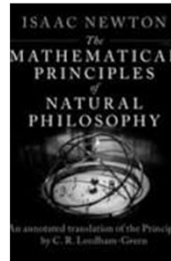
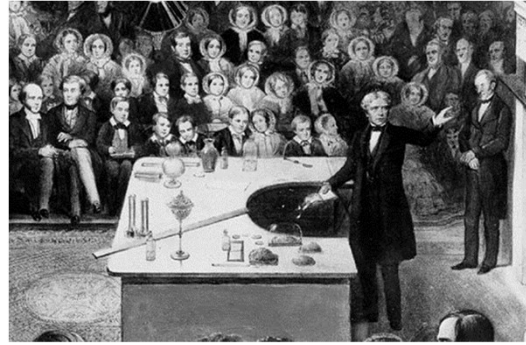


In search of Mode x.y knowledge production

Contents

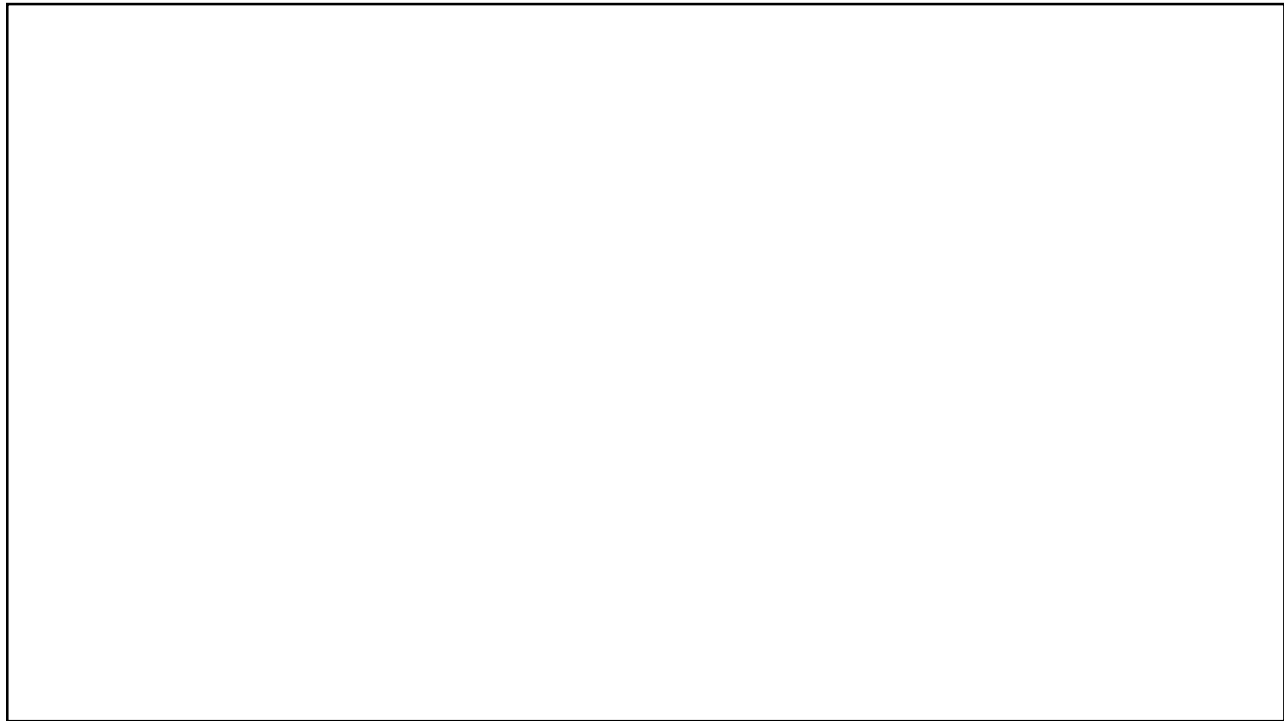
- The role of HE
- Research
- Science communication
- Research uptake
- **Visibility and communication**




1

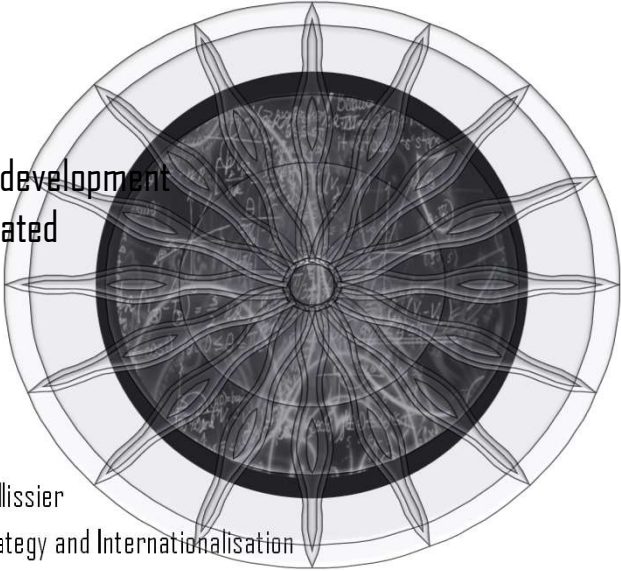
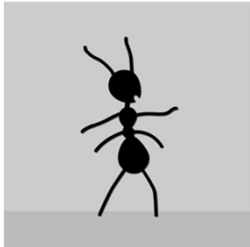
	DNA	X-Rays	HIV/AIDS
Penicillin	Periodic Table		Atomic Bomb
Law of universal gravitation			Theory of evolution and the process of natural selection
	Disease came from microorganisms and bacteria could be killed by heat and disinfectant		
		Electricity	
The Big Bang Theory of the universe			

2



3

 **The sex life of an ant**
Part 1
impact, networking, social media, career development
Science isn't finished until it is communicated



Prof René Pellissier
Director, Strategy and Internationalisation
Cape Peninsula University of Technology
II Prof René Pellissier II PhD, MBA, MSc II rene@pellissier.co.za II

4





Co-funded by the Erasmus+ Programme of the European Union


YEBO!


Why should anyone, including you, care about your research?



Whether it is to write scientific articles, get funding, or to teach the next generation their skills and knowledge, **Research Communication** and the **Uptake of Our Research** are essential.














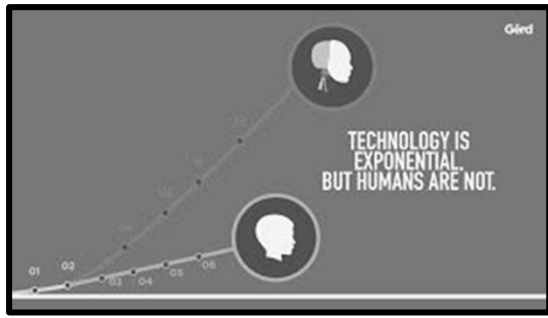






5



The world is hungry for information



Gerd



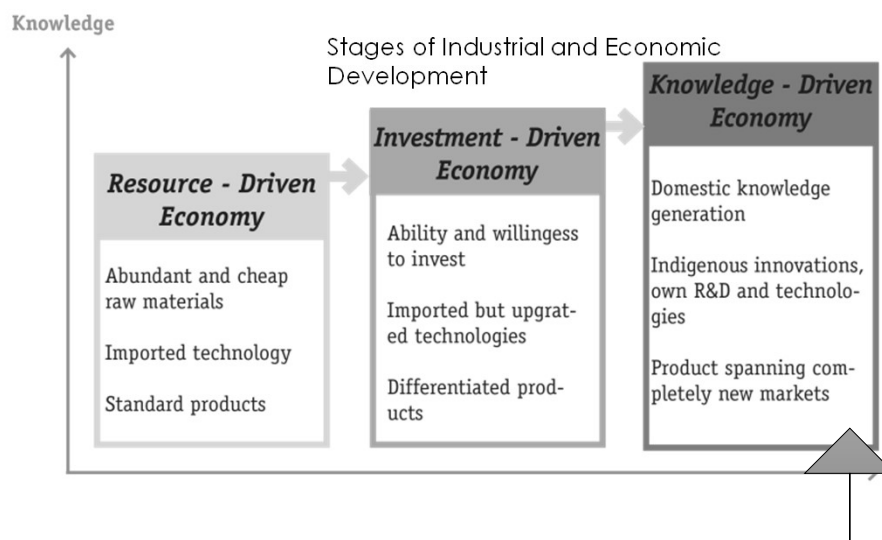
6

Here's where we are ...

