Inovasi dalam Pengembangan *Smart City* yang berwawasan Lingkungan

Keynote Speech

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Perkenalan Penceramah

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Pengantar (1)

- ✓ Gerakan untuk membangun *smart city* sedang marak di seluruh dunia, termasuk di Indonesia.
- ✓ Meski banyak pengertian tentang apa itu *smart city*, tapi semua pengertian *smart city* menekankan tentang keberlanjutan *(sustainability).*
- ✓ Salahsatu yang penting dari keberlanjutan adalah *environmental sustainability* (keberlanjutan lingkungan)

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Pengantar (2)

- ✓ Pada dasarnya "*smart city*" menerapkan kemajuan teknologi informasi (TI) untuk mengatasi permasalahan perkotaan dan mendukung kota-kota mencapai visinya ke masa depan.
- ✓ Bila visinya menjadi kota hijau *(green city)* maka kita bisa mengembangkan kota yang hijau dan sekaligus cerdas *(smart city).*

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Pengertian *Green City* (1)

Definisi oleh UNEP (2011: 456) *"Green cities are defined as those are environmentally friendly."* (Kota Hijau adalah kota yang ramah lingkungan).

Menurut UNEP, agar menjadi kota hijau, diperlukan 5 hal:

(1) Pengendalian wabah penyakit dan akibat yg ditimbulkan wabah tsb.
(2) Pengurangan ancaman bencana kimia dan fisik.
(3) Pengembangan lingkungan perkotaan yang berkualitas tinggi untuk semua orang.
(4) Memiminalkan dampak lingkungan ke luar area perkotaan.
(5) Memastikan kemajuan menuju konsumsi yang berkelanjutan.

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Pengertian *Green City* (2)

Ada beberapa pengertian lain tentang kota hijau yang berasal dari banyak sumber, sbb:

(1) Kota hijau merupakan cara baru dalam meningkatkan keberlanjutan suatu wilayah perkotaan *("Green city actually means a new way of enhancing the sustainability of urbanized areas")*.
(2) Kota dikatakan sebagai kota hijau bila kejadian timbulnya penyakit yang disebabkan karena lingkungan yang buruk jarang terjadi *("a city is considered green if the incidence of environmentally linked disease is relatively low.")*

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Mengapa perlu *Green City?*

Adanya tantangan dan peluang sbb:

- Tantangan
  - Laju urbanisasi yang tinggi
  - Dampak buruk urbanisasi pada lingkungan
  - Implikasi sosial pengembangan kota secara "tradisional" (kumuh, kurang air bersih, sampah menumpuk, dsb)
- Peluang
  - Kapasitas struktural (yg masih bisa ditata/ dirancang ulang)
  - Potensi (pemanfaatan) Teknologi
  - Potensi sinergi dan integrase perkotaan

Sumber: UNEP (2011)

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Menghijaukan Sektor-sektor perkotaan

Sektor-sektor yang konsep *green city* bisa diterapkan sbb:

- Transportasi
- Bangunan
- Energi
- Vegetasi dan lansekap
- Air
- Makanan
- Limbah
- Infrastruktur dan teknologi digital

Sumber: UNEP (2011)

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Pengertian *Smart*

dalam "Smart City":

Menurut Vogl (2012: 373), cerdas bukan hanya menunjukkan kata sifat (*adjective*), tapi juga menunjukkan pendekatan yang pintar (*intelligent*) dan menarik (*attractive*) dalam membangun kota yang berkelanjutan (*sustainable cities*) yang menggabungkan infrastruktur, teknologi dan keterlibatan masyarakat lokal berdasar visi ke masa depan yang mempertimbangkan kondisi, kemampuan dan sumberdaya yang ada.

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Asal Mula Konsep "*Smart City*"

Konsep "*smart city*" (kota pintar/cerdas) muncul saat dunia menghadapi krisis ekonomi sekitar tahun 2008. Pada tahun 2008, Perusahaan IBM melontarkan konsep "*smart city*" sebagai bagian dari inisiatif "*Smarter Planet*" (Planet Yang Lebih Cerdas/Pintar).

