

A Digital Economy Model for Talent Prediction Data Analytic

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Abstract: This research proposed a model to assist the design of the associated data architecture and data analytic to support talent forecast in the current accelerating changes in economy, industry and business change due to the accelerating pace of technological change. The emerging and re-emerging economy model were available, such as Industrial revolution 4.0, platform economy, sharing economy and token economy. Those were driven by new business model and technology innovation. An increase capability of technology to automate more jobs will cause a shift in talent pool and workforce. New business model emerge as the availability and the cost effective emerging technology, and as a result of emerging or re-emerging economic models. Both, new business model and technology innovation, create new jobs and works that have not been existed decades ago. The future workers will be faced by jobs that may not exist today. A dynamics model of inter-correlation of economy, industry, business model and talent forecast were proposed. A collection of literature review were conducted to initially validate the model.

Keywords: Digital Economy, Data Architecture, Data Analytic, Business Model, Talent Forecast

1. Introduction

Technology disruption cause the changes in the level of economy, industry and business models. These, in turn, will make some jobs obsolete. At the same time there will be new jobs created that have not been existed today.

1.1. Changes in the economy

World economic forum shows the eight global transformations that cause by industrial revolution 4.0, WEF World Economic Forum (2018). Those global transformations as the result are:

- Disruption to Jobs and Skills
- Innovation and Productivity
- Business Disruption
- Inequality
- Fusing Technologies
- Agile Governance
- Ethics and Identity
- Security and Conflict

Disruption to jobs and skills are inevitable as business models are disrupted, therefore, the employment landscape will change. New significant job creation with expected increase productivity- and job displacement. There are an increasingly widening gaps between the skills that employers need and those that potential employees can offer. During previous industrial revolutions, it required decades to adapt and to develop new skill sets on a large scale. However, we cannot afford to be that slow as the faster change and broader scale of disruption, therefore, a faster response needed.

Innovation and productivity will be accelerating as well. Technology innovation will make further automation possible. This will increase business productivity with the expectation that the worker keep pace with the expected changes. New business models emerged as the result of new

available technology, this may create a new kind of jobs and skills needed to support the newly formation of business model. In short, digital innovation and new business models are driving transformation, including of new jobs and new trade, OECD (2017).

Business disruption had impacted to US economy, according to McKinsey Global Institute (2016), as shown in figure 1. On the emerging fourth industrial revolution majority of business owners are eager to embrace Industry 4.0 as a way to stay competitive in the market, based on the survey of Survey in 6 countries: US, UK, Germany, Japan, South Korea and China, Kagemmann et. Al (2016).

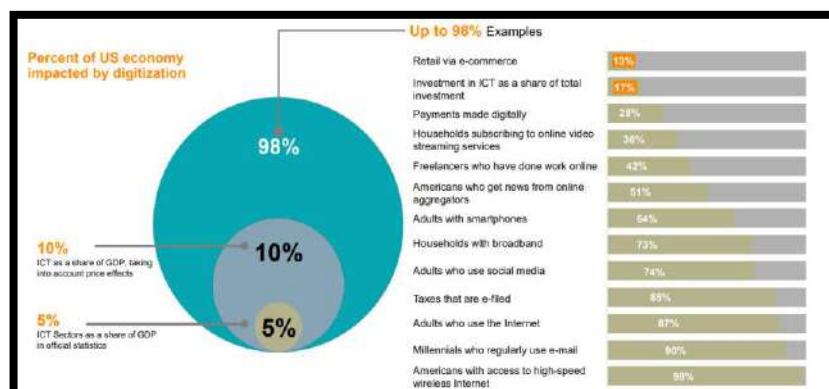


Figure 1. Size of the Digital Economy. (McKinsey Global Institute Analysis, 2017)

