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Gdańsk from Tri-City to Smart-city. The new challenges and risks

Gdańsk od Trójmiasta do Smart-city. Nowe wyzwania i zagrożenia

This study analyzes the organizational, technological and societal changes of Gdansk in the process to become a smart city. The Gdansk's planning to climate change to reconcile social, cultural and environmental pillars. Finally analyzes the challenges of the Polish government to build participatory governance with companies and citizens.

Cette étude analyse les changements organisationnels, technologiques et sociétaux de Gdansk dans le processus de devenir une ville intelligente. La réponse de la ville au changement climatique pour concilier les piliers sociaux, culturels et environnementaux. Finalement analyse les défis du gouvernement polonais afin de construire une gouvernance participative avec les entreprises et des citoyens.

Niniejsze opracowanie analizuje zmiany organizacyjne, technologiczne i społeczne Gdańska w procesie przekształcania się w inteligentne miasto. Zamierzenia Gdańska związane ze zmianą klimatu mają pogodzić filary społeczne, kulturowe i środowiskowe. Analiza obejmuje wyzwania stojące przed polskim rządem w budowaniu partycypacyjnego zarządzania z firmami i obywatelami.

Słowa kluczowe: Gdansk, Tri-City, Smart-city, challenges, risks
Mot clés: Gdansk, Tri-City, ville-intelligente, défis, risques.
Keywords: Gdańsk, Trójmiasto, Smart-city, wyzwania, zagrożenia

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INTRODUCTION

The United Nations Climate Change Conference (COP24) in Katowice in 2018 recalls the history of mining in Poland, and invites all Polish and Europeans people to look at a new way of rebuilding Poland with public policies to guarantee a better quality of life for the Polish population, a respect for the environment and an openness towards the new technological challenges for each city.

The Polish president, Andrzej Duda in his inaugural address at COP24 in Katowice, insisted in front of the assembly of the 196 states bound by the Paris agreement, on “the importance of the economics, as a condition of the success of the environmental policies”[1].

However, the tragic event that took place on January 13th, 2019 in Gdansk during the annual Polish charity event for medical equipment in hospitals[2], forced us to rethink the concept of “smart-city”, around the topics as: education, health, population growth and transport, all to guarantee a better “security” of people and to build a better style of life. In fact, the attack was not only against the mayor of the Polish city of Gdansk Mr. Pawel Adamowicz, but also against all the polish people and foreigners living in Poland.

This study takes up that challenge and proposes from an academic and practical context the first step towards the reconstruction of Poland, starting from the digitization of cities. Taking the city of Gdansk as the key point of study, this research proposes an analysis with the social sciences for a modeling of the public policies in Gdansk, so that the city can fulfill the current metropolitan challenges and become a smart-city. The objective is to contribute with all stakeholders to find together the right balance between economy, job creation and quality of life of its population.

The Tricity metropolitan area includes Wejherowo, Reda, Rumia, Pruszcz Gdański and also several other communities, but this study focuses on the city of Gdansk, in the Pomerania region in Poland. It has 464,293 inhabitants in 261.96 Km²[3].

The idea about the smart cities as key to fight against climate change is one of the more attractive points of the different studies about this topic, but not the only one. The urban planning and governmental challenges are the two columns which can help one city to runs faster to become smart.

The emphasis here is the role of population in Gdansk, industries, and local government in tackling climate change and improving new services for better style of life of people living in this city.

In a new digital age, a new on-line model, the benefit of having a more open access between the population and the government, these first take the risk of being also under a type of "control". The sociologist Varsov Maciej Gdula believes that under the pretext of building another society, "We take the risk not to talk about democracy, but autocracy"[4].

1 Reference: Official website of COP24, Poland. Available on-line: https://cop24.gov.pl/ (revised on December 6th 2018).
2 Pawel Adamowicz, Gdansk mayor, dies after stabbing. Reference: BBC, published on January 14th, 2019. Also, Największe Serce Świata i apel żony prezydenta Magdaleny Adamowicz, data publikacji: 16 stycznia 2019 r. z: https://www.gdansk.pl/wiadomosci/najwieksze-serce-swiata-i-apel-zony-prezydenta-magdaleny-adamowicz,a,136048.
3 According to the official European Union data.
4 M. Gdula, *Démocratie en Pologne. «La société plus divisée que jamais»*, Ouest-France Journalm published on March 4th, 2017, available on-line https://www.ouest-france.fr/europe/pologne/democratie-en-pologne-la-societe-plus-divisee-que-jamais-temoignages-4833422 (revised on December 6th 2018).

The current vision of Gdansk orients the city towards the future in order to constitute itself as a smart-city. But, what exactly is a smart-city? How Gdansk cans turn this challenge on? What are the others challenges to consider and what to learn from examples of other cities in the world? These are important questions that guide the development of this research. Knowing that one of the risks that Gdansk faces in the hypothetical digital transition could be the limitation of the privacy of his population.

According to Rudolf Giffinger , smart cities can be classified according to six main criteria, linked to regional and neoclassical theories of growth and urban development respectively. He focused on six principal points:

- a smart economy;
- intelligent mobility;
- a smart environment;
- smart inhabitants;
- a smart lifestyle;
- an intelligent administration.

Following Giffinger the Smart-cities standards[6], this study rethinks these six points and proposes a structure of two central parts, adapted to the Gdansk's planning to open the horizon to become part of the new smart-cities. These two central parts will implicate the regional competitiveness, the economics of transport, information and communication technologies, natural resources, human and social capital, quality of life and Polish people's participation in the democratic life of Gdansk, as follow:

- **Urban design in Gdansk to become the next smart-city:** This part is developed by the Social services and the smart cities as tool to guarantee a better security, a better style of life and fight against the climate change (1).
- **Governmental challenges:** This part focuses on the urbanistic contextualization and develops the concept of "digital transition to the city model in online action". Finally, it is developed the targets and stakeholders (2).

