GRG School of Management Studies
PSGR Krishnammal College for Women
International Conference 2019 on Industry 4.0: Developing Sustainable Competitive Strategies

‘Finance 4.0’

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Scheme

1. Industrial Revolutions
2. Industrial Revolution 4.0 or Industry 4.0
3. Industry Revolution and Finance
4. Finance 3.0
5. Finance 4.0
6. Future of Finance
7. Implications

1. Industrial Revolutions

- Transformation, 1800s, Britain
  - Mechanization, **water power, steam power** (1760 – 1820)
- Shaping, 1900s, USA
  - Mass production (1870), assembly line (1913), **electricity**, UK, US
- Shaping, 1950
  - **Computer and automation**, took shape very fast compared to earlier revolutions
- Blooming, Europe, no consensus on what is the revolution and nomenclature
  - **Cyber Physical Systems** (Industrial Revolution 4.0 or Industry 4.0)

1.1 Revolution or Evolution?

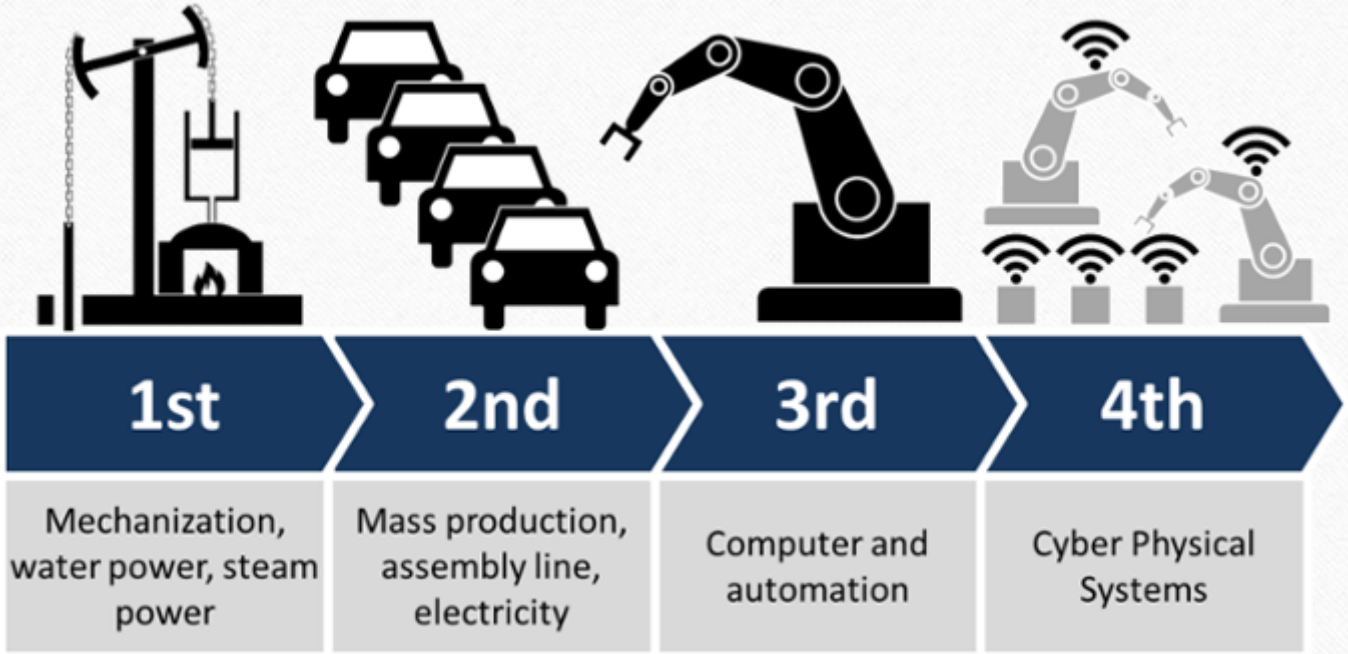


Image Courtesy: Roser, C.

