

Scientific nationalism and museums of the future in Germany and the UAE

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Abstract. Nationalist visions of the future are articulated through the language and logic of science. This article extends political geography research on the future by examining “scientific nationalism” expressed at two museums of the future in Germany and the UAE: Berlin’s Futurium and Dubai’s Museum of the Future. The techno-science ideals narrated in the museums are projected as planetary stories about building common futures through science, technological innovation, and concern for the environment, but fundamentally reinforce nationalist ideals and aspirations about their nations’ success and prosperity in the future. In Germany and the United Arab Emirates (UAE), nationalist discourses celebrate science and technology – and technoscientific prowess is framed in the two museums of the future as holding the key to solving planetary challenges like the climate crisis. But in “technowashing” social, political, and environmental challenges, they reflect a conservative approach to centering technology-centered questions about the future, while working to persevere the energy-intensive, capitalist political economy that defines their present. By projecting these extractive and nationalist presents into the future, the two future-themed museums illustrate how the future animates nationalist visions not just through stories of survivance, but also through stories of science.

Keywords: future; climate change; museums; nationalism; Germany; United Arab Emirates

1. Introduction

Dubai’s newest icon, the Museum of the Future, opened on February 22, 2022. Best described as a science and technology museum, its website proclaims its desire to “inspire and empower people to positively shape humanity’s next chapter” and to serve as a “beacon of hope,” “committed to a more sustainable future for all” (Museum of the Future, 2023a). Yet the museum’s overtly global messages are balanced with a clear statement of Emirati nationalism:

Our Home – We are of Dubai and for the world: The Museum builds on the visionary culture that has transformed the UAE into one of the world’s most advanced nations in less than 50 years. We are a showcase for the spirit of courage, optimism and innovation that propels Dubai forward. Like our home city, the Museum is a place of tolerance, inviting varied cultural, philosophical, social and spiritual outlooks. Our imagined futures are rooted in the values of the UAE and the Arab world. (Museum of the Future, 2023a)

Just a few years before, in September 2019, Berlin opened its own icon, the Futurium. Also a science and technology museum, its stated goal is to serve as “a forum for presentation and the facilitation of dialogue on scientific, technical and social developments of national and international significance, and to conduct a scientific-based social discussion on shaping the future” (Futurium, 2023a). At an early key handover celebration in 2017, the German Federal Research Minister Johanna Wanka (CDU) proclaimed the structure a “smash hit,” standing for “what distinguishes Germany internationally in science” (quoted in Strack, 2017).



Fig. 1. Museum of the Future, Dubai, UAE. February 2022. Source: Author.

Both museums of the future are architecturally impressive, deliberately wowing visitors with their techno-futuristic design (**Fig. 1-2**). Science museums have a long history of serving as architectural icons of a nation’s modernity. And as Bergeron and Bigg (2021, p. 124) note, “One way of exploring the meaning and significance of museums and exhibitions is to think of them as projects that essentially seek to materially inscribe science and technology in space.” The Futurium and the Museum of the Future do precisely this: they inscribe the technoscience ideals of German and Emirati nationalism in space. But they also project these nationalist ideals into the future. Nationalisms are famously future-focused –though the theme of the future has received far less attention than the past in both nationalism studies and geography (Anderson, 2010; Anderson and Adey, 2012; Jeffrey and Dyson, 2021; Koch, 2023a; Kurniawan and Kundurpi, 2019). This article therefore extends political geography research on nationalism to give closer attention to the future and its differential political geographies. To do so, I focus on “scientific nationalism,” showing how nationalist visions of the future are articulated through the language and logic of science.



Fig. 2. Futurium, Berlin, Germany. May 2022. Source: Author.