URBAN DEISGN IN GDAŃSK TO BECOME THE NEXT SMART-CITY

The digital transition from cities to smart cities is a challenge that involves all stakeholders, including Government at national, regional and other level, the population (Polish and foreign) and the other organizations (public, private and mixed).

The key questions here are to know what is meant exactly by a 'smart city'? And why Gdansk could become one?

There is no universally accepted definition of a smart-city. It means different things to different people. The conceptualization of Smart City, therefore, varies from city to city and country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents[7].

Some definitions indicate that smart cities are those cities with a "smart" economic, institutional, social and physical infrastructure, which ensure the centralization of their citizens in a sustainable environment[8]. But all this depends of population growth.

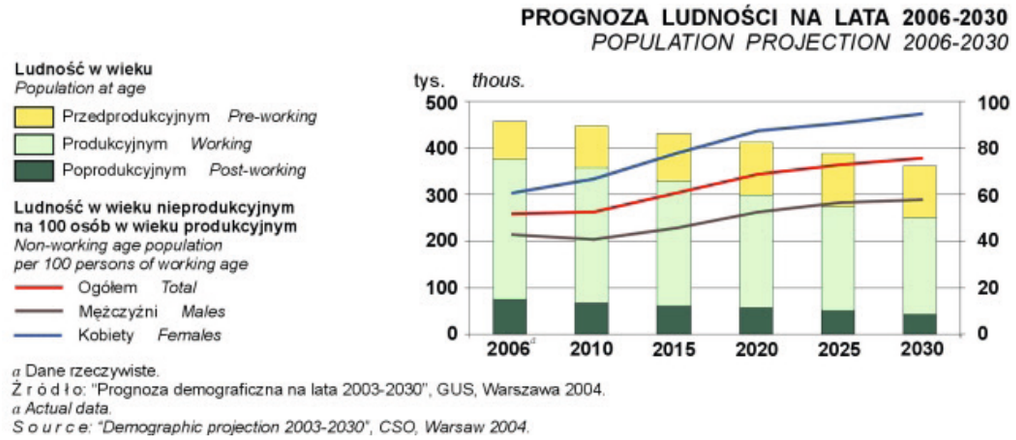
In Gdansk, as in Warsaw, if the population growth rate would be the same as in period 2011-2014

5 R. Giffinger, *European Smart-cities*, the Vienna University of Technology 2017 (available on-line: http://smart-cities.eu/team_1.html).

6 *Ibidem*.

7 Government of India, *Smart Cities mission*, Ministry of Housing and Urban Affairs, 2018. Available on-line http://smartcities.gov.in/content/ (visited on October 10th, 2018).

8 United Nations Conference on Housing and Sustainable Urban Development – HABITAT III. Thematic document on smart cities, 21 – smart cities, New York, May 31, 2015, p. 1. (Presented in Quito. October 2016).



a Dane rzeczywiste.
Źródło: "Prognoza demograficzna na lata 2003-2030", GUS, Warszawa 2004.
a Actual data.
Source: "Demographic projection 2003-2030", CSO, Warsaw 2004.

Fig. 1: Population projection (2006-2030)[9]. Source: Demographic projection 2003 – 2030, CSO, Warsaw, 2004.

(+0.09%/year), Gdansk population in 2030 would be one of the "Few" highest Polish Cities with a Growing Population[10], is why also it constitutes one important place to promote the smart-city transition.

Infrastructure and urbans services are pivotal aspects of a smart sustainable city now. Traditionally, there have been two types of infrastructure: physical (e.g. buildings, roads, transportation, and power plants) and digital (information technology - IT & communications infrastructure)[11]. Nevertheless, the real challenge here is to have the informatics security for all the informatics information. Common physical and service infrastructures include: (1) smart energy, (2) smart buildings, (3) smart transportation, (4) smart water, (5) smart waste, (6) smart physical safety and security, (7) smart health care and (8) smart education.

In this context, it is interesting to see the next graphic and understand the population history in Gdansk and how it must be considered as the strategical point before to planning the transition strategies to become a smart-city.

The annual Gdansk population big change was arrived after the Second World War, until the end of the Cold War[12]. Then, since 1992 to 2002, the population decreased with a rhythm of -0.01 %/year, and since 2002 to 2011[13], it has been decreased with a rhythm

9 The Statistical office in Gdańsk, *Population projection 2006-2030*, (available on-line: http://gdansk.stat.gov.pl/en/information-about-voivodship/capital-of-voivodship-395/population---data-on-gdansk-400/population-projection-2006-2030-401/ (visited on November 27th).

10 Ref. A. Aleksandrowicz, CEO of InvestGDA, the Gdańsk Economic Development Agency 2015.

11 S. N. Kondepudi. *An overview of smart sustainable cities and the role of information and communication technologies*. ITU-T's Technical Reports and Specifications. National University of Singapore (NUS). Research under the ITU-T Focus Group on Smart Sustainable Cities (FG-SSC), 2016, p. 11.

12 A. Huizinga, *Internationaal aardrijkskundig woordenboek.*, published in 1958 in Amsterdam by Strengholt.

13 Statistics Poland. Local data Bank. *Data for selected administrative unit (locality, gmina, powiat, voivodship or the entire Poland) or statistical unit (subregion, region, macroregion) from multiple subject area*. Population data 1992-2014 by regions. Available on-line https://bdl.stat.gov.pl/BDL/dane/teryt/jednostka# (visited on November 28th 2018).

