Internet of Things & Its Implication on Knowledge Management

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Areopagus Network Meeting
Jakarta Design Centre
Jakarta, 21 Oktober 2018

Know Who

Dr. Ir. Paul Lumbantobing, M.Eng

Kel.
dr. Sarah Siagian
Felicia, Michael & Calvin

Education

- S1 Teknik Elektro Universitas Sumatera Utara, Medan
- S2 Engineering University of Technology Sydney
- Mini MBA, INSEAD
- S3 Management Science Universitas Padjadjaran, Bandung

Training

- TAC-3 Siemens, Munich, Germany
- Product Development, AT&T, Chicago, USA
- Systems Engineering, Lucent Technology, Singapore
- Contributor in European Conference on Intellectual Capital
- Advanced Leadership Training Pusdikhub TNIAD

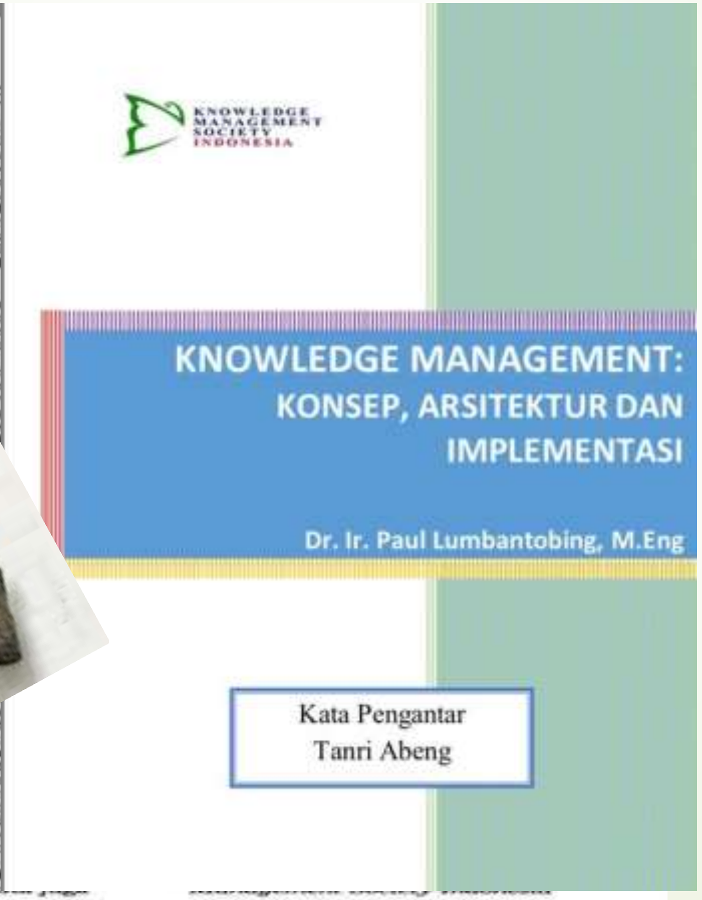
Organisasi

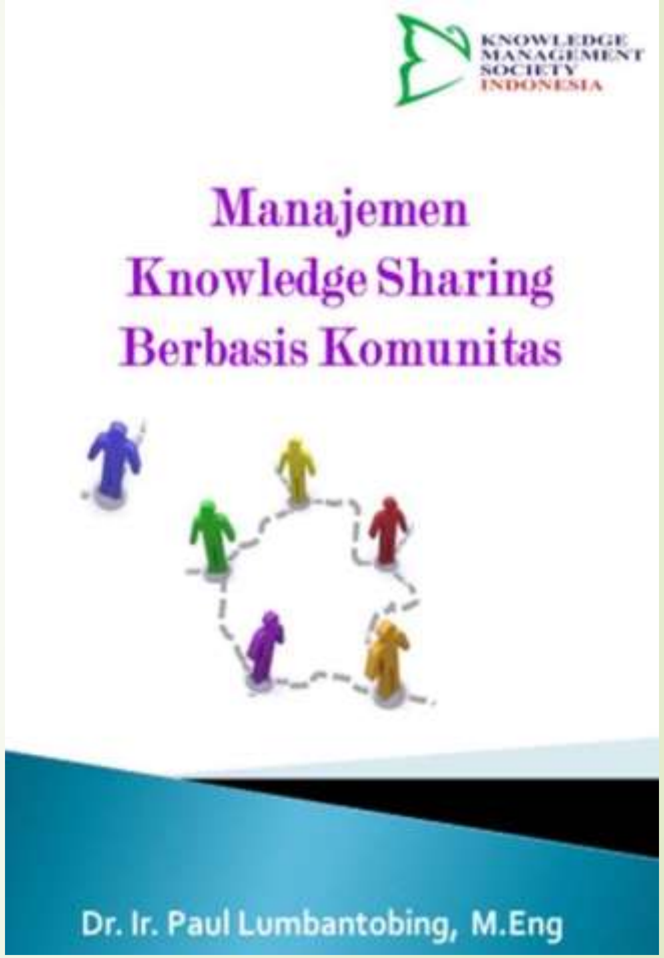
2016 – Now	Ketua Alumni SMPN1 77 Tarutung
2010 – 2011	Pengurus YPPAK
2006 – Now	Knowledge Management Society, Co-Founder
2007 – 2009	Serikat Karyawan Telkom, KABID LITBANG DPD

Job Assignment

1988 – 1992	Dosen (USU & Telkom University)
1992 – 1993	TAC -3 Program
1993 – 2004	Staf sd Manager di Telkom
2004 – 2011	Senior Officer KM Systems Development
2011 – 2016	Vice President (Aset, Perf, IPO etc) Mitratel
2016 – Present	**Direktur PT Sukses Daya Mitra/Direktur Komitel/Komisaris PT. Infrako**

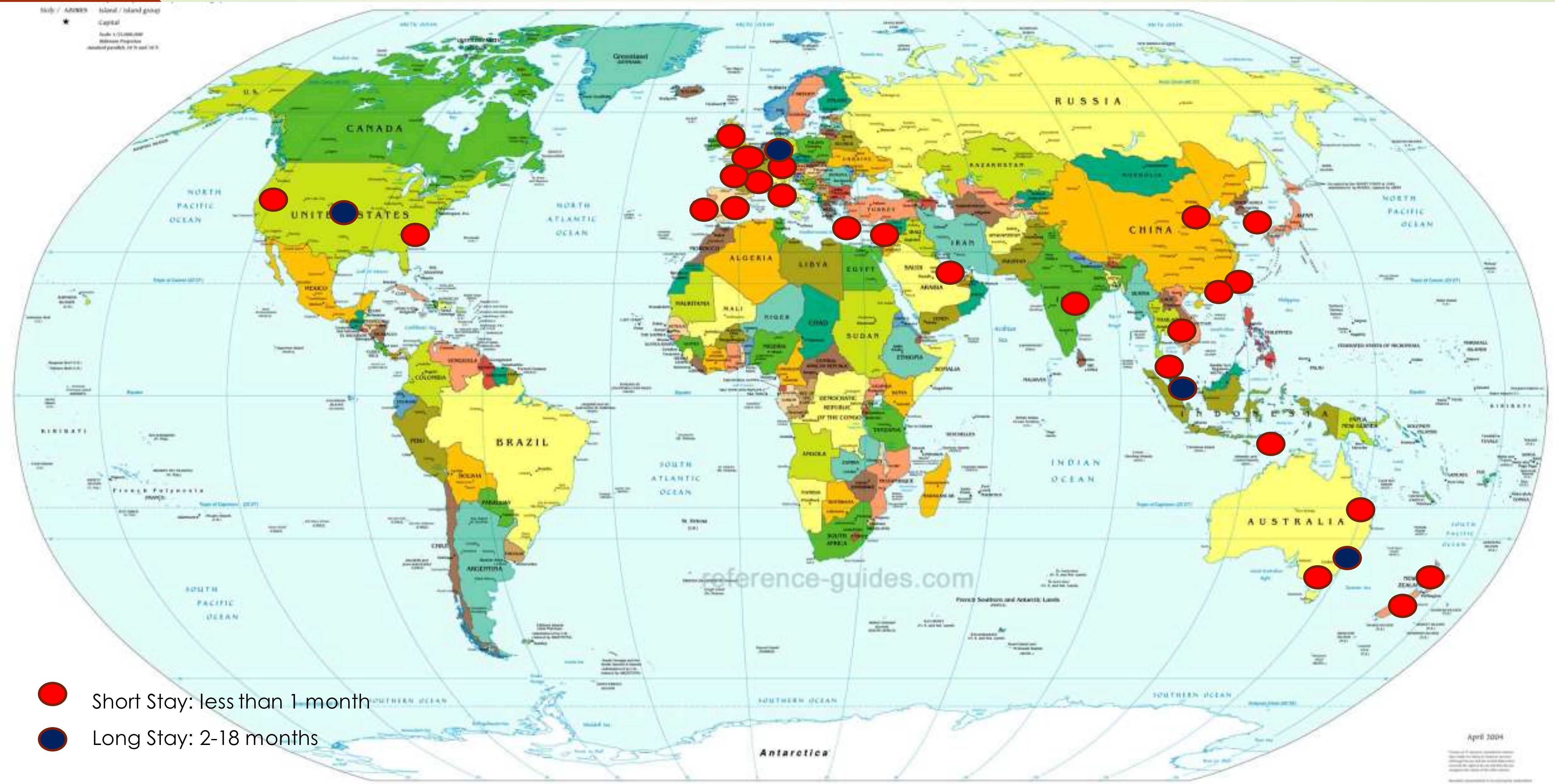
Publikasi





Puluhan artikel, opini, buku dll, yang tersebar di berbagai media (Kompas, Inspire, Pikiran Rakyat dll)