The UAE’s Museum of the Future and Germany’s Futurium both advance internationally-oriented stories about building common futures through science, technological innovation, and concern for the environment. Though they have a global orientation, the two museums are also decidedly local, reflecting prevailing nationalist values that celebrate technoscience.¹ They both rely on the tropes of “scientific nationalism,” which reinforce specifically Emirati or German nationalist ideals and aspirations about their nations’ success and prosperity in the future. These are hopeful visions of the future that are framed as achievable through a commitment to science and technology. Yet by considering these two museums together, we can see how they both engage in a process that Ribeiro and Soromenho-Marques (2022) describe as “technowashing.” Found in corporate and political realms alike, technowashing is “an excessive optimism around technology, aiming to promote the idea that the planetary problems made by man [sic] will be solved with more modern, evolved and efficient technology” (Ribeiro and Soromenho-Marques, 2022, p. 9). But as with other such “-washing” terms, technowashing is built on a false promise – in this case, using science nationalism to obscure the fact that the museums are dedicated to persevering the energy-intensive, capitalist political economy that defines Germany and the UAE alike. In the face of a global climate crisis – a topic that is front and center at both venues – the future-themed museums in Berlin

¹ “Science” and “technology” are not synonymous, but I discuss them together in this article because they circulate as a common node in mainstream nationalist discourse in the case countries and most other global settings. They are also commonly grouped in academic studies of “technoscience,” a term that scholars have used since the 1950s but has increased in popularity following the rise of Science and Technology Studies (STS) as a discipline.

and Dubai optimistically project these extractive and nationalist presents into the future through celebratory stories of science.

In advancing political geographic research on the future, this article necessarily confronts the politics of today's climate crisis – asking how nationalist futures are being imagined at a time when the entire world is facing climate catastrophe (Lenton et al., 2019). It is part of a larger study of environmental politics in the UAE and how climate challenges bind the country to other parts of the world, including Germany. It is informed by mixed-methods research in the UAE since 2018 (see Koch, 2022b, 2023b), as well as my own observations at the Dubai Museum of the Future shortly after it opened in February 2022. It is also informed by my experience of living in Germany for several months at a time since 2009, including a longer residency from March 2022 to April 2023. While working in the Berlin area in Spring 2022, I learned about the Futurium through discussions with colleagues and others working in the sustainability industry, and conducted my own site visit in May 2022. In addition to drawing on material and observations collected during the museum site visits in 2022, my longer ethnographic experiences in both countries allow me to contextualize the prevailing nationalist storylines analyzed here, as well as the visions of the future that they conjure. Although my discursive analysis of museum materials, display photographs, and web content was as systematic as possible, my ethnographic work is necessarily partial – not a fault but a *feature* of critical geographic research rooted in feminist epistemologies (Haraway, 1988; Rose, 1997).

2. Scientific nationalism and the museum

Political geography research on nationalism is rich and varied, but scientific nationalism has not received significant attention to date. As geographers and non-geographers explain, scientific nationalism is a genre of nationalist discourse found in places thick with narratives celebrating science and technology as part of a nation's identity (e.g. Delbourgo, 2019; Elshakry, 2015; Fox, 2016; Gibson, 2022; Janué i Miret & Presas i Puig, 2021; Latham, 2000; Maly, 2016; Mizuno, 2009; Murphy, 2016; Nieto-Galan, 2022; Palló, 2012; Somsen, 2017, 2021; Yarrow, 2020). It can be expressed in many ways and in a wide range of institutions and places, but science museums are one of the most iconic sites for cultural and political leaders to showcase their country's scientific values. All genres of museums can provide a window on how national identities are constructed and contested through the stories they tell about the past and present, self and other, and valued and non-valued artifacts, art, ideals, and perspectives (Abu-Lughod, 2020; Anderson, 1983; Beel, 2017; Bennett, 1995; Bozdoğan, 2019; Crane, 1997; Geoghegan 2010; Geoghegan and Hess, 2015; Gavrilova, 2023; Kendall, 1999; Hooper-Greenhill, 1992; Horne, 1984; Kaplan, 2006; McNeill, 2000; Penrose, 2020; Sylvester, 2009; Varutti, 2011; Wheeler and Luedee, 2022).

