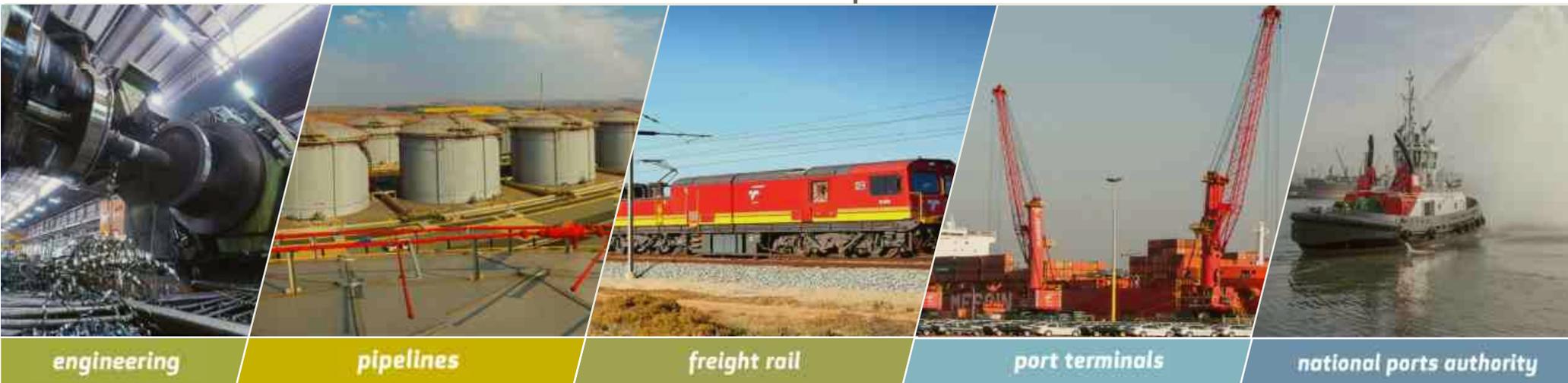# Impact of the 4ᵗʰ Industrial Revolution in Africa for better ports performance

Date: 10 July 2019
Venue: Pretoria
Presenter: Thamsanqa Basi

engineering   pipelines   freight rail   port terminals   national ports authority

Contents

Introduction and Background

- We are currently experiencing the 4th Industrial Revolution (**4IR**).

- Most industries are undergoing a **massive transformation** which will change the way they approach business.

- In the implementation of Industry 4.0, we are expected to encounter a number of challenges related to the **skill level** of the workforce.

- A higher percentage of the **jobs** will give importance to cognitive abilities and system skills over physical abilities, hence, defining the required core work-related skill sets.

- Some new technologies can disrupt or radically change the established order in existing markets or even create **new markets** (Bower & Christensen 1995).

- In education and training, **e-Learning** is still more considered as supplementary compared with the interactive learning in classroom.

Research focus questions

The main research question for this paper is: **Are we ready for disruptive technology (in Learning and Development) as expected to cause rapid and major disruptions to the demand for occupations and skills?**

1. What is the relationship between **disruptive technologies and demand for skills**?

2. To what extent are **specialist skills versus generic skills** relevant to the implementation of disruptive technologies?

3. To what extent is there consensus between the **technology innovators and end-use employers** when it comes to skills acquisition/development for disruptive technologies?

4. What are the **barriers to students' and graduates'** skill acquisition and development in the next five to ten years in the context of disruptive technologies?

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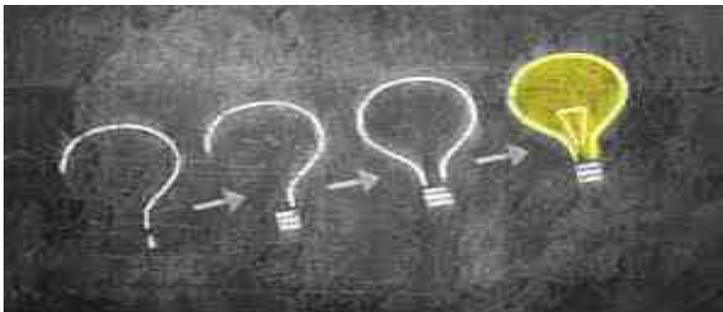
Disruptive technology on L&D

- As disruptive technology, particularly in the form of digital technology, becomes more widely deployed in workplaces, education and training providers will face the challenge of understanding the implications of this change for **course offerings and delivery**.