**Which is not so interesting as
where we are headed**

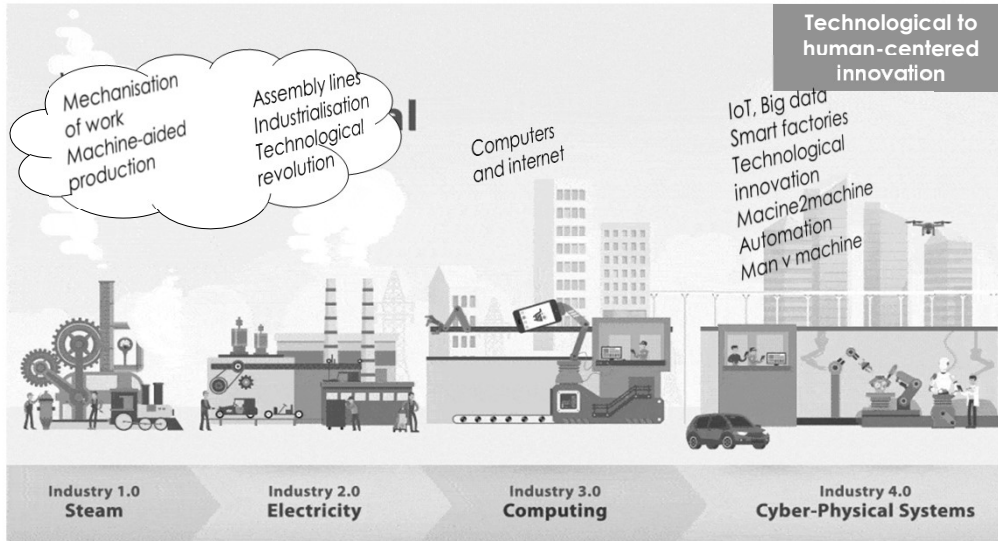
7

Research uptake Contribution to a knowledge economy in SA



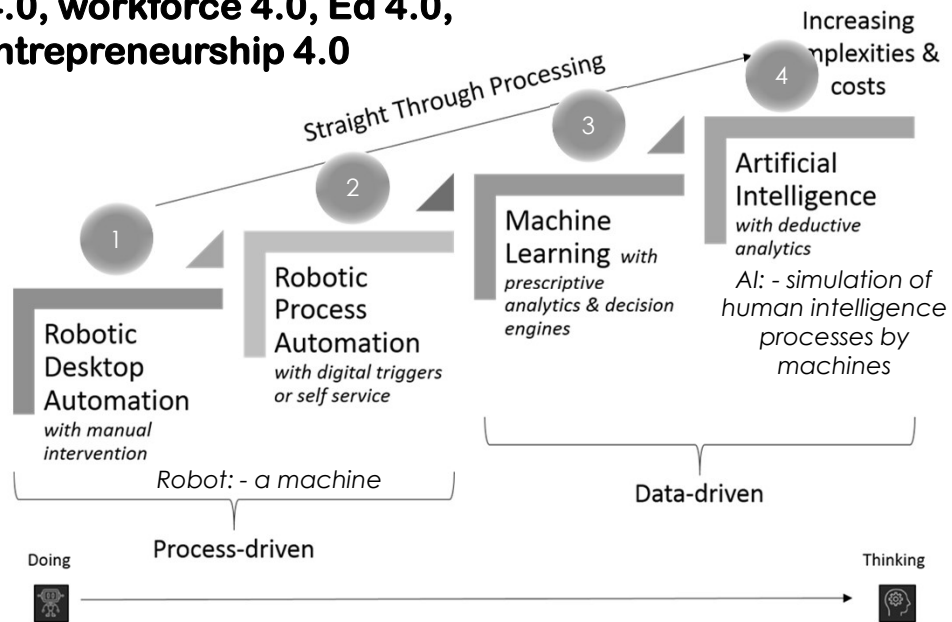
8

The birth of Sophia The four five six industrial (r)evolutions



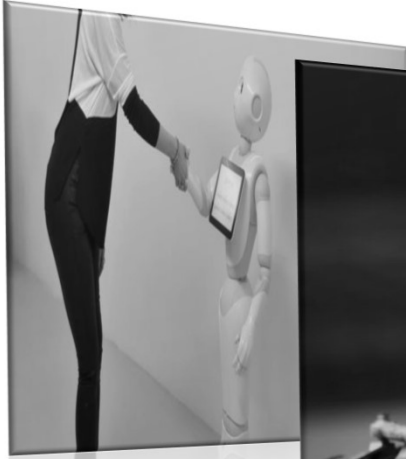

9

4.0, workforce 4.0, Ed 4.0, entrepreneurship 4.0



10

The world by 2030 (WEF, 2018)

Innovation
rules

Corporations
rule

Greening,
caring

Humans

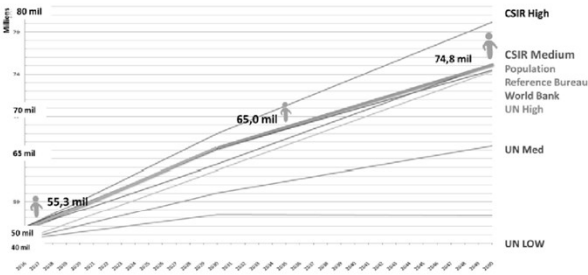
11

So many problems

The South African population will grow by at least another **17 million people in the next 31 years**

It is anticipated that (1) it will primarily be an urban-based population, and (2) at least **30 million of the 75 million South Africans (40%)** are likely to be living below the Minimum Living Level (MLL)

25% of the population will be below 15 years of age, 31% between 15 and 34 years of age, and 8% older than 65 years of age (double the number we have now)



Population growth in Millions:

Year	Population (Millions)
1996	40.6
2001	44.8
2011	51.8
2016	55.7
2030	65.3
2050	75.1

