

Determinants of a smart city in Morocco (Facteurs déterminants d'une ville smart au Maroc)

Pr. Aicha EL ALAOUI

Faculty Poly-disciplinary. University of Sultan Moulay Slimane, Morocco
Tel. (+212) 6 63 50 62 11 Email: aicha_elalaoui@yahoo.fr

“ Innovative Universities for Smart Cities ”

12th & 13th May 2017– University Ibn Tofail – Morocco

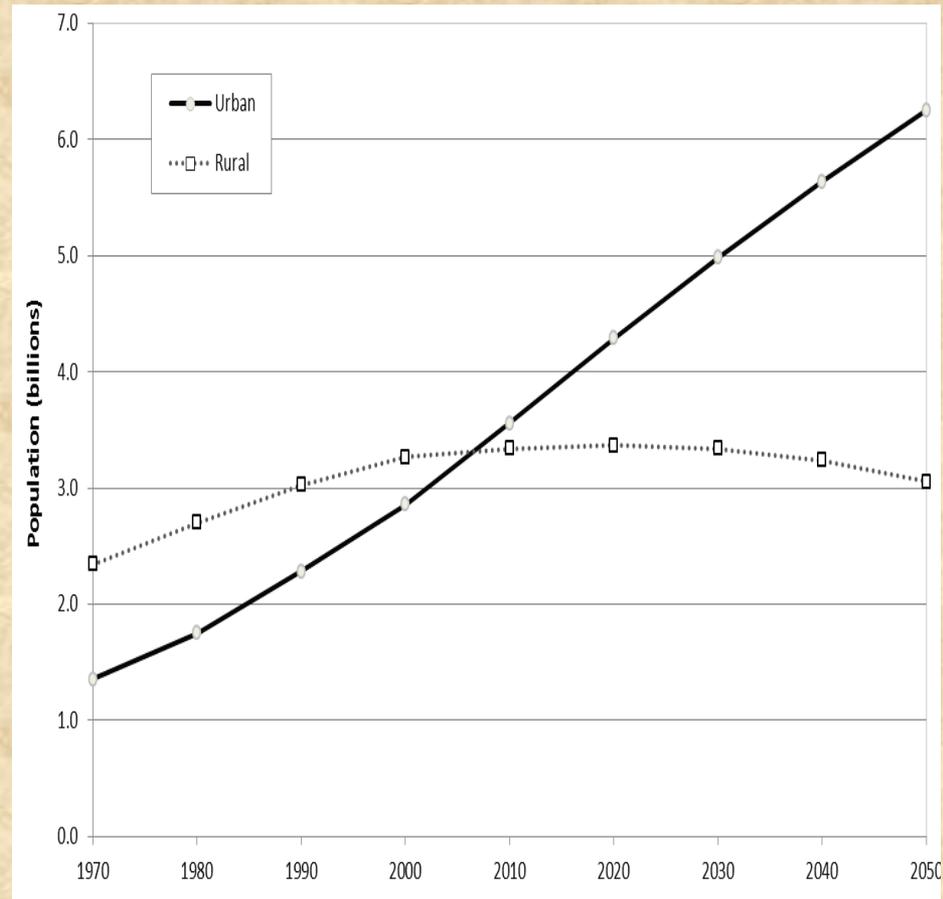
Plan

1. Introduction
2. Defining the smart city and its factors /drivers
3. Challenges linked to urban population explosion in Morocco
4. Model of Smart City for Morocco
5. Conclusion

1. Introduction
2. Définition d'une ville intelligente et les facteurs déterminants
3. Challenges d'une explosion démographique dans les villes marocaines
4. Modèle du SC pour le cas Maroc
5. Conclusion

Introduction

- After the **industrial revolution in the 18th century**, the economic activity changed manner of life, replacing activities associated with land by activities related to the process of production and transformation.
- Since the **beginning of the 21st century**, more than half of the world's population lives in cities.



