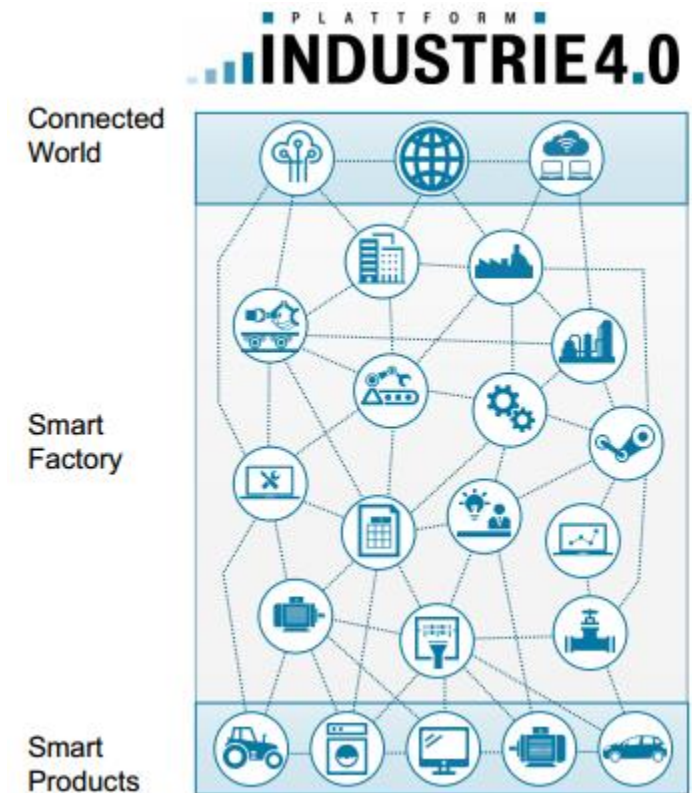


# IOT for SMART INDUSTRIES

## Industries 4.0 from Vision to Implementation

**The 27<sup>th</sup> JOINT ECONOMIC COOPERATION MEETING BETWEEN CIECA – F.T.I.**

26 – 29 Jun 2018 at Taipei, Taiwan



**“Most industries  
and professions will  
change more in next  
10 years than in last  
50, even 100.”**

# Future Show Now!

## THE STRAITS TIMES OPINION

WEDNESDAY, AUGUST 1, 2012 THE STRAITS TIMES

OPINION | A21

These intelligent technologies will be a cheaper, and eventually better performing, substitute to human resources. They threaten to disrupt trillion-dollar industries (such as manufacturing, transportation, logistics, finance, agriculture, healthcare, defence, entertainment and education) and modernise them into hyper-lean, ultra-intelligent versions of the old.

The disruption of energy resources is in full swing. Be warned that the disruption of human resources is next and this time, few businesses, industries and countries will be spared.

### Disruptive technology plays out in Swiber debacle

Charlie Ang  
Hwa Leong

For The Straits Times

The recent financial debacle of Swiber Holdings, an MNC listed on the Singapore Stock Exchange, has highlighted the deep weaknesses of the energy industry that has been well reported.

Less well known is that Swiber, the oil and gas industry, and even the national economies of oil-exporting countries have been disrupted by a disruptive technology called advanced fracking that enables the extraction of shale hydrocarbons at "rock bottom" prices.

Using horizontal drilling and hydraulic fracturing techniques, advanced fracking can produce plentiful new supply in the United States which, in tandem with expanded traditional sources (most notably in Libya and Brazil) and more efficient renewable energy technologies, caused the global crude oil price to plummet from US\$100 a barrel to the new record of US\$60.

As a result, the whole energy sector has been heavily hit. According to Bloomberg, 107 energy companies listed in the NYSE World Energy Sector Index lost US\$1.3 trillion in combined

market value between June 2010 and August last year. During the same period, roughly a third of Exxon Mobil's value was shed off from its market capitalisation. Local marine and offshore giants, Seadrone Marine and Kogas Corporation, were not spared in the carnage, registering huge plunges in stock prices, revenue and profitability.

