University of Pardubice

Faculty of Economics and Administration

Success Factors of Smart Cities Initiatives

Yaw Agyei Manu

Bachelor Thesis

2019

University of Pardubice
Faculty of Economics and Administration
Academic year: **2018/2019**

DISSERTATION ASSIGNMENT

(PROJECT, ART WORK, ART PERFORMANCE)

First name and surname:	**Yaw Agyei Manu**
Study program:	**B6209 System Engineering and Informatics**
Identification number:	**E15022**
Specialization:	**Regional and Information Management**
Topic name:	**Success factors of Smart Cities Initiatives**
Assigning department:	**Institute of System Engineering and Informatics**

Rules for elaboration:

The aim of the thesis is to find out factors that influence the success of smart city initiative. Factors will be derived based on literature review.

Outline:
- Definitions and approaches to Smart City concept
- World examples of Smart Cities
- Smart Cities in European Union
- Derivation of success factors from smart city frameworks and successful examples of Smart Cities

Scope of graphic works:

Scope of work report
(scope of dissertation): **cca 35 stran**

Form of dissertation elaboration: **printed/electronical**

List of specialized literature:

REEDS, J. Smart Growth: From Sprawl to Sustainability. Totnes, Devon: Green, 2011. Print,ISBN.9781900322829
GRODACH C. Urban Revitalization: Remaking Cities in a Changing World (9780415730549): Carl Grodach, Renia Ehrenfeucht: Books. N.p., n.d. Web. 30 June 2017.
BOSCH, P. et al. CITYkeys indicators for smart city projects and smart cities. European Commission, H2020 Programme, 2017.
MANVILLE, C. et al. Mapping Smart Cities in the EU. Directorate General for Internal Policies, Policy Department A: Economic and Scientific Policy, 2014.
Smart city framework - Guide to establishing strategies for smart cities and communities (PAS 181:2014).The British Standards Institution, 2014

Tutor for dissertation: **Ing. Hana Kopáčková, Ph.D.**
Institute of System Engineering and Informatics

Date of dissertation assignment: **3 September 2018**

Date of dissertation submission: **30 April 2019**

L.S.

doc. Ing. Romana Provazníková, Ph.D.
Dean

doc. Ing. Pavel Petr, Ph.D.
Department Manager

In Pardubice, dated: 3 September 2018

AUTHOR´S DECLARATION

I hereby confirm that I have written this document independently. All the reference literature and information used in the paper are quoted in the list of reference literature.

I hereby acknowledge that all the rights and duties resulting from Act. N. 121/2000 Sb., the Copyright Act, apply to my written work, especially that the University of Pardubice has the right to make a license agreement of use of this written work as a school work pursuant to § 60 section 1 of the Copyright Act. On the condition that the written work shall be used by me or a license shall be provided to another subject for the hereof, the University of Pardubice shall have the right to require from me a relevant contribution to reimburse the cost incurred for the making of such work including all relevant cost and total overall expenditure and expenses incurred.

I express my consent with making the work accessible in the University Library.

In Pardubice April 30, 2019 Yaw Agyei Manu

ACKNOWLEDGEMENT:

I will firstly give thanks to God Almighty for the mercy and protection throughout the preparation of this bachelor thesis.

My sincere appreciation goes to my kind supervisor, Ing. Hana Kopáčková, Ph.D. without whose supervision and help, this work would not have been possible. I am most grateful for your patience, inspiration and care from the beginning to the end of this thesis work. You always found time out of your busy schedule to read, correct and provided recommendations for the realization of the thesis aim. It was amazing working with you!

I will forever be indebted to Mr. and Mrs. Toseafa, Ing. Solomon Gyamfi, Ing. Henry Anderson Junior for their support and advice during my study here. And to all my siblings, I say I am grateful for the love and care you have showed me God bless you.

This bachelor thesis is dedicated to my loving parents, Mr. Joseph Agyei and Madam Grace Amponsah whose offered me support and love in all my academic journey. You instilled in me hard work and discipline, May the God Almighty endure the blessing on you abundantly for all the sacrifices you have made for me.

TITUL

FAKTORY ÚSPĚCHU INICIATIV INTELIGENTNÍCH MĚST

ABSTRAKT

CÍLEM PŘÍSPĚVKU BYLO ZJISTIT INTELIGENTNÍ MĚSTO VE SVĚTĚ A MĚSTO EVROPY, JEJICH KRITICKÉ FAKTORY ÚSPĚCHU, KTERÉ JIM POMÁHAJÍ V ŠIKOVNOSTI. VĚCI, KTERÉ MĚSTA DĚLALY V INICIATIVĚ, KTEROU MAJÍ SPOLEČNÉHO? TAM BYLA NĚJAKÁ TECHNOLOGIE A MODELY, KTERÉ KAŽDÉ MĚSTO POUŽÍVALO, ONI VŠICHNI ZDŮRAZŇUJÍ V NĚJAKÉM KLÍČOVÉM ROZMĚRU, KTERÝ POMŮŽE JIM DOSÁHNOUT JEJICH CÍLE.

KLÍČOVÁ SLOVA

Inteligentní město ve světě av Evropě, kritické faktory úspěchu

TITLE

Success Factors of Smart Cities Initiatives

ABSTRACT

The aim of this paper was to find out the Smart city in the world and that of Europe, their critical success factors that help them in smartness. Things the cities did in the initiative that they have in common? There was some technology and models that each city used, they all emphasis in some key dimension that help them achieve their goal.

KEYWORDS

Smart city in the world and in Europe, critical success factors

Table of Contents

1 INTRODUCTION TO SMART CITIES

Smart city initiatives have recently gained audience in the challenge to merge innovation with technology and fiercely standardise practices within the digital 2.0 systems. As innovation has been widely supported with individual and firm co-operation, in that same vein, governance of the people without the involvement of the people makes it uncooperative, undemocratic and falls just fitting the tailor-made solution to the needs of the citizenry. Even more, as the population of the people dwelling in the cities continue to swell and people increasingly fraught with responsibilities and disinterest in political affairs, it becomes increasingly difficult for people to get involved in issues of politics and governance even as they are the subject of both. Hence, with the proliferation of technology in a myriad of varieties, digital communication may just be a way (Townsend, 2013; Jorna and Veenstra 2015). In an integrative context, Caragliu, Del Bo and Nijkamp (2011) comprehensively termed smart cities to be that which has "investments in human and social capital, traditional and modern (ICT) communication structure, sustainable economic growth and good quality of life, with a sage management of natural resources through participatory governance. Regarding the technology aspect, it is adjudged to represent virtual, mobile and ubiquitous technologies (Forest et al., 2009). Technology today is, obviously, a constructive and essential part of the formation of a smart city as it is known to transform live and simplify traditionally difficult and manual tasks. However, in the context of smart cities, they are considered prerequisites such that there aside the obvious need for humans to man these new devices. There is also the added need of a real engagement and collaborative intention to connect with public institutions, private sectors, non-profit making organisations, academia and the users as well.

1.1 DEFINITIONS OF SMART CITIES ACCORDING TO SOME WRITERS

Table 1 Definitions of Smart City

DEFINITIONS	**SOURCES**
Smart city as a high-tech intensive and advanced city that connects people, information and city elements using new technologies to create a sustainable, greener city, competitive and innovative commerce, and an increased life quality	Bakici et al. (2012)

Being a smart city means using all available technology and resources in an intelligent and coordinated manner to develop urban centre's that are at once integrated, habitable, and sustainable	Barrionuevo et al. (2012)
"Smart community – a community which makes a conscious decision to aggressively deploy technology as a catalyst to solving its social and business needs – will undoubtedly focus on building its high-speed broadband infrastructures, but the real opportunity is in rebuilding and renewing a sense of place, and in the process a sense of civic pride. Smart communities are not, at their core, exercises in the deployment and use of technology, but in the promotion of economic development, job growth, and an increased quality of life. In other words, technological propagation of smart communities isn't an end, but only a means to reinventing cities for a new economy and society with clear and compelling community benefit".	Eger (2009)
"A smart city is based on intelligent exchanges of information that flow between its many different subsystems. This flow of information is analysed and translated into citizen and commercial services. The city will act on this information flow to make its wider ecosystem more resource efficient and sustainable. The information exchange is based on a smart governance operating framework designed to make cities sustainable."	Gartner (2011)
"The use of Smart Computing know-hows to make the serious infrastructure components and services of a city-which contain city administration, education, healthcare, public safety, parkland, transportation, and services—more intelligent, organised, and efficient"	Washburn et al. (2010)

