Challenges of the 4th Industrial Revolution for Skills Planning

Suzanne Hattingh
Focus of the Presentation

▪ Impact of the Disruptive Technologies of the 4th Industrial Revolution (*Industry 4.0*)
▪ Future World of Work
  • Changes in the nature of Work, Jobs and Occupations
▪ Construction Industry examples
▪ Skills we will need to survive and thrive in the workplace of the future
▪ Failures of our Skills Development System
▪ How to respond to the challenges?
  • Strategies to prepare the workforce for 2030
“Technology has catapulted us into the 4th Industrial Revolution. The exponential pace of change is disrupting every industry in every country and impacting every aspect of how we work and how we live, creating threats and opportunities.”

(The 4th IR: What it means, How to respond, World Economic Forum, 2016)
### 4th IR Technology disrupting entire industries

<table>
<thead>
<tr>
<th>Company</th>
<th>Transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>World’s largest taxi company</td>
<td>Owns no taxis</td>
</tr>
<tr>
<td>World’s largest book store</td>
<td>Doesn’t have stores in shopping malls</td>
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<tr>
<td>World’s largest provider of</td>
<td>Owns no real estate</td>
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<tr>
<td>accommodation</td>
<td></td>
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<tr>
<td>World’s largest phone company</td>
<td>Owns no telecommunication infrastructure</td>
</tr>
<tr>
<td>Most popular media owner</td>
<td>Creates no content</td>
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<tr>
<td>World’s largest distributor</td>
<td>Doesn’t make videos</td>
</tr>
<tr>
<td>Largest software vendor</td>
<td>Doesn’t write the apps</td>
</tr>
</tbody>
</table>

www.burtonpp.com
ROBOTS ARE COMING FOR YOUR JOB

What the future of work in SA looks like — and which careers to avoid
Videos: Impact on the Construction Industry

Key Questions:
- Impact on Work, Jobs & Occupations
- Skills sets the workforce will need
- Social impact
- How do we prepare for the major disruptions in 10-20 years?

Video link: The Construction Robots are Coming [05:48 min]
https://www.youtube.com/watch?v=nKGGHdI3NyQ

Video link: Apis Cor: First residential house has been printed [06:47 min]
https://www.youtube.com/watch?v=xktwDfasPGQ
Video: Negative impact of the 4th Industrial Revolution

Video link: Fourth Industrial Revolution Tsunami Warning in Davos [01:45 min]
https://www.youtube.com/watch?v=DNkPmfwacGE
Video: Sam the Bricklayer – Implication for the Industry & Jobs

Video link: Sam the Bricklaying Robot Can Build Walls Faster Than Humans [05:16 min]
https://www.youtube.com/watch?v=2-VR4IcDhX0
Future of Jobs

- Major disruptions in labour markets in **all industries**
- Job losses in areas where productivity can be greatly improved by Technology
  - Especially jobs that are standardised, repetitive and involve patterns
- 75% of trading on the New York Stock Exchange is made by computers
  - Automation to remain competitive – **will result** in job losses (*JSE CEO: Nicky Newton-King*)
- Many new jobs will be created – **BUT**: in digital industries that require **highly specialised skills**
- **Re-education** of those who are already working – to acquire **new skills in new fields** if we want to survive in the new world of work
Percentage of Jobs at Risk to Automation

The risk of jobs being replaced by automation varies by country


Impact on Work, Occupations and Employment

- Existing **occupations** will disappear as new jobs emerge
  - End of fixed **Job descriptions**
- **Hybrid jobs**: Integration of human, technical, problem solving skills
- Working through **temporary cross-functional project teams**
  - Collaborating through **virtual** communication across time / space / organisations
  - Death of “**The Office**” as place to work
  - Shifts in **employment relationships**
  - ‘**Gig’ economy**: Flexible, on-demand work in short-term contracts
    - Uber, Airbnb, Mr Delivery, etc.

