DUT DURBAN UNIVERSITY OF TECHNOLOGY

higher education & training
Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

(#4IR) Opportunities and Implications

Dr Colin Thakur

InSeta Research Chair Digitalization

Director KZN eSkills CoLab

Ministerial Task Team (MTT) on 4IR

Member World of Work Task Team at USAf with 4 VC's

Former National Treasurer of the CSSA

BANK SETA

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BankSETA & InSeta Research Chair Digitalization

Director KZN eSkills CoLab

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BANK SETA

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Research Chair in Digitalisation

higher education & training
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KZN e-Skills CoLab

NEMISA NPC
National Electronic Media Institute of South Africa

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Acknowledgements

InSeta

- ***CEO*** Nadia Starr
- **Head of Training and Research** Adeline Singh

Acknowledgements

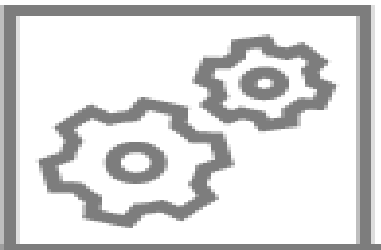
merSETA

- ***CEO*** Dr Raymond Patel
- **Regional Manager** Yogi Pillay
- **KZN Client Services Head Chris Mapu**

Greetings from DUT

Vice Chancellor Prof Twanda Mthembu

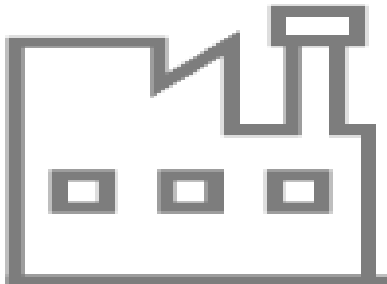
Deputy Vice Chancellor§ Prof Sibu Moyo



STEAM

Mechanization, steam power, loom

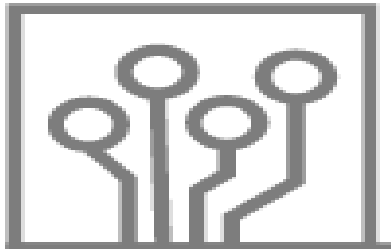
1st
1700s



ELECTRICITY

Mass production, assembly line, electrical energy

2nd