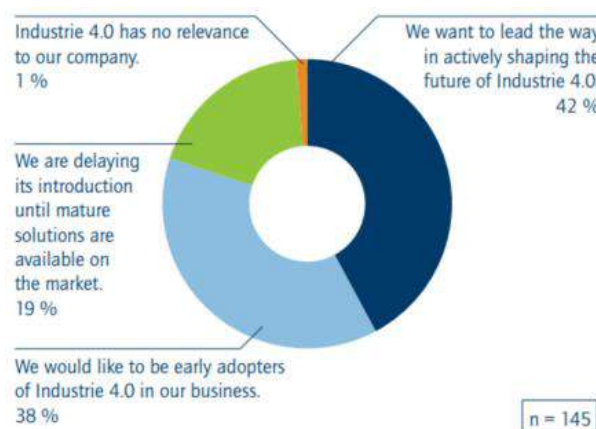


Figure 2. The fundamental significant of Industrie 4.0 to business.

Source: "industrie 4.0 in global context", acatech study, 2016.

Inequality will not only impact on workforce but in business as well, Kagermann et. Al. (2017). ICT usage keeps growing but remains unequally distributed across countries and among firms and individuals as shown in figure 3.

In other part, workers, the World Economic Forum's Global Risks Report 2016 showed strong interconnections between rising income disparity, unemployment or underemployment and profound social instability.

Fusing technologies are happening across industries. In the future, autonomous vehicles are both IT industry as well as automotive where in today, those are still a distinct industries. In the past, a smart-phone industry has already decimated Walkman, digital camera, calculators and many other products. While the market for those are still exist, however, this market is significantly smaller than their previous peak.

Agile government has been a response to the ever changing new technologies which has to be fast, but accurate as well. The accuracy of policy needed to avoid bottleneck in put into practice a new business models and opportunities. An example from OECD, in figure 4, Australia is considered better in comparison to their peers in the policy that facilitating digital transformation.

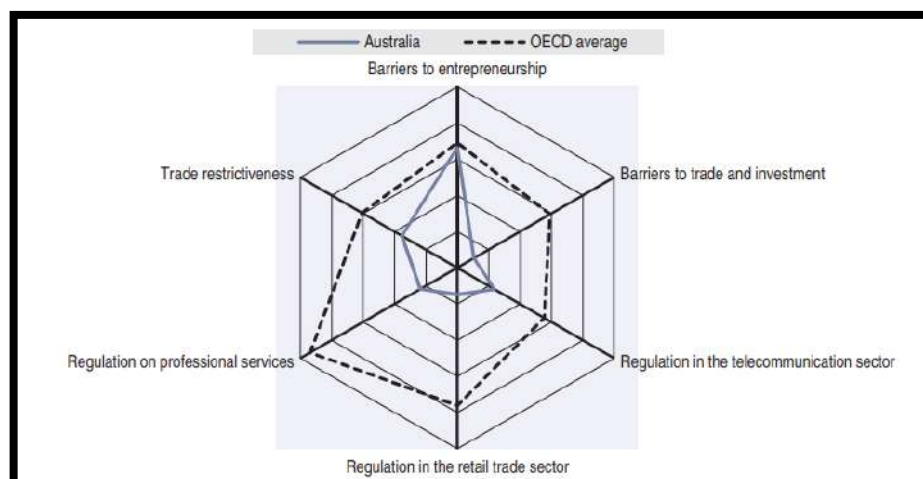


Figure 3. Product market regulation database, www.oecd.org/economy/pmr and OECD, Services Trade Restrictiveness Index Regulatory Database, www.oecd.org/tad/services-trade/services-trade-restrictiveness-index.htm (accessed March 2017).

Ethics and identity are another challenges in the current global transformation. As there are increasingly deep relationship between human and technology, there are other social factors that we need to care about, one of the issue is on social skills. A 2010 study by the University of Michigan Institute for Social Research identified a nearly 40% decline in empathy among college students compared with counterparts 20 or 30 years earlier.

Security and conflicts are another both positive and negative aspects. The rise of technology make the possibility to accelerating conflicts faster, example of Arab Spring that fueled by social media. However, this is an opportunities as well where new kind of information, ICT and cybersecurity jobs emerging.