Crucially, the long-standing status quo in the international market equilibrium, regardless of power dynamics and wealth transfer between producing and consuming countries has been upset. Under the new rules of the game, any subsidies by the Organisation of Petroleum Exporting Countries (OPEC) will simply be doubly increasing support by the market state producers. Swiber's fragile and weakened ability to influence the price through its own production swings has forced its hand into keeping output high in order to protect market share against the low-cost disruption. It's a case of "if you can't beat them, join them".

This supply glut is causing deep budget deficits and hurting economic growth in major oil-dependent economies, especially in the Middle East, Central Asia, Africa, and East Europe, while giving a welcome relief to importing countries facing the prospect of oil glut and growth.

A Bank of America Merrill Lynch analyst estimates that a sustained price plunge "will push back US\$1

trillion (104 trillion) a year from oil producers to global consumers, setting the stage for one of the largest transfers of wealth in human history". If this persists, many petro-states will be forced to curb public spending and social welfare, risking the risks of civil unrest and internal strife.

The implications on international relations are not inconceivable. Within merely a few years, the prospect of landscape in the Middle East has been redrawn. Last year, the US-owned Saudi Arabia as the world's largest oil producer, its output grew by an incredible 18 per cent from 5.1 million barrels per day in January 2009 to 8.1 million bpd in April last year, with fracking now accounting for half of its output.

Against this backdrop, the prospect of a post-US Middle East is hardly surprising and almost inevitable. It is not difficult to look, at least indirectly, the current affairs in the region to the strategic withdrawal of the US. The protracted Syrian civil war, the aggressive rise of the Islamic State in Iraq and Syria, the mounting disintegration of Iraq, the heightened sectarian clashes and the shock absorption of Iran back into the global system have played the region in the last few years.

What fracking has done to oil and gas, and to Middle East geopolitics, is merely one example of the widespread effects and game-changing nature of certain disruptive technologies. In the 21st

century, technology has become the ultimate game changer; whereas it keeps forward, seismic effects can be felt across the political, business, economic and social dimensions, often with unintended consequences.

Within the next decade or so, I expect intelligent technologies to reshape the entire domestic effect on businesses, industries and economies, but not an immediate epic proportion and disruptive scope. Just ahead of us is a "Cambridge explosion" of intelligent new life forms, from robo-advisors, chatbots, medical diagnostics, emotion recognition systems, self-driving vehicles, drones, autonomous news writers, smart delivery drones, digital science researchers and law enforcement robots, to sports like personal assistants. Imagine the disruptive effect of these can perform the same work of humans at 10 per cent, 20 per cent, 5 per cent and eventually 1 per cent of the cost.

These intelligent technologies will be a cheaper, and eventually better performing, substitute to human resources. They threaten to disrupt trillion-dollar industries (such as manufacturing, transportation, logistics, finance, agriculture, healthcare, defence, entertainment and education) and modernise them into hyper-lean, ultra-intelligent versions of the old.

The disruption of energy resources is in full swing. Be warned that the disruption of human resources is next and this time, few businesses, industries and countries will be spared.

\* The writer is a business futurist and former public diplomat. He is the founding president of The Innovators Institute, an innovation company based in Singapore.

# Future Shock Now!

Friday, Oct 24, 2014

## THE STRAITS TIMES / Opinion

With technology disrupting one industry after another, small and medium-sized enterprises must change, says an innovation expert.

### SMEs at risk of losing out in high-stakes Innovation Wars

By CHARLIE AND YING LEONG  
FOR THE STRAITS TIMES

**I**RNING into the prospect of small and medium-sized enterprises (SMEs) across the world and across industries becoming collateral damage in the Innovation Wars is, to put it more mildly, Global Innovation for Dummies.

SMEs are helplessly squeezed between technology start-ups and global corporations in this battle. The stakes are high because the digital world follows "the winner takes all" economics.

Analysts both optimists and pessimists across continents feel united by common visions, are driving the worldwide start-up movement that is fundamentally an insubstantial creation of the late 20th-century first stage in the industrial revolution, and disrupting one industry after another.

Successful home-grown is mainly in content-driven industries, for instance, shopping malls, books, photography, travel, movies and advertising, have established the start-up economy and its incentives to pursue ever bigger ambitions.

The battle has barely started, not in the way that the digital disruption are the more traditional and creative industries of education, health care, telecommunications, tourism, entertainment, transport, finance, infrastructure, defence, and more.

