



32nd Annual **INCOSE**
international symposium

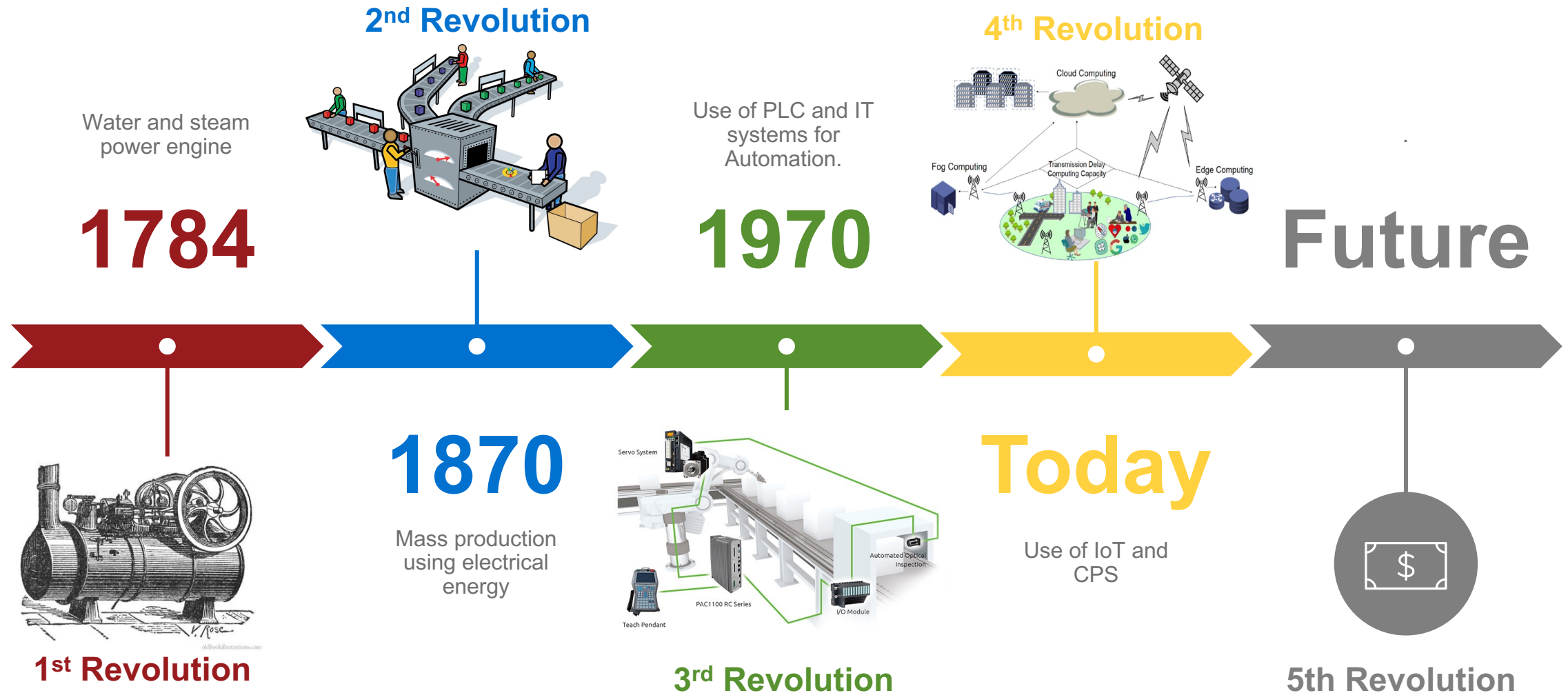
hybrid event

Detroit, MI, USA
June 25 - 30, 2022

BY BONGEKILE MATSENJWA

**MANUFACTURING INDUSTRY IN INDUSTRY 4.0:
*AS EXPERIENCED BY ENGINEERING MANAGERS.***

HOW IT ALL STARTED



IMPACT OF INDUSTRY 4.0 IN MANUFACTURING



MAIN PRINCIPLES

- Interoperability
- Decentralization
- Virtualization
- Real-time capacity
- Modularity
- Service orientation
- Big data
- Artificial intelligence



Smart factory developed in the industry 4.0. (Brettel et al, 2014).



