Article

Smart Is the New Big Umbrella Over Sustainability-Green-Clean, Etc.

Phillip Andrews

On March 20, 2015 Forbes published an excellent article called **"Smart is the New Green"** (https://www.forbes.com/ sites/ sarwantsingh/2015/03/20/smart-is-the-new-green/ #30a52bb433ee). In the article the author, **Sarwant Singh**, made the following opening remarks:

"As an electrical engineer, I feel I spent the first half of my career working on green and renewable energy solutions. However, now my career's focus is on smart solutions. I feel that a lot of my time spent working on green solutions was more for corporate social responsibility and image, and there wasn't really a strong return-on-investment (ROI) business case. Organizations and governments that invested in solar and wind power have seen limited or delayed returns. In contrast, "Smart" products—like smart grids, smart meters, and smart buildings—have a ROI of three to five years and provide higher-efficiency returns than green products. Therefore, I predict that the Mega Trend of the past decade—green products—will be replaced in this decade by Smart products and services.

There are several Smart concepts already in the market today, like Smart cities, intelligent buildings, Smart homes, Smart energy, Smart cloud computing, Smart citizens, Smart governance, Smart businesses, Smart cars, Smart materials…the list is long."

He goes on to explain the different levels of Smart and the value they will provide in our personal and professional lives. Unfortunately, the article is short, and the author did not have the opportunity to explain the full impact[i] of SMART on the Clean, Green and Sustainable solutions (including the enabling technologies). The main point that the author missed is that Smart is not only the new Green, but also the main trigger for a new civilization. Yes, **we are at the cusp of a new Civilization** because practically everything all around us is being reinvented in a dramatic way[ii]. Here is a high-level synopsis of what is happening in every sector and every industry:

- Smart **Manufacturing** (Smart Factories, Smart Machines, Machine Learning, Digital Transformation, Integrated Business & Innovation Ecosystems, AI …)
- Smart **Retailing** (Online Retailing, Holistic Customer Experience …)

- Smart **Architecture** (Ecofriendly and Disaster-Proof Buildings, new materials for construction, compostable towers …)
- Smart **Agriculture** (Vertical Farms & Gardens, Autonomous Tractors..)
- Smart **Health Care** (Telehealth, Telemedicine, Genetics, Nanotech..)
- Smart **Government** (e-Gov, Gov 3.0)
- Smart **Education** (Tailored for Industry 4.0, e-Education, …)
- Smart **Transportation** (Driverless Vehicles, Drones …)
- Smart **Energy** (Alternative fuel options, Green Energy, Smart Grid..)
- **Etc.**

Behind all those reinvented, revived and reinvigorated sectors and industries there are hundreds of new technologies that will not only revolutionize everything, but also produce new professions, new jobs and new opportunities. **Big Data** and **Artificial Intelligence** are behind most of all that because the numbers that are propelling them to the front are so massive that most people today have hard time grasping their impact. Here are just a few of the numbers and statements that tell the story:

- 20 billion connected devices today. It is expected that by 2020 we will have over 100 billion connected devices. They call that the **Trillion Sensor Economy.**
- The billions of sensors (including humans as sensors (per The Wisdom of The Crowd, TV series) will create an unbelievable number of data that only super computers will be able to process, decipher and use in productive ways. This is the **Petabyte Era** --- growing and organizing data is "the ticket to dance" in the new truly global economy
- **Data** is rapidly becoming the most valuable resource, and its value is exponentially increasing with the new technologies, such as AI, Advanced Analytics and Machine Learning.
- People can process 60 bits/sec and recall 65% of the information stored in their brains. **AI** can process 1 trillion bits/sec and recall 100%
- AI is radically altering the effectiveness of people, cities, institutions and businesses. Becoming Smart now is not only nice-to-be or have, but also a necessity for survival, sustainability and prosperity
- AI is the apex technology (behind all new innovations, creative disruptions and "revolutions"), empowered by data.
- 47% of jobs will be lost to AI-based technologies, but an equal or higher number of jobs will be created in the next 30 years. Here is a small sample of the new jobs that experts are projecting that will be created in the years ahead:
  o Quantum Machine Learning Analyst
  o Man-Machine Teaming Manager
  o Data Detectives
  o Augmented Reality Journey Builder
  o Genomic Portfolio Specialist

Here are some examples:

Sustainability Concepts / Tenets	Integrated Sustainability and Smart Concepts / Tenets
• Public Transportation	• Smart and Integrated Transportation (incl. driverless/ autonomous vehicles)
• Green Buildings	• Green and Smart Buildings (well beyond LEED Certification)
• Renewable Energy	• Renewable Energy w/Smart Grid and Smart Meters
• Water Conservation	• Water Conservation coupled with Smart Water, Smart Sprinkling, and Smart Waste Management
• Public Green Spaces	• Public Green & Smart Spaces

      o Personal Data Broker
      o Cyber City Analyst
      o Virtual Store Sherpa

We are living in an unprecedented era … and the best is yet to come (assuming that humans will not get in the way of their own progress). So, what do all these things have to do with Sustainability? Everything! When Smart is added on top of the Sustainability principles, tenets, practices and applications, then everything looks even better and more attractive.

