Public Libraries: Their Role in Smart City Strategies

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Abstract

Purpose/Thesis: This paper examines the position of public libraries in smart city strategies. To that end, I verify two hypotheses, H1: Cities analyzed employ strategic plans to define their path to "smartness", and H2: Public libraries are a part of these strategies.
Approach/Methods: Top 30 cities from the ranking of IESE Cities in Motion Index 2019 were selected. The hypotheses were tested through the analysis of strategy documents and Web portals. In most cases, the analysis relied on English versions of said documents/portals, occasionally compared with the national language version.
Results and conclusions: The process of verifying the first hypothesis led to identifying four groups: G1, comprising cities with a general strategy, presumed to include smart initiatives (3 cities), G2: cities with a separate "smart city" strategy, published on their own portal, or a related website (15 cities); G3: cities with subsites/portals briefly summarizing their activities in the area of 'smart' development (10 cities), and G4: cities with many sectoral strategies, presumed to include smart initiatives (2 cities). The analysis allowed the identification of a number of areas in which public libraries already contribute to smart development: smart building, smart infrastructure, smart services, digital skills and life-long learning, sustainability, creativity, digital citizenship and smart business.
Originality/Value: Although many library and information science scholars study smart cities, no similar study has been conducted, and therefore, this paper, with its unique approach, offers a new perspective on the discussion on smart libraries.

Keywords

Digital city. Public library. Smart city. Smart library.

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1. Introduction

As cities constantly attract new inhabitants, in 2007 the population of urban areas outnumbered the rural population (Mora et al., 2019); furthermore, it is expected that by the year 2050 the number of inhabitants of urban areas will rise to about 9 billion (Ojo et al., 2015). The steady increase of urban populations poses challenges to the management of the city's infrastructure – energy, water, transportation or waste. However, city officials' central question is how to make cities more livable (Manville et al., 2014, 11)?

In 2020, researchers are still discussing what "smart city" actually is, and, with various approaches to presenting a comprehensive proposal, there is still no definition we could all

agree on (Dameri, 2013). A part of the problem is the abundance of terms and concepts used to describe modern cities. They can emphasize one of the city's dimensions above others, or generalize. As a result, we may speak of a networked city (Mitchell, 2003), an informational city (Castells, 1989), or a digital city (Schuler, 2002), emphasizing the role of ICTs; a knowledge city (Franz, 2008) and a creative city (Martini, 2016), centering citizens' innovation, as well as a sustainable city (Cohen, 2018), focused on the environmental impact or a resilient city (Papa et al., 2015), highlighting the city's capacity for adapting to new and occasionally unexpected conditions. It is clear that an urban ecosystem cannot be "smart" without being "digital", "networked" and "informational". To complicate matters further, smart cities, with their recent turn to citizens, often try to provide a creative environment allowing the inhabitants to share their knowledge and ideas (Chatfield & Reddick, 2016). Finally, we may ask if any city can be truly resilient or sustainable without being smart (Yigitcanlar et al., 2019). The trouble with the abundance of concepts describing modern cities is that a bibliographical analysis of research on smart strategies based on the presence or absence of the term "smart city" (Mora et al., 2019), does not provide a comprehensive view of relevant scholarship (Ojo et al., 2015).

A smart city is a city that uses ICT to support participatory social and economic sustainable growth, with the aim of improving citizens' quality of life (Dameri, 2017), e.g. by fostering e-participation and e-government in general (Bicking & Wimmer, 2011). At the same time, many researchers see smart government as the next stage of development of e-government (Bernardo, 2017), which involves the digital provision of public services and information (Grönlund & Horan, 2005). This suggests that services provided by public libraries have been a part of e-government from the beginning, which is confirmed by, e.g., European Union's e-government strategy (eGovernment, 2005). Public libraries also act as intermediaries, helping digitally challenged citizens in accessing e-gov services (Smart, 2016). This raises questions regarding public libraries' role in smart government, and their position in smart city strategies.

To state the obvious – public libraries are a part of smart cities, at least physically. However, what LIS researchers want to determine is how public libraries may actively participate in implementing a vision of a modern city. In general, an ideal public library supports citizens, businesses and administration by providing digital services and resources, and physical space for study, work, and interaction (Mainka et al., 2013), thus allowing the users to access global explicit knowledge, at the same times as it is facilitating social exchanges to stimulate sharing implicit information (Stock, 2011). As a result, public libraries may play a significant role in engaging citizens in smart, inclusive and connected communities (Mersand et al., 2018).

This paper examines the position of public libraries in Smart City strategies. To that end, I verify two hypotheses, H1: Cities analyzed employ strategic plans to define their path to "smartness", and H2: Public libraries are a part of these strategies.

The remainder of this paper is organized as follows. First, I present the sample comprising 30 cities and in the following section, I discuss my methodology. Finally, I present the results and main conclusions.

