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THE CITY OF STOCKHOLM AND THE CITY OF GDAŃSK: TWO URBAN STRATEGIES TO REACH THE ONE GOAL OF SUSTAINABLE DEVELOPMENT

***Miasto Sztokholm i Miasto Gdańsk: dwie strategie urbanizacji
prowadzące do jednego celu – zrównoważonego rozwoju***

Summary

The author analyses development strategies of two cities – the City of Stockholm and the City of Gdańsk – to compare the key features of both strategies and to identify good practices in Sustainable Development (SD), which could be used by other urban policy-makers. The author addresses the four research questions: (1) What a specific approach does the City of Stockholm apply to advance SD? (2) What unique measures does the City of Gdańsk take to promote SD? (3) What are the similarities and differences of two sustainable urbanisation strategies? (4) What good practices in SD could we adopt from a development strategy of Stockholm and a development strategy of Gdańsk? Research hypothesis states that historical and economic circumstances have a major impact on the starting points and, as a result, current priorities of development strategies of both cities. The main findings demonstrate that both City Councils formulated a clearly defined goals and indicators for long – and short-term strategies according to their needs – Stockholm focuses on ambitious environmental goals, while Gdańsk puts an emphasis on a social aspect of SD. The capability to establish strongly defined goals in align with cities' needs is the first good practice identified by the author. The following good practice is the integration of digital elements into the urban system and becoming

a “sustainable smart city”, which helps to meet urban challenges of the 21st century. The third good practice is the cities’ participation in international environmental contests and initiatives that drives self-improvement, knowledge and experience sharing, green city branding and, in a result, draws attention of investors, highly qualified workers and a youth. Methodology of this study is based on the review of scientific elaborations, Internet sources and public speeches of the Mayor of Stockholm Mrs. Karin Wanngård and the Mayor of Gdańsk Mrs. Aleksandra Dulciewicz.

Keywords: Sustainable urbanisation, smart city, Stockholm, Gdańsk

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Streszczenie

Autorka analizuje strategie rozwoju dwóch miast – Miasta Sztokholm i Miasta Gdańsk – aby porównać kluczowe cechy obu strategii i zidentyfikować dobre praktyki w zakresie Zrównoważonego Rozwoju (ZR), które mogłyby zostać wykorzystane przez innych decydentów miejskich. Autorka stawia cztery pytania badawcze: (1) Jakie konkretne podejście stosuje Miasto Sztokholm, aby promować ZR? (2) Jakie wyjątkowe działania podejmuje Miasto Gdańsk w celu promowania ZR? (3) Jakie są podobieństwa i różnice pomiędzy dwiema strategiami zrównoważonej urbanizacji? (4) Jakie dobre praktyki ZR moglibyśmy zaczerpnąć ze strategii rozwoju Sztokholmu i strategii rozwoju Gdańska? Hipoteza badawcza głosi, że uwarunkowania historyczne i gospodarcze mają zasadniczy wpływ na punkty wyjścia, a co za tym idzie, aktualne priorytety strategii rozwoju obu miast. Z głównych ustaleń wynika, że obie Rady Miejskie sformułowały jasno określone cele i wskaźniki strategii długo – i krótkoterminowych zgodnie ze swoimi potrzebami – Sztokholm stawia na ambitne

cele środowiskowe, natomiast Gdańsk kładzie nacisk na społeczny aspekt ZR. Pierwszą zidentyfikowaną przez autora dobrą praktyką jest umiejętność wyznaczania ściśle określonych celów, dostosowanych do potrzeb miast. Następną dobrą praktyką jest integracja elementów cyfrowych z systemem miejskim i stanie się „zrównoważonym inteligentnym miastem”, które pomaga sprostać miejskim wyzwaniom XXI wieku. Trzecią dobrą praktyką jest udział miast w międzynarodowych konkursach i inicjatywach ekologicznych, które napędzają samodoskonalenie, wymianę wiedzy i doświadczeń, budowanie zielonego brandingu miasta, a w efekcie przyciągają uwagę inwestorów, wysoko wykwalifikowanych pracowników i młodzieży. Metodologia badania opiera się na przeglądzie opracowań naukowych, źródeł internetowych oraz wystąpień publicznych Prezydenta Sztokholmu Pani Karin Wanngård i Prezydenta Gdańska Pani Aleksandry Dulkwicz.

Słowa kluczowe: zrównoważona urbanizacja, miasto inteligentne, Sztokholm, Gdańsk

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Introduction

The City of Stockholm and the City of Gdańsk appear to be two distinct places with few similarities and many contrasts. Indeed, the historical, cultural and economic backgrounds of the two cities are quite different. To better understand similarities and dissimilarities of these cities the author proposes to start from the comparison of their countries – Sweden and Poland. Sweden is a unitary parliamentary constitutional monarchy headed by

King Carl XVI Gustaf, who has only non-political and ceremonial duties.¹ With the legacy of old Vikings, Sweden became an independent country on 6 June 1523, when Gustav Vasa declared a separation from the Kalmar Union² and proclaimed himself as the new King of Sweden.³ The country has been neutral since the mid-19th century, during the World War II⁴, and as of October 2023 Sweden is not a Member of the NATO. With the area of 447,430 km² and population of 10.⁴ million people⁵, Sweden is a prosperous Scandinavian country in the Northern Europe with GDP per capita PPP estimated USD 54,818.40 in 2022⁶ and HDI⁷ of 0.94⁷ as of 2023, which is the 7th highest score in the world⁸.

Besides of proclaiming independence on 11 November 1918, Poland has a long history, starting from being a monarchy in 10th – 18th centuries and the Member of Polish-Lithuanian Commonwealth in 1569-1795, till three Partitions of Poland in 1772, 1793 and 1795 between Russia, Prussia, Austria and its involvement in the World War II in 1939.⁹ After the war's end Poland remained under the Soviet Union's influence and had been developing as a social state till the emergence of the Solidarity movement in 1980 and partially free elections in 1989.¹⁰ Nowadays Poland is a unitary parliamentary republic in the East-Central Europe with area of 312,680 km² and population of 40.8

¹ Swedish Government, *Power from the people! This is how Sweden is governed.*, <https://sweden.se/life/democracy/swedish-government>, access: 01.08.2023.

