LEARNING & DEVELOPMENT PRACTICES TO NAVIGATE THE FOURTH INDUSTRIAL REVOLUTION (4IR)

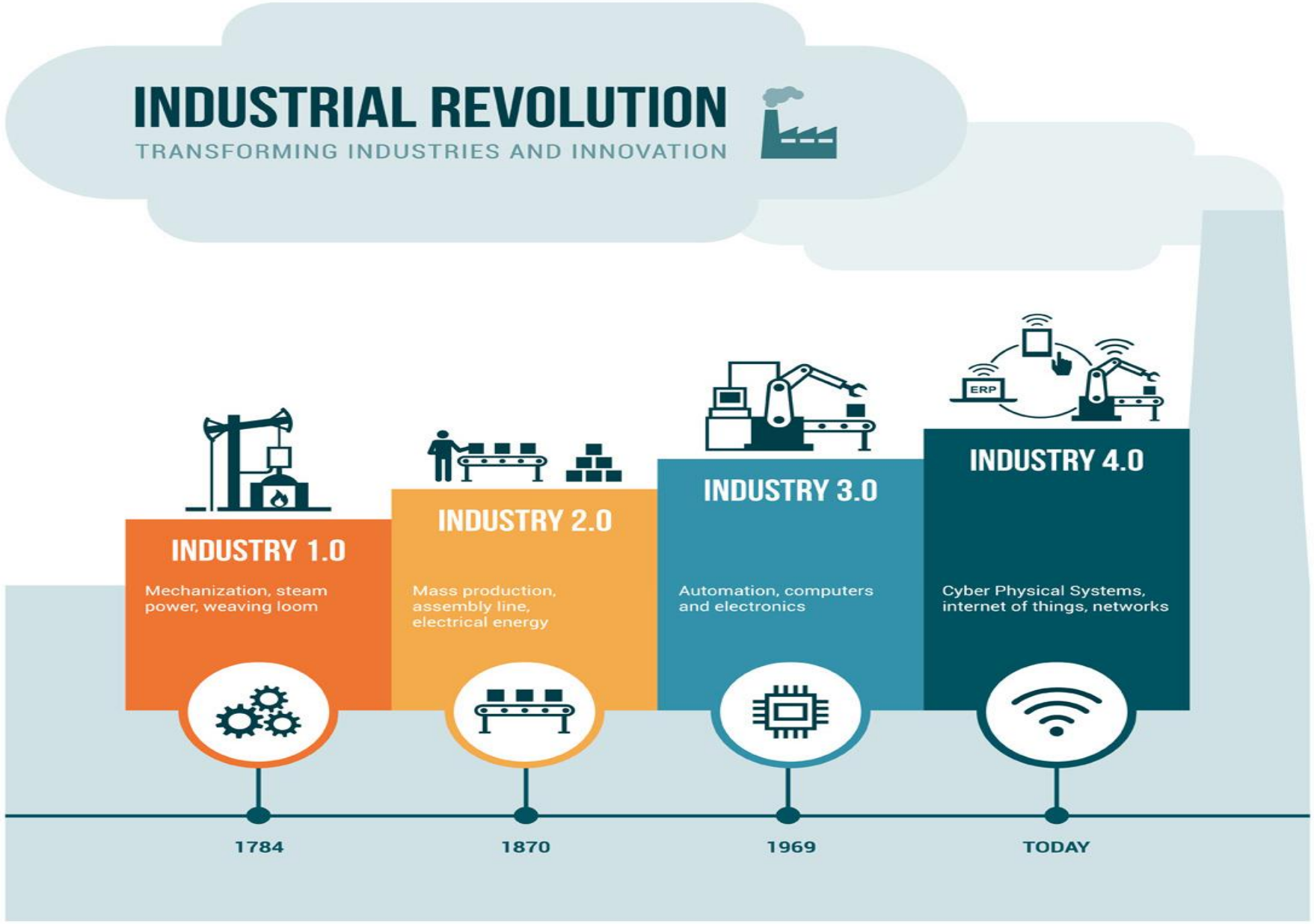
Lord Mawuko-Yevugah, PhD
Ghana Institute of Management and Public Administration (GIMPA)

Presented at the 20th Public Sector Trainers' Forum Conference on October 8, 2019 at Gallagher Convention Centre, Midrand, South Africa

