

As part of the CQI's centenary celebrations, *Quality World* has been looking at the past 100 years, focusing on each decade, to highlight an example of a major development that influenced the quality profession



# 2010's INDUSTRY 4.0

Industry 4.0 is the fourth industrial revolution. The term was first coined at the Hannover Fair in Germany in 2011, to describe how emerging digital technologies will radically change global value chains.

The first industrial revolution saw the rise of mechanical production. The second, between the late 19th century and early 20th century, was marked by mass production. The third, which began in the 1960s, saw the rise of electronics, computers and computer-controlled robots.

Industry 4.0 is the digitisation of manufacturing: interconnected computers can communicate and make data-driven decisions across the value chain without the need for human involvement.

The quality profession is in a unique position to lead and influence industry as global markets navigate through the early stages of this technology-driven era.



## MAIN TOOLS

Many experts consider the following technologies as key concepts and tools that make Industry 4.0 possible.

- **Automation and robotics**  
The term automation was first coined in 1946 by DS Harder.
- **Internet of things**  
Was first used in the 1990s by Kevin Ashton.
- **Cloud computing**  
The earliest recorded use of the term was in 1996 by George Favaloro.
- **Big data**  
This term is thought to be first used in an article by Michael Cox and David Ellsworth in 1997.
- **Machine learning and artificial intelligence**  
Amazon launched its machine learning platform in 2015 and created the distributed learning toolkit.

## OPPORTUNITIES

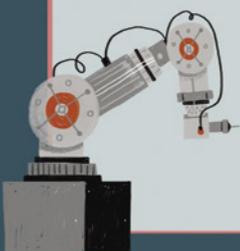
- ➔ Economic growth
- ➔ Reliable and consistent outputs
- ➔ Increase role for SMEs with a shift to mass customisation
- ➔ Energy-efficient and sustainable production
- ➔ Health and safety improvements
- ➔ Changes in education and training
- ➔ Shift in organisation of work with emphasis on flexibility.

## CHALLENGES

- Gaps in infrastructure
- Global rules and regulations fail to consider Industry 4.0
- Standards and interoperability
- Data security and ownership
- Transparency, privacy, ethics and security
- Inequality and exclusion
- Innovative processes will affect competition and create barriers to entering the market.

## PERIOD of TRANSFORMATION

The integration of the physical world within digital ecosystems opens up new opportunities for global collaboration, more customised products and new operating models.



Experts from the UN and the World Economic Forum predict conflicting issues and benefits will unfold as Industry 4.0 disrupts society and traditional models of manufacturing.

## PROJECTED WORTH



KPMG's estimated worth of Industry 4.0 component markets is US \$4 trillion by 2020.

## COUNTRIES LEADING NOW

The top three countries investing in Industry 4.0, according to BloombergNEF:

- Germany
- Singapore
- South Korea.

