# The Issues of Big Data Network and Al Initiatives



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2 Data Capital & Data Economy



Big data use cases in Korea

4 AI(Artificial Intelligence) Initiative



Innovative Technologies of 4<sup>th</sup> Industrial Revolution



New Paradigm of Manufacturing Industry

The Industry 4.0 based on the the Digital Transformation



## **Beginning of New Digital Economy**

2011









The Fourth









### Use of an ecosystem of digital technologies...

- Enables a new wave of digital transformation that:
  - Builds on digitisation and datafication
  - Is more than the sum of its parts
  - And includes technologies such as:
    - Big data
    - Cloud computing
    - Internet of Things
    - Robotics
    - 3D printing
    - Artificial Intelligence
    - Distributed ledgers
    - ...



# ... is a game-changer providing new opportunities and enabling new business

I can afford this house, by renting it out.



With drones, I can get deliveri es anywhere.



models on't need a car,

I need mobility.



I don't need a bank, I can use a platform.



# ... is disrupting the markets

NE

Instagram



# ... also raising digital privacy and security issues





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# Data: A fundamental driver Quantum-jump computing power



### Data as a core driver of disruptive innovation

 The use of big data promises to significantly improve products, processes, organizational methods and markets, a phenomenon referred to as data-driven innovation









# 3 Big Data Center & Use Cases in Korea

4 AI(Artificial Intelligence) Initiative



# **Data Capital & Data Economy**

## The Change of Data Value *Resource, Data refinement ...* New Capital of Digital Economy



The oil of the 21th century (Gartner, 2012)

# The rice of 4<sup>th</sup> industrial revolution



(MIT Technology Review with Oracle, 2016)

Data is New Capital of Global Economy (Deloitte, 2013)

### "Big data is the capital in the 4<sup>th</sup> revolution"

"Monetary capital is the key factor in the manufacturing industry, however, Big data is the most valuable capital" (Vice President, Roland verger, march, 2017)

# **Data Capital & Data Economy**

Data is now a form of capital, on the same level as financial capital in terms of generating new digital products and innovative services

Exponential Organizations (Unicorn) Marginal Cost Zero, Winer-Takes-All(WTA)



### < 3 factors of production >





Data Economy

Economy

# **The Potential of Data Capital**

Societal benefits in many areas such as health, environment, agriculture, mobility, research, and society's progress

Economic growth in many business for competitiveness, innovatioin, job creation

# Bringing it all together!



# Data Resources for building a Data Economy

### 1) Personal data - GDPR

- Anonymized personal data: treated like non-personal data
- Data protection logic
- Free flow of personal data

### 2) Government data – PSI(Public Sector Information) & Open data

- Avoid discrimination between re-users
- Address re-use applications within a time limit
- Limit use of exclusive arrangements
- Limit charges (marginal cost of reproduction)

### 3) Research data – Open Science

- avoid discrimination between re-users
- Address re-use applications within a time limit
- Limit use of exclusive arrangements

### 4) Industry-held data

- Focus on non-personal, machine-generated data(ex, IoT data)
- Contracts are main vehicles to share and re-use
- Data silos innovation hampered

# **Data related with 4th industrial revolution**

### 1) Type of Big Data

- Bio tech: genome data
- Medical: patient record, sensor data, image, video data
- Manufacture: MES data, IoT-device enabled data, CPS data
- Transportation: traffic data, DTG data
- Security & Safety : CCTV, 112 voice data, accident data
- Finance: credit/debit data, stock trading
- Energy: Electric power, smart sensor data
- Distribution: logistics data by RFID
- Administration: government-owned data
- Welfare: pension data
- Agriculture : IoT smart farm data

$\bigcirc$	SAMPLE_TIME	VDS_ID	VDS_V	VDS_0	VDS_S	VDS_L	FT_TYPE
►	20060502000000	0251VDE19003	1	6	73	15	02
	20060502000000	0251VDS19003	4	7	51	38	02
	20060502000000	0251VDE19103	2	6	70	49	02
	20060502000000	0251VDS19103	3	2	95	67	02
	20060502000000	0251VDE19193	2	0	75	83	02
	20060502000000	0251VDS19193	1	0	104	35	02
	20060502000000	0251VDE19293	-999	-999	-999	-999	02
	20060502000000	0251VDS19293	0	0	100	0	02
	20060502000000	0251VDE19383	-999	-999	-999	-999	02
	20060502000000	0251VDS19383	-999	-999	-999	-999	02
	20060502000000	0251VDE19483	1	2	85	41	02
	20060502000000	0251VDS19483	0	0	100	0	02
	20060502000000	0351VDE04883	2	0	106	17	02
	20060502000000	0351VDS04883	0	0	100	0	02

### 2) Sour of Big data

- Anonymized personal data: treated like non-personal data
- Sensor, CCTV
- Internet of Things(IoT)
- Wearable device: CGM(Continuous Glucose Monitoring)
- Monitoring tool: EMS, BEMS, ...
- Location: GPS
- Traffic: VDS (Vehicle Detection System), AVI (Automatic Vehicle Identification) system, TCS (Toll Collection System), Hi-Pass system





### **Ecosystem of Open Data**

8 dimensions considered essential for an open data initiative that builds a sustainable open data ecosystem



### Global LOD(Linked Open Data) Cloud Diagram

### Web of Internet ⇒ Web of Data!



# SMEs in a digital economy

# **Big Data Analysis for SMEs is challenging!**

#### Mostly Uses external data rather than internal data!

Big data Solution Matching Project(No. of Company)



#### **SNS** Data

- Online Data(Blog, Twitter, News, Cafe, Community)
- Thesis
  - Main Target Customer
  - Purchase Purpose
  - Product and Brand Image
  - PR Channel

#### **Sensor Data**

- Wi-Fi Signal of Smart Phone
- Identifier, Customer location

#### IT System Data

- Transactional Data (ERP, POP, etc.)
- Workflow Time, Facility Capacity, Production Data, Idle time etc.