"We are now on the brink of a technological revolution that will alter the way we live, work, and relate to each other. The pace of technological innovation is faster today than ever before. Artificial Intelligence (AI) is in the early stages of development and the possibilities are vast. Should you fear or embrace AI? This question revolves around the assumption that we may have a choice to control its implementation. Opposition to automation, robotics and AI is about as futile as it would have been in the 20th Century to oppose electricity"

Brigiette Tasha Hyacinth (2017) *The Future of Leadership: Rise of Automation, Robotics and Artficial Intelligence*

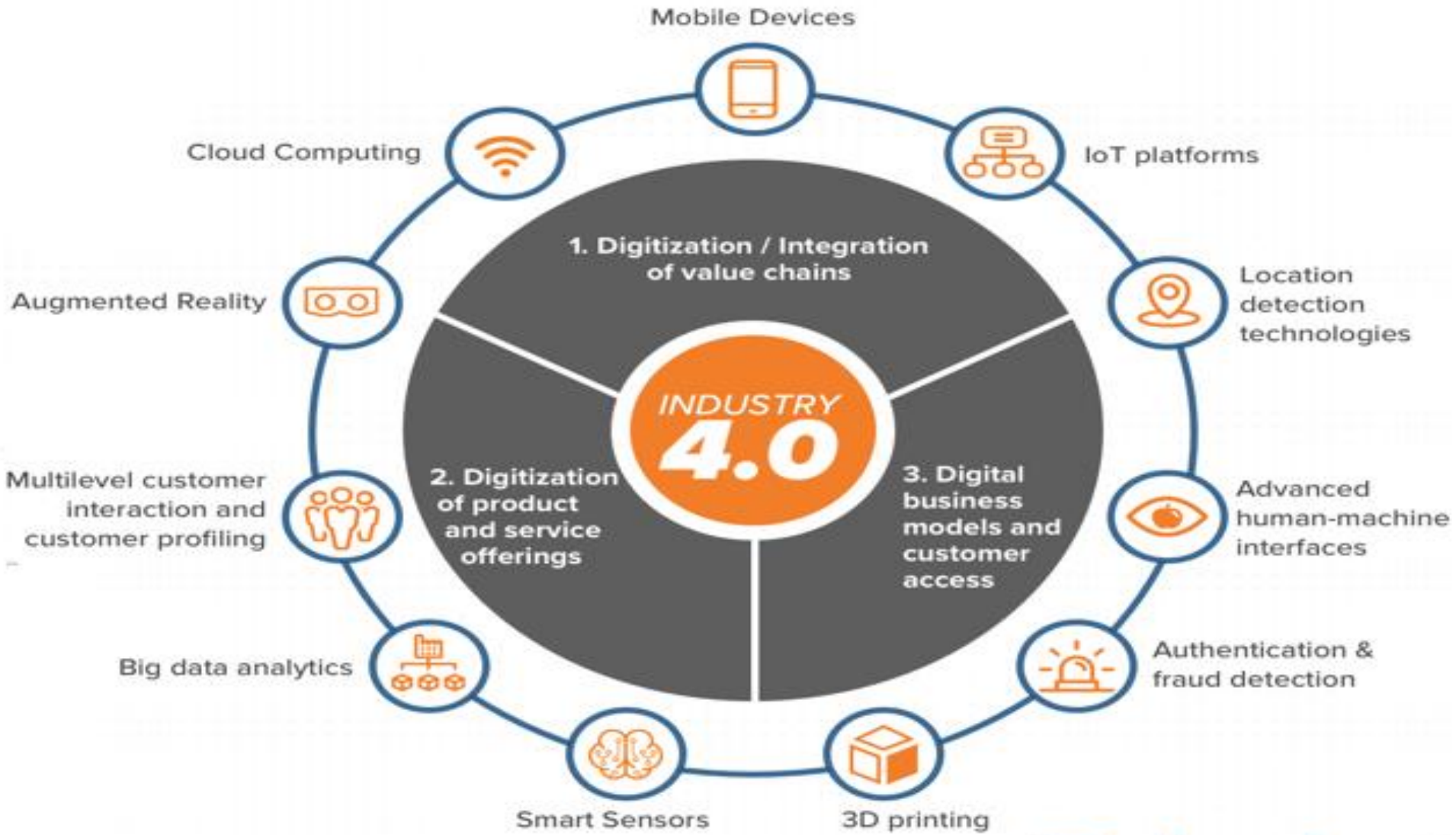
The Industrial Revolutions



Description

- **The first industrial revolution**
  - Involved a change from mostly agrarian societies to greater industrialization as a consequence of the steam engine etc.
- **The second industrial revolution**
  - Was driven by electricity and involved expansion of industries and mass production as well as technological advances.
- **The third industrial revolution**
  - The digital revolution, involved the development of computers and IT (information technology)
- **The fourth industrial revolution**
  - Disruptive technologies and trends such as the Internet of Things (IoT), robotics, virtual reality (VR) and artificial intelligence (AI) are changing the way we live and work.

