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SMART PEOPLE – SMART ECONOMY – SMART CITIES



Towards Smart Cities: How should the transformation look like?

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Contents

- Smart City vision for climate change mitigation in Europe:
From political discourse to local implementation
- Smart City concept and approach in the German context
- Insights from mySMARTLife in Hamburg on the transformation
towards Smart Cities



The Smart City Concept in the EU Urban Development framework

- 2007: Leipzig Charter

Guiding document; “basis for a contemporary urban development policy [...] throughout Europe“

(National Urban Development Policy n.d.)

- 2016: Urban Agenda (Pact of Amsterdam)

“An integrated and coordinated approach to deal with the urban dimension of EU and national policies and

legislation“ (EC 2022d)

- 2020: New Leipzig Charter

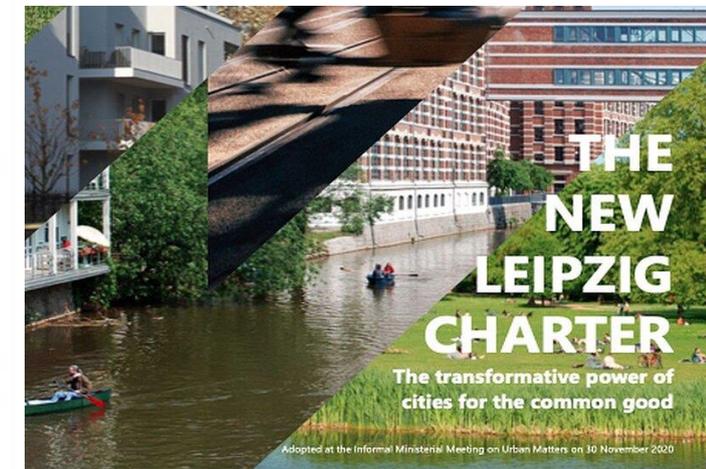
“A European policy framework to sustainable urban development“ (EC 2022d)



European Commission (2007): https://ec.europa.eu/regional_policy/sources/activity/urban/leipzig_charter.pdf



European Commission (2021): <https://ec.europa.eu/futurium/en/urban-agenda.html>



BMI (2020): <https://www.connective-cities.net/aktuelles/eu-verabschiedet-neue-leipzig-charter>

EU Funding Programmes, Platforms, Projects

Variety of EU-funded programmes and projects

- Open Cities 2010-2013 (Exchange & Networking)
- Smart City Member State Initiative 2011 (Transnational Cooperation)
- Smart Cities and Communities 2012 (Network & Funding)
- Smart Cities Marketplace 2018 (Cooperation Platform)

- Horizon 2020 (2014-2020) & Horizon Europe (2021-2027)
- mySMARTLife (Example for a Research & Implementation Project)



REFINE (2020): <https://refineproject.eu/de/h2020/>



Wag Futurelab (2013): <https://wag.org/en/project/open-cities/>



European Commission (2021): <https://www.sparcs.info/what-is-new/events/smart-cities-marketplace-forum>

Pillars of Concept & Relation to Climate Change Mitigation

- Main Pillars

„The Urban Agenda focuses on **the three pillars of EU policy making** and implementation: Better regulation, Better funding and Better knowledge” (EC 2022d)

- Relevant Sectors

“More energy efficient buildings, integrated renewable energy sources, sustainable heating and cooling systems, smarter urban transport networks, upgraded water supply and better waste disposal facilities” (EC 2022a)

- Green Deal: Relation to Climate Change Mitigation

“Smart cities at the **forefront of its efforts** to reach the European „Green Deal“ objectives and make Europe climate-neutral by 2050” (EC 2022a)



European Economic and Social Committee (2015):
<https://www.eesc.europa.eu/en/our-work/publications-other-work/project/smart-cities-project>

Discussion of Smart City concept in General

Critics of the Smart City Concept in general

- Threat of deepening gaps between member states (Rothe et al. 2018)
- High dependency on technology and their developers (Kunzmann 2014)
- Technologies are “outpacing policy” (Lohrmann 2016)
- Privacy and cybersecurity concerns (Lohrmann 2016)
- Smart Cities as a “blueprint of neoliberal urbanism” (Cardullo & Kitchin 2018)
- Limited capacities in the municipalities (Giest 2016)

EU Comparison to international contexts

- European projects rather small-scale, with a big variety (Ringel 2021)
- European focus on “energy, resources and democracy” (Kim et al. 2020)
- European approaches rather bottom-up, focused on the needs of all stakeholders (Kubina et al. 2021)