It is worth mentioning that this study is a part of bigger research project "Smart City Research and Library and Information Science", and thus it employs the perspective of LIS, assuming as a basic premise that smart cities' turn to citizens creates space for public libraries and information specialists to participate in "smart" initiatives. As previous papers on the topic include extensive review of scholarship on public libraries and smart cities (Luterek, 2018) and on citizen orientation (Luterek, 2020), this paper will include only the highlights.

Tab. 1. The position of analyzed cities in various rankings

City	IESE Cities in Motion Index (2019)	IESE Cities in Motion Index (2018)	Top 50 Smart City Governments (2018)	IMD Smart City Index (2019)	Smart Cities Index (2019)	Global Cities Index (2019)	The Sustainable Cities Index (2018)
London	1	2	1	20	50	2	1
New York	2	1	4	38	23	1	14
Amsterdam	3	10	13	11	2	20	12
Paris	4	3	46	51	38	3	15
Reykjavik	5	5	44	n/a	27	n/a	n/a
Tokyo	6	4	28	62	54	4	33
Singapore	7	6	2	1	9	6	4
Copenhagen	8	13	24	5	4	17	11
Berlin	9	11	29	39	21	14	18
Vienna	10	19	12	17	7	25	5
Hong Kong	11	9	18	37	87	5	9
Seoul	12	7	3	47	72	13	13
Stockholm	13	16	15	25	5	39	2
Oslo	14	23	n/a	3	1	n/a	8
Zurich	15	24	n/a	2	11	30	6
Los Angeles	16	17	26	35	18	7	45
Chicago	17	14	17	53	24	8	48
Toronto	18	8	39	15	22	17	30
Sydney	19	15	31	14	42	11	34
Melbourne	20	12	8	24	53	16	56
San Francisco	21	27	11	12	44	22	16
Helsinki	22	22	5	8	19	n/a	n/a
Washington DC	23	20	21	31	16	10	39
Madrid	24	25	n/a	21	62	15	21
Boston	25	21	7	32	10	21	22
Wellington	26	18	37	n/a	n/a	n/a	49
Munich	27	37	n/a	n/a	30	32	7
Barcelona	28	26	9	48	88	23	28
Basel	29	34	n/a	n/a	n/a	n/a	n/a
Taipei	30	n/a	16	7	25	44	24

2. Sample selection

After a careful analysis of indicators and methodologies employed by various smart-city rankings, IESE Cities in Motion Index 2019 was selected as the source of the sample. The sample consists of top 30 cities from the ranking. Over half of these are capitals, with 15 located in Europe, 7 in North America, 5 in Asia, and 3 in Australia and Oceania. Every city was also ranked in at least one other ranking (Tab. 1), where their scores may vary significantly.

3. Methodological Approach

Hypothesis H1: Cities analyzed employ strategic documents to define their path to "smartness": Q1: Is there a „smart city strategy" on the city's website?, if not – Q2: Is there a general strategy for the city's development?, if not – Q3: Is there a subsite/portal dedicated to "smart" initiatives of the city?, if not – Q4: Are there sectoral strategies for the city's development? Answering these questions allowed for distinguishing four preliminary groups of cities: (1) cities with smart city strategy, (2) cities with general strategy, (3) cities with subsites/portals dedicated to "smartness", and (4) cities with sectoral strategies.

The data was collected in January 2020, and updated in April 2020 (on portals dedicated to smart initiatives). In case of every city, the search for strategy documents began with the analysis of the English version of the city's official website. Only the documents meeting the following criteria were recognized as strategies: they included (1) a clear mission statement, and (2) a list of specific goals to achieve that vision. Well-constructed documents should also include plans for specific actions and key performance metrics (Johnson et al., 2017), but the preliminary analysis showed that many cities publish strategies which only identify their goals. Nonetheless, the standardized structure of these documents made them good material for scientific analysis.

Verification of the hypothesis H2: Public libraries are a part of "smart city" strategies involved text analysis of strategy documents and Web portals identified in the process of validating hypothesis H1. In most cases, the analysis was conducted on the English versions of these documents/portals, but in some cases it was supplemented by the comparison with the national language version – the details are provided in results section of this paper.

4. Results

The analysis of the selected cities allowed for distinguishing of four groups: G1: cities with a general strategy, presumed to include smart initiatives (3 cities), G2: cities with a separate "smart city" strategy, published on their own portal or a related website (15 cities); G3: cities with subsites/portals subsites/portals briefly summarizing their activities in the area of 'smart' development on their "smartness" (10 cities), and G4: cities with many sectoral strategies, presumed to include smart initiatives (2 cities).

General strategies were found on the websites of the following: New York (Brassio & Shorris, 2015), Los Angeles (Garcetti, 2019) and Boston (Walsh, 2017).