The solutions on the right-hand side are a lot more powerful, valuable and exciting than the original sustainability concepts. "Smart" offers ingenious new designs and options that improve quality of life (QoL) and introduce society to a new standard of living that will be an order of magnitude better than what we are experiencing today.

Examples

Several foreign cities have taken the lead in implementing Smart Cities the right way. Copenhagen and Paris are two shining examples of how to integrate the concepts of Sustainability and Smart.

1. **Copenhagen:** The city declared (in 2017) that by 2025 they will be Europe's first **Eco-Metropolis**, by achieving zero carbon footprint and zero waste. Their vision revolves around a Smart City that emphasizes improved QoL, accelerated Smart Growth, and Proactive Sustainability[iii]. Copenhagen is one of the few true Smart Cities in the whole world that has a vision for the future and is driving Smart and Sustainable solutions and initiatives top-down (as opposed to the bottom-up approach that most other cities are pursuing). Copenhagen is also among the very first

cities to recognize the need for an
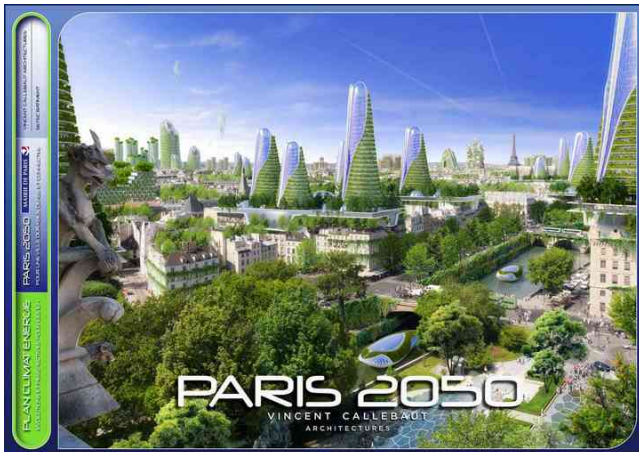
Innovation Hub (or Solutions Lab)[iv] that

helps all citizens because they understood the need to aid all citizens to move in a lockstep mode into the future. Copenhagen is an elite city that is showing the world what the real meaning of "Inclusivity" is all about. NYC is the only American city that is trying to emulate the Copenhagen model and even create a transatlantic alliance with Denmark.

2. **Paris:** This city is following Copenhagen's example by considering a plan that would make Paris a paradise of plant-embedded smart architecture by 2050. The City Hall is envisioning a healthy and sustainable future for Paris proposed by **Vincent Callebaut** that recommends eco-friendly high-rise buildings with suspended gardens of green algae bioreactors, bamboo exoskeleton structures, vertical farms and mangrove tree-shaped train stations.

This vision is aimed at supporting Paris's Climate Energy Plan that mandates a 75% reduction of greenhouse gas emissions by 2050. The proposed Master Plan for **Smart Paris** incorporates vertical farms and gardens with the help of aquaponics, hydroponics, and even aeroponics. The **benefits** include:

● Combining the new Ag Concepts (Vertical Farms) with new green and eco-friendly architecture principles
● Smog-eating buildings
● Drastically reducing pollution, deforestation, and land decertification
● Using 80% less water -- recycling water as many as 17 times prior to releasing it to the waste management system
● Combining Rural and Urban Environments (bringing nature back in people's daily lives)
● Improving Quality of Life (QoL)
● Improving overall health
● Improving and enabling the **Circular**

Examples

The last point brings to an American example that is worth mentioning because it fits perfectly with the sustainability and smart efforts of a great city.

3. **Houston EcoHub (Smart Recycling Facility):** Material separation and recycling technologies have been around for decades, but they were never put together in the right way to optimize mixed waste recovery and processing it so quickly as to be useful

to the community right away. The EcoHub utilizes smart technologies (including the latest sorting and conversion technologies) that convert

SMART CITY STRATEGY COPENHAGEN
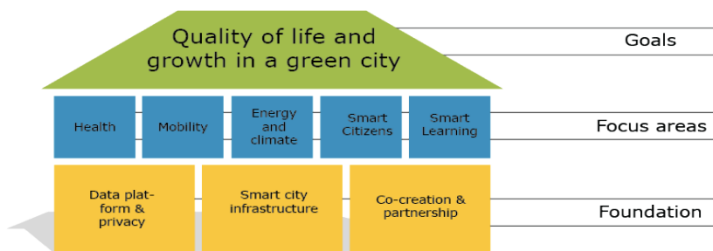
- Achieving the goal of zero waste (like Copenhagen's goal)
- Reducing Houston's greenhouse gas emissions (no incineration required)
- Eliminating 500,000 tons of emissions (equivalent to taking 200,000 cars off the road)
- Reducing fuel use and noise/air pollution from trash collection by 30% – 50%
- Avoiding incineration (all processes and facilities are green)
- Reducing municipal costs of resource recovery by 40% (savings of $60M /yr. to collect and dispose of garbage). But more importantly, the EcoHub

