostly merge together. These include machine learning, machine vision, urban planning, climate change tools and early warning systems for fires
3. It believes there is a “fair amount” of capability in the robotics space, including for mining and agriculture. It has already developed industrial and defence robots, and recently completed one for the pharmaceutical sector
4. On digitalisation, it is working on digital twinning with Siemens on product lifecycle management which looks “at the digital version of your product and process all the way through its entire lifecycle”
5. It believes not enough is being done on cyber security, so it is turning much of its focus there. It has helped develop a road map on cyber security and is assisting the state with policy and legislation. It is currently establishing its third National Centre for Cyber Security and has developed what it calls a “sovereign capability” for cyber security, which will become increasingly important as more data is generated
6. At the moment, one of the CSIR’s most important projects is Beyond 60 which will see it developing a new strategy over the next year. While the council has done well on developing scientific capability, it admits that it has not fulfilled its mandate on industrial development. The new project will be rolled in the first quarter of 2019

7. In a nutshell the project focuses on what the CSIR calls multiplier sectors in terms of economic impact on the country, job creation and socioeconomic upliftment
8. Industries include mining, agriculture, manufacturing, health, defence and tertiary education. There will be a special focus on disruptive technologies
9. This is a big change from how the CSIR usually operates, but it says it believes it will result in a lot more collaboration, particularly with the private sector. The private sector will essentially dictate the kind of work the CSIR will focus on to put the country first. In the past, it was more of an inside approach
10. Another important area is work the council is doing with the departments of Telecommunications and Postal Services, Trade and Industry, and Science and Technology on conceptualising a collaborative platform effectively for the 4IR. The council says that it will not just be talk shops, but it must be solution based. While the CSIR is not necessarily looking to develop a centre, if it does happen, it will be a national centre initially be hosted at the CSIR
11. The second part of the collaboration will focus on not only converging technologies, but other aspects such as inclusive development
12. The third aspect will look at the policy and regulatory environment. The council is currently doing work in Parliament on this issue and is also in talks with WEF. While it wants to pilot disruptive technologies, it needs to ensure this is done in the ambit of trade laws in and out the country

Human Sciences Research Council

Input by: Hester du Plessis

1. There is a lot of human sciences research that comes into the 4IR space. The council wants to see more stakeholder involvement
2. Our aspiration is that one way or another that this becomes a core national platform for 4IR whether that will or should be led by the government or will or should be led outside of the state, or whether it will be related to the presidential commission
3. This is meeting is therefore important for the national good. The stakes are ultimately the technological trajectory of this country and this continent. We owe it to the country to make a plan
4. Another aspiration here is engaging in a substantive debate, and we could sit here for a week and not come close to exhausting the substantive debates in this area
5. The debates are about the tech. The debates are about machine learning and industrial automation and so on and so forth, each of which has its own issues
6. We can debate the concept of 4IR and its ideology and its contextualisation. There's a whole bunch of social science research questions that are on the table whether it's the future of work, whether it's understanding innovation systems, etc

Our mandate:

1. Our aim is to do the research that can inform policy of departments including the departments represented here, and to build social science capabilities.
2. In terms of response to the revolution, the HSRC has established a task team on 4IR

3. Looking at the scope of the commission initiated by the president a lot of these questions that are within that scope are social science questions:
   - How will it impact on the future of work?
   - How can we make it equitable?
   - How do we optimise policy?
   - How do you make the correct RDI decisions?
4. We've engaged a little bit with NACI and are also working with the DST on the internal coordinating group. So, we're speaking inside and outside

What is happening currently:

1. What's immediately on the horizon is a Dialogue Conference that's being done under the European Union's dialogue facility
2. There is a conference on December 10 on 4IR, and the focus is on policy options for South Africa and potential partnerships between South Africa and the EU. So, we've got experts in biotech, digitisation, machine learning and industrial automation and from different sectors including a lot of European multinationals with South African subsidiaries that are interested in bridging these two economies
3. The HSRC will conduct a national survey called the South African Social Attitudes survey, scanning about 3000 households. It's representative of the country in terms of the data we've put in and are getting out
4. Questions include: Do you think your job will be lost to a machine? Are you concerned about the future of work? How do you feel about digitisation and changes coming from that?
5. It is part of one of our research tracks which questions not just 4IR being significant because of technological changes, but there's such an interest in it and what are the social and institutional anxieties it gives rise to?