1.2. Changes in the Industry

The size of certain industry shrinking, growing or merging as a result of new business model and technology innovation. Even there has been need kind industry emerging, for example, in the context of Go-Jek, is it a IT, logistics, transportation or services? This shrink taxi industry already, an an emerging on-demand the same day courier, for example. The emerging autonomous vehicle, for example, this will blur the boundary of IT and automotive industries.

As an example of manufacturing, manufacturing will not only concern about mass production only, but as technology provides new ways of doing manufacturing, a combination of scale, product variety, and unit costs are possible, UNCTAD(2017), as shown in figure 5. There has been a new business model and talent needs to support those new business capabilities.

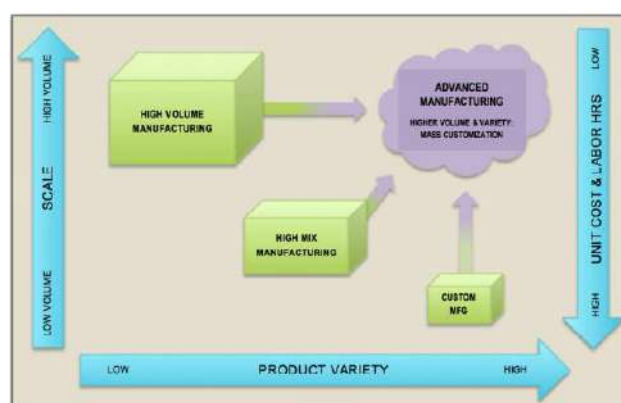


Figure 4. A shifting trade-off with advanced manufacturing in scale, variety and unit costs. T. Surgeon for UNCTAD.

1.3. Changes in business model

New business models grows in speed and numbers, Accenture (2016). The ability of a company to reach 1 billion USD valuation are faster than the previous business can achieved as shown in figure 6. If previous business growth into 1 billion valuation, current unicorns are in average within 4.4 years. And there are increasingly more crowded business models as shown in figure 7.

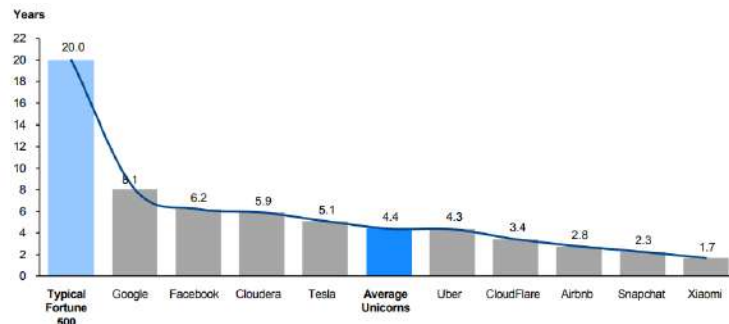


Figure 5. Time to 1 billion USD valuation (Accenture)

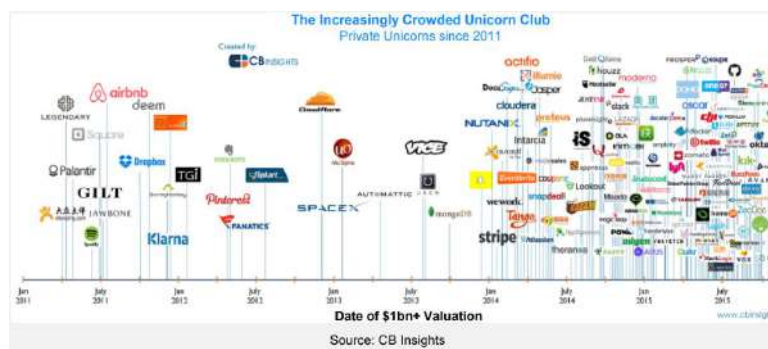


Figure 6. Timeline of the emerging business models. (Digital Enterprise: World Economic Forum White Paper Digital Transformation of Industries. World Economic Forum. 2016)

2. Proposed data analytic model for talent forecast on digital economy

2.1. Proposed Model

Based on section 1, the proposed model for the relationships for the changes in economy, industry and business model in figure 8.