2017 Statystyczne Vademecum Samorządowca

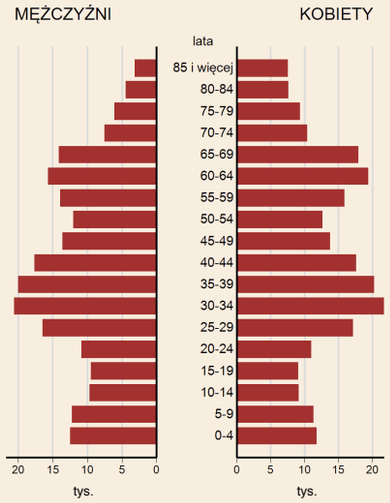
URZĄD STATYSTYCZNY W GDAŃSKU

2016		
	Powierzchnia w km^2	262
	Gęstość zaludnienia w osobach na 1 km^2	1770

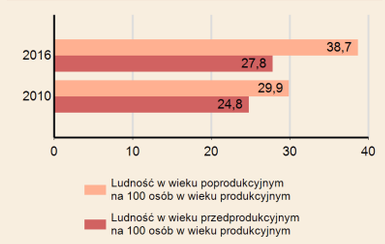
Miasto GDAŃSK

WYBRANE DANE STATYSTYCZNE	2014	2015	2016	Województwo 2016
Ludność	461489	462249	463754	2315611
Ludność w wieku nieprodukcyjnym na 100 osób w wieku produkcyjnym	61,6	64,0	66,5	62,3
Ludność w % ogółu ludności w wieku:				
przedprodukcyjnym	16,2	16,4	16,7	19,4
produkcyjnym	61,9	61,0	60,1	61,6
poprodukcyjnym	22,0	22,7	23,2	19,0
Urodzenia żywe na 1000 ludności	10,1	10,7	11,9	11,2
Zgony na 1000 ludności	10,0	10,6	10,4	9,1
Przyrost naturalny na 1000 ludności	0,1	0,1	1,4	2,0
Saldo migracji wewnętrznych i zagranicznych na pobyt stały na 1000 ludności	1,9	2,5[a]	2,7	1,5
Dochody ogółem budżetu miasta na 1 mieszkańca w zł	5917	5883	6035	5904
Wydatki ogółem budżetu miasta na 1 mieszkańca w zł	5687	5488	5790	5636
Liczba uczniów przypadająca na 1 oddział w szkołach:				
podstawowych	20	20	20	19
gimnazjalnych	21	21	22	21
ponadgimnazjalnych i policealnych	24	23	22	23
Turystyczne obiekty noclegowe[b]	122	122	139	1602
Mieszkania oddane do użytkowania na 10 tys. ludności	85	98	110	57
Drogi publiczne o twardej nawierzchni (powiatowe i gminne) na 100 km^2 w km	197,7	247,3	199,7	58,5
Samochody osobowe zarejestrowane na 1000 ludności	543	552	572	559
Podmioty gospodarki narodowej w rejestrze REGON na 10 tys. ludności w wieku produkcyjnym	2490	2601	2707	2011
Pracujący[c] na 1000 ludności	333	338	353	238
Udział bezrobotnych zarejestrowanych poniżej 25 roku życia w liczbie bezrobotnych ogółem w %	7,9	7,1	7,3	14,2
Stopa bezrobocia rejestrowanego w %	5,5	4,0	3,5	7,1

LUDNOŚĆ WEDŁUG PŁCI I WIEKU W 2016 R.



WSPÓŁCZYNNIKI OBCIĄŻENIA DEMOGRAFICZNEGO



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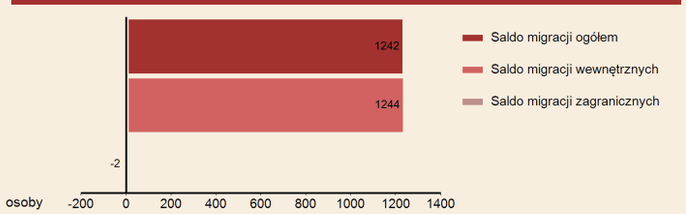

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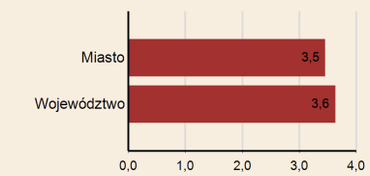

[a] W przypadku migracji zagranicznych dane dotyczą 2014 r. [b] Dane dotyczą obiektów posiadających 10 i więcej miejsc noclegowych. [c] Bez podmiotów gospodarczych o liczbie pracujących do 9 osób oraz gospodarstw indywidualnych w rolnictwie.

Fig. 2: Population history in Gdansk[14]

of -0.03 %/year[15]. Obviously, this statistics data shows a big problem in this part of the world, and this problem increased the other ones. It reflects a lack of economic dynamism, lack of public resources to finance the administration. This diminishes the services that the city can offer to its population.

Indeed, since 2011 to 2014, the statistics has been opposite drastically, the population grew by +0.09 %/year[16]. This is "why" this moment is the better moment, and the Tricity[17] constitute one of the most important places around Poland, where the new governments (local and national) could promote the new era of the smart-city transition, but everything starts with a good social service planning.

SOCIAL SERVICES (EDUCATION, HEALTH & POPULATION GROWTH AND TRANSPORT

This part of study will develop the 3 more sensible topics around the smart-cities challenges and risk, the educational public service (a), the Health & population growth (b), and the transport (c).

a) Education:

The most basic mission of an organization is to maintain efficient operations, optimize work and assets to the maximum. This mission, although basic, is also an endless challenge as assets age, transitions in the workforce and the additional increase in demand in the production of assets.