The Fourth Industrial Revolution



The Narrative of the 4IR

- The new age is differentiated by the speed of technological breakthroughs, the pervasiveness of scope and the tremendous impact of new systems
  - (Professor Klaus Schwab, Founder and Executive Chairman of the World Economic Forum and author of *The Fourth Industrial Revolution (2015)*)
- The revolution could yield greater inequality, particularly in its potential to disrupt labor markets
  - Economists Erik Brynjolfsson and Andrew McAfee have pointed out,.
- As automation substitutes for labor across the entire economy, the net displacement of workers by machines might exacerbate the gap between returns to capital and returns to labor or result in a net increase in safe and rewarding jobs.

The 4IR and the Future of Work

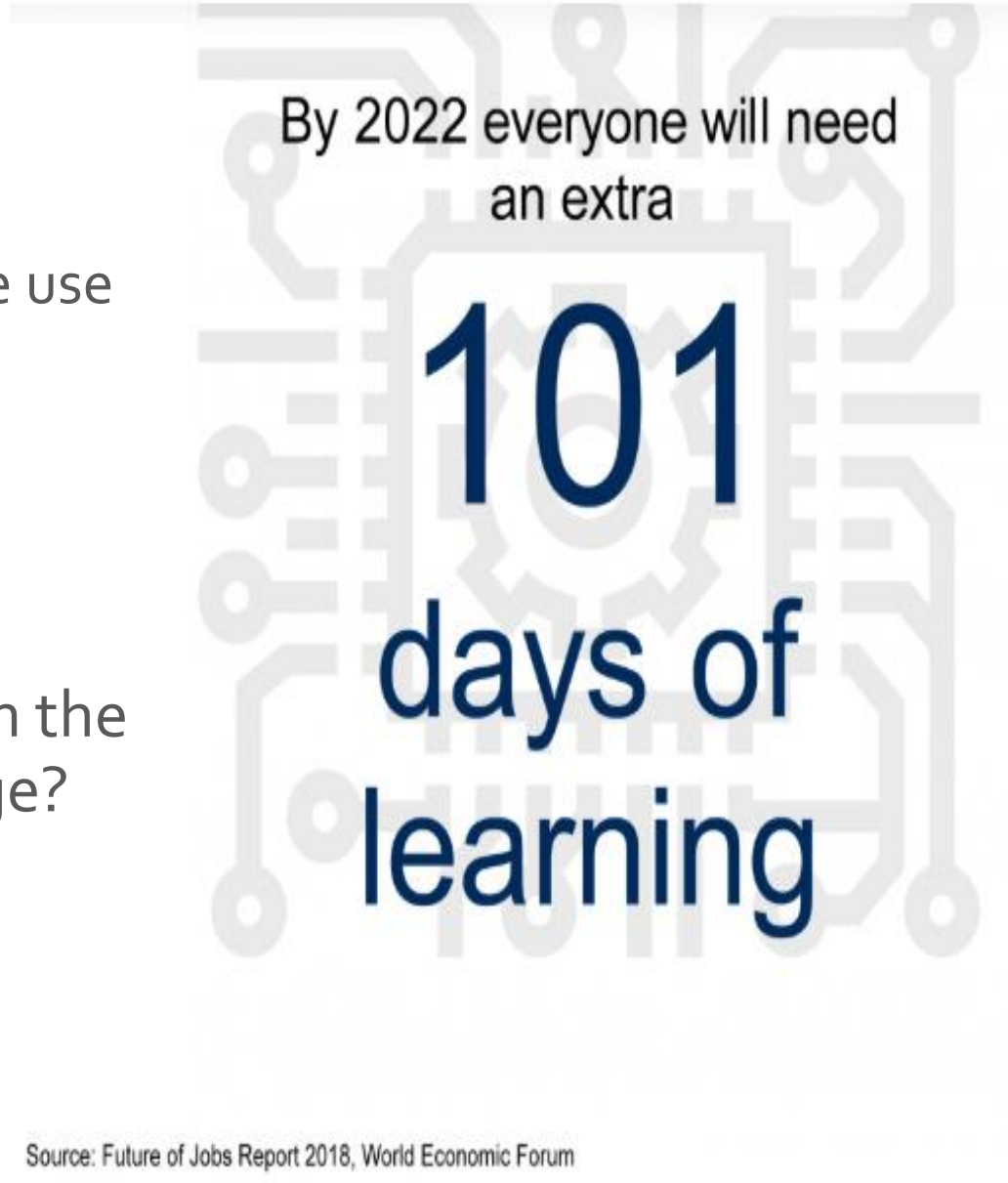
- The Fourth Industrial Revolution
  - continues to evolve; disrupting social and economic systems