Source: UN, 2014, p.27

Figure 1. World urban and rural population, 1970-2050

- In cities of the world's population of 10 million inhabitants or more: rise of **10%** in 2014 to almost **14%** in 2025, (UN, 2014, p.27).
- In urban of the world's population settlements with fewer than 500,000 inhabitants, decrease from **51%** in 2014 to **43%** 2025, (UN, 2014, p.27).
- In Morocco, population in urban agglomerations of more than one million was **22.65%** in 2015 compared to **13.98%** in 1960 (UN, 2016).

Living together in big cities generates several Challenges...

- **Social challenges, food challenges, security challenges, climate challenges and energy challenges.**

→ Policy makers must find the right solutions to these challenges to ensure planning, performance and sustainability of territories.

→ Can smart city as a strategy to alleviate the problems generated by the urban population growth and rapid urbanization?

→ What factors are important to be considered in assessing the extent of smart city and can improve the quality of territories and the way of life of the population?

→ Can the smart city will be synonymous an efficiently managed city, an ecological city, a pleasant place to live and well-connected city?

→ Are we getting smart city to offer the same services to all people in the globe and to talk about Smart Globe/World within material barriers as digital/numerical barriers?

Objective of this work ...

To determine the factors of a smart city in the case of Morocco.

The smart city is considered as a strategy of long-term.

2. Defining the smart city and its factors /drivers

- *Boulton, Brunn, and Devriend (2011)* confirmed that this concept is used all over the world with different nomenclatures, context and meanings.
- *Nam and Pardo (2011)* thought that the smart city was representing as an organic connection among technology, human and institutional components.

Authors	Core ideas 1/6
<p><i>Giffinger et al. (2007)</i></p>	<p>developed the European Smart City Model which is based in six key fields of urban development: <i>smart economy, smart people, smart governance, smart mobility, smart environment and smart living</i></p>
<p><i>Caragliu et al. (2009)</i></p>	<p>believed that city can <i>become smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.</i></p>

Authors

Core ideas 2/6

Washburn and Sindhu (2010)

defined the smart city as "the use of Smart Computing Technologies to make the critical infrastructure components and services of a city - which include city administration, education, healthcare, public safety, real estate, transportation, and utilities- **more intelligent, interconnected, and efficient**".

Harrison et al. (2010)

defined smart city as a city "connecting the physical infrastructure, the IT infrastructure, the social infrastructure, and the business infrastructure to leverage the collective intelligence of the city". Meaning smart city as an instrumented city, intelligent city and interconnected city.

Authors

Core ideas 3/6

*Lombardi
et al.*
(2011)

Confirmed that city can become "smart" if universities and industry support government's investment in the development of such infrastructures.

Triple-Helix Network Model includes ***(i)*** knowledge stock generated by the interplay of universities and industries; ***(ii)*** collective 'learning' due to the synergies deriving by the common action of universities and government in searching for efficient public management solutions, and ***(iii)*** their institutionalization within on the Market, which form the "contour conditions" that magnify the returns to the original Triple-Helix elements.

Authors

Core ideas 4/6

*Chourabi
et al.*
(2012)

Identified **eight critical factors** : management and organization, technology, governance, policy context, people and communities, economy, built infrastructure, and natural environment. "each of these factors is important to be considered in assessing the extent of smart city and when examining smart city initiatives".

Authors

Core ideas 5/6

Giovannella
(2013)

Typical Smart City operational approaches tend to adopt a **top-down functionalist model** that aims at optimizing, possibly in a standardized manner, the consumption of primary tangible and intangible resources (energy, water, materials, food, etc.) and to save time which is another important resource, usually associated with both money and individual freedom.

"smart citizen" are as "smart consumers" that must be educated to take rational behaviors compatible with the policies promoted by the municipalities aimed at promoting a sustainable economic development.