“A city connecting the physical infrastructure, the IT infrastructure, the social infrastructure, and the business infrastructure to leverage the collective intelligence of the city”.	Harrison et al. (2010)
“A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens”.	Giffinger et al’s (2008)
A city “merging ICT and Web 2.0 knowledge with other structural, design and planning efforts to de-materialize and speed up governmental processes and help to recognise new advance solutions to city management difficulty, in order to improve sustainability and responsibility.”	Toppeta, D. (2010).
“Smart Cities initiatives try to improve urban performance by using data, information and information technologies (IT) to provide more efficient services to citizens, to monitor and optimize existing infrastructure, to increase collaboration among different economic actors, and to encourage innovative business models in both the private and public sectors”.	Marsal-Llacuna et al. (2014)
“A smart city is understood as a certain intellectual ability that addresses several innovative socio-technical and socio-economic aspects of growth. These aspects lead to smart city conceptions as “green” referring to urban infrastructure for environment protection and reduction of CO2 emission, “interconnected” related to revolution of broadband economy, “intelligent” declaring the	Zygiaris (2013)

capacity to produce added value information from the processing of city's real-time data from sensors and activators, whereas the terms "innovating", "knowledge" cities interchangeably refer to the city's ability to raise innovation based on knowledgeable and creative human capital".	
"A city that monitors and integrates conditions of all of its critical infrastructures, including roads, bridges, tunnels, rails, subways, airports, seaports, communications, water, power, even major buildings, can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens"	Hall (2000)
"Smart cities of the future will need sustainable urban development policies where all residents, including the poor, can live well and the attraction of the towns and cities is preserved. Smart cities are cities that have a high quality of life; those that pursue sustainable economic development through investments in human and social capital, and traditional and modern communications infrastructure (transport and information communication technology); and manage natural resources through participatory policies. Smart cities should also be sustainable, converging economic, social, and environmental goals".	Thuzar (2011)
A smart city infuses information into its physical infrastructure to improve conveniences, facilitate mobility, add efficiencies, conserve energy, improve the quality of air and water, identify problems and fix them quickly, recover rapidly from disasters, collect data to make	Nam and Pardo (2011)

better decisions, deploy resources effectively, and share data to enable collaboration across entities and domains.	
"The application of information and communications technology (ICT) with their effects on human capital/education, social and relational capital, and environmental issues is often indicated by the notion of smart city".	Lombardi et al. (2012)
"Smart cities have high productivity as they have a relatively high share of highly educated people, knowledge-intensive jobs, output-oriented planning systems, creative activities and sustainability-oriented initiatives"	Kourtit et al. (2012)
"(Smart) cities as territories with high capacity for learning and innovation, which is built-in the creativity of their population, their institutions of knowledge creation, and their digital infrastructure for communication and knowledge management."	Komninos (2011)

Table 2 Collated keywords from the definitions

AUTHORS	**KEYWORDS FROM THE DEFINITION GIVEN**
Bakici (2012)	High – Intensive technology to connect with people
Eager (2009)	Technology as a catalyst to solve social problems

Barrionuevo et al. (2012)	Technology and resources to run urban centres
Gartner (2011) Washburn et al. (2010)	Exchange of information flow in different subsystem The use of computer technology to manage social amenities or manage a city
Harrison et al. (2010)	Connect these infrastructural, physical, IT, social and business for the benefits of the city
Giffinger et al's (2008)	Creation of forward-looking economy, people, government, mobility and environment and living with self-decisive independent citizenry.
Toppeta, D. (2010).	A combination of ICT and web technology as well as structural design and planning to a city management.
Marsal-Llacuna et al. (2014)	Improve IT in urban performance with the help of data information and technology
Zygiaris (2013)	Smart city as intellectual ability to address several innovation, social technology and social economic aspect of growth

SIMILARITIES

People have different perspectives into what a Smart city should be. From the table one above, different scholars define what a Smart city is in a different way, whereas some defines it from the perspective of IT, others define it from the social, economic and sustainability point of views. From the table two above, we could see that five (5) to six (6) of the definitions are based on the use of information and the use of innovation technology for the advancement of the life of citizens

or for the better management of services that is, transportation services, subway, security, monitoring and as well as environmental issues.

Giffinger et al (2008) looks at Smart city as a good governance creation of forward-looking economy, people, government, mobility and environment and living with self-decisive independent citizenry. The progressive growth approach to a smart city deliberates issues like, alertness, flexibility, individuality, decision making, and strategic behaviour underlines the development in sustainability. Washburn et al. (2010) hold the view that, smart city is a gathering of smart computing know-hows applied to life-threatening infrastructure components and services. Smart computing refers to a new generation of integrated hardware, software, and network technologies that provide IT systems and real-time awareness of the real World and advanced analytics and actions that optimize business processes

2. EVALUATION OF THE SEVEN (7) SMART CITY INITIATIVES

In the following paragraphs, seven (7) key cities have achieved smartness in their cities. Therefore, they are used as models for other countries or cities or states to emulate. For all these seven (7) cities in the World and that of Europe, they emphasise on 6 key dimensions in the area of SMART Mobility; SMART Environment; SMART Living; SMART People, SMART Government and SMART Economy which would be described below.

2.1 SMART ECONOMY

An economy consists of the economic system, comprising the production, distribution or trade, and consumption of limited goods and services between two agents, the agents can be individuals, businesses, organizations, or governments. Transactions only occur when both parties agree to the value or price of the transacted good, commonly expressed in a certain currency (Nazar, 2018). Some years back, economic action was theorized to be limited by natural resources, labour, and capital. This opinion removed the value of knowledge and creativity thus new products, services, processes, new markets, expands markets, diversification of markets, niche markets, especially that which produces intellectual property which is nothing but Smart Economy. The smart economy characteristics basically include a focus on high quality education system, publicly funded scientific research, attractive corporate fiscal incentives including tax breaks and great infrastructure including high quality domestic and international connections, pervasive broadband

and excellent public services including health care. Now, many countries are already started their version of a smart economy that's Denmark, Singapore, Netherlands, Ireland and Finland.

2.2 SMART MOBILITY

The smart mobility framework highlights on travel choices, healthy, attractive communities, unfailing travel times for people and freight and safety for all users. The objective of smart mobility supports the goals of climate change intervention and energy security, traffic supervision in real time, management of passenger transport means, management of car parks, management of the use of bicycles, payment of tolls, support in the use of electric vehicles, tracking applications and logistics, car sharing services, (Giffinger, 2008). This can be achieved through foundations for Caltrans and partner agencies to actively and successfully pursue the smart mobility objectives and gain its many other travelling benefits.

There are various smart mobility solutions approaches in the smart cities including video shadowing and Intelligence analysis i.e. detect traffic, occurrence detection, license plate recognition, emergence command, customer service, passenger reservation system and multimedia. Gradually a lot of computer systems are more and more used in vehicles. This helps to enhance their actions such as automatically controlling or provide support control, wherein the driver has control, of the anti-lock brakes, air-bag inflation, cruise speed, in vehicle climate, collision avoidance breaking etc. Location-determination computer systems (GIS) also enable vehicles and goods to be remotely tracked and interested parties to be informed of their schedule. Some transport systems can automatically be guided along tracks and controlled, with no drivers.

2.3 SMART ENVIRONMENT

The smart environment can be seen as a region of the actual world that is widely equipped with sensors and computing components. There are many more definitions, which are listed as follows "Sensing, Computing, Communicating and controlling the overall structure within Cities is called smart environment" and "Several smart environment strategies can adapt to human activities (Nazar 2018). Exits of buildings, lighting of houses, taps of water tanks and air ventilation of offices etc… can be planned to detect the presence of humans, to be started by them and to adapt to them". The awareness of the Internet of Things due to high-tech advances, both in software and

hardware, has led to the potential for network-enabled objects with sensing and actuating capabilities in diverse environments, known as Smart Environments. From environment monitoring and military applications, to health care and event tracking applications, both the diversity and complexity of the nodes themselves and their networked applications have increased immensely

2.4 SMART PEOPLE

The quality of the ICT set-up is not the only definition of intelligent city. Other definitions express the part of human wealth and education in urban development. For the technological and political ambitions of Smart Cities to be implemented very successfully, citizen acceptance and inclusion is vital. Citizens are the primary reason for the existence of the city and its policies. A key element in the development of smarter cities, therefore, is the inclusion of especially smart people in the Smart City creation. Smart people create and pursue S.M.A.R.T. goals; they are Specific, Measurable, Attainable, Relevant and Timely strategic goals every smart city pursue in their quest to achieving smartness. But with respect to Smart Cities, the smart people concept comprises various factors like affinity to lifelong learning, social and ethnic plurality (diversity), flexibility, creativity, cosmopolitanism or open-mindedness, and participation in public life. Problems related to the quality of a city can be solved by means of creativity, human capital, cooperation among relevant stakeholders, and their bright scientific ideas.

