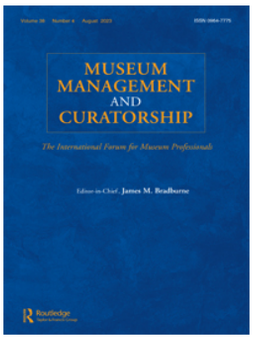

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City museums in the age of datafication: could museums be meaningful sites of data practice in smart cities?

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ABSTRACT

The article documents connections and synergies between city museums' visions and programming as well as emerging smart city issues and dilemmas in a fast-paced urban environment marked with the processes of increasing digitalization and datafication. The research employs policy/document analysis and semi-structured interviews with smart city government representatives and museum professionals to investigating both smart city policy frameworks as well as city museum's data-driven installations and activities in New York, London and Singapore. A comparative program analysis of the Singapore City Gallery, Museum of the City of New York and Museum of London identifies such sites of data practices as Data storytelling, interpretation and eco-curation. Discussing these sites as dedicated spaces of smart citizen engagement, the article reveals that city museums can either empower their visitors to consider their roles as active city co-makers or see them as passive recipients of the smart city transformations.

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Introduction

As public hubs for constituting citizenry (Bennett 1995), museums have established their important role in shaping cultural and political discourses, educating citizens and elevating feelings of local belonging (Wallis 1994; Poulot 1997; Luke 2002). Especially, city museums have been recognized as prominent contributors to the curation and circulation of urban representations and narratives of the city's cultural and political landscapes (Silva 2012). Calabi (2012) defined a city museum as an institution that does not necessarily have to deal with art masterpieces, 'but with multiple stories about local communities, spaces and buildings where people live, move, play, go to school or to work' (458). Gosselin (2013) further explained that city museums exist 'to respond to global problems by proposing local solutions' in developing new models of economic, environmental and cultural sustainability (21).

In the beginning of the twentieth century, with the growth of urban centres and proliferation of museums as public institutions, civic museums spread across all European countries. They primarily aimed to consolidate collections of objects whose different

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origins represented urban centres where they were located (Tewdwr-Jones et al. 2020). While the mission of these civic museums in the early years was mainly educational, in the 1970s with the development of new museology movement city museums expanded their goals to enhance citizen engagement in co-developing narratives of urban life (Vergo 1997). A new social constructivist model of a museum as a social 'forum' prioritized personal experiences of the audiences treated as active meaning-makers (Hooper-Greenhill 2000):

> 'Less interested in a top-down knowledge production and delivery model, institutions practicing civic museography,' or city museums, progressively started to design interactive visitor opportunities to engage audiences in urban narratives co-creation (Gosselin 2013, 21). In the past decades, many city museums across countries and continents have experimented with programming that engaged visitors in debates on a wide range of urban issues, including environmental, health, diversity and inclusion, architecture and design, scientific and technological progress, economic development, or political mobilization (Ünsal 2019; Black 2010; Smith 2009). This article explores how city museums have expanded their curatorial and representation agenda in the raise of smart cities, especially in light of increasing datafication processes transforming the urban life.

This article defines smart cities as densely networked and connected urban centres that employ smart infrastructures and data-driven solutions to enable urban governance that supports knowledge-sharing and encourages civic participation (Kitchin 2014). From e-government systems to city dashboards, to digital surveillance and to sensor networks, to name but a few, a wide range of smart city platforms generate a vast amount of data. These data uniquely connect people, objects, and urban spaces and can be repurposed for predictive profiling, social sorting of citizens and communities as well as for creating urban models and simulations (Kitchin 2014). Data-driven solutions promise cities a new level of urban design and transparency enabling a more efficient management of the city environment, security, economic sustainability and even cultural vitality (O'Connor and Andrejevic 2017).

However, it remains questionable what data are included in and excluded from a smart city data ecology and what purposes do they serve, 'not simply from an instrumental perspective […] but with respect to issues such as fairness, equity, justice, citizenship, democracy and governance?' (Kitchin et al. 2017b, 2). Developing a more democratic, inclusive and human-centred environment is a growing need in the development of agenda of smart cities. Academic scholarship has criticized smart cities for exacerbating digital divides, increasing inequalities, disadvantaging poorer citizens and creating power asymmetries within and among cities (Ryan and Gregory 2019). Smart city datafication created new threats of 'algorithmizing' different areas of human life and intended to maximize economic benefits rather than to increase social justice (O'Neil 2016). Excess control, loss of privacy and decision-making powers as well as algorithm bias leading to social exclusion decrease the role of citizens in managing a smart city that can benefit not only techno and corporate giants but also improve cultural communities (Calvo 2020).

This situation signals a growing necessity to find new ways to transform an increasing 'dataveillance and geosurveillance' into a meaningful way to empower citizens to take an active role in co-design and transformation of the city into a comfortable space to live and create (Kitchin 2015, 7). To explore the potentials of smart cities for productive community-led co-design of innovative urban solutions, this article draws on the rationalistic

or pragmatic school of thought that sees smart city building as primarily a smart citizenship and community development activity rather than concentrating around ICTs or technology. The scholars in this school argue that the strengthening citizens' digital skills and enhancing communities' capabilities lead to enhancing a meaningful usage of technologies, based on the need in the local contexts (add names). Bringing the human element into the forefront, the school emphasizes the value of community-driven smart open innovation models as a meta-factor that 'should be the overarching goal of smart city planning' (Kummitha and Crutzen 2017, 46).

These innovation models are based on public-private-people partnerships, living labs and e-governance systems that facilitate bottom-up interventions. They provide a required collaborative innovation structure that connects smart government, research institutions, companies, third-sector organizations and citizens to develop more inclusive, higher quality and more efficient smart urban services (Errichiello and Micera 2018). For example, de Waal et al. (2020a) identified the level of collectives that combine citizens and other stakeholders mobilized by a third party that acts on their behalf around a particular issue. They indicate that, in the process of city-making, intermediaries or 'urban curators' (Beer et al. 2015) can play an important role as initiators and facilitators (de Waal et al. 2020a). Cultural institutions in particular have long been serving the society by 'organizing dramaturgies' that activate citizens around urgent social and political issues (Knoop and Schwarz 2017). As centers of expertise, such institutions as museums, libraries, archives and institutes for education and research, are particularly well placed to 'operationalize the knowledge produced in hackable city-making' (de Waal et al. 2020a).

Specifically, as key community-oriented institutions, city museums can be a meaningful part of smart city ecosystems who can educate, engage and empower smart citizens to further democratize smart environments (Romanelli 2018). Bringing in citizens as important stakeholders to the open innovation model, museums could play a fundamental role in nurturing a smart citizen, defined by Alexandru et al. (2019) as a person who actively uses digital technologies to get involved in society, politics, and governance to solve complex urban problems. The smart citizen is a new paradigm of the concept of citizen by which human interactions within urban environments and social intelligence serve as a key resource to be used to increase the quality of life (Alexandru et al. 2019).

For example, to augment public discourse and generate citizen-driven solutions to contribute to the smart city co-making museums can offer *sites of data practice*. According to Bates (2017), sites of data practice are dedicated spaces within a smart city ecosystem, where different actors, from governments to citizen activist groups, engage in various forms of data curation, circulation, analysis and meaning making. They are based on interconnected networks that might include public bodies, regulatory agencies, citizen-led communities, private companies, research centres, universities and museums. Different sites of data practices would have their own data cultures and objectives regarding the opening and repurposing of public data. These sites could perform various functions in the smart city development, ranging from policymaking or urban research to open data network building and even data activism and protest campaigns challenging municipal governments decisions and practices (Bates 2017).