Government technology (2016): <https://www.govtech.com/blogs/lohrmann-on-cybersecurity/smart-cities-the-good-the-bad-and-the-ugly.html>



Telecom Review Asia Pacific (2020): <https://www.telecomreviewasia.com/index.php/news/featured-articles/1963-what-we-can-learn-from-singapore-s-smart-nation-initiative>



The Smart City Concept in Germany

- Important Role of the Leipzig Charter 2007
Paradigm shift also in the German context
- “Dialogplattform Smart Cities” 2016
Platform with stakeholders from federal level, states, municipalities, science, economy and social institutions
- 2017: Smart City Charter
Developed in recognition of Leipzig Charter, national urban development policies, Urban Agenda of the EU and new Urban Agenda of the UN: “**Integrated and sustainable urban development**” as main objective (BBSR, BMI 2021)



BMWSB (2022a): <https://www.smart-city-dialog.de/#>



BMWSB (2022b): <https://www.smart-city-dialog.de/nationale-dialogplattform>

Funding Programmes in Germany

Variety of funding programmes from different ministeries

- 'Coordination and Transfer-Agency of Smart City model projects' (KTS)
- Smart Cities made in Germany
- Zukunftsstadt
- Heimat 2.0
- Land.digital
Focus on mobility, resource efficiency and digitalization in rural areas



Bee Smart City (2020): <https://hub.beesmart.city/de/smart-city-atlas>



BMEL(2020): https://www.bmel.de/DE/themen/laendliche-regionen/digitales/land-digital/land-digital_node.html



BMBF (2016): <https://www.bmbf.de/bmbf/shareddocs/kurzmeldungen/de/wettbewerb-zukunftsstadt-zwanzig-kommunen-ausgewaehlt.html>



Fraunhofer Institut (2021): <https://www.iese.fraunhofer.de/blog/heimat-20/>



Pilot-Projects across Germany

Variety of pilot projects funded by the federal level

- Projects in big cities:
'Connected Urban Twins' in Leipzig, Hamburg and Munich
- Projects in small cities:
'Konstanz im Wandel' – Smart City Konstanz
- Projects in rural areas:
'Smart City Modellprojekt Landkreis Höxter'



Connected urban Twins (2022):
<https://connectedurbantwins.de>



Kreis Höxter (2021): <https://www.kreis-hoexter.de/service-kontakt/pressestelle/pressemitteilungen/2021/6023.Smart-Nahversorgungsraeume-der-Zukunft-87-Millionen-Euro-von-Bund-und-Kreis-fliesen-in-bislang-groesstes-Digitalisierungsprojekt.html>



Stadt Konstanz (2021):
<https://www.konstanz.de/service/pressereferat/pressemitteilungen/konstanz+wird+smart+green+city>

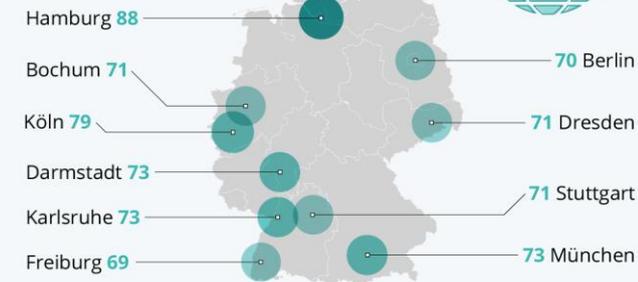


Integration and the Political Discourse in Hamburg

- Smart City Index 2021: Hamburg on 1st position
- Integrated approach - integration of administration, economy and civil society
- Coordination by the “Office for IT and Digitalization”
- Strong integration on EU-level and international projects
- Strong role of citizens participation: (‘Finding Places’)
- Smart Port; E-Culture Agenda; Digitale Stadt; City Science Lab; Digitale Verwaltung; Urban Data Hub

Hamburg ist Deutschlands smarteste Stadt

Die Top 10 der deutschen Städte im Bitkom Smart City Index 2021*



* untersucht wurden 81 Großstädte (über 100.000 Einwohner) in Deutschland; Wertung auf einer Skala von 0 bis 100 in fünf verschiedenen Kategorien
Quelle: Bitkom



statista

Bitkom e.V. (2021): <https://de.statista.com/infografik/19687/digital-ranking-in-deutschen-grossstaedten/>



Wolfgang Gilde (n.d.): <https://wolfganggilde.de/projekte/markenentwicklung-oeffentlichkeitskommunikation-findingplaces-hamburg/>