Global Exposure



Short Stay: less than 1 month

Long Stay: 2-18 months

Agenda

- Introduction to Knowledge Management (KM)
- IoT and Digitalization
- Implication on KM

Introduction to KM

- What is Knowledge
- KM Definition
- KM Imperatives
- KM Processes (SECI)

Konsep KM: Knowledge

- Knowledge:
  - Knowledge is power (Sir Francis Bacon) → knowledge hoarding
  - Knowledge sharing multiplies power (Paul Lumbantobing) -→ knowledge sharing
  - Knowledge is actionable information (Drucker)
  - DIKW: Data-Informasi-Knowledge-Wisdom

- Characteristics of knowledge:
  - Using knowledge does not consume it.
  - Transferring knowledge does not result in losing it.
  - Knowledge is abundant, but the ability to use it is scarce.
  - Much of an organization's valuable knowledge walks out the door at the end of the day.

Konsep KM: Knowledge Definition

"Knowledge is information that changes something or somebody — either by becoming **grounds for action**, or by making an individual (or an institution) **capable of different or more effective action**." — Peter F. Drucker, in: The New Realities

"Justified belief that increases an entity's capacity for **effective action**." — Ikujiro Nonaka, Organization Science 5(1):14-37 (1994).

"I define knowledge as a **capacity to act**."

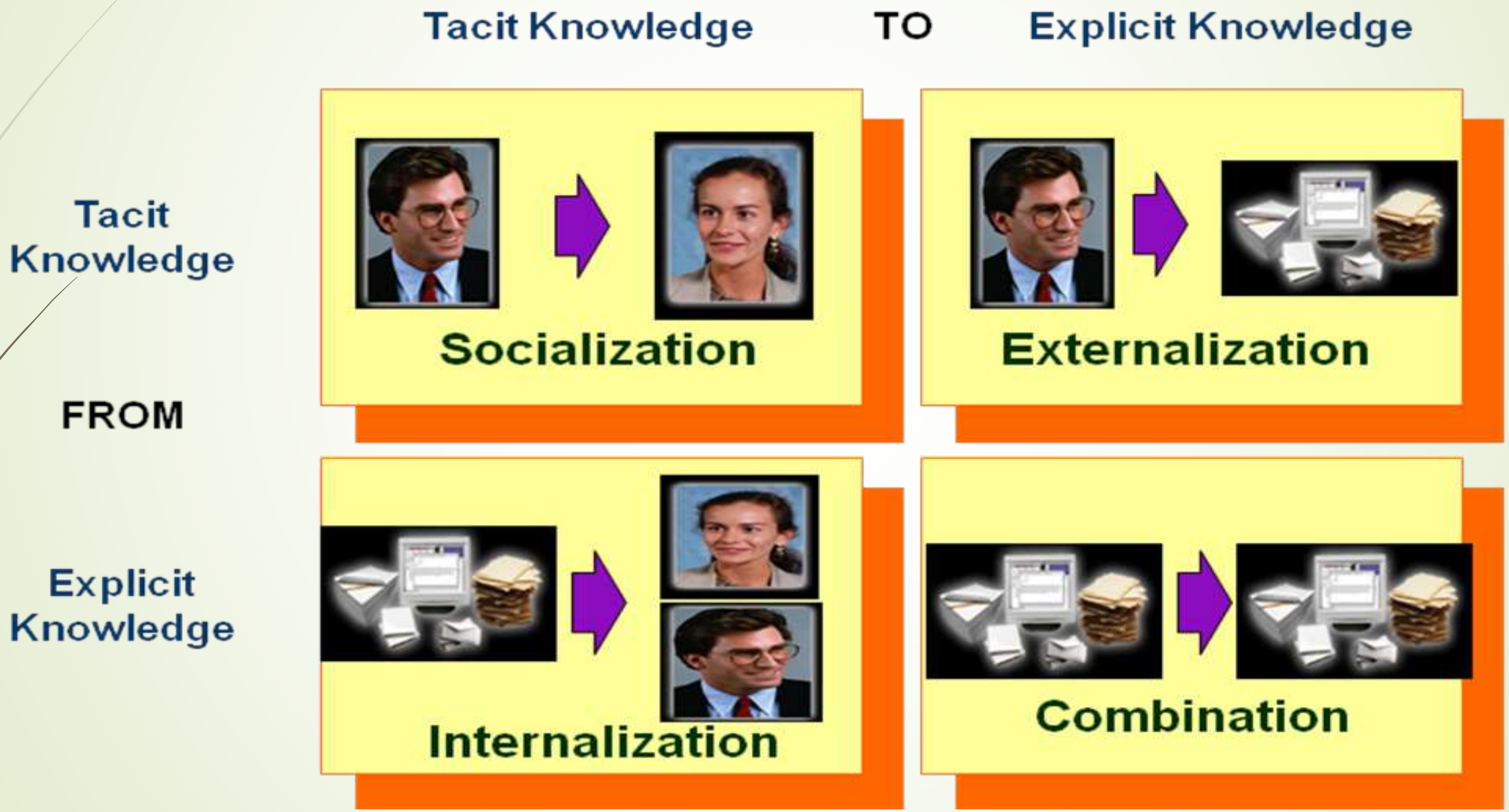
— Karl-Erik Sveiby, in "The New Organizational Wealth: Managing & Measuring Knowledge-Based Assets", 1997

Konsep KM: Type of Knowledge (3)

- ***Tacit Knowledge***
  - Melekat di dalam pikiran individu
  - Merupakan satu keluaran dari masyarakat sosial, baik individu maupun kelompok
  - Merupakan *know-how* individu dan konteksnya ditambah melalui pengalaman dan interaksi.
  - Contoh : Personal Skills, Beliefs, Values, Ideas, Creativity, Insight, Innovation.

- ***Explicit Knowledge***
  - Mudah di-*share* sesudah dikodifikasi dan disimpan di dalam KM storage, menjadikannya dapat diakses oleh semua orang
  - Terstruktur dan memuat item-item seperti: kebijakan, prosedur, paten, *trademarks*, penelitian dan *trade skills*
  - Ditemukan di dalam proses atau rutin yang mengikuti beberapa set *logical guidelines* yang ditetapkan sebelumnya.

Knowledge Conversion (SECI)



Nonaka dan Takeuchi (1995)

A workable Definition of KM

Knowledge Management **as "the systematic use of people, processes, and technology to capture and share know-how" Liebowitz 2012**

Knowledge Management refers to all systematic activities for creation and sharing of knowledge so that knowledge can be used **for the success of the organization**. (Siemens AG)

Knowledge Management **adalah pengelolaan knowledge perusahaan dalam menciptakan nilai bisnis dan dalam menghasilkan keunggulan kompetitif yang berkesinambungan dengan mengoptimalkan proses penciptaan atau akuisisi, *sharing* dan utilisasi knowledge yang dibutuhkan.** (Telkom)

KM Imperatives

- **Threats of employee attrition**
- **Ensure that today's 'Core Competencies' do not become 'Core Rigidities' of tomorrow**
- **Survival strategy**
- **Competitive advantage**
- **Creating wealth by leveraging invisible capital, mainly organizational knowledge**
- **Asset perusahaan terpenting adalah *intellectual/ knowledge*.**
- **Tingkat intensitas kompetisi yang semakin tinggi menuntut kolaborasi antar fungsi dan antar disiplin knowledge.**
- **Perubahan paradigma dari *Skill Worker* menuju *Knowledge Worker dan Creative Worker*.**
- **Membantu Inovasi yg terkait dengan:**
  - Product and Service Design and Development
  - Customer Management
  - Employee Management and Development
  - Business Planning

Model KM: MAKE Framework

Value

KM in Business Reality

KM Activities

Foundation of Knowledge Base Organization

Based on MAKE Framework Teleos

Telkom Knowledge Management Practices (*Process*)