1800s



COMPUTING

Automation, computers and electronics

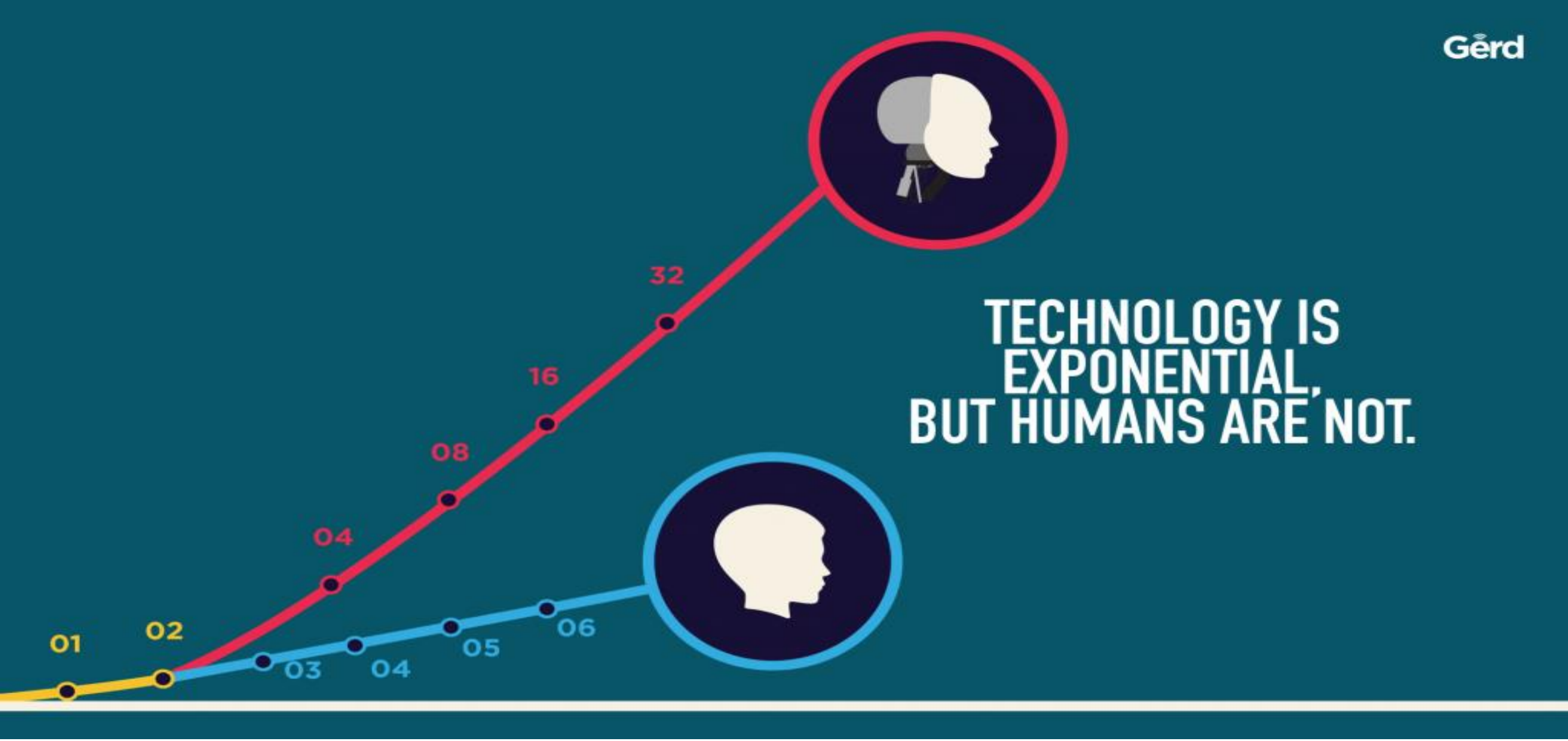
3rd
1900s

CONNECTED

Cyber-physical systems, AI, IoT, genome editing, autonomous vehicles

4th
Today

INDUSTRIAL REVOLUTIONS



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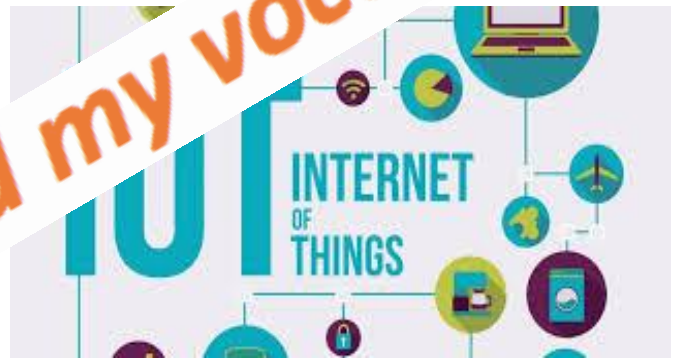
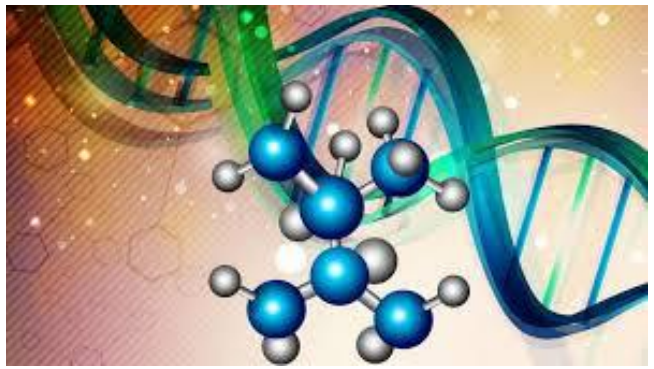
Digitisation versus Digitalisation

The main drivers of change in 4IR

- High-speed Internet
- Big Data analytics
- Internet of things (IoT)
- Cloud Technology
- Artificial Intelligence
- 3D Printing
- Biotechnology
- Blockchain technology
- Gamefication
- AR and VR
- Autono[illegible]vehicles
- Na[illegible]nology





What does each have to do with me and my vocation?

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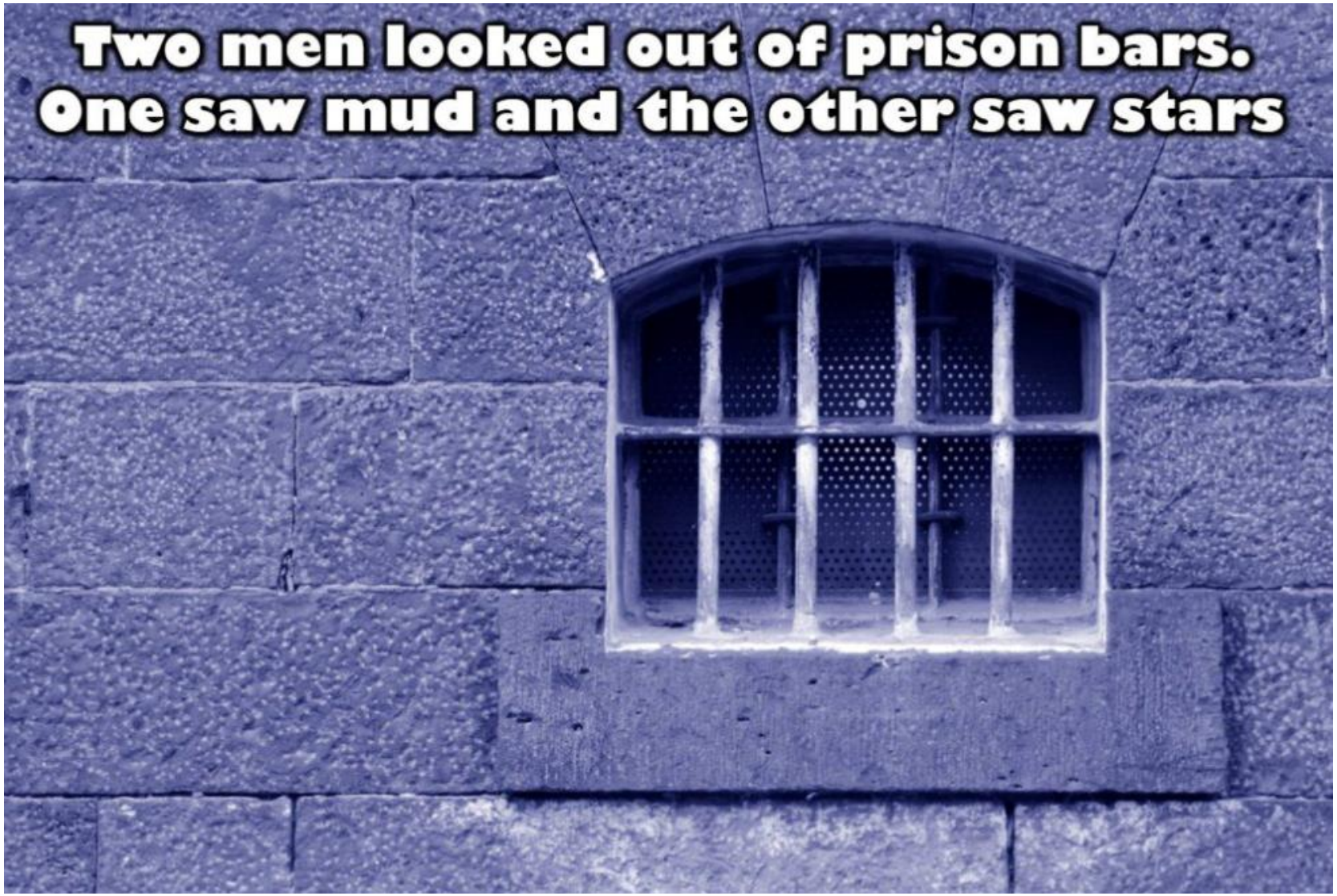
Is 4IR good or bad?

4IR: boom or gloom?



High Road: *#4IR*

Low road: *Job losses*

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Why Revolution and not Ev tion??

Car maker Nedcar cuts 1,000 jobs reduces production

Business October 5, 2018

News Lifestyle Sport Fe

HOME » HOMEPAGE FEATURED STORY SLIDER »

Volkswagen to

13 March 2019, 11:10 A

Tags: Germany

Fo jobs to save $600 million as p g plan

AP Associat

Carnage!!

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Job Shrinkage

Standard Ba

1,200 j

M

Absa

827 Jobs

May 2019

Nedban

pote **over**

Nedbank

1,500 jobs

July 2019

Carnage!