IMPLEMENTATION REQUIREMENT

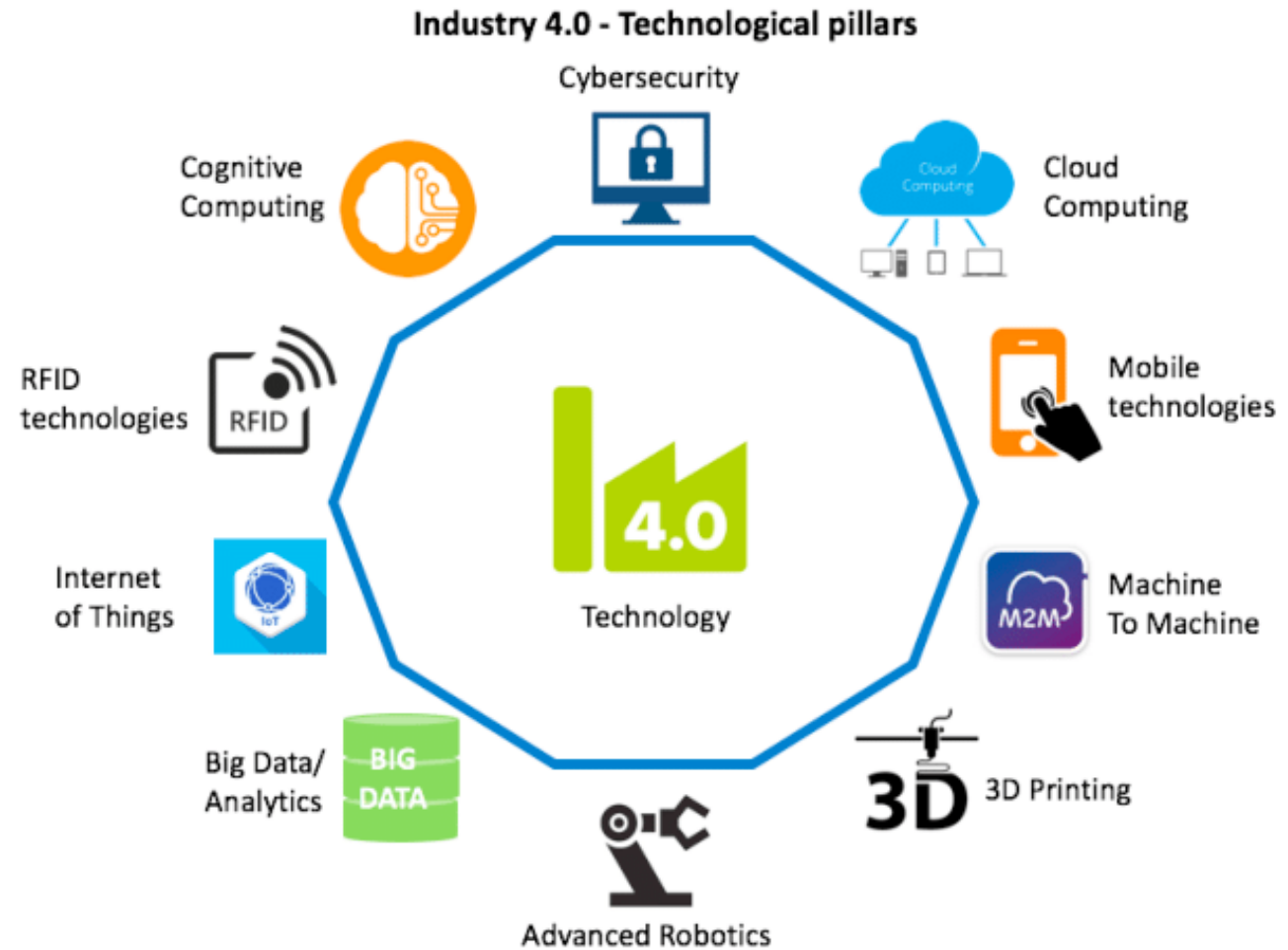
1 Infrastructure and broadband

2 Cybersecurity

3 Electricity