- This is not straightforward, as it requires gathering evidence at the workplace level; nonetheless, education and training providers must **decide which technologies** to use in training.

Source: DFKI (2011) Unrestricted © Siemens AG 2013
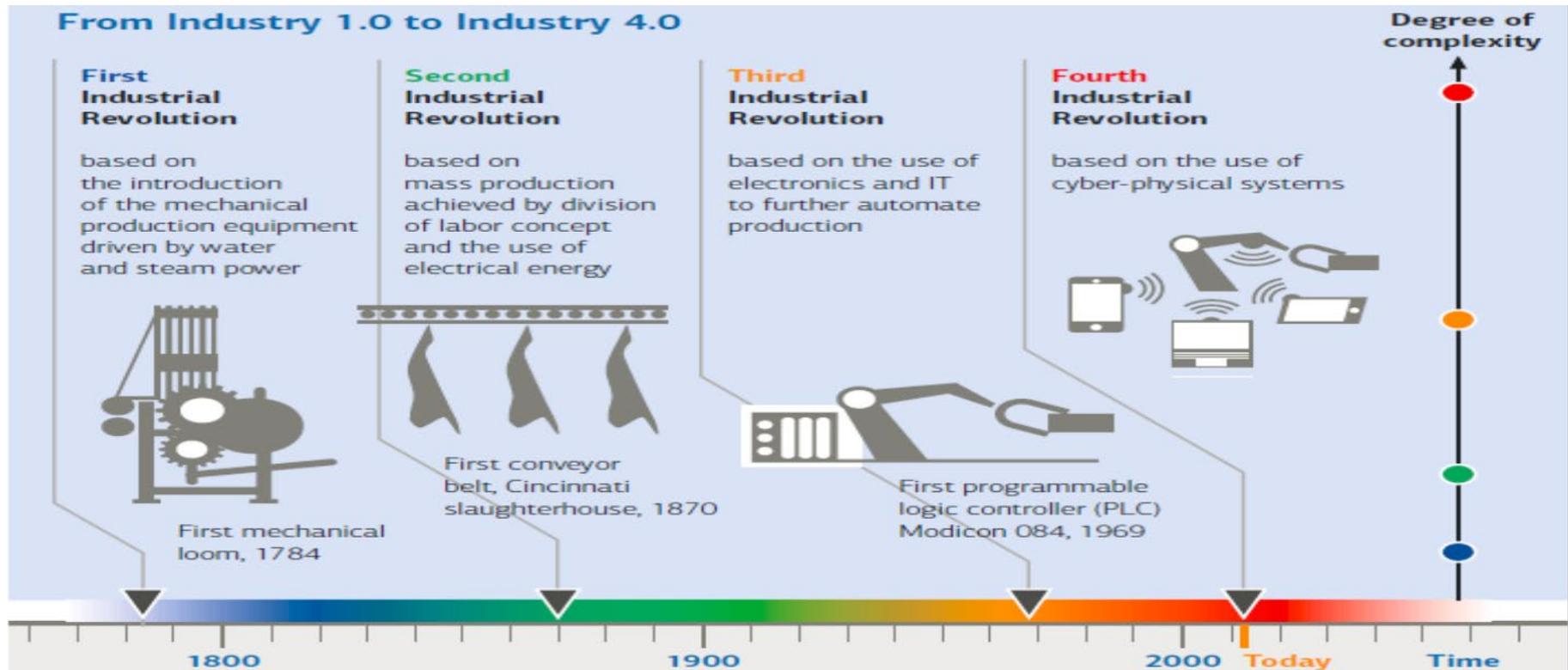
Human capacity development

- Trainers need to be exposed to current and emerging technologies by undertaking training and development to enable them to be **competent technology users** as well as educators (Reeson et al. 2016).

- Disruptive technology can also impact on how and where students learn, with education and training increasingly available online through **massive open online courses** (MOOCs).

- These courses provide **learning flexibility** and make skill and knowledge acquisition more accessible, convenient, engaging and potentially cheaper (Bainbridge Consulting 2015).