The interdisciplinary academic scholarship across museology and urban studies argued that museums as socially responsible urban actors can offer powerful spaces for the generation, promotion and even legitimization of smart city narratives (Estrada-Grajales et al. 2020). In relation to data practices, museums in a smart city can generate urban imaginaries through technical and data-driven interventions (Ioannidis et al. 2013; Giannini and Bowen 2019). More importantly, data-driven installations in museums can engage citizens in the process of urban co-creation, transforming them from passive urban residents to active data producers and narrators (Chronis 2012). Estrada-Grajales et al. (2020) analysed the 100% Brisbane exhibition in the Museum of Brisbane in Australia to argue that citizens can perform as 'data sensors,' capable of reshaping their urban spaces and the narrative representations attached to those spaces (333).

While the interdisciplinary scholarship exploring the role of museums in smart city is slowly growing (Giannini and Bowen 2019), there have been no focused studies so far that would explore specific cases of museums' programs and installations that could be understood as sites of data practices, especially in relation to smart city policy context. As Bates (2017) indicated, each of such data practice sites is embedded within a wider socio-material context and shaped by 'public policy, legislation, political economy and various other factors that inform and shape how ideas and practices emerge around data' (192). It is important, though, to explore further this assumption and investigate links between urban policy making and city museum programs which could provide interactive spaces of data practice.

To address the research problem the article offers a comparative case analysis of data-intensive programs developed by dedicated city museums in three selected cities, such as London, Singapore and New York. The next section justifies and explains a cross-case analysis employed in this research to explore if the Museum of London (MoL), Singapore City Gallery (SCG) and Museum of the City of New York (MCNY) offer meaningful sites of data practice in their respective smart cities. The following part briefly presents these cases, identifying three types of data practices established in the museums, ranging from data storytelling to eco-curation. The article proceeds with a more focused analysis and discussion of the key research findings that are presented in two sections. The first one explores how three city museums position themselves in relation to the smart city agenda and how they conceptualize their institutional roles within their urban data ecologies. The second section assess to what extent city museums can provide engaging sites of data practices by analysing how they understand citizens' role in smart city co-making and reflecting on the practical implications for museums in terms of their societal mission in nurturing citizenship.

Research questions and methodology

Investigating both smart city policy frameworks as well as city museums data-driven installations and activities in New York, London and Singapore, the article aims to address the following key questions: *How city museums understand their roles and place in smart city ecosystems? If/how do smart city governments frame museum data practices within their policy frameworks and agenda? And what roles are assigned to citizens in these museums' spaces of data practice?*

To address these questions the article draws on a comparative analysis of three case studies explored in the context of city museums and their data-inspired installations and programs in such smart cities as London, New York and Singapore. All three cities have been consistently analysed in the academic scholarship in relation to their smart city governance, aspirations, programming, implementation challenges and technological development (Shamsuzzoha et al. 2021, Csukas and Szabo 2021; Gonzaga 2019). Furthermore, all three smart cities stress their commitments to citizen-centred policy development aiming to provide adequate opportunities for public engagement in collaborative city co-design and management.

For example, Singapore Smart Nation plan outlines Digital Society, as one of its three pillars of the smart development to 'empower Singaporeans to maximize the opportunities of a digital society, improve their lives, […] and have an equal chance to succeed' (SDGO 2020). In New York, 2018 NYCx programming as a part of the smart city development plan focuses on involving neighborhoods and city communities 'to surface problems, co-create prototype solutions, and apply, test and grow emerging technologies' (MOCTO 2018). Finally, aiming for a global 'leadership in design and common standards' Smarter London Together Plan (2019) stresses its key goal to 'put users at the heart of what' the city does by developing 'new approaches to digital inclusion to support citizens' (16).

Considering that in recent years many smart city governments re-branded their endeavors and programs as citizen-centric without a real distribution of power to benefit smart citizens (Kitchin 2015), it is important to consider the role of 'intermediaries' such as museums to understand to what extent they can serve as safe and engaging places for citizens to get involved into meaningful acts of data practice. This article explores citizen-centred installations and activities closely engaging with urban data in three smart cities in the context of such city museums as SCG, MoL and MCNY. As evidenced in the article all these city museums have been very responsive to the smart city development agenda and reflected on these urban transformations through their data-driven programming and exhibitions.

These three case studies offered a culturally and geographically diverse research sample for a close explorations of city museums' initiatives in different economic and political urban settings. The analysis of cases started with desk research based on document analysis that accounted for two important sources of data: city museum programming documentation and government policies. Extending the findings derived from the desk research I conducted 8 focused semi-structured online interviews (facilitated through Zoom) with both museum professionals and curators as well as with government officials from selected museums and smart cities (see Table 1).

These interviews were instrumental to reveal complex relationships (or a lack of thereof) between city museums and municipal authorities, that are not necessarily documented through direct policy incentives and explicitly articulated programs. More importantly, these interviews were particularly illuminating in explaining what roles these museums have chosen in relation to engaging with urban data through their installations and programming. Table 2 presents three data roles identified through the case analysis, such as *Data storytelling*, *Data interpretation* and *Data eco-curation* and highlights some key details on city museums' exhibitions and installations which are further discussed in the next section.

Table 1. Museum professionals and government representatives from Singapore, New York and London, interviewed by the author in March–April 2021.

City	Interviewee	Position and affiliation	Cited in text as
Singapore	Anonymous	Smart Nation Spokesperson, Smart National, Digital Government Office	SMS 2021
	Anonymous	Senior Manager, Singapore City Gallery, Strategic Communications & Outreach Department, Urban Redevelopment Authority	SCG 2021
New York	Sarah Henry	Deputy Director and Chief Curator, Museum of the City of New York	Henry 2021
	Kubi Ackerman	Former Director of the Future City Lab, Museum of the City of New York	Ackerman 2021
London	Claire Sussums	Assistant Director of Content, Museum of London	Sussums 2021
	Sharon Ament	Director, Museum of London	Ament 2021
	Steve Watson	Technical Building Lead, New Museum of London	Watson 2021
	Julia Thomson	Smart Cities Policy Lead, Mayor of London	Thomson 2021

Table 2. Data-driven installations of the Singapore City Gallery, Museum of the City of New York, and Museum of London as sites of data practices.

Museum	Data-driven installation	Site of data practice	Key functions
Museum of London	'The City is Ours' & New Museum of London envisioned programming	**Data eco-curation**	Storing, collecting, sharing, circulating, analysing, and repurposing urban and heritage data to generate innovations and smart city solutions.
Museum of the City of New York	The Future City Lab	**Data interpretation**	Exposing new meanings of urban data, encouraging their re-interpretation through artistic approaches, and facilitating citizen feedback.
Singapore City Gallery	'Smart Nation CityScape'	**Data storytelling**	Creatively representing urban data, programs, and agenda to tell stories and represent smart city narratives to educate responsible and involved citizens.

Case studies: museums as cites of data practices

Singapore City Gallery: data storytelling through Smart Nation CityScape

Since its inception in January 1999, the Singapore City Gallery (SCG), existed under the custodianship of Singapore Urban Redevelopment Authority (URA), a statutory board under the Ministry of National Development, that facilitates Singapore's long term land use and physical development. URA formulates strategic plans of the city to guide its physical and spatial development and focuses 'on achieving a quality living environment for Singapore' (URA 2020a). Formerly known as the URA Gallery, this three-storey visitor centre, spanning 24,000 square meters, was devised as a showcase for the planning solutions that URA had implemented to pursue national development. It offered a devoted space in the city to explore its history and design its future (Lee 2014). The Gallery aims to create 'awareness and seeks the public's understanding of Singapore's unique constraints and the solutions' (Lim 1999).

Since its first days, the SCG has been on the Museum's Roundtable, a Singapore association of private and public museums, chaired by a representative from the National Heritage Board. It shares with other museums its key goals and objectives to tell stories about

their communities, 'however, not with a help of objects, but through representation of the city design and development' (SCG 2021). The gallery welcomes more than 200,000 visitors a year to explore the Singapore's development story, through public exhibits offering multisensory experiences, including interactive installations, audio-visual narrations, tactile encounters, 3D models and even participatory games (URA 2021).