Telkom Indonesia
the world in your hand

	Knowledge Acquisition	Knowledge Refinement	Knowledge Sharing	Knowlege Utilization	Knowledge Evaluation
Objective	**Knowledge based on Competence**	**Knowledge codified & standardized**	**Knowledge is actively shared**	**Knowledge based Enterprise**	**Knowledge should evaluated**
Activity	▪ Knowledge need Inventory ▪ Knowledge source identification ▪ Knowledge Searching and Collecting ▪ Business Case Study	▪ Knowledge is filtered and synthesized ▪ Explicit knowledge is formatted, evaluated, and selected	▪ Silaturahmi Patriot 135 ▪ Community of Practice ▪ Employee Contribution ▪ Leader as Father ▪ Knowledge Day , DSH, IL@W	▪ Innovation ▪ Solution Based Learning ▪ Collaborative Problem-Solving ▪ Decision Making ▪ Knowledge Re-Use ▪ Customer Knowledge	▪ Feedback to Content and process ▪ Continous Improvement ▪ Lesson Learnt
Result	**Knowledge Repository**	**Relevant quality content**	**Knowledge Dissemination**	**People guided by knowledge**	**Quality Assured Knowledge**

Digital & IoT:

- **Multiple aspects of digital**
- **DiSRuptive World**
- **IoT**
- **Smart Connected Products**

Multiple aspects of digital

Asia Pacific Digital General Manager GE Power ... Gonzales, CEO Dattabot Regi Wahyu, Country Manager Intel ... Technology and Engineering PT Pembangkitan Jawa Bali Teguh Widjajanto (kiri ke kanan) menjadi pembicara dalam diskusi yang diadakan GE bekerja sama dengan Kamar Dagang dan Industri (Kadin) Indonesia di Ritz Carlton Pasific Place, Jakarta, Rabu (21/9). Acara tersebut bertajuk "The Future of Electricity Conference".

Indonesia Perlu Solusi Digital

Program Listrik 35.000 Megawatt Harus Didukung Teknologi

JAKARTA, KOMPAS — Indonesia membutuhkan solusi digital di sektor ketenagalistrikan terkait program 35.000 megawatt. Solusi digital dipandang mampu menciptakan efisiensi, penghematan biaya, dan memperluas keterjangkauan akses listrik bagi masyarakat di Indonesia.

Demikian mengemuka dalam diskusi bertajuk "The Future of Electricity Conference" yang diselenggarakan General Electric (GE), Rabu (21/9), di Jakarta. Sebagai narasumber adalah Asia Pacific Digital Manager GE Power Luis Sanchez Gonzales, CEO Dattabot Regi Wahyu, Country Manager Intel Indonesia Harry K Nugraha, dan Head of Technology and Engineering PT Pembangkitan Jawa Bali Teguh Widjajanto. Adapun sebagai pembicara kunci adalah Presiden and CEO of GE Power Steve Bolze, CEO GE Indonesia Handry Satriago, serta Ketua Umum Kamar Dagang dan Industri (Kadin) Indonesia Rosan Roeslani.

Menurut Steve, program pemerintah Indonesia membangun pembangkit berkapasitas 35.000 MW tidak bisa dipisahkan dengan pemanfaatan teknologi di sektor tersebut. Ia mengatakan, teknologi memegang peranan ... an. Dengan program tersebut, Indonesia berpeluang menjadi model penerapan teknologi mutakhir sektor ketenagalistrikan.

"Teknologi mampu menciptakan efisiensi, keandalan sistem, dan tentu saja penghematan. Apalagi, perkembangan teknologi semakin pesat," kata Steve.

Indonesia memiliki sumber tenaga pembangkit yang beragam, seperti batubara, gas, atau energi terbarukan. Semua sumber pembangkit tersebut, kata Steve, menuntut pemakaian teknologi mutakhir agar tujuan efisiensi dan penghematan bisa tercapai. Pada mesin tenaga uap, misalnya, saat ini sudah ada teknologi tinggi untuk menurunkan emisi gas buang dari pembakaran batubara.

"Begitu pula dengan teknologi pada turbin gas atau pembangkit untuk energi terbarukan. Sudah ada teknologi hibrida yang bisa menggabungkan berbagai jenis ...

Senada dengan Steve, Regi berpendapat, teknologi kecerdasan buatan (*artificial intelligence*) sangat dibutuhkan hampir di semua sektor, seperti telekomunikasi, pertanian, perbankan, termasuk untuk urusan cuaca. Menurut dia, sudah banyak perusahaan di Indonesia yang memanfaatkan layanan pengolahan *big data*.

"Melalui pengolahan data yang sudah dikumpulkan, keputusan penting dalam industri atau instansi bisa diambil berdasar data yang ada," kata Regi.

Teknologi

Di sektor pembangkitan listrik, Teguh mengatakan, perusahaannya sudah memanfaatkan teknologi pintar untuk mengelola pembangkit-pembangkit di bawah PT Pembangkitan Jawa Bali (PJB) yang merupakan anak usaha PT Perusahaan Listrik Negara (Persero). Teknologi yang diterapkan di PJB adalah memantau secara langsung (*real time*) kondisi mesin pembangkit yang tersebar di 34 lokasi di Indonesia yang dikelola PJB.

"Jadi, kami tak perlu mengirim teknisi kami untuk memeriksa kondisi pembangkit-pembangkit yang tersebar di seluruh Indonesia itu. Kondisi pembangkit itu cukup dikontrol dan dipantau di satu lokasi," ujar Teguh.

Namun, kata Teguh, penerapan teknologi itu bukan tanpa kendala. Menurut dia, akses internet di Indonesia yang belum stabil terkadang menyebabkan informasi secara langsung daring terputus. Jika demikian, lanjut dia, semua informasi yang sudah disampaikan menjadi hilang atau terhapus.

Terkait dengan teknologi di atas, GE memiliki proyek teknologi yang mereka namai Predix. Teknologi tersebut adalah sistem digitalisasi pada pembangkit listrik. Predix mampu memprediksi kerusakan mesin pembangkit dan menghubungkan antarperangkat secara langsung. Dengan demikian, operator bisa mengoperasikan alat-alat mereka dalam perangkat bergerak (gawai) tanpa harus terus-menerus berada di ruang kontrol. (APO)

KOMPAS

S, JUMAT, 23 SEPTEMBER 2016

Masa Depan Demokrasi Digital Indonesia

Oleh WASISTO RAHARJO JATI

an semangat agitasi, emosi, dan afeksi publik dalam menilai dan mengkaji suatu permasalahan kontemporer. Dari situlah sebenarnya terjadi anomali dalam memahami rasionalitas kelas menengah *netizen* hari ini. Alih-alih bersikap rasional dalam menyikapi isu, *netizen* kita justru bersikap delusional yang secara instan dan emosional melihat permasalahan.

Implikasinya, pemetaan masalah dipola dan diselesaikan secara asimetris karena menganggap

ENERGI

Digitalisasi Listrik

KOMPAS

Ekspansionisme Digital Vs Proteksionisme Digital

Oleh AGUS SUDIBYO

nomi, dan—pada gilirannya—kedaulatan politik. Mereka merasa hanya dimanfaatkan sebagai obyek lanskap komunikasi informasi global yang secara bisnis dan politis didominasi AS.

Tiongkok dengan keras menolak kedatangan Google dan berhasil mengembangkan mesin pencari dan *e-commerce* sendiri: Baido, Alibaba, dan Tencent. Rusia, Perancis, Jerman, Italia, Spanyol, Belanda, Belgia, Brasil, dan India juga mengambil lang-

ternet yang sangat besar jelas amat menggiurkan bagi raksasa teknologi digital. Dengan keunggulan komparatif itu, apa yang dapat kita raih? Posisi tawar seperti apa yang hendak kita tegakkan?

Bukan perkara mudah

Pengalaman Eropa menunjukkan bahwa menerapkan pajak untuk korporasi digital bukan perkara mudah. Ketika mode beriklan beralih ke mode digital, siapa yang ber-

16 SOSOK

Sauvage, Stoddart, Feringa

Mesin Kecil untuk Perubahan Besar

JEAN-PIERRE SAUVAGE

- ◆ Lahir: Paris, Perancis, 1944
- ◆ Pekerjaan:
  - Profesor Emeritus Universitas Strasbourg, Perancis
  - Direktur Riset Emeritus Pusat Riset Ilmiah Nasional Perancis (CNRS)

SIR J FRASER STODDART

- ◆ Lahir: Edinburgh, Inggris, 1942
- ◆ Pekerjaan:
  - Profesor Kimia Universitas Northwestern, Evanston, Illinois, Amerika Serikat
  - Direktur Pusat Integrasi Sistem Kimia (CCIS)

BERNARD L FERINGA

- ◆ Lahir: Barger-Compascuum, Belanda, 1951
- ◆ Pekerjaan:
  - Profesor Kimia Organik Universitas Groningen, Belanda
  - Anggota Dewan Akademik Akademi Ilmu Pengetahuan dan Seni Kerajaan Belanda

ritus di Universitas Strasbourg, Perancis, dan Bernard L Feringa, profesor kimia organik di Universitas Groningen, Belanda. Mereka bekerja bersama sangat erat.