Science museums arose from a broader museum culture in the 1800s in Europe, where they were built on a Western ontology of separating the seeing subject from the physical world (Mitchell, 1988). At a time that Timothy Mitchell (1988, p. 13) describes in *Colonising Egypt* as the “age of the world-as-exhibition,” cultures of display in Europe both arose from and actively promoted modernist techno-science ideals: “Exhibitions, museums and other spectacles were not just reflections of this certainty, however, but the means of its production, by their technique of rendering history, progress, culture and empire in ‘objective’ form” (Mitchell, 1988, p. 7). In celebrating the home country's national uniqueness, early European museums also celebrated the imperial order that privileged those countries on the global stage (Appadurai, 2021; Bennett, 2004; Barringer and Flynn, 1998; Longair and McAleer, 2016; Sheets-Pyenson, 1988). One way that cultural and political elites in European settings claimed civilizational supremacy was through their contributions to modernist science.

The Western romance for “objective” vision – or what Donna Haraway (1988) would call the “god-trick” – is also a romance for rational subjects who can be called upon to advance the nation through their labor in the name of modernist science. The privileging of science within Western cultures of display was partly enacted through World's Fairs – indeed Mitchell's observations above were illustrated through the 1889 Exposition Universelle in Paris (see also Rydell, 1984; Rydell et al., 1994). But world expos were infrequent and most accessible to an elite traveling class, making museums far more significant places to enact the modernist representational order from the 1800s on. Western science museums were crucial sites in the early idealization of the modern political subject as a scientific observer. But the idealized scientific

subject is rarely conceptualized as a global citizen. Rather, science museums around the world are typically organized around nationalist imaginaries, celebrating the scientific achievements or prowess of the country where they are located (Bergeron and Bigg, 2021; Conn, 2006; Charles and Giraud, 2021; Fox, 2016; Macdonald, 1998; Rader and Cain, 2014; Sastre-Juan, 2021; Yanni, 1999).

As new expressions of the science museum tradition, Dubai's Museum of the Future and Berlin's Futurium showcase local cultures of scientific nationalism – projecting these narratives across space and time. In the UAE and Germany, contemporary nationalist scripts vigorously celebrate science and technology. Scientific nationalisms in both places look backward to some extent, but they are largely geared toward the future. In Germany, the backward- and forward-looking orientation of scientific nationalism is seen with the country's long history of science and technology museums, proudly traced to the founding of the Deutsches Museum in 1903 by the Munich engineer Oskar von Miller, who hoped that it might foster “cultural prestige” for engineers and scientists in Germany (Fehlhammer and Fuesl, 2000, p. 518; see also Keogh and Möllers, 2015; Müller, 2013). Despite (or perhaps because of) the huge and contentious topic of memory politics in post-WWII Germany, museum studies remains a relatively small field (but see Crane, 1997; El-Tayeb, 2020; Macdonald, 2022; Maier, 1988; Pieken, 2015; Till, 2005).

In Gulf studies, by contrast, a large body of scholarship has developed on museums (e.g. Ajana, 2015; Bounia, 2018; El Mousfy and Syed, 2015; Erskine-Loftus et al., 2016; Exell, 2016, 2017, 2018; Freer and Kherfi, 2020; Gierlichs, 2014; Giusti and Lamonica, 2023; Hightower, 2018; Ponzini et al, 2020; Sachedina, 2021; Saragoça, 2022; Wakefield, 2015, 2020). Most of this research focuses on museums as sites to promote Gulf Arab heritage, where the region's iconic new museums fuse backward-looking nationalist conceptualizations of Gulf identity with contemporary global imaginaries of techno-modernity. Yet science and technology museums have not been explored in depth in the Gulf, although they are plentiful across the region, including the Sharjah Science Museum and DEWA Innovation Centre in the UAE; History of Science Centre, PDO Knowledge World in Oman; the Bahrain Science Center for SDGs; the Abdullah Alsalem Cultural Center and the Scientific Center in Kuwait; and the Museum for Science and Technology's History in Islam, Museum of the History of Technology, King Salman Science Oasis, and Scitech in Saudi Arabia.