Kini konsep "*smart city*" berkembang dan kini terdapat banyak ragam pengertian dan konsep "*smart city*".

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Pengertian (sederhana) "*Smart City*"

Berikut ini diberikan pengertian yang sederhana:

***Smart city* adalah kota yang memanfaatkan kemajuan teknologi informasi dalam mengelola kotanya secara cerdas dan efisien sehingga mampu, antara lain:**

- ✓ Efisien dan efektif dalam menggunakan sumberdaya (mengurangi biaya; menghemat energy)
- ✓ Meningkatkan layanan publik
- ✓ Meningkatkan kenyamanan hidup
- ✓ Mengurangi pencemaran lingkungan

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Ragam lain Pengertian *Smart City*

Menurut Baron (2012), *smart city* adalah cara untuk menerapkan solusi teknologi terhadap masalah perkotaan dengan respon yang *real-time* (atau cepat) yang dilayankan ke warga dan bisnis serta untuk mengatasi risiko dan bahaya yang muncul.

Menurut Vogl (2012: 375), kota pintar (*smart city*) mencakup dimensi teknologi informasi, dimensi sosial dan dimensi-dimensi lainnya dari kehidupan perkotaan yang dengan cara pintar (*intelligent*) meningkatkan kualitas kehidupan kita.

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Karakteristik "*Smart City*"

Antara lain:

- ✓ Dilakukan tidak hanya oleh Pemerintah tapi juga oleh semua pihak (termasuk oleh pihak swasta dan masyarakat)—bersifat kolaboratif.
- ✓ Beda dengan *e-government* (yg hanya dilakukan oleh Pemerintah, dengan memanfaatkan TI untuk meningkatkan layanan publik sehingga efisien, efektif dan akuntabel).
- ✓ Dalam *smart city*, saat ini banyak dipakai teknologi sensor untuk menangkap data kondisi/permasalahan di lapangan secara *real-time*. Data diolah agar mampu difahami kondisi yang ada dan kemudian dilakukan tindakan.
- ✓ Juga banyak dikembangkan aplikasi (biasanya untuk gadget yg "*mobile*") utk meningkatkan layanan publik.

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Alasan Memerlukan *Smart City*

- ✓ **Kebutuhan untuk mengatasi masalah lingkungan global dan urbanisasi**

  Antara lain: pemanasan global, perubahan iklim; peningkatan jumlah penduduk dan kelangkaan sumberdaya; dampak peningkatan urbanisasi.

- ✓ **Kebutuhan untuk mengakomodasi perubahan cara hidup (antara lain karena dipengaruhi oleh globalisasi dan kemajuan teknologi informasi)**
- ✓ **Kebutuhan untuk kota agar berkembang secara berkelanjutan (*sustainable*)**
  - Agar kota mampu tetap nyaman dan sejahtera dalam jangka yang lebih lama.
  - Agar mampu mengendalikan kelestarian lingkungan dari ancaman kemajuan jaman (polusi udara, dsb).
  - Agar mampu meningkatkan daya saing

Sumber: Paparan Supreme & Co. PVT, Ltd

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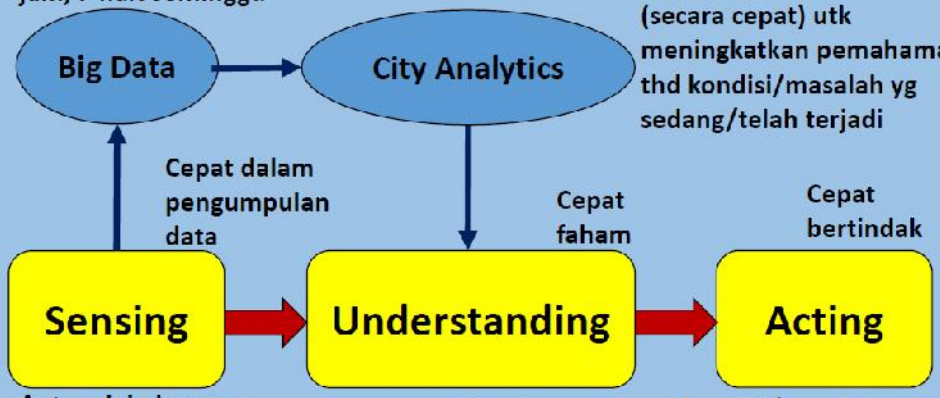
Proses kerja "Smart City"