The educational system in Poland functions according to the Education System Act dated 7 IX 1991[18] and the Higher Education and Science Act dated 20 VII 2018[19] shows that "Among schools covered by the educational system, there are:

- since the 1999/2000 school year, 6-years primary schools and 3-years lower secondary schools (which replaced 8- years primary schools), where education is compulsory[20],
- since the 2002/03 school year, upper secondary schools, i.e. 2—3-years basic vocational schools, 3-years general secondary schools and specialized secondary schools, 4-years technical secondary schools, as well as since the 2004/05 school year supplementary schools for graduates from basic vocational schools (i.e. 2-years supplementary general secondary schools and 3-years supplementary technical secondary schools), and 3-years special job-training schools; upper secondary schools include also art schools leading to professional certification and post-secondary schools; moreover, upper secondary (post-primary) schools (for graduates from 8-years primary

[14] Central Statistical office of Poland, *Household and agricultural research*, (Badania gospodarstw domowych i rolniczych. Sprawozdawczość podmiotów), available on-line: http://stat.gov.pl/ (visited on November 27th), Information contrasted with the Statistical Yearbook of Poland, Warsaw 1965.

[15] Główny Urząd Statystyczny. Statistical yearbook of the Republic of Poland, CSO data, Zakład Wydawnictw Statystycznych, Warszawa 2011. Available on-line: http://stat.gov.pl/cps/rde/xbcr/gus/rs_rocznik_statystyczny_rp_2011.pdf (visited on November 28th 2018).

[16] Główny Urząd Statystyczny. Baza Demografia, *Population in Poland, Size and structure by territorial division,* (*available* on-line: http://demografia.stat.gov.pl/bazademografia/Tables.aspx (visited on November 29th 2018).

[17] Webster's new geographical dictionary, 2nd ed. 1972.

[18] Ustawa z dnia 7 września 1991 r. o systemie oświaty (tekst jedn. Dz. U. z 2018 r., poz. 1457 ze zm.).

[19] Ustawa z dnia 27 lipca 2005 r. - Prawo o szkolnictwie wyższym i nauce (tekst jedn. Dz. U. z 2018 r., poz. 1668).

[20] *Główny Urząd Statystyczny Rocznik statystyczny Rzeczypospolitej Polskiej* (Central Statistical Office. Statistical Yearbook of the Republic of Poland 2011). Rok LXXI Warszawa Year LXXI Warsaw, p. 315 ss.

schools) operating until the end of the education cycle in the structure of upper secondary schools[21].

This public educational system in Poland will change in September 2019 in connection with the amendment of the Education System Act. According to the new regulation the educational system covers:

- 8-years for the primary schools;
- six types of secondary schools: 4-years grammar schools, 5-years technical secondary schools, 3-years vocational schools (first degree), 3-years special job training schools, 2-years vocational schools (second degree), and 2,5 years post-secondary schools.

In the hypothetical context of some technological transition arrives soon in Gdansk (public administration and public services), the educational part is concerned. The Universities of the city, the Technological centers and the Metropolitan Institutes have a great challenge because their responsibility is to train the new professionals that take over the next steps.

This challenge will be increasingly for the centers of education of the youngest. Hi-Schools and then the primary schools, gradually, to arrive to involucrate all the educational system in the process with the Polish Law of Education.

b) Health & population growth:

Very close to the first point of this research about the urban design in Gdansk, the relation between health and population growth is the big challenge in this process to become smart-city.

The health system in Poland has been divided in regions and sub-regions for the good management of the information, and also has been divided in sectors, as population's health problems, number of hospitals (materials and capacity), to planning this system with the population growth[22]. In this context, only about the sector of "Gross fertility and reproduction", its rate data shows that the "Sub-region 40 – Gdansk" has the high level of fertility in Poland (1.744 fertility & of gross reproduction), more than Warszawa (1.307 fertility & 0,627 of gross reproduction) in 2010[23].

This data is very important before to planning the smart-city transition because it permits to have a "real perspective" of all the service that the future (close or not) will ask the central public administration and its reply to the locals ones. Will Gdansk have the urban capacity to guarantee the good style of life to the new generation? Also, what about their "social responsibility"? Remember that the population growth influence directly with the "health public service" and Poland, as part of Europe, needs to keep the similar standard of public services offered.

c) Transport:

Technology has evolved in terms of information processing capability in parallel with the world's data set. It is no longer just computer architectures that benefit from technical progress, but all sectors of society, including production, commerce, health, politics, and so on. So, how to start a technological transition that benefits Gdansk and the Tricity?

In Tri-City was created the Tristar system. It is he Integrated Traffic Management System in Gdynia, Gdańsk and Sopot. It was created in order to revolutionize the way of moving around the Tri-City street network. Tristar allows the people to control traffic in automatic mode throughout the entire Tri-City through the use of available technologies[24].

[21] Główny Urząd Statystyczny, Statistical yearbook. Warszawa, 2011, p. 316.
[22] Rozporządzenie Ministra Zdrowia z dnia 7 grudnia 2017 r. w sprawie wzorów karty urodzenia i karty martwego urodzenia (Dz. U., poz. 2305).
[23] The Poland's largest database of the economy, society and the environment Local Data Bank, available on-line : https://bdl.stat.gov.pl/BDL/archiwum (visited on November 30th 2018).
[24] Official website of Projekt Tristar, available on-line: https://www.tristar.gdynia.pl (visited on December 14th 2018).

But, beyond this effort what else? The available technologies in Tri-City are enough to the field of Intelligent Transport Systems (ITS)?

The transportation is one of the new challenges for all the cities around the world, not only the candidate to become smarts. Here, there exist different keys points, for example: the strategies to reduce the number of private cars, the implementation of public electrical transports, and to have the service. All of them part of the big new urban model challenge, which needs to be developed in the urbanistic planning of the city.