Strategies dedicated specifically to "smart development" were found on the websites of the following: London (Khan, 2018), Paris (Hidalgo & Missika, 2016), Singapore (Smart Nation, 2018), Copenhagen (Gate 21, 2016), Berlin (Berlin.de, 2015), Vienna (Häupl & Vassilakou, 2014), Hong Kong (Smart City Blueprint for Hong Kong, 2017), Seoul (Smart Seoul, 2014), Stockholm (Insyn Sverige, 2016), Zurich (Stadt Zürich, 2018), Wellington (Wade-Brown, 2011) and Basel (Smart City Basel, 2018). Additionally, further analysis of Tokyo's strategy (Koike, 2016) showed that it comprised three distinct sections, one of which was dedicated to building a smart city; as a result Tokyo was included in the G2 category, rather than G1. Finally, the documents available on Sydney (Moore, 2017) and Chicago's (Emanuel, 2019) websites include not only general strategies (focusing on the concept of the resilient city) but also digital sub-strategies, which, after further analysis were shown to fit within the scope of smart city strategies; thus these cities were also included in the G2 category, which then comprised 15 cities.

A summary of the city's activities in the area of "smart" development was found on the websites of the following: Reykjavik (City of Reykjavík, 2019), Toronto (City of Toronto, 2020), Melbourne (City of Melbourne, 2018), Oslo (City of Oslo, 2019), Munich Landeshauptstadt München, n.d.) and Barcelona (Ajuntament de Barcelona, 2019). These subsites contain a general mission statement and examples of smart initiatives, but they do not refer to any strategy documents. It is surprising, as most of those cities, e.g. Barcelona (Vives, 2017), or Amsterdam (Mora & Bolici, 2017), are discussed in scholarship as cities with a "plan", despite the fact that these publications do not refer to any "plan". Finally, Amsterdam (Amsterdam Economic Board, n.d.), Helsinki (Helsinki Smart, n.d.), Washington DC (Smarter DC, n.d.), and Taipei (Smart Taipei, n.d.) are also included in this category.

A characteristic feature of a smart city is that it will make its plans available in English, as well as in the country's native language. However, websites of Stockholm, Zurich, Basel and Munich do not follow this norm and therefore, only documents in Swedish and German were available for analysis.

The websites of San Francisco and Madrid included no material meeting the research criteria; accordingly, they were excluded from further investigation.

4.1. Cities with general strategies

From the technical point of view, the general strategies published on the websites of New York, Los Angeles, and Boston are very well organized. All three include not only a clear vision and a set of goals to achieve that vision, but also a list of actions required to do so, and key performance metrics, which are necessary for future evaluation. *OneNYC* strategy is based on four principles: growth, equity, sustainability and resiliency, with an emphasis on the role of ICTs. It involves not only expanding access to high-speed broadband for individuals and businesses, but also launching training programs, improving e-government services and providing a series of mobile applications that will empower and engage citizens. Although the document itself includes several smart initiatives (it refers to smart building and smart grid technologies, smart controls to manage lights in commercial and retail spaces or stormwater management), the smart city concept is not the primary focus this strategy. Public libraries are similarly marginal. New York City Library System is described in a footnote (Brassio & Shorris, 2015, 131), which includes 10 instances of

words "library" and "libraries" (out of total 19 in the text). Public libraries are mentioned only in one goal, which refers to increasing the transparency and accessibility of brownfield cleanup plans, where public libraries facilitate accessing relevant online repository of governmental documents.

Imagine Boston (Walsh, 2017) distinguishes following directions of development: housing, health, education, economy, energy and environment, open space, transportation, technology, arts and culture, land use and planning. It includes significantly more "smart" actions than *OneNYC*, e.g., smart street infrastructure to make Boston easier and safer to navigate, increasing responsivity to real-time data, free outdoor wireless network or smart utilities provision and usage. More originally, the strategy claims that smart technology (from public datasets to infrastructure) will create opportunities for new forms of public collaboration, leading to digital equity. All these initiatives feature in the "technology" part, which allows us to consider it as synonymous with "smart city development". Public libraries are involved in three planned actions included in the "improving digital equality" initiative: improving digital penetration and access to public hotspots across the city (with the libraries as a supporting department) and hosting classes on computer skills (as a leading department).

Boston public libraries also feature as supporting departments in the following educational actions: improving the facilities so that they support the needs of educational programming, promoting best practices and innovation and maximizing the resources for teaching and learning, supporting after-school programs, expanding opportunities to earn credit in community settings, increasing access to summer learning opportunities, unlocking learning outside of classroom walls, including giving caregivers tools to support children's learning. In the section devoted to economy, the public library's role involves giving businesses and the labor force the tools to adapt to economic shifts, improving linkages to existing jobs and opportunities through local programs, and building career pathways from school to the workforce. Finally, they feature prominently in the section devoted to arts and culture, not only supporting various initiatives, but also as the object of the plan to strengthen the Boston Public Library in its growth as a city-wide educational, cultural and civic institution.