HCU (2022): <https://mobile.twitter.com/citysciencelab>



BSW (n.d.): <https://www.hamburg.de/bsw/urban-data-hub/>



Transformation towards Smart Cities: Insights from mySMARTLife in Hamburg

Research Objectives

- Analyse and evaluate the framework conditions and instruments for Smart City development in Hamburg
- Analyse and evaluate the citizen and stakeholder participation framework of mySMARTLife project in Hamburg

Some insights from mySMARTLife in Hamburg on the transformation towards Smart Cities

Research Focus

- **Starting point:** Little research on practical Smart City experiences and implications on the local level
- **Overall aim** to analyse institutional framework conditions in Hamburg: forms of governance as well as implications of the project on urban development practices
- **Output:** 5 scientific publications: 2 journal articles, 2 book chapters, 1 conference paper



Some insights from mySMARTLife in Hamburg on the transformation towards Smart Cities

Results

- Due to the EU funding framework, specific project interventions were contractually defined at an early stage when **local stakeholders have limited involvement** in the decisional process.
- ySMARTLife activities in Hamburg were more limited to the **demonstration of sectoral interventions** than to a comprehensive Smart City strategy.

Such initiatives can be considered as **experimental fields** which **enable cities to gain experiences that can be incorporated into local strategic development objectives.**

Some insights from mySMARTLife in Hamburg on the transformation towards Smart Cities

Results

- Like other similar initiatives, mySMARTLife project in Hamburg follows an **experimental approach** to the shaping of infrastructures: It promotes the development of multiple experiments as a means to **prepare public and private stakeholders jointly for the exploitation of opportunities** arising from the technological developments.
- mySMARTLife project in Hamburg represents an approach to the shaping of (mobility) infrastructures that significantly differs from the pre-existing approaches of integrated mobility planning: While it is formally legitimized through the Grant Agreement, **the (pre-) determination of technological choices has not been exposed to democratic scrutiny.**

Some insights from mySMARTLife in Hamburg on the transformation towards Smart Cities

Results

- It is highly questionable whether a mainly expert driven process can produce outcomes that sufficiently reflect the **local residents' ideas of sustainable and appropriate changes to urban infrastructures**. For this reason, **candidate 'solutions' for future demands should be exposed to societal deliberation at an earlier stage** in their development.
- As smart cities are considered an extremely complex subject, which requires the involvement and co-determination of many actors, and strongly relies on many external factors, **open bottom-up approaches, room for flexibility and experimentation, and constant adaptation is needed.**

Some insights from mySMARTLife in Hamburg on the transformation towards Smart Cities

Conclusion

- Valuable contribution to **European Green Deal** and **Climate Mitigation Goals**
- **Process quality** plus technological innovation
- **Experimental Governance** and **citizen involvement** for Sustainability Transition

Thank you for your attention!

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 [mySMARTLife Project](#)

 [mySMARTLife EU](#)



Sources

Bee Smart City (2019): Smart City Hamburg. [Bitkom Smart City Atlas](https://hub.beesmart.city/de/city-portraits/smart-city-hamburg). 19.03.2019. <https://hub.beesmart.city/de/city-portraits/smart-city-hamburg>

Bee Smart City (2020): Smart Cities Made in Germany. Landkarte der Smart Cities in Deutschland plus konkrete Handlungsschritte zur Transformation zur Smart City. <https://hub.beesmart.city/de/smart-city-atlas>

Bezirksamt Bergedorf (2020): Informationen zum Projekt mySMARTLife. Hamburg, DE. Bezirk Bergedorf. Stabsstelle Smart City und Innovation. my SMARTLife. Layout & Graphik: konsalt GmbH.

Bundesamt für Bauwesen und Raumordnung (2021): Heimat 2.0 - Potenziale digitaler Lösungsansätze. Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen und Bundesministerium des Innern und für Heimat. <https://www.region-gestalten.bund.de/Region/DE/vorhaben/heimat20/Heimat20.html>

Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR), Bundesministerium des Innern, für Bau und Heimat (BMI) (2021): Smart City Charta. Digitale Transformation in den Kommunen nachhaltig gestalten. Mai 2021. Bonn.