Fully funded by the Communication and PR Department of the Government and official representing its agenda, the programming of the SCG communicates the urban policy to the public. It transmits a clear message of the Singapore government, stressing the state's vision of the city as a developed, vibrant and globally connected hub to live and work (Glass 2018). Ho (2006) argued, that the SCG serves broader state narrative efforts which stage Singapore as a 'vibrant cosmopolis' that builds on economic globalization to offer a high quality of urban life to its residents. Mainly because the Singapore's development in the past decades 'involved citizens trading democratic freedoms for competent developmentalist governance' (Vadaketh and Low 2014), URA seeks to reengage Singapore's citizens in the urban planning (Glass 2018, 237). As a part of these commitments, the SCG runs multiple interactive exhibitions, including 'How Our City Works,' 'Shaping Singapore' or 'Mapping Singapore' (URA 2021).

These installations engage citizens with urban data either by exhibiting Singapore maps and plans for the last 40 years or exposing them to urban design challenges and solutions through gaming. While sharing insights into the urban complexities, documentation on decision-making choices and explanations of city transformations in the past decades, the SCG aims to 'tell stories not only through the prism of curation, but also engaging people through interactive interfaces' (SCG 2021). According to the Senior Manager, the SCG aims for highly social experiences, as all their participatory games and touchscreen interactives are designed for group activities to encourage socialization within the gallery space.

In the past years, the programming of the SCG has been informed by the Smart City policies (SCG 2021), especially in light of the Digital Society agenda of the Singapore Smart Nation plan that has an ambition to 'infuse digital literacy into national consciousness' (SNS 2020, 22). When the Smart Nation Plan was launched in 2016, there was 'quite a bit of push back from the public, especially from the older generations' (SNS 2020). The government was faced with a necessity to make the technology more accessible to all generations as well as to demystify fears and misconceptions about digital technologies and perceived threats around them. As a part of the movement under the Digital Society agenda, in March 2021, the SCG installed 'Smart Nation CityScape' (SNS 2021). This interactive data-intense exhibition shares the story of Singapore digitalization and datafication from the early days of the national computerization efforts to the proliferation of smart solutions that exist today (SNS 2021).

With its strong focus on broadcasting of the smart city policy to a wider community and its playful interactive design, the exhibition is an excellent example of the data practice that can be understood in terms of *Data storytelling* (see Table 2), an effective way to communicate a large amount of information, tailored to a specific audience, with a compelling narrative (Dykes 2019). Indeed, while being highly interactive and sharing a larger amount of urban data, the exhibition primarily aims to translate the Singapore Smart Nation plan into meaningful stories and share them with wider communities. According to the Smart Nation spokesperson, the CityScape exhibition was the first attempt of the

government to communicate to Singaporeans in its three stages outreach plan that also aspires to further develop citizens engagement sessions at the Science Centre Singapore and road shows across local communities. By contrast to two other practice sites' ideas, the CityScape installation was designed primarily as 'an informational showcase with a broad view about different policy initiatives to demonstrate what we do as a smart nation' (SMS 2021). Covering up to seven different areas which demonstrate how smart city impacts residents from security concerns to environmental issues, the Cityscape walks visitors through the smart city's recent transformations, sharing stories about a new urban life and about its future (SNS 2021).

Museum of the City of New York: interpreting data through the Future City Lab

Founded in 1923, the Museum of the City of New York (MCNY), was the first museum in the United States to commit 'to the study and interpretation of a single city' (Henry 2018, 63). It received the land from the city government on Fifth Avenue on 103rd-104th Streets and the property construction was completed by 1932. During the next few decades, the Museum collected more than 750,000 unique objects, ranging from prints and photographs to sculpture and theatrical memorabilia (MCNY 2021). The museum is part of the New York Cultural Institutions Group that consists of 34 private non-profit organizations, occupying city-owned buildings. The City offers them operating, capital and energy support, while these privately managed organizations provide 'cultural services and programs to the people of New York' (CIG 2021). Annually, the museum budget is dependent on no more than 10% of the funding received from the Department of Cultural Affairs of the City Government (MCNY 2016, 2018, 2019).

In 2016 the MCNY completed a decade-long $97 million physical modernization project, followed by the creation of the first permanent exhibition 'New York at Its Core' (Henry 2018). The largest of its gallery is the signature Future City Lab that delivers creative design games, animated maps and dynamic data visualizations tools. These interactive installations aim to empower audiences to invent new solutions to imagine the city's future (MCNY 2017). 'The exhibition captures the pulse of the city' and offers 'artistic interpretations of New York's diverse subcultures, street life and the sometimes invisible but prevalent patterns of city living' (Shalant 2016). In past several years, the Lab ran three Program Series: 'New York's Future in a Changing Climate' (2017–2018), 'Housing Tomorrow's City' (2018–2019) and 'Garbage, Garbage Everywhere!' (2019–2020) exploring critical issues of housing, rising waters and pollution and their impacts on the urban future.

Aspiring to offer a citizen engagement space for interpretation of urban data, the Future City Lab, served as a dedicated city hub where interested citizens could play with the Open Data to reimagine the future of NYC. These activities of the Lab matched the objectives of One NYC 2050 Smart City Plan that outlined Thriving Neighborhoods as one of its 8 key goals. It aims to advance citizens' shared responsibility for communities' co-development and facilitate community planning and strategies (NYG 2019, 15). The Lab tasked itself to transform ordinary museum visitors into active planners and decision-makers involved in solving various urban problems. 'The real experts on the future of New York are New Yorkers,' the Future City Lab Director stressed, 'people decisions can determine what kind of city this is in the future' (Shalant 2016).

While the Lab offered access to NYC Open data, it primarily aimed to provide a site for *Data interpretation* (see Table 2), a dedicated space where data could be explained artistically and tell human stories about numbers, demonstrating the value, meaning and beauty of statistics. As the Director further explained the Lab aimed to celebrate an important 'civic engagement momentum,' serving as a deliberation space for citizens to discuss the past, the present and the future of NYC (Ackerman 2021). Challenging the aspirations of the Open Data movement, Ackerman (2021) further pointed out that making municipal data publicly available was not enough, 'because it's far from self-exploratory and it can't speak for itself.' In order to make data meaningful, citizens need to learn how to objectify data, how to reveal hidden methodological biases or data inequities, how to translate mere quantitative information into qualitative experiences.

Following its key mission to dedicate itself to the 'interpretation of a single city' (Henry 2018, 63), the MCNY explicitly identified its role in relation to the urban data practice 'to spur the imagination, start conversations and empower visitors to feel a sense of agency' (MCNY 2017). The Data Lab was designed to enable a meaningful 'interpretation of urban data to facilitate a public co-creation of big narratives' (Ackerman 2021). 'The museum role is an interpreter, not an access provider,' the Lab Director stressed. Offering new qualitative imaginative experiences around data was a primary objective that the museum aimed to achieve when inviting citizens to its data installation.

Museum of London: eco-curating smart city data

The Museum of London (MoL) is known as the largest urban history museum in the world (Swain 2002). The museum was first created by the Corporation of London back in 1826. The original museum housed a large archaeological collection of discoveries from Roman and medieval times that later on was united with the collections from the Guildhall Museum to give birth to a new dedicated city museum (Hayes 1991). The MoL was established by act of Parliament in 1965 to preserve and represent the city history from prehistoric to the present times (Lewis 2014). Attracting more than 700,000 visitors a year (ALVA 2021), the MoL is publicly funded from both municipal and national government, with 85% of funding coming directly from the Greater London Authority (GLA) and the City of London Corporation through donations, grants and legacies (MoL 2017–2020).