CSIR High: 74.8 mil

CSIR Medium

Population Reference Bureau

World Bank

UN High

UN Med

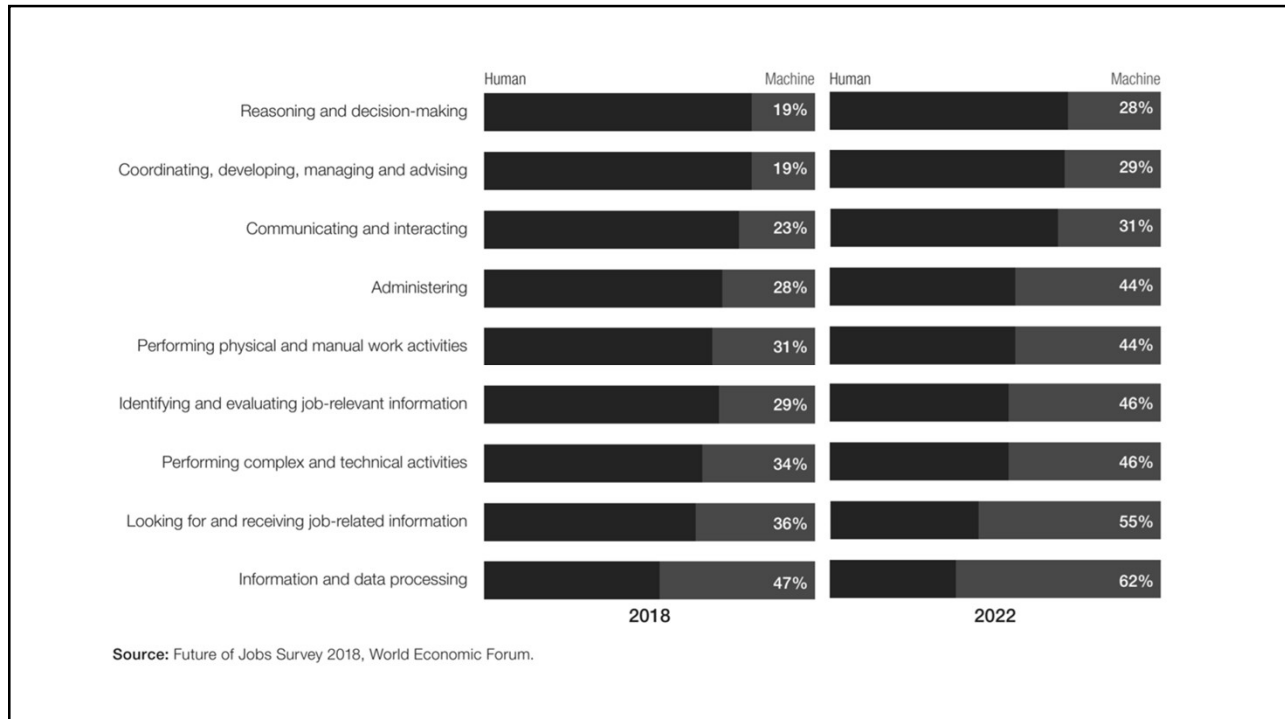
UN Low

Estimated Population Growth Implications 2018 to 2050:

- 17 million people
- 5 million dwelling units
- 664 084 hectares of land required for housing alone (i.e. an area equal to that of the City of Tshwane)
- 1.04 billion m³ water required for domestic use

Demographic modelling and scenarios developed through CSIR, Green Book-project, 2018, using CSIR Town Typology, 2018. See Annexure A

12



13

Society and the Fourth Industrial Revolution

Robots, AI and other forms of automation will drastically change the workplace within the next four years.

By 2022:-

- Jobs predicted to be displaced: 75 million
- Jobs predicted to be created: 133 million
- Share of workforce requiring re-/upskilling: 54%
- Companies expecting to cut permanent workforce: 50%
- Companies expecting to hire specialist contractors: 48%
- Companies expecting to grow workforce: 38%
- Companies expecting automation to grow workforce: 28%

[Surveyed executives representing 15 million employees across 20 economies]

The risk of jobs being replaced by automation varies by country
Source: World Bank Development Report (2016)

OECD Average	Thailand	Nigeria	China	South Africa	UK
57%	72%	65%	77%	67%	35%
		Argentina		India	Ethiopia
		65%		69%	85%
			US		
			47%		

14



The raison d'être of HE has shifted

15

HE is a truly beautiful thing

Role of HE for economic growth

- To be the focal point of knowledge creation, distribution and application
- To grow a sense of life-long learning
- To contribute to economic growth & development through fostering innovation & increasing deeper skills
- To help increase living standards and well-being
- To respond to specific socio-economic needs
- To develop intellectual talent and capabilities to drive innovation for economic prosperity.

- 'Education is the most powerful weapon which you can use to change the world.'
- 'The power of education extends beyond the development of skills we need for economic success. It can contribute to nation-building and reconciliation.'

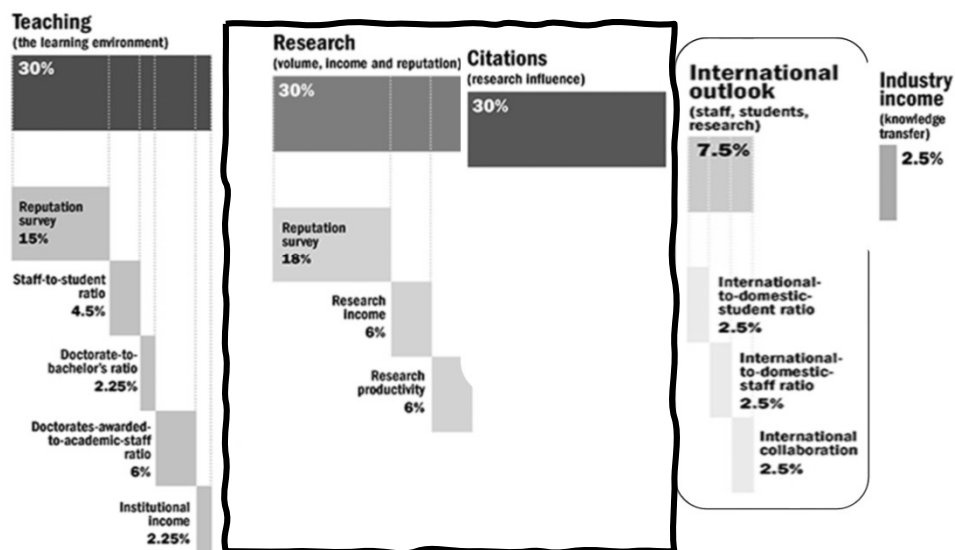
16

Traditional Role of Higher Education (HE) The quantity vs quality debate

- HE operate around three key pillars:
 - **Teaching, Research and Community Engagement**
- **The “publish or perish” imperative**
 - Research outputs became key
- Thus balance of forces are skewed towards the **goal of publishing**, with less effort toward the goal of **ensuring the uptake of research output**.

17

Indeed, universities are ranked based on ...



18

HE is a mandate from government, and it requires PhDs

The situation is far from ideal

- **Unemployment rate: 30%**
women (31.3%), men (27.1%)
- **Youth (aged 15–24 years):** Most vulnerable in the South African labour market: unemployment rate 55,2% (Q1, 2019)
- **Adult (15+) literacy rate** from 88.7 % (2007) to 94.4 % (2015)
- In 2017 only 0.05% of 1,483,575 permanent employees in SA's top 500 companies held a PhD

- **Target 1:** Increase % of academic staff with a doctorate from 34% (2010) to 75% (2030)
- **Target 2:** Produce more than 100 doctoral graduates per one million of the population by 2030
- The **annual production of PhDs** will have to increase from 1420 per annum (2010) to 5000 per annum (2030)
- Expand **science, technology and innovation** outputs by increasing research and development spending by government and through encouraging industry to do so.
- Build a **knowledge-based economy**, in which the production and dissemination of knowledge leads to economic benefits and enriches all fields of human endeavour.

Here's the catch

However, generating supply of PhDs must be met with adequate demand from employers (academia, public and private sectors) to absorb PhDs into appropriate positions within the workforce.