Authors

Core ideas 7/7

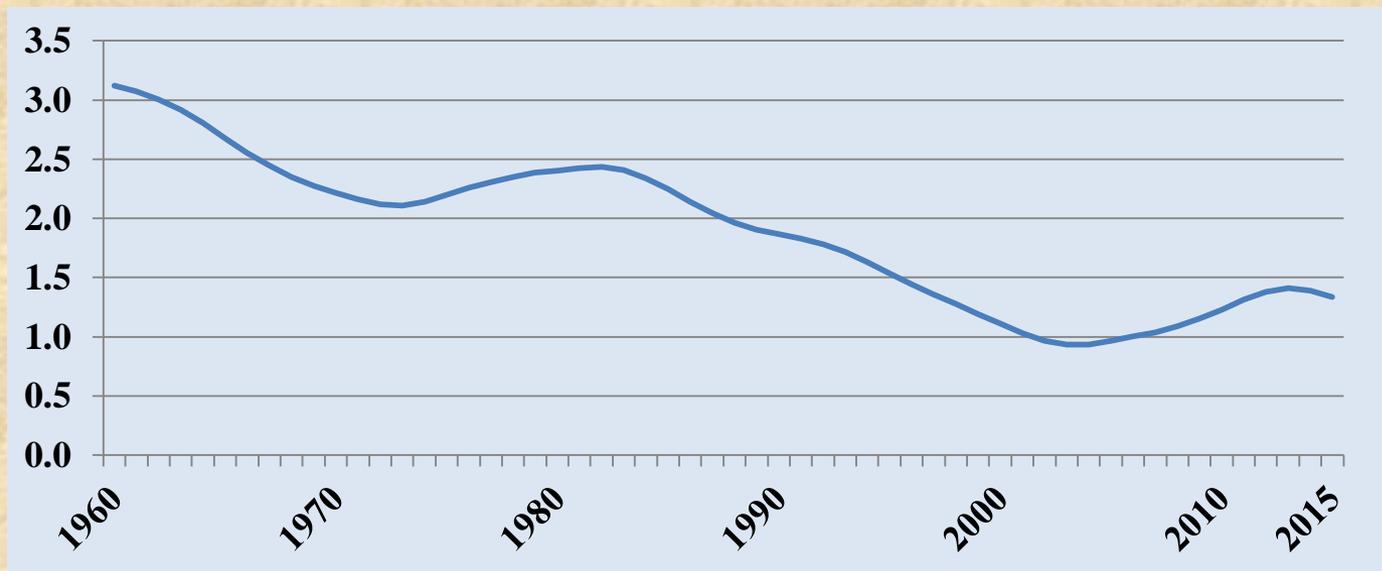
European parliament (report mapping Smart Cities in the European Union (2014))

confirmed the idea of *Giffinger et al. (2007)* that Smart Cities is "rooted in the creation and connection of human capital, social capital and ICT infrastructure in order to generate greater and more sustainable economic development and a better quality of life. Smart Cities have been further defined along six axes or dimensions: Smart Governance, Smart People, Smart Living, Smart Mobility, Smart Economy and Smart Environment", (European parliament, 2014, p.18).

ICT links and strengthens networks of people, businesses, infrastructures, resources, energy and spaces, as well as providing intelligent organisational and governance tools, European Parliament (2014), p.9.