2.5 SMART LIVING

Smart Living comprises of two main concepts which are quality family unit as well as good possession which will aid in the quality or comfortable living of people in their homes. Family unit according to (Cook and Youngblood, 2008) should be “able to acquire and apply knowledge about its inhabitants and their surroundings in order to adopt to the inhabitants and meet the goals of comfort and efficiency”. Initially, Smart homes were communities with the ability to check and adjust environmental systems like heating and lighting. As Electrical Reading meters are smart devices which help homes to utilize electricity, it can be connected to the homes network and respond at your management. And these could be monitored or controlled by computer or remote management or by voice, the home network responds once you command it. Smart Possessions

include Smart things that make it easy to link things in your physical world to the Internet. Smart things place the world of connected things at your fingertips. Smart Things are more fitting, safe, and efficient. Smart Things can make things more intelligent, automate, monitor and control in homes. We call smart possession any physical object connected to the web with some identifying capabilities that provides comfortable living in the home.

2.6 SMART GOVERNMENT

Governance is the bodybuilding of political, economic and administrative authority to supervise a nation's activities. It is the complex devices, processes and organisations of which people and groups declare their interests, exercise their legal rights and responsibilities, and mediate their differences' (Zygiaris 2013). In the same line, smart governance talks about the future of the public services in the cities. The main importance of smart governance is about greater capability, community headship, good set-up, and nonstop improvement through invention. Smart governance is all about using technology to ease and support better planning and decision making in the cities. It is about improving democratic processes and converting the way that public services are carried out effectively and efficiently. The engagement of the internet and the world-wide-web for delivering government information and services to the citizens makes e-governance a smart approach.

3. BEST SMART CITY INITIATIVES COMPARED

Here, four of the best examples of smart city initiatives in the world are compared against the Smart city dimensions outlined above.

3.1 TORONTO STATEMENT

The good living of life in this world is spreading to different cities and countries. Toronto vision is to give out smart community for good living where people can stablish their self forever as part of natural features and existence. To accomplish this vision, they work with other institution to make sure living city is built on natural base of clean rivers, green atmosphere and survival area or community.

3.1.1 INITIATIVES OF THE TORONTO SMART CITY AGENDA

Toronto started by planning and forming a strategy, and these strategies stem from the city council which set a strategic goal with actions and vision coupled with performance matrix that will lead to achieving the set goals for Toronto to achieve it target as being Smart. They started by using three (3) models of smart city as discussed below;

3.1.2 SMART ENVIRONMENT

By doing this specifically by targeting the problem and deficiencies in the system of Toronto public service thereby making it efficient and effective. They target the area by reducing greenhouse gas emission, this act will help them decrease their influence on climate change that can reach the other objectives at the same period. The greenhouse gas (GHG) emission are normally from vehicle, industries and how individual heated their buildings. Their idea was to stick on improving the existing tree canopy and continuously planting trees across the city. Tree planting provide shade for people, provide oxygen and, it improves healthy life, remove air pollution in the society that hold a tangible economic worth.

*Figure 1*smart city concept- Toronto

Source:https://www.google.com/search?q=toronto+vs+new+york+aerial+view&hl=enCZ&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiYv_baqjhAhUGdJoKHeqhBRgQ_AUIDigB&cshid=1556095614219249&biw=1366&bih=657

3.1.3 SMART MOBILITY

Among the Toronto smart mobility initiatives talk about good roads, settlement that allow free flow of movement or free flow of people from one point of the city to another city without any traffic jam or without delaying in the traffic which will eventually improve the environment in the city, i.e. when cars are delayed in the traffic, high cost of fuel usage and fuel combustion also leads to emission that create pollution in the environment but when this Smart movement of transportation is enhanced, the possibility of a danger of combusted fuel emission from car exhaust is reduced.

3.1.4 SMART LIVING

Regarding Smart Living initiative, Toronto aims at improving the water system, lighting and air quality. When there's good air quality or good portable water, People's health will be improved, there'll be no diseases. While lighting may prevent crimes in the city, it may also elevate slum information by people, and it give the people in the city a life that's wealth living e.g. people will feel happy and the city will be safe to move about 24/7 without any fear of been attacked or people forming groups or sub groups or gangs attacking people in the dark.

3.1.5 Results of Toronto models

Toronto decided to take 3 strategic action which include Smart Mobility, Smart Environment and Smart living. This strategic action was later transformed into measurable performance indicators which are summarized in the table below;

Table 3 Strategic actions of Toronto's Smart city Initiative

	GOAL	MEASUREMENT	PROGRESS	ACHIEVEMENT
SMART ENVIRONMENT	57,000-114,000 of trees are planted on annual year	1.Annual tree planting	49% in excellent or good condition (2011)	In 2013, Toronto has over $7.1 billion of trees planting, which is $700 per tree. 10million of tree planted

SMART MOBILITY	They double bicycle roads as percentage of all trips from 2001 by 2011 2. Completion of the bikeway network, approximately 1,000 (km) of bikeways by 2011 consisting of: 495 km of bike lanes 249 km of off-road trails 260 km of signed routes1	Percent change in bicycle trips to work	69% increase from 2001 to 2011 2. 848 km of bikeway network in 2014 (of which 551 km is on-street), consisting of: 249 km of bike lanes 297 km of off-road trails 302 km signed routes	
SMART LIVING	Progress water `quality in some rivers and lakes for body-contact recreation1	1	26% (2000 – 2014	

3.2 NEW YORK

New York city is situated in the United states of America, with the population over 8.9 million. The vision of New York city is classified into centuries and behind it are some characteristics of growth, equity and sustainability.

GROWTH: For them to meet the wants of their people while there is increase in population and the cost of housing are going up, the city council will install some program where people can find home easily or they must build a lot of affordable houses the city will also add their 21st century commercial sectors to increase job in the city. They will also install some programs that will be focused on investment in the growth of firms.

EQUITY CITY: With the population growing, the city will boost up at least 800,000 people from poverty or near poverty by 2025. By fighting this poverty, their goal is to increase the minimum wage in the city and increase the effort on initiatives where the city will support the educational system and create jobs as well.

SUSTAINABILITY: New York try to reduce the harmful greenhouse gas emission which will make clean water and quality air, and their goal by 2050 is to cut down greenhouse gas effect and spread their attention on energy supply. They have a plan of updating their building to be more energetic and they'll focus on telecommunication, water, transportation, build up defence against flooding. Also, for New York to be able to build a Smart city, there were some models or indicators that were put in place for New York in Smartness and these indicators are Smart mobility, Smart Living, Smart Environment and Smart Government.

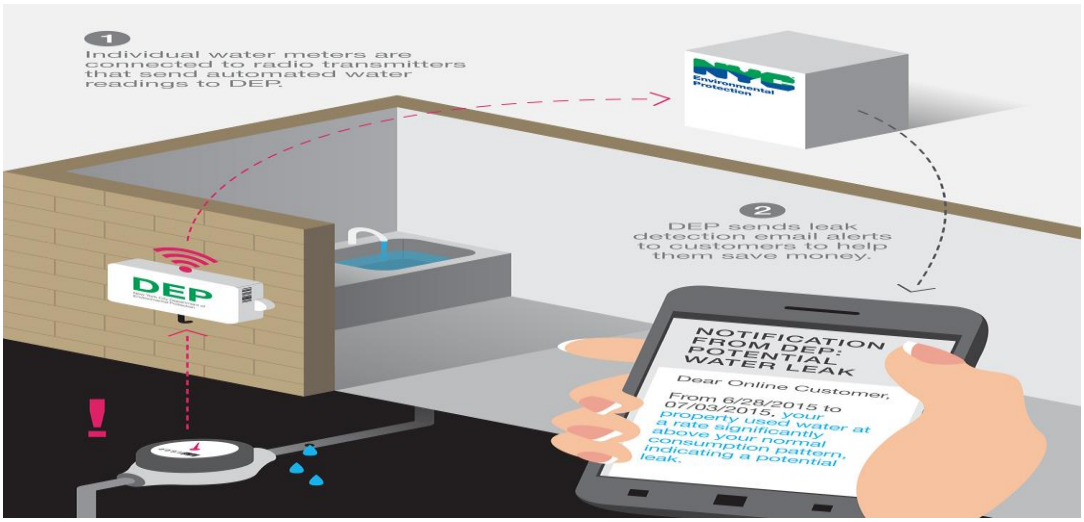
3.2.1 SMART LIVING

In terms of Smart living, New York introduced the lighting system where we all know light is everything that people need in New York for them to fight terrorism and armed robbery, because whenever some corner of the street is dark, people take advantage in stealing from other's or causing panic to the individuals living in that area. So, in doing this, the council installed LED Lighting which is cheaper and can also decrease the green gas emission. The LED lighting come with some benefit like high quality of light, low maintenance and higher longevity.