² A personal union between three kingdoms of Denmark, Sweden and Norway in 1397-1523.

³ Swedish Presidency of the Council of the European Union, *500 years of Sweden!*, 5 June 2023, <https://swedish-presidency.consilium.europa.eu/en/news/500-years-of-sweden/>, access: 01.08.2023.

⁴ Y. Yashem, *Sweden*, Shoah Resource Centre, The International School for Holocaust Studies, https://www.yadvashem.org/odot_pdf/Microsoft%20Word%20-%206061.PDF, p. 1.

⁵ WorldData.info, *Sweden*, <https://www.worlddata.info/europe/sweden/index.php>, access: 01.08.2023.

⁶ Trading Economics, *Sweden GDP per capita PPP*, <https://tradingeconomics.com/sweden/gdp-per-capita-ppp>, access: 01.08.2023.

⁷ Human Development Index.

⁸ Countryeconomy.com, *Sweden*, <https://countryeconomy.com/countries/sweden>, access: 01.08.2023.

⁹ Britannica, *Poland*, <https://www.britannica.com/place/Poland>, access: 01.08.2023.

¹⁰ Zintegrowana Platforma Edukacyjna Ministerstwa Edukacji i Nauki, *Powstanie Solidarności i stan wojenny*, <https://zpe.gov.pl/a/powstanie-solidarnosci-i-stan-wojenny/D1CygZdik>, access: 01.08.2023.

million residents (as of 2023);¹¹ its GDP per capita PPP estimates almost two times less than Sweden's – USD 36,798.19¹² and HDI is 0.876¹³ leaving it on the 34th place out of 191 countries published. Poland is the Member of NATO since 1999.¹⁴ Both countries are the Members of the European Union; Sweden since 1995 and Poland since 2004.¹⁵ Gdańsk has a special role in the Polish history – it's the place, where the German invasion of Poland in 1939 has started, and where Lech Wałęsa established the aforementioned Solidarity movement, which led to the modern Polish democracy.¹⁶ In its turn, Stockholm refers itself as the “Capital of Scandinavia” due to its central position in the region, as well as economic and cultural advantage.¹⁷

Regardless of their differences, the two cities are situated on the Baltic Sea and both strive to be a sustainable city. This article is based on comparative analysis of the development strategies of two cities – Stockholm and Gdańsk – that aims to identify the most characteristic features of each development strategy, compare them, and then discuss which of the good practices could be adopted in another urban development strategies seeking sustainability. The author sets the following four research questions: (1) What unique measures does the City of Stockholm adopt to promote SD? (2) What special steps does the City of Gdańsk take to foster SD? (3) What are the similarities and differences in both strategies? (4) What good practices in SD could we adopt from a development strategy of the City of Stockholm and a development strategy of the City of Gdańsk? Research hypothesis suggests that historical and economic backgrounds have a crucial impact on the starting points and, in a result, actual priorities of development strategies of both cities. Respectively, the elaboration is divided on the four parts. In the first section the author concentrates

¹¹ Worldometr, *Poland Population*, <https://www.worldometers.info/world-population/poland-population/>, access: 01.08.2023.

¹² Trading Economics, *Poland GDP per capita PPP*, <https://tradingeconomics.com/poland/gdp-per-capita-ppp>, access: 01.08.2023.

¹³ Countryeconomy.com, *Poland*, <https://countryeconomy.com/countries/poland>, access: 01.08.2023.

¹⁴ NATO, *NATO member countries*, 8 June 2023, https://www.nato.int/cps/en/natohq/topics_52044.htm, access: 01.08.2023.

¹⁵ European Commission, *From 6 to 27 members*, https://neighbourhood-enlargement.ec.europa.eu/enlargement-policy/6-27-members_en, access: 01.08.2023.

¹⁶ InYourPocket, *Gdańsk History*, <https://www.inyourpocket.com/gdansk/Gdansk-History>, access: 01.08.2023.

¹⁷ T. Sahlgren, *Stockholm – The “Capital of Scandinavia”?*, 17 May 2016, <https://scandicorp.com/stockholm-capital-scandinavia/>, access: 01.08.2023.

on the evaluation of the Stockholm's development strategy; in the second part the author analyses the Gdańsk's development strategy; in the third section the author compares both strategies and tests hypothesis; in the final part the author draws conclusions regarding the most beneficial good practices for sustainable urban development. Methodology of this research is based on the review of corresponding scientific elaborations, information from official web pages of the Stockholm's City Council and the Gdańsk's City Council and other Internet sources, as well as relevant interviews, public speeches and social media content shared by the Mayor of Stockholm Mrs. Karin Wanngård and the Mayor of Gdańsk Mrs. Aleksandra Dulkiewicz.

The City of Stockholm

The City of Stockholm is the capital and largest city of Sweden with population of 1.7 million residents (as of 2023) and with 1.25% of population annual growth.¹⁸ With the area of 188 km², it situates in the central part of the country and has the 3rd major port in Sweden¹⁹. Stockholm is a popular case study for both European and international scientists working on the city's different sustainability and "smartness" aspects, e.g., urban energy sustainability²⁰, space-economic transformation²¹, smart urban metabolism²² and many more. The perception of Stockholm as a role model for urban sustainability has its strong arguments – the city has been numerous times listed in the ranking of the world's most liveable cities²³; the ranking of cities with the cleanest

¹⁸ World Population Review, *Stockholm Population 2023*, <https://worldpopulationreview.com/world-cities/stockholm-population>, access: 01.08.2023.

¹⁹ R. Joshi, *7 Major Ports in Sweden*, Marine Insight, 3 April 2022, <https://www.marineinsight.com/know-more/7-major-ports-in-sweden/>, access: 01.08.2023.

²⁰ H. Haarstad, M. W. Wathne, *Are smart city projects catalysing urban energy sustainability?*, "Energy policy" 2019, Vol.129, DOI: 10.1016/j.enpol.2019.03.001, pp. 918-925.

²¹ P. Bachtold, *The Space-Economic Transformation of the City: Towards Sustainability*, Dordrecht: Springer Netherlands 2013. DOI: 10.1007/978-94-007-5252-8..