19

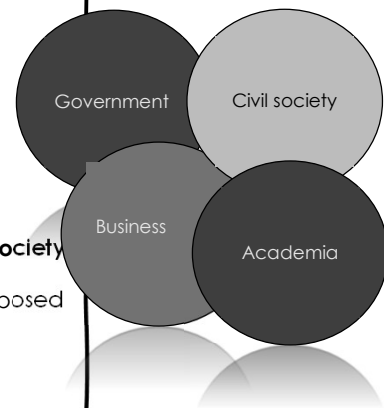
Changing role of Universities:- Scientific pursuit and knowledge creation for society's benefit

From:-

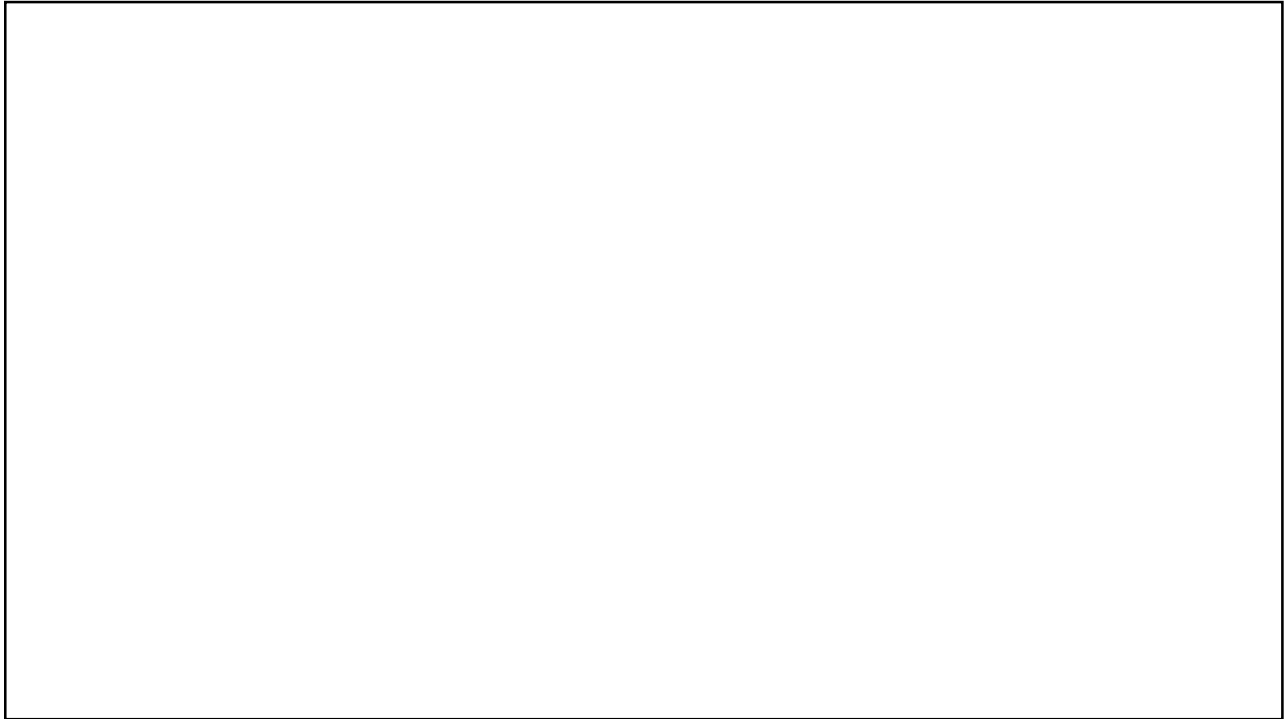
- **Universities serving as intelligence banks:**
 - Publicly funded in return for academic contributions to science.
- **Ivory tower view of academia:**
 - Drove university specific research agenda
 - Limited academic accountability to scientific disciplines rather than the public.

To:- *Quadruple helix partnership*

- **Renegotiation of the actual social contract between science and society**
- **Society is an active partner in the creation of socially robust** (as opposed to reliable) knowledge.



20



21

A slide with a white background and a thin black border. In the top-left corner, there is a dark grey circle containing the white number '2'. Below this, the word '(Re)search' is written in a large, black, sans-serif font. Underneath the title, the subtitle 'Research that has value and impact' is written in a smaller, black, sans-serif font.

22

Let's define research

- **Research as a verb**
 - **to search** or investigate exhaustively a
- **Research as a noun**
 - A careful or diligent search
 - A studious inquiry or examination
 - An investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws
 - **The collection of information about a particular subject**

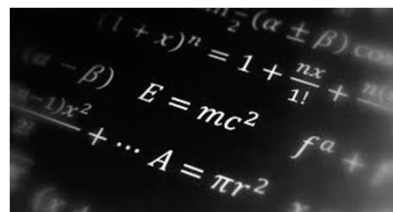
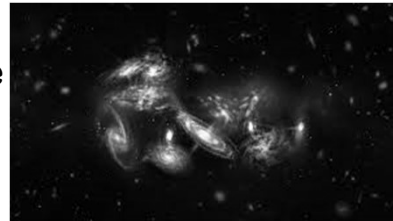
'Any creative systematic activity undertaken in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications'

OECD. 2015. Frascati Manual. The Measurement of Scientific, Technological and Innovation Activities.
doi:10.1787/9789264239012-en ISBN 978-9264238800.

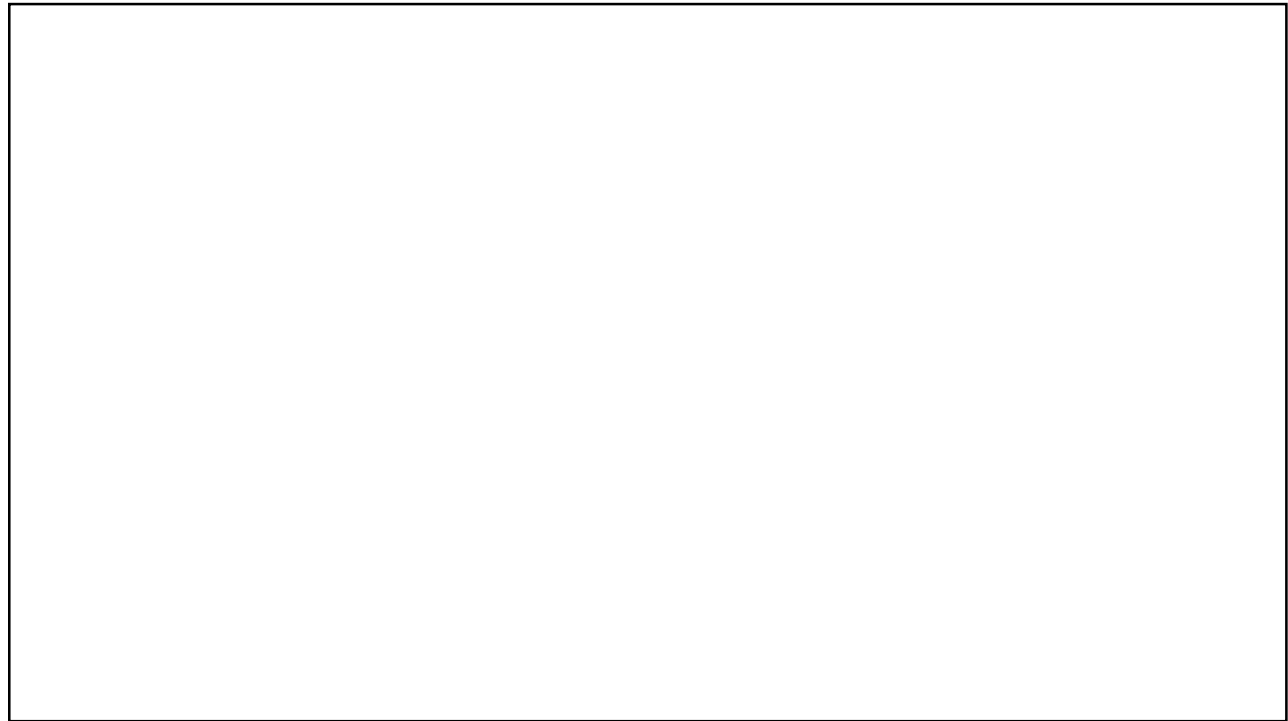
23

Great research discoveries with value

- New Human Relatives
- Taking Measure of the Cosmos
- The Hottest Years on Record
- Editing Genes
- Mysteries of Other Worlds Revealed
- Fossilized Pigments Reveal the Colors of Dinosaurs
- Redefining the Fundamental Unit of Mass
- First Ancient Human Genome Sequenced
- A Vaccine and New Treatments to Fight Ebola
- CERN Detects the Higgs Boson
- Cure for COVID-19