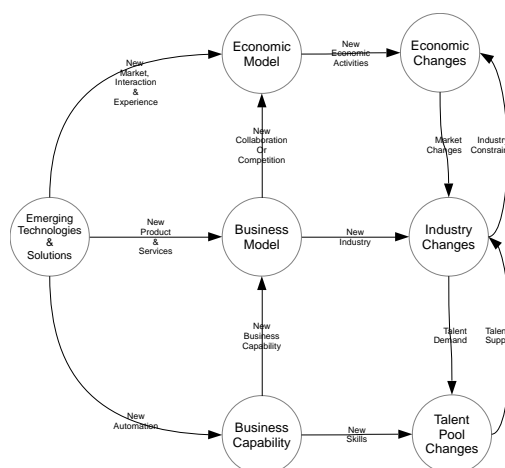


Figure 7. Proposed model.

2.2. Model relationships

The following table summarized some evident of the relationships those components in the model.

Table 1: Model Relationships.

Model Relationship	Notes	References
New Market interaction and Experience	This paper explores the new technology such as blockchain and IoT that may give a new drive to sharing economy, even the established Uber and AirBnB may be disrupted with this growing development of these technologies.	Huckle et. Al.
	Token economy was coined to shows the full potential of the technology in entirely diferrent economic model.	Swan, M., 2015.
New Product and Services	Blockchain may be regarded as revolutionary as internet, 20 years ago. This technology enables new business models that required distributed, decentralized and less dependency of the central intemediary or authority.	Tapscott et. Al. 2016
New Automation	New technology will give new set of use cases that can automate certain business capabilities.	https://www.ibm.com/blockchain/use-cases/ https://lists.hyperledger.org/g/meetups/.../22/0/HyperledgerRockaway01March18
New Collaboration and Competition	Self driving cars change the automative industry in the future. The concentp of car ownership would be different. IT and automotive companies are collaborating and competing for the next wave of industry like google, baidu and others will be the competitors of the current manufacturers like Toyota, Ford and others. Lynx and Uber collaboration with automaker that define new ownership scheme of the cars.	Gao et. Al. 2014
New Business Capability	Business model consists of two main parts: Business Capability and Value Proposition. Blockchain use cases with the appropriate value proposition may change the supply chain industry.	Korpela et. al 2017
New Economic Activities	Estonia, as a digital citizenship, had a major problem in 2017 for its security issues. This triggered an adoption blockchain for e-residency that enable ease of business in estonia and new business flousrished.	Sullivan et. al 2017
New Industry	Uber, AirBnB gave a challeneges to the government and the current conventional industry. Those platform economy business model gave a close down of many conventional taxi industry and pose a challenges to the established hospitality industry.	Biber et. Al. , 2017
New Skills	New skills were needed to support new business model. Those will disrupt the current model of employment relationships as shown in mos GIG economy like Go-Jek, Grab, AirBnB and alike.	Drahokoupi et. Al 2016

Market Changes	New economic activities, like Uber, Go-Car, Grab Car and alike, changed the competitive landscapes of cities. New customer behaviours emerges and those make the conventional taxi industry are not a favourable as used to be.	Wallsten, S., 2015.
Industry Constraints	The platform business model of Uber and alike make the area coverage wider and closer to the customers in needed. The same taxi fleet will take longer pick-up routes to pick-up a passengers, this became a constraints in the competition of the faster pick up and operation cost of Uber and alike.	Cramer et. Al. 2016.
Talent Demand	Recent PwC 2018 study show that there will be 200 million jobs displaced and new 293 million jobs created in china due to the advancement of AI, Robotic, Automation, IoT, Blockchain and related technologies.	PwC, September 2018.
Talent Supply	Forecasting the talent demand and supply has been a challenges. The jobs that replaced by automation may need a set of new skills where the upskilling the pool of talent still a slow process.	Cappelli, P., 2008.

3. Summary

A dynamics model of inter-correlation of economy, industry, business model and talent forecast were proposed. The components and its relationships were presented to show the initial system dynamics that can be used further in the talent forecast data analytic.

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