Bundesministerium des Innern und für Heimat (BMI) (2019): Wir fördern "Smart Cities made in Germany". Meldung. Bauen, Stadt & Wohnen. 18.03.2019. <https://www.bmi.bund.de/SharedDocs/kurzmeldungen/DE/2019/03/smart-cities-modellprojektfoerderung.html>

Bundesministerium für Bildung und Forschung (BMBF) (2018): Forschung. Zukunftsstadt. Pressemitteilung. https://www.bmbf.de/bmbf/de/forschung/energiewende-und-nachhaltiges-wirtschaften/zukunftsstadt/zukunftsstadt_node.html

Bundesministerium für Ernährung und Landwirtschaft (BMEL) (2020): Land.Digital: 61 innovative Projekte gefördert. https://www.bmel.de/DE/themen/laendliche-regionen/digitales/land-digital/land-digital_node.html

Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen (2021): Smart City Modellprojekt Landkreis Höxter. <https://www.smart-city-dialog.de/modellprojekte/smart-city-modellprojekt-kreis-hoexter>

Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen (BMWSB) (2022a): Smart City Dialog. <https://www.smart-city-dialog.de/#>

Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen (BMWSB) (2022b): Nationale Dialogplattform. <https://www.smart-city-dialog.de/nationale-dialogplattform>

Cardullo, Paolo; Kitchin, Rob (2018): Smart urbanism and smart citizenship: The neoliberal logic of 'citizen-focused' smart cities in Europe. October 2018. <https://journals.sagepub.com/doi/abs/10.1177/0263774X18806508>

European Commission (2022a): In focus: Energy and Smart Cities. News. 13 July 2022. Brussels. https://ec.europa.eu/info/news/focus-energy-and-smart-cities-2022-jul-04_en



Sources

European Commission (2022b): Commission announces 100 cities participating in EU Mission for climate-neutral and smart cities by 2030. Press release. 28 April 2022. Brussels. https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2591

European Commission (2022c): Smart Cities. Cities using technological solutions to improve the management and efficiency of the urban environment. https://ec.europa.eu/info/es-regionu-ir-miestu-pletra/temos/miestai-ir-miestu-pletra/miestu-iniciatyvos/smart-cities_en

European Commission (2022d): The Urban Agenda for the EU. Background Information. https://ec.europa.eu/regional_policy/en/policy/themes/urban-development/agenda/

Fraunhofer Institut (2021): Heimat 2.0 – Stärkung der Daseinsvorsorge in ländlichen Räumen. Annika Meier. <https://www.iese.fraunhofer.de/blog/heimat-20/>

Giest, Sarah (2016): Big data analytics for mitigating carbon emissions in smart cities: opportunities and challenges. European Planning Studies, 25:6, 941-957. <https://www.tandfonline.com/doi/full/10.1080/09654313.2017.1294149?scroll=top&needAccess=true>

HafenCity GmbH (2020): Smart Mobility Hafen City. Innovationsprojekt Carsharing und Elektromobilität für die Quartiere Baakenhafen und Elbbrücken. April 2020. Hamburg.

Hamburg News (2021): Smart City Index 2021: Hamburg belegt erneut Platz 1. 06.10.2021. [https://hamburg-news.hamburg/standort/smart-city-index-2021-hamburg-belegt-erneut-platz-](https://hamburg-news.hamburg/standort/smart-city-index-2021-hamburg-belegt-erneut-platz-1)

[1](https://hamburg-news.hamburg/standort/smart-city-index-2021-hamburg-belegt-erneut-platz-1)

Joo, Yu-Min; Tan, Teck-Boon (2020): Smart cities in Asia: An Introduction. Social and Political Science 2020. https://www.elgaronline.com/view/edcoll/9781788972871/9781788972871.00007.xml?tab_body=abstract-copy1

Kim, Daehwan et al. (2020): Regional Smart City Development Focus: The South Korean National Strategic Smart City Program. With: [Jeyun Yang](#); [Youngsang Kwon](#). IEEE. <https://ieeexplore.ieee.org/abstract/document/9306816>

Knieling, J. and Lange, K., 2019. Smart City Governance in Practice – the Example of mySMARTLife Project in Hamburg. In: Real Corp 2019 - Is this the real world? "Perfect Smart Cities vs. Real Smart Cities". [online] Karlsruhe: REAL CORP, pp.671-677.

Kubina, Milan et al. (2021): Comparison of Smart City Standards, Implementation and Cluster Models of Cities in North America and Europe. With: Dominika Sulyova, Josef Vodak. Sustainability 2021, 13, 3120. MDPI.