24



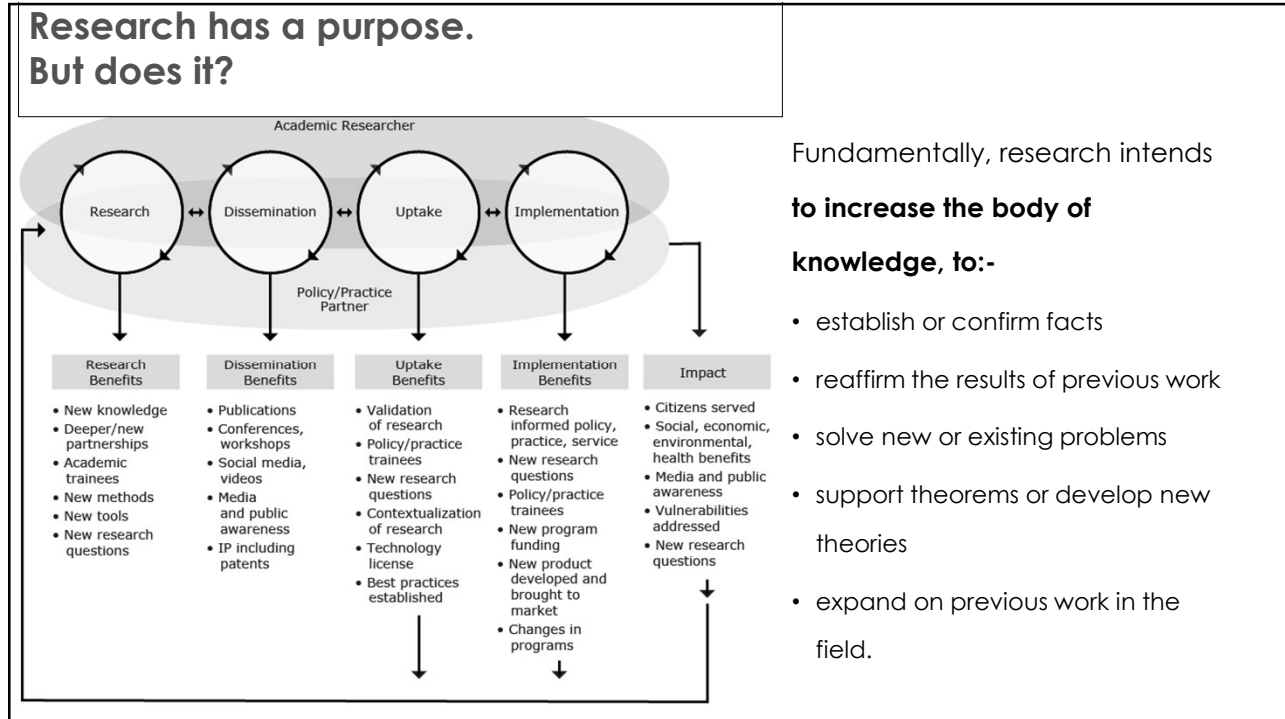
25



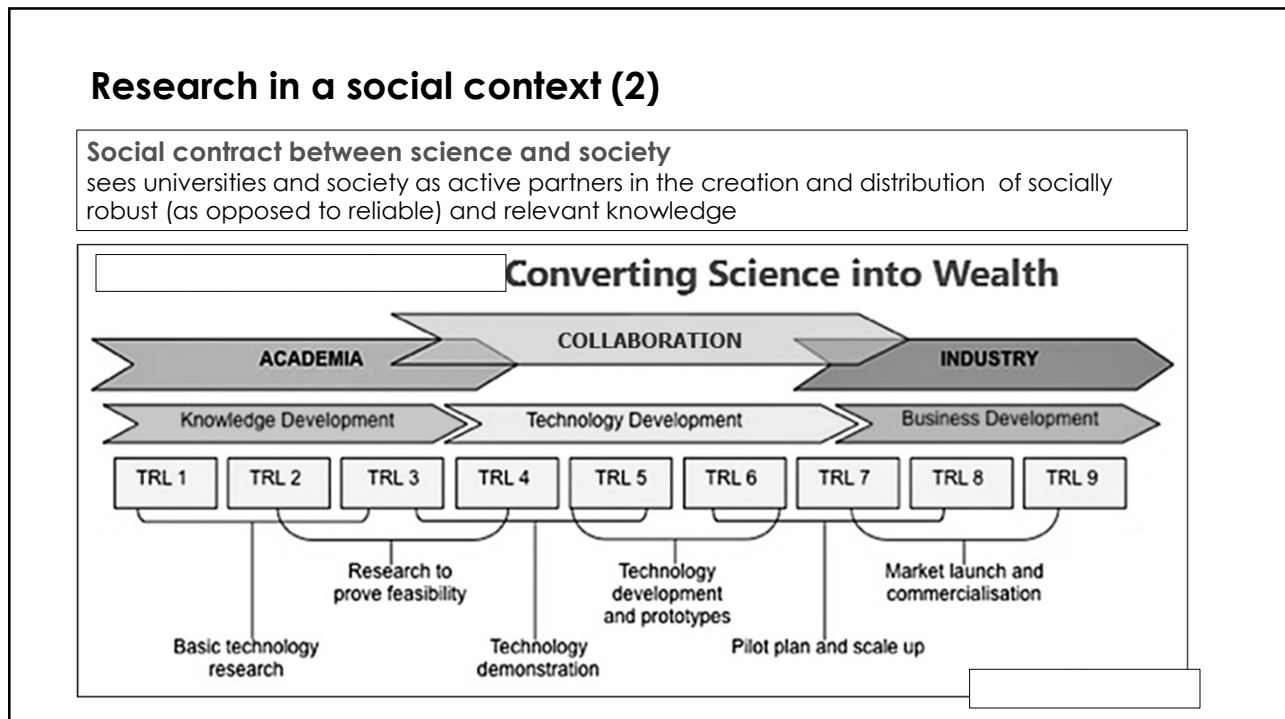
Research in a social context

- Science communication
- Research uptake

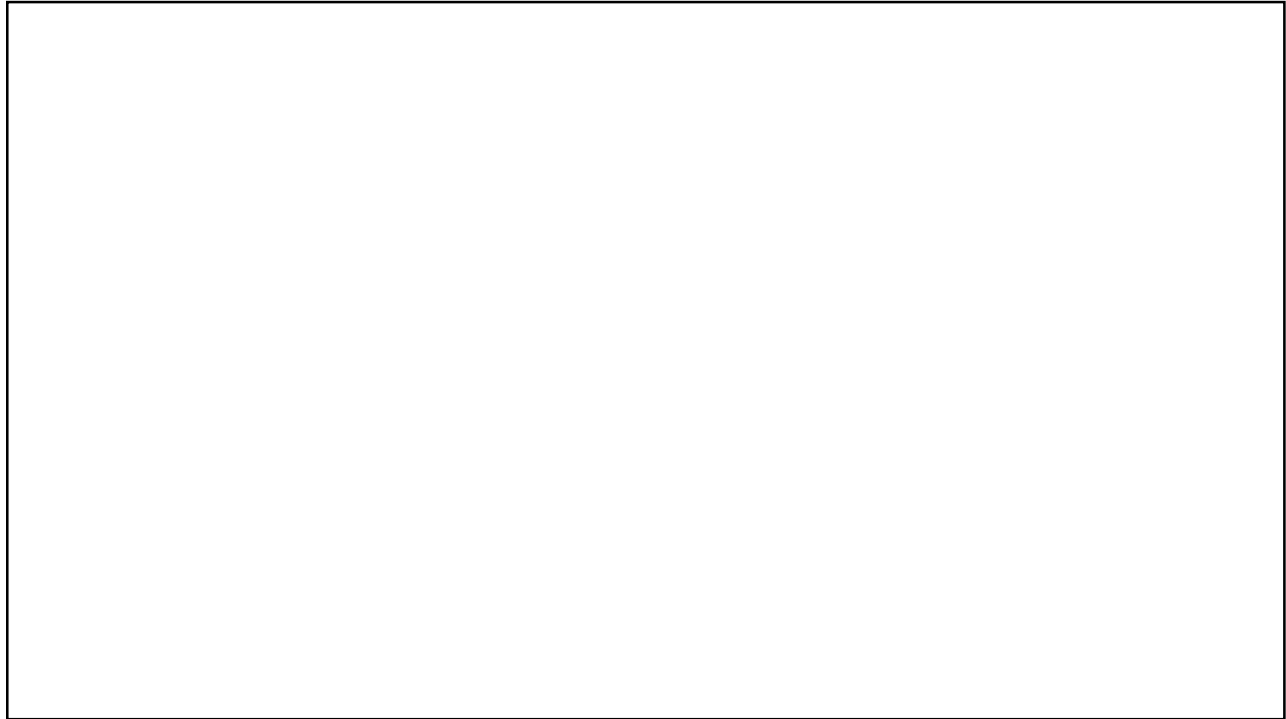
26



27



28



29

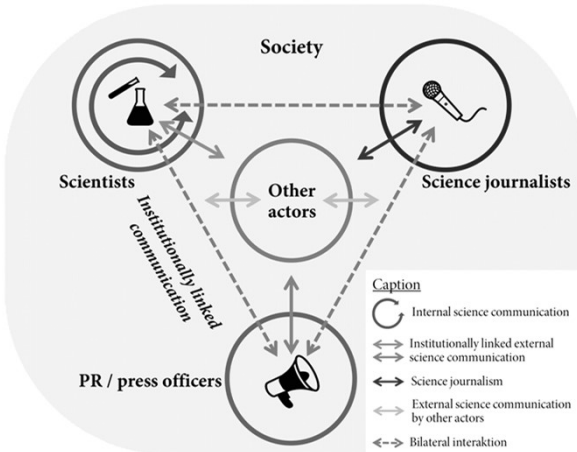
A slide with a white background and a black border. In the top-left corner, there is a dark grey circle containing the white text "3.1". Below this, the words "Science" and "communication" are stacked vertically in a large, black, sans-serif font.

3.1

Science
communication

30

Enter **science communication**



- **The practice of informing, educating, sharing wonderment, and raising awareness of science-related topics**
- Types of defined science communication:
 - **science outreach** (typically conducted by professional scientists to non-expert audiences)
 - **science inreach** (expert to expert communication from similar or different scientific backgrounds). (Example: scholarly communication and publication in scientific journals).

31

The value of knowledge and science lies in the application

- How can knowledge or science be used to improve our lives? (Estabrooks, 2008).
- Society has changed to be increasingly dependent on **knowledge to the extent that we refer to our societies as knowledge societies**

32

Incentivizing research is not sufficient

- There are incentives for formal outputs
- **BUT...** visibility of the application of research outputs **i.e. research uptake** increases traffic to formal outputs...
 - .. which enhances image & brand...
 - .. which attracts more funding...
 - ..which provides more resources to do more *relevant* research.
- **Therefore, VISIBILITY is a critical component of research practice**