Urban studies and museums studies scholars emphasize that museums can be national symbols in their own right – their built form intended to become an icon of the nation. As Leslie Sklair (2006, 2017) argues, iconic architecture is an important way for elites to communicate their vision of the nation's identities and ideals, while also serving the interests of the “transnational capitalist class,” like the star architects and city planners who reap the financial rewards of building such iconic museums. Art museums often get more attention from such elites, but science museums' architectural design can also serve as a powerful marker of a nation's modernity (Bennett, 1995; Charles and Giraud, 2021; Forgan, 1994; Macleod, 2005; Yanni, 1999). In fact, the Western “faith” in science and technology has been monumentalized in and through iconic science museums since the nineteenth century:

With their landmark architectures, exhibitions and museums of science and technology partook centrally in the spatial inscription of modernity, and continue to do so into our own age of newfangled science centers designed by star architects. Unlike other beacons of modernity (but like Marker's photo-novel itself), exhibitions and museums of science and technology double up, inside, as material arrangements of objects, visuals and texts aiming to confer meaning onto the modern world. They both embody and seek to order the spectacle of modernity that Baudelaire and others after him claimed was one of its very hallmarks, while promoting particular visions of the future. (Bergeron and Bigg, 2021, p. 124)

Science museums are interwoven with nationalist imaginaries about those “particular visions” of the future – both resulting from and advancing national identity narratives that hail a nation's techno-scientific credentials.

Dubai's Museum of the Future and Berlin's Futurium are flashy architectural icons, which are also aimed at spatially inscribing the modernity of the UAE and Germany for audiences far and wide to read, whether they visit the site or not. The celebration of science and technology is only one strand of the wider

rhetorical landscape of nationalism in both countries, but science serves a unique role in this landscape because it largely works outside the tropes of ethnonationalism. In Berlin, the Futurium is strategically located next to the train station, in the heart of the newly designed city center, “meant to symbolize the new united and forward-facing Germany” (El-Tayeb, 2020, p. 79). Dubai’s Museum of the Future building also gestures toward unity. Although the calligraphy on its façade are all quotes from the ruler of Dubai and the building is said to “speak Arabic” (Museum of the Future, 2023a), the other architectural elements are described with globally-oriented language: “The circular building represents humanity; the green mound it sits atop represents the earth; the void represents the unknown future” (Museum of the Future, 2023b). And in both cases, the green credentials are proudly displayed, from the Museum of the Future’s LEED Platinum rating to the Futurium’s rooftop “Skywalk” where visitors can view its solar panels. As architectural monuments to science and technology, the museums clearly project the techno-futuristic ideals of scientific nationalism in Germany and the UAE today.

Multiple nationalist storylines co-exist in all countries, and all countries will have a mix of ethnic and civic nationalist scripts. Scientific nationalism generally draws more heavily on civic nationalist storylines – celebrating the ostensible values of the state and its population, rather than celebrating the ethnically-defined kinship and culture of a supposedly primordial national group (Koch, 2016). Ethnonationalism is highly sensitive in both Germany and the UAE, albeit for different historical and contemporary reasons – a full discussion of which is beyond the scope of this article (but on Germany, see Wittlinger, 2010; on the UAE, see Koch, 2016; Ledstrup, 2019). Because of this sensitivity, focusing on science and technology offers a way to promote national pride in a broader, more inclusive manner, and with fewer political pitfalls. Yet scientific nationalism has its own omissions, erasures, and silences. As I discuss in the remainder of this article, scientific nationalism operates as a depoliticizing force in Germany and the UAE, crafting compliant citizens and subjects in the present in the name of the future – all while technowashing their country’s response to the climate crisis.