Los Angeles' Green New Deal (Garcetti, 2019) distinguishes 12 goals: environmental justice, renewable energy, local water, clean and healthy buildings, housing and development, mobility and public transit, zero emission vehicles, industrial emissions and air quality monitoring, waste and resource recovery, food systems, urban ecosystems and resilience, prosperity and green jobs. Its composition shows a strong environmental focus, which is evident in the projected use of the smart solutions: tracking the quality of air, preparing for large-scale adoption of electric vehicles and smart meters, improving the management of water usage and decarbonizing of new buildings. The public libraries feature in this context –they are expected to support educational awareness campaigns and promote waste reduction, e.g. by organizing workshops on zero waste, reuse, or upcycling, or offering classes on robotics, coding, circuitry, and community science. Furthermore, LA libraries are expected to become more green themselves by planting edible gardens, using advanced software to manage energy in the building, installing smart faucets and sustainable, low water use landscaping. Finally, the city also plans to install electric vehicles chargers all libraries.

Tab. 2. The vision of the city presented in the analyzed documents

City	Presented vision
Vision of the "smart city"	
London	"A smart city is a collaborative, connected and responsive city. It integrates digital technologies and uses city-wide data to respond to our citizens' needs." (p. 6)
Paris	"Our vision of Smart and Sustainable Paris is based on three major pillars: the open city, the connected city and the sustainable city. Each one of these brings value and resources to the comprehensive approach that will help develop the new trajectory of this 21st-century metropolis. Data use and governance will also influence these three dimensions for the city of tomorrow." (p. 25)
Tokyo	"A «Smart City» is a vibrant city that keeps growing, a city open to the world, a city leading the world in environmental policies, and a global financial and economic center." (p. 22)
Singapore	"A Smart Nation is a Singapore where people will be more empowered to live meaningful and fulfilled lives, enabled seamlessly by technology, offering exciting opportunities for all. It is where businesses can be more productive and seize new opportunities in the digital economy. It is a nation which collaborates with our international partners to deliver digital solutions and benefit people and businesses across boundaries." (p. 1)
Copenhagen	"Technology is not an end goal in itself, but a means to ensure quality of life and growth in Copenhagen. Smart city solutions are the key to making Copenhagen a vibrant, responsible city that is both modern and livable." (p. 2)
Berlin	"Smart City approach aims to find solutions to the ecological, social, economic and cultural challenges faced by Berlin through the use of intelligent technology. Berlin wishes to preserve – and as far as possible enhance – its appeal and its quality of life." (p. 3)
Vienna	"City that assigns priority to, and interlinks, the issues of energy, mobility, buildings and infrastructure. In this, the following premises apply: radical resource preservation, development and productive use of innovations/new technologies, high and socially balanced quality of life." (p. 30)
Hong-Kong	"Embrace I&T to build a world-famed Smart Hong Kong characterized by a strong economy and high quality of living." (p. 4)
Seoul	"to utilize the huge potential of Smart technologies for urban development." (p. 2)
Stockholm	"to provide the highest quality of life for the Stockholm inhabitants and the best entrepreneurial climate." (p. 4)
Zurich	"Smart" means people, organizations or infrastructures to network in a way that is more social, ecological or allows creations of more economic added value. (p. 7)
Wellington	"builds on our creative, dynamic strengths and looks to grow these in a way that supports Wellington to be sustainable and resilient into the future." (p. 8)
Basel	"uses modern technologies and targeted digital data for sustainable development of the canton." (p. 3)
Vision of the "digital city"	
Chicago	"the city where technology fuels opportunity, inclusion, engagement, and innovation." (p. 8)
Sydney	"rapid development in technology has opened new opportunities to enhance the liveability and therefore the competitiveness of cities – the «smart city». The City's Digital Strategy is a roadmap for how we can achieve that in a changing digital environment." (p. 2)

4.2. Cities with smart city strategies

Smart city strategies come in different shapes and forms: sometimes they are very organized, including detailed plans and milestones, but sometimes they are very short, general in nature and chaotic. There seems to be no differentiation between "smart" and "sustainable" in some cases, as e.g. Paris wants to achieve both, and Tokyo's "smart" is actually mostly "sustainable". Similarly, Chicago's and Sydney's understanding of "digital" seems very "smart". Most notably, all these cities aim to provide high quality of living (Tab. 2).

It is surprising that the strategies that include initiatives involving the activities already associated with public libraries, such as providing Wi-Fi access or limiting digital divide by organizing relevant classes, do not mention public libraries. This is the case of *Smarter London Together* (Khan, 2018), which has a very clear mission statement, including more user-design services and new approach to city data, achieving better connectivity and smarter streets, improving city-wide collaboration, and enhancing digital leadership and skills. This strategy shows a strong citizen-orientation, but it does not refer to sustainability, which features prominently in the strategies of many other cities. It includes a general goal of recognizing the role of cultural institutions in engaging the citizens in the digital world, but mentions only technologies such as augmented reality and virtual reality in relation to the Museum of London.