²² H. Shahrokni, L. Ärman, D. Lazarevic, A. Nilsson, N. Brandt, *Implementing Smart Urban Metabolism in the Stockholm Royal Seaport: Smart City SRS*, "Journal of Industrial Ecology" 2015, Vol. 19, Issue 5, DOI: 10.1111/jiec.12308, pp. 917-929.

²³ T. Hardingham-Gill, *The world's most liveable cities for 2023*, CNN, 21 June 2023, <https://edition.cnn.com/travel/worlds-most-liveable-cities-2023/index.html>, access: 01.08.2023.

air²⁴; the ranking of cities with the best work-life balance²⁵ and so on. Ambitious environmental strategies and climate targets have been implemented in Stockholm for many years; the first environmental programme of the city was established in 1976, and since then its goals only have gotten bigger and more rigorous with each new policy. In 2010, Stockholm was honoured by the title of the first European Green Capital as a result of many years of committed and fruitful environmental work.²⁶ Also, not the last role plays the attitude of the Mayor of the City; in this elaboration the author takes into consideration the interviews²⁷ public speeches²⁸ and social media of Mrs. Karin Wanngård – Mayor of Stockholm – in which she considers equality and sustainability as the top priorities for the city development.²⁹

The environmental strategy and goals of the City of Stockholm have been captured in its urban development strategies, mainly the Environment Programme 2020-2023 and the Climate Action Plan 2020-2023 for a fossil-free and climate-positive Stockholm by 2040 (both adopted on 25 May 2020)³⁰, and supplemented with the Strategy for Stockholm as a smart and connected city (adopted on 3 April 2017)³¹. The City of Stockholm's the Environment Programme 2020-2023 is organised around the city's top long-term environmental

²⁴ J. Chiedu, *10 Cities With The Cleanest Air In The World, Ranked*, The Travel, 6 July 2023, <https://www.thetravel.com/cities-with-cleanest-air/>, access: 02.08.2023.

²⁵ I. E. Atillah, *Are these the 10 best cities in the world to live in if you want a better work-life balance?*, Euronews.next, 28 June 2023, <https://www.euronews.com/next/2023/06/28/these-are-the-top-10-cities-in-the-world-for-the-best-work-life-balance>, access: 02.08.2023.

²⁶ City of Stockholm, *Environment programme 2020-2023*, City Executive Office, 2019 https://international.stockholm.se/globalassets/rapporter/environment-programme-2020-2023_ta.pdf, p. 5.

²⁷ J. Andrews, *Can European Green Capitals drive environmental action?*, Cities Today, 16 May 2018, <https://cities-today.com/can-european-green-capitals-drive-environmental-action/>, access: 02.08.2023.

²⁸ M. Smolaks, *DCD>Energy Smart: Mayor of Stockholm welcomes data centre projects*, DCD, 15 March 2018, <https://www.datacenterdynamics.com/en/news/dcdenergy-smart-mayor-of-stockholm-welcomes-data-center-projects/>, access: 02.08.2023.

²⁹ Pontifical Academy of Social Sciences, *Karin Wanngård | Mayour of Stockholm: Stockholm – a City Defined by Equality and Sustainability*, 21 July 2015, <https://www.pass.va/en/publications/extra-series/es16/wanngard.html>, access: 02.08.2023.

³⁰ City of Stockholm, *Climate Action Plan 2020-2023: For a fossil-free and climate-positive Stockholm by 2040*, City Executive Office, 2019, https://international.stockholm.se/globalassets/rapporter/climate-action-plan-2020-2023_ta.pdf, pp. 5-6.

³¹ City of Stockholm, *Strategy for Stockholm as a smart and connected city: Summary*, City Executive Office, 2017, <https://international.stockholm.se/globalassets/summary-of-the-strategy-for-stockholm-as-a-smart-and-connected-city.pdf>, p. 4.

priorities i.e., (1) Stockholm is a fossil free and climate positive city by 2040; (2) The City of Stockholm is a fossil free organisation by 2030; (3) Stockholm is adapted to climate change; (4) Stockholm is a resource smart city; (5) Bio-diversity flourishes in coherent ecosystems; (6) Stockholm is a city with clean air and low noise levels; (7) Stockholm is free of toxics. Each goal has its specific milestones for the 2020-2023 program period. In total, the Environment Programme outlines 7 priority goals, 16 milestones, indicator suggestions for Stockholm's living environment, as well as an explanation of how they relate to the national environmental goals and the Sustainable Development Goals of the UN Agenda 2030.³² Table 1 presents the overview of priority goals, milestones and proposed indicators for the Stockholm's Environment Programme 2020-2023.

Table 1: Priority goals, milestones and proposed indicators for the Stockholm's Environment Programme 2020-2023

Priority goal	Milestone	Proposed indicators
A fossil-free and climate-positive Stockholm by 2040	Reducing GHG emissions – max. 1.5 tonnes CO ₂ e per citizen	Emissions, tonnes CO ₂ e per citizen
		Emissions, tonnes CO ₂ e by 2040
		Emissions, tonnes CO ₂ e from transport
		Emissions, tonnes CO ₂ e from heating
		Emissions, tonnes CO ₂ e from use of electricity and gas
	Reduced climate impact from consumption	Climate impact from procured meals and food
	Proportion of LCA-calculated new construction projects	
	GHG emissions from the City of Stockholm's air travel	
A fossil-free organisation by 2030	Reducing GHG emissions – max. 105,000 tonnes CO ₂ e from the City's operations	Emissions, tonnes CO ₂ e in the heating, electricity and gas use sectors, as well as transport in the City's organisation

³² City of Stockholm, *Environment...*, p. 7.