And, they talk about wireless Water Meter, every day, over billions of clean waters are distributed across the city of New York residence. For people to effectively manage the water they consumed every day, New York Department of environmental Protection (DEP) came up with the idea of

one of the largest advance Automatic Meter Reader (AMR) system. This water meter system helps individuals to know how much water they've consumed. The meter has a safe city-wide telecommunication network that are connected to everyone's phone for them to know how much they've consumed to save money.

Figure 2 Shows New York's Smart Living concept

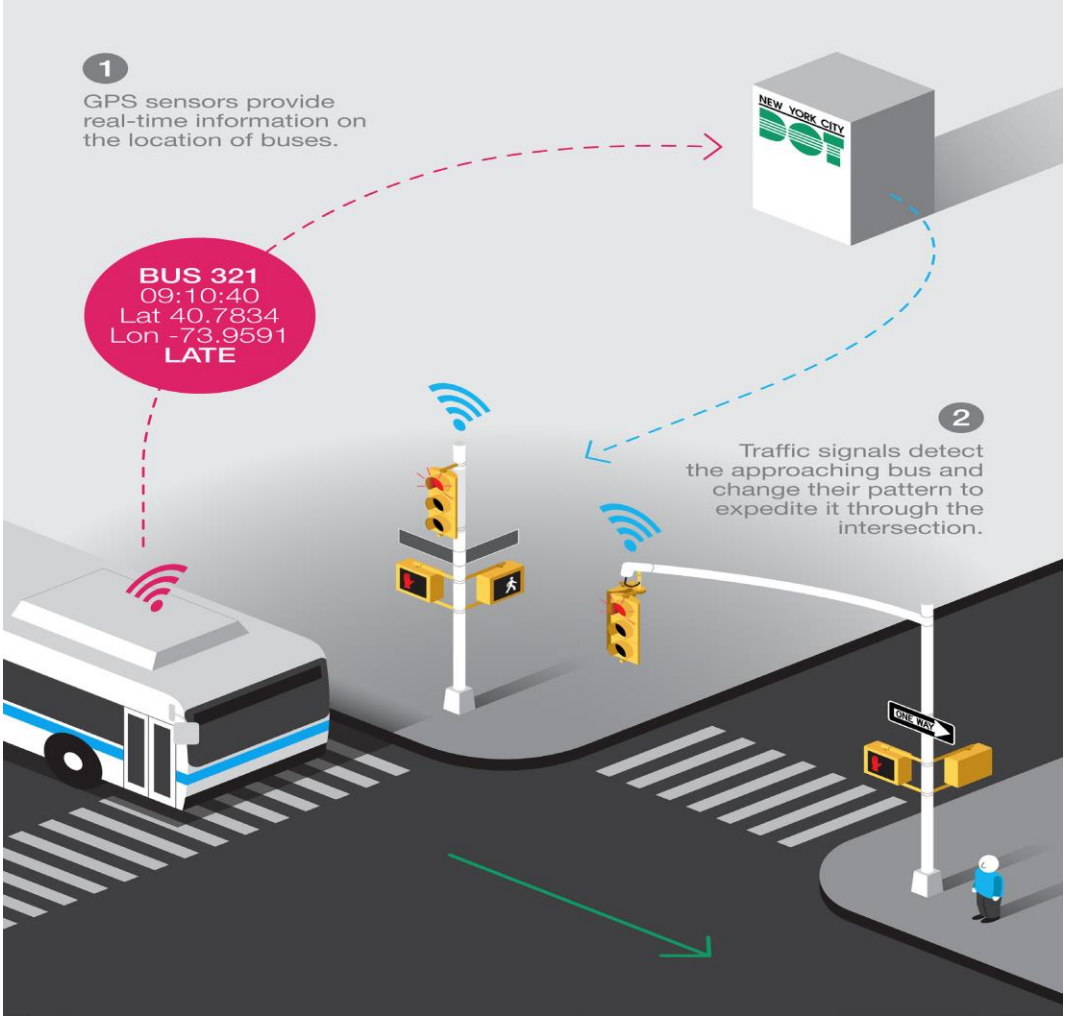


Source:
https://www.google.com/search?q=building+a+smart+equitable+city+nyc&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjEiIun3unhAhUPbFAKHa3nBoQQ_AUIDigB&biw=1366&bih=657

3.2.3 SMART MOBILITY

New York has over 2.5 million of passengers moving every day to work using the public transport. To maintain the movement without any delays and traffic, the metropolitan authorities installed a traffic signal Priority (its duty is to improve the dependency and efficiency of bus transit. They installed Transit Signal Priority (TSP) system in every bus so whenever they're getting closer to the interaction or traffic light, the TSP will change for early green or expend the green light knowing the buses expeditious passage through the traffic light.

Figure 3 show New York smart city concept



Source:

https://www.google.com/search?q=building+a+smart+equitable+city+nyc&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjEiIun3unhAhUPbFAKHa3nBoQQ_AUIDigB&biw=1366&bih=657

3.2.3 SMART ENVIRONMENT

New York city has the biggest sanitation cleanliness department where more than 10,000 tons of garbage can come from the industries and the residents. To manage all these waste without letting the garbage can to be full which will cause pollution. So, the New York city in collaboration with the Business Improvement Districts (BIDs), came up with a system called BIGBELLYS. This system uses wireless sensors to detect the level of every garbage can and the sanitation service to empty it in a good time so as not to pollute the environment. Moreover, in addition to the Smart environment, they talk about Smart water quality monitoring, in this model, the department of

environmental protection installed a remote monitoring system that check on every water station in the city and watershed. The system later upgraded to Robotic Monitoring Network where at each station there are sensors that automatically send water data to the DEP headquarters and always shows the actual time of water quality and supply. The water data detected in the operational staff office showing information about the level so that the staffs can order before it reaches the taps in the city.

3.3 SYDNEY STATEMENT

Sydney is the capital of New South Wales state in Australia, while the State has the population of 7.9 million, Sydney cover about 4.6 million population in the state that makes it the most populated city in Australia (Jopson D. 2012). Their vision for 2030 is to make the city GREEN where the world will see them as environmental leader with good environmental act (Moore 2014)

3.3.1 SMART ENVIRONMENT

For the city of Sydney to become sustainable for living, the city council took some measures to deal with waste. In the past, Sydney used to have a traditional method in dealing with waste where they dumped their garbage in the landfilled. And the problem of it is that, the landfill always produce greenhouse gas and it contaminate the rivers around it. Also, it's hard to find a new area for landfill and even if they found some, the garbage must be transported for a long kilometer to the landfilled. So, in moving forward for the new ideas, the government or the council uses the city staffs and some private company contractor to help in the collection service. They stated by educating the public about how important the waste they are making from their home is important to the city. In the education, the government stated that, their waste will be divided into 3 parts includes Garbage where it will be collected within a week. Recycling also be collected within a week and the Garden organic will be collected fortnightly or by mowing. Moreover, the council members of Sydney introduced new idea where the city will use waste management to improve sustainability. These technologies can retrieve resources from the waste i.e. deriving of energy from the waste. This system help avoids reuse waste, reduce greenhouse emission and purify water.

3.4 HONGKONG STATEMENT

Hongkong is the capital city of China located in the south coast of China. With the population of 7.4 million, the vision of Hongkong's smart city agenda for 2030 is to make their city achieves sustainable growth as well as becoming green. They set up some initiatives like Smart Living, Smart Mobility and Smart Environment that will help them achieve their goal (PWC Report ,2017).

3.4.1 SMART LIVING

In Hong Kong, human activities are the most cause of air pollution that turned to illness and premature death. As we all know, Hong Kong is one of the populated cities in the world and when their impact on air pollution is high, you can see how healthier their citizens are. So, the government has made a huge step on air quality, a smart, green and residence in the city strategy for improving the quality of air in the environment. For the government to have the ability to reduce air pollution which will help them save money in the future public health care, the government tackled other health issues like clean water and food security which mostly affect individual's well-being in the city.