Vienna (Häupl & Vassilakou, 2014) distinguishes three principles of smart development: quality of life (referring to social inclusion and participation, healthcare and environment), resource preservation (energy, mobility, infrastructure and buildings) and innovation (education, economy, research, technology and innovation). The city aims to be an inclusive place open to all, where efficient, intelligent networks and useful information systems facilitate life. It highlights education and qualifications as a basis of future development, exemplified in Vienna Campus Plus Model, concentrating kindergartens, schools and leisure education in one location to provide integrated teaching. Public libraries are not mentioned. They are also absent from *Wellington Towards 2040: Smart Capital* (Wade-Brown, 2011), which articulates four main goals: the city aims to be people-centered (healthy, vibrant, affordable, resilient and open), connected (virtually and ecologically), eco (leading the green New Zealand) and dynamic (a place of creativity, exploration, innovation), in order to become smart and resilient. Finally, Hong-Kong (Smart City Blueprint for Hong Kong, 2017) aims to make people happier, healthier, smarter and more prosperous, especially the elderly and youth. It plans to become a living lab, allowing business to grow in a friendly environment, but also to consume less resources while maintaining its unique nature as an international city. To achieve all these goals, Hong Kong sets a plan based on six pillars: smart mobility, smart living, smart environment, smart people, smart government and smart economy. Although the strategy includes broadening free Wi-Fi network coverage and supporting all citizens in taking advantage of new technologies, it does not refer to public libraries.

Paris Smart and Sustainable (Hidalgo & Missika, 2016) articulates three major objectives: to be open (fostering participation, collaboration and co-creation), connected (developing infrastructure and e-government) and sustainable (promoting energy transition, environment, resilience and responsible recycling and consumption). The strategy contains several references to public libraries: one of its goals is to develop high-quality digital

public services, and it mentions digital library an example of already existing solutions; public libraries are mentioned as hosts of municipal Wi-Fi hotspots; and, finally, the *Paris Libraries* association is used as an example of organization which will be supported in its activities targeting local businesses. Sustainability is also an important part of Tokyo's smart city strategy, which combines environmental and economic goals. The city plans to limit its energy consumption and food waste, build more effective transport networks, as well as foster innovations and support SMEs. It aims to become a global financial city and a prime tourist destination. Similarly, Stockholm's strategy is based on the principles of openness, innovation and connectivity, and, most importantly – sustainability. It aims to make its economic growth sustainable by using digitalization and new technologies to make the city attractive and innovative, and to make it the best start-up scene in the world. Ecological sustainability will result from the reduction of energy consumption and waste production, introducing modern transport and reducing carbon footprint. Transparent administration, accessibility and e-participation will lead to democratic sustainability; finally, social sustainability will follow digital inclusion and higher perceived safety.

The aims identified in Singapore's *Smart Nation* (2018) are to build digital economy, digital government and digital society. Its strategy includes goals related to: e-government (including system foundations such as cybersecurity, digital infrastructure and data management systems), economic transformation (digitalization of existing sectors, increase of global competitiveness by fostering new ecosystems and developing the next generation digital industry) and citizens (digital access and inclusivity, digital literacy and participation). In a section titled "What Can I Do for Smart Nation?", authors suggest attending a talk or a course offered by institutions such as the National Library.

Smart Seoul (2014) distinguished three main stages of smart development: developing smart infrastructure with the use of existing ICTs, providing smart services, and advancing these services. The city's goal was to become the best city with regards to the use of smart technologies; this was achieved by developing smart infrastructure and actively closing the digital divide. Public libraries contributed by providing free Wi-Fi.

Some of the documents discussed are very short, and do not suggest any specific activities. For example, *Strategie Smart City Zurich* (Stadt Zürich, 2018), identifies three main goals: equal opportunities and high quality of life for everyone, resource conservation and sustainable development, and becoming an innovative and attractive business location. The strategy frames digital networking as a tool for the citizens to provide feedback to the authorities and administration as well as a means towards facilitating dialogue regarding the ways in which to achieve sustainability. Copenhagen's strategy (Gate21, 2016) is similarly vague. It sets two main goals: improving the quality of life and developing the economy. It uses smart city infrastructure, data platform and privacy, and co-creation partnerships as a foundation for implementing its vision in five areas: health, smart mobility, energy and climate, smart citizen, and smart learning. The strategy suggests only one specific activity per area, so it does not provide enough material for a sustained analysis. Finally, *Strategie Smart City Basel* (Smart City Basel, 2018) identifies three main areas of development: resources and skills (which refers mostly to local administration), infrastructure and data (e-government and affordability of the Internet access), transparency and openness (inclusiveness and e-participation); as a result, the document reads more like an e-government strategy than a smart city strategy.