In the recent years, the museum closely engaged with smart city topics. For instance, during the 2017–2018 season *City Now City Future* program, the MoL hosted 160,000 visitors who attended a hundred of events, exhibitions, creative commissions, talks and debates 'to imagine how London will be from tomorrow to 2050' (MoL 2017a). The season included the major exhibition 'The City Is Ours,' featuring 15 displays and 87 events. This interactive exhibit directly involved its audiences to explore issues of 'affordable housing, effective urban planning, transport, air quality, green spaces, surveillance, smart city technology, diversity, activism and social cohesion' (MoL 2017a).

Moreover, in 2017 the Mayor of London committed to build a new Museum of London at West Smithfield Markets that is envisioned to be a truly smart museum that will exhibit seven million objects available 'to more people than ever before' (MoL 2018, 16). According to the most recent Museum of London media release, 'the City of London Corporation has made an unprecedented investment into the project by putting forward £197 million'

with a 'substantial contribution of a capped £70 m has also been made by the Mayor of London' (MoL 2020).

Planning to open the doors in 2025 (Ament 2021), the new museum project aspires 'to redefine what it means to be a twenty-first century museum for London' by providing 24-hour access to city residents, visitors and dwellers 'as a shared space for enjoyment and contemporary discussion' (MoL 2020). Conceptualized as a smart heritage project, the new museum aims to offer 'a democratic and inclusive arena for public life, performance, installation and debate,' capturing many voices of the smart city (Williams 2020). Smart heritage refers to an innovative heritage institution or site that 'can be enabled, accessed, experienced and shared by different technologies and communities of users both in person and remotely' and diffused 'outside the traditional museum walls and spread around in the whole visitors' experience of a territory' (Errichiello and Micera 2018, 7).

Indeed, with more than 2 million anticipated visitors, the new MoL envisions its role as an active contributor to understanding the demographic profile of smart Londoners. However, going beyond a mere demographic, the data projects, as anticipated by the Director, will create a deeper understanding of London to solve big societal questions and shape the urban futures (Ament 2021). For example, having a huge human remain collections totaling around 20 thousands skeletons, the MoL collaborates with researchers tracking the evidence of diseases of poverty which are currently re-emerging in London (Ament 2021). This is one of the projects that Ament (2021) categorized as those important data practices that aim to contribute to the smart city agenda on improving conditions for health and well-being.

Aspiring to provide digital interactive tools and spaces 'to participate as citizens in all sorts of new ways' (MoL 2020), the museum promises to open up digital heritage data to the full agency of the smart city ecosystem. This type of data heritage practice refers to *eco-curation* (see Table 2), or an 'ecological curation,' defined by Cameron (2021) as an open and process-based curatorial activity that is attentive to environmental changes and results in reconceptualization of digital cultural heritage as a dynamic ecological composition within a larger context (203). Within this system, different types of heritage and urban data can not only be collected, shared, or circulated, but they can be made 'active,' remixed, reinterpreted and re-used in 'a larger world' to inform non-linear, iterative design processes (Cameron 2021, 203).

The MoL Director, for instance, stressed that the new museum plans to host numerous crowdsourcing activities for citizens, curate mass participation citizen science projects as well as collect and preserve contemporary London digital cultures (Ament 2021). In this way, the museum positions itself more than just space where urban data could be accessed, shared or interpreted. It aspires to be a smart heritage site, closely integrated with a smart city ecosystem of London with very lose and porous borders between a museum space and a larger urban environment (Watson 2021). This new type of city museum could produce new forms of data cognition and sensing, through which urban data could be understood in terms of 'radical interconnectedness in a wide range of coordinates that are involved in eco-curating processes across human and non-human agencies' (Cameron 2021, 214). While still being in its infancy, the MoL project promises to create a new smart heritage institution establishing a site for smart city data eco-curating, enabling a dynamic hackable urban co-making.

A comparative analysis across cases demonstrated that three types of data practices established by city museums through their programming (data storytelling, interpretation and eco-curating) translated into different missions that museums have identified for themselves in their respected smart city ecosystems. Consequently, these museums defined the roles of smart citizens within their data-intensive activities through different approaches. These missions range from providing mere informational spaces to educate and nurture obedient smart citizens to attempting to become partners to smart city governments contributing to policy development through dedicated citizens engagement campaigns. The next section opens the discussion and analysis part, focusing first on the roles of city museums in larger smart city contexts, ranging from a mere educational model to a democratic institution (see Table 3).

The role of museums: from educational institutions to smart city stakeholders

To identify and explain the roles that city museums chose to play in their smart city environments, the analysis draws on the conceptual framework of museum civil engagement models and functions (Black 2010). This framework allows to assess the capacities of museums to actively support community empowerment and civil engagement on the scale where on the one end we have a museum 'being a 'state space', presenting a single, 'official' account of the past,' and on the opposite end a city museum understood as 'a shared space representing multiple perspectives' (Black 2010, 129). Black (2010) argued that the more a city museum is responsive to the needs of urban communities, the more this museum can empower people to take an active role in the city decision-making processes for the future.

Table 3 presents the scale with five role models that museums can adopt to facilitate citizen engagements, ranging from mere memory institutions that only preserve and present the historical and cultural heritage of the city for creating inclusive civil environments to truly responsive urban actors who collaborate with communities to meet the needs of contemporary society by working directly with citizens' input to facilitate change (Black 2010). None of these far ends' models, though, have been helpful to describe three city museums' activities and their perceived roles in their smart cities in the analysis. Nevertheless, three role models in between two extremes perfectly illustrated how city museums in Singapore, New York and London identified their vision and mission within their smart city environments, corresponding respectively to such roles as a *learning*, *social* and *democratic institution*.

A museum as a *learning institution* prioritizes education of individuals and communities to nurture responsible citizens who can contribute positively to urban development and civic well-being (Falk 2009) (see Table 2). This could be done through interactive display and enjoyable programming, engaging visitors' minds as well as senses, stimuli and responses to encourage learning by addressing audiences' interests, needs and expectations. The SCG offers a valuable example of this learning institution model, as it strongly relies on its high-tech innovative exhibition design that encourages multisensory experiences by facilitating interactive installations, participatory games and immersive tactile encounters (URA 2021).

Table 3. Singapore City Gallery, Museum of the City of New York, and Museum of London on the Museum Smart City Role Model, adopted from the museum civil engagement framework (Black 2010).

City museum role	Key functions	Museum	Museum role in the Smart City	Key functions	Examples
Responsive institution	Responding to citizens' concerns to change their organization and culture to meet the needs of contemporary society.				
Democratic institution	Facilitating civil dialogue and reflective participation in civil society.	**Museum of London**	**Smart City stakeholder**	Engaging closely with communities through data practices to propose smart city solutions and co-design policies	'The City is Ours' exhibition created a social forum where representatives of different communities discussed their neighborhoods' challenges and offered innovative solutions by presenting their current projects to larger urban communities to debate the future of the city development.
Social institution	Supporting and representing diversity within the communities they serve in partnerships of equals.	**Museum of the City of New York**	**Facilitator of civic activism**	Providing access to data and improving citizens data literacy skills to empower a critical response and activism	The Future City Lab invited visitors to play with a large volume of data to address urban challenges and reimagine the city by digitally redesigning their neighborhoods and signaling critical problems. It encouraged a diverse and inclusive dialogue to contribute to urban narrative construction.
Learning institution	Educating and informing individuals and communities who can contribute positively to decision-making about their future lives.	**Singapore City Gallery**	**Educational institution**	Providing educational support through data-play to nurture smart citizens	'Smart Nation CityScape' installation explained to citizens the smart city technological innovations and policy to increase their data/digital literacy to effectively navigate the smart urban environment and increase their security and well-being
Memory institution	Collecting, conserving, documenting, and representing the cultures and life experiences of citizens to create inclusive society.				