3.4.2 SMART MOBILITY

Hong Kong as a populated city in the world, always millions of people go out to use the public transport every day. So, for Hong Kong to be Smart, the government provided Smart transportation system and traffic man operation. This System add ICT and new technology help in promoting Smart city. ICT helps in updating the software used in traffic management system, this is to show how smart Hong Kong is. An upgraded transport system provides traffic information automatically and how to control this pedestrian flow or traffic flow. When it comes to public transport, this system alerts the real time information about the service of multiple mode of transport and this also allow people to choose which transport or route they will take.

3.4.3 SMART ENVIRONMENT

This is how Hong Kong government is set-up. Their well-built environment with the assents of lifting people living in the city out of poverty- every life and quality of life is seen valuable. For Hong Kong to be a Smart city, they make use of technology, sensors to achieve their target. Their aim is to create the best smart environment with the help of technology in their environment, integration and optimization in urban centers would improve effectiveness and decrease their influence on the environment. For Hong Kong to be successful, the government goes into

agreement with power companies. In the agreement, the government put his burden on promoting energy effectiveness and spread out renewable energy. The Hong Kong Government protection Department has a concern on upgrading their water system in the environment. With the signature from the authority of sewerage projects and the law enforcement legislation, the river quality of Hong Kong has performed well over the centuries.

4. EUROPEAN PERSPECTIVE

The European Union (EU) has keep their efforts on Smart city strategy for achieving smart growth in a 'smart' way for its areas. With the European perspective, there are only three (3) cities compared with the smart city initiatives.

4.1VIENNA

Every city emphasizes the smart city approach as a way of changing on its own path. Some cities target technology possibilities, while others focus on decreasing the greenhouse gas emission. But Vienna proceeded with its chosen and prosperous path by backing a lot of objectives that led them to a Smart city. And these objectives are Quality of life, Resources, Innovation.

4.1.2 RESOURCES

For Vienna to maintain their goals of being smart, the resources surrounding the city, politics and administration targeting important steps in some areas of energy, mobility and building. This contain some debate of energy system, how energy is used, what the city has and how the city looks now, how the transportation system in the future would be like and how they can use ICT to improve social services.

Objectives of their energy: as Vienna make greater amount of energy efficiency, they will reduce energy consumption per capita by 40% up till 2050 at the same time, the energy input dropped from 3000 watts to 2000watts.

Objective of building: Vienna has made a low-cost zero energy building for their new city footprint.

Objective of Infrastructure: there will be improved high standards of Vienna infrastructure facilities by the year 2020, Vienna would become the most developed European city with respect to greater infrastructure development ushered by open government.

4.1.3 QUALITY OF LIFE

Vienna specifically chose this approach like quality of life of its people added to necessary resources objective. In building this up, they came across with a strong objective in the area of healthcare of its people, social inclusion and environment.

Objective in healthcare is to improve the health condition of life and health ability of all the population groups living in the city of Vienna.

Social inclusion every individual living in the city are to enjoy good atmosphere in the recreational centers and safe life condition no matter your background, psychological condition.

Objectives of Environment: Some years to come, all the achievement by the municipal waste management have got to 270000 times of CO2 like the results planned measurement and upgrade.

4.1.4 INNOVATION

Vienna is considered an innovative leader because of their experimentation, education system and economy which helped on the road to becoming a smart city. They target some functions like intelligence, some innovative methodological way to using technologies. Their education system is based or rooted in research, technology and innovation to citizens while their economy flourishes enabling job creations and robustness in the state welfare.

Result: RTI: by 2050, Vienna will have the best European innovation and research centres In 2030, Vienna city will attract a lot of skilled researchers from international firms. **Objective of Education**: by 2020, Vienna City will increase the number of teenagers who are studying by making compulsory for everyone to further their level of education. **Objective of Economy**: by 2050, 80%, shared technology- intensive artefact in the expert system will increase as compared to 60% in 2012.

GOAL 2050; the goal of Vienna city by 2050 is to have a vibrant metropole and be the attractive city in Europe. This goal is on strategic plans for long term measures of the city

4.2 PARIS

Paris is the capital city of France with a population over 2.2 million and the population around the city is over 10.1 million making the province one of the populated urban in Europe. Paris to make

their city Smarter and safe to live, they came up with a strategic idea where they will build a multiple high-rise building with strong energy attached to it across the city and talk about sustainability problems which all the districts are facing now while given solution on it way. They also have plans for climate energy which aims at decreasing the greenhouse gas emission by 2050. For them to reach the level of good living, they have planned to raise the integration of several energy to maintain the effort or on the other hand uplifting individuals to adapt the ecofriendly standard of living by 2050 (Pierre-E, 2016).

Paris as a capital of France and most populated city in France, with their GDP of 12b euros in 2012 and score 30.3 GDP of France making them one of the richest cities in Europe aim of attaining smartness through the initiatives discussed below;

4.2.1 SMART LIVING

Air quality is the major goal of the city of Paris, fumes from vehicles remain the main sources of air pollution. A lot of polluted cars are decreasing in the city with the restricted tariff zone which have been put in place between September 2015 and September 2020 (Fredon, 2016). Paris introduced a project called the PARIS CAR-FREE which was held in September 2015 has helped to minimize the air pollution from 20 to 40%.

Municipal services are energetically working on reducing the impression of their assembly and cleaning activities on air and noise pollution. This will have a good impression on the citizens and their representatives who are working on the same field. There are new procedures that are built on a high-tech 24-hour care. A lot of the equipment which are in the system /market are all tested in Paris ground. These trials concern vehicles, hybrid washers, electric sweepers. This investigation will be helpful in the City and other department of Paris. The figure below shows the example of how electric blowers are used to clean school backyards, streets and gardens.

Figure 4 shows the Paris smart city concept

*Source:*https://www.google.com/search?q=street+cleaning+machine&hl=enCZ&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiNidOk4enhAhXPUlAKHS6XBdkQ_AUIDigB&biw=1366&bih=657#imgrc=0hHvV3ocMAd2XM:

4.2.2 SMART MOBILITY

Paris Smart mobility section has a unique structure in helping the avoidance of traffic, delays of busses and people's living in the city. The city council put in place some measures of changing the landscape of the city by making more space for other ways of transport like bicycles, public transport, private transport. At the same time, they enlarged the city roads to enable drivers travel at an average speed of 30km/h that helps in decreasing dangers of accident and noise pollution. As of 2014, 37% of the street of Paris mostly within a close range of schools were all lean to 30km/h. The goal of this initiative did not only construct and expanded roads near schools but also constructed many roads across the streets of Paris, leaving the superhighway at 50km/h.

Furthermore, the city council introduced Autolib where individuals will be rented out a self-service vehicle or bicycle. To highlight its vows in service of a Smart mobility, the city has planned to install a network of 180 high speed recharge position in 60 terminals in the city. The city of Paris has ironic and diverse system around its mobility, coming together big firms like Blablacar is a car sharing actor in France where drivers and individual agree to travel together to place without individuals worrying their self in looking for bus stations/ platform, Also VERT CHES VOUS is a bicycle or truck company with the goal to transport logistics across the city. With its electric vehicle, it gives out noisy free solution for delivery.