Data (*real time*) mengalir 24 jam, 7 hari seminggu

Big Data (*real time*) diolah (secara cepat) utk meningkatkan pemahaman thd kondisi/masalah yg sedang/telah terjadi



Antara lain berupa:
- Sensor yg dipasang di seluruh bagian kota
- Aplikasi di smartphone warga (yg mengirim data ke PemKot)

Cepat memahami kondisi/masalah dan secara otomatis dan atau manual maka cepat bertindak

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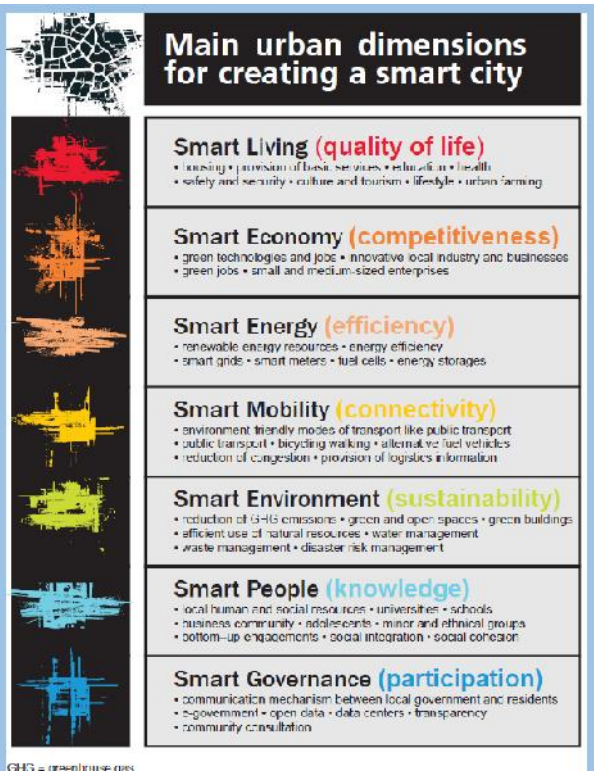
Dimensi-dimensi utama *Smart City*



Sumber:
Vogl (2012: 376)

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Hubungan Pengertian

Green City (GC):

Kota Hijau adalah kota yang ramah lingkungan (UNEP, 2011)

Smart City (SC):

...adalah cara untuk menerapkan solusi teknologi terhadap masalah perkotaan dengan respon yang *real-time* (atau cepat) yang dilayankan ke warga dan bisnis serta untuk mengatasi risiko dan bahaya yang muncul (Baron, 2012)

Nampak ada hubungan

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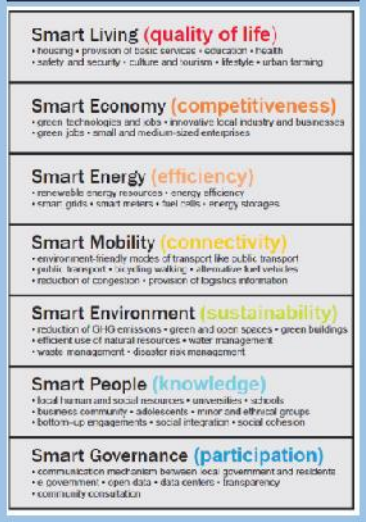
Hubungan Komponen Perkotaan yang ditangani

Green City (GC):

- Transportasi
- Bangunan
- Energi
- Vegetasi dan lansekap
- Air
- Makanan
- Limbah
- Infrastruktur dan teknologi digital

Smart City (SC):