3. Two museums of the future: Idealizing technoscience in Germany and the UAE

The Museum of the Future and the Futurium have many differences, but how their narratives about the future are interwoven with the tropes of scientific nationalism point to important commonalities. In this section, I identify those commonalities to show how scientific nationalism assumes national futures that are (a) defined by capitalist consumer culture and ideals of technoscience and (b) inhabited by entrepreneurial, participatory subjects. The two future-themed museums in Berlin and Dubai are organized around similar styles, practices, and logics of the future (Anderson, 2010), or what Sheila Jasanoff refers to as sociotechnical imaginaries: “‘collectively held and performed visions of desirable futures’ (or of resistance against the undesirable), [...] ‘animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology’” (Jasanoff, 2015, p. 20). As this section illustrates, the future is imagined in the Museum of the Future and the Futurium as a place of great scientific progress and national glory – if approached correctly.

A. Technowashing consumerism: Scientific nationalism for capitalist futures

The Museum of the Future and the Futurium both position technology and scientific innovation as having the unique power to alleviate contemporary global ills and the global climate crisis. In the UAE, nationalist discourse places a strong emphasis on “post-oil” energy futures and the knowledge economy’s techno-futures (Günel, 2019; Koch, 2018, 2022, 2023b). German nationalism also reflects a commitment to building a “post-oil” future, although in a different manner because Germany is not an oil-exporting country like the UAE. Rather, the expression of German nationalism today is increasingly articulated through pro-environment ideals and tropes, which are characteristic of left-leaning “green nationalisms” found across Europe (see Conversi, 2020; Conversi and Friis Hau, 2021; Conversi and Posocco, 2022; Posocco and Watson, 2022), but are also increasingly interwoven into the country’s far-right political movements (Forchtner, 2020; Forchtner and Olsen, 2023; Obertreis, 2022; Varco, forthcoming).

Using technology as a solution to environmental ills is illustrated in one of the first displays at the Futurium on “Rethinking nature” (*Natur neu denken*). A display placard outlines various “human

interventions in nature,” and asserts that such intervention is inevitable for sustaining human life. The real challenge, it suggests, is how “to meet our needs in the future without destroying nature even more.” What those “needs” are is not named in the placard – though I will return to this below – which instead expounds the principle of looking to nature itself for solutions to human desires:

Safeguarding nature and studying it will help us arrive at new solutions for the challenges facing mankind. Nature provides us with countless principles and many small building blocks that we can further develop into environmentally friendly processes and products, medications, construction materials and much more. And some things like solar energy makes nature lavishly available to us.

A similar message is communicated in Dubai at the Museum of the Future’s display on “Tomorrow Today” (Fig. 3). The placard at the start of the exhibit – “ever-changing display of near future technologies” – describes it thus:

The world we live in today is very different from the world of ten years ago. What then can we expect the next decade to bring? Technology has the power to transform and change the way we live. It can respond to many of the environmental, cultural, social and political issues that define our time and overcome challenges to lead our planet towards an optimistic and positive future.



Fig. 3. Tomorrow Today exhibit, Museum of the Future. February 2022. Source: Author.

The Tomorrow Today exhibit is the one floor of the Museum of the Future that names corporate sponsors. These include a number of Dubai-based entities (including the local transit and electric companies, the Dubai Municipality, Emirates airline, Dubai Holding, and the Mohammed bin Rashid Space Centre), as well as international firms (Visa, SAP, Pepsico, and Audi). Like all other parts of Emirati nationalism, Emirati scientific nationalism has always been an international affair. Scientific nationalism in the UAE celebrates the country’s excellence in science and technology, though it is only possible through a wider project of corporate nationalism that “domesticates” international brands as markers of the country’s modernity (for more, see Koch, 2020).

The scientific nationalism of the Futurium is also built on a specifically German consumer culture and corporate nationalism – a mix that is no surprise in a country that has long reaped huge financial rewards from branding its technological prowess in sectors as diverse as automobiles to solar power, engineering and industrial equipment (Edgerton, 2007; Etges, 2019). The corporate sponsorship of the Futurium is named in the museum’s brochure, given out with a visitor’s entry, but is also available on their website. Corporate sponsors at the Futurium are only German companies (BASF SE, Bayer, Boehringer Ingelheim Pharma, Siemens, Infineon Technologies, and Deutsche Telekom), while other support comes from only German science and research institutions (German Federal Ministry of Education and Research, Alexander von Humboldt Foundation, the German Academic Exchange Service (DAAD), the German National Academy of Sciences Leopoldina, the National Academy of Science and Engineering acatech, the Fraunhofer-Gesellschaft, Helmholtz Association, the Max Planck Society, and the Leibniz Association). The state-science alliance is especially strong in Germany, but it is fundamentally motivated by economic nationalist ambitions of advancing the German economy (Götze, 2021).