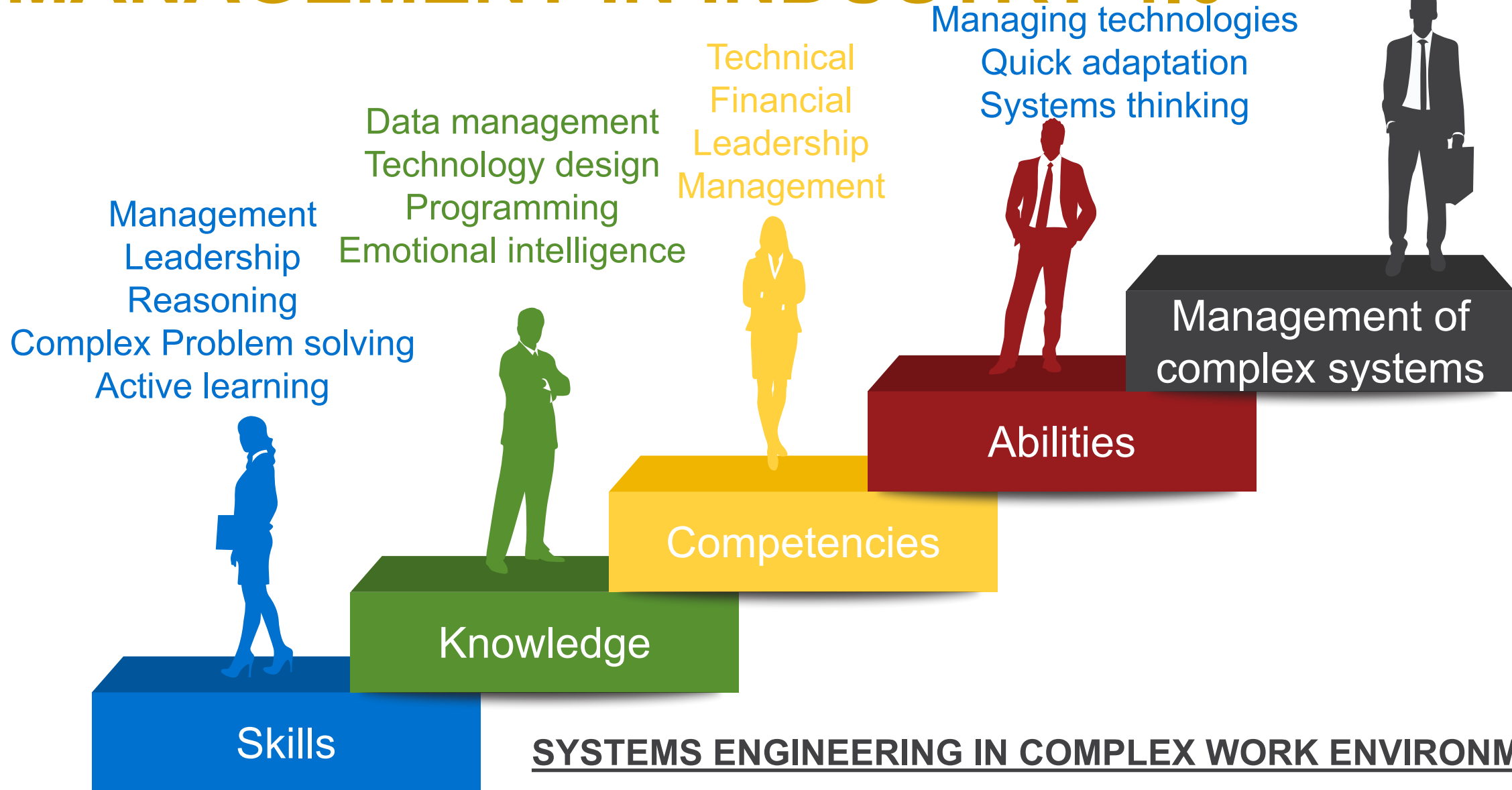
4 Mindset change

5 Lack of skills



Proposal of automation solutions architecture for industry 4.0 (Saturno et al, 2017)