Smart cities need a lot of data for planning and desigining new services. The public transport vehicles are everywhere in the city, so it is the best tool to distribute the information. It is therefore logical to use them to provide real-time data for these applications. Today, with the idea of smart cities, buses became more than just a means of transport, and in the future they will become mobile sensor platforms generating data[25], i.e. The Norwegian capital city Oslo intends to make it first[26]. "This means moving from closed, vendor-dependent systems where data is held internally to data from the entire transportation fleet available to the public space"[27].

The organizational, technological and societal changes of modern cities are driven by their desire to be part of the response to climate change, which requires a continuous source of energy, that the entire smart city system is guaranteed. This requirement also has complementary initiatives that can guarantee it, such as the implementation of an Energy Commission to regulate it. To take a parallel example, we find it in France, the Energy Regulation Commission (CRE), since its creation, on March 24th, 2000, this Regulatory Commission has been overseeing the functioning of the electricity and gas markets in France[28].

Nevertheless, all these 3 key points contribute to guarantee the "social responsibility of Gdansk", but also Poland, as part of Europe, has the high pressure of International Law to respect, in the same time, the environmental/climate agreements. So, could be possible to planning the Smart transition of the city as tool to fight against climate changes?

SMART CITIES AS TOOL TO FIGHT AGAINST CLIMATE CHANGES

The smart city seeks to reconcile the social, cultural and environmental pillars through a systemic approach that combines participative governance and enlightened management of natural resources to meet the needs of institutions, businesses and citizens[29].

This is an interesting subject with a very close link to the discussion of the urban environmental conservation and the climate changes.

Cities across Europe are taking concrete steps to reduce their carbon emissions through a variety of innovative solutions that incorporate businesses and civil society to some degree, as a mechanism for monitoring and reporting greenhouse gas emissions

[25] ZDNet Journal, *Smart cities*, by Stig Øyvann, published on May 11th 2018.
[26] *Ibidem*.
[27] B. R. Jenssen, C.E.O. of "Ruter" - Norwegian enterprise of Transport. Communication, Transport in Oslo, 2018 to ZDNews on May, 2018. Available, https://ruter.no/en/ (visited on November 30th 2018).
[28] Ref: Website of the Energy Regulation Commission: https://www.cre.fr/ (visited on December 1st 2018).
[29] SmartGrids - CRS, *Les caractéristiques d'une ville intelligente*, referenced of *tecdev cité par ERDF, available on-line*: http://www.smartgrids-cre.fr/index.php?p=smartcities-caracteristiques (visited on November 5th, 2018).

and for reporting other information at national and Union level relevant to climate change and repealing[30].

Implementing the Paris Agreement progress of the EU towards the at least -40% target[31]. In 2015, the EU greenhouse gas emissions were 22 % below the 1990 level. The EU's share of global emissions has also been declining over time. According to the latest available EDGAR database, this share stood at 8.8 % in 2012[32].

Poland hosts a COP for the third time (after Poznań in 2008 and Warsaw in 2013), this time the COP24 (it is the informal name for the 24th Conference of the Parties to the United Nations Framework Convention on Climate Change)[33]. Three years after the COP 21, the most important UN climate conference since the adoption of the Paris Agreement in 2015 opened on Sunday (December 2nd) in Katowice. Indeed, Poland has chosen the capital of Silesia, a region whose economy was traditionally based on the mining and steel industry. Highlight the recent and profound reconversion of this industrial center towards innovation and culture and present Katowice as the model of a "green" transition[34]. But, what are the Poland's efforts with this serious topic?

As mentioned in the official website of the COP24, the actual Polish government, as a part of the implementation of the Responsible Development Strategy, has developed a series of regulations aiming popularizing low- and zero-emission vehicles. Also, on June 7, 2018 has been launched the "Clean Air" program, and will allocate PLN 103 billion for such activities by 2029[35]. This initiative tries to create favorable conditions for the construction of a profitable, effective and modern hard coal mining sector, based on cooperation, knowledge and innovation. Pure, innovative coal technologies, such as coal gasification, are tested in Silesia. Śląskie Voivodship was also included in the EU initiative addressed to the coal regions in the transformation period (Coal Regions in Transition)[36]. Reminder that all efforts are connected to the others "European's countries actions plans" to fight climate changes.

According to the projections based on existing measures provided by Europe member States in 2015, emissions are expected to be 24 % lower in 2020 compared to 1990[37].

All this looks like some great news, but how could help Gdansk to his perspective about smart city planning?

30 Required under Article 21 of Regulation (EU) No 525/2013 of the European Parliament and of the Council of May 21st, 2013, Decision No 280/2004/EC.

31 *European Commission. Report from the commission to the European parliament and the council. Implementing the Paris Agreement - Progress of the EU towards the at least -40% target*, available on-line: https://ec.europa.eu/clima/sites/clima/files/eu_progress_report_2016_en.pdf (visited on November 5th, 2018).

32 *Ibidem*, pag. 1.

33 Ref: Official website of COP24, https://cop24.gov.pl/ (Visited on December 1st 2018).

34 Institute of Sustainable Development and International Relations IDDRI, *Déclaration de Silésie sur la transition juste - La transition doit s'accélérer et permettre d'anticiper des reconversions nécessaires, Billet de Blog*, Published on Décember 6th 2018, p.1.

35 Ministry of the Environment of Poland,*103 mld zł na poprawę jakości powietrza w Polsce*, published on Jun 7th 2018.

36 The Platform on Coal Regions in Transition is part of the Coal and Carbon-Intensive Regions in Transition Initiative, included in the Clean Energy for All Europeans Package of November 2016. Ref: *Coal Regions in Transition - European Commission*. Available on-line: https://ec.europa.eu/energy/en/topics/oil-gas-and-coal/coal-and-other-solid-fuels. (visited on November 29th 2018).