 - Communication between and among the scientific and user community.

34

36



3.2

2. Research uptake

37

Let's focus on Research Uptake (RU)

RU:-

The processes by which the knowledge which is generated through research **finds its way to those who need it**, be they practitioners, end-users, policymakers in government and other agencies (DRUSSA, 2012).

38

Research Uptake objectives in a university setting

- To focus research, technology and innovation efforts on **producing tangible benefits in response to key social and economic challenges facing staff, students and local, national and international communities**
- To foster a culture of research and innovation practice where **equal emphasis is placed on all components of the research and innovation life cycle**, from project inception to its conclusion, to ensure effective research uptake and utilisation.

39

The need for mode 2 knowledge production

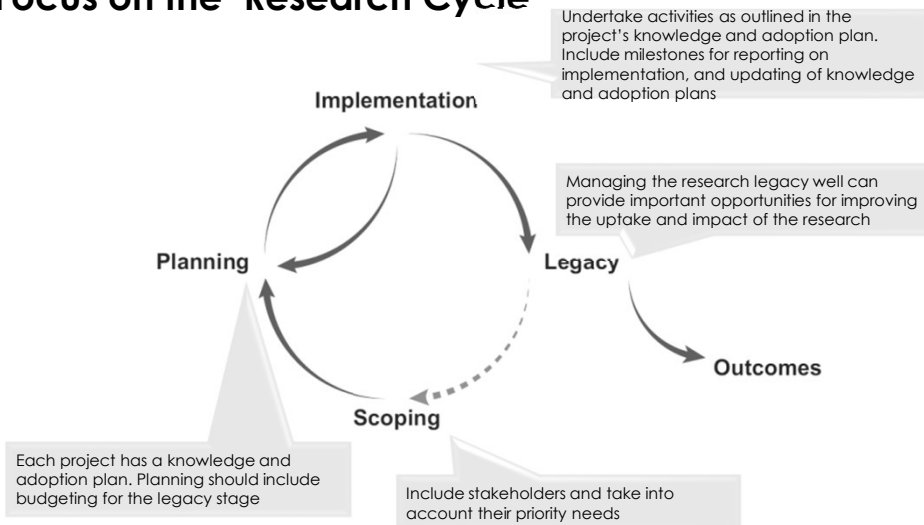
Mode 1 science. Knowledge production motivated by scientific knowledge alone (fundamental research) and not bothered by the applicability of its findings.

Mode 2 science. Knowledge is produced for application.. It contrasts with Mode 1 production of knowledge.

Mode 1	Mode 2
Problems are set and solved in a context governed by the, largely academic, interests of a specific community	Carried out in a context of application
Disciplinary	Transdisciplinary
Characterised by homogeneity	Characterised by heterogeneity
Organised hierarchically and tends to preserve its form	Organised more heterarchically and tends to be transient
Quality control by peer review	Quality control is more socially accountable and reflexive
Adapted from Gibbons <i>et al.</i> , 1994, p.3	