	Effective energy consumption	Total energy purchased in the City's operations
		Relative energy efficiency enhancement in the City's operations
		Proportion of large-scale rebuilding work where energy decreased by at least 30%
		Heat production and electricity based on solar power
A climate-adapted Stockholm	Improved ability to manage the effects of torrential rain	
	Improved ability to manage the effects of heat waves	
A resource-smart Stockholm	Reduced use of resources and more responsible consumption	Reuse by local citizens via the City's recycling sites
		Reuse within the City's own operations (Stocket)
		Drinking water consumption in the City's own operations
		Proportion of generated volume of drinking water charged to customers
		Food waste in the City's operations
	Increased recirculation of material resources within the city	Plastic to energy recovery
		Proportion of food waste to biological treatment
		Sorting at source in the City's own operations, plastic packaging
		Sorting at source in the City's own operations, food waste
	Increased resource efficiency regarding the construction process	Proportion of phosphorus in sludge returned to agricultural land
A Stockholm with biodiversity in well-functioning and cohesive ecosystems	Maintained functions and connections for biodiversity in the city's green and blue infrastructure	Proportion of individual development projects where ecological compensation measures are implemented
		Proportion of annual land allocations for the City's land where the green space factor for district land is a requirement

	Increased implementation of ecological compensation, reinforcement measures and conservation	
	Increased proportion of goods and food promoting biodiversity in City purchasing	Proportion of ecological food and meals purchased in the City in SEK out of the total value of purchased food and meals
	Improved water quality in the City's waterways, lakes and coastal waters	Proportion of water bodies that meet the environmental quality norms for ecological status
		Proportion of water bodies that meet the environmental quality norms for chemical status
		Proportion of water bodies with high or acceptable status for nutrients
A Stockholm with a good sound environment and clean air	Decreased exposure to NO ₂ and particulate matter for the city's residents	Number of days over the norm for NO ₂ in air (existing)
		Number of days over the norm for particulate matter in air (existing)
		Fulfilment of environmental goal for hourly average NO ₂ in air
		Fulfilment of environmental goal for annual average particulate matter in air
	Reduced environmental noise	Number of noise-actioned recreational areas during the year
		Number of noise-actioned school playgrounds during the year
		Number of noise protection screens actioned during the year
Number of noise-exposed apartments where façade measures have been taken to reduce indoor noise during the year		
A toxin-free Stockholm	Reduced levels of harmful substances in goods and chemical products	Number of chemical products in the City's operations that contain phase-out substances
		Number of 14 selected substances that show reducing or unchanged levels in sludge
		Proportion of City procurements in priority agreement areas under the chemicals plan that including relevant chemical requirements that have also been followed up

		Civil engineering: proportion of City administrations' and companies' new construction agreements with materials supplier, where chemical products shall be environmentally assessed and documented in the Building Material Assessment system
		Civil engineering: proportion of City administrations' and companies' renovation agreements with materials supplier, where chemical products shall be environmentally assessed and documented in the Building Material Assessment system
		Building: proportion of City administrations' and companies' completed new-build projects, where goods and chemical products have been environmentally assessed and documented in the Building Material Assessment system
		Building: proportion of City administrations' and companies' completed rebuilding projects, where goods and chemical products have been environmentally assessed and documented in the Building Material Assessment system
		Proportion of products with content information in the Building Material Assessment system in the City's projects
		Proportion of products with the assessment recommended, accepted and avoided respectively in the City's projects
		Proportion of hazardous waste in bin bags

Source: City of Stockholm, *Environment programme 2020-2023*, City Executive Office, 2019, pp. 36-37.

The Climate Action Plan 2020-2023 determines for the City of Stockholm the following two ambitious climate goals: (1) A fossil-free and climate-positive Stockholm by 2040; and (2) A fossil-free organisation by 2030. This plan has been developed alongside the Stockholm's Environment Programme; it explains how exactly the City of Stockholm will reach fossil freedom by 2040, mainly

(1) The plan sets a goal of a maximum allowable amount of 19 million tonnes of GHG emissions for the years 2020-2040 to cover the City's climate budget up to 2040; (2) The plan presents specific steps to lower GHG emissions for the period of 2020-2023 that the City Executive Board will annually monitor; (3) The plan sets that the city can reach zero net emissions by 2040 by increasing biochar production and supporting initiatives targeted on the CO₂ capturing and storage. The Climate Action Plan constitutes the Stockholm's long-term roadman on its way to becoming the climate-positive city by 2040, where the special emphasis put on the four industries: (1) Transport; (2) Energy use for heating and cooling in buildings; (3) Electricity use and production; and (4) Gas production and use.³³

Illustration 1: Stockholm's Smart City wheel



Source: City of Stockholm, *Strategy for Stockholm as a smart and connected city: Summary*, City Executive Office, 2017, p. 5.

Adopted in 2017, The Strategy for Stockholm as a smart and connected city is a roadmap for the Stockholm's City Council aspirations to turn the city into a smart sustainable city.³⁴ Presented by Illustration 1, the strategy offers

³³ City of Stockholm, *Climate...*, p. 5.

³⁴ City of Stockholm, *The Smart City*, 24 March 2021, <https://international.stockholm.se/city-development/the-smart-city/>, access: 08.08.2023.

“a smart city wheel”, in which the four key areas are identified as followed: (1) Financially sustainable; (2) Ecologically sustainable; (3) Socially sustainable; and (4) Democratically sustainable.³⁵ In the brochure “Smart & Connected”, the City Council provides us with the examples of Stockholm’s smart solutions, e.g. in the category “Financially sustainable” we can find the case of smart traffic control, where main bus lines are prioritised at traffic lights and to the buses that are late is given a preference; the following area “Ecologically sustainable” offers waste bins that automatically notify and pack the garbage, when they are full; in the “Socially sustainable” division the “1:1 in 2016” project aiming to improve high school students’ learning by boosting the librarians’ and teachers’ level of digital literacy; finally, within the category “Democratically sustainable” the Stockholm’s City Council created a corresponding web form stockholm.se, through which the residents have the opportunity to share their opinion and influence the city.³⁶

The Stockholm’s smart city has big ambitions. Along with the Stockholm’s aspirations to become carbon-neutral by 2040, the City Council also officially declared the goal to become the world’s smartest city by 2040. The city sees digital infrastructure as a key to “facilitate the services of the future”, including IoT, 5G, edge processing and computing, data centres, sensors and so on.³⁷ In 2019, Stockholm received the Smart City Award for its GrowSmarter project at the Smart City Expo World Congress in Barcelona.³⁸ Being leader is a great responsibility, thus Sweden promotes knowledge sharing about smart city solutions among different actors. Smart City Sweden is a state-funded platform for sustainable and smart solutions, which welcomes delegations from all over the world to share good smart city practices within the key six areas: (1) Energy; (2) Climate & Environment; (3) Mobility; (4) Digitalisation; (5) Urban Planning;

³⁵ City of Stockholm, *Strategy...*, p. 5.