1.2 Cost of Industrial Revolutions

- Conflict, **inequality**, pollution
- **Environmental problems**, unsustainable debts, unemployment
  - Wealth moved from East to West
- Turbulence, conflict, **disruptive innovation**, Financial Engineering, frequent and large scale financial frauds
  - Conflicting views exist (European Parliament considered Renewable Energy as IR 3.0)
- **Loss of privacy** and totalitarianism, non-inclusive growth

2. Industrial Revolution 4.0 or Industry 4.0

- **Revolution or Evolution?** – political and ideological differences exist
- **Convergence** of software, novel materials, dexterous robots, new processes (3D printing) and web-based services
- **Autonomous production** – devices communicate with each other
- Impacts almost **all disciplines**
- Challenges: Setting up, data handling and economies of scale
- Finance: Cyber currency, block chain, **autonomous (M2M) payments**

2.1 Why Industry 4.0?

- Confluence of **physical, digital and biological** worlds than mere technological development
- '**Mass customization**' as compared to 'mass production'
- Evolving from 'IT and automation' to '**digitization and IOT**'
- Different in terms of real time application, data size, data complexity and **two-way communication**
- Tremendous impact on **logistics**, financial systems, 3D printing
- Cost of ignoring the 'revolution' would be heavy

2.2 Are we ready for Industry 4.0?

Networked Readiness Index 2016	Global Rank*
Singapore	1
Finland	2
Sweden	3
Norway	4
United States	5
Netherlands	6
Switzerland	7
United Kingdom	8
Luxembourg	9
Japan	10
Hong Kong SAR	12
Korea, Rep.	13
Canada	14
Germany	15
Malaysia	31
China	59
Thailand	62
Sri Lanka	63
India	91
Pakistan	110

as-

- increasing pressure to innovate technology,
- trailing out of rapidly growing digital population by businesses and companies,
- developing of new types of behaviour,
- leadership and governance mechanisms etc.

to adopt digital technologies and to capture the growing market.

Notably, India's rank on the Network Readiness Index in 2013 was 61. In 2016, India ranked 91 out of 139 countries. At 91, India was ahead of Pakistan (110) and Bangladesh (112), but behind Sri Lanka (63), Malaysia (31), and China (59). Singapore topped the rankings for second year in a row. The US was placed at 5th position.

The WEF's report makes it very clear that there is huge gap between developed nations and developing ones because of many factors. It says that the digital economy has divided the developed countries and developing nations into two segments. The top-ranked developed nations such as the U.S, and Singapore ranking is almost unchanged. But many developing nations, especially India saw a drop in ranking.

Though it seems convincing that Industry 4.0 can become a success story for Germany's engineering sector; however, the detailed study for "Industry 4.0 Readiness" may further do its part in this effort to highlight the challenging milestones that many companies must still pass on the road to Industry 4.0 Readiness.

2.3 In summary

Klaus Schwab, Executive Chairman of the World Economic Forum

- The current revolution is "unlike anything that human kind has experienced before" in its "scale, scope, and complexity".

3. Industrial Revolution and Finance

- Finance was a derivative of **real economy** to serve **real production**
- Finance 1.0: **Central banks** (Sweden and England) were established at the start of the First Industrial Revolution during 17th century
- Finance 2.0: Second Industrial Revolution lead to setting up of **equity and credit market** during 18th and 19th century

4. Finance 3.0

- Evolution of 'derivatives' described as "**weapons of mass destruction**" by Warren Buffet
- **Top-down architecture** or hierarchical ledgers systems
- Most settlements made in USD across the **ledgers of US Federal Reserve**
- Institutions and individuals indulge in **off balance sheet and off-shore trading**
- Prone to frauds