Tech giants, such as Apple, Google and Amazon, who were start-ups themselves and too big

to have little respect for industry and geographic boundaries, are leading the charge for an all-out war on traditional businesses.

Mr Marc Andreessen, a widely respected venture capitalist, says: "Competition in every industry used to assume that a software revolution is coming."

Over the next 10 years, the battles between incumbents and well-served incumbents will be epic.

As predicted by Microsoft on Reader 10, sales in 2014 and recently asked by IBM, Bank of America, JPMorgan Chase, people will still need banking in the future but they will not need banks. In the same way, the world will still need education, retailing and manufacturing in the future but not the schools, retailers and manufacturers in the form we are familiar with today.

Marketed by a disruptive entrepreneurial ecosystem, start-ups in Singapore are also disrupting the status quo.

Business history is a common thread in the business ecosystem, including education, healthcare, retail, travel, tourism, shopping services, and telecommunications. Successful business models are being disrupted by new disruptive models through the use of technology-powered business models that offer more than to be better, cheaper and faster than existing competitors.

Now, global corporations are fighting back on multiple fronts.

Their strategies include building extensive and risk-taking culture in the organisations; adopting lean start-up practices; harnessing "crowd power" through open innovation; establishing global innovation centres; and starting venture funds with accelerators to incubate, nurture and invest in disruptive start-ups.

In recent years, local corporate powerhouses, including DBS, Singtel, MNC Corp, Singapore Press Holdings, Sphera and SingPost, have been undergoing digital transformation, and adopting some of these disruptive strategies.

The software, digital consulting and telecommunications in Singapore are also disrupting the status quo.

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that to become larger to compete on scale, or smaller to compete on speed.

Similarly in Singapore, the ability of local SMEs to exploit it, at least, without this intensifying technological revolution, will be crucial.

In the foreseeable future, how will smaller retailers survive the escalating retailing war between e-commerce players such as Amazon, Alibaba, Qoo10, Lazada and the likes of Farfetch, Farfetch and Farfetch? How will private education providers continue to attract fee-paying students when online education platforms offer accredited programmes from top universities at a small fraction of conventional prices? As for providers of labour-intensive business services such as recruitment, research, translation, content review, support, marketing and accounting, how will they

continue to compete with agencies powered by integrated algorithms and connected networks and the "cloud"?

How will traditional fast-moving logistics, delivery and courier companies compete against peer-to-peer platforms that seamlessly connect customers and independent drivers?

I anticipate that, within the next five years, the six platform technologies of cloud computing, robotics, 3D manufacturing, Internet of Things, big data and smart algorithms will reach tipping point. This will create the perfect storm for innovation, new "digital blue oceans" and an extension of retail business models. McKinsey Global Institute estimates that between 2013/14 to 2022, a total of \$1.1 trillion of economic value will be created annually by 2025 as a result of disruptive technologies such as advanced re-

tailors, next-generation generators and new energy storage devices.

Wal-Mart chief executive Doug McMillon says: "Five years ago, Wal-Mart was a retail company. Today, we are a technology company." His prediction is that some of the ideas that occurred in the future will be those which position themselves as technology-first companies. Hence, I expect SMEs to start their innovation engines, imagine their existing business and capabilities, then generate disruptive technologies. The alternative is to become collateral damage in the conflict between the future and the present.

[singaporehigh.com.sg](http://singaporehigh.com.sg)  
The author, a former trade diplomat, is the founding president of The Innovation Institute, an innovation company, and co-founder of The Innovation Network, an open networking platform which inspires innovation. Both are based in Singapore.

## The Fourth Industrial Revolution: what it means, how to respond



*"We are at the beginning of a revolution that is fundamentally changing the way we live, work, and relate to one another. In its scale, scope and complexity, what I consider to be the fourth industrial revolution is unlike anything humankind has experienced before. We are witnessing profound shifts across all industries, marked by the emergence of new business models, the disruption of incumbents and the reshaping of production, consumption, transportation and delivery systems."*

**Professor Klaus Schwab, Founder and Chairman World Economic Forum and Author of The Fourth Industrial Revolution**

# 2016 WAS YEAR OF 4<sup>TH</sup> INDUSTRIAL REVOLUTION!



**EVERYTHING 4.0**

# TECHNOLOGY 4.0

ECONOMY 4.0

WORK 4.0

SOCIETY 4.0

TALENT 4.0

BUSINESS 4.0

POLITICS 4.0

LIFE 4.0

INDUSTRY 4.0

EDUCATION 4.0

TRADE 4.0

YOUR INDUSTRY 4.0?