Mult **s to cut 2,194 jobs**

Staff Writer 21 Ju 19

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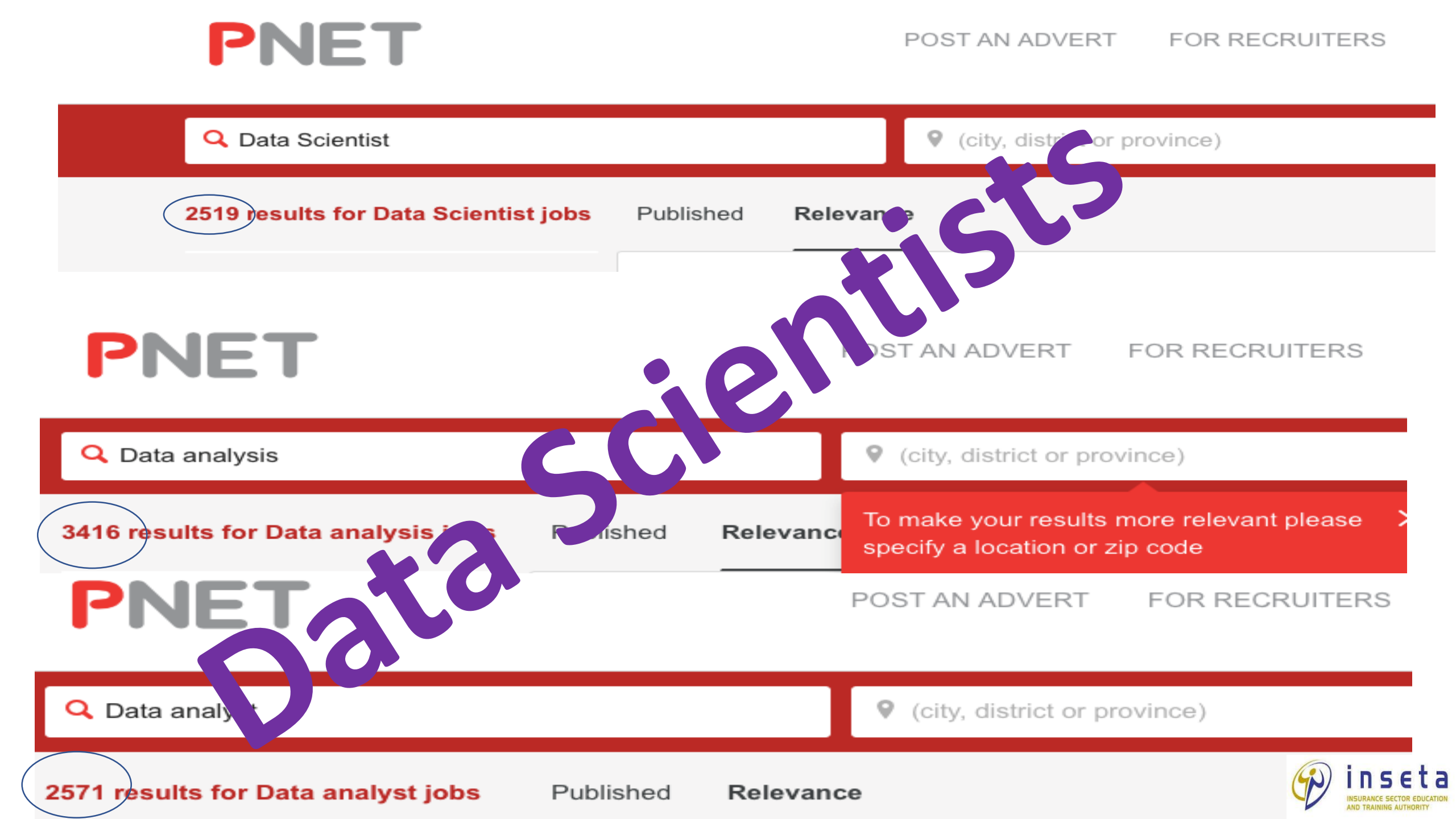
Job extinction

- Reduces tax base
- Reduces down stream employment
- Impacts economy
- Has psychological and physiological health issues on the individual and family

Any good news in 4IR for ZA?

The data so far is dismal!

Throttle the data until it confesses


PNET
POST AN ADVERT
FOR RECRUITERS
Data Scientist
(city, district or province)
2519 results for Data Scientist jobs
Published
Relevance
PNET
POST AN ADVERT
FOR RECRUITERS
Data analysis
(city, district or province)
3416 results for Data analysis jobs
Published
Relevance
To make your results more relevant please specify a location or zip code
PNET
POST AN ADVERT
FOR RECRUITERS
Data analyst
(city, district or province)
2571 results for Data analyst jobs
Published
Relevance
Data Scientists
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PNET

artificial intelligence

2638 results for artificial intelligence jobs

Published Relevance

PNET

Cloud computing

5303 results for Cloud computing jobs

Published

PNET

Robot Programming

1808 results for Robot Programming jobs

Published

PNET

internet of things

1614 results for internet of things jobs

Published

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Description	Number	Western C
Internet Banking	1887	
Data Scientist	2510	755
Data Analyst		827
Robotic	1809	546
Progra		
Data s USA needs	250 000	

Total 61155 Jobs attributable to 4IR

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Digitisation to unlock 1.2m jobs, ease SA's unemployment woes

By Admire Moyo, ITWeb's news editor.
Johannesburg, 05 Sep 2019

McKinsey & Company

"The PC in the 1980s destroyed an estimated 3.5 million jobs in the US (for instance, among typists), but created 19 million new jobs right across the economy."

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Data has a high road and a low road …

ZAPIRO ©
DAILY MAVERICK 1-8-19
SCIENCE
ARTS
TECH
SPORT
BUSINESS
?
FARMING
TEACHING
ENGINEERIN
...SO WHAT WOULD YOU LIKE TO BE?
EMPLOYED!
29% Jobless
WORLD'S 2ND-WORST

What happens to people in work?