Nampak ada hubungan

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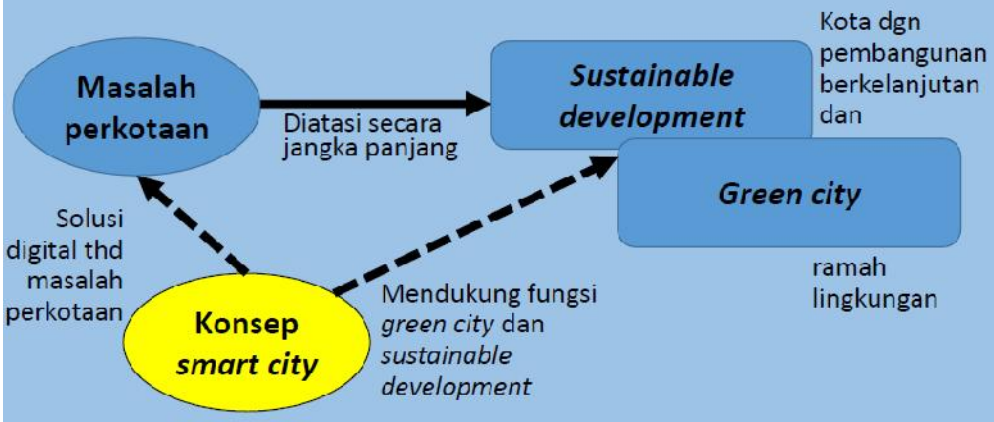
Diagram Hubungan antara *Smart City* dan *Green City*



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Inovasi dalam Smart City

Prinsip-prinsip Smart City , antara lain:

- ✓ Efisiensi & efektivitas
- ✓ Berkelanjutan
- ✓ Berkolaborasi, berjejaring
- ✓ Terintegrasi
- ✓ **Kreatif/Inovatif**
- ✓ *Empowering*

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Kasus-kasus INOVASI Smart Green Cities

"Top 10 Smart Cities on the Planet" (menurut ADB, 2012)

1. Vienna, Austria
2. Toronto, Canada
3. Paris, France
4. New York City, USA
5. London, UK
6. Tokyo, Japan
7. Berlin, Germany
8. Compenhagen, Denmark
9. Hongkong, China
10. Barcelona, Spain

Sumber: Vogl (2012)

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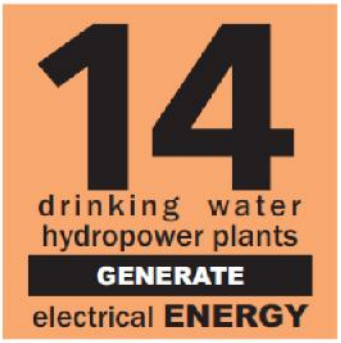
Kasus 1: Vienna, Austria

Vienna is establishing bold smart-city targets and tracking the city's progress in reaching them with programs such as Smart Energy Vision 2050, Roadmap 2020, and Action Plan 2012–2015. To achieve the targets it has set, Vienna is incorporating stakeholder consultation processes into formulating and executing changes in carbon-intensity, transport, and land-use planning in hopes of becoming a major European player in smart-city green technologies. The city is undertaking a broad range of projects within an integrated strategy for smart urban development. An example of various sectors working together is Vienna's 14 drinking water hydropower plants within its water supply network reducing pressure in their pipes, thus generating green energy, which is distributed to a local energy supplier. The 65 million kilowatt-hours of electricity per year thus generated fulfill the annual electricity needs of 50,000 inhabitants. The plants are financed through a public–private partnership (TINA VIENNA 2012).



Sumber: Vogl (2012: 382-383)

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Kasus 2: Toronto, Canada

Toronto is moving toward a low-carbon economy by opening a Business Analytics Solutions Center and collaborating with the private sector in creating a Smart Commute Toronto initiative in hopes of increasing transit efficiency in the city's metro area. For example, they use natural gas from landfills to power the city's garbage trucks. The City of Toronto Fleet Services Division is responsible for managing the city's fleet of 5,200 corporate vehicles and pieces of equipment, more than 10% of which are smart vehicles. Use of these vehicles reduced CO_2 emissions by approximately 15,000 tons over the period 2008–2011 compared with using conventional vehicles. This equals an 11% reduction in fleet emissions.