The 4IR and the Future of Work

- As the Fourth Industrial Revolution unfolds, companies amd organizations seek ways to harness emerging technologies for efficiency, expansion into new markets, and competitiveness
- Employers thus look out for workers with new skills sets to leverage the potential of emerging technologies in the 4IR for greater workforce productivity and competitive edge
- As a result, certain job functions will become redundant and others more important.

- In the Fourth Industrial Revolution:
  - the future of work will increasingly be defined by the use of digital technology
  - not simply to supplant humans but to augment human ability and experiences.

- How do workers prepare for the future of work in the fourth industrial revolution of unprecedented change?
  - **The solution is digital technology powered continuous education, learning and training!**



Source: Future of Jobs Report 2018, World Economic Forum

Why Learning & Development

What is Training?

- **Training** - a planned effort by a company/organization to facilitate employees' learning of job-related competencies.
- Competencies include knowledge, skills or behavior critical for successful job performance.
- The goal of training is for employees to master the competencies and apply them to their day-to-day activities.

Navigating the 4IR

- **High-leverage training**
  - Is linked to strategic organizational goals and objectives.
  - Uses an instructional design process to ensure that training is effective.
  - Compares or benchmarks the organization's training programs against training programs in other organizations.
  - Creates working conditions that encourage continuous learning.

Navigating the 4IR

- **Continuous learning** –
  - requires employees to understand the entire work system, including the relationships among their jobs, their work units, and the company.

Navigating the 4IR

- **Training Effectiveness**
  - Identifying training needs.
  - Ensuring that employees use training in their work.
  - Facilitating the sharing of knowledge, by using informational maps.

Learning & Development Cycle

- This cycle is composed of interrelated components that are the steps of a systematic process, usually starting with identifying learning needs and ending with assessing learning and training evaluation.
- The process of continuous improvement,
  - both in terms of training processes and in terms of the professional development of learners.
- Knowledge is a process of continual change—
  - job requirements change with time and training processes evolve with technologies and organizational needs.

Learning Development Cycle

Learning and Development Outcomes

- Today, training is being evaluated on how training addresses business needs related to learning, behavior change, and performance improvement.
- There is a greater emphasis on:
  - Providing educational opportunities for all employees.
  - Performance improvement as an ongoing process than a one-time training event.
  - Demonstrating to executives, managers, and trainees the benefits of training.
  - Learning as a lifelong event.
  - Training being used to help attain strategic organizational objectives.

Learning & Development Outcomes

Key Trends in Learning & Development

- Key trends in learning and development:
  - There is an increased demand for specialized learning that includes professional or industry-specific content.
  - The use of technology-based learning delivery has increased from 11 percent in 2001 to 33 percent in 2007 and 76 percent in 2015.
  - Self-paced online learning is the most frequently used type of technology-based learning.
  - Technology-based learning has helped improve learning efficiency, and has resulted in a larger employee–learning staff member ratio.
  - The percentage of services distributed by external providers dropped from 25 percent in 2007 to 12 percent in 2015. Organizations developing in-house technology-based learning

Impact of New Technology

- New technology
  - Is changing the delivery of training and makes training more realistic.
  - Training occurs at any time and any place.
  - Reduces travel costs and provides greater access to training and consistent delivery.
  - Provides the ability to access experts and share learning with others
  - Allows companies greater use of alternative work arrangements.