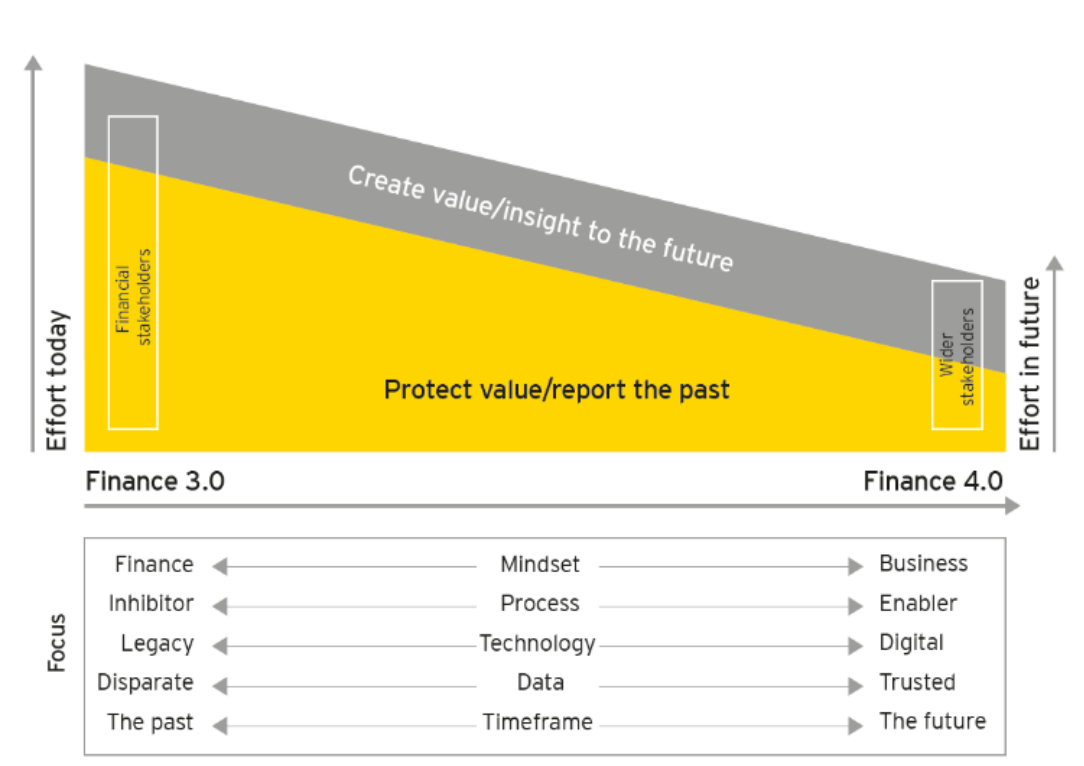
4 Finance 3.0 cont.

- Large scale **non-bank** financial transactions are **possible**
- Illicit transactions could be done in **cash or cyber-tokens (bitcoins)**
- Stalled in 2007 with the **Global Financial Crisis**
- Massive intervention by central banks with unconventional monetary policies
- "Central banks are in the business of debasing their currency", Stephen Bannon

5 Finance 4.0

- Global Financial Crisis lead to **tighter financial regulations**
- Innovation, talent and money are moving out of the banking system into **asset management industry** (relatively less regulated)
- **Distributed ledger** or 'block chain' technology
- Bottom-up architecture, P2P transactions
- **Cyber currency**, autonomous (M2M) payments

6 Future of Finance 4.0



- Size
- Shape
- Scope

Source: EY, 2017

6.1 Future of Accounting

- **Real time** access to data
- Easier data extraction
- Better data **quality**
- **Faster** data transfer
- Improved **credibility** and relevance of reporting
  - (Burritt, 2018)
- Reduced expenses in record keeping and compliance

6.2 Future of Retail

- Invoices and sales reports could be automated
- Fully autonomous **unmanned retail stores** (Nayasale Retail, Kochi) require a complete overhaul of financial systems

6.3 Future of Financial Services

- Technology will begin to **substitute**, not just complement
- Much more than process automation
- Information from machines could be used for **underwriting** in insurance
  - Options include, simulation, monitoring and benchmarking
  - New risks: Cyber attack could cripple production/supply leading to catastrophic losses
- Artificial intelligence and data analytics would play a key role in **distribution, underwriting, pricing and claims settlement**
- A company in Chile uses **big data** and machine learning to predict **loan repayment**

6.4 Future of Payment System

- **Authentication** would become payment
- **Invisible** transactions
- **Orchestrated** rewards
  - (Forrester, 2018)
- Autonomous payments
- Mobile facilitated payments
- Biometrics

7 Implications

- Different from the **orderly world** we are used to
- Potential loss of control
- Concerns on **privacy, security and state control** (from credit rating to 'Social Credit Score', China)
  - "If you have something that you don't want anyone to know, maybe you shouldn't be doing it in the first place", Erick Schmidt
- 54% of institutional investors and 38% of retail investors, in a CFA survey, indicated that another financial crisis is likely/very likely in the next one-three years

7 Implications cont.

- Prediction is **power**
- Prediction is **profit**
  - Hendricks, V.F. & Vestergaard, M. (2018)
- "[Google] should know what you want and tell it to you before you ask the question.", Larry Page.
- That is a lot of information!