6. One of our main constraints is that we need to build capacity at a rate that can keep up with demand for these kinds of things
7. So, a forum like this is good not just for knowledge sharing and for having debates, but for building partnerships that can respond to international calls for proposals and work so that we can put together a bigger South African response

World Economic Forum

Input by: Elsie Kanza

1. The South African government is currently negotiating with WEF to join the Centre for the Fourth Industrial Revolution Network. Although the details are being ironed out, WEF is confident the country will make the grade
2. This will make South Africa the first affiliate from Africa to join the centre, which is both regionally and globally significant
3. WEF focused on five core areas during its presentation. These were the definition of 4IR and why it matters, a perspective from business organisations, skills and mindset, how to lead transformation and not be reactive, and the collective risks of cyber security
4. A key concern is that the value being generated by the 4IR is concentrated: seven digital companies have been responsible for approximately 80 percent of value creation in the last 10 years. This is despite that it is meant to be an inclusive mental model, transform society, transform industrial models, and ensure that good governance is practised by all stakeholders
5. WEF emphasises that 4IR is not about the technologies themselves, but rather a combination of these technologies, how they are impacting each other, and changing the way we live and relate to each other as people and as groups
6. 4IR also matters because it impacts competitiveness
7. WEF highlighted that in its global competitiveness index 4.0 report, South Africa ranks 85 out of 140 in terms of ICT adoption, but it is more sophisticated on the finance side, where it ranks at 18.
8. It is these types of concerns that need to be worked out holistically because 4IR creates and amplifies risks

9. On businesses, leaders are asking how much they should allow the 4IR to disrupt them? A worry is how do you ensure that your going concern grows as it cannot change overnight, and how fast do you switch to new developments? So far only five percent on 1012 multinational companies have been able to digitise completely
10. Another critical element is that internally consultants tend to focus a lot on the business model and the enablers, but they should be focusing on the orchestration. How do you get there? What does it mean in terms of leadership and engagement? What does it mean in terms of scaling? How fast and how much are you willing to spend or invest? What does it mean in terms of governance metrics and risk management? What does it mean in terms of funding and investor management, and what does it mean in terms of regulatory and community engagement? These are critical decisions that need to be taken even before a company goes through the mechanics of who does what and which technologies are adopted. And how to manage the entire ecosystem?
11. On investing in skills and mindsets, it essentially depends on how you approach tech transformation. WEF believes that investing in social science and really understanding which perspectives are being considered are critical, particularly as a country decides where to place emphasis and where to mitigate risks
12. Investment profiles have three distinct investment modes. One is just increasing efficiency in terms of the adoption of technologies and so it is more about incremental increases for example in productivity. The next level is much more foundational where you see heavy investments in technology departments. And the third level is digital evolution where investments transform businesses over time.

13. At the centre, WEF focuses on nine key areas: digital trade and cross-border data flows, future drones and tomorrow's airspace, precision medicine, AI and machine learning, blockchain and distributed ledger technology, 4IR for the earth, future of autonomous and urban mobility, IET connected devices and new production technologies, 3D printing and robotics
14. The centre, which is based in San Francisco, is also working on determining a governance framework that can support these technologies and how to keep up with the technology. How can governance remain agile?
15. Other concerns are ethics and values, such as what happens when jobs are lost due to automation. WEF says there is a need to develop new skills to cope with the technologies, so re-skilling is paramount, instead of losing skills.
16. It is essential that 4IR works for citizens. So WEF's commitment is to create a space to help governments cope and respond better as custodians of society to ensure that everyone is operating on the 21st century technology.

South African Reserve Bank

Input by: Anrich Daseman

1. SARB formed a tech programme in August last year (2017). Its focus is on policy and regulatory issues, particularly how fintech will influence the Bank's policy and regulatory mandate
2. The Bank is also part of an intergovernmental fintech working group, which includes the National Treasury, and the financial intelligence sector. It is trying to get the Competition Commission and the South African Revenue Service on board
3. It is currently developing a policy paper on fintech to see how the technology can be supported, and what is the appropriate regulatory framework
4. The Bank says that technology enabled financial innovations will materially affect financial services in many different business models' application processes
5. When viewing fintech, the Bank looks at it from an activity-based point of view, including APIs, AI and blockchain
6. Also, while e-money is already being used, the shift is towards a virtual currency central bank that issues digital currencies
7. While the Bank is not ready yet to issue crypto currencies, it does need to explore what the policy rationale would be for doing this
8. The Bank plans on establishing an innovation hub, which will set up a regulatory guidance unit. It will engage Fintech companies so that the Bank has a better sense on what is happening in the market.