iTWeb

Retraining required for 120m workers

By SIBAHLE MALINGA, ITWeb senior news journalist.
Johannesburg, 09 Sep 2019

IBM

By 2030

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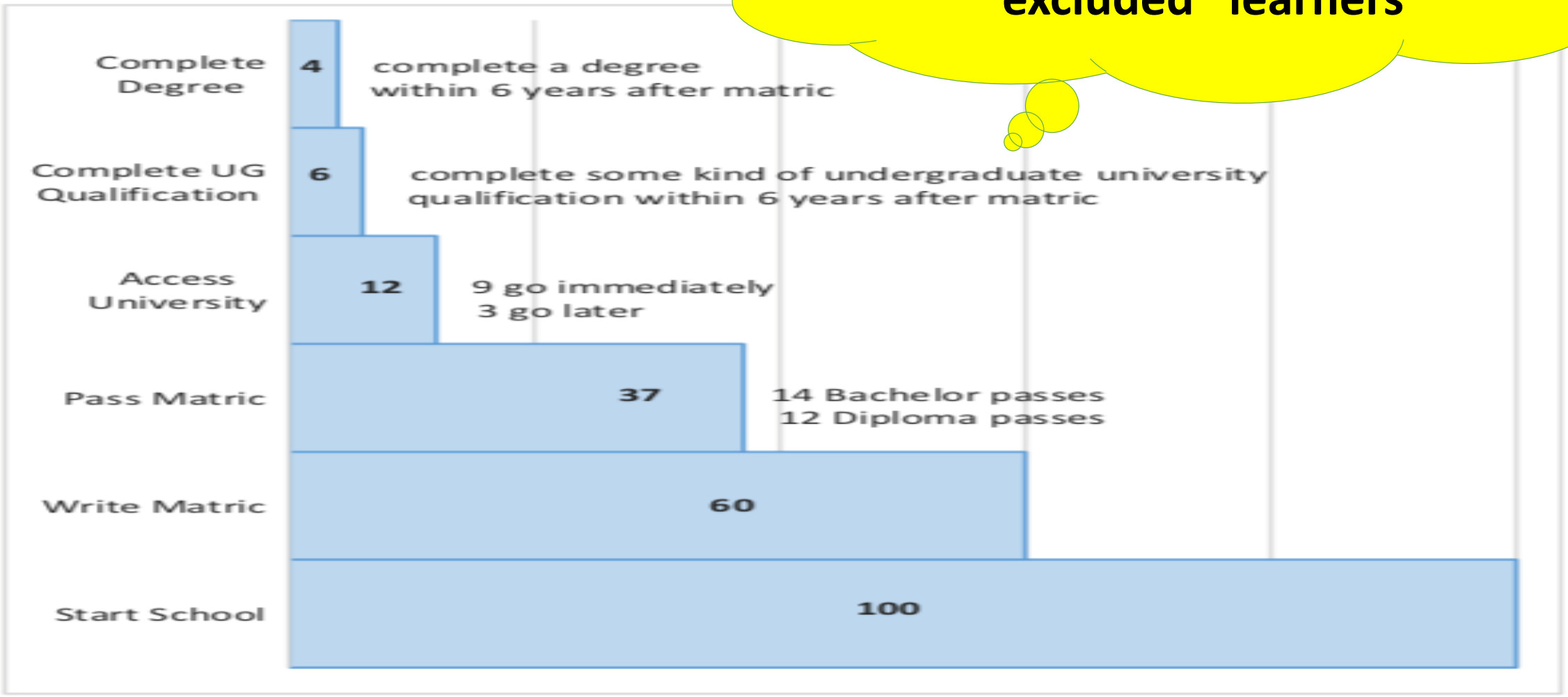
So we have jobs. Can we fill them? How good is our PSET supply side?

Skilling unemployed and underemployed

- Use 4IR for **skilling** for the **forgotten millennials** at TVETS and Community Colleges e.g. jobs using gamifications, AR, VR and simulations
- Use blended learning supported by technology

This is outside the PSET sector

4IR technology can be recursively used to support "excluded" learners

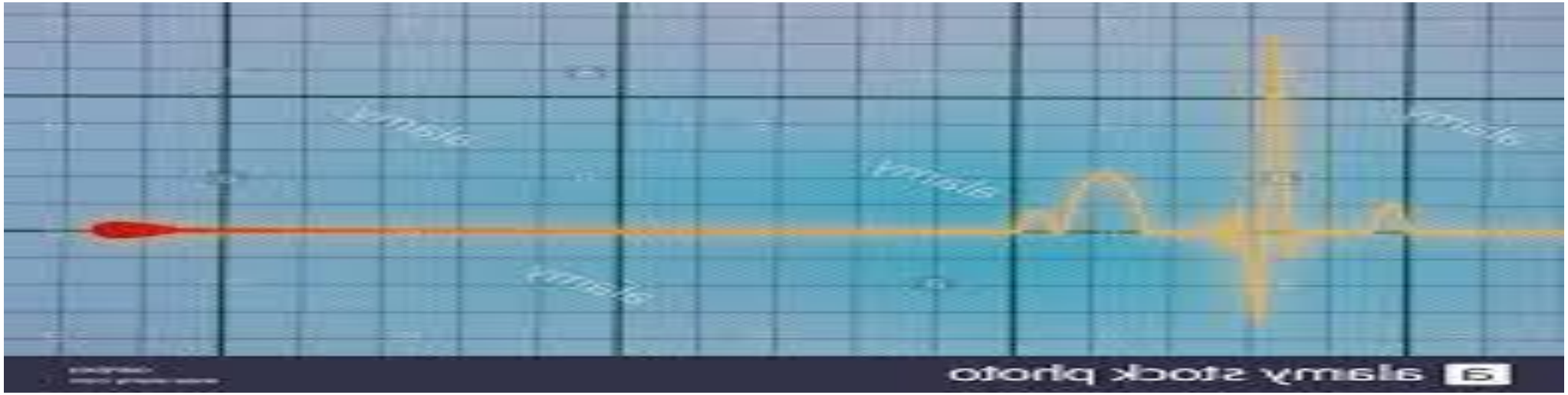


Throughput of the 2008 Grade 12 Class.