7.1 Equipping Finance 4.0 for Industry 4.0

- Data and analytics
- Cloud technology
- Robotic Process Automation
- Artificial Intelligence
- Block chain
  - (Source: EY, 2017)

References

1. Balasubramanian, R., Libarikian, A. and McElhaney, (2018), Insurance 2030 – The impact of AI on the future of insurance, available at: https://www.mckinsey.com/industries/financial-services/our-insights/insurance-2030-the-impact-of-ai-on-the-future-of-insurance
2. Bhattacharyya, (2009), The Third Industrial Revolution, available at: https://warwick.ac.uk/fac/sci/wmg/about/chairman/hol/wmg_ptc_presentation.pdf
3. Burritt, R. (2018), Get ready for the fourth industrial revolution, ACCA, available at: https://www.accaglobal.com/my/en/member/member/accounting-business/2016/11-12/insights/industrial-revolution.html
4. Chiang, J.A., and Klimczak, C. (2018), Towards Finance 4.0: As CFOs Know, It Will Take Much More Than Just Robots, available at: https://www.cfoinnovation.com/management/towards-finance-4-0-as-cfos-know-it-will-take-much-more-than-just-robots
5. Dutt, R.P. (2007), History of the Indian subcontinent: British rule and the legacy of colonisation, India Today, archived at: https://web.archive.org/web/20070127194629/http://india_resource.tripod.com/colonial.html
6. EY (2017), What role could the finance function play in a 4.0 world?, available at: https://www.ey.com/Publication/vwLUAssets/ey-faas-finance-4-0-presentation/$File/ey-faas-finance-4-0-presentation.pdf
7. Genre Publications (2018), Industry 4.0 – Implications for the Insurance Industry, available at: http://www.genre.com/knowledge/publications/iipc1808-en.html
8. Grant Thornton and CII (2018), India's Readiness for Industry 4.0, available at: https://www.gita.org.in/Attachments/Reports/India's Readiness for Industry 4.0.pdf
9. Grasser, M. (2017), The Fourth Industrial Revolution: How Big Data and Machine Learning Can Boost Inclusive Fintech, available at: https://nextbillion.net/the-fourth-industrial-revolution-how-big-data-and-machine-learning-can-boost-inclusive-fintech/
10. Hebbar, P. (2018), Walk In, Bag It, Skip Out: India's First AI Supermarket In Kochi Has Made Shopping Hassle-Free, Analytics India Magazine, available at: https://www.analyticsindiamag.com/india-first-ai-supermarket-watasale-kochi/

References cont.

11. Kiss, A. (2018), Industrial Revolutions and a Future View, available at: https://softtech.com/resources/industry-4-0/
12. Matthews, K. (2017), What is big data's role in the fourth industrial revolution?, available at: https://bigdata-madesimple.com/big-datas-role-fourth-industrial-revolution/
13. Nead, N. (2017), Fintech and the 4th Industrial Revolution, Investment Bank, available at: https://investmentbank.com/fintech-revolution/
14. Omata, S. (2018), Finance 4.0 in a Nutshell, Techwire Asia, available at: https://techwireasia.com/2018/07/finance-4-0-in-a-nutshell/
15. Pena, I. (2014), Huffington Post, available at: https://www.huffingtonpost.com/ignacio-peaa/industrial-revolution-30_b_5806874.html
16. Robotlab, (2016), What is Industry 4.0, available at: https://www.robotlab.com/blog/what-is-industry-4.0
17. Rossow, A. (2018), Bringing Blockchain into Industry 4.0, Forbes, available at: https://www.forbes.com/sites/andrewrossow/2018/04/11/bringing-blockchain-into-industry-4-0/#71024d26dc7d
18. Sheng, A. (2018), From Industrial 4.0 to Finance 4.0, The Star, available at: https://www.thestar.com.my/business/business-news/2018/05/26/from-industrial-40-to-finance-40/
19. The Economist (2012), The Third Industrial Revolution, available at: https://www.economist.com/leaders/2012/04/21/the-third-industrial-revolution

Thank you!

Questions?