# SMEs in a digital economy

# **Big Data Issues of SMEs**

Roadblocks to Big Data

- Not much of data accessible while still wondering about the tangible impact of big data
- Especially, SMEs think that big data is NOT quite relevant to what they do for their business.



# SMEs in a digital economy

# Explosion of Unicorn Companies(\$1Billion) in Global

Fortune 500 companies take 20 years,

but, Unicorn companies takes 4.4 years in average



### **Big Data Big Data Landscape 2018**

**BIG DATA LANDSCAPE 2017** 









2 Data Capital & Data Economy



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### **Case1:** Bus line Routing Decision Support



**BIG DATA** 



### Case2: Using big data to monitor epidemic transmission

#### Cause of Animal Epidemic Transmission

#### **Cause of Human Epidemic Transmission**





# Spread by vehicles visiting the infected farm

Spread by people visiting the infected area

#### Using big data and ICT technologies can help prevent infectious disease from spreading

% KT, SKT, LGU+ are telecommunication companies from South Korea

**FI AGSHIP** 

## **Case2: Infectious Diseases Monitoring**



### Korea's Case: Human Epidemic

#### KT and KCDC have started 'Smart Quarantine Service' since November 17th , 2016

- Send 630K+ individuals a warning message of Infectious Diseases
- Find 36K+ individuals who stop over a clean country after visiting affected areas (It is difficult for the quarantine agency to find this case)
- SKT and LGU+ subscribers will receive a service from April 2017





# **Case 3 : Traffic Accident Prediction**



- Collect and analyze various internal and external data including traffic accident data
- Develop traffic accident risk prediction system by applying deep learning technology with selected traffic accident variables
- Inform through TBN Korean Traffic Broadcasting and navigation contents



# **Case 3 : Traffic Accident Prediction**



#### Selection of Traffic Accident Variable and Design Deep Learning Algorithm













Jeju

# kakao

- Public places + Bus and bus platform Wifi access information
- Bus transportation cards information
- BC card consumption pattern information

- Movement data of Kakao(bus, automobile, taxi)
- Search data of Kakao

**Public institutions** 

"

- Jeju Agricultural Technology Institute + Meteorological Administration : Jeju Detailed Weather Information
- Information of related organizations such as Jeju Tourism Corporation

Full routing information mashup of floating population according to Jeju situation



Private institution







2 Data Capital & Data Economy



Big data use cases in Korea

# 4 Al(Artificial Intelligence) Initiative



# Paradigm Shift to Al

# Al is already Here!

• AlphaGo Game( March 9<sup>th</sup>-15<sup>th</sup>, 2016, Seoul, Korea)



### Machine Learning, Data Science, and Statistics



### **Techniques of AI(Artificial Intelligence)**



### Al Landscape 2019 in Global



# **Big Data Network and Al**

# Widening AI Gap



# Strategic Plan for Innovative Growth

Key of 4<sup>th</sup> Industrial Revolution - AI, BigData, IoT



# Strategic Plan for Innovative Growth



Source: Related Ministries (2018), "Innovation Platform" Strategic Investment for Innovative Growth

# AI Learning Knowledge base Infra(2017-2021)



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# **Big Data Network Initiative**

### Data as Core Asset for Innovative Growth

We will build a Korea Data eXpress(KDX) for the Data Economy Era, just like it built the highway road in the industrial age.

"

From Internet savvy to data savvy, to a safely handled data country – this is what we want to be

"

The Korean Government will fully support the data industry to bring a new vitality to our economy.

**President Moon Jae-in's Declaration** on regulatory reform for data economy vitalization (August, 2018)



# Change of Key Economic Components by age Core of the Innovation – Big Data eXpress



[1970's] Industrialization Age

(Road) Expressway (SOC)

•Change of Key Economic Components by age [2000s] Information Age Information

Superhighway (Network)



[2020] Intelligent Age

Korea Data

eXpress(Data)



**Strategy for Big Data eXpress (1)** 

Build & Open up High-value & High-demand Data



**Strategy for Big Data eXpress (2)** 



# Key Success Factors(KSF) of Al

### ✓ 2 Key Factor for AI Success

- Time To Market!
- Al is a CEO Agenda!

### ✓ 4 Success conditions for AI

**Big Data** 

#### New Algorithms

Massively parallel

delivering Superman

Data is the New Capital 50 Zetabytes created in 2020





### Super Computing

Massively Parallel Architecture Driving Performance





Analyzing Big data and Visualization



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## **Key Driver of Industry 4.0**

#### Industry 4.0: Key Driver [Skill, Policy, Culture]



### **Appendix : Requirements of Data Architect**



### **Global Tech-Business and HRD 4.0 Model at Hoseo Univ.**

ABL(Actual-task Based Learning) Program in Hoseo University with Mol and MoICT



### **ABL Education Model in Hoseo University**



# **Terima Kasih!**

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