Feringa, yang dihubungi Komite Nobel secara terpisah, mengakui itu. Para pemenang Nobel bersama itu sudah menjadi keluarga ilmiah. Mes-

Gambaran tentang mesin molekuler itu mirip mesin yang kita kenal sehari-hari. Ada penggunaan rantai mekanik, motor, lift, dan robot. Namun, semuanya dalam dimensi molekul yang merupakan kumpulan atom yang terikat secara kimia.

Gagasan tentang mesin molekuler itu dimulai Sauvage pada 1983.

bangkan Stoddart pada 1991. Dia berhasil merangkai cincin molekuler yang miskin elektron pada sebuah gandar atau sumbu molekuler yang kaya elektron. Saat cincin molekuler itu diberi tambahan energi panas, cincin itu mampu bergerak maju mundur sepanjang sumbu.

Desain cincin molekuler yang bisa bergerak sepanjang sumbu molekuler

OLEH M ZAID WAHYUDI

Komite Nobel Kimia 2016 Akademi Ilmu Pengetahuan Kerajaan Swedia (RSAS) menganugerahkan hadiah itu atas temuan desain dan sintesis mesin molekuler, mesin terkecil di dunia berukuran lebih kecil daripada sehelai rambut dibelah 1.000.

Penelitian di bidang ilmu dasar itu dinilai memicu kemunculan berbagai inovasi baru, mulai dari pengembangan material baru, sensor, sistem penyimpanan energi, cip komputer, hingga robot molekuler yang mampu melepaskan zat aktif obat pada waktu dan tempat yang diinginkan.

Sukacita langsung menyebar ke sejumlah negara seusai tim RSAS

Yang masih tertinggal...hospitality, creative, synthesa

ATI NURANI RAKYAT

Sejumlah Profesi Terancam Hilang

Kecerdasan Buatan Belum Masuk Kurikulum PT

JAKARTA, KOMPAS — Sejumlah profesi dan pekerjaan diperkirakan akan hilang karena digantikan oleh produk-produk kecerdasan buatan. Pekerjaan yang akan terkena terlebih dahulu adalah pekerjaan yang dilakukan berulang. Karena itu, pebisnis perlu melakukan adaptasi.

Ketua Dewan Kerja Siemens AG Düsseldorf Jerman Mimon Uhamou di Jakarta, pekan lalu, di sela-sela seminar Labour 4.0: "Ekonomi Digital dan Implikasinya terhadap Ketenagakerjaan", serta CEO Bahaso Tyovan Ari Widadgo dan CEO Daily Social Rama Mamuaya di Jakarta, Selasa (2/5), mengatakan, implikasi penggunaan kecerdasan buatan yang masif akan mengurangi sejumlah tenaga kerja dan mengancam sejumlah profesi.

Uhamou menuturkan, revolusi industri 4.0, lanjutan dari revolusi industri sebelumnya, menuntut operasi pabrik yang cerdas (*smart factory*), pelayanan cerdas (*smart service*), dan produk inovatif. Setidaknya ada 15 profesi yang paling terkena dampak terhadap revolusi industri 4.0, antara lain operator mesin, perencana teknik, dan operator pemeliharaan.

Tyovan juga mengingatkan, beberapa profesi akan lenyap ketika kecerdasan buatan makin masif digunakan, seperti akuntan dan operator pabrik, hingga beberapa jenis pakar yang akan digantikan dengan sistem pakar dalam kecerdasan buatan.

"Beberapa pekerjaan dokter dan wartawan mulai dikerjakan oleh sistem kecerdasan buatan. digantikan sistem dengan kecerdasan buatan," katanya.

Forum Ekonomi Dunia (WEF) mengingatkan kemungkinan pengurangan jumlah tenaga kerja 5 juta orang sebelum 2020 sebagai dampak otomatisasi di dunia industri. Meski demikian, ekonomi baru ini akan melahirkan lapangan pekerjaan untuk 2,1 juta orang dengan syarat memiliki penguasaan teknologi yang tinggi.

Rama Mamuaya mengemukakan, fungsi tugas yang berulang akan digantikan oleh kecerdasan buatan melalui otomatisasi. "Posisi apa pun bisa terancam. Beberapa pekerjaan malah mulai dikurangi," katanya.

Sementara itu, Direktur Pinjam.co.id Teguh B Ariwibowo mengatakan, saat ini tenaga manusia sebagai penaksir harga barang masih diperlukan di salah satu produknya, yaitu gadai dalam jaringan. Akan tetapi, ke depan taksiran akan mengandalkan kecerdasan buatan.

"Kami masih mengembangkan algoritma agar taksiran harga barang oleh tenaga penaksir kami, taksiran daring, dan nilai sesungguhnya tidak terlalu jauh bedanya," kata Teguh.

Data yang dihimpun dan diolah tersebut bisa menjadi patokan bagi mitra usaha dalam melaksanakan kegiatan gadai daring dan peminjaman dana.

Kunci di pendidikan

Uhamou menuturkan, menghadapi semua itu, perusahaannya memilih beradaptasi terhadap perubahan tersebut. Transformasi mulai dilakukan agar bisnis perusahaan tetap berjalan. Salah satu langkah yang diambil Siemens adalah mendirikan pusat pelatihan vokasi untuk meningkatkan keterampilan sumber daya manusia.

(Bersambung ke hal 15 kol 5-7)

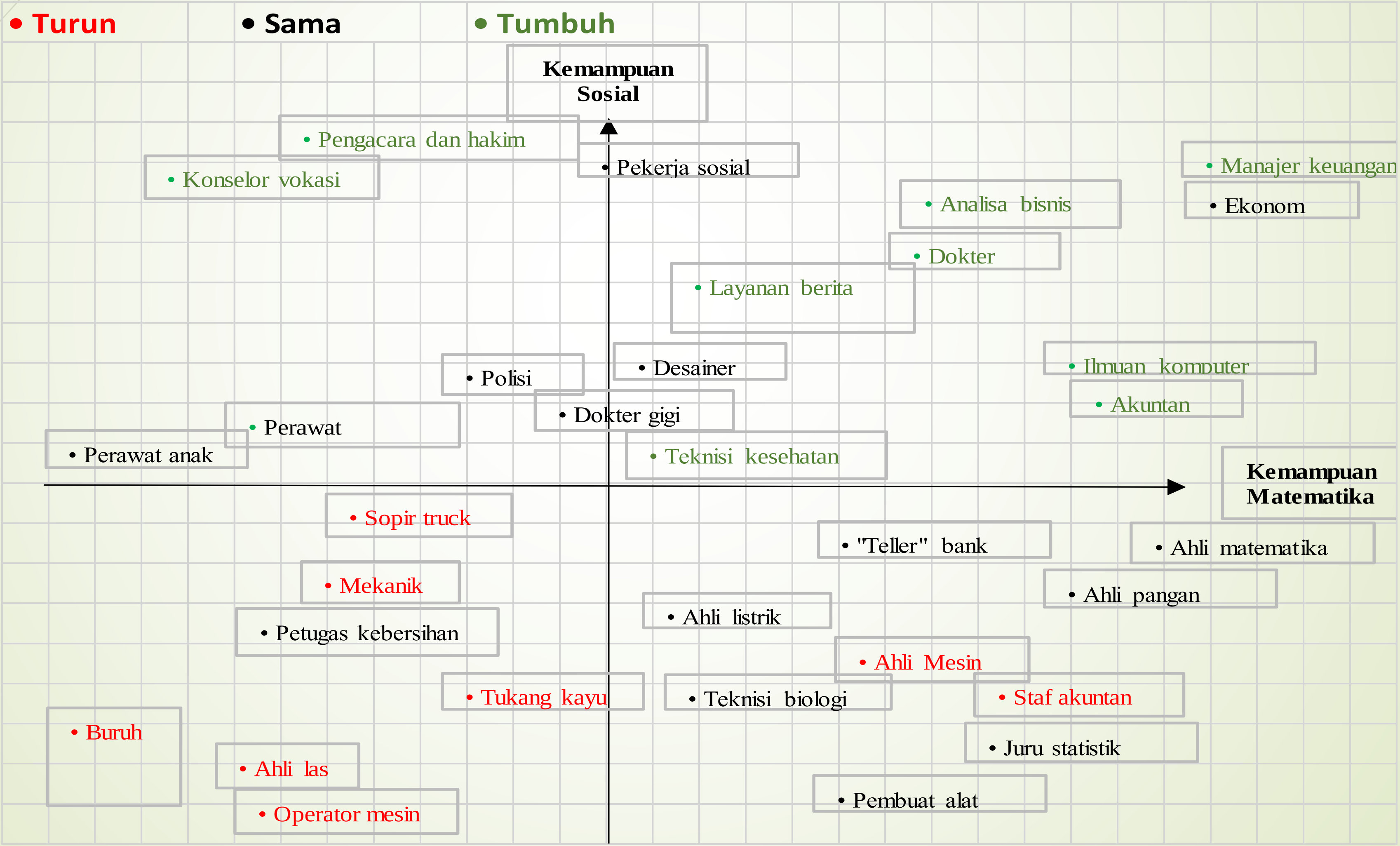
BACA JUGA HAL 17

Keterampilan yang Dibutuhkan Menghadapi Perkembangan Kecerdasan Buatan*

Kemampuan di bidang digital dan teknologi	42%
Berpikir kreatif dan eksperimentasi	33%
Analisis dan interpretasi data	31%
Pengembangan strategi	30%
Perencanaan dan administrasi	23%
Berjejaring sosial**	21%
Pengembangan dan pendampingan orang**	21%
[illegible]	20%
[illegible]	20%