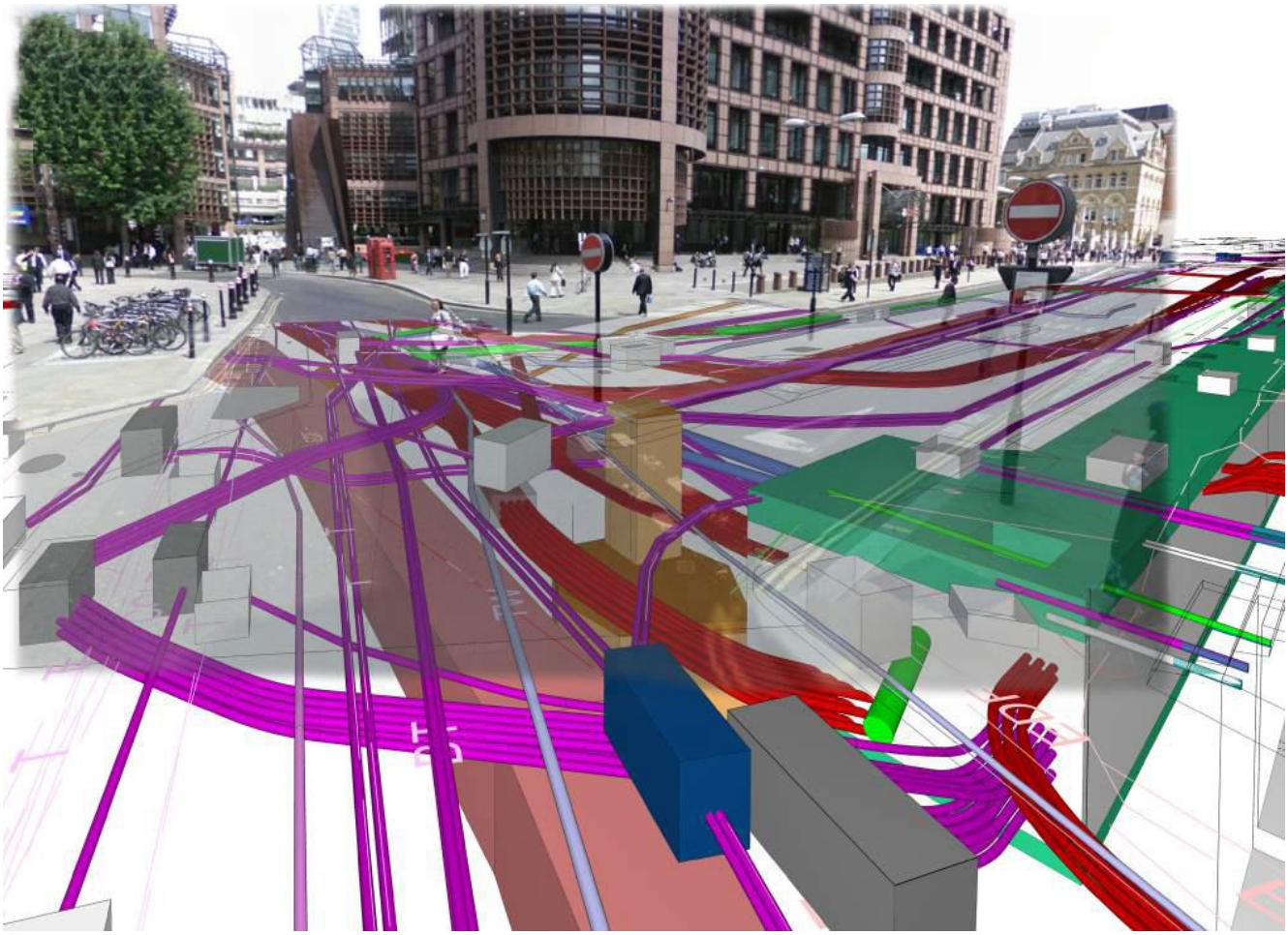
4.2.3 SMART GOVERNMENT

One of the ranges that Paris use in Smart city is participating initiatives where it was pointed to the citizens or individual living in the city to participate or get involve in democracy. Paris has 123 participation council across the city. Paris is an open city and want to inspire citizen participation in government. A key example of this method is the move involving budgeting, that has helped the Parisians to submit over 5000 application to the city hall department, which has turn out to numerous hundred project being put to Parisian voters. One of the councils called the youth council in 2015 suggested with respect to air pollution, COP21(to reduce the greenhouse emission), recycling.

4.3 LONDON

By 2021 London's population will increase by a million, that's highest rate of acceleration ever. With these demographic estimates, the city will have more than 641,000 jobs, with 800,000 homes, and more than 600,000 extra people will have to travel by public transport at highest times by 2031 (Boris Johnson, Major 2014). 'Smart London' vision that puts high-tech innovation at the heart of creating the capital to be a better place to live, work and invest.

Figure 5 show London smart city concept



Source https://www.london.gov.uk/sites/default/files/smart_london_plan.pdf

4.3.1 SMART ENERGY

London accounts for closely 10% of the electricity power consumption in the UK, henceforth improve the efficiency of the power system and the decreasing of fossil fuel dependency is at the lead of London's energy policy. Initiatives are trying to recover demand side through smart metering and energy storage, while inspiring renewable energy production. Mayor of London and the UK's general government have dedicated to drop carbon dioxide emissions by 80% (from the 1990 baseline) by 2050. To accomplish this, several actions were taken, as well as improving energy performance of new and old buildings, producing energy from geothermal power, and

shifting to smart energy demand and storage. The Mayor set a goal to supply 25% of London's energy from home ground by 2025 (Great London Authority (GLA) 2018).

As the Smart city of London is concern, the Major have been targeting to progress energy activeness in the transportation area throughout the city. Street lighting came in which were introduced by the Major to decrease the amount of energy consumed and to master the visibility of A4 road that were opened across the city of London (Duncan, 2017). London's bus system now structures more than 80 hydrogen fuel buses and about 17 electric buses were introduced and is an indication of the commitment from Major to decrease energy consumption.

4.3.2 SMART MOBILITY

Transportation system is one of the priorities that the major of London wants to improve with the use of data and technology. While the population of the city increases, it creates a lot of challenges for the transport sectors which add up significantly to air pollution. Air pollution is mainly caused by traffic and road vehicles. Sixty percent (60%) of nitrogen dioxide pollution comes from the transport sector. To minimize the pollution in the city, The Major in collaboration with Transport for London (TFL) came up with inventive technology called Surface Intelligent Transport System (SITS) to manage traffic in the city. SITS is a system of smart sensors that have stood throughout the city and it merit will improve in TfL capacity to manage London road space.

London's road network which has help to manage road space in time by cracking additional road Capacity. Traffic movement will be levelled over area and it'll give a proper information to people on a time of travel. This advance in technology will allow TfL to enhance the use of road space in London, decrease traffic and improve journey time with more merits while the pollution will also decrease by Stop Start driving situation. In addition, a Smart Ticket system were also introduced in London transport sectors, which allows a contactless payment for ticket as well as a cash free buses, this attach to traffic information, buses allocation data (Johnson, 2014).

4.3.3 SMART LIVING

The health of inhabitants is a key significance to Major and it his task to provide a higher quality of life for all, but because it is essential for a fruitful economy, a quality healthcare system that will decrease city benefit bills and a reduced state benefits bill. The city of London is now facing some health challenges that every city in the planet are facing. London is facing many of the health

challenges that other cities around the world are facing, such as an increase in the rate of overweightness, dementia and long-term chronic health conditions. However, for the Major to help minimise this challenge like Obesity where it develops to diabetes, heart disease, stroke and cancer as well as mental health. Telecare Solution were introduced where Isolated care devices permit the aged and people with disabilities and mental health snags to be in their home whereas they receive good care. It contains electronic assistive technology devices that gather, store and transmit information to a remote source, normally it needed a specific type of response. Telehealth devices also transmit diagnostic information to medical staff to support the treatment of long-term conditions (D. Gann 2014).

5. CITIZENS ENGAGEMENT

It is the same as participation democracy and in the participation democracy, it has to deal with when the government start up a project for the city while taking opinion from the citizens about the project and involving them throughout the project as to the formulation of the start of the project to the end of it because the citizens will be using it or be affected by the project. In some cases, it is the citizens who initiate or ask for that project to be undertaken by the government which makes them custodians of such projects.

Table 4 Technology use and citizen engagement in smart city innitiative

	ECONOMY	GOVERNMENT	LIVING	MOBILITY	ENVIRONMENT	PEOPLE
TORONTO				senses		
NEW YORK			AMR and LED	TSP system	sensors	
SYNDEY						
HONG KONG				Sensors	Sensors	
VIENNA						
PARIS		Citizens participation	Car free paris	Autolip,Blablacar		

LONDON						
TECHNOLOGY USED BY THE CITIES						

From the table above, Paris is the city that uses citizen participation in their smart city initiative. For example, in the Smart Government initiative, citizens can form groups in participation of the city democracy. One key example was a group called youth council. The youth council made a proposal to the city council regarding air pollution and recycling on 2015, which their proposal was accepted, and put in place those proposals for the benefit of the people regarding smart environment initiative of Paris.

6. TECHNOLOGY USED

From the table above, on Smart mobility, only Toronto and Hong Kong use sensors to detect or to manage traffic in the city to prevent air pollution or to delay individuals to work while New York used Transit Signal Priority (TSP) system to control traffic signal. Approaching buses then receive green light straight up to avoid delay of workers. Furthermore, in the Smart environment, New York and Hong Kong use wireless sensors to detect the level of garbage in the dustbin across the city. About Smart living, New York uses AMR and LED where the AMR help individual to know how much water they waste every day that will help reduce water consumption and the Light Emitting Diode (LED) which is affordable, quality lighting and can reduce greenhouse emission. Moreover, Paris uses Car Free Paris in Smart living initiative, electric-free cars are used to clean up the city and the park yard, it is noise free and can reduce air pollution in the society while in the Smart Mobility initiative, they used technology called AUTOLIB where people can rent a self-service car and the car has over 60 auto charge stations across the city.