Why Technology-enabled Learning & Development

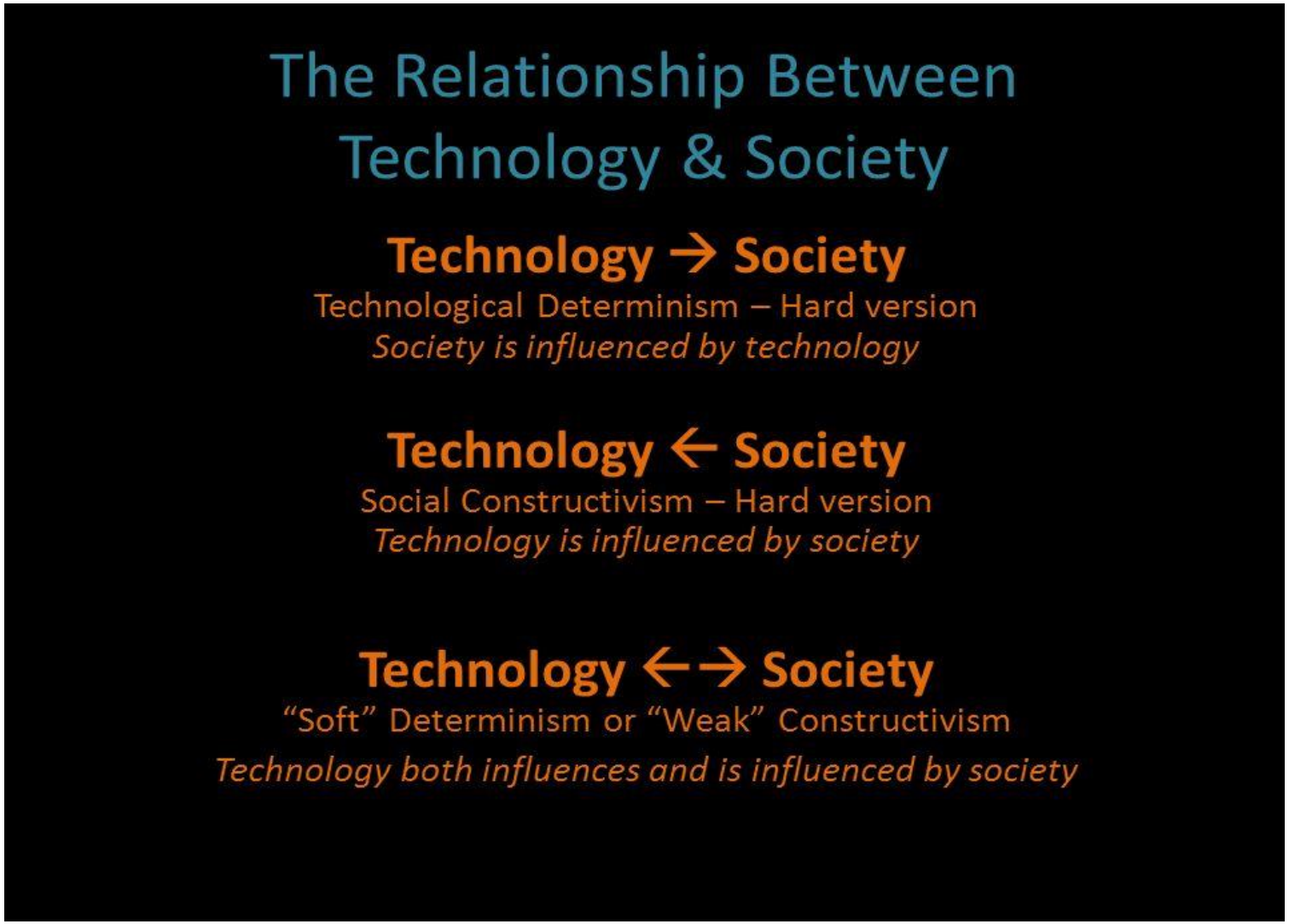
Why Technology-enabled Learning & Development?

- Information is central to the things people do everyday.
  - Access to information is crucial in the development of people and their communities. People need information to find ways of meeting their needs, access basic services like water and health care, look for opportunities.
- How can you impart highly effective training that helps your people perform better?
  - What does it take to equip your staff with the needed knowledge and skills in an engaging manner?
  - Technology-enabled learning facilitates the use of technology in training to yields better results.

Let's Define Technology

- Technology is considered
  - the science and art of getting things done through the application of skills and knowledge (Smillie, 2000, 69)
- Benefiting from technology
  - is not simply a matter of getting new equipment, tools and infrastructure. It is putting people's knowledge and skills to use and applying it to their problems.
- Social scientists
  - have looked at the interaction between technology and society from two perspectives: technology determinism and social determinism

Relationship Between Technology and Society



Technology Determinism

- Technology determinism –
  - Technology drives the evolution of society.
  - The idea is that technology begets technology and that society is continually reformed in the wake of this process (Ling, 2007).
  - An example is the printing press contributed to Pentecostal reformation by giving people more access to the Bible and permitting individual interpretations of God's word.