Kompas, 3 Mei 2017

JENIS KETERAMPILAN BARU UNTUK EKONOMI BARU



Kompas, 2016

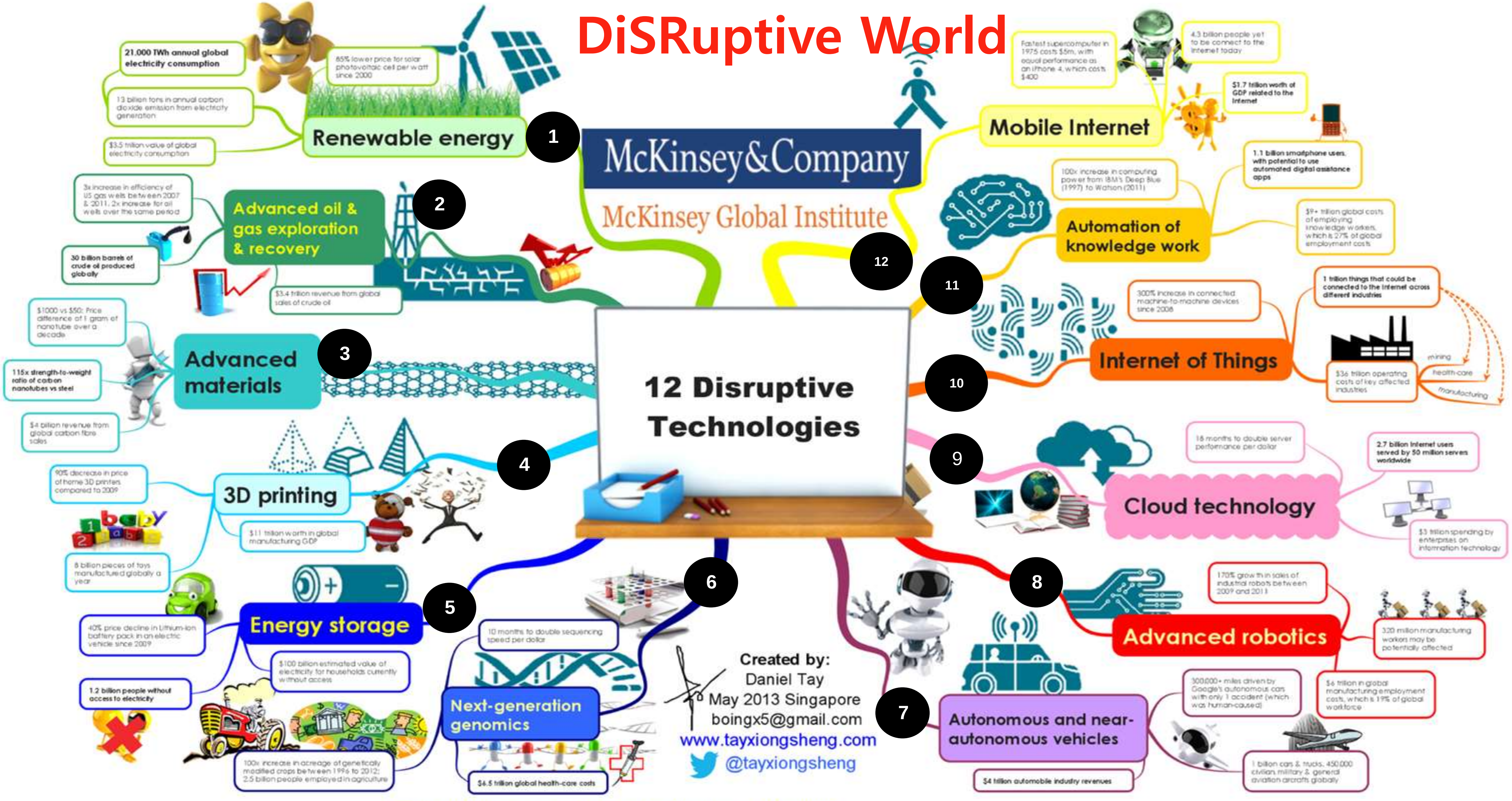
KETERAMPILAN YANG DIBUTUHKAN MENGHADAPI KECERDASAAN BUATAN

Begitu banyaknya dimensi dari era digital

Konvergensi Ilmu (kimia, fisika, IT)

Kompas, 2016

DiSRuptive World



The source of information in this Mind Map comes from http://www.mckinsey.com/insights/business_technology/disruptive_technologies

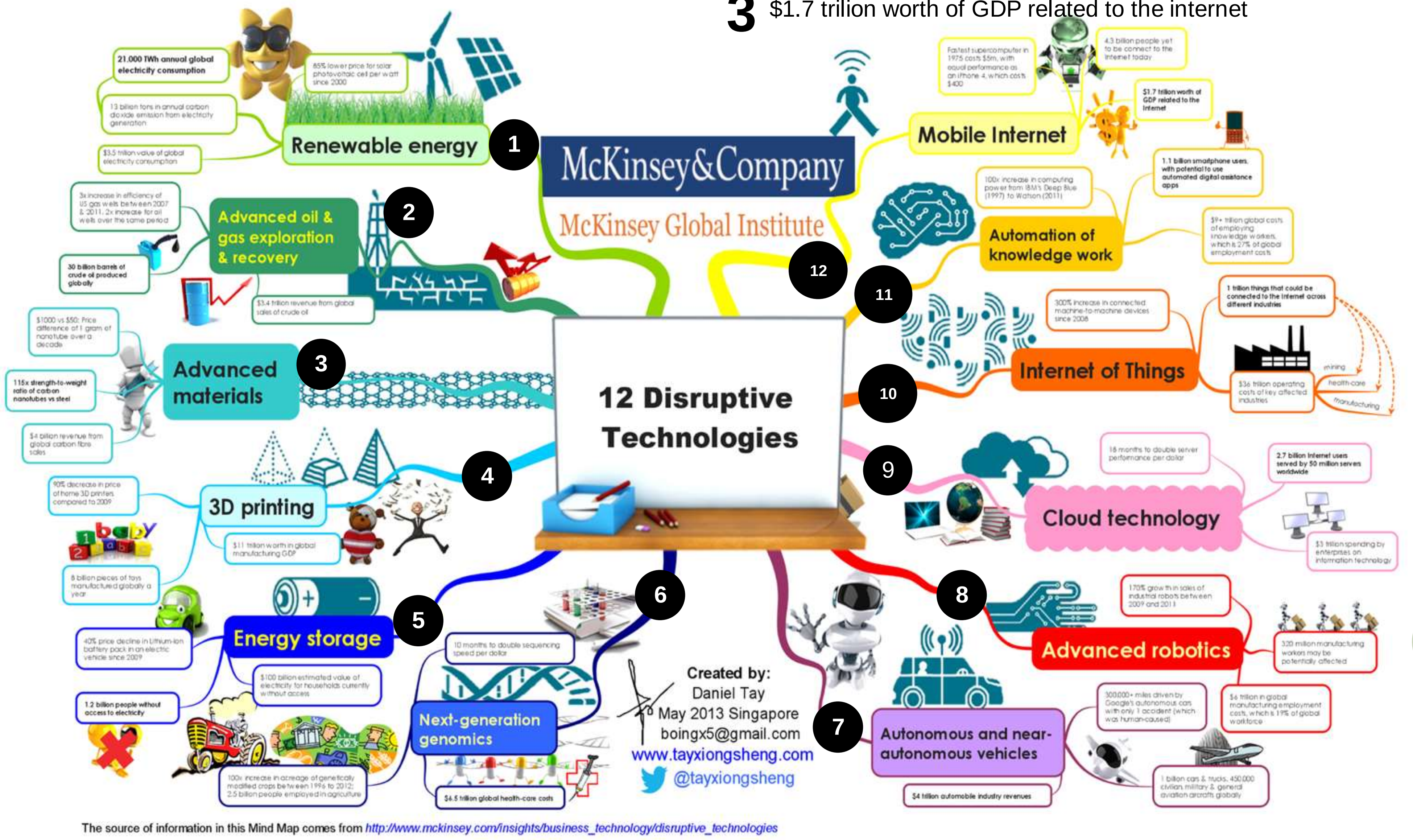
DiSRuptive World

Mobile Internet

1 Fastest supercomputer in 1975 costs $5m, with equal performance as an iPhone 4 which cost $400

2 4.3 bio people yet to be connect to the internet today

3 $1.7 trilion worth of GDP related to the internet



Automation of K-Work

1 100x increase in comp. power from IBM deep blue (1997) to Watson (2011)