UNIVERSITIES SOUTH AFRICA

The numbers are flatlined …
Computer Science Graduates over 4 years

2014	2015	2016	2017
2 670	2 746	2 617	2 843



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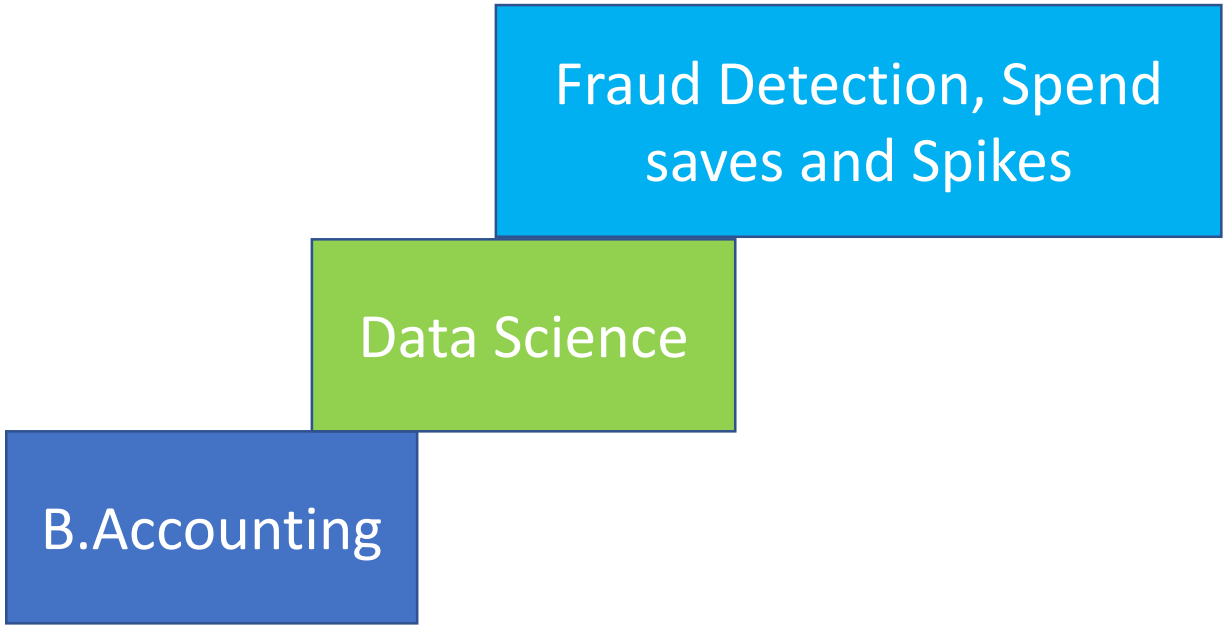
4IR Building blocks



Accounting skills - PG Diploma in Data Science

- **Advanced Excel** –Data Scientists still do the majority of their analysis in Excel at its highest potential, including the use of sophisticated data tables, statistical functions, report automation, and self-correcting models.
- **Data Mining/SQL Programming.** There are many programming languages for data analysis yet Data Scientists rely almost exclusively on SQL to query transaction databases for data analysis
- **Advanced (Revenue) Analytics. F**aster smarter pricing and sales channel optimization. This requires one to know how to get the right information and apply the right math through the right data set.
- **Mathematical Optimization.** One must understand the algorithms of mathematical optimization and its proper use them to provide creative solutions to unravelling puzzles.
- **Analytical Segmentation.** Highly targeted marketing, sales, and pricing strategies have been proven to deliver the most profit. Using data to reveal important trends at the customer level.
- **Visualization.** "Visualization" means the ability to reformat data insights for easy consumption depending on the audience. A CEO-view is not the way the Head of Marketing "sees".
- **Real-Time Models.** The legacy latency of accounting reporting is the reactive nature of managerial decision making. Needs **more real-time dashboards and reporting.**

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What are our emerging opportunities? i.e. PSET

Opportunities

1. **Square Kilometre Array (SKA)**
2. **Set-Top-boxes (STB's) Missed Opportunity!!**
3. **Spectrum dividend –4.National Health Insurance (NHI)**
5. **One tablet per child (OTPC or OLPC)**
6. **Bullet Train**
7. **One million climate jobs**
9. **Government support for entities with qualified audits**
10. **Voluntary retrenchments offered to government employees**
11. **Grant disbursements (NSFAS, SASSA, RAF)**
12. **Small Office Home Office (SOHO) *sharing economy***
13. **5G Internet of Things (IoT)**

Inc GDP by 0.5%. 7x impact of Multichoice

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SKA is evidence if 4IR possibilities

Square Kilometre Array project creates over 7 000 jobs

NEWS / 13 NOVEMBER 2017, 11:01AM / LISA ISAACS

National Health Insurance

Discovery warns of weaker profits, but says NHI could help it grow

Aug 30 2019 14:34 Helena Wasserman

fin24

Digital Dividend

Rolling out 5G network will **boost GDP** by **0.25% to 0.5% of GDP**

Lower data costs and create new markets, and **between 300K to 600K jobs**

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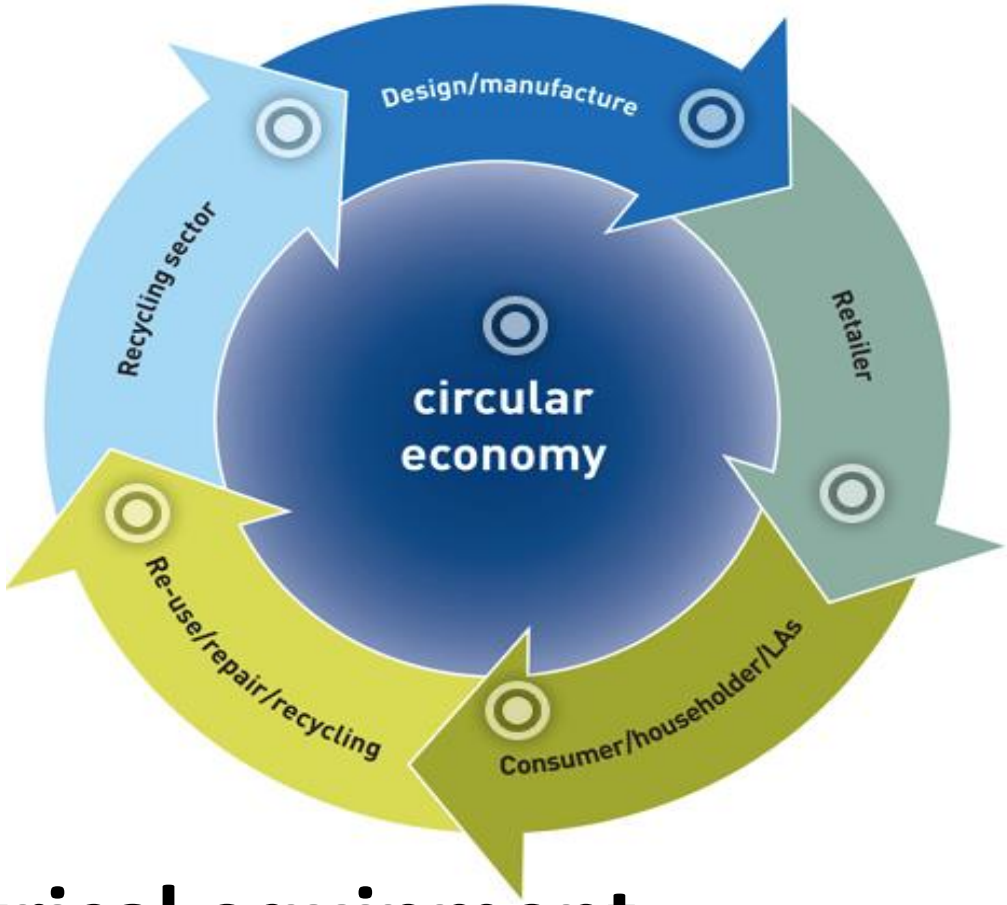
Waste Economy - 4IR will add to e-waste economy

The waste economy contributed **R24.3 billion** to ZA GDP in 2016. It created **36 000 formal jobs** and 80 000 informal jobs from **111 million tonnes of waste in 2016 – 106 tonnes in 2017**
Imagine if we improve our separation and recycling. It will create even more jobs. Only 10% recycled.