Sumber: Vogl (2012: 383)

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Kasus 3: Paris, France

Paris is well-known for its successful large-scale, self-service bicycle-sharing system called Vélib. This service consists of 20,000 bicycles that are available 24 hours a day. Its 1,800 bicycle stations, which are located every 300 meters, use electronic terminals and thus can be accessed by smart cards and phones. The concept underlying Vélib is to provide affordable access to bicycles for short-distance trips in an urban area as an alternative to motorized public transport or private vehicles, thereby reducing traffic congestion, noise, and air pollution. Since December 2011, Vélib has been complemented by an electric car-sharing scheme that operates on similar principles.

Sumber: Vogl (2012: 383)

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Kasus 4: New York City, USA

Like Toronto, New York City partnered with the private sector to build an efficient technology platform under the city's ICT infrastructure modernization program. The goal of this initiative is to streamline delivery of city services by consolidating and updating ICT, thereby reducing energy consumption, strengthening security, and providing city workers with faster access to information. The new consolidated data center, which will bring together information from more than 40 government agencies to a modern cloud computing environment, is expected to save the city $100 million over 5 years. Previously, the city operated dozens of separate data centers that lacked basic capabilities such as 24-hours-per-day support in fire suppression, emergency response, and security planning. The new center, which was created under the Citywide IT Infrastructure Services (CITIServ) Program, will enable New York to expand existing shared services; reduce costs; and provide modern, reliable, secure, and green-technology services (Hickey 2011).

Sumber: Vogl (2012: 384)

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Kasus 5: London, UK

The city is well recognized for implementing a congestion tax and having a robust public transit system. But London has done much more in becoming a smart city. Concerning public access to data, London's Datastore encourages development of innovations with more than 5,000 public free-of-charge data sets relating to various issues. Furthermore, the city is partnering with private companies to launch the largest free Wi-Fi network in Europe. London also started RE:FIT, a public building retrofit program that reequips buildings with new insulation, low-carbon cooling and heating systems, and modern management technologies. Pilot projects under this program have been initiated for 42 public sector buildings across London. These projects resulted in energy savings measures over approximately 146,000 square meters of building space, and reduced CO_2 emissions by more than 7,000 tons, equivalent to an average 28% reduction in energy consumption. With annual energy savings of more than $1.5 million, the payback period for the expenditure of $10.8 million under the program will be 7 years. In addition, a framework with standard contracts and tools that facilitated replication of these pilot projects was likewise developed under the initiative (Greater London Authority webpage).

Sumber: Vogl (2012; 384)

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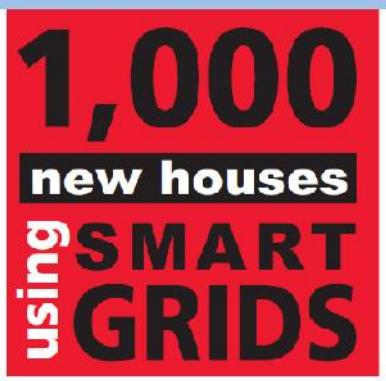
Kasus 6: Tokyo, Japan

Tokyo is known as a hub of innovation of digital-city approaches and smart-mobility solutions. In addition, Tokyo is creating new smart suburbs. Often driven by high-technology companies in cooperation with municipal bodies, such initiatives reduce carbon emissions through an intelligent network of electricity grids and homes fitted with high-tech equipment such as solar panels, storage batteries, light-emitting-diode applications, and devices that communicate with each other in order to maximize energy efficiency. Located 40 kilometers southwest of Tokyo, the smart-town project in Fujisawa city will build 1,000 houses that use smart grids and high-tech equipment (Tanikawa 2011).