3. Challenges linked to urban population explosion in Morocco

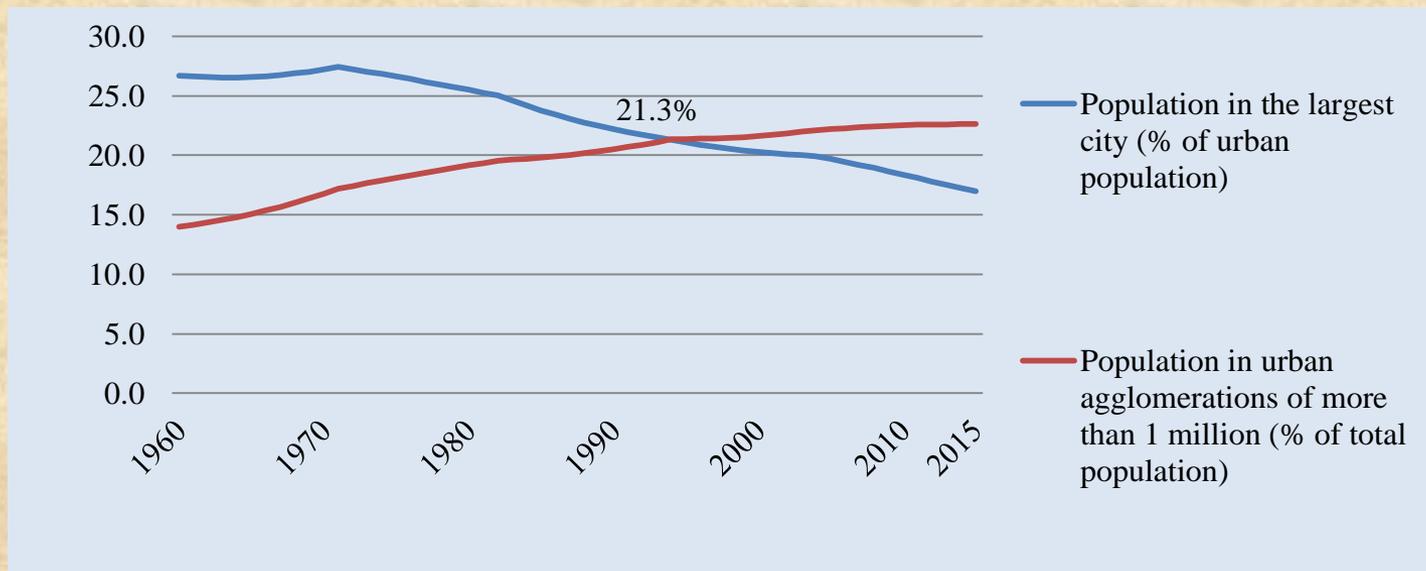
- In the last fifty-six years, the Moroccan population has grown at an average rate of 1.9% per year (figure 2), accompanied by an urban population explosion at rate 2.2% in 2015.



Source: Elaborated according to WDI data, 2016

Figure 2. Moroccan Population growth (annual %), during 1960-2015

- Moroccan population in urban agglomerations of more than one million has grown speedily at an average rate of 19.6% of the total population per year.



Source: Elaborated according to WDI data, 2016

Figure 3. Urban population % of the total population, during 1960-2015

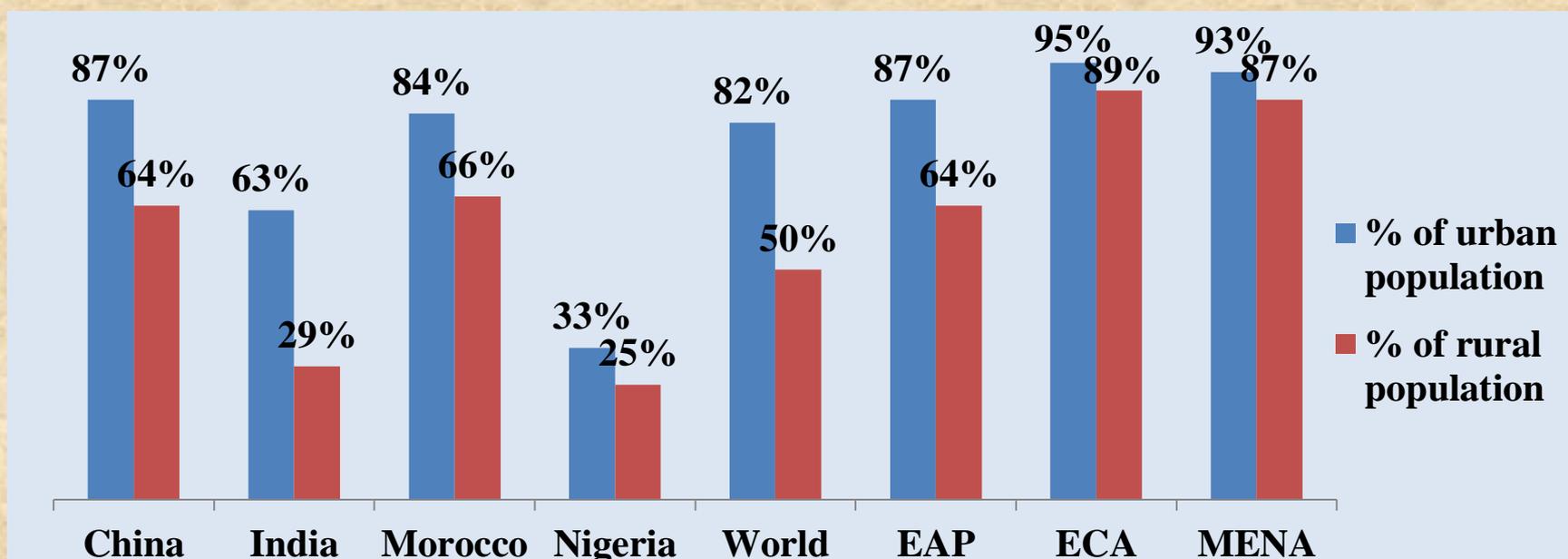
- 23% of the Moroccan population lives in urban areas of 1,000,000 population or more: it is more important than that recorded by India or Nigeria.
- Moroccan population in the largest city (% of urban population) is on its downward trend from 22% in 1990 to 17% in 2015.