MANAGEMENT IN INDUSTRY 4.0



SYSTEMS ENGINEERING IN COMPLEX WORK ENVIRONMENT

CASE STUDY: FCMG, SOUTH AFRICA



The experience of an engineering manager

Before industry 4.0

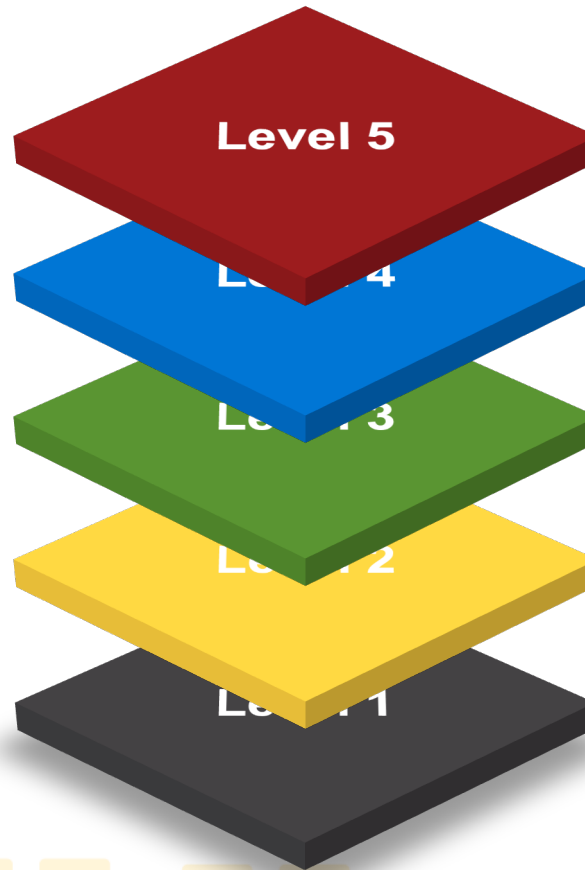
Manual work with
nonvalue adding
activities