Berlin's strategy (Berlin.de, 2015) suffers from a different problem. It defines six areas of action: smart administration and urban society, smart housing, smart economy, smart mobility, smart infrastructures and public safety. Unfortunately, it is a very poorly organized document, which makes it difficult to distinguish between the discussion of a given problem ("challenge"), and the presentation of a solution, as the use of headlines is very misleading.

The City of Chicago Tech Plan, a part of *Resilient Chicago* (Emanuel, 2019), articulates five goals: introducing next-generation infrastructure that enables residents and businesses to become more digitally-engaged, ensuring the full participation of all residents and businesses in the digital economy, creating open government, embracing civic technology innovations and encouraging growth of technology sector. Public libraries play a key role in in many areas. The city is planning to increase accessibility of low-cost broadband, which will involve Chicago Public Library (CPL) offering the readers an option of borrowing Internet access for their home for a limited time, in addition to providing access to computer labs and Wi-Fi at site.

The section "Educate and engage young people in technology" also refers to the public libraries. Harold Washington Library Center allows teens to engage in project-based learning using digital tools such as 3D printers or drawing tablets. CPL offered classes in STEM skills to over 60.000 kids within Summer Learning Challenge. The library also organizes a Maker Lab, in which everyone, not only youth, can learn to use digital production and manufacturing tools, such as 3D printers and laser cutters; additionally, it provides "Cyber Navigators" to help the users develop computer skills necessary to carry out basic online tasks, such as job searches. CPL will also offer more digital content: it plans not only to turn its website into an online community focused on reading and other cultural experiences, but also to digitalize assets related to Chicago's neighborhood history, making them available for educational purposes. Finally, CPL is one of the civic partners in the initiative for establishing a benchmark of fully connected community.

Sydney's strategy (Moore, 2017) identifies six goals: digital inclusion and lifelong learning, people-centricity, digital engagement of communities, knowledge and infrastructure, digital urban renewal and ethical innovation. Achieving the first goal in particular will involve public libraries: they provide courses in computer literacy and coding classes, as well as Wi-Fi and computer access. The strategy underlines that the aim is not only to provide the citizens with basic computer skills but primarily to offer them a pathway to becoming an active digital citizen. The city promises them a significant IT upgrade and network extension by opening two new libraries. The strategy states:

> Both internationally and in Australia, public libraries are leading the way in building digitally inclusive communities by providing digital infrastructure, delivering lifelong learning programs, celebrating digital creativity and increasing access to information, knowledge and skills (Moore, 2017, 15).

4.3. Cities with dedicated subsites and portals

The G3 category was divided in two subgroups: G3A (Reykjavik, Toronto, Melbourne, Oslo, Munich) and G3B (Amsterdam, Helsinki, Washington DC, Barcelona and Taipei). The websites of the cities in the G3A group offer very little material, as their contents are brief and generic, providing a, small selection of initiatives, which are presented as a proof of the city's "smartness".

Reykjavik's website (City of Reykjavik, 2019) defines "smart city" as a city that uses information and ICTs to improve the quality of life in a sustainable way. It presents four projects as an example of their attempts to become more 'smart': a mobile app allowing the user to take a bus, LUKR – The Land Information System of the Reykjavík Area, a link to energy company website, and the city's online consultation forum "Better Reykjavik".

Toronto is currently consulting its Digital Infrastructure Plan with the public, aiming to improve accessibility of the information and data as a tool to create more economic, social and environmental connections (City of Toronto, 2020). This explains its loose use of the terms "smart city", "digital city" and "connected community" as synonyms, but the imprecise vocabulary makes the city's vision less clear. The website offers the following as examples of Toronto's actions to realize its vision: an open data portal, two mobile applications: MyWater (allowing the users to monitor their water usage) and DineSafe (allowing the users to review the results of restaurants' sanitary inspections), smart traffic signals and improving transit reliability, speed and capacity (with one pilot project provided).

Melbourne's "smart city" vision statement (City of Melbourne, 2018) is similarly vague: it refers to enhancing those aspects of that city that make it uniquely Melbourne. Current initiatives, presented on the website, are: CityLab, emerging technology testbeds and an open competition for an innovation facilitating safe mobility. Furthermore, Melbourne's website mentions an open data platform, free Wi-Fi, pedestrian counting system, smart bins (to reduce litter) and a website providing information on the trees in the city.

Oslo (City of Oslo, 2019) wants to become smarter, greener, more inclusive and more creative city for all citizens, but does not identify any steps towards achieving those goals. Instead it claims that everything which is digitizable will be digitalized and citizen-oriented, emphasizing electrical buses, decarbonizing buildings and more environmental friendly waste management.

Finally, Munich's (Landeshauptstadt München, n.d.) dedicated subsite refers to the urban renewal area of Neuaubing-Westkreuz district, one of large-scale test-beds for smart solutions within "Smarter Together" project. Consequently, it does not meet the standards established by other cities in the G3A.