According to Luke (2018), the primarily goal of the SGC is educating citizens about the state's aspired and asserted order of things so that citizens can learn in Geddes' terms (1915) to 'see like the city.' Indeed, as the Senior Manager explained, the SCG was developed as an interface for the public, to explain 'the hard work behind the urban development in the last 50 years,' (SCG 2021). Addressing the lack of the 'feeling of ownership,' , the SCG serves 'to explain the government's balance choices and trade-offs in the careful long-term planning and transformation of the city, so people can […] grow their appreciation' (SCG 2021).

For example, the 'Smart Nation CityScape' installation covers several key areas of how the Smart Nation policies transform citizens life. In this respect, it features an installation that captures and maps urban human flows in public spaces during COVID-19. It aims to demonstrate the power of geospatial technology to address urban design challenges and enhance public health and safety 'rather than merely track the individual identifiable data on citizens,' as the government representative clarified (SMS 2021). While the exhibition shares with the public a large volume of urban data, its primary objective is limited to drive awareness and promote Smart Nation agenda among wider communities (SNS 2021). Terry Lim, Senior Assistant Director of the Adoption and Engaging Directorate at Smart Nation stressed, 'We hope that when visitors come here, they will walk away thinking about what Smart Nation means to them and hopefully they will realize that everyone has a part to play in building our smart nation' (SNS 2021).

Glass (2018) pointed out that the Gallery is 'performative and is a reaction to shifts in state–society relations' (Glass 2018, 252). SCG installations intend to excite visitors by encouraging 'to put their eyeballs to the street, their fingers on the screens, and to appreciate why the government has made specific choices over time' (Glass 2018, 252). As a highly 'performative' space (Glass 2018), where the 'information is pushed out to citizens,' the SCG serves to 'produce particular regulatory outcomes that actively shape behavior' of people (Cardullo and Kitchin 2018, 6). Contributing to the smart city movement as a promotional campaign on behalf of the Smart Nation government, the gallery offers a space for social learning. Accepting its role as an *educational institution* in the smart city ecosystem (see Table 3), the SCG offers excellent learning environments for citizens to 'infuse digital literacy' into their minds, or to 'enculturate the ideas and ideals of using digital technologies to manage cities and solve urban issues' (Kitchin et al. 2017a, 15).

Progressing to one level up on the scale of citizen engagement model, the MCNY is an interesting illustration of a *social institution* that builds its programming to invite, support and represent the many voices of diverse urban communities in partnerships of equals (Black 2010) (see Table 3). Creating a friendly and welcoming environment, such a museum primarily aims to actively encourage visitors' own contributions to museum exhibitions and content seeking to represent multiple perspectives (Falk 2009). Rather than representing an 'official' version of the urban narrative and image, the social institution celebrates pluralism by ensuring a diverse and inclusive content coming from multiple sources. Such a museum prioritizes a user-generated content through community participation and creative output facilitated through dialogical interactive installations. It opens beyond its physical walls to share debates and discussions with communities through social media networks to circulate stories about the life in the locality now (Black 2010).

For example, in the context of the MCNY, the Future City Lab provided visitors with a large volume of data on urban challenges and offered an opportunity to reimagine the city through at least two activities (Henry 2018). First, *What If? Table* facilitated unmoderated exchanges of visitors' views of New York under 'what if' conditions. The conversations continued online via Twitter and were shared publicly on the MCNY's website (Henry 2018). Second, the design games *Challenge Tables* on the Living with Nature, Housing a Growing Population, and Getting Around invited visitors to redesign their own city boroughs to address key challenges in the local contexts. The interactive Tables supplied visitors with various data sets and metrics, including sustainability and cost of decisions, to inform meaningful urban planning (Henry 2018). Participants' design outcomes were displayed on the gallery walls as well as shared through social media to move the conversations beyond the museum space.

Reflecting on the place of the Lab in New York, its Director stressed that it was directly motivated by the discussions of the smart city development, but in two contradictory ways (Ackerman 2021). On one hand, the Lab aspired not only to provide urban data access to offer 'information just for the sake of information.' It intended to educate citizens to intelligently use, analyses and interpret data to interrogate the politics of data access, inclusion, provenance and hidden biases. On the other hand, the Lab 'was a reaction against some smart city assumptions and ideas.' It expressed the citizens scepticism about the smart city aspirations of the Open Data as a panacea to social ills and questioned their actual applicability to address concerns of local neighborhoods and communities. 'One of the things that we really challenged ourselves to do,' the Lab Director pointed out, 'is *not* to create flashy data visualizations […] that exhibit a technocratic approach to city management' (Ackerman 2021).

The museum encourages visitors 'to think of themselves as agents of urban change, much as the historical figures elsewhere in the exhibition were for the city's past,' the Museum Director shared (Henry 2018, 64). While adhering to smart city transparency and accountability, the Future City Lab and its data-intensive exhibitions also served as educational spaces. But, by contrast to the SCG, this education did not merely justify municipal government decisions. Instead, the MCNY aspired to be a public space where these decisions could be challenged and contested, where people could learn how to translate data into stories about their communities to actively shape the city narratives and discourses. In this way, the MCNY perceived its role in the smart city as an active *facilitator of civic activism* that tasks itself not only to provide an access to urban data but mainly to offer tools for their interpretation to empower a critical response and activism (see Table 3).

Finally, the MoL offers a valuable example of a museum that in the smart city ecosystem works to adopt the role of a *democratic institution* (see Table 3). According to Black (2010), such a democratic institution aims to support civil dialogue and to motivate an active and reflective participation in civil society by accepting a great flexibility in its program design. This type of institution seeks to nurture democratic citizens who can act responsibly, taking due account of the impact of their actions and choices on their communities (Goodin 2003). This could be done by expanding the museum exhibitory spaces and transforming them into open forums of civil engagement. These forums are built on carefully planned and designed programming platforms that feature voices of individuals who have first-hand knowledge, represent their neighborhoods and

communities and can facilitate a productive dialogue among all involved participants and stakeholders (McRainey 2008, 40).

For instance, the MoL's *City Now City Future* program aspired to provide a space to nurture, support and empower change-makers among citizens. However, in comparison to MCNY, the museum aimed to go beyond the gamification design opportunities to facilitate urban transformations. The program clearly stressed 'We didn't just want to talk about making the city better: we wanted to actually do it, to help Londoners be agents of positive change in their city' (MoL 2017a). 'The City is Ours' exhibition directly partnered with 25 local projects across London 'working to make the city a better place,' by redistributing food waste, installing solar panels, helping deaf Londoners navigate the city or building sustainable housing (MoL 2017b). These local projects ranged from Open Data Camden that shared 300 government data sets with the local communities to You-Choose App, an online budget simulator that engaged citizens with decision-making about government budgets (MoL 2017b).

In this way, the museum provided a space for focused discussions on the community problems with public organizations and groups who have already been working on smart city issues in the field. The exhibition curator clarified that during the program duration, these projects were presented at the museum and discussed through dedicated community talks. 'We did not curate anything they said,' she stressed, 'It was important for us to give these community organizations a space to share their aspirations and accomplishments' (Sussums 2021). The curator further identified the role of the museum in running these community engagement activities as a 'convener,' a dedicated platform that gave citizens a space for deliberation to engage closer with various issues of urban challenges and futures (Sussums 2021).

Specifically, Sussums (2021) acknowledged that the selection process of the participating projects was driven by the London Smart City Strategy on data sharing, prioritizing those projects that represented London Open Data initiatives and their implications for the local communities. Bringing them in the centre for public debates, the museum offered a space to nurture smart citizenship through establishing opportunities for city-wide collaborations 'to design and share what works for citizens across public and community services' (GLA 2019, 14). Furthermore, the MoL Director stressed that it was one of the museum's missions to explore meaningful ways how community engagements activities could further contribute to the development of the smart city (Ament 2021).