IBM

Input by: Solomon Sassefa

1. IBM Research, which is the innovation engine of the company, has spent $6bn on research and development. It has 12 labs across the world, with the latest ones in South Africa and Kenya
2. These labs have been set up in Africa to figure out how the company can create technologies locally so that the continent is not left behind
3. They have two components: One is technologies that get developed outside, but do not necessarily apply right now to Africa's context, such as Google's self-driving car. It is necessary that these technologies are adapted accordingly for different countries by developing local skills
4. In terms of applying machine learning technologies adapted to the local context, for example, IBM says it can transform some of the platforms that are developed to connect small and medium enterprises to banks and to distributors If done correctly, it adds huge value because it allows SMMEs to make more money and hire more people
5. A deep dive in AI can be used to help the continent combat diseases such as malaria
6. Because technology is being developed so quickly, the company has decided to start conducting experiments and make the results available as they go along. This will avoid time being wasted on trying to find partners initially
7. IBM's vision is to apply technology to transform industries. So, the second component is not to do this in silos
8. The company says it is greatly concerned that even though we are talking about innovation in Africa, it does not see it happening. This is despite there being a lot of intellectual property that can be made available to people to utilise it and create new business models around it

9. IBM warns that while stakeholders on the continent are talking about 4IR, the next revolution is already on its way. Such an example is quantum computing that is happening in the US and Europe. This is despite the capacity we have in our universities and research institutions. Another concern is that if big announcements do happen in this arena, African countries will not have the skills on the ground to keep up
10. IBM believes South Africa has not properly thought about which industries should be transformed

4IRSA

Input by: Brain Armstrong

1. 4IRSA was founded based on the premise that it is critical for South Africa to have a conversation on 4IR
2. The reasons are that there are several unconnected and divergent conversations and many of them are not fact based or rational. So, a common discourse is needed to develop a coherent set of responses
3. The wave of change is coming and while the country cannot control it, it can respond to it
4. Currently the country zooms too much on tech, rather than considering the social and human impact
5. For this reason, a collection of universities decided to get together. But ultimately the aim is to broaden the circle to help shape how the country will approach 4IR. Inclusive diverse fact-based dialogue is important. It needs to include labour, business, the government, civil society and global institutions
6. While discussing the impact on the economy and policy, the impact on society is just as important
7. It is crucial that there is infrastructure support and a degree of curation will help create a common dialogue
8. The initiative is focusing on five themes.
9. The first one is jobs and the impact 4IR will have on them. This includes changing models for work and work structure, as well as fair remuneration in the digital economy and how to share value in platform business models
10. The second theme is how the digital economy is getting more concentrated. How does South Africa deal with the concentration and ensure that inequality is not deepened? The initiative will look at digitisation concentration, inequality, the control and regulation of critical assets and infrastructures, the effectiveness and adequacy of competition

law, and new challenges regarding distribution and redistribution in the global economy and conceptual alternatives

11. The third theme is around society, the state and citizens. How does the county digitise in terms of digital literacy? Also, how do we foster trust between technology and people and technology-centric processes? How do we move towards the adoption of e-government services? Also, what is personal identity and how does it evolve in the digital world? What does this mean for new challenges for a democracy and opportunities?
12. This theme will also flesh out what is socially acceptable and inappropriate in a cyber physical world, new frontiers, and safety and security
13. The fourth theme will look at opportunities such as export growth, improving competitiveness and productivity, and focusing on critical growth segments. For example, the Department of Telecommunications and Postal Services has created a small business platform. How do we become more of a digital republic than a digital colony? Transforming healthcare and education will also be a focus
14. The fifth theme focuses on critical success factors so that we get all of this right. They'll include skills training and education, policy and regulatory frameworks, policy execution, and lessons from emerging economies
15. So far 4IRSA has formed a secretariat, which formulated the framework and has started with research. Rolling workshops are being planned over the next few months, and many research, and position papers will be produced from the various sectors
16. A Summit of Principles hopes to achieve a degree of intellectual and conceptual coherence. And after that there will be an elaboration phase where responses will start to be developed and research will be enhanced

17. A Summit of Declarations is where the initiative will decide on the way forward
18. It is not a short-term process and has to keep on moving towards execution.

This concludes the presentations and other inputs of the participants. This segment was followed by an open discussion based on the preceding presentations and guided by the outline set out by 4IRSA secretary, Dr Brian Armstrong.

Discussions

It was agreed amongst the attendees that the 4IRSA initiative and the first workshop was a good starting point in helping the country understand and utilise the Fourth Industrial Revolution to its best advantage.