2 1.1 bio smartphone users, with potential to use automated digital assistance apps. connect to the internet today

3 $9+ trillion global cost of employing K-workers, which is 27% of global employment costs

Internet of Things

1 300% increase in connected M2M devices since 2008

2 1 trillion things that could be connected to the internet across different industries

Cloud Technology

1 2.7 bio internet users served by 50 mio servers worldwide

2 $3 trillion spending by enterprises on IT

The Internet of Things

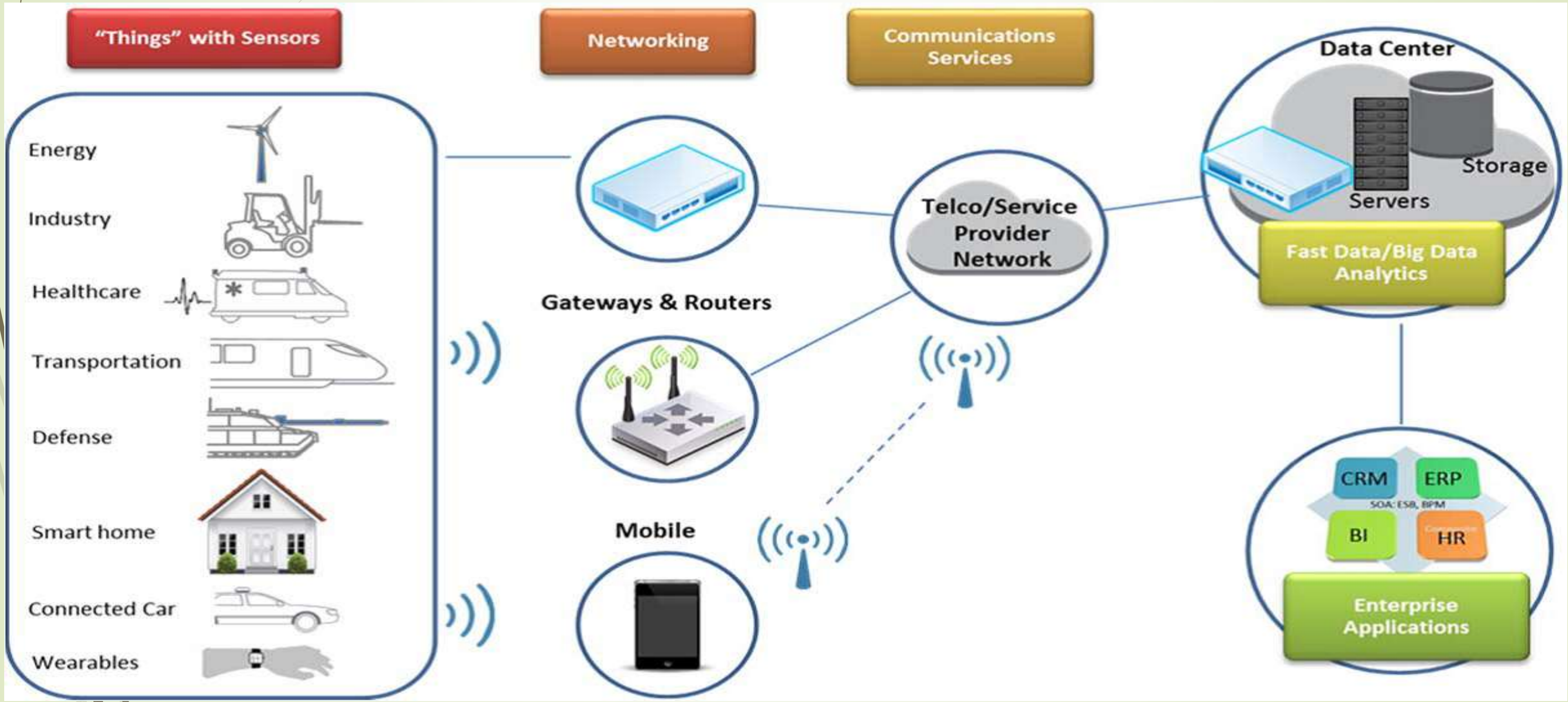
THE INTERNET OF THINGS

SAMUEL GREENGARD

We turn on the lights in our house from a desk in an office miles away. Our refrigerator alerts us to buy milk on the way home. A package of cookies on the supermarket shelf suggests that we buy it, based on past purchases. The cookies themselves are on the shelf because of a "smart" supply chain. When we get home, the thermostat has already adjusted the temperature so that it's toasty or bracing, whichever we prefer. This is the Internet of Things—a networked world of connected devices, objects, and people. In this book Samuel Greengard offers a guided tour through this emerging world and how it will change the way we live and work.

Greengard explains that the Internet of Things (IoT) is still in its early stages. Smart phones, cloud computing, RFID (radio

Smart Things, Connectivity and Big Data



IoT Enablers

- The cost and physical size of sensor technology have dropped such that they can be incorporated into most items.
- Widespread communications infrastructure is in place to allow these distributed components to communicate and coordinate.
- Savvy innovators are showing the rest of us the possibilities from the data they collect.

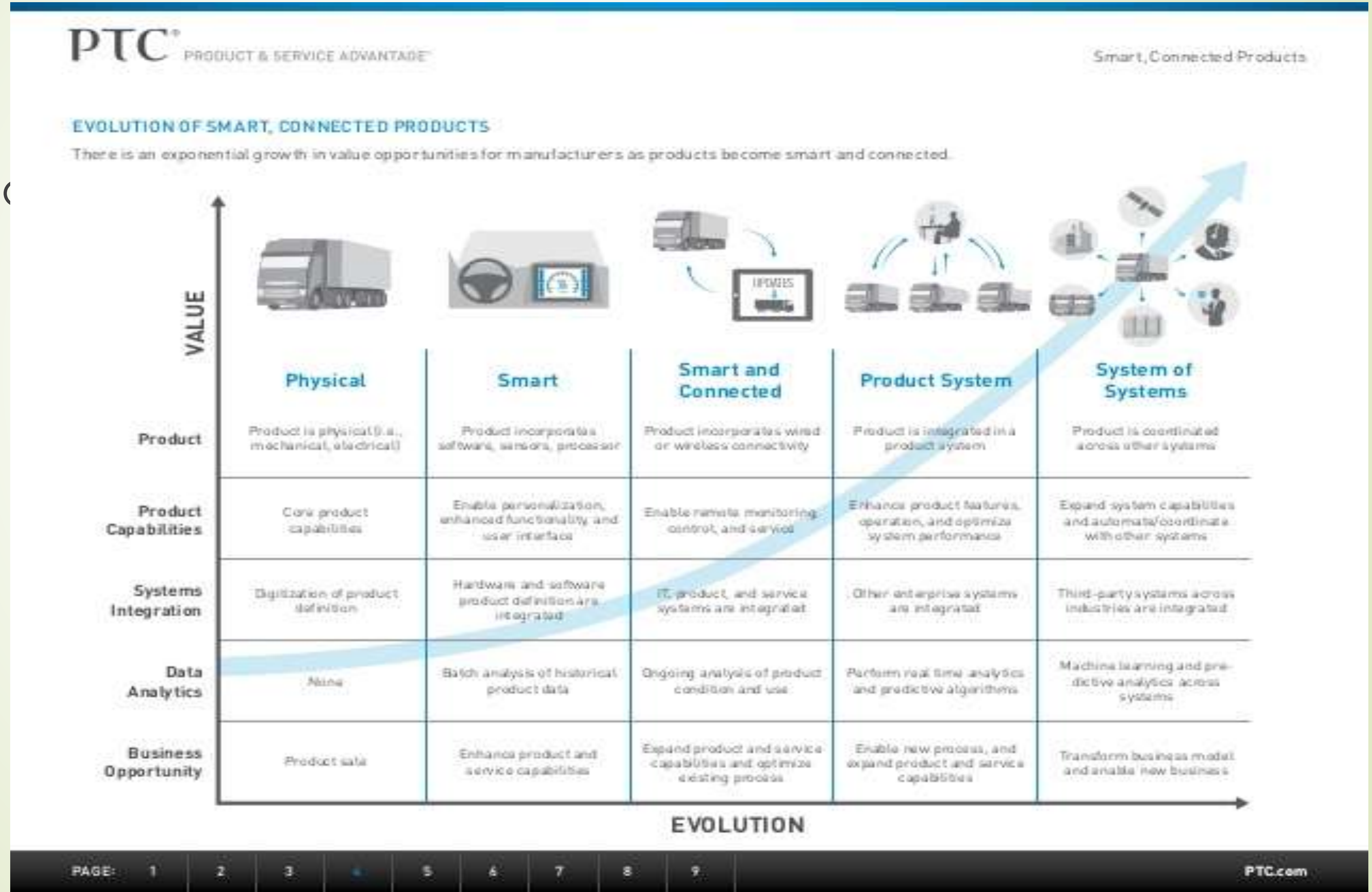
- With these in place, the smoldering potential of IoT may be ready to catch.