280m plant



Separate waste electronic and electrical equipment

Samsung and DTI e-waste campaign

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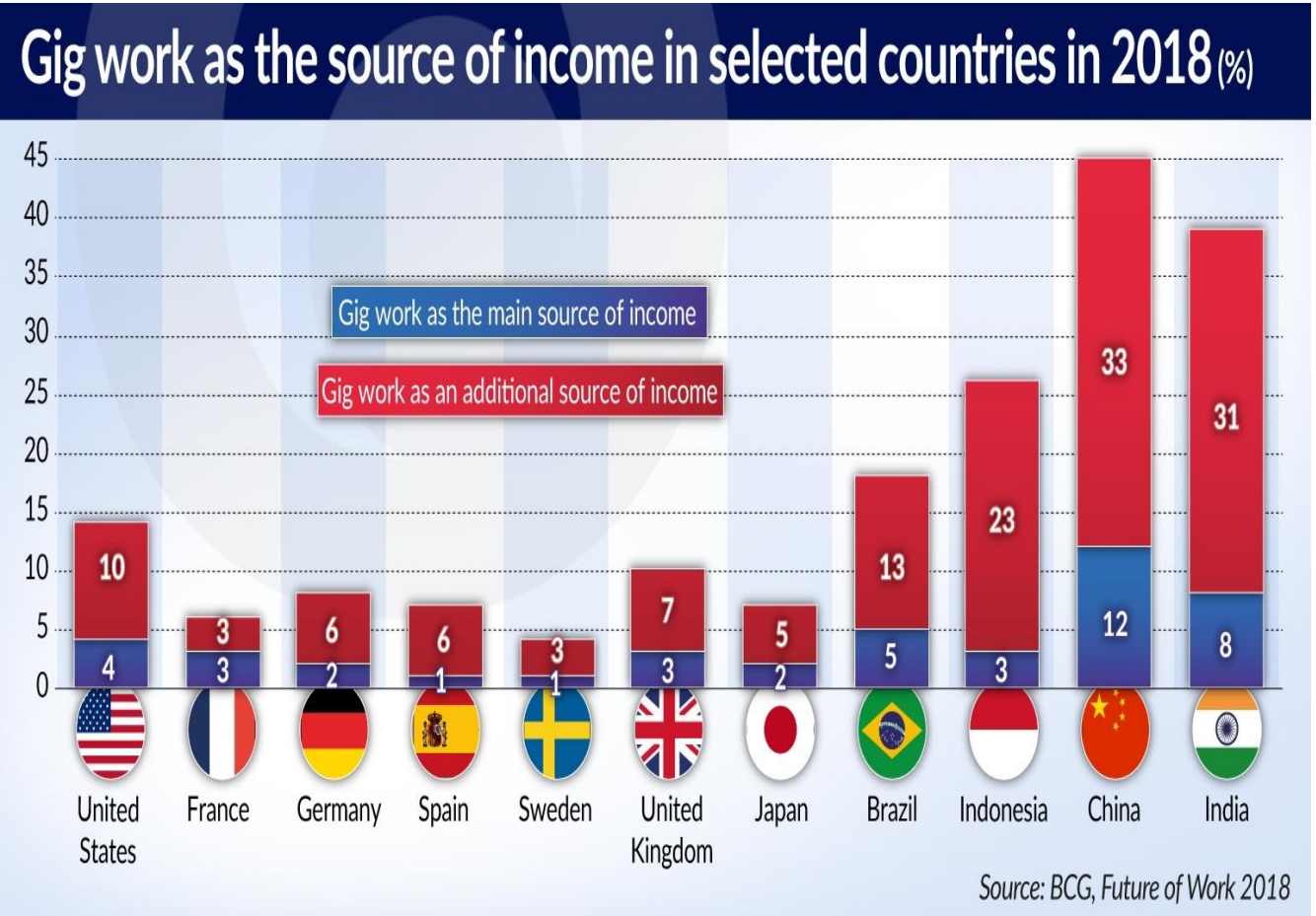
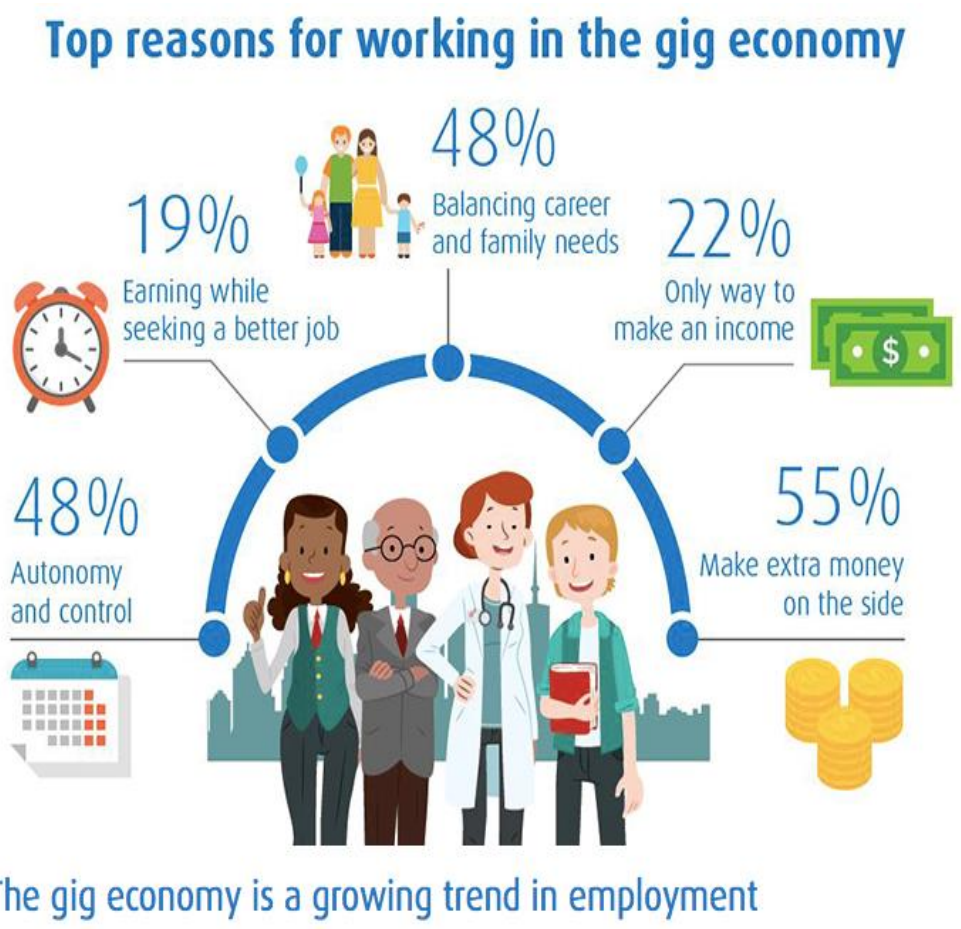
Gig Economy – evangelize the digital economy