Human error and
high production
costs



Launching new
products within 6
months



With industry 4.0



Automation and
digitization of
processes



Seamless data
integration with
improved efficiencies



Launching new
products within two
months with reduced
costs

CASE STUDY: FCMG, SOUTH AFRICA

The experience of an engineering manager



Implementation



Investment

1. Business case based on production line
2. Purchasing new technologies



Training

1. Skills assessment
2. Training and upskilling leaders and employees on new technologies



Challenges faced

1. Resistance from employees
2. Lay-off
3. Changes in roles and responsibilities



Culture change

1. Understanding the why
2. Coaching and training
3. New ways of working

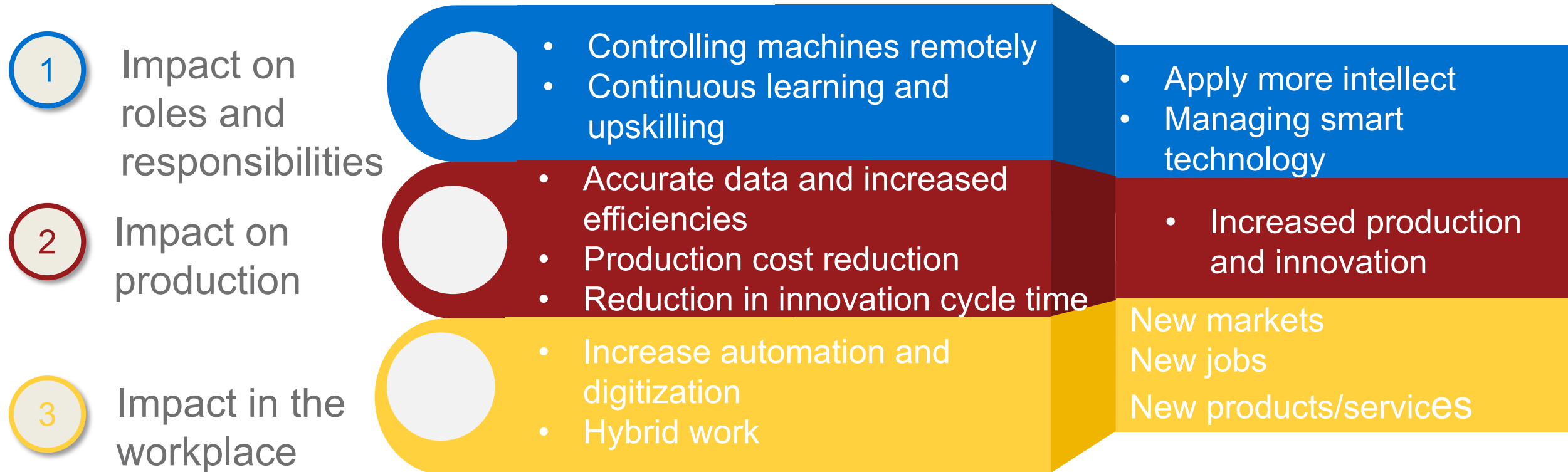
“But our factory was running inefficiently such that our global team was looking at shutting it down. This is how bad the situation was. So, we had to go into a big saving initiative not only for saving costs but for saving our factory and saving jobs”

INCREASING EFFICIENCIES

CASE STUDY: FCMG, SOUTH AFRICA



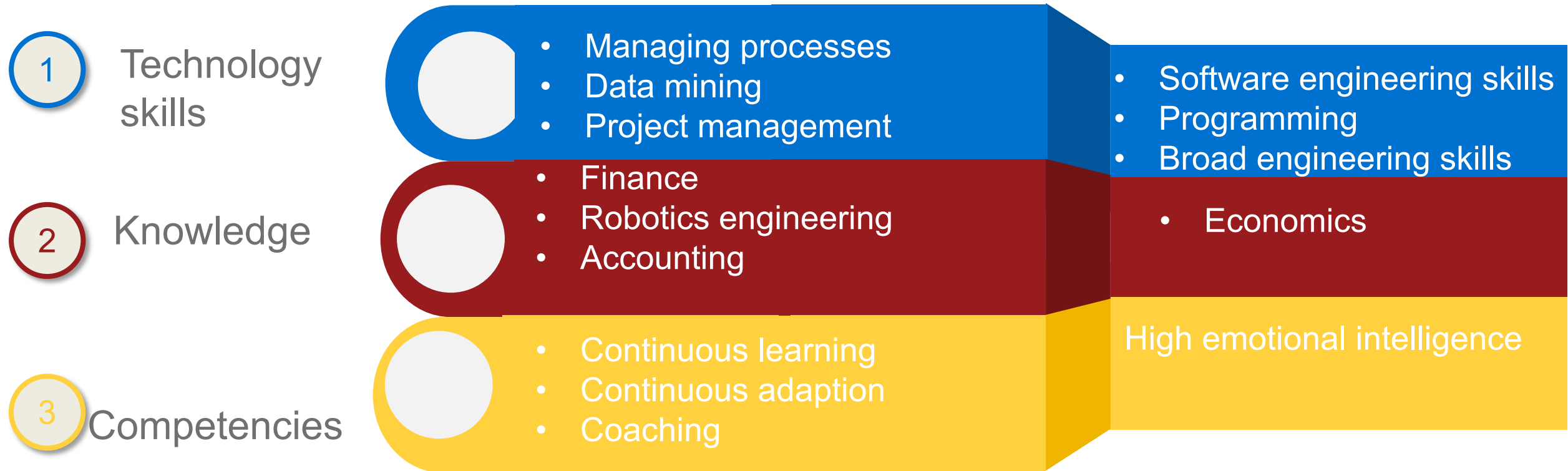
The experience of an engineering manager