scrap into reusable raw materials for manufacturers. EcoHub's **benefits** include:

has created 1,000 direct jobs and 2,000 indirect jobs (which is one of the principles and promises of "Smart")[v]. Houston is already considering adding additional EcoHubs in order to deal with the magnitude of waste that it has to deal with. There is some speculation that Houston may build six additional EcoHubs, despite the political wrangling that has delayed the project.

This is exaclty how the right marriage of Smart and Clean can advance our societies to the nest plateau of excellence. In other words, when clean and sustainable solutions are combined with smart technologies, Cities and/or entire States realize benefits in economic development, job creation, acceleared business growth, and overall health improvements, on top of all the other environmental benefits.
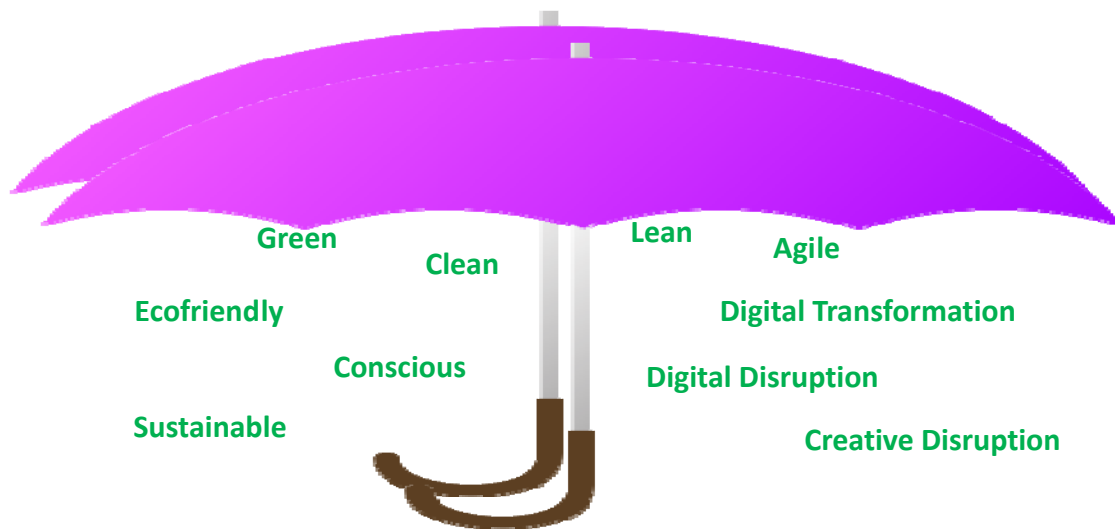
to 30 years. This is not a surprise as there is an **Omni-Corvegence** going on that affects value chains, industries, technologies, devices, channels, services, customer experiences, and so many more. So, the intelligent thing to do is to embrace "Smart" and fully leverage its potential.

In summary, "Smart" is slowly and steadily becoming the new big umbrella that encompasses all the great concepts that were introduced the last 20

Green
Clean
Lean
Agile
Ecofriendly
Digital Transformation
Conscious
Digital Disruption
Sustainable
Creative Disruption

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i https://www.sciencedirect.com/science/article/pii/S1877705815021074 and http://www.kesinternational.org/sustainability.php and https://jopeninnovation.springeropen.com/articles/10.1186/s40852-017-0063-2

ii http://www.businessinsider.com/15-ways-tech-is-reinventing-society-2013-4 and http://thegovlab.org/reinventing-society-in-the-wake-of-big-data-edges-interview-with-mits-alex-sandy-pentland/

iii As reported in Urban Opus: http://urbanopus.net/smart-city-copenhagen-key-lessons-and-future-directions/

iv https://www.nycedc.com/press-release/nycedc-and-new-lab-announce-launch-urban-tech-hub

v As reported in Big Jolly Times: https://bigjolly.com/possible-bid-rigging-houstons-trash-contract/

Phillip Andrews is an author, professor, international keynote speaker, thought leader in the areas of Smart and Sustainable Cities & Businesses, executive coach, entrepreneur and business owner/executive. He started his career as a Robotics Engineer working in the automotive industry. He has a long business career with Ford Motor Company, GE, IBM and EDS (now HP). He also worked for Deloitte and Booz Allen. His consulting clients (among others) include General Motors (parent company of EDS at that time), 3M, Caterpillar, Case Corporation, Alenia, and McDonnell Douglas (now Boeing). He is currently involved in bringing a Smart Cities Conference to Denton in 2020.