Social Constructivism

- Social Constructivism –
  - considers social interaction as having primacy in terms of development and use of tools.
  - Thus, tools while originally intended to function in one particular way, can be reinterpreted and used in another way.
  - A farm tractor originally intended for use on the farm for ploughing has been adapted as a means of transport.

Impact of Technology

- According to the United Nations Development Programme (UNDP, 2001, 27) Technology can be used for human development
  - To increase people's incomes and improve health care
  - Allow them to live longer and enjoy better lives
  - Permit them to participate more fully in their communities

Industrial Age versus Information Age

- What mechanization did for the Industrial Revolution, computer technology is doing for the Information Age.

	Industrial Age	Information Age
Productive Input	Energy (steam, electricity); machines	Information; ICTs
Productive Output	Products	Services
Organizations	Large factories	Networked organizations
Workers	Organized labour	Individualized labour

Haslam, Schafer and Beaudet, 2009, 443

Information and Communication Technologies (ICTs)

- Information and Communication Technologies (ICTs) are arguably the defining technologies of contemporary life.
  - ICTs encompass both the equipment and the services that facilitate the electronic capture, processing and display of information (Torrero and Braun 2006, 3).
  - They include
  - Computer technologies (computers, the Internet)
  - Telecommunications (cellular and landline phones)
  - Audio-visual technologies (DVDs, cameras, MP3s and
  - Broadcasting (radio, television)

Flexibility vs Control

- Flexibility vs Control
  - ICTs can be used to make work easier and empowering. This can be done by diving people greater access to different kinds of information within (through internal knowledge management systems) and outside (providing internet access during work).
  - ICTs can also expand control over what employees are doing because they increase managers span of control (via cellphones etc.)

Barriers to use of ICTs

- Unequal diffusion/distribution of technologies –
  - a major source of disparity in the use of ICTs is the lack of access to technology infrastructure. Access is often prioritised for urban over rural areas. Social barriers also inhibit the distribution and use of ICTs. Among these barriers are high costs, lack of education, and insufficient motivation.
- Affordability –
  - even-though ICTs are commonplace, one barrier to usage is the cost of obtaining and using then. This contributes to disparities in the use of ICTs between different categories of technology users.