37 *European Commission. Report from the commission to the European parliament and the council. Implementing the Paris Agreement - Progress of the EU towards the at least -40% target*, p. 2.

Member states' targets for 2020 for emissions under the Effort Sharing Decision
(million tonnes of CO2 equivalents)

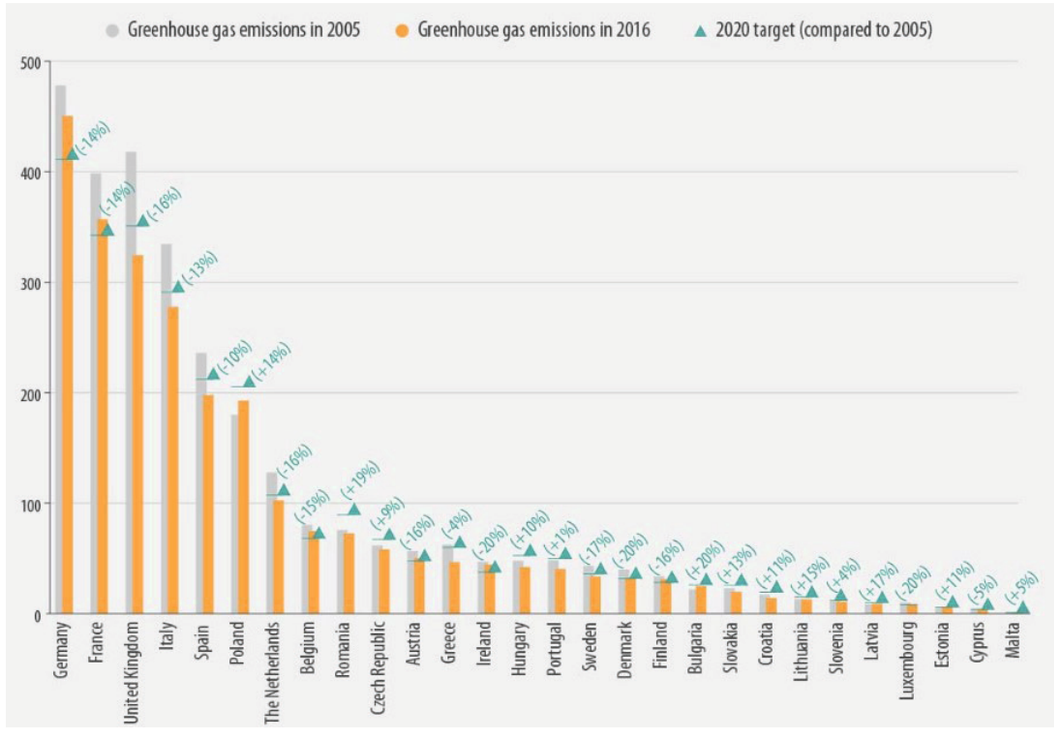

Fig. 3: Progress towards meeting Europe 2020 targets

The COP24 should be taken as a great opportunity of Gdansk to involve the Polish government in its challenge to become smart-city. The other environmental measures could be the strategical link to work as an environmental protagonist around the Europe, for example, to proclaim Gdansk as a "car-free city" for some days per week. The city which is a good example, in this moment, is Pontevedra in Spain. This city adopted a strategy to reduce the number of private cars. Indeed, this Spanish city has been car-free for 19 years[38]. Its streets are filled with people instead of noisy engines. In this city, the air pollution has decreased by 61% since 2013[39].

During the COP 24, is extremely important also to focus on the problem of coal combustion, and it is also the opportunity to start Gdansk's efforts for its transition to digital, ensuring the environmental protection (as shown in the chart on reducing emissions in Europe for 2020 targets). The stakeholders' actions are principal and their responsibility is evident to ensure the Gdansk's planning to become the Polish reference for the climate, an important aspect of smart cities after 2020.

The next second part of this research develops towards analysis on the challenges of governments to lead to Gdansk towards the digital transition.

38 Ref: Concello de Pontevedra, Spain, 27th November, 2018.

39 A. de Nazelle, *What would happen if we removed cars from cities?*. World Economic Forum, published on August 9th 2018, p. 1-7.

GOVERNMENTAL CHALLENGES

Cities around the world grow and deteriorate, highways and houses spread across the urban landscape, minorities cluster in ghettos; sources of water supply are polluted and reclaimed[40]. The central concern in this study is with the role of Polish government in shaping urban development in Smart-City of Gdansk.

In a new metropolitan context of urban development, the digital transition of cities guarantees a new democratic-participative level, but above all a greater transparency of the public administration. This is also because of International Law, i.e. Poland is part of the Arhus agreement about Public Participation in Decision-Making and Access to Justice in Environmental Matters[41].

For sure, this study lends to contribute to the analysis of the new metropolitan mechanisms to develop a better participation of all the stakeholders in Gdansk, in order to switch on the link of the Polish public administrations in a connected world.

Economy, governance, environment and society are the four main columns that characterize a smart-city. Each of these dimensions has multiple attributes which characterizes them. All of these topics need to be studied by young people's opportunities in Gdansk.

This is why this research proposes to the Gdansk's government a summary planning to the digital transition by 3 steps: Firstly, the "urbanistic contextualization". Then, the second step will address the topic to "the digital transition to the city model in online action". The third step will push the process to the "targets" of the stakeholders in the digital transition, including the Polish Governments (national, regional and other level) and theirs projections (these projections muss to focus on their effective participation). All these steps need a networking context with a high level of digital connectivity.

The Gdansk's transition need to work with a main dimension: "the quality of life of the citizens".

Follow illustration: Fig.4.