³⁶ City of Stockholm, *Smart & Connected*, City Executive Office, 2017, <https://international.stockholm.se/globalassets/ovriga-bilder-och-filer/smart-city/brochure-smart-and-connected.pdf>, pp. 5-11.

³⁷ L. Puttkamer, *Smart City Stockholm: A Connected, Sustainable, Data-Driven City*, Bee Smart City, 17 May 2023, <https://www.beesmart.city/city-portraits/smart-city-stockholm>, access: 09.08.2023.

³⁸ G. Landahl, *Stockholm: Smart City* [in:] *Handbook of Smart Cities*, ed. J. C. Augusto, Springer Cham, 2021, DOI: 10.1007/978-3-030-69698-6_8, p. 295.

and (6) Social Sustainability. As of 2022, the initiative hosted 1922 visitors at 136 study visits from 69 countries.³⁹

The City of Gdańsk

Gdańsk is the city situated on the Baltic Sea coast of northern Poland. With area of 683 km² and population of 466,000 residents (as of 2023), the City of Gdańsk is the principal port and the 6th largest city of Poland.⁴⁰ Alongside with the City of Gdynia and the City of Sopot, Gdańsk creates the Tricity Metropolitan Area with population around 1 million residents.⁴¹ The City of Gdańsk was also honoured to be the topic of many scientific elaborations regarding its sustainable urban development and implementation of the smart city concept, e.g. comparative studies of urban climate in Gdańsk and Gdynia⁴²; a research on sustainable urban transport in Gdańsk⁴³; studies on smart local government on the example of the Gdańsk-Gdynia-Sopot Metropolitan Area⁴⁴ and many more. The City of Gdańsk was chosen as the Host for Velo-city Summit 2025, which gives the city an additional stimulus to develop its public bicycle infrastructure; the plans include the construction of a 36.8 km long bicycle highway network, the modernisation of 30 km of bicycle routes and the achieving the goal, where 75% of the entire bicycle fleet will be electrically assisted.⁴⁵ As in the case of Stockholm, the author also takes into account public involvement

³⁹ Smart City Sweden, *Explore smart & sustainable city solutions from Sweden*, 2022, <https://smartcitysweden.com/>, access: 09.08.2023.

⁴⁰ PopulationStat, Gdańsk, *Poland population*, <https://populationstat.com/poland/gda-sk>, access: 09.08.2023.

⁴¹ Britannica, *Gdańsk*, <https://www.britannica.com/place/Gdansk>, access: 09.08.2023.

⁴² J. Filipiak, M. Miętus, *Badania klimatu miejskiego w Gdańsku i Gdyni*, „Acta Geographica Lodziensia” 2019, Vol. 108, DOI: 10.26485/AGL/2019/108/2, p. 108.

⁴³ G. Chaberek-Karwacka, *Rozwiązania organizacyjne i infrastrukturalne w tworzeniu przewagi konkurencyjnej zrównoważonego transportu miejskiego – studium przypadku Gdańska*, „Miscellanea geographica” 2018, Vol. 22, Issue 4, DOI: 10.2478/mgrsd-2018-0029, pp. 203-209.

⁴⁴ G. Masik, J. Stępień, *Inteligentne samorzędy lokalne. Przypadek Metropolii Gdańsko-Gdynia-Sopot w Polsce*, „Czasopismo Techniki Miejskiej” 2022, Vol. 29, Issue 4, DOI: 10.1080/10630732.2021.1930841, pp. 63-81.

⁴⁵ Polska Organizacja Turystyczna, *Velo-city 2025 w Gdańsku. Najważniejsza konferencja rowerowa po raz pierwszy w Polsce!*, 2023, <https://www.pot.gov.pl/pl/pcb/news/velo-city-2025-w-gdansk-najwazniejsza-konferencja-rowerowa-po-raz-pierwszy-w-polsce>, access: 10.08.2023.

of Mrs. Aleksandra Dulkiwicz – Mayor of Gdańsk – in which she pays a special attention to sustainable development of the city (together with Mr. Piotr Grzelak, deputy for sustainable development)⁴⁶, the air quality⁴⁷, the “greening” of the city⁴⁸ and so on.

Table 2: The action lines assigned to the four strategic objectives of the Gdańsk 2030 Plus City Development Strategy

Green City	Common City	Accessible City	Innovative City
<ul style="list-style-type: none"> • Natural system; • Protection of natural resources; • Adaptation to climate change; • Reduction of pollution; • Greening and biodiversity; 	<ul style="list-style-type: none"> • Lifelong learning; • Solidarity and equal opportunities; • Partnerships and communities; • Culture and heritage; • Public health; • Preventing depopulation; 	<ul style="list-style-type: none"> • Sustainable mobility; • Improving safety; • Removal of barriers; • Road system; • Proximity and compactness; • Public spaces; 	<ul style="list-style-type: none"> • Modern economy; • Energy transition; • Digitisation of services; • Sea port and airport; • Tourism and leisure.

Source: City of Gdańsk, *The Gdańsk 2030 Plus City Development Strategy*, Gdańsk City Hall, 2022, p. 78.

The two main documents regulating sustainable and smart development of the city are the Gdańsk 2030 Plus City Development Strategy and the Gdańsk Operational Programmes 2023. In the first document, Mrs. Aleksandra Dulkiwicz outlines a strategic goal to make Gdańsk a green, shared, accessible and

⁴⁶ A. Dulkiwicz, *Czat z prezydent Aleksandrą Dulkiwicz i Piotrem Grzelakiem, zastępcą ds. zrównoważonego rozwoju*, Facebook, 13 October 2020, <https://www.facebook.com/A.Dulkiwicz/videos/1064347637335177/>, access: 10.08.2023.

⁴⁷ M. Tokarczyk, *Aleksandra Dulkiwicz pochwaliła się tym, co zrobiła dla poprawy jakości powietrza w Gdańsku*, Wyborcza.pl, 21 December 2020, <https://trojmiasto.wyborcza.pl/trojmiasto/7,35612,26629229,aleksandra-dulkiwicz-pochwalila-sie-tym-co-zrobila-dla-poprawy.html>, access: 10.08.2023.