The Futurium placard quoted above, which notes that “some things like solar energy makes nature lavishly available to us,” exemplifies how technoscientific futures in Germany are imagined as surpassing the limits of nature to achieve what one display described as “infinite provision” (*unendlich versorgt*). In a larger section on new technologies, artificial intelligence, and climate engineering, this display raised ethical questions about topics like consumer privacy and data or the risks of geoengineering, but never questioned consumerism itself. The underlying assumption is that the future will continue to be defined by consumer capitalism – a future that German companies are keen to profit from through their scientific and technological innovations. This logic about the future is the same in the UAE, where consumer capitalism motivates the political organization of state-society relations (Hanieh, 2018). State-science relations are likewise motivated by nationalist ambitions for fueling the Emirati economy (Ewers and Malecki, 2010), just as in Germany and, indeed, many other countries that promote the “knowledge economy” as a model for economic development (Moisio, 2018).

The way that German political and economic leaders center technoscience in questions about the future reflects a broader conservative anxiety about how young people today are thinking about the climate crisis – and what this might mean for their future engagement with the economic system that Germany is locked into. The increasing articulation of “futurelessness” among young people imagining climate-changed futures has been characterized by some as leading to a contemporary zeitgeist of “doom and gloom” (Tutton, 2023, p. 439). Young people’s sense of hopelessness or resignation about the future is a growing anxiety for elites and governments, who do not just see it as a psychological illness, but also a threat to the capitalist system that is fueled by the aspirations for growth and prosperity among workers and subjects of the state. Museum planners are well aware of this challenge. Germany’s leading science museum, the Deutsches Museum, has since 2002 hosted a handful of exhibits about climate change and the Anthropocene, in which organizers were explicitly concerned with avoiding the common narrative of decline (Keogh and Möllers, 2015, p. 85). The Futurium’s planners follow the same pattern, and clearly seek a positive orientation to instill hope among visitors – and in so doing, inspire a belief in their own agency and labor for securing a prosperous future for themselves and for Germany.

Dubai’s Museum of the Future also projects “hope” as a key theme in its vision statement, setting it in contrast with the zeitgeist of “doom and gloom” thus:

Our Vision – We are a beacon of hope: The Museum is a home for inspiration, open to all. We represent the vision of His Highness Sheikh Mohammed bin Rashid Al Maktoum showing what is possible with conviction, commitment and togetherness. Our goal is to provide light in dark times: in an age of anxiety and cynicism about the future, we are showing that things can and must progress. Our imagined futures are fundamentally hopeful, but honest about the dangers of the present. (Museum of the Future, 2023a)

Sheikh Mohammed is the ruler of the emirate of Dubai, whose vision of politics is decidedly authoritarian, but who is keen to present himself as a visionary and benevolent father figure. His words about the future are even inscribed on the façade of the museum – the Arabic calligraphy features several quotes from him, including: “The future will be for those who will be able to imagine, design and build it, the future does not

wait, the future can be designed and built today” (Dom, 2022). In the highly censored rhetorical landscape of the UAE, Sheikh Mohammed’s vision of the future – of “conviction, commitment and togetherness” – may sound hopeful, but is nonetheless authoritarian. As “progressive” as the vision may appear, one cannot argue with the vision of the ruler in Dubai.