42

Change the research culture: Focus on the Research Cycle



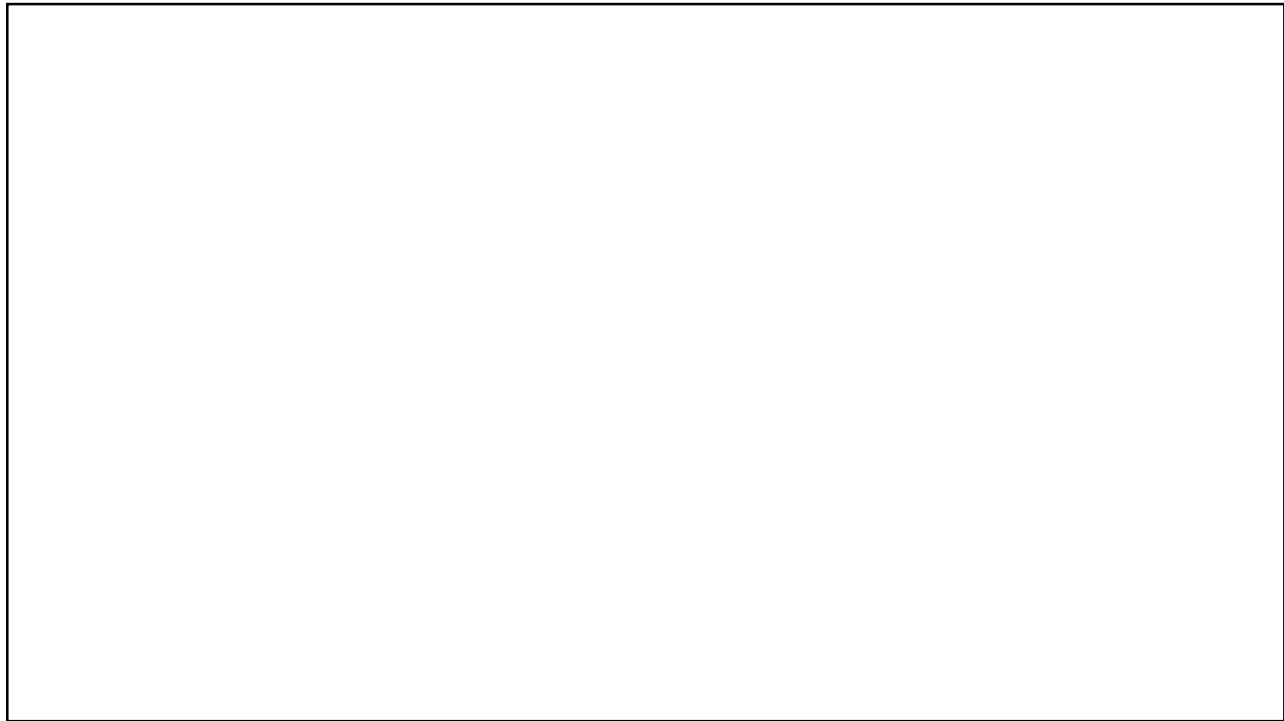
Australian Government (Department of Sustainability, Environment, Water, Population and Communication), in Grobelaar, 2012.

46


If I was asked, I would require the following to derive RU



48




49

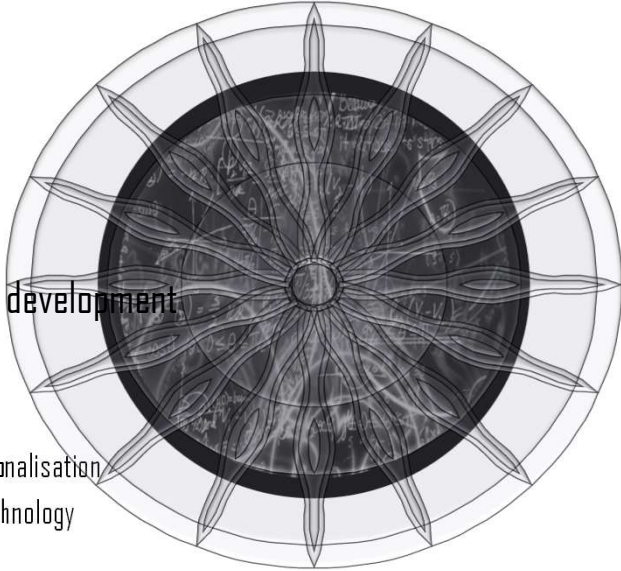

YEBO!

The sex life of an ant

Part 2

impact, networking, social media, career development

 Prof René Pellissier
Director, Strategy and Internationalisation
Cape Peninsula University of Technology



|| Prof René Pellissier || PhD, MBA, MSc || rene@pellissier.co.za ||

50



" I tend to put off writing in favour of other research-related activities and having an environment where there's strong pressure to just sit down and write was very useful."

51

Are you connected to data/information?

- Create
- Gather
- Analyse
- Disseminate



52

Communicating research is important because ...

The research of today is the practice of the future of tomorrow

- These started with research: new treatments for current and future diseases, living conditions for generations to come and developments in technology
- We need to be informed to engage and make decisions
- We need to know about the possible outcomes of research and its applications
- It informs policies and regulations
- It can help us to make ethical decisions about research findings and discoveries.

Examples: Developments in a genome editing technique called CRISPR-Cas9 can turn designer babies (genetically making up a baby with e.g. the desired eye colour) into reality. But is this something we want to implement? Or do we keep these techniques for incurable diseases only? Where do we draw the line?

53

Nobody said it is easy

Coming out of the research bubble and into society

- **Research Communication** is not only about explaining findings in an understandable and concise manner, but about engaging people in your research
- People want to hear stories that affect them, facts that they can relate to and findings that inspire them
- One of the reasons researchers are having such a hard time communicating their research to the public is because it is **completely different from reporting research in scientific journals, writing grant proposals, using referencing, tables and figures and experiments with data**
- Public engagement through science communication forces the researchers to look at their project in a much broader picture and to formulate the essence of their findings or theories



54

For researchers to be “good” researchers, they need to be “good” communicators

- **It is just part of the job.** Whether it is to write scientific articles, get funding, or to teach the next generation their skills and knowledge, **Research Communication** is essential.
- **Grants.** Most grant applications require impact statement as a way for the researchers to demonstrate the wider scientific and societal implications of their projects. Researchers have to show that what they do could have an impact on people’s lives or has the potential to help solve societal problems.
- Accessibility of research outcomes.
- Having the skills to communicate research in an effective way has a positive impact on researchers themselves. By making the public understand what they are doing, they can prevent misinformation from arising and help to sustain support for their research.
- It’s also an excellent way to connect more with the public and to see one’s own research in a new light. Some researchers may even find it motivational to share their findings and thoughts with the public.

55

Visibility

- **Visibility** is about where you are publishing and who is citing your work.
- Various measures have been devised to assess visibility or impact and these are the subject of much debate.
- Visibility is heightened if one is publishing in international journals, and in the sciences.

Checking your visibility

- Web of Knowledge - not only provides traditional search functionality by author, title, keywords etc, but also allows citation searching - who has cited whom, where and how many times. You may check your H-index here. Few SA journals appear in this database. There are 3 collections in WOS: for sciences, social sciences and humanities and arts.
- [GoogleScholar](#) - beware, citations are often high - thought to be due to problematic metadata.
- Publish or perish (harvests Google Scholar data) - been developed for the social sciences, humanities. The link takes you to a page that explains the site, provides the download and how to use tutorials.
- Scopus - Social sciences not as well covered as the pure Sciences.

Visibility of journals is often measured by a journal's impact factor: the frequency of citations to articles published in a particular journal. The major tool is JCR: Journal Citation Reports published by Thomson Reuters. This site contains explanations of how journals are evaluated.

57

E-visibility

Preserving your outputs and availability for future use

Share outputs of your research
Publications, preprints, conference papers and posters, presentations, research data, video, code are all evidence of your research activity
publish in periodicals that are referred to in both of the databases: **Scopus and Web of Science**.
Check the **journal's impact factor** in **Journal Citation Reports (JCR)** to get an indication of the average number of citations.
Sharing research data

Unique author identifier ORCID
to distinguish yourself and your work from that of all other researchers

Blogging
Research Blogging
ScienceBlogs™

Sharing research data
Data repositories: Figshare, Mendeley Data,
Other sharing: Slideshare,

Research networking communities
R^G ACADEMIA LinkedIn MENDELEY

Online profile (or a web CV)
Google Scholar
Google
Wordpress
YOUTUBE

Tweeting

<https://libraryguides.helsinki.fi/researchvisibility/>

58

Measuring performance

- **h-index** - "a scientist has an index of h if h of his or her N_p papers have at least h citations each and the other (N_p - h) papers have less than or equal to h citations each" (Hirsch, J.E. (2005). An index to quantify and individual's scientific output. *Proceedings of the National Academy of Sciences*, 102 (46), 16569-16572)
- **i10-index** - indicates the number of academic publications and author has written that have at least 10 citations from other sources.
- **g-index** - a given set of articles ranked in decreasing order of the number such that the top g articles received [together] at least gx2 citations
- **e-index** - is defined as the square root of the sum of the 'excess' citations in the papers that contributed to the h-index. It aims to address the number of 'excess' citations above and beyond the h-index.