⁴⁸ J. Sieliwończyk, *„Zielony Gdańsk – solidarność z przyszłymi pokoleniami”*. *Jak dbamy o środowisko w mieście*, www.gdansk.pl, 21 December 2020, <https://www.gdansk.pl/wiadomosci/Zielony-Gdansk-solidarnosc-z-przyszlymi-pokoleniami,a,186351>, access: 10.08.2023.

innovative city until 2030.⁴⁹ Initially adopted on 25 September 2014⁵⁰ and updated in November 2021⁵¹, the strategy sets the vision of Gdańsk as “a city that responds to the current needs of its inhabitants and simultaneously takes into account the challenges that the future will bring”⁵² – a statement that directly reflects the idea of sustainable development. The strategy determines the six core values for the city growth, mainly (1) Cooperation; (2) Education; (3) Openness; (4) Environment; (5) Mobility; and The Residents as the main element integrating all spheres.⁵³ Next, the document outlines the four strategic objectives: (1) Green City; (2) Common City; (3) Accessible City; and (4) Innovative City. Table 2 presents the action lines, which are assigned to each of the objectives.⁵⁴ To track the expected results of the objectives, the Gdańsk’s City Council also provides with the results indicators in 2030 that are presented in Table 3.

Table 3: Expected results and indicators of strategic objectives of the Gdańsk 2030 Plus City Development Strategy

No.	Expected result of the objective	Result indicator in 2030
Strategic objective “Green City”		
GC.1	Reduction of GHG emissions / CO ₂	Reduction of GHG emissions (CO ₂) by 30%
GC.2	Increase in biodiversity	Planting of 50 thousand trees
GC.3	Increase in urban retention	Increase in the capacity of retention reservoirs and urban green retention from 0.76 million m ³ to 1 million m ³
GC.4	Increase in installed capacity from green energy sources	Increase in renewable energy installation capacity from 16 MW to 90 MW
Strategic objective “Common City”		
CC.1	Increasing the number of citizens	Increase in population of the city from 471 thousand to 500 thousand

⁴⁹ City of Gdańsk, *Gdańsk 2030 Plus City Development Strategy*, Gdańsk City Hall, 2022, <https://www.gdansk.pl/akcja/pdf/202302203632/gdansk-2030-plus-city-development-strategy>, p. 5.

⁵⁰ Tamże, p. 10.

⁵¹ Tamże, p. 18.

⁵² Tamże, p. 5.

⁵³ Tamże, p. 67.

⁵⁴ Tamże, p. 78.

CC.2	Improving the availability of pre-school education	Increase in the level of provision of places for 3-year-old children in public kindergartens appointed as a primary choice in the recruitment process from 65% to 90%
CC.3	Improving of civic involvement of citizens	Increase in the percentage of citizens engaging in city development activities from 20% to 30%
CC.4	Improving the health of citizens	Increase in the percentage of citizens positively evaluating their health from 66% to 76%
Strategic objective “Accessible City”		
AC.1	Increase in the share of cycling, walking, scooters and public transport trips in the total number of trips in Gdańsk	Increase in the share of cycling, walking, scooters and public transport trips in the total number of trips in Gdańsk from 59% to 65%
AC.2	Improving the competitive ability of public transport	Change in average journey time by public transport in comparison to passenger car from 174% to 150%
AC.3	Improving the availability of multifunctional public spaces	40 public places, e.g. parks, pedestrian routes, squares, promenades and boulevards, to be completed or renovated
AC.4	Improving road safety	Decreasing the number of road fatalities from 11-15 people to 0 people per year
Strategic objective “Innovative City”		
IC.1	Increase in the number of jobs in the modern economy	Creation of 20,000 new jobs in the manufacturing sectors and modern services
IC.2	Increase in investment attractiveness of Gdańsk	Increase in the area of real estate occupied for business activities from 7.6 million m ² to 9.4 million m ²
IC.3	Increase in the competitiveness of the seaport	Increase in container handling in the seaport from 2.1 million TEU to 2.8 million TEU
IC.4	Increase in the digitalization of public services	Increase in the number of services provided by the Gdańsk City Hall and budget entities of the city available in digital form from 30% to 85%

Source: City of Gdańsk, *The Gdańsk 2030 Plus City Development Strategy*, Gdańsk City Hall, 2022, pp. 82-83.

The Gdańsk 2030 Plus Development Strategy is implemented through individual operational programmes focusing on the immediate future, which

are gathered in Operational Programmes strategic documents.⁵⁵ The current Gdańsk Operational Programmes 2023 includes the following nine operational programmes: (1) Education; (2) Public Health and Sports; (3) Social Integration and Active Citizenship; (4) Culture and Leisure; (5) Innovation and Entrepreneurship; (6) Investment Attractiveness; (7) Infrastructure; (8) Mobility and Transport; and (9) Public Space. Cross-cutting issues common to all Operational Programmes, referred as the Horizontal issues, cover the following: (1) Equal Opportunities; (2) Revitalization; (3) Safety; (4) Environment; and (5) Smart City.⁵⁶

Since the adoption of the City of Gdańsk Manifesto of Openness in 2014, the city is leading in the implementation of open-data standards and resources sharing with citizens and business.⁵⁷ In 2017, Gdańsk, as the second city in Poland (after Gdynia), received the smart city certificate – ISO 37120.⁵⁸ The idea of smart city is also mentioned as one of the five Horizontal issues of the Gdańsk Operational Programmes 2023. The city intends to apply innovative IT and telecommunication tools, including open-source solutions (where acceptable), in order to enable city residents and businesses to use advanced public services connected to transport, infrastructure, education and so on. By pursuing the policy that improves communication and access to information, the City of Gdańsk aims to provide new technologies and data for the residents to facilitate transparent governance. The open access to data allows the inhabitants not only to become familiar with the city functioning, but also facilitate their business and social initiatives, as well as increase their involvement in public affairs. The Gdańsk's City Council believes that the form of a transparent city that listens to its residents, the policy of openness and the spirit of dialogue will help to develop the concept of Smart City Gdańsk – a well-thought project that serves for organisations, universities, businesses, young people and administration in the city.⁵⁹

⁵⁵ City of Gdańsk, *Gdańsk Operational Programmes 2023*, Gdańsk City Hall, 2015, <https://download.cloudgdansk.pl/gdansk-pl/d/20160877137/gdansk-operational-programmes-2023.pdf>, p. 7.