Sam Ransbotham, 2015

Smart Connected Product

Smart, Connected Product (SCP) Elements: treat products as things

1. Product
2. Smart Applicati
3. Connectivity
4. Data Analytic


PTC® PRODUCT & SERVICE ADVANTAGE™

Smart, Connected Products

EVOLUTION OF SMART, CONNECTED PRODUCTS

There is an exponential growth in value opportunities for manufacturers as products become smart and connected.

VALUE

	Physical	Smart	Smart and Connected	Product System	System of Systems
Product	Product is physical (i.e., mechanical, electrical)	Product incorporates software, sensors, processor	Product incorporates wired or wireless connectivity	Product is integrated in a product system	Product is coordinated across other systems
Product Capabilities	Core product capabilities	Enable personalization, enhanced functionality and user interface	Enable remote monitoring, control, and service	Enhance product features, operation, and optimize system performance	Expand system capabilities and automate/coordinate with other systems
Systems Integration	Digitization of product definition	Hardware and software product definition are integrated	IT, product, and service systems are integrated	Other enterprise systems are integrated	Third-party systems across industries are integrated
Data Analytics	None	Batch analysis of historical product data	Ongoing analysis of product condition and use	Perform real time analytics and predictive algorithms	Machine learning and predictive analytics across systems
Business Opportunity	Product sale	Enhance product and service capabilities	Expand product and service capabilities and optimize existing process	Enable new process, and expand product and service capabilities	Transform business model and enable new business

EVOLUTION

PAGE: 1 2 3 4 5 6 7 8 9

PTC.com

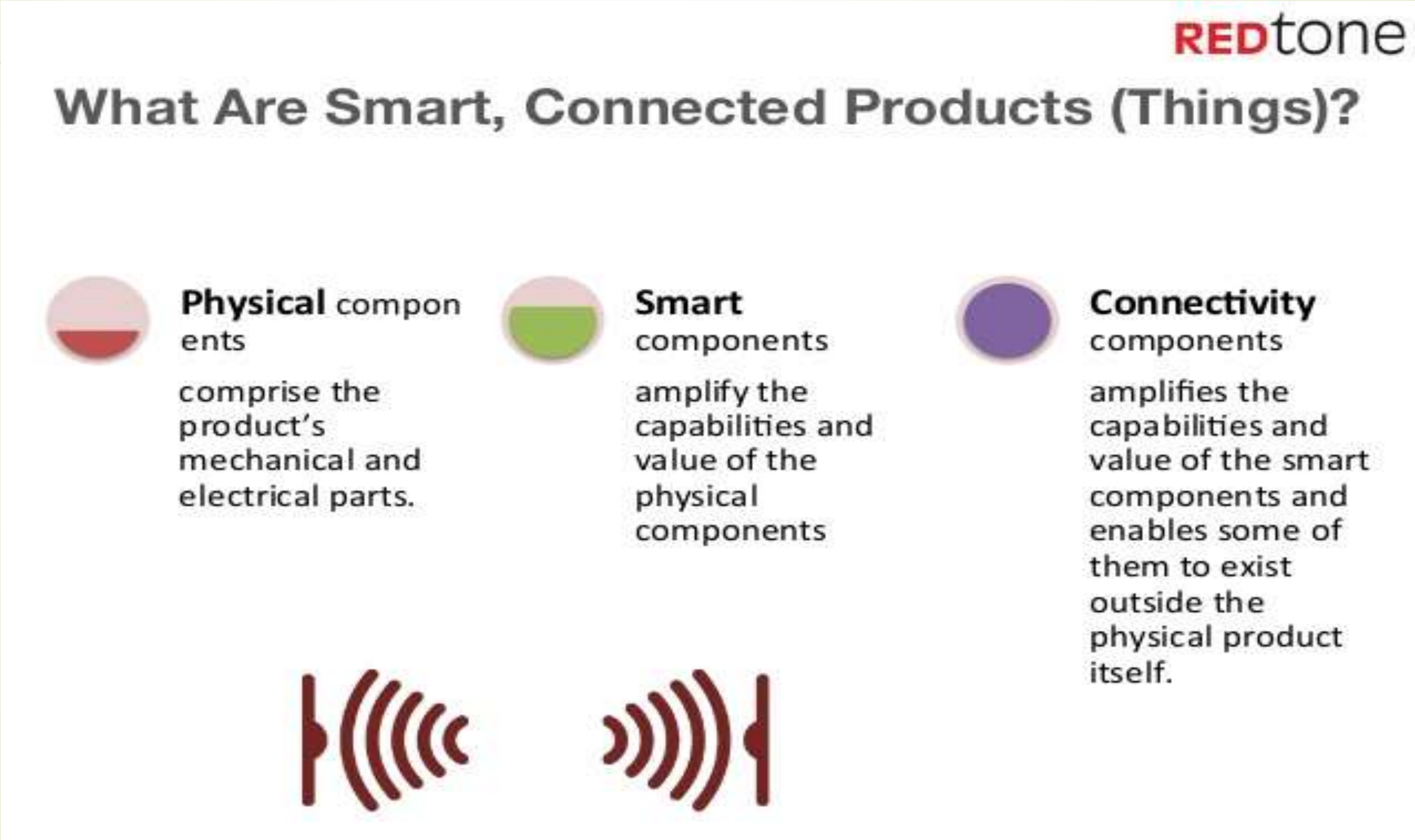
What are SCPs?

- SCPs have **3 core** elements: physical components, smart components, and connectivity components.
- Smart components amplify the capabilities and value of physical components.
- Connectivity components amplify the capabilities and value of the smart components and enables some of them to exist outside the physical product itself. The result is a virtuous cycle of value improvement.
- Physical components comprise the product's mechanical and electrical parts. In a car: engine block, tires, and batteries.
- Smart components: sensors, microprocessors, data storage, controls, sw, and an embedded operating system and enhanced user interface. In a car: engine control unit, ABS, rain-sensing windshields with automatic wipers, and touch screen displays. In many products, sw replaces some hw components or enables a single physical device to perform at a variety of levels.