YOUR PROFESSION 4.0?

# **DISRUPTIVE TECHS**

# **INTERNET OF THINGS**

***“Fusion of Physical, Digital  
and Virtual Worlds”***



# Disruptive Techs

## Internet of Things

- **Internet operating system that fuses physical, digital and virtual domains**
- **Connecting sensors, things, wearables, appliances, vehicles, robots, machines, systems & environments**

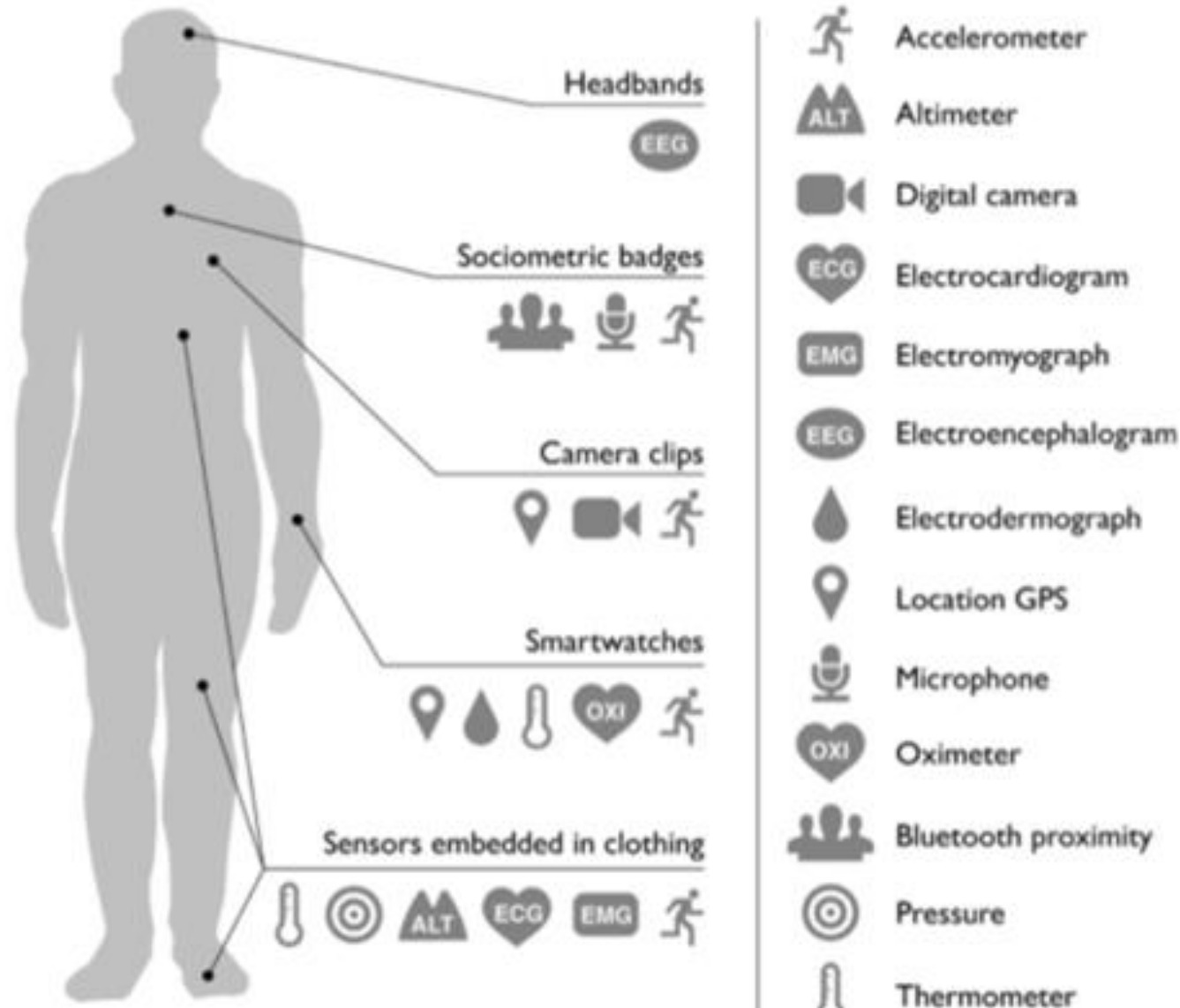