Kunzmann, Klaus R. (2014): Smart Cities: A New Paradigm of Urban Development. January 2014. <https://www.rivisteweb.it/doi/10.7373/77140>

Landesbetrieb Geoinformation und Vermessung (LGV) (n.d.): Hamburg auf dem Weg zur Smart City. mySmartLife. <https://www.hamburg.de/bsw/lgv-gremien-projekte/7967698/my-smart-life/>

Lange, K. and Knieling, J., 2020. EU Smart City Lighthouse Projects between Top-Down Strategies and Local Legitimation: The Case of Hamburg. Urban Planning, 5(1), pp.107-115.



Sources

Lohrmann, Dan (2016): Smart Cities: The Good, the Bad and the Ugly. government technology. April 2, 2016. <https://www.govtech.com/blogs/lohrmann-on-cybersecurity/smart-cities-the-good-the-bad-and-the-ugly.html>

mySMARTLife (2022): What is mySMARTLife about?
<https://www.mysmartlife.eu/mysmartlife/>

National Urban Development Policy (n.d.): The Leipzig Charter: Basis for Integrated Urban Development. https://www.nationale-stadtentwicklungspolitik.de/NSPWeb/EN/Initiative/Leipzig-Charter/leipzig-charter_node.html

Projekt Zukunft Berlin (n.d.): Open Cities. Tanja Mühlhans. Management of Creative and Media Industry, Digital Economy, Projekt Zukunft. <https://projektzukunft.berlin.de/en/projekt-zukunft/services/international/open-cities/page>

Ringel, Marc (2021): Smart City Design Differences: Insights from Decision-Makers in Germany and the Middle East/North-Africa Region. Sustainability 2021, 13, 2143. MDPI. TU Darmstadt. <https://tuprints.ulb.tu-darmstadt.de/19318/1/sustainability-13-02143-v3.pdf>

Rothe, Robert et al. (2018): Smart Cities and Challenges for European Integration. With: Malgorzata Rutkowska, Adam Sulich. International Conference on European Integration 2018. Ostrava. https://is.muni.cz/publication/1418268/ICEI-2018_Proceedings.pdf#page=1241

Smart Cities Initiative (2022): EU-Netzwerk. Klima- und Energie-Fonds. Österreich. <https://smartcities.at/europa/eu-netzwerk/>

Späth, P. and Knieling, J. (2018). Endlich Smart-City-Leuchtturm: Auswirkungen des EU-Projektes mySMARTLife auf die Planungspraxis in Hamburg. In: Sybille Bauriedl/Anke Strüver (Eds.), Smart City - Kritische Perspektiven auf die Digitalisierung in Städten (345-356). Bielefeld: transcript Verlag.

Späth P., Knieling J. (2019) Smart City Experimentation in Urban Mobility - Exploring the Politics of Futuring in Hamburg. In: Lösch A., Grunwald A., Meister M., Schulz-Schaeffer I. (eds) Socio-Technical Futures Shaping the Present. Technikzukünfte, Wissenschaft und Gesellschaft / Futures of Technology, Science and Society. Springer VS, Wiesbaden.

Späth, P. and Knieling, J., 2020. How EU-funded Smart City experiments influence modes of planning for mobility: observations from Hamburg. Urban Transformations, 2(1).

Stadt Konstanz (2021): Konstanz wird Smart (Green) City. Stadt als Modellprojekt ausgewählt und mit über 11 Millionen Euro gefördert. 16.07.2021. https://www.konstanz.de/service/pressereferat/pressemitteilungen/konstanz+wird+smart+_gr_eeen+_city

Van Lierop, Christian (2020): Renewal of the Leipzig Charter. EPRS. <https://policycommons.net/artifacts/1336821/renewal-of-the-leipzig-charter/1944336/>



Sources for the Images

Leipzig Charter 2007:

European Commission (2007): Leipzig Charter on Sustainable European Cities. Preamble. Final Draft.

https://ec.europa.eu/regional_policy/sources/activity/urban/leipzig_charter.pdf

Urban Agenda:

European Commission (2021): Urban Agenda for the EU.

<https://ec.europa.eu/futurium/en/urban-agenda.html>

New Leipzig Charter 2020:

Bundesministerium des Innern, für Bau und Heimat (BMI) (2020): EU verabschiedet Neue Leipzig Charter. <https://www.connective-cities.net/aktuelles/eu-verabschiedet-neue-leipzig-charter>

Horizon 2020:

REFINE (2020): Horizont 2020. <https://refineproject.eu/de/h2020/>

Open Cities:

waag Futurelab (2013): Open Cities. <https://waag.org/en/project/open-cities/>

Smart Cities Marketplace:

European Commission (2021): Smart Cities Marketplace Forum. Sparcs.info. <https://www.sparcs.info/what-is-new/events/smart-cities-marketplace-forum>

Pillars Smart City:

European Economic and Social Committee (2015): Smart Cities Project. September 09, 2015. <https://www.eesc.europa.eu/en/our-work/publications-other-work/project/smart-cities-project>

City on the Smartphone:

government technology (2016): Smart Cities: The Good, the Bad and the Ugly.