However, Zeblon Vilakazi did warn the meeting that while its starting point is coordination, it may not be easy to achieve. A reason is that unlike China or Korea where there is a strong top down approach, in South Africa there are too many forces doing their own thing. This had led to a complex, messy space and it would not be easy to get the government, business and labour onto the same page.

He said that South Africa was not making significant gains because “we don't have things on the ground hitting on the ground fast”. Instead we are left behind because we are so emboldened in trying to coordinate in an institutional way, and not even a technological way, and for that reason behavioural science institutions needed to be part of the process.

Another of his concerns was uncertainty as no one was sure what the structure of the state would look like in the future, given the current political changes in South Africa, which are likely to accelerate after the 2019 elections.

“It is kind of what's best in terms of the kind of arrangements at this point in time and how would do we drive it because that's an uncertain including it's not just core central government this point in time I think there is widespread acknowledgement that there's just too many entities and government agencies...,” he said.

Daniel Visser told the gathering that the CSIR has been assisting the government with coming to grips with the 4IR.
He said they had established a task team in Parliament comprising researchers and advisors, as well as outside advisors.

“CSIR is assisting them with that. We are looking at putting together a few sector specific cluster papers. Information papers, white papers whatever you want to call them looking at what the opportunities, the threats, the rescue basket... and analysis for that cluster. So, whether it's the defence cluster, social, or economic cluster etc, we are looking to empower them.

“So, it's not a strategy or policy advice or whatever it is. It’s really just to inform Cabinet members in both houses as to what they can expect on legislation and policy...”

He reminded the group that the country had a plan for what it wanted to accomplish by 2030 (NDP). This plan did not go out the window now because of these kinds of initiatives.

“Let's look at how we can solve problems not how we can apply technology for the sake of applying our technology we still need to solve those same problems. Our response should still be along the lines of that development plan. And how we can use all of these evolving technologies in solving those key fundamental issues for the country that's set in the development plan.”

He said while funding was a concern, the country should be focusing to create special economic zones and how to get venture capitalists involved in the funding of different initiatives.

Elzie Kanza said a major concern of hers about South Africa was that very little was being done in the rural areas on 4IR.
“It’s a matter of urgency that you start getting more people to have access.”

She said quick wins were essential and cited an example of translating books and reading material into local languages so that they could be understood by all.

Siyabonga Mahlangu (Telkom) told attendees that these kinds of discussions and debates were exciting and important.

He said it was important that the people in the room recognised the workshop for what it was - the beginning of trying to find the coherence that everyone has been talking about. He did acknowledge that the country was dealing with a complex set of problems.

“The Fourth Industrial Revolution is more than just the start of technological change (and) technological convergence. It's about the impact of that convergence has on society... on culture, on everything.”

The process that 4IRSA envisaged had brought everyone into the room to start the debate. And while these discussions were currently happening in silos, they needed to start working towards convergence, he said.

This would help with starting to understand what the problems were and establish a common understanding of where solutions may lie.

He said it was the start of a long process that the initiative hoped would be shaped by the government, industry, academia, labour and civil society together.

Brian Armstrong said that he wanted to be clear that conversations were not about tech, as in a sense if it was not for tech, there would be no revolution.

It was rather about what the country did with the tech and what it could contribute to the economy.

“The South African ICT sector is probably about 5 percent of our economy. Focusing on the ICT sector not going to transform South Africa. It is how we make sure that our ICT sector services South Africa to transform the other 95% of South African industry,” he said.

“Let me give you some examples. Well let’s first use the global icons that we have which are creating all this wealth so Uber, Airbnb, Facebook etc. The techs fine but it's more about the way society is transforming and the way they're using that in new business models to create new sources of value.

“Let’s take South Africa I think there's some, if I was to ask you what some of South Africa’s more innovative companies are. You might come out with Discovery, Capitec, Nando's, OUTsurance, and maybe Sasol once upon a time. None of those are tech companies. But the point is they will use tech and they use it well... But they have created new sources of value... It’s about how you leverage the tech,” he said.

He also said the urban/rural divide and the digital divide were very serious points for the country, and despite our best efforts, this divide was continuing to grow. The reason was that the digitally empowered were accelerating at an increasing rate, and the digitally disempowered were moving forward, but at a slower rate.

He said it was crucial that conceptual coherence was reached by all parties involved.

Way Forward

Dr Armstrong's summation concluded the workshop.
A series of sectoral stakeholder workshops will be held as part of the Path to the Summit of Principles in March 2019.
The proposed dates for these are:

- 24 January 2019 – ICT Sector
- 5 February 2019 – TBD
- 21 February 2019 – TBD
- 7 March 2019 – TBD
- 15 March 2019 – TBD