- Introduce, evangelize and systemically (policy, legislation, min wages etc.) support the **Gig Economy** to improve employment rates
- Around **15.6%** of the UK's workforce and **34%** on the US comprise the **gig economy**. This is expected to rise to **43%** by the year 2020





Components of Digital Economy

2016-17 ($ bn) 2024-25 ($ bn)*

160 350
IT/ITeS

100 300
Electronics

80 150
Telecom

30 150
Ecommerce

3 50
Digital payments

18 35
Cyber security

6 20
IoT@

1 30
Sharing economy

15 30
Digital skilling

Total $413 bn $1.15 trillion

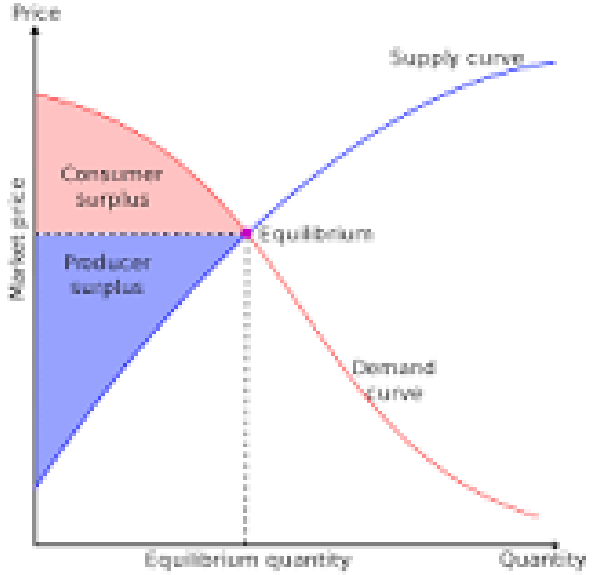
* Projections | @ Internet of Things

Can the surplus economy apply to warmware?

Opportunity for the financial services sector retrenchment

be cross-trained into

- **mentors** or **consultants** for municipalities who do not achieve an unqualified or “clean” audit



picture - When Life Gives You Lemons Portal 2 Quote

POLITICS

Government 'to retrench 30,000 public servants in next 3 years'

Treasury has reportedly set aside R4-billion to kickstart the process of issuing severance packages

10 August 2018 - 07:56
BY STAFF REPORTER

Times LIVE

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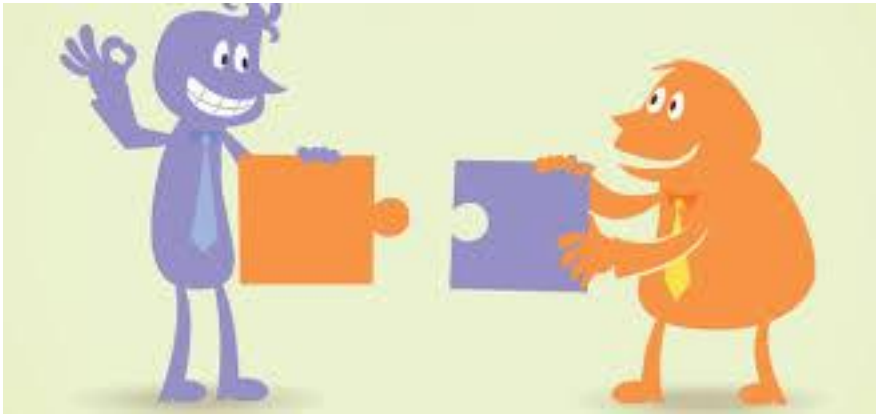
Job sharing for Minister Mboweni!

- Opportunity for aging workforce to
  - Manage exit,
  - Maintain institutional continuity through expedited skills transfer,
  - mitigating retrenchment-related “illnesses”



Mitigate changes in jobs through SETA sector skills planning and reporting

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Jobshift and job mobility

- This is the gradual shift in job description in the face of automation and disruptive change.
- The events are clear though the reaction is slowed by inaction

Calls for tech energy rethink as SA's coal exports dry up

By Admire Moyo, ITWeb's news editor.
Johannesburg, 16 Sep 2019

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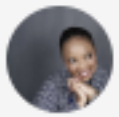
Jobshift and Job Mobility

- Use **Reskilling** for employed folk to mitigate job extinction
- This involves **retraining** and keeping workers in the same roles, rather than fundamentally changing their jobs
- In the next **three years**, an estimated **120 million workers** in the world's **12 largest economies** will need to be retrained or reskilled

Retraining required for 120m workers



By Sibahle Malinga, ITWeb senior news journalist.
Johannesburg, 09 Sep 2019

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Cloud Computing	4 800
Functions	
IT and Telecoms	**2 000**
Sales and Purchases	**440**
Sales	**1 000**
Engineering, Technical, Production, Manufacturing	**440**
Banking, Finance, Insurance, Stock Broking	**430**
Accounting, Auditing	**350**
Other	**4 650**

Sectors	
IT and Internet	1 700
Engineering	420
Banking	400
Finance	370
Manufacturing	290
Wholesale and Retail	270
FMCG	260
Consulting	225
Insurance	190
Transport Logistics	180
Auditing/Accounting	160
Automative	150
Telecoms	140
HR	130
Transport Import and. Export	120
Food	120
Education	115
Construction and Building	110
Agriculture	100
Other	3 850
Total	9 300

Be *weary* of the prophet and the *ICT guy*!