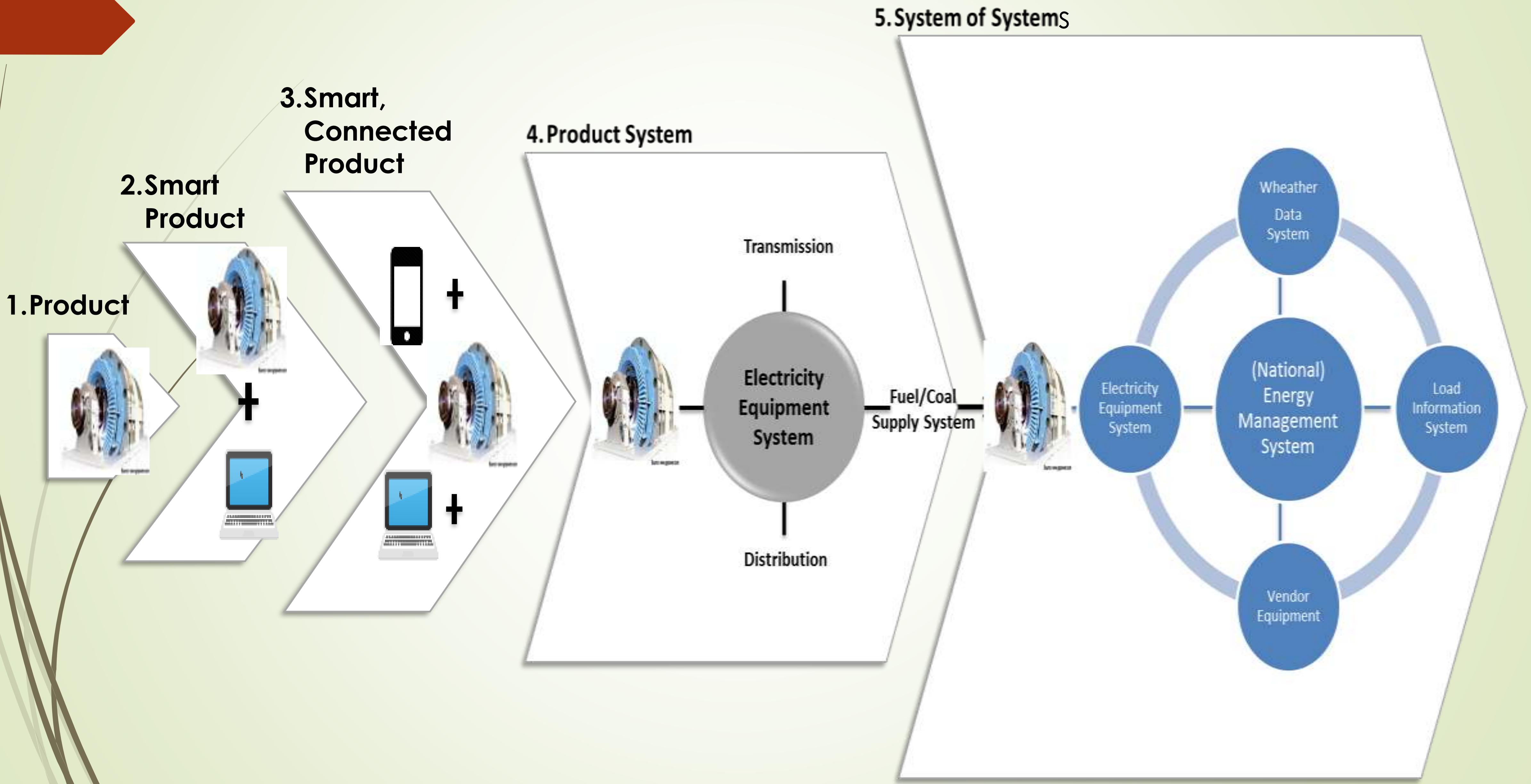
What are SCPs? (2): Connectivity

- Connectivity components: ports, antennae, and protocol enabling wired or wireless connections with the product.
  - One-one : an individual product connect to the user, the manufacturer, or another product through a port or other interface- for example, when a car is hooked up to a diagnostic machine.
  - One-many: a central system is continuously or intermittently connected to many products simultaneously. Many Tesla automobiles are connected to a single manufacturer system that monitors performance and accomplishes remote service and upgrade.
  - Many-Many: multiple products connect to many other types of product and often also to external data sources. An array of types of farm equipment are connected to one another, and to geolocation data, to coordinate and optimize the farms system. Eg, automated tillers inject nitrogen fertilizer at precise depths and intervals, and seeders follow, placing corn seeds directly in the fertilized soil.
- Connectivity serves a dual purpose:
  - It allows information to be exchanged between the product and its operating environment, its maker, its users, and other products and systems.
  - Enables some functions of the product to exist outside the physical device, in what is known as the product cloud. Eg. Bose’s new wifi system, a smartphone application running in the product cloud stream streams music to the system from internet. To achieve high levels of functionality, all three types of connectivity are necessary.

SCP Elements



REDEFINING INDUSTRY BOUNDARIES



What can SCPs Do?

- Intelligence and connectivity enable an entirely new set of Product function and capabilities, which can be grouped into 4 areas:
  - Monitoring
  - Control
  - Optimization
  - Autonomously (Execution)

CAPABILITIES OF SMART, CONNECTED Products

The capabilities of smart, connected products can be grouped into four areas: monitoring, control, optimization, and autonomy. Each builds on the preceding one; to have control capability, for example, a product must have monitoring capability.

Autonomy

Optimization

Controling

Monitoring

1. Sensors and external data sources enable the comprehensive monitoring of:
   - The Product's condition
   - The external environment
   - The Product's operation and usage

Monitoring also enables alerts and notification of changes

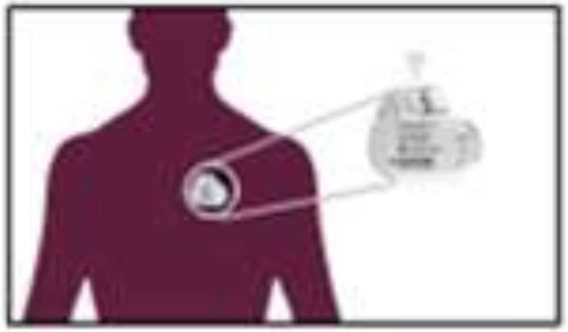
2. Software embedded in the Product or in the Product system enables:
   - Control of Product functions
   - Personalization of the executor experience

3. Monitoring and control capabilities enable algorithms that optimize Product operation and use in order to:
   - Enhance Product performance
   - Allow predictive diagnosis (potential barrier, bottleneck etc)

4. Combining monitoring, control, and optimization allows:
   - Autonomous Product operation
   - Self-coordination of operation with other Products and systems
   - Autonomous Product enhancement and personalization
   - Self-diagnosis and service

Capabilities of Smart, Connected Product

Smart, connected products enable new categories of capabilities, with each building on the preceding layers



1. Monitoring

Sensors and external data enables monitoring of:

- Product **location**
- Product **operation**
- Product **condition**
- Surrounding **environment**

2. Control

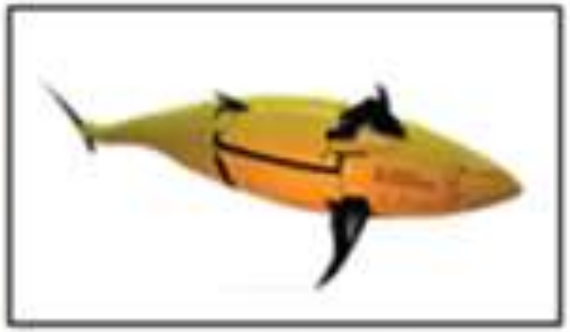
Software embedded in the product or cloud enables:

- **Expanded** and **remote** control of product functions
- Unprecedented **customization** and **personalization**

3. Optimization

Algorithms and analytics can optimize:

- Product **operation**
- Capacity **utilization**
- **Diagnostics**, allowing for **predictive service** and **repair**



4. Autonomy

The combination of other capabilities enables:

- Autonomous **operation**
- **Self-coordination** with other products and systems
- Autonomous **enhancement** and **personalization**
- **Self-diagnosis** and service

Where is KM in the midst of digital storm?

What is its role?

Implication on Knowledge Management

- Knowledge:
  - Real Time Knowledge Creation, Use and Reuse: The IoT now compresses days or months into seconds (or nearly realtime)
  - Confirmation knowledge: not only in knowledge worker but in knowledge (smart) machine
  - Programmable/predefined knowledge judgment
  - Knowledge mining capability more strategic: Data Modelling Skill, Big Data Analytic (Industry insiders have speculated that part of the rationale behind acquiring WhatsApp was for Facebook to access user's behavioral data and personal information).

- Knowledge Processes:
  - Re-Thinking the Existing Knowledge Processes Relevancy (Nonaka's Knowledge Process, Probst, Sveiby Knowledge Processes)
  - Knowledge Sharing and Transfer shift: people – people, people – machines (things) and machines (things) to machine (things).
  - Relevancy of Knowledge Hoarding (knowledge is easy to find, shorter relevancy of knowledge)
  - Knowledge Utilization: Inteligence Decision and Execution are performed by machine

Implication on Knowledge Management

- Business Model:
  - Shorter Business Models/Technology Life Cycle
  - Disrupt your self first (disrupting or being disrupted)
  - GoJek, Grab, Air BnB
- Intellectual Property & Privacy (Case acquisition of WA by FB)

IoT Potentially Replaces Everything (one)

Type of Job	Nature of Job	Performed by	Replace by:
Physical Job	Man power based	Physical Worker	Traditional Machine
Skilled Job	Repetitive	Skill Worker	Machine and Computer (MS Word, Excell)
Knowledge Job	Need actionable decision	K- Worker	Computer & Application (DSS)
Creative Job	New model, ideas,	Creative Worker	Mostly supported by: Computer Software, Sensor, Microcontroller

The Potential Downside of Digital

- Smart System Dumb People?
  - The more things devices do for us, the less in touch we are with our natural environment and rhythms.
- Displacement of manual job and knowledge worker
- Easily distracted generation with short attention spans
- Digital technology "do more to distract students than to help them academically"
- Many worker spend a considerable portion of their workday browsing FB and Twitter.
- Critical thinking skills may also be on the decline.
- Digital ubiquity prevents people from getting a deeper understanding of information.
- The truth is determined by the crowd (buzzer)
- Potential Fraud (carding, charging, crowd funding)
- High Tech High Touch

A workable Definition of KM

Knowledge Management **as "the systematic use of people, processes, and technology to capture and share know-how" Liebowitz 2012**

Knowledge Management refers to all systematic activities for creation and sharing of knowledge so that knowledge can be used **for the success of the organization**. (Siemens AG)

Knowledge Management **adalah pengelolaan knowledge perusahaan dalam menciptakan nilai bisnis dan dalam menghasilkan keunggulan kompetitif yang berkesinambungan dengan mengoptimalkan proses penciptaan atau akuisisi, *sharing* dan utilisasi knowledge yang dibutuhkan.** (Telkom)

What is the positioning of KM in Digital Era???
What its Role??

Thank you

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