CASE STUDY: FCMG, SOUTH AFRICA



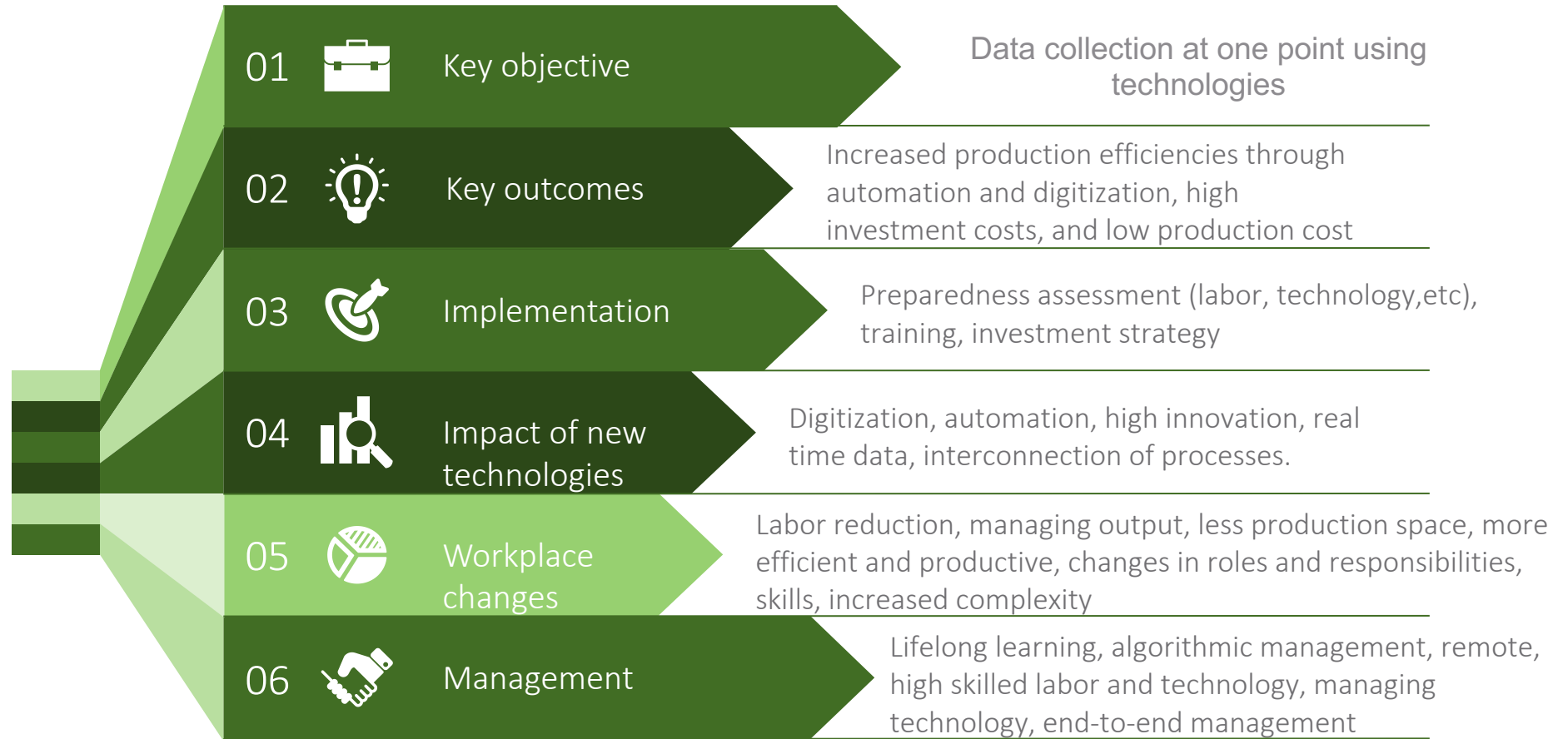
The experience of an engineering manager



SUMMARY



MANAGING INDUSTRY 4.0





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THANK YOU