7. CRITICAL SUCCESS FACTORES OF SMART CITIES TO THE WORLD INITIATIVE

There are four (4) smart city initiatives chosen from the world perspective. They had some successful factors that all the cities in the world performed to reach their targets. These factors are Plantation, Traffic Management, Citizens Welfare, Citizenship engagement and Waste Management.

7.1 MAKING USE OF THE ENVIRONMENT

Toronto use Smart environment to achieve their target in smartness, by doing this, they started by improving and maintaining the old or existing trees that can absorb fusil waste in the air, that provide shade for its people and gives them fresh air to breath. There are some critical factors that they used, and these are Funding, government policy and commitment.

7.1.1 FUNDING

This project cannot be funded by the government alone, so the city Council make a collaboration or partnership with entrepreneurships as required. These entrepreneurships were including, non-government organization, private sectors and state agencies to expand the capacity to reach the sustainable goal of the city. With the help from their entrepreneurs, they managed to acquire the amount of $7.1 billion, on tree planting which lead to $700 for every tree, they now have over 10 million trees in the city that help to decrease energy from heating and cooling the city.

7.1.2 COMMITMENT

The city officials, and several participants at the conferences accepted in backing of this project, knowing they should follow up the progress meeting the City's tree canopy cover target. Moreover, data collection and analysis, mainly in a city like Toronto, can be very inflated and time-consuming. Therefore, they introduced strategic approach requiring the focus on representative measures that can be gained with data and its either collected or can be readily attained. Furthermore, they plan to start by deciding the various measures programs that are approved on a trial basis for a period of three (3) to five (5) years to estimate which are most effective. The suggestions made by City staff, sponsors and members of the public that should be tracked the number of trees planted, which one survive or the health of it, the level the program, the cost involve and how much the city the city contribute to support this project. This monitoring will allow the city to compare the project success.

These metrics will allow the City to compare the success of the various programs, estimate the returns for the dollars invested, and provide an indication of the proportion of trees planted that are becoming well-established, and therefore more likely to contribute to the City's canopy cover targets.

7.1.3 GOVERNMENT POLICY

Government policy on tree canopy has affected the project on Toronto in the area of tree planting and has also acted as a guide on secluded land to help reach their tree canopy target. They have good ambition for planting on private land, on the street, everyone's participation is critical to achieving our tree canopy target. They have a lot of options to plant the trees ranging from a homeowner looking to have a tree planted his backyard, a community group looking for funding to plant trees in their neighbourhood, or just interested in learning more about trees. The City with Local Enhancement and Appreciation of Forests (LEAF) and the Toronto Parks and Trees Foundation (TPTF) to propose a diversity of programs to Toronto residents.

7.2 TRAFFIC MANAGEMENT

Managing the traffic in the city is one of the major priorities every government want to get rid of in the city of smartness, three (3) of the four (4) cities mention traffic management and how they tackled it.

7.2.1 GOVERNMENT

The City of New York has plan to manage their traffic. In this, the governor has priced vehicles driving to Manhattan to be charged $11.5 per car, $2 to $6 for taxis and hired cars and $25 for trucks. These proceeds will be used to fund repairs of the city transport system even as the strategy will also help record traffic in the city. On the other hand, Hong Kong with the growth rate of 3% of their public vehicles, 1.7% growth rate in their population will create a problem of road space, car park and traffic. In traffic management measures that they put in place, mainly managing private cars in the city. They introduce ICT software to manage traffic in the city to endorse their smart mobility. This system provides automatic real time in traffic flow, people and cargo flow in the city. Meanwhile Toronto uses different approach in managing their traffic, they started by constructing bicycle road and strengthen the old once to reduce the number of people travel by car to work and the government divert the road from the city to outside the city for cargo cars who pass through the city to different destination to reduce traffic. On the other hands, Hong Kong Government uses different approach in making traffic in the city, firstly was to manage traffic information system real time in the city, secondly was to follow freight logistics in the city and last was to put effective sensor in all the public transport in the city so as to avoid traffic.

7.3 WASTE MANAGEMENT

The waste management under the initiatives in world was some cities priority to manage it, the mission of Sydney for 2030 plan was to decrease greenhouse emission. The city is suffering from their old source of electric supply station that produce electricity from coal fire that help them in managing their waste, so they turn away from it where they introduce of master plan to manage their waste. At the same time New York also have plans in dealing with waste in the city was to decrease the greenhouse gas emissions

7.3.1 GOVERNMENT POLICY

The government believe the best way to make use of their waste to useful energy or fossil fuel is to collaborate with private company contractors to help manage their waste. They came up with technology to produce energy to the city is through their waste after they have recycling what they need. The government acted by promoting Extended Production Responsibility (EPR) which was to concentrate on the waste. Their action was meant to deal with waste items and to improve their Smart city performance. They established a permanent reuse or collection center for harboring waste. They evaluated the feasibility of jointly establishing a center with some council in agreement with their regional cooperation action (Sydney 2030). The motive of this plan is to meet their crops, greenhouse emission, environmental merits and to reduce greenhouse gas emission. On the other hands, New York uses similar way in dealing with waste, they went agreement with private company in collecting the waste for recycling.

7.3.2 EDUCATE THE PUBLIC

The government set a plan to educate his people about how important the waste they make in their household and business centers so important, the education instruction talks about the problem area and misinterpretation about aspect of recycling program. They set a target of reducing their waste in the city by improve the recycling output or outcome, improved data management, sustainable project, to have a fast treatment of future solution. The outcome the waste management project that was share to the people is to transform no recycling waste material to renewable and non-runic fuel gas, clear and clean city to prevent air pollution, also retrieving material and energy resources from their waste with effectively leaving no waste in the landfill and lastly they will use

their renewable non fossil gas into natural gas for dosing into gas that will decrease the carbon energy delivery.

7.4 TECHNOLOGY USE

In their collaboration with private business company, they introduce wireless sensor called BIGBELLYS which detect the level of baggage cans in the city and to empty the old once out.

7.5 GOAL

Sydney 2030 linked objective for treating waste as a valuable resource. This strategy adopts targets to 2021 for our own operations Recycling and resource recovery 50 per cent resource recovery of the waste from the city parks, streets and public places by the end of June 2021 70 per cent resource.

7.6 CITIZEN WELFARE

Citizens welfare is the type of support every government give to the people living in the city like air quality.

7.6.1 AIR QUALITY

The health of people living in the city matters to the New York government. Hence the government put some measures in the city to help his people enjoy the live they want. they started by reducing the air pollution in the city, the Department of Health and Mental Hygiene conducts steady air quality reviews determine the particulates, nitrogen oxides, sulphur dioxide, elemental carbon, and ozone levels. They use data from society air survey to present procedures targeting main local pollution sources. Thus, once from the heating system in some building. On the other hands, Toronto government understood the local air quality in the city, they introduce a study to assess the existence of pollutants in the city and the potential growing health impacts on areas around Toronto. The results help set priorities and actions to decrease subjective and improve the health of Toronto residents. The study also pulls out the two sources of emission disturbing the quality of air in the city are fuel from vehicles, gasoline and diesel, and fuels used to heat homes and businesses. These affect the air quality in the city of Toronto. Moreover, Welfare is a support

government provide for its people in the society, support that will make everybody in the city feel good without any extra cost like air quality that led them to smartness.

The Environmental Protection Agency in Hong Kong initiated a clean air plan project in March 2013 to outline widely the problems Hong Kong was regarding to air quality and to give a summary of the relevant air quality upgrading policies and measures. They will be executing a long procedure covering the land and sea transport, power plants and non-road mobile machinery to decrease air pollution.

8. CRITICAL SUCCESS FACTORS OF SMART CITY ON EUROPEAN PERSPECTIVE

There are some success factors that the European union have in common in smartness, these success factors help them achieve their goal.

8.1 MAKING USE IF ICT

Information and communication technology are one of the ideal innovation drivers that make up the special asset of Vienna. The city allocates high priority to this sector – from science to business and public services – under the Smart City Vienna strategy. It relates to both the basic and infrastructure appeal of ICT and how ICT is influencing whole lot of services in an innovative way. At this point, a lot of essentials duties lies in the way that the city views itself as an advanced client, provider and enabler of digital services. In this background, Vienna is dedicated to the open government principle and the related concepts of involving, but also to data security. The further development of high-quality e-government services of the City of Vienna is on the way. This concerns important matters such as the Virtual Office or the open government data catalogue, which is currently meeting with great interest on an international scale as well. Furthermore, Paris government introduce different technology like Blablacar, AUTOLIP, and Car free Paris where the Blablacar people sharing their journey for others to join, AUTOLIP is where the people rent self-service or electric cars (Fredon, 2016). Moreover, London uses ICT in decreasing their traffic in the city, the government with collaboration with private company, they came up sensor called Surface Intelligent Transport System (SITS) to improve the traffic system and road space in the city (Johnson, 2014).