This is how the inhabitants of a city perceive their own sense of well-being and the fact that they are constantly striving for better, i.e. in terms of wealth, health and education. All of the above is needed for a successful smart sustainable city.

Urbanistic contextualization

"Everybody plans, (i.e. our workdays, our careers, etc.), but private plans are flexible. In contrast, as soon as a government plan is written, people who benefit from the plan form special interest groups to insure that the plan does not change, no matter how costly it proves to be to society as a whole"[42].

The policies that result from government planning is directly proportional from the "urbanistic contextualization", it means, the real stocktaking valuation of all public services and how it works.

This is the first challenge for healthy governance, which will permit to involve the private and voluntary efforts to protect the critical open space, and to separate the plans that do not need the connectivity to work, i.e. at the first moment, the activities in-situ, as parks restoration. Normally the rapport will need the connectivity, but not the activity itself (reminder the last illustration, Fig.4).

[40] *Government and Urban Development*, University of California, USA, UC Press E-Books Collection, 1982-2004, formerly eScholarship Editions, pSec. 1.

[41] The Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, named *Arhus Convention*. It was adopted on 25 June 1998 in the Danish city of Aarhus (Århus) at the Fourth Ministerial Conference as part of the "Environment for Europe" process. It entered into force on 30 October 2001.

[42] R. O'Toole, *Why Government Planning Always Fails*, Cato Institute, Washington, DC. September, 2007, p.1.

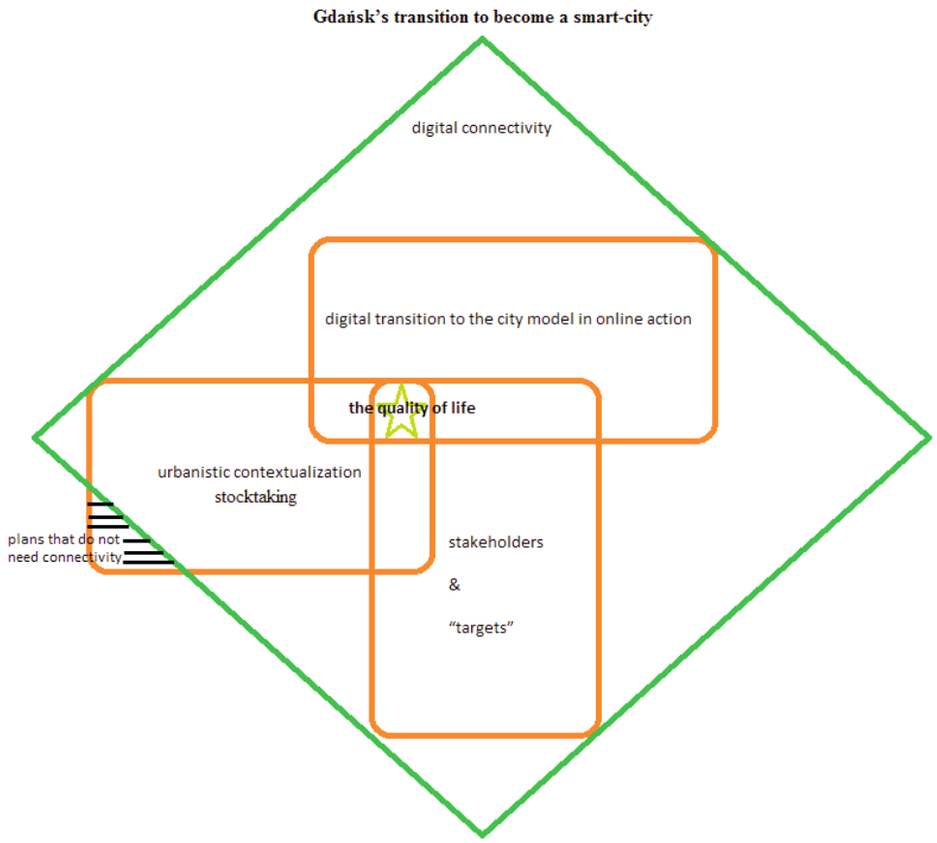

Fig. 4: Garcia D. (2018). Gdansk's transition to become a smart-city.

Such real stocktaking -based solutions do far more to improve our quality of life with far looter intended consequences to the next smart city planning. Here, the governmental administration is apt to push the city to the digital level.

The digital transition to the city model in online action

Infrastructure is a pivotal aspect of a smart sustainable city. Traditionally, there have been two types of infrastructure: physical (i.e. buildings, roads, transportation, and power plants) and digital (information technology (IT) and communications infrastructure)[43].

Common physical and service infrastructures include: smart energy, smart buildings, smart transportation, smart water, smart waste, smart physical safety and security, smart health care and smart education. It is important to remind the first part of study (educational and health reality in Gdansk). The govern-

[43] S.N. Kondepudi. *An overview of smart sustainable cities and the role of information and communication technologies*. ITU-T's Technical Reports and Specifications. National University of Singapore (NUS). Research under the ITU-T Focus Group on Smart Sustainable Cities (FG-SSC), 2016, p. 11.

ment needs to adapt their studies to theirs potential public services. But the real challenge here is to have the informatics security for all the information. That is to say, design an action plan to prevent the cyber-criminals attacks.

But the real challenge here is to have the informatics security for all the information. That is to say, design an action plan to prevent the cybercriminals attacks. More than ever, now Gdansk is vulnerable to cyberattacks. There exist 104 free hotspots of wifi in Gdansk, but the regulations concerning the use of the urban wireless in Gdansk is not so complete[44], unfortunately, the Decree No. 1421/11 establish only six principal points of regulation, and only one of them about the "liability of the user". The challenge is How to prevent the cyber-criminality, if someone uses this wifi-network to illicit acts? And it is the polish legal system ready to know about these problems? What kind of cooperation exists between the local government in Gdansk and the polish legal system (court and tribunals)?