This vision of being an important factor in the smart city co-making amplified even further in the agenda of the new MoL, currently being built 'at the heart of one of the capital's most historic and creative quarters, Smithfield' (MoL 2020). Aiming to be 'an active contributor to the smart city policy rather than just a recipient' (Ament 2021), the MoL positions itself as an important *Smart city stakeholder* that can engage closely with communities to propose smart city solutions and co-design policies (see Table 3). It sees its role as an 'intermediary' between citizens and the municipal government. The Director explained, 'I would like every future Mayor of London to think about the museum as a place where they can connect to its citizens' (Ament 2021). According to de Waal et al. (2020a) such a professional involvement of an 'intermediary' offers a sustainable model for developing meaningful government-citizens partnerships in a smart city. Bottom-up self-organizing civic initiatives are quite seldom and could achieve a greater impact only with a help of 'community orchestrators' (Balestrini et al. 2017) or 'urban curators'

(Beer et al. 2015). As a 'centre of expertise,' the museum could be an 'initiator of collaborative city-making projects' by capturing or operationalising the knowledge produced by 'more volatile, informal, interdisciplinary network-shaped field of collectives' (Foth 2017).

On the Black's (2010) scale of museum role models, the MoL's aspirations and programming to participate in the smart city life of London place it on the higher level of the democratic institution that moves a step forward from a social role, adopted by the MCNY, and goes far beyond a mere educational mission, taken by the SCG (see Table 3). However, even though understanding and capturing citizens' concerns, visions and ideas is important, only translating them 'into policies and the execution of policy frameworks' can, in fact, facilitate a real change (de Waal et al. 2020a). In order for a city to become an urban 'living lab [or] a playground of innovation and transformation' smart citizens should acquire and be able to strategically use their power to co-design a city on several role levels 'from a mere informant to tester as well as contributor and co-creator in the development processes' (Veeckman and Graaf 2014).

While, as the section demonstrated, these perceived roles of the museums in their respective smart city ecosystems translate into specific institutional policies and programming, it is important to understand to what extent they empower citizens to act as contributors to the smart city co-making. The next section addresses this question and focuses on a critical analysis of the place and role assigned by museums to their visitors in data-intensive exhibitions and installations.

The role of citizens: from smart city recipients to proposers

To analyses to what extent citizens are transformed from mere smart city users to active decision-makers through data practices offered by the city museums, the article employs the Scaffold of Smart Citizen Participation developed by Cardullo and Kitchin (2018) (see Table 4). Depending on the amount of power that citizens acquire in different smart city activities, they identified several levels of smart citizens participation. It starts with the lowest level of *Non-participation*, on which citizens are understood as passive 'data subjects' who are nudged towards specific sets of behaviors and practices. The Scaffold reaches the highest point at the level of *Citizen Power*, where citizens are granted the dominant decision-making authority and acquire control rights within a co-shared initiative (Cardullo and Kitchin 2018) (see Table 4).

However, none of the analysed museums could be associated with these upper top or lower bottom levels. Instead, all three museums' examples sit perfectly in between these opposite extremes on the level of *Tokenism*. It concerns various degrees of citizen engagement with a lower form, where citizens can only access and repurpose open data. Higher forms of Tokenism are based on collecting citizens feedback on certain government policies or programs through public crowdsourcing tools from social media to hackathons (Cardullo and Kitchin 2018). Data-intensive installations of the SCG, MCNY and MoL that shaped museum goers' specific behavior, outputs and attitudes offered valuable examples, placing three museums respectively on the levels of *Information*, where citizens take a role of recipients of smart city policies and programs, *Consultation*, where museum goers are understood as participants or testers of the smart city solutions, and, finally, *Placation,* the level on which museum visitors act as proposers of the smart city future developments (see Table 4).

Table 4. Visitors of the Singapore City Gallery, Museum of the City of New York and Museum of London on the Museum Smart Citizen Engagement model, adopted from the Scaffold of Smart Citizen Participation (Cardullo and Kitchin 2018).

Form of civic engagement	Level of citizens' participation	Role of citizens' involvement	Characteristics	Museum example	Examples of citizens role in data-intensive installations
Citizen Power	Citizen control	Leader	Co-owner who can generate ideas, share vision and design policies.		
	Delegated power	Decision-maker	Partner involved in co-creation of smart city solutions and policies.		
	Partnership	Co-creator	Actor involved in co-production of the smart city agenda through negotiations.		
Tokenism	Placation	**Proposer**	Critical reviewer who can suggest improvements.	**Museum of London**	'The City is Ours' engaged local communities and stakeholders in London to feature their projects and discuss future urban development.
	Consultation	**Participant-tester**	Active user who can share feedback.	**Museum of the City of New York**	The Future City Lab invited participants to reinterpret Open Data to signal challenges and explore opportunities in their neighborhoods.
	Information	**Recipient**	Person acting upon instructions and regulations.	**Singapore City Gallery**	Smart Nation CityScape' educated digitally literate citizens to appreciate the Singapore Smart Nation Plan agenda and policies.
Non-Participation	Therapy	Patient-user	Subject who is being steered and nudged toward a preferred behavior.		
	Manipulation	Data-point	Subject fully controlled by the smart city government.		

On the Scaffold of Smart Citizen Participation the SCG facilitates data practices which place citizens involvement on the lower level of *Information,* on which they are mainly provided access to urban administrative and operational data, including, real-time data-sets related to transport and environment. For example, 'Smart Nation CityScape' offers interactive displays that feature accurate open data representing the planning of towns and amenities and informing the development of smart urban infrastructure (SNS 2021). Sharing the data with citizens is, indeed, important to create transparency and accountability with regards to the actions and decisions of smart city authority. However, a mere act of citizens' informing 'is often unidirectional, with limited or no

channel for feedback' and 'is often provided after key planning and decision-making processes have occurred, leaving little or no room for change' (Cardullo and Kitchin 2018, 8).

For instance, while the exhibition 'Smart Nation CityScape' was an important attempt of the smart city government to communicate to a broader public the Smart Nation national agenda, these efforts were not intended to generate outputs to inform the policy development. The Smart Nation spokesperson explained that museums are not necessarily seen by the government as meaningful sites where smart city policies could be co-designed with citizens. The SCG Senior Manager also revealed that apart from sharing the data with the public, the gallery hasn't developed mechanisms to collect or analyze public contributions to inform urban policy development. Due to a high volume of visitors, including school tours, educational groups and VIP guests who come for an expert advice, as explained by managers, the gallery's expectations on the quality of the audience input are very low (SCG 2021).

The SCG is designed to facilitate social interactions and enable group conversations in the exhibition space, but there are no tools to record the visitors' feedback, nor there was an interest on the gallery side to engage closer with visitors' data practices and their outputs. Challenged by a direct question if the exhibition could be considered as a civic site of data practice, the Smart Nation Spokesperson shared the limitations of CityScape as a site to 'facilitate participatory planning' where data collected from citizens could 'inform the policy-making' (SMS 2021). The government sees museums as spaces where people could be exposed to important ideas and discourses. However, the museum might not necessarily be a conducive space where audiences 'have the mindset of giving proper constructive feedback […] Not enough to the extent that [they] can take it seriously as sufficient information to work upon' (SMS 2021).

According to the Smart Nation Spokesperson the participatory citizen engagement can happen beyond the museum spaces: 'if we want to build something constructive, we bring people into a room where they can focus on the discussion' (SMS 2021). Apparently, the SCG cannot offer such a dialogical space, where visitors could 'focus' on city problems and share meaningful feedback on urban development tasks. Understood as subjects of the smart nation educational agenda, visitors to 'Smart Nation Cityscape' are rather 'gently persuaded of how to conduct a way of life contained within optimal or ideal targets around environmentally friendly use of resources or care of own body' (Cardullo and Kitchin 2018, 6). In this way, the SCG shares urban data with citizens, but with little access to or even no political capital to act upon them. Within this framework, citizens could only be understood as mere *recipients* of smart city policies (see Table 4), co-opted in neoliberal discourses of efficiency and environmental sustainability (Cardullo and Kitchin 2018).