Dedicated websites of the cities in the G3B group provide long lists of smart projects, aiming to present the full range of those initiatives, rather than singular examples, as was the case in the G3A. Websites of Amsterdam, Helsinki, Washington DC and Taipei are very similar to one another – they are maintained separately from city's main Web-portal, contain short description of smart initiatives with links to more detailed information, and provide tools to foster cooperation between different stakeholders.

Amsterdam's Smart City portal, maintained by Amsterdam Economic Board (n.d.), divides the smart initiatives into seven thematic categories: digital city (39 projects), energy (57 projects), mobility (38 projects), circular city (73 projects), governance and education (27 projects), citizens and living (68 projects) and smart city academy (4 projects). From a number of projects alone it can be deduced that sustainability is a priority, as projects addressing more efficient use of energy and circular economy (reducing the waste and pollution, increasing recycling and reusing) number almost 130. None of these names a public library as a leading/supporting partner. Interestingly, SmartTaipei (n.d.), the only Asian city in the G3 group, was modeled after Amsterdam's portal – it is mentioned in the introductory section and the website links to the original Dutch site. Taipei lists 129 smart

projects, divided into categories such as transportation (23), healthcare (21) education (6), economy (16), government (13), environment (19), safety (16) and other (10). Taipei Public Library is mentioned only in one project: "Reading. Taipei, Taipei Reading Never Rest", as a supporting partner. However, another project "Smart Community Reference Manual of Taipei Public Housing", mentions smart services: smart library, smart healthcare, smart day care, smart office and smart commercial retail.

Helsinki's smart portal (Helsinki Smart, n.d.) was created as a part of "smart city, smart country side, smart region" project and as such it refers not only to the city itself but also to its surroundings. It identifies four principles of smart development: citizen city, digitalizing industry, health and wellness, and urban cleantech. Seventy-six projects are listed on the website. One of the showcased initiatives is "The Central Library: creating new Millennium's civil society in Helsinki", which "brings civic society to the new millennium by combining eco-efficient wood architecture, digital services and robotics" and offers "everything from books to drilling machines and guitars". However, the description is very general and does not explain why the project is 'smart'.

The SmarterDC (n.d.) portal also identifies four principles: resiliency, sustainability, equitability, citizen focus and transparency and collaboration. It additionally defines specific focus areas: economic development, energy and environment, healthcare, infrastructure, public safety, transportation and urban planning. The portal lists 27 projects, e.g. smart waste management, movement analytics, water leak detection or street light management. None of them names public library as a leading/supporting partner.

Finally, Barcelona Smart City website (Ajuntament de Barcelona, 2019) is much simpler than other websites discussed in this section, possibly because it is located on city's main portal. It identifies three main goals: digital transformation (following the following principles: technology for a better government, urban technology and city data commons), digital innovation (digital economy, maker movement, and BIT Habitat-i.lab) and digital empowerment (digital education and training, digital inclusion, democracy and digital rights). The number of projects in every category ranges between one and five, but none of them names public library as a leading/supporting partner.

5. Public libraries in smart city strategies

The public libraries' contribution to smart development in the analyzed cities is sometimes very extensive, as in case of Boston, Chicago or Los Angeles, very undefined, as – e.g. in Helsinki, or completely unacknowledged, which unfortunately is true for the majority of the analyzed cities. However, it is important to remember that many strategy documents in group G2 do not identify the entities responsible for implementation of planned activities; therefore, public libraries may still participate in the process. The obvious next step is a detailed analysis of the activities undertaken by libraries in the cities discussed above.

For now, it is possible to identify several areas in which public libraries already play a role, contributing to smart development:

– smart building – public libraries occupy public buildings, which in smart and sustainable city must meet the standards of efficient management of energy and water consumption, and production. It is expected that libraries functioning in such

buildings will be smart: they may plant edible gardens, use advanced software and smart faucets to manage energy, or install electric vehicles chargers (Los Angeles);
- smart services – public libraries may provide more digital content, create online communities (Chicago), and develop high quality digital library services (Paris, Taipei);
- smart infrastructure – public libraries provide access to Wi-Fi and computers onsite (Boston, Paris, Seoul, Chicago), but they also may allow their users to borrow Internet access home (Chicago);
- digital skills and life-long learning – public libraries may host classes on digital skills, support after-school programs, maximize resources for teaching and learning(Boston, Los Angeles, Singapore, Chicago, Sydney);
- sustainability – public libraries may offer zero waste, reuse or upcycling workshops (Los Angeles);
- creativity – public libraries may organize workshops on robotics, circuitry and community science (Los Angeles), give their users access to technologies such as 3D printers and drawing tablets (Chicago) or even drilling machines and guitars (Helsinki);
- digital citizenship –public libraries provide tools and friendly environment allowing inhabitants to become digital citizens, and teach them how to use e-participation and e-collaboration tools (Sydney);
- smart business –public libraries support workforce by helping them to progress in their career, (Boston), or by activities targeting local SMEs (Paris).