Other of the biggest challenges of smart-cities is the relationship of governments with private companies that do not necessarily have their location in cities, but thanks to the way of computerization offer their service for its population, especially for the health, education and transports.

In the cities transition process to digital era, technical changes are accompanied by substantive variations in the risks covered by "public contracts", "new taxes", etc. Here, the discussions touch the importance of the government planning to the restructuration of the public service staff. This is a big challenge around a polish labor law.

In the health sector, technologies have evolved to develop the information system of insurance companies, during the last four decades[45].

If "all" information of the "all" population in Gdansk will manage now by informatics way, the key questions to addressee to the polish central administration are: What about the impacts for governments in the standardization of public data processing? What about the legal obligation of Poland to allow public access to information? As mentioned before, Poland is part of the Arhus agreement and the Polish Government (at national, regional and other level)[46] has the obligation to "shall provide for early public participation, when all options are open and effective public participation can take place"[47]. But, could be possible to guarantee the Cybersecurity? What are the prospects of changing the automobile insurance market with the connected-public transport and what about the fully autonomous ones? How to deal with cyber--risks considered as one of the major issues of the coming decades?

New perspectives are opening up again with learning machine technologies. The government of Gdansk must exchange with academics and professionals around these stimulating and innovative themes.

Targets and stakeholders

Let's take stock of the integration of technological changes currently underway in the various sectors of governments and its relations among the others governments and private sectors. The key questions here turn around the guarantee of the effective stakeholder's participation, that is to say the participation of all the population.

44 Appendix No. 1 to the Decree No. 1421/11 of the Mayor of the City of Gdańsk dated on October 13th, 2011. Available on-line http://www.gdanskwifi.pl (visited on November 15th, 2018).
45 Le mans University, *Symposium of Nouvelles technologies et mutations de l'assurance,* France, December,2018.
46 Arhus Convention, Art. 1.
47 Arhus Convention, Art. 6 (n°5).

Take the French example here to the inclusion of vulnerable people in the public administration with the smart-phones applications (App's) addressed to the deaf or hard of hearing[48]. But first it's necessary to have the real stocktaking (see the last illustration).

Local companies in Gdansk are also concerned by commercial law to structure with the government the hypothetical new regulations, especially in the context of e-commerce funds; Information Systems Security and Enterprise Cybersecurity. Polish governments must also initiate dialogue with companies on alternatives to traditional financing, i.e. crowd-lending and equity crowdfunding, etc. Another challenges identified by this research are about "taxes and digital enterprises".

How to prevent the avoiding unfair tax competition for companies located in Gdansk or Poland (subject to Polish law), and those not located in Poland but offering their services in Gdansk (subject to the foreigners rulers)? Maybe, the Polish government can to propose some kind of tax advantages to seduce the private companies to lodge in Gdansk, and thus to multiply the job offers in the city, which plays a domino effect for all economic dynamics.

In this hypothesis (of a transition to smart-city), governments will have to implement taxes-mechanisms as digital as its platforms allow them, however, local businesses also have to adapt their business, which necessarily goes to the e-targets and new jobs. Polish Universities are part of the sector called by this new requirement of work, to act appropriately, to adapt their study plans for the new generations.

This is the big difference for companies with the current system. Assuming a transition to Smart-city in Gdansk, it will also be confronted with collaborative business management platforms, and thus its management system would be more flexible. That is to say, it no longer requires a unique expertise, but a collaborative, or more holistic, of all human teams for each collaborative platform.

CONCLUSIONS

The digital transition from cities to smart cities is a big challenge for all actors and stakeholders, including Polish governments (national, local), the population (Polish and foreign) and organizations (public, private and mixed).

As analyzed throughout this study, the location of Gdansk is privileged and needs the fittest and holistic urban planning to overcome the challenges.

The main directions to be adopted in Gdansk, to arrive at a new digital model of the city, are directly concerned by the effective participation among all actors and these with governments, in a more direct, faster and more efficient way to build a security context to ensure the better style of life. All this elements guarantees the current democratic mechanisms and ensure a better quality of life for the metropolitan population and its urban development.

Do not forget that, the main objective of the smart--cities is the quality of life of its population. This reflects how the Gdansk's inhabitants perceive their own sense of well-being and the fact that they are constantly striving to better themselves, i.e. economics and environmental wealth, health and education. All of the above need to be balanced for a successful smart-city.

48 The different app's for the smart-phones are available to download the dialogue with the deaf and hard of hearing in France. i.e. RogerVoice, or AVA App. (available in France since July 2017) has been launched in November 2016 in the United States; this application translates written oral conversations for people who are deaf or hard of hearing. Source: France tv, Journal, Allodocteurs.fr. Published on September 26th, 2017.

The real questions are, are they really able Polish public administrations to transform Gdansk to smart--city? Maybe it could be the start to the long change from the Tri-city to the new Smart Tri-city.

Following the real questions, we could focus: Are they really able (the polish public administrations) to transform Gdansk to smart-city? Could be possible to reinforce the security of population in the public places? How secure fell the people in Gdansk? Maybe, this is the start point to the long change from the Tri-city to the new Smart Tri-city.

Also, there is a financial availability and especially what level of political commitment could be envisaged to date in Poland, by current and future policies?

The Polish governments (national and local) need to work in a coherent way with the necessities of the inhabitants of Gdansk, because all identified challenges are connected. Undoubtedly, the establishment of a strategic planning of Gdansk, in order to rebuild itself in modern digital models is a vast subject that deserves a continuous analysis, in a broader academic framework, such as a collective book.

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