Going one level up on the Scaffold of Smart Citizen Participation the MCNY exemplifies smart citizen engagement understood in terms of *Consultation* (see Table 4). On this level citizens are invited to provide their critical feedback on the smart city developments and agenda through various forms of social media and online tools (de Waal et al. 2020b). This user-testing feedback can be quite productive to 'keep civic paternalism in check' by contesting decisions and assertions taken by smart city authorities (Cardullo and Kitchin 2018, 8). For example, aiming to engage citizens to critically reflect on the urban data, the Future City Lab, offered a meaningful design hub were interested citizens could play with the Open Data to reimagine their neighborhoods and communities. Indeed, the

Lab's creative interactives offered an interface for developing human-centered smart city dashboards that can 'draw in large volumes of participants with higher potential for contribution and activity than traditional style community engagement forums such as town-hall events' (Lock et al. 2020, 5). Within the smart city participatory agenda, these forms of citizen engagement could be understood as meaningful data practices. Such practices empower the 'citizen voice' through more open and transparent data sharing and repurposing to produce interactive maps, graphs and applications (Cardullo and Kitchin 2018).

A focused policy analysis of the Smart City of New York, though, was not productive to identify the government's intentions, strategies or incentives to engage with museums as citizens hubs to collect the public feedback. In this regard, the Future City Lab's objectives to involve people 'not only in the discussions, but in the decision-making processes to ensure future change' (Ackerman 2021), were merely aspirational. While the MCNY employed gallery's screens and social media to feature visitors' ideas and outputs in redesigning city neighborhoods which could contribute to larger urban narratives and discourses, it is questionable if these data practices were potent to shape decision-making in the smart city of NYC. Furthermore, the MCNY, the same way as the SCG, did not develop specific reliable mechanisms to collect citizen feedback to inform the urban policy development. While Ackerman (2021) emphasized, 'It's not only politicians and experts and economists who are in cast of making decisions,' he also expressed doubts that visitors' designs of their boroughs created at the data Lab were useful for a democratic process of city co-making.

Similarly to his colleagues at the SCG, he indicated that apart from being hard to dynamically collect and store data generated by visitors, the real value of audience feedback for urban policy-making was unclear. However, a reason he indicated for that, places the MCNY in direct opposition to CSG, where visitors are simply not trusted to provide quality feedback. Instead, the Lab Director referred to a certain 'bias toward the views of well-educated, technologically-literate participants in the digital public sphere' (Crutcher and Zook 2009). Specifically, he stressed that a very selective sample of the museum's visitors who actively participated in interactive design at their Lab might have produced data that would not be representative of what really was going on the ground in different city neighborhoods (Ackerman 2021). He questioned if these interactive design exercises performed at the museum's premises could be valid, reliable and trustworthy without the input gathered from actual communities (Dodge and Kitchin 2013).

The Lab Director admitted that they never achieved a degree of community work that would be required to co-develop solutions for urban problems, useful for city planners. 'One of my dreams,' Ackerman (2021) shared, 'was to work directly with community groups on the ground to run design shreds at the museum' to engage participants in a very focused way and brainstorm working ideas. However, with the hit of the Covid-19 pandemic crisis and the closure of the Lab in 2020 these ambitions did not progress beyond a mere vision. While the MCNY activities were not potent to feed the government policymaking with direct citizen input, they still nurtured more engaged and responsible smart citizens who were invited to share their concerns and use the museum as an open advocacy space. In comparison to the Singapore case, where the SCG is co-opted by the government to serve as its mouthpiece, independently curated MCNY engaged its visitors

as active *participants* in the development of the smart city narratives and discourses who could voice their opinions (see Table 4).

Moving one step up on the Scaffold of Smart Citizen Participation the MoL's programming and activities could offer an example of *Placation* (see Table 3). On that level, citizens are expected to exercise their rights to contribute to a set of urban design initiatives with their own proposals and solutions. However, on that level smart city initiatives can allow only a partial rearrangement of 'the deckchairs on a ship's deck' that does not 'determine how the ship is run or its general course' (Cardullo and Kitchin 2018, 8). For instance, understood as proposers of new smart city developments based on their professional expertise and first-hand experiences in local community projects, participants of the *City Now City Future* program in the MoL, indeed, were directly involved in their neighborhoods' future planning. However, the questions remain who actually exercised the real decision-making power and if/how proposed changes were implemented.

In fact, London was the only city among selected for this research where the municipal government clearly identified museums as important actors in the smart city development. The Smarter London Together Strategic Framework has a dedicated section on the role of cultural institutions in the smart city (GLA 2019). This document stresses one of its strategic priorities to explore 'how cultural institutions, including the new Museum of London being built at Smithfield Market, can promote greater understanding of Londoners about the smart technologies and data shaping their lives' (GLA 2019, 38). Referring to the 2017–2018 *City Now City Future*, the strategic framework illustrates the role of city museums as important playgrounds that facilitate public discussions and increase citizen participation (GLA 2019, 38). Julia Thompson (2021), Smart City Policy Lead confirmed that among five missions of the Smarter London Together Road Map, 'there is a specific task around connecting to cultural institutions.'

Apart from running their own dedicated platforms for direct two-way communication with the public, the London government stresses the role of city museums in facilitating this dialogue with citizens. 'Cultural institutions and particularly museums, in fact, are a great way for people to have a bit more tangible relationship with the city and share their feedback,' Smart City Policy Lead stressed (Thompson 2021). Indeed, the MoL's urban data practices can establish a meaningful space for active engagement with London researchers, citizens groups, activists and communities working on the ground. Offering some examples, the MoL Director mentioned the new project of addressing the downturns of contemporary citizen's loneliness in the smart city. Stressing the museum's role as a crucial meeting point and a place for civic socialization, she emphasized that especially the new MoL could become a dedicated space where citizens can engage with data, learn about themselves, and reshape the social composition of the smart city (Ament 2021).

This, however, could be established only when all parties, governments, museums and communities, are on equal footing, but the potentials for smart city co-making on the premises of the MoL remain questionable. For instance, the Smart City Policy Lead (2021) confirmed that the government's goals to establish closer collaborations with museums as sites of smart citizens engagements remain unaccomplished. The MoL Director also admitted that in the past several years it was difficult to continue these conversations with the government in the framework of the City Cooperation of London agenda. The

2021 London Mayoral election and the Covid-19 pandemic situation drastically shifted the focus of the government attention (Ament 2021).

Though the museum does see its communities and stakeholders as active *proposers* of smart city solutions (see Table 4), at the moment, no direct mechanisms or schemes have been developed between the government and the museum to feed the smart city governance decision-making processes through participatory citizen engagement in the museum. While both parties explicitly commit working toward this direction, without purposefully designed citizen-centred policy-making mechanisms in place, these participatory activities could be mere 'performative acts' which only claim to involve citizens in planning and decision-making (Cardullo and Kithcin 2020). In this way, citizenship could 'operate largely as an empty signifier […] with the underlying neoliberal ethos and mode of governmentality remained unchanged' (Cardullo 2021, 7), because there is 'no follow through, no muscle, hence no assurance of changing the status quo' (Arnstein 1969, 217).

As this section demonstrated, none of the museums enabled their visitor to exercise the *Citizen Power* (see Table 4), the most rewarding form of civic participation in which people reach 'increasing degrees of decision-making clout' (Arnstein 1969, 217). However, even though a citizen power could be an appealing and desirable goal for museums, 'in practice such bottom-up, inclusive, and empowering citizen involvement in key decision-making about cities is difficult to achieve' (Cardullo and Kitchin 2018, 9). The MoL's case clearly demonstrates that the museum's ambitions to directly contribute to the smart city policy development through devoted community engagement activities as well as the rhetoric of the London authorities stressing the important role of museums in the process of smart city co-making do not easily translate into robust mechanisms which can transform mere aspirations into meaningful actions.