59

Rene's top tips

Tip 1: Consider your audience

.....

Tip 2: Simplify your language

.....

Tip 3: Present your work (attend and listen, then present and learn more)

.....

Tip 4: Be open to sharing

Blogs, YouTube.. Be open to sharing

Tip 5: Keep being creative

....

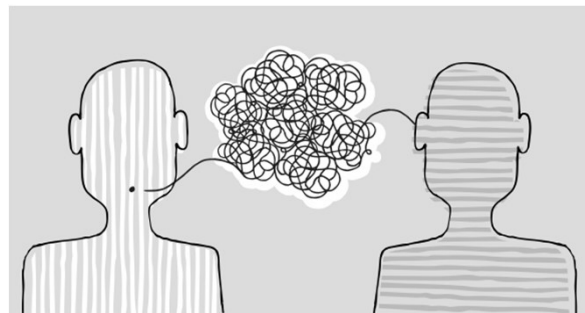


60

Let's check what we want to communicate

- Who is the audience?
- What are you 'selling'?

- Pride
- Bragging
- Sharing
- Value of the outcome



65

**Let's say you were Einstein
My research is useful because**

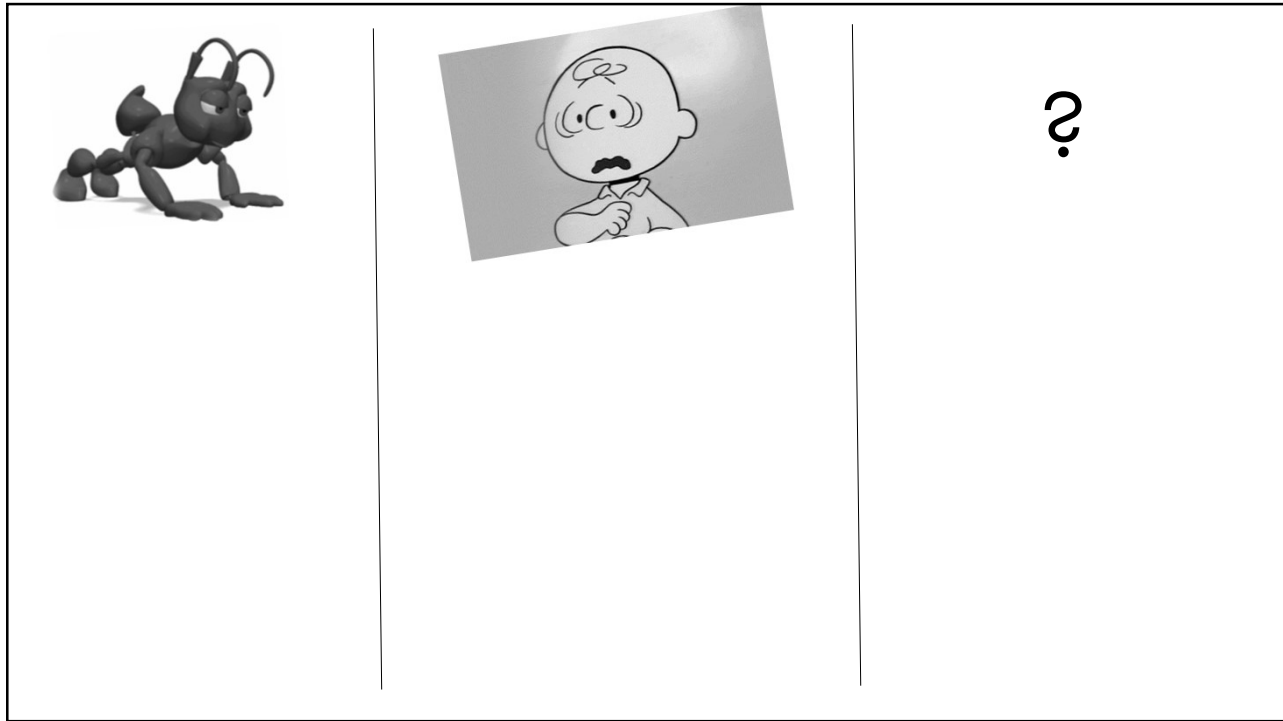


66

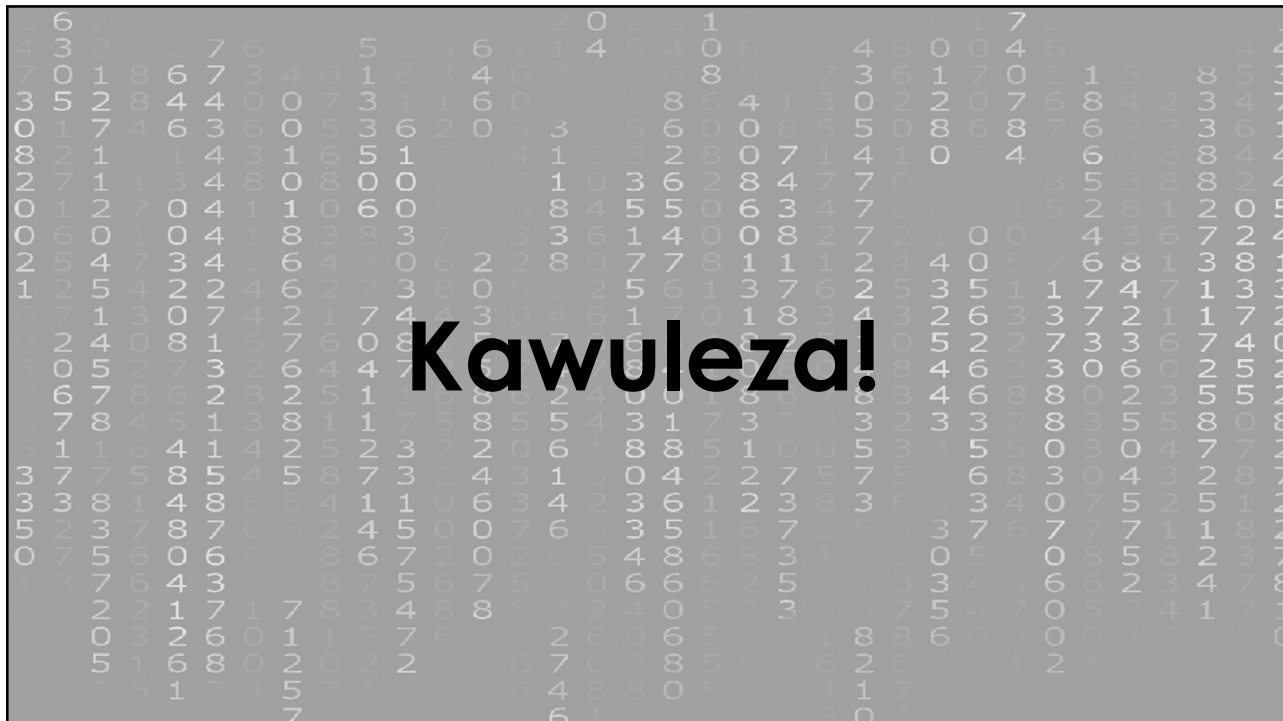
**I can now make my research more
visible/relevant/valuable by ...**



67



68



70