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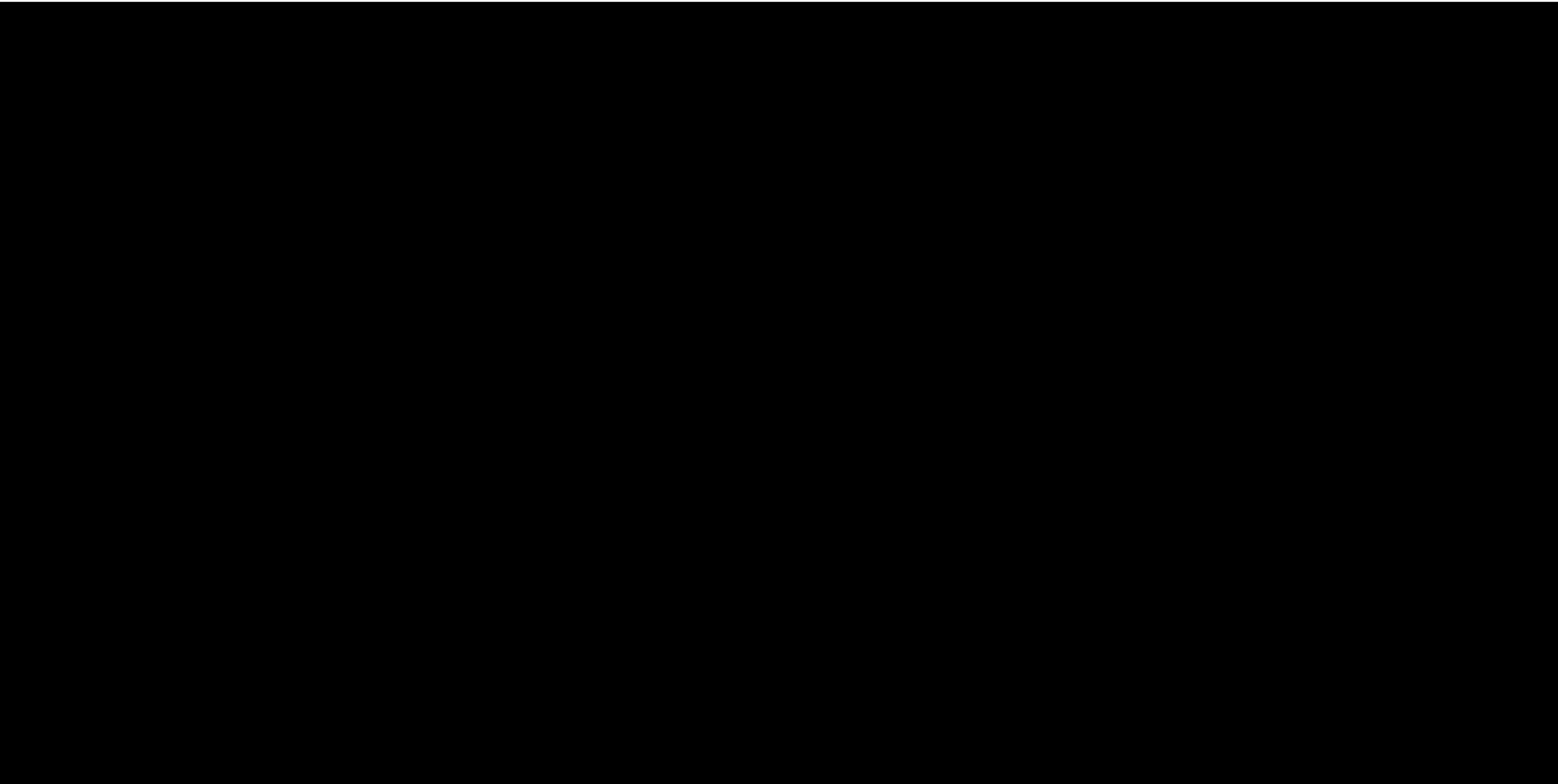
4IR is not about ICT it is about technology



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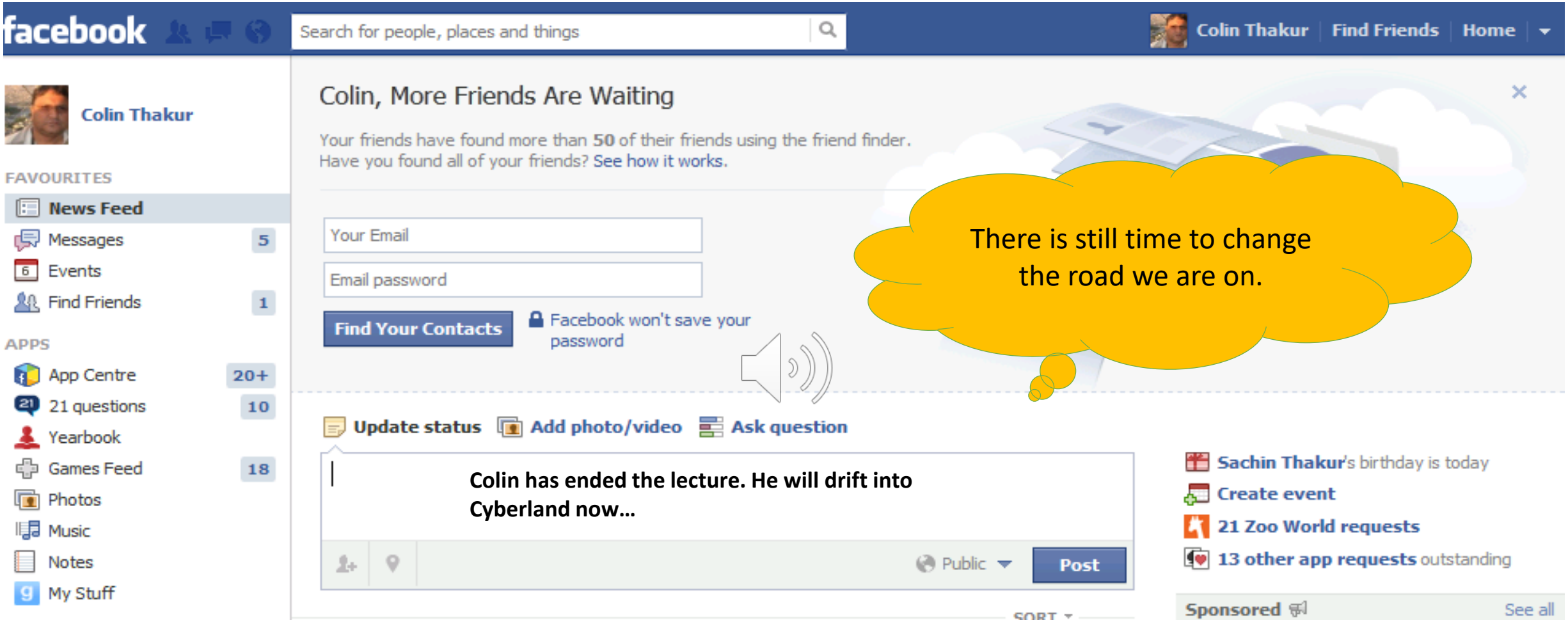

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