# Disruptive Techs

## Internet of Things



# Disruptive Techs

## Internet of Things



# Introduction from Government – Thailand 4.0



PLATFORM  
**INDUSTRIE 4.0**

**RETAIL 4.0**

**BANKING 4.0**

**HEALTH CARE 4.0**

**SMART GRID 4.0**

**WATER 4.0**

# Introduction from Government – Thailand 4.0





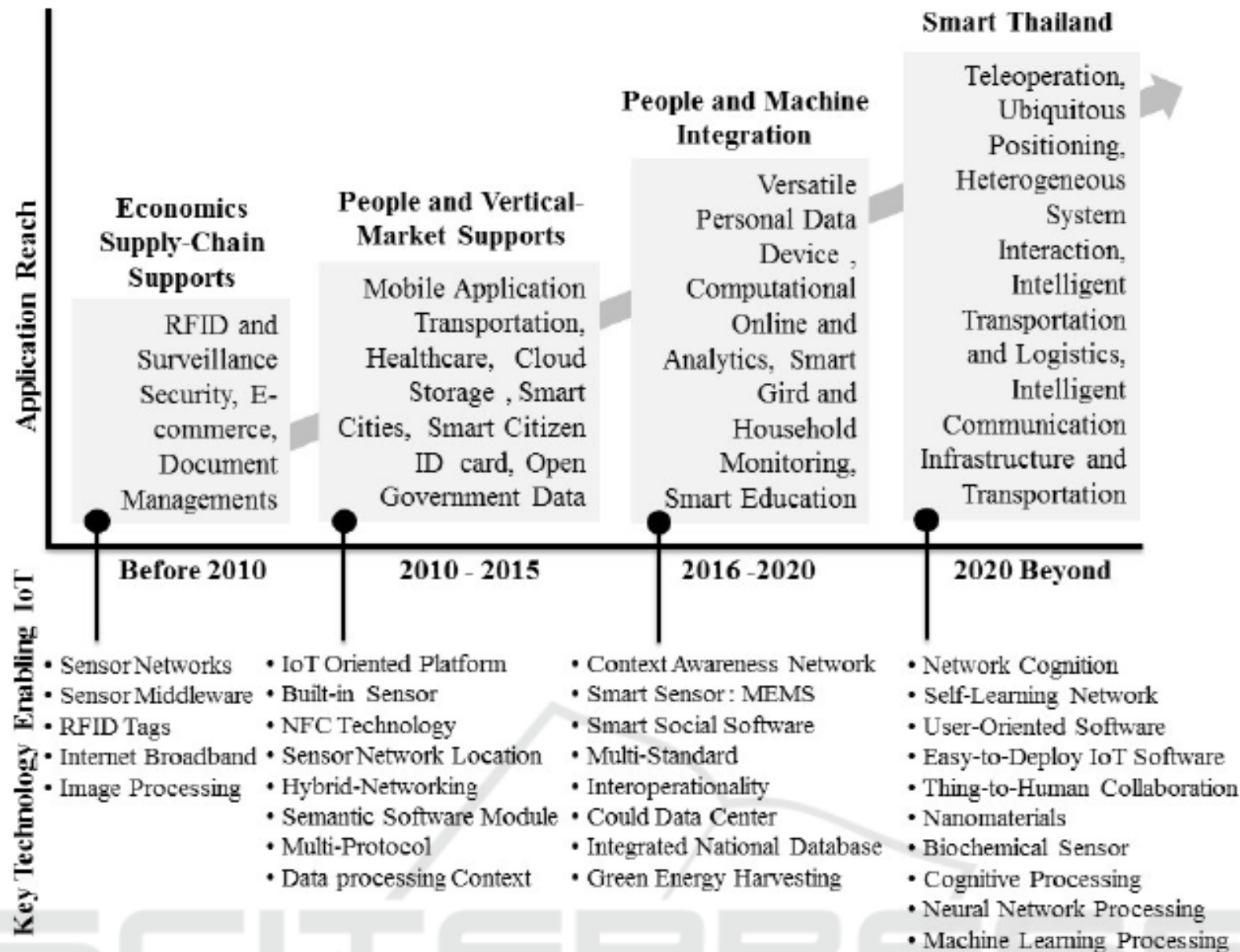


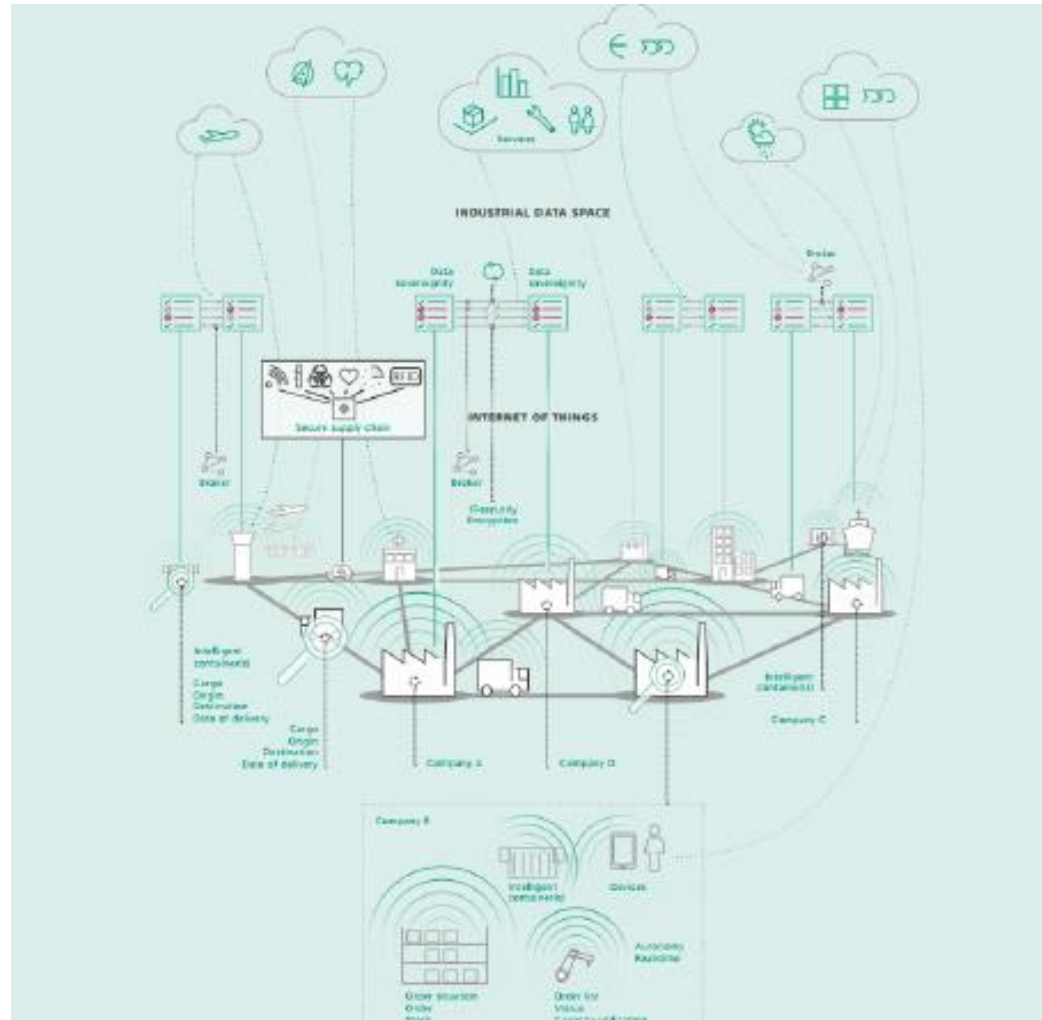
Figure 2: The proposed roadmap of IoT towards smart Thailand in 2020.

# Cycling of IoT for SMART Industries

**Business:**  
Model & Ideas  
To Launch in  
Market

**Product:**  
Or Services  
To Market

**Profit:**  
For  
Investment



**Skill:**  
Resource/  
Team  
Developers

**Platform:**  
IoT App.

**Technology:**  
IoT Devices

# M2M

Machine to machine communication.