⁵⁶ City of Gdańsk, *Gdańsk Operational...*, p. 8.

⁵⁷ European Commission's Intelligent Cities Challenge, *Gdańsk*, <https://www.intelligent-citieschallenge.eu/cities/gdansk>, access: 12.08.2023.

⁵⁸ Business Insider Polska, *Gdańsk otrzymał certyfikat „smart city”*, 21 September 2017, <https://businessinsider.com.pl/wiadomosci/gdansk-otrzymal-certyfikat-smart-city/4rr-2jy1>, access: 12.08.2023.

⁵⁹ City of Gdańsk, *Gdańsk Operational...*, p. 14.

In the period of 2020-2022, the City of Gdańsk (as the only Polish city) has been participated in the European Commission's Intelligent Cities Challenge. The city's journey was divided on the four parts: (1) Preparation and assessment: September 2020 – January 2021; (2) Ambition & roadmap: February 2021 – April 2021; (3) Implementation: May 2021 – July 2022; (4) Review & way forward: August 2022 – September 2022. The key objectives of Gdańsk Smart City are the following: (1) Integrating approach to eGov services; (2) The upgrade of Open Data Project; (3) Energy based on renewable energy and lower CO₂ emissions; and (4) Energy efficiency systems applied for all municipal buildings. In the impact executive summary, the city declares its desire to increase the share of e-services and open data from 30% at the moment to 85% in 2030 in order to pursue the vision of digital and green city.⁶⁰

Comparison and hypothesis testing

Before the author begins to compare development strategies in Stockholm and Gdańsk, it is important to highlight different circumstances and starting points of two cities by testing the hypothesis of this research. The reason behind the author starts her research from providing historical backgrounds of two cities (in fact two countries) is due to their crucial differences in both historical backgrounds and the level of economic development. While Sweden has been an independent country for 500 years with the non-alignment policy and the ability to develop its own model of welfare state, Poland has been suffering for centuries due its weak geopolitical position and involvement in global armed conflicts. As a result, nowadays Sweden surpasses Poland in the economic aspect – GDP per capita PPP: USD 54,818.40 in Sweden vs USD 36,798.19 in Poland; in the HDI scores: 0.947 and the 7th place worldwide for Sweden vs 0.876 and the 34th place for Poland; and in other areas, because Poland had less spare time to invest into its development, but instead fought for its survival. Long-lasting political and economic stability allowed Sweden and its cities to focus more on environmental issues and climate change adaptation, when ensuring an adequate standard of living for their citizens continues to be a key

⁶⁰ European Commission's Intelligent Cities Challenge, *Gdańsk: Intelligent City Transformation Overview. ICC Final Deliverable*, https://www.intelligentcitieschallenge.eu/sites/default/files/2023-04/ICC_Final%20deliverable_Gda%C5%84sk.pdf, pp. 1-43.

goal for Polish cities. Stockholm, that established its first environmental programme in 1976, holds top positions in the world pro-environmental rankings, while Gdańsk plays a role of one of the pioneers and leaders of sustainable urban development in Poland.

Proving hypothesis by underling a crucial role of city's country as a major trigger for its capabilities and current goals, the author provides with the further comparison of sustainable urban strategies of Stockholm and Gdańsk. The first difference is that Stockholm sets long-lasting environmental goals (up to 2030 and 2040) and right away converts them into short-term strategic documents that will be performed during the three-year periods – the Environment Programme 2020-2023 and the Climate Action Plan 2020-2023. In its turn, the Gdańsk City Council places long-term goals and short-term objectives separately into the Gdańsk 2030 Plus City Development Strategy (by 2030) and one-year operational programmes (currently the Gdańsk Operational Programmes 2023), respectively.

The next difference is in the focus – while Stockholm entirely concentrates on the environmental goals, Gdańsk highlights both environmental and social aspects. In the Environment Programme 2020-2023, Stockholm sets two ambitious goals: (1) Stockholm is a fossil free and climate positive city by 2040; and (2) The City of Stockholm is a fossil free organisation by 2030, and another five goals dedicated to climate change, smart city, coherent ecosystem, toxins, air quality and noise pollution. The Stockholm City Council's aspirations to become the first fossil free city are so high, so they additionally adopted the Climate Action Plan 2020-2023 to provide a roadmap explaining how the city will reach these two ambitious climate goals. Accordingly, the document focuses on entirely environmental topics, mainly transport, heating and cooling, electricity and gas production. In contract, the Gdańsk 2030 Plus City Development Strategy underlines six core values – cooperation, education, openness, environment, mobility and residents – and is built upon four strategic values – green city, common city, accessible city and innovative city. The Gdańsk Operational Programmes 2023 gives the social issues the highest priority by setting eight out of nice operational programmes focusing on the city residents.

The common feature of both cities' strategies is the strictly defined goals and precise indicators, i.e. the Stockholm Environment Programme provides with 7 priority goals and 16 milestones, while the Gdańsk 2030 Plus City Development Strategy presents 4 strategic goals and 16 indicators. Another common

feature of both cities is the integration of smart city into the urban system. While the category of smart city is present among the Horizontal issues of the Gdańsk Operational Programmes 2023, the Stockholm City Council created a separated document – the Strategy for Stockholm as a smart and connected city – aiming to make Stockholm the world’s smartest city by 2040. Gdańsk puts a strong emphasis on the issues of digitalization and open access to data, but smart city in Stockholm is already far advanced than in Gdańsk – Pozdniakova (2018)⁶¹, Landahl (2020)⁶² and Shahrokni et al. (2015)⁶³ believe that Smart City Stockholm is the best smart city in the world, while other authors, e.g. Garcia Caceres (2018)⁶⁴ underlines the ongoing transformation of Gdańsk towards smart city.