Countries/ region	Urban population		Population in urban agglomerations of more than 1 million		Population in the largest city	
	1990	2015	1990	2015	1990	2015
EAP ^(a)	34%	57%	NA	NA	16%	12%
ECA ^(b)	68%	71%	17%	20%	15%	17%
China	26%	56%	10%	25%	3%	3%
India	26%	33%	11%	15%	6%	6%
MENA ^(c)	55%	64%	24%	27%	28%	26%
Morocco	48%	60%	21%	23%	22%	17%
Nigeria	30%	48%	12%	16%	17%	15%
World	43%	54%	18%	23%	17%	16%

Source: Elaborated according to WDI data, 2016

Table 1. Urban population distribution in % of the total population

- The rural population has difficulty accessing to improve sanitation facilities compared to the urban population.
- The lower situation is recorded in Nigeria
- The highest situation is recorded in ECA and MENA
- In Morocco, 84% of the urban population has access to improve sanitation facilities against only 66% of the rural population.
- Approximately all population (rural and urban) has access to the electricity in 2012 according to WDI (2016). This situation doesn't provide any information on quality of life of all citizens and access in all services.



Source: Elaborated according to WDI data, 2016

Figure 4. Access to improved sanitation facilities % of the total population, 2015

For development Index of Information and Communication Technologies (ICT)

- Report of International *Telecommunication Union* (ITU), 2016 declared that "nearly all countries improved their IDI values over the last year, but great disparities continue to exist between more and less connected countries ... The gap between the highest and lowest performing countries remained almost unchanged, at **7.76** points in IDI 2016" (ITU, 2016, p.3).
- ***According to their IDI rankings, Morocco is at 96th rank among the 175 countries with IDI value of 4.60 :***
 - ***83th rank : IDI access value of 6.07;***
 - ***95th rank : IDI use value of 3.40;***
 - ***127th rank : IDI skills value of 4.09.***