Machines



Maintenance



Point to point



Support and updates



Hardware based

# IOT

Internet of things



Things (sensors)



Integration / systems



Cloud (HTTP)

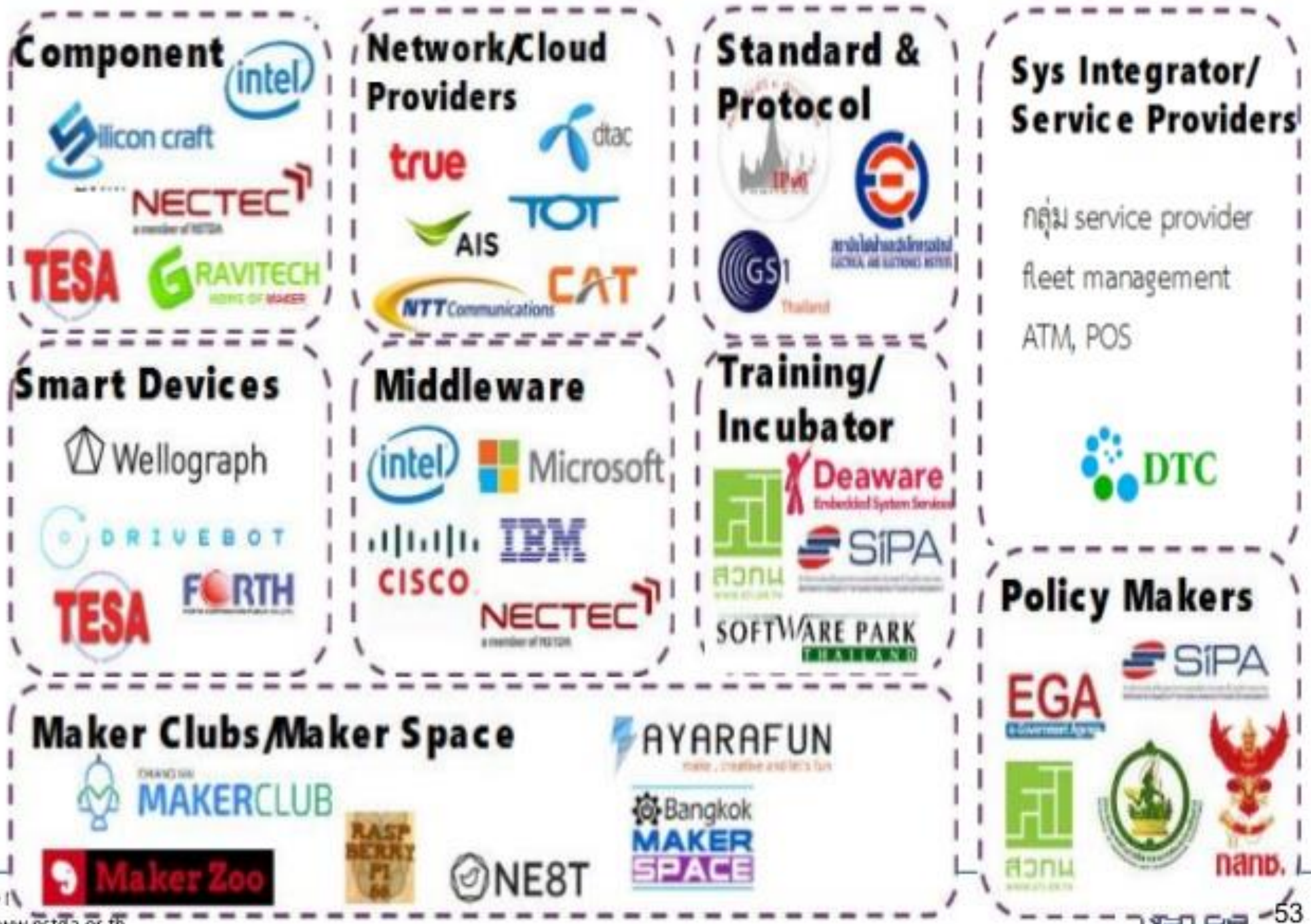


Big data



Software based





# THANK YOU