- Science, Technology, Engineering and Mathematics (STEM) skills value data analysis, computing skills, digital technology and lifelong learning. That is "*learning how to learn*".

- The **African education system** will need to create workers with the skills and competencies required to thrive in a continuously changing environment.

South African Opportunities

- Port of Durban, South Africa, is number **ONE** port in sub-Saharan Africa;

- South Africa has the **THIRD** longest coastline in Africa (advantage/leverage) boasting about 3 000 km;

- Technology training – **SIMULATORS** (world class);

- Most countries in the continent want to benchmark against us – provides opportunities for training/ **KNOWLEDGE TRANSFER**;

- Simulations and **DIGITAL SKILLS** demand is on the rise.

Dredging Simulator   **Ship Handling Simulator**   **Equipment Simulator**

African Ports Expansion Projects

Are the above projects incorporating Industry 4.0?

Source: africaportsexpansion.iqpc.com

- The full potential of Industry 4.0 is yet to be leveraged, particularly in **emerging markets**;

- Opportunities for companies to revamp or create entirely new offerings and **business models**;

- Increasingly favouring more **flexible and customizable outputs** over standard product offerings;

- African ports need to formulate their **Industry 4.0 strategies**, and should take into account skills readiness, skills development required to meet 4IR.

Smart Ports = Digital Ports

Defining features of the logistics environment in the 4th Industrial Revolution:

➢ Common platforms delivering distributed/shared value;

➢ Networked, digital industrial solutions;

➢ Internet of things and services;

➢ "Smart" systems, tools and processes;

➢ Big-data harvesting for intelligent, sustainable decision-making;

➢ Autonomous machines;

➢ Virtual environments;

➢ Cyber-physical systems connected directly via the internet.

Ports of the future – through Digitalization

Challenges

- That any changes to accredited training courses require a multi-year national **consultation process**, especially the processes that create, update and endorse training curriculum.

- It has been argued for some time that too much bureaucratic red tape and unnecessary detail means that the existing training system is **sluggish in responding** to emerging needs in a timely fashion (Misko 2010).

- Thus providers of accredited training have very little freedom to respond rapidly to changes in technology and their skill requirements, putting them at a **competitive disadvantage** to providers of training who are not nationally accredited but who have greater flexibility to change the content of training (Reeson et al. 2016).

- The massive **upfront capital requirements** and sizeable investments into R&D and implementation deter corporations, particularly those in the emerging markets, from foraying into Industry 4.0.

- Furthermore, the **education and skill level** of the labour force has been often below the expectations of the companies looking to expand their businesses in these markets.

- Infrastructure also poses an important challenge – despite significant advances made in this space, relatively poor **connectivity and accessibility** continues to be a challenge for the implementation of digital elements of Industry 4.0.

Conclusion
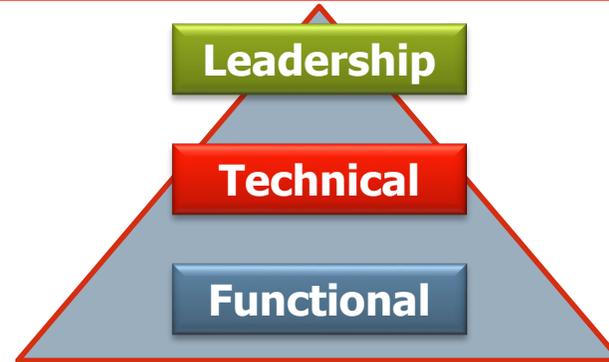
- Disruptive technologies offer limitless new opportunities, and may well lead to significant <u>job losses</u> and tasks within jobs (Frey & Osborne 2013; Dolphin 2015; AlphaBeta 2017; Chartered Accountants Australia and New Zealand & Deloitte Access Economics 2016; Department of Industry, Innovation and Science 2017).

- <u>Disruptive technology</u>, (new) knowledge, skills and attributes

- Impact of disruptive technology in the African context. Is there research in the African context on the impending impact of disruptive technology on <u>skills and training</u>?

- Relationship between <u>education and training</u> and innovation.

- Identify the implications for education and training from the <u>Industry 4.0 agenda</u>.

- What are the African <u>Government's Industry 4.0 initiatives</u>.

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Thank you