Good practices

The City of Stockholm and the City of Gdańsk have the one common goal of continuously improving their sustainable development, thus both City Councils work hard to create long-term strategies (up to 2030 or 2040) and short-term operational programmes (for 1 or 3 years) to remain at the leading position in urban sustainability. Taking into account extremely different starting points, both cities did a great job in establishing and preserving SD in their own ways – Stockholm puts a strong emphasis on environmental issues, especially on making the city a climate-neutral by 2040, while Gdańsk focuses on the residents’ well-being, citizen participation and open data policy. The first good practice that the author identifies is that clearly defined objectives and indicators could be extremely beneficial for city councils to track progress and provide changes into ongoing operational programmes, but these goals should to be established according city’s needs. While Stockholm achieved a convincing level of citizen participation and social well-being, it can focus on the ambitious environmental plans, but Gdańsk firstly needs to achieve the

⁶¹ A.M. Pozdniakova, *Smart City Strategies “London-Stockholm-Vienna-Kyiv”*: In *Search of Common Ground and Best Practices*, “Acta Innovations” 2018, No. 27, DOI:10.32933/ActaInnovations.27.4, p. 37.

⁶² G. Landahl, et al., p. 297.

⁶³ H. Shahrokni, et al., p. 920.

⁶⁴ D. Garcia Caceres, *Gdańsk from Tri-City to Smart-city. The new challenges and risks, “Metropolian”*, Nr 2, Issue 10, pp. 8-22.

sophisticated level of social sustainability by creating a comfortable city that is so-governed by its residents. Obviously, Gdańsk also cares about the environment by setting goal of cutting its CO₂ emissions by 30% by 2030, but its top priority is education, equality, accessibility, entrepreneurship and so on.

The following good practice is the adoption of smart city into the urban system to create a “sustainable smart city”. Both Stockholm and Gdańsk put a strong emphasis on digitalisation and open data policy. Why? The key reason is that if we would like to become a sustainable city of the 21st the only option is to keep pace with the times. Majority of the city residents in developed countries have an access to Internet on their smart devices, thus city governments need to use this fact to improve public involvement via web platforms and to better regulate public transport, energy efficiency and so on. The second reason for integrating smart elements into urban systems is because it actually works. The case that is not mentioned in the main body of research, but still quite impressive is the meal optimisation in the City of Stockholm, where pupils report their absences via the system to school kitchen in order to avoid over-production of food. Though this smart element seems to be insignificant, in practice it notably helps to reduce both economic and environmental costs of food waste: during a pilot test of the project, it allowed to save over SEK 6,000 and reduced environmental impact by almost 0.5 tonnes of GHG or CO₂ emissions. From the annual perspective, it holds a potential to save over 10 tonnes of GHG emissions and more than SEK 135,000.⁶⁵

The last, but not the least good practice is the cities’ participation in environment-related competitions and initiatives – Stockholm received the European Green Capital Award in 2010 and the Smart City Award in 2019, while Gdańsk was a participant the European Commission’s Intelligent Cities Challenge in 2020-22 and is the Host for Velo-city Summit 2025. The author believes that the spirit of competition and cooperation not only awakens the desire to improve, but also supports information sharing between participants and helps them to establish long-term partnerships. Moreover, as in the Stockholm’s case, it could help to build a reputation of ecologically responsible and green city, that in its turn will help to draw attention of businesses, highly qualified workers, investors, academia and youth from around the world. Therefore,

⁶⁵ City of Stockholm, *Smart & Connected*, City Executive Office, 2017, <https://international.stockholm.se/globalassets/ovriga-bilder-och-filer/smart-city/brochure-smart-and-connected.pdf>, p. 7.

cities' aspirations towards ambitious climate goals and their wish to compete in prestigious environmental contests and green initiatives could be undoubtedly considered as a good practice for other city councils.

Conclusion

In this research the author analyses development strategies of the City of Stockholm and the City of Gdańsk to identify good practices in SD. The hypothesis shows that notably contrasting historical backgrounds and different economic situations of two cities surely impact on their strategies, but nevertheless both City Councils are strived to become sustainable cities by applying ambitious environmental and social objectives. The author distinguishes three good practices based on this research: (1) Strongly defined long – and short-term goals and indicators in align with cities' starting points and current needs; (2) The creation of a “sustainable smart city” as a solution to the 21st century urban challenges; and (3) Participation in cities' pro-environmental contests and initiatives.

What is next? As of 2023, about 56% of the global population or 4.4 billion people live in urban areas; moreover, cities are responsible for 80% of world GDP and 70% of global GHG emissions.⁶⁶ According the UN, the number of people living in cities will increase by 68% and reach 6.9 billion people in 2050.⁶⁷ Europe belongs to the most urbanised regions: nowadays the level of its urbanisation estimates 74% and it is projected to reach 84% by 2050.⁶⁸ Taking into consideration the growing role of cities on the global arena, the author forecasts that more and more cities will unite into international city networks to empower their forces and gain a support in reaching ambitious climate goals. Nowadays there are a number of international city unions predominantly working in the

⁶⁶ World Bank, *Urban Development: Overview*, <https://www.worldbank.org/en/topic/urbandevelopment/overview>, 3 April 2023, access: 05.11.2023.

⁶⁷ United Nations Department of Economic and Social Affairs, *Around 2.5 billion more people will be living in cities by 2050, projects new UN report*, 16 May 2018, <https://www.un.org/development/desa/en/news/population/2018-world-urbanization-prospects.html>, access: 05.11.2023.

⁶⁸ European Commission, Knowledge for Policy, *Urbanisation in Europe*, 3 July 2020, https://knowledge4policy.ec.europa.eu/foresight/topic/continuing-urbanisation/urbanisation-europe_en, access: 05.11.2023.

area of climate change, mainly C40 Cities Climate Leadership Group, 100 Resilient Cities, ICLEI – Local Governments for Sustainability, Cities Climate Finance Leadership Alliance and so on.⁶⁹ Participation in such unions not only opens doors for city councils to international cooperation and partnership in the area of environment, but strengthen cities' diplomacy and leadership in the global society. Cities like Stockholm can hold the role of a role model in the world, where ambitious climate goals will be not a something unique, but a necessity for each city. The author is going to continue her research on sustainable urban development with the special consideration of the increasing role of cities and international city networks in the climate change resistance.

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⁶⁹ Cities Climate Finance Leadership Alliance, *About*, <https://citiesclimatefinance.org/about/>, 2023, access: 05.11.2023.

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