<https://www.govtech.com/blogs/lohrmann-on-cybersecurity/smart-cities-the-good-the-bad-and-the-ugly.html>

Singapore:

Telecom Review Asia Pacific (2020): [What we can learn from Singapore's Smart Nation initiative](https://www.telecomreviewasia.com/index.php/news/featured-articles/1963-what-we-can-learn-from-singapore-s-smart-nation-initiative). April 27, 2020. <https://www.telecomreviewasia.com/index.php/news/featured-articles/1963-what-we-can-learn-from-singapore-s-smart-nation-initiative>

Smart City Dialogplattform:

Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen (BMWSB) (2022a): Smart City Dialog. <https://www.smart-city-dialog.de/#>

Smart City Charta:

Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen (BMWSB) (2022b): Nationale Dialogplattform. <https://www.smart-city-dialog.de/nationale-dialogplattform>



Sources for the Images

Smart Cities made in Germany:

Bee Smart City (2020): Smart City Atlas: Landkarte Deutschland.

<https://hub.beesmart.city/de/smart-city-atlas>

Heimat 2.0:

Fraunhofer Institut (2021): Heimat 2.0 – Stärkung der Daseinsvorsorge in ländlichen

Räumen. Annika Meier. <https://www.iese.fraunhofer.de/blog/heimat-20/>

Zukunftsstadt:

Bundesministerium für Bildung und Forschung (BMBF) (2016): Wettbewerb Zukunftsstadt: 20 Kommunen ausgewählt. 14.07.2016.

<https://www.bmbf.de/bmbf/shareddocs/kurzmeldungen/de/wettbewerb-zukunftsstadt-zwanzig-kommunen-ausgewaehlt.html>

Land.digital:

Bundesministerium für Ernährung und Landwirtschaft (BMEL) (2020): Land.Digital: 61

innovative Projekte gefördert. https://www.bmel.de/DE/themen/laendliche-regionen/digitales/land-digital/land-digital_node.html

Connected Urban Twins:

Connected Urban Twins (2022): Digitale Zwillinge für die Stadtentwicklung der Zukunft.

Aktuelles. <https://connectedurbantwins.de>

Smart City Konstanz:

Stadt Konstanz (2021): Konstanz wird Smart (Green) City. Stadt als Modellprojekt ausgewählt und mit über 11 Millionen Euro gefördert. Designstudio Eminent.

https://www.konstanz.de/service/pressereferat/pressemitteilungen/konstanz+wird+smart+_gr_eeen+_city

Projekt Landkreis Höxter:

Kreis Höxter (2021): Smarte Nahversorgungsräume der Zukunft: 8,7 Millionen Euro von Bund und Kreis fließen in bislang größtes Digitalisierungsprojekt. Pressemitteilung. 16.07.2021.

<https://www.kreis-hoexter.de/service-kontakt/pressestelle/pressemitteilungen/2021/6023.Smart-Nahversorgungsraeume-der-Zukunft-87-Millionen-Euro-von-Bund-und-Kreis-fliessen-in-bislang-groesstes-Digitalisierungsprojekt.html>

Smart City Index 2021:

Bitkom e.V. (2021): Hamburg ist Deutschlands smarteste Stadt. Smart City Index 2021.

Statista. Rene Bocksch. 13.11.2021. <https://de.statista.com/infografik/19687/digital-ranking-in-deutschen-grossstaedten/>

Urban Data Hub:

Behörde für Stadtentwicklung und Wohnen (BSW) (n.d.): Urban Data Hub. Datenbasierte Innovation. <https://www.hamburg.de/bsw/urban-data-hub/>



Sources for the Images

City Science Lab:

HafenCity University (HCU) (2022): HCU City Science Lab.

<https://mobile.twitter.com/citysciencelab>

Finding Places:

Wolfgang Gilde (n.d.): Finding Places | Hamburgs Bürger machen mit. Public Communication. <https://wolfganggilde.de/projekte/markenentwicklung-oeffentlichkeitskommunikation-findingplaces-hamburg/>