The American libraries provided the majority of the examples, which is not surprising, as the American model of a public library assumes a more extensive involvement in city's day-to-day life (Gorham et al., 2013). Considering the nature of initiatives defined as "smart", it is possible that many modern libraries are smart, without knowing/articulating it. What is clear, is that if an institution such as a library wishes to actively contribute to the development of the modern city, it has to take action and define its own path. If it worked for Chicago Public Library, whose employees are credited as co-authors of *The City of Chicago Tech Plan*, why not try it elsewhere?

6. Final remarks

Only 15 of the 30 cities in the sample include on their website a document recognizable as smart city strategy. As a result, the hypothesis *H1: Cities analyzed employ strategic plans* to define their path to "smartness" was not verified, and the attempts made clear the difficulties of defining a "smart" city. As transparency is one of the most important elements of "smartness," it can be expected that if a strategy for smart development exists, it should be available online, but it is technically possible that such documents are used internally by local administration.

Surprisingly, expired strategies of certain smart cities were not updated; rather, cities have established "smart" portals, listing "smart initiatives" instead. It is possible that a new version would be unnecessary, as the smart city framework already existed in the urban environment. This seems to be the case in Amsterdam, as scholarship refers to "Amsterdam Smart City Programme", developed in 2007 (Mora & Bolici, 2017). Absence of strategy

documents also explains the bottom-up approach adopted by some researchers to identify the strategic principles of smart city development: they collect information on smart initiatives, classify them and try to extrapolate the wider vision from these data (Mora et al., 2019). This approach would be appropriate to the cities from the G3B group, as their websites provided long lists of initiatives without articulating a general strategy. But even in this case, as those portals rely on self-reporting mechanisms, they may provide only a limited view.

This paper faced another challenge as the understanding of a smart city has recently been subject to rapid transformations, which made it impossible to assume a single shared definition. Because there is no clear understanding of a "smart city", and the goals of every city are influenced by the local political, legal, social and economic factors, it is difficult to understand why public libraries feature more prominently in strategies describing long-term plans for development, while in others they are not even mentioned.

Finally, the goal of my analysis was to understand the current position of public libraries in smart cities, considering contemporary smart cities frameworks, which are far more citizen-oriented than those of 10 years ago, thus creating space where public libraries may play an active role. This understanding will direct the next stages of my research, which will be based on a larger sample and analyze public libraries themselves.

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Biblioteki publiczne w strategiach budowania inteligentnego miasta

Abstrakt

Cel/Teza: Celem artykułu jest weryfikacja w jakim zakresie biblioteki publiczne są obecne w strategiach budowania tzw. *smart city*. W tym celu przyjęto dwie hipotezy: H1: Inteligentne miasta są tworzone w sposób zorganizowany w oparciu o dokument strategiczny, oraz H2: Biblioteki publiczne występują w tych dokumentach strategicznych.
Koncepcja/Metody badań: W badaniu przeanalizowano 30 miast, które zajęły najwyższe miejsca w rankingu *IESE Cities in Motion Index 2019*. Weryfikacja obu hipotez została przeprowadzona poprzez analizę dokumentów strategicznych i stron internetowych. W większości przypadków korzystano z ich wersji anglojęzycznych, jednak w niektórych przypadkach konieczne było uwzględnienie wersji w języku narodowym.
Wyniki i wnioski: Weryfikacja hipotezy H1 pozwoliła na wyodrębnienie czterech podgrup w badanej próbie: G1: miasta, które opublikowały strategie ogólne, z założeniem, że mogę obejmować także *inteligentne* inicjatywy, (3 miasta), G2: miasta z dedykowaną *inteligentną* strategią, opublikowaną na stronie miasta lub powiązanych serwisach internetowych, (15 miast); G:3 te, które opublikowały podstronę na swojej głównej stronie, prezentującą jedynie krótkie podsumowanie swoich działań w tym zakresie (10 miasta), wreszcie G4: miasta z wieloma różnymi strategiami sektorowymi (2 miasta). Na podstawie przedstawionej analizy zidentyfikowano następujące obszary działalności bibliotek, w których uczestniczą w budowaniu inteligentnych miast: inteligentny budynek, inteligentna infrastruktura, inteligentne usługi, kompetencje cyfrowe i kształcenie ustawiczne, zrównoważony rozwój, kreatywność, cyfrowy obywatel and inteligentne przedsiębiorstwo.
Oryginalność/Wartość poznawcza: Pomimo obserwowanego wzrostu zainteresowania badaczy tematyką roli bibliotek w inteligentnych miastach, który przekłada się na wzrost liczby publikacji, do tej pory nie było opracowania o podobnym zakresie.

Słowa kluczowe

Biblioteka publiczna. Inteligentna biblioteka. Inteligentne miasto. Miasto cyfrowe.

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