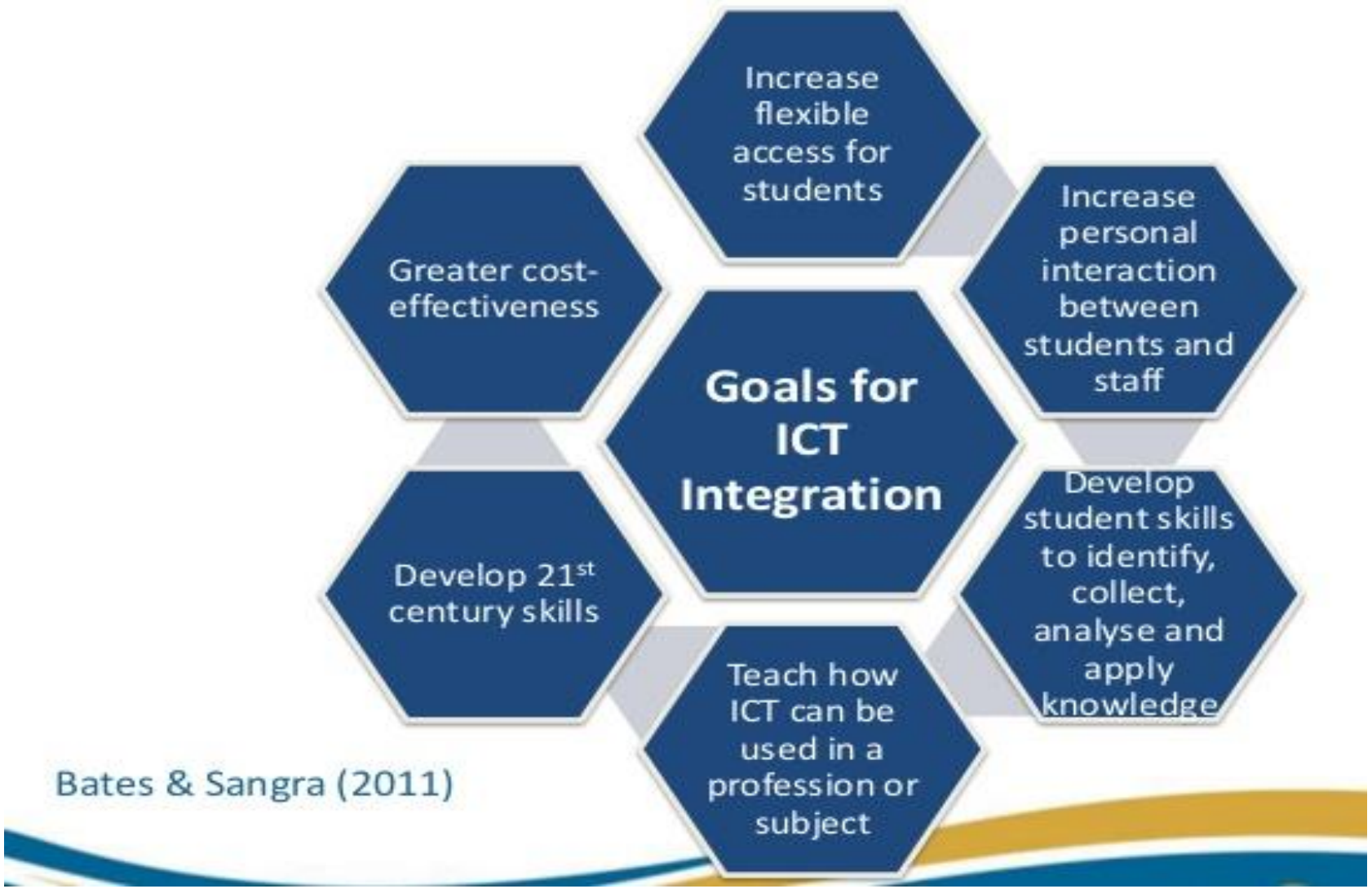
Barriers to Use of ICTs

- Skills –
  - differences in the use of ICTs are related to educational attainment. The more education tend to use ICTs kore. A gender dimension is also apparent, especially in places where women have less access to education, and to ICT resources.
- Motivation –
  - older people tend to have a harder time adapting to new technologies, partly because they are quite used to life without them. Motivation is also related to the relevance of the technologies to a person's occupation.

Using Technology for Development

- Using technology to improve learning and development requires an integrated approach that takes into consideration:
  - access to the ICT itself,
  - the content and applications that can be used,
  - and building necessary skills among people to make use of them

Goals of ICT Integration in Learning & Development Cycle



Benefits of ICT Integration in Learning & Development

Reduced costs

Technology allows multiple options of training delivery. It reduces the cost of training considerably as more employees can be trained within less time.