4. Model of Smart City for Morocco

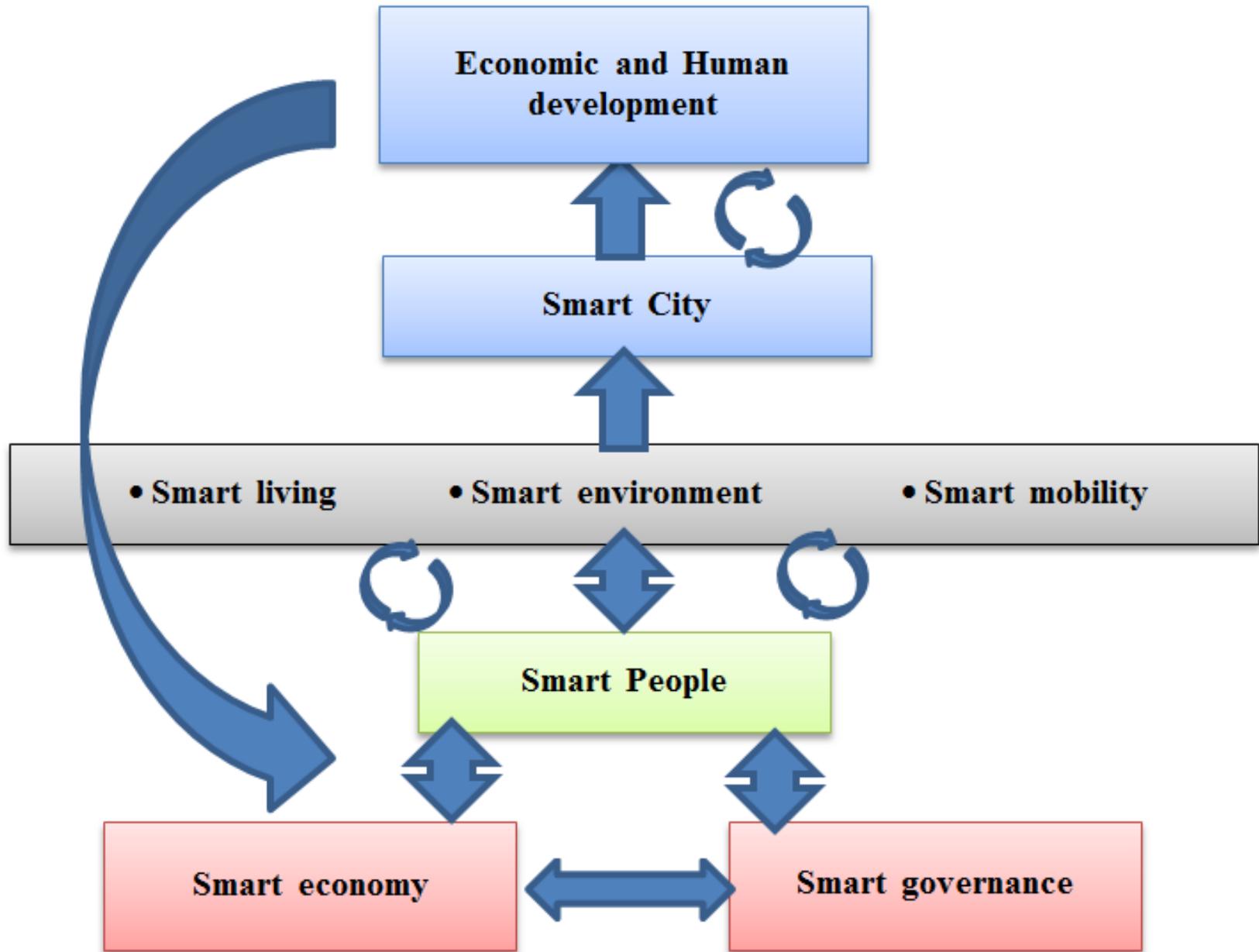
Definition: Intelligent and smart are two concepts differently:

- Being intelligent is having displaying or characterized by quickness of understanding or good judgment;
- but being smart is to know exactly how to organize, participate and coordinate all these means.

➔ *That is from intelligent to smart cities*

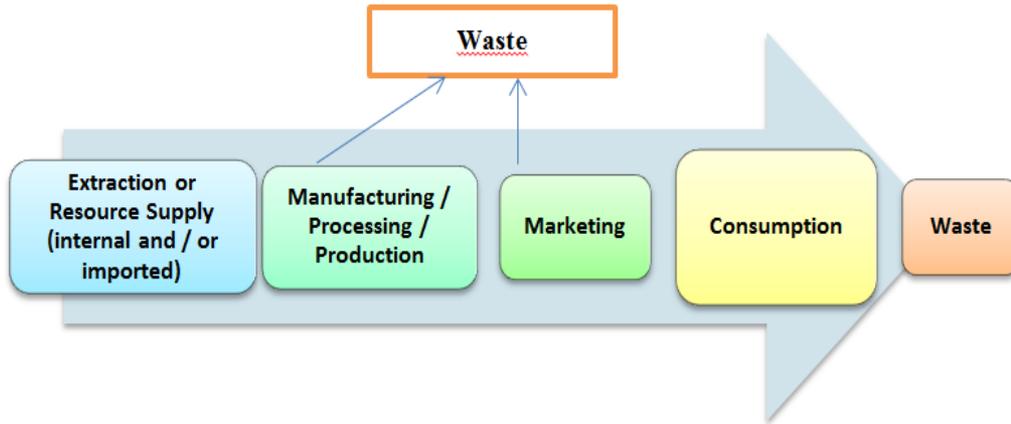
Model inspired : *Giffinger et al.* (2007) and *Cohen* (2012).