ILO 2015: **Less than 45% of wage and salaried workers** are employed on full-time, permanent basis.
**Nearly 6 out of 10 workers worldwide** are in part-time or temporary forms of employment.
Predictions about the 2030 Workplace

- 65% of children starting school in 2018 will enter jobs that don’t exist yet
- 65% of children now at school will have 14 different jobs before age 40
- Workforce will need a ‘basket of skills’ for flexible career paths in multiple career changes across occupational fields
- The amount of technical information is doubling every 2 years
- 60% of what students learn in their 1st year at university is outdated by their 3rd year
- 80% of the technology we will be using in 2030 hasn’t been *conceptualised* yet
# Skills Industries will need to Succeed in Industry 4.0

- Creativity and Innovation
- Cognitive Flexibility & Cognitive Load Management
- Complex Problem Solving: Ability to evaluate situations and respond rapidly
- Change Resilience
- Technological Literacy – adding value alongside machines
- Transdisciplinarity – ability to work across disciplines / specialisations
- Collaboration in virtual cross-functional teams
- Entrepreneurial skills: creating own WORK – not finding a JOB
- Deep Learning Skills

*Future Work Skills 2020 (Institute for the Future)*

Not learning for credits on the NQF
Key Challenges for Skills Development

▪ How do you teach **Creativity, Innovation Transdisciplinarity**, and other 4\(^{th}\) IR skills in a prescriptive and inflexible school & post-school system?

▪ How equipped are school leavers for the 4\(^{th}\) IR with only 30% in Maths, and no Science and Technology?

▪ **What** should we be ‘**teaching**’ if there is too much knowledge and the knowledge we acquired is soon **outdated**?

▪ What skills should **new entrants** to the “job” market acquire
  ▪ If they **don’t know what jobs there will be** when they graduate?
  ▪ What **Skills Development strategies** do we need in organisations and our countries to ensure relevance in the **global economy**?

Human Resource Development and Skills Planning strategies for 4\(^{th}\) IR **cannot be driven by credits** on the NQF, accredited programmes, SETA grants or QCTO qualifications – or **points** on the B-BBEE Scorecard.
Skills Development System is failing to Prepare the Workforce for 2030

- NQF-SETA-QCTO system is not designed to prepare the workforce for 2030
  - Focused on skills needed for the 2nd & 3rd Industrial Revolutions
  - Occupational qualifications for ‘fixed’ occupations:
    - Occupational Certificate: Footwear Cutting Machine Operator
    - Occupational Certificate: Footwear Closing Production Machine Operator
    - Automobile & Marine Painter
We are preparing students for a world that no longer exists.

“We are currently preparing students for jobs that don’t yet exist, To be using technologies that haven’t been invented, In order to solve problems we don’t even know are problems yet.”

(Video: Did You Know? / Shift Happens, David Rose)

“We are still preparing students for the market that prevailed fifty years ago, educating students for the job market of the middle of the last century.”

(Clem Sunter)
Strategies to Prepare the Workforce for Industry 4.0

- **Analyse the workforce readiness for the 4th IR**
  - Who has the skills and adaptability to take you into 2030?
  - What are you going to do with the others?

- **Conduct future-focused skills audits**
  - What skills will you need in 2025-2030?
  - How are you going to address the gap between current & future needs?

- **Revise your organisation’s current skills and training strategies**
  - Learning on the fly: Just-in-time learning for newly emerging challenges
  - Problem-based, multi-disciplinary learning
  - MOOCs, Continuous Learning & Re-skilling

- **Use professional bodies for pressure on QCTO, SETAs & Government**
  - Prioritise skills needs for industry competitiveness
  - Urge for Parallel Systems to recognise Flexible, less Structured Learning Interventions
Additional Videos

Video link: 10 Coolest Construction Machines & Technology [10:54 min]
https://www.youtube.com/watch?v=QUIMmXF6QOQ

Video link: What are Horizontal Elevators? [03:03 min]
https://www.youtube.com/watch?v=IUGtMuJJZ1g

Video link: The Digital Skills Gap and the Future of Jobs 2020 [05:48 min]
https://www.youtube.com/watch?v=Y9FOyoS3F6g

Video link: The 4IR and the future of jobs [4:28 min]
https://www.youtube.com/watch?v=VJnALTWTBHw
Video link: Producing the world’s first 3D-printed bridge with robots [02:21]
https://vimeo.com/162959848
Video link: Self-Healing "Bio" Concrete Repairs Its Own Cracks [01:16]
https://www.youtube.com/watch?v=laqACVY1U_k

Video link: What are "Smog-Eating" Buildings? [02:15 min]
https://www.youtube.com/watch?v=9jyoA3Mlf1c
“You cannot wait until a house burns down to buy fire insurance on it. We cannot wait until there are massive dislocations in our society to prepare for the Fourth Industrial Revolution.”

Robert Shiller, Nobel prize winner
Thank you

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Read article on the Impact of the 4th IR under Downloads: General documents on: www.learningroadmap.co.za