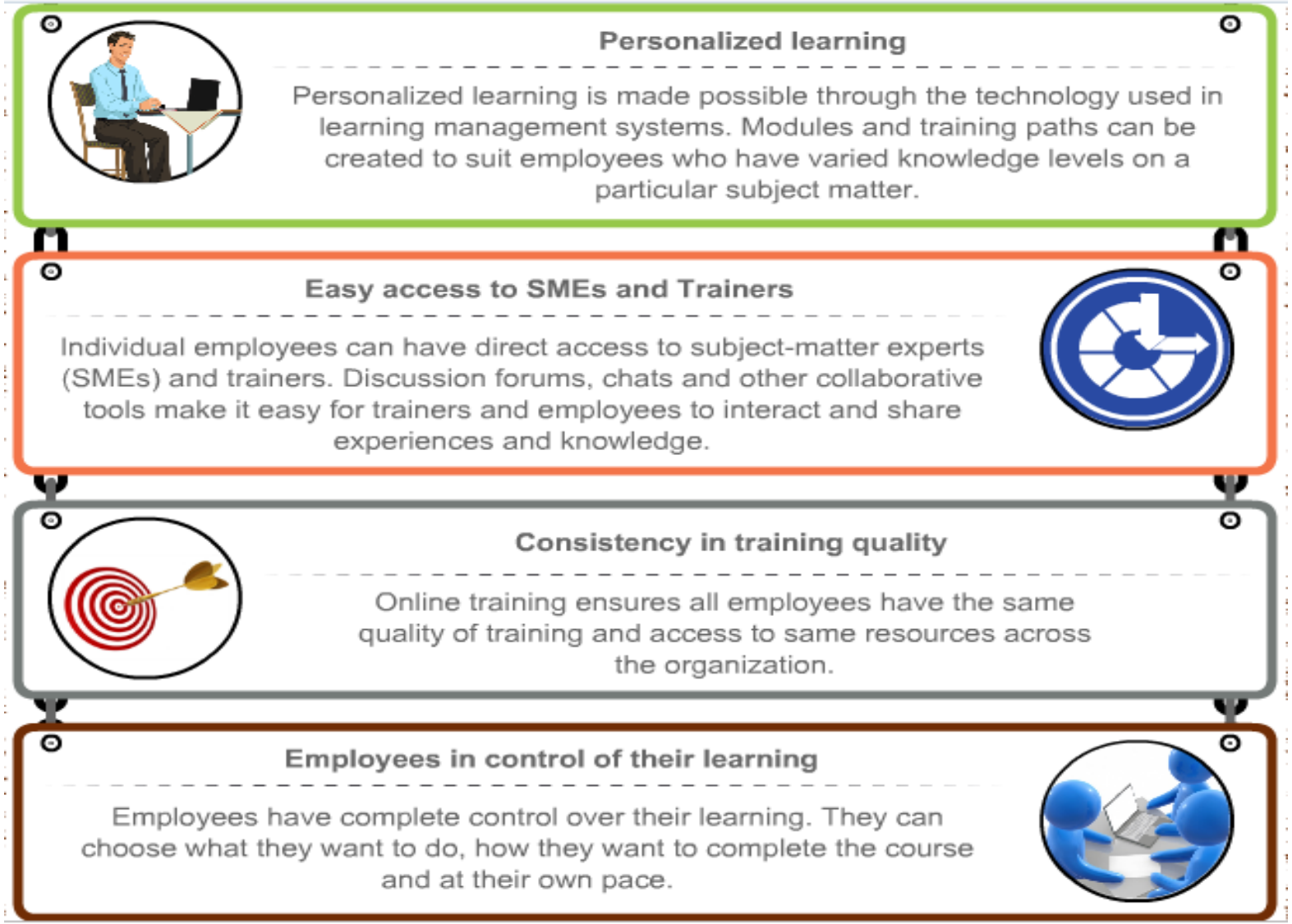
Reduced training time

Scheduling, assigning and tracking of user registrations can be done with a click of a button. Reports can be prepared and evaluation of training programs can be done, swiftly and efficiently.

Varied instructional strategies:

Different instructional strategies can be adopted based on the training need, making the courses rich and engaging to all types of learners.

Benefits of ICT Integration in Learning & Development



Success Factors of ICT Integration in Learning & Development

- Access and Equity
  - Providing people with universal access to ICTs
- Creating Value
  - Developing Relevant Content
- Providing Quality Transformation
  - Making ICT use relevant to people

Access and Equity

- Providing people with universal access to ICTs
  - Universal service – making affordable a defined minimum service of specified quality to all users at an affordable price (Poser 1997, 80). Focuses on availability of ICTs to individuals in homes, offices etc.
  - Universal access – a situation where every person has a reasonable means of access to publicly available ICTs which may be provided through telecommunication companies, internet service providers, community internet access terminals etc.
  - Both universal service and universal access are based on affordability, accessibility and quality of telecommunications services.

Creating Value

- Developing Relevant Content
  - Using ICTs to improve learning and development requires understanding, first and foremost of the information needs and rights of the intended users.
  - This can be done through observation, surveys,, focus group discussions and organization wide stakeholder consultations.
  - Basic information that can be collected include:
    - The different groups of workers
    - The tasks worker group perform and the information they require to perform them
    - The different technology media and ICTs that can be used to access the information
    - The places where information can be obtained and how often they can be accessed

Providing Quality Transformation

- Making ICT use relevant to people
  - It is not enough to assume that ICTs alone can make a significant impact on the learning and development of an individual or an organisation at large.
  - The effects depend on the capabilities and values of the people using the technology.
  - Thus, investing in ICTs require shaping people and developing the necessary skills to permit them to success.
  - Although new forms of ICTs are more user-friendly, they still require some degree of skill to operate effectively.

Conclusions

Source: Future of Jobs Report 2018, World Economic Forum

"AI and Robotics will become a new reality whether we decide to embrace it or not. Everything that can be automated, will be automated. There will be massive disturbance. Incorporating these new technologies is similar to a change process. Most people resist change. As leaders we need to be change agents. Our responsibility should be to make sure everyone is informed and prepared for the upcoming changes…"

Brigiette Tasha Hyacinth (2017)*The Future of Leadership: Rise of Automation, Robotics and Artficial Intelligence*

Thank You.