Nevertheless, these examples have important practical implications for museum management, especially in terms of nurturing new type of engaged and responsible citizens who must acquire new skills and competences not only to successfully navigate but more importantly to co-own smart cities. 'Promoting or inhibiting active citizenship and so tackling or reinforcing the experience of social exclusion' has long been an important task on city museums agenda (Newman et al. 2009, 42). The challenge for museums however remained on the institutional transformation side to firmly establish such a culture so it champions civil engagement at an appropriate level (Black 2010). Most recently, the processes of increasing digitalization and datafication called for more transparency, accountability, social inclusion and equity, amplifying the urgency and importance of these tasks. As Errichiello and Micera (2018) argued, in the age of smart cities, museums are expected to exercise their civic role by offering dedicated spaces, where people can access 'reliable data to actively participate in the city life, also contributing to increase the transparency of public administrations and create a dialogue' (11). The process of nurturing this digital citizenship in museums can result in a greater breadth of civic participation and richer opportunities for smart citizenry (Borda and Bowen 2021), that according to Angelidou (2015) can contribute to the growth of intangible capital to promote the 'smartness' of cities.

However, it is important to stress that state-of-the-art technologies alone cannot necessarily guarantee a 'museum for everyone' to foster citizen-driven innovations in smart cities (Errichiello and Micera 2018, 14). This article offers three examples of

dedicated data practices established by museums in Singapore, New York, and London that convincingly demonstrate that a potential for community engagement depends on multiple factors, including the museums' missions and visions, their perceived roles in smart city ecosystems as well as the level of smart city policy development that could either recognize or neglect city museums as important venues for practicing citizen activism. Educating smart citizens as recipients, collaborating with smart city users or testers and inviting proposers to co-create smart cities offer working models that exemplify progressing levels of smart citizens engagement. Challenged by civic mission to nurture smart citizenship that goes beyond a mere data access and digital literacy development among wider populations, museums can employ the framework to assess their community work while offering different sites of data practices from data storytelling to eco-curation.

Conclusions

The article documented connections and synergies between city museums' visions and programming as well as emerging smart city issues and dilemmas in a fast-paced urban environment, marked with the processes of increasing digitalization and datafication. The SCG, CMTY and MoL actively build their programming and design data-driven installations to reflect urban challenges emerging in the smart city, ranging from environmental concerns to safe communities. A comparative analysis across cases illustrated, though, that different political and economic contexts within selected smart cities differently shape how museums understand their roles as sites of urban data practices as well as what power they ascribe to citizens in a smart city co-making. The article is evidence that city museums can either empower their visitors to consider their roles as active city co-makers or see them as passive recipients of the smart city transformations.

The case of the SCG, for instance, illustrated how the authoritarian regime of Singapore shapes a development of a dedicated city museum that only reinforces civic paternalism, where smart citizens participation is framed in a very narrow instrumental way. Taking an educational role, the gallery serves the smart governments as a 'performative' space to nurture smart citizenry as obedient recipients and deliver its vision of the smart future development. Offering a dedicated data storytelling site, the SCG represents Singapore as a culmination of 'bureaucratic decision-making that is data-based and focused on constructing a better, globally connected city' (Shatkin 2014). It is designed to convince citizens in governments' decisions to shape the city's future and functions to reassert the value of the Smart Nation vision for Singapore

The MCNY, in a more open democratic environment where the city museum retains its curatorial independence, has developed a different stance as a social intuition or a space of civic activism. As the Director of the museum explains: 'MCNY is located in and tells the story of a city that is overwhelmingly liberal, both politically and culturally. In many ways, American urban liberalism was born in New York, and its legacy is still very much alive' (Henry 2018, 65). Offering a site of data interpretation, the museum aims to empower responsible smart citizens who can question the government decision and learn to use the Open Data in a more critical way to tell their own community stories. In light of absent municipal government's commitments to engage with local museums as deliberative sites of smart city participatory design, the MCNY sees its institutional mission as an

urban data interpreter. It positions itself as site of data practice, where smart city participants or testers can voice their concerns and share their visions of the city future in a wider public space.

However, such a site lacks a political participation platform or a mechanism that would bring all these public contributions to the attention of the government. This is also the case in London, despite the MoL's strong ambitions to make significant contributions to the smart city policy development. With a long tradition of public support of cultural institutions, London municipal government commits to nurture deeper connections with the cultural sector, especially with city museums which are understood as important sites of engaging with smart citizens. The Mayor of London invested considerable resources in the development of the new MoL as a smart heritage project that aims to inspire further innovative transformation of the city. Directly funded by the government, the new museum intends to assert its place in a smart city ecosystem as a democratic institution by offering a dedicated space for smart citizens to engage closer with major urban challenges and societal problems.

Nevertheless, as evidenced through conversations with both the Smart City Policy representative and the MoL Director, these official commitments on both sides remain more aspirational rather than realistic. Offering opportunities for data eco-curation, the MoL could serve as an important 'intermediary' between smart city proposers and the municipal government in participatory smart city design and management. However, currently, there is no mechanisms, tools or specific programs in place to ensure such a democratic city co-making. It would be fascinating to further explore if/how these aspirations would translate in the future into the new MoL's programming as a smart heritage site as well as into the specific political mechanisms on the government side to facilitate a productive two-way communication with smart citizens.

The future research should also expand the geography of the empirical framework and add case studies across smart cities and different parts of the world, where city museums might have developed explicit or implicit links and connections to smart city visions, narratives, and agenda. Worth mentioning, for instance, that many urban planning galleries, administered by state agencies, similar to the SCG, are currently mushrooming in Asia. 'China has eleven city galleries, Hong Kong, Seoul and Jakarta have one, Qatar is going to have one soon, quite a few will be open soon in the Middle East' (SCG 2021). In the context of increasing urban datafication and smart city developments these newly emerging museums offer educational sites of data practice where they mostly serve as 'material imprints of urban political goals' (Glass 2018).

A different trend, however, might be emerging in Western, more liberal political contexts, similar to where the MCNY identified its place in opposition to the smart city governance, offering a site for contestation, debate and civic activism. However, as Zandbergen and Uitermark (2020) indicate, a manifestation of 'smart citizenship' depends on many factors, including social, economic and political traditions which shape local relationships among governments and city residents. The case of the MoL and its close connection to the municipal government, in comparison to the MCNY, demonstrates that within more democratic societies there could be a wide range of relationships established among urban stakeholders 'to develop new governance infrastructures and practices for civic engagement' (Foth and Brynskov 2016).

This article started an important conversation about the role of city museums in developing these 'governance infrastructures' by exploring museums as participatory sites of interactive data practices. As Giannini and Bowen (2019) point out, 'the future for cultural heritage and the GLAM sector in the smart city agenda is evolving at a fast pace […] and it will most likely continue to be dynamically shaped' by museums who encourage and support innovation and social engagements in the urban context (545). With more smart city governments prioritizing culture as a pillar in the sustainable urban development (Angelidou and Stylianidis 2020), this research requires further academic attention, especially in relation to evolving city museums' social roles in changing smart city contexts and their implications for citizens.

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Dr Natalia Grincheva is an internationally recognized expert in innovative forms and global trends in contemporary museology, digital diplomacy, and international cultural relations. She received many prestigious international academic awards, including Fulbright (2007–2009), Quebec Fund (2011–2013), Australian Endeavour (2012–2013), SOROS research grant (2013–2014) and visiting research Fellowship (2020) at the University of Oxford. Most recently she accepted a position of a Program Leader in Arts Management at LASALLE College of the Arts in Singapore. Her major publications include two monographs: *Museum Diplomacy in the Digital Age* (Routledge: 2020) and Global Trends in Museum Diplomacy (Routledge: 2019). Currently she is working on a new co-authored monograph, *Geopolitics of Digital Heritage* (Cambridge University Press: forthcoming 2023).

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