- Model based on six characteristics: smart economy, smart people, smart governance, smart mobility, smart environment and smart living: Each characteristic is a goal, where there are many overall actions and specific actions will be undertaken to help Moroccan cities will be smart

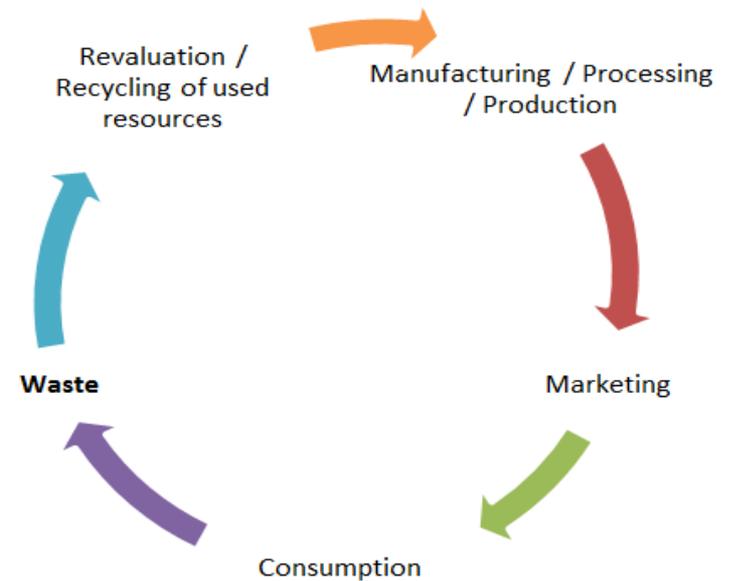


Smart economy

From Linear Economy



To circular economy



Smart governance

- Smart governance is referred to E-democracy, transparency, access and open data, boosting public expenditure on R&D (research and development) and education, increasing investment on roads and infrastructure, reinforcing social and relational capital such as all social classes should benefit from the success of the high-technology and creative business to prevent social polarization.
- ***A smart city community should be taught to learn, adapt and innovate to allow for a long-term sustainability of people capital and well-being (Coe et al. 2001).***

Smart people

- Smart people are reinforcing education and skills. The role of human capital has a positive correlation between growth of the city and the share of highly educated and skilled workforce (*Berry and Glaeser, 2005; El Alaoui, 2016*).
- The higher education levels lead to a better environment for new enterprises, creating new knowledge, jobs and business opportunities. However, concentration of human capital in a few cities may lead to increasing economic inequality between "smart" and the rest of cities (*Glaeser and Berry, 2006*).

Smart living

- Smart living means the best conditions of life (security and quality of life), meaning living with healthy people and healthy buildings in the best conditions. So, city utility infrastructure (water/electricity/heating network, lighting, waste disposal...) and smart sensor network (internet for everything project)...

Smart environment

- Smart environment is efficiency and sustainability, ecologically sustainable enterprises, renewable energy production, urban tooling and pollution control. It is related to the circular economy.

Smart mobility

- Smart mobility is reinforcing logistics and infrastructures, such as public transport, bicycling and bike sharing, introduction of hybrid and compressed natural gas (CNG) powered buses and vehicles to reduce emissions (CNG)-powered buses and electrical vehicles (EVs) solutions, reduction and best management solutions of traffic,...

Conclusion

- The concept of smart city is **far from realization** in Morocco because the six indicators/factors will require huge investments and significant adaptation of business.
- Building a smart city in Morocco is a long-term strategy. In medium-term, it must be focused improving *democracy, education and knowledge and moving towards a circular economy centered on human development and ecological equilibrium*.
- *Smart city is a democratic and ecological city based on a circular economy, highlighting two factors human development and democracy development which may contribute to the instituting a smart city in Morocco.*

شكرا

Tanimirt

Merci

Thank you