Sumber: Vogl (2012: 385)

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Kasus 7: Berlin, Germany

Together with the private sector, the City of Berlin is testing smart meters for housing districts and retrofitting residential buildings with energy-saving measures. Today, Berlin is Germany's largest e-mobility laboratory. Together with the industrial and service sectors as well as research institutes and universities, the city is testing technologies for ensuring mobility in future years. Under its "Action Plan for Electromobility 2020," the city is pursuing e-mobility by constructing 550 recharging stations at a cost of 80 million euros. The city is also encouraging new electric vehicle-to-grid technologies and electric-vehicle car-sharing systems (Berlin Agency for Electromobility 2011).

Sumber: Vogl (2012: 386)

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Kasus 8: Compenhagen, Denmark

Copenhagen has committed to carbon neutrality by 2025. In addition to widespread local commitment to this goal (e.g., 40% of the population regularly commutes via bicycle), there is also strong political support for stimulating the economy through "green" innovations. Copenhagen also hosts one of the largest global cleantech clusters. The Danish cleantech sector already accounts for 16% of total exports, with 40% of these companies enjoying annual growth rates of more than 25% (City of Copenhagen 2012).

Sumber: Vogl (2012: 386)

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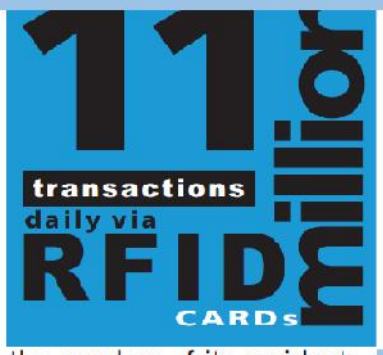
Kasus 9: Hongkong, China

Hong Kong, China has been a leading producer of radio-frequency identification (RFID) technology, particularly in the production of smart cards. The so-called "Octopus Card," which was introduced in 1997, is now used by millions of residents for services such as public transit, library access, building access, shopping, and parking. Today, more than 20 million cards are in circulation, which is nearly three times the number of its residents. The cards are used by 95% of the population of Hong Kong, China aged 16 to 65, generating over 11 million daily transactions worth HK$100 million, or $12.8 million (Octopus Cards Limited webpage). The city is also experimenting with RFID technology in its airport as well as throughout its agriculture supply chain.



Sumber: Vogl (2012: 386-387)

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Kasus 10: Barcelona, Spain

As a pioneer in low-carbon solutions, Barcelona was among the first cities in the world to introduce a solar thermal ordinance in 2000 that required all new buildings over a certain size to generate hot water from solar thermal energy. In 2011, the city started an initiative that promoted the adoption of electric vehicles and charging infrastructure. In addition, Barcelona Wifi, a free city service, enables people to connect to the Internet through 430 Wi-Fi hotspots located in various municipal amenities and public-access points (Barcelona City webpage). Beside such general infrastructure, the city's "22@Barcelona" project transforms former industrial land into a living lab for urban, economic, and social innovation (22@ Barcelona website).

Sumber: Vogl (2012: 387)

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Penutup (1)

- ✓ Pada dasarnya kita bisa mulai *smart city* atau *smart green city* kapanpun, karena dapat dikembangkan secara bertahap: lebih cerdas dan menjadi lebih cerdas lagi *(getting smarter and smarter),* serta lebih hijau dan lebih hijau lagi (*getting greener and greener*).
- ✓ Belajar dari kasus-kasus, kita bisa mulai dari permasalahan (besar/penting) yang kita pilih untuk diprioritaskan lebih dulu untuk ditangani ke dalam program *smart and green city*.

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Penutup (2)

- ✓ Selain mengatasi masalah utama dengan cara pengelolaan kota yang cerdas, maka gerakan *smart city* juga perlu inovatif.
- ✓ Pelajari keberhasilan kota-kota cerdas lainnya dan kaji inovasi yang diunggulkan.
- ✓ Kita bisa fikirkan bersama-sama (Pemerintah, Masyarakat dan Swasta) dan melahirkan inovasi-inovasi yang dapat diterima bersama.

Sekian dulu,
terima kasih atas perhatiannya dan kini dan waktunya untuk tanya-jawab/ berdiskusi

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Daftar Acuan

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