8.1.2 GOVERNMENT POLICY

The City of Paris desires to let their citizens to govern their priorities regarding the use of a part of the Municipal asset budget. On a verge where Parisians can send petition for investment and, on the other hand, they can vote for the distribution of proposals to Parisians that they consider a priority. The execution of the participatory budget characterises a major democratic innovation. Parisians are invited to give their view directly on the allocation of the City's investment budget, which by 2020 will represent represents half a billion euros while London uses different format in policy making, the major is responsible for setting up the city budget in specific matter on like Paris allow their citizen to policy making. IN Vienna, the government invest in its citizens like in education and health of the people. Their education is based on research and technology, to improve the air quality in the environment to improve the health of the people.

8.2 IMPROVING THE ECOLOGICAL QUALITY IN THE CITY

Parisians strength and well-being is at the city first concern regarding smart city. The capital, one of Europe's deepest cities, they welcome more than 30 million to the city every year. The city's economic prosperity is awkward, the one (1) of which remains road traffic and air pollution. The road is most used means of transport to the Parisians people in the city.

8.2.1 TRAFFIC CONJUCTION

The diversity of advance undergo has contributed to this: building civilised spaces, applying "30 km/h" and public traffic zones, refurbishing their parking spaces, improving their tramway, structured protected bus lanes and creating locality bus lines, spreading self-service bicycle and car rentals, supporting electric vehicle purchases (taxis, electric bicycles and motors, charging spaces). This all contributed to the strategy the city takes in smart city. Furthermore, these initiatives will expand to air quality as well to decrease noise pollution in the city. This will establish by redefining mobility to help respond quickly to peaks in pollution and boost non-motorised means of transport, public transport, air transport and electric mobility. This strategy is in this part detailed the profit of being sharing public spaces and taking into consideration of environmental effect of goods transport in the city.

8.2.2 THE CITY IS INSTALLING FACILITIES TO SHARE PUBLIC SPACES BETTER

Changing the city's countryside is a condition which were given more space to non-motorised means of transport. The many developments made to public spaces encourage smartness means of transport and the transit of pedestrians, cyclists and public transport. Moreover, new actions that extend the 30km/h speed limit reduce the risk of accidents and noise pollution in the city. Meanwhile London uses similar approach in reducing air pollution in the city, 60% of air pollution are from the transport system so the city with collaboration with private company came up with sensor that will manage road space and reduce traffic in the city.

9. METHODOLOGY

The aim of the thesis is to find out factors that influence the success of smart city initiative. Factors will be derived based on literature review. In other to achieve the aim, data will be collected and a research method will be adopted for this purpose.

9.1DATACOLLECTION

Information from Primary and Secondary resources was used in this research. Primary resources consist of unadulterated data acquired from respondents. s. On the other hand, secondary resources in this research consisted of information from government departments, organizational records and other information also collated for other research purposes.

9.2 RESEARCH METHOD

In reference to the aim of the paper, qualitative research methodology was opted for to be used. In qualitative method according to Ashley Crossman, it is used to reveal trends in thought and opinions on some problems or topic with regard to smart city. Some public methods contain groups discussions, individual interviews, and contribution or observations in an event. In this thesis, because I want to find the critical success factors of smart city initiative, I selected Toronto, Hong Kong, New York, Vienna, London, Sydney, Paris. In section of the cities, I grouped the cities in to two (2) different part, thus Smart cities in the world and Smart cities in Europe which will give me a perspective of their critical success factors. Regarding smart cities in the world, they comprise with New York, Hong Kong, Toronto, Sydney and that of Europe comprises with Paris, London and Vienna and most of the cities in the world learned from them

in to smartly develop as well, this is the unique feature about the selected cities in this thesis and the reason they were chosen.

9.3 LIMITATION OF THE THESIS

The limitations of the thesis are those features of methodology I mentioned above that influenced the clarification of the findings from the research. Firstly, the study was limited by deficiency of previous research studies on the topics. There weren't enough studies on the smart cities initiative as it is a new concept. Secondly there was also lack of reliable data limit the study as most of the authors could not get enough data for their article. I believe that due to the information I gather from different angles or sources it makes it validates the sample and research purpose enough to carry out this research. Even though I think the deficiency of previous research study topics and lack of reliable tata has limit my paper yet due to the information I gathered from some authors and major of some cities, the problem can be said to have been managed.

10. CONCLUSION

Smart cities seem to be the new darling of governance in the currently information driven economies. Web 2.0 and its constituents have been generally accepted as an overwhelming way of integrating all pillars for a sustainable growth and innovation in the economy. However, participation of citizens, in this fast-paced world and even technology dominated society seems to be an issue and it is hoped that with the advent of governance via various technological channels coupled with a high participation rate could result in proper development of sound strategies to tackle nibbling societal issues.

REFERENCE

Albino, V., Berardi, U., & Dangelico, R. M. (2015). Smart cities: Definitions, dimensions, performance, and initiatives. Journal of urban technology, 22(1), 3-21.

Barrionuevo, J. M., Berrone, P., & Ricart, J. E. (2012). Smart cities, sustainable progress. IESE Insight, 14(14), 50-57.

Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., ... & Scholl, H. J. (2012, January). Understanding smart cities: An integrative framework. In 2012 45th Hawaii international conference on system sciences (pp. 2289-2297). IEEE.

Schaffers, H., Komninos, N., Pallot, M., Aguas, M., Almirall, E., Bakici, T., ... & Hielkema, H. (2012). Smart cities as innovation ecosystems sustained by the future internet.

Jopson D. (2013) "Sustainable Sydney 2030, community strategic plan 2013"

Horsman A. (2001). Financial Planning Division of the City of Toronto.Strategic plan for cycling in Toronto, 7-22

Sciolo J. (2017). Strategic Policy and planning Deputy city manager Toronto. Climate Action for Health, Equitable and Prosperous Toronto, 36-37

Sciolo J. (2017). Strategic Policy and planning Deputy city manager Toronto. Climate Action for Health, Toronto Environmental Progress, 14-15

Romoff J. (2016). Actions to Grow Toronto's Tree Canopy. General Manager, Parks, Forestry and Recreation, 7-10

Hollands, R. G. (2008). Will the real smart city please stand up? Intelligent, progressive or entrepreneurial? *City*, *12*(3), 303-320.

Rosenborg, Zoe. (2018, January 19). NYC congestion pricing plan could mean $12 charge for driving in Manhattan. https://www.toronto.ca/legdocs/mmis/2016/pe/bgrd/backgroundfile-97020.pdf

Nowak, D. J., Hoehn, R. E., Bodine, A. R., Greenfield, E. J., Ellis, A., Endreny, T. A., ... & Henry, R. (2013). *Assessing urban forest effects and values: Toronto's urban forest*. Newtown Square: US Department of Agriculture, Forest Service, Northern Research Station.

Lindfield, M., & Steinberg, F. (2012). *Green cities*. Asian Development Bank.

Searle, G. (2006). Is the City of Cities Metropolitan Strategy the Answer for Sydney? PRACTICE REVIEWS. *Urban Policy and Research*, *24*(4), 553-566.

Kornberger, M., & Clegg, S. (2011). Strategy as performative practice: The case of Sydney 2030. *Strategic Organization*, *9*(2), 136-162.

Mairie De Paris (2015): Sustainable Development Report 2014-2015, https://api-site-cdn.paris.fr/images/76945

Jungwoo Lee, Hyejung Lee. (2014). Developing and validating a citizen-centric typology for smart city services, 1-9.

Caragliu, A., Del Bo, C., & Nijkamp, P. (2011). Smart cities in Europe. *Journal of urban technology*, *18*(2), 65-82.

Cohen, S. A. (2011). Sustainable New York City: A Work in Progress.

Saunders, T., & Baeck, P. (2015). Rethinking smart cities from the ground up. London: Nesta.

Townsend, A. M. (2013). Smart cities: Big data, civic hackers, and the quest for a new utopia. WW Norton & Company.

Caragliu, A., Del Bo, C., & Nijkamp, P. (2011). Smart cities in Europe. *Journal of urban technology*, *18*(2), 65-82.