As Appadurai (2013, p. 188) explains, people in positions of power in unequal social settings are uniquely positioned to advance their vision of the future, and “to explore the future more frequently and more realistically, and to share this knowledge with one another more routinely than their poorer and weaker neighbors.” Because of the way that the future is commodified around the spatio-temporal logic of “abstract time and the empty future” in contemporary capitalist states like Germany and the UAE, “the temporal realm becomes a source of wealth creation: it is associated with fortune” (Adam, 2010, p. 366). The Museum of the Future and the Futurium can therefore be read as displays of wealth, privilege, and power by those who stand to profit from the techno-futures that their scripts of scientific nationalism celebrate. Meanwhile, the depoliticizing effect of their technowashing entices us to “still hold on to the same illusion, still live the same make-believe: the future is empty and open, we say. It is ours to forge and shape to will, ours to colonise with treasured belief systems and techno-scientific products of the mind, ours to traverse, ours for the taking” (Adam, 2010, p. 369). And in the face of the dire warnings of climate scientists that there may be *no* future for humans on earth (Lenton et al., 2019), the Emirati and German scripts of optimistic scientific nationalism works as a kind of salve, soothing the anxieties of young people whose future has already been stolen.

B. Technowashing participation: Scientific nationalism for participatory subjects

In writing on “future geographies,” Anderson and Adey (2012, p. 1532) note: “If futures are made present, and such present futures have context-specific effects, then futures are also folded into the making of subjects in the present.” The Museum of the Future and the Futurium both promote a particular vision of a national subject in Germany and the UAE – a national subject who participates in the country’s political economy in the “right” way, while successfully navigating climate change and other challenges in the future. In their focus on the future, the two museums in Berlin and Dubai are unique in today’s museum landscape, though it is worth mentioning that Rio de Janeiro opened a similar “Museum of Tomorrow” in 2015, which *The Guardian* described as “a captivating invitation to imagine a sustainable world” (Watts, 2015) All three future museums thus place a strong emphasis on climate change, which positions them within a broader global trend of international exhibits at science museums focused on climate and environmental topics in the last 15 years (Cameron and Neilson, 2015).

In fact, these new future-themed museums are part of a longer genealogy of “museums of the future” geared toward educating the broader public, first articulated in a report with that name in 1891, written by the Smithsonian Institution’s Assistant Secretary, G. Brown Goode (1891). Goode’s desire to recruit the “layman” into museums of science was taken a step further by the Austrian social scientist Otto Neurath, who thought the “museum of the future” “should enlighten and empower the people by providing a critical view of modern industrial civilization and pointing at the means of its improvement” (Charles and Giraud, 2021, p. 135). In this vision, the science museum should be a site to foster active, participating subjects. This is similar to how discussions about climate change are unfolding in the museum community today, where science museums are being called on to center climate change in an *active* manner, developing “new modes of engaging publics beyond passive modes of informing visitors about the science of climate change” (Salazar, 2015, p. 90).

This active approach is clearly visible in Berlin’s Futurium, the exhibits of which are all organized around *questions*. It is explained on the museum’s website thus:

At Futurium, everything revolves around the question: how do we want to live? In the exhibition, visitors can discover many possible futures; in the Forum, they can participate in open discussions; and, in the Futurium Lab, they can try out their own ideas. (Futurium, 2023a)

Rather than the declarative statements common to other museums, the displays are instead filled with questions (**Fig. 4**). On one level, this approach seems to encourage a critical approach to questions about

the future. But at another level, the stage is already set with the questions themselves. That is, the museum designers have already decided on the important questions for thinking about the future – and these are defined by issues of science and technology and German national interests.



Fig. 4. Exhibit “How big is my world”?, Futurium. May 2022. Source: Author.

Yet the nationalist storyline of Germany as an exemplar of democracy features prominently in how the Futurium is imagined as a space for educating active, voting subjects. The museum named “Democracy” as its annual theme in 2023, which included a series of events and a dedicated section in the museum spaces about how visitors can help to preserve democracy in the future. It was outlined on the website thus:

What is needed for democracies to run smoothly? You can try things out for yourself at our illuminated democracy sculpture: gather together your idea’s supporters on the spot, put your brainwaves on the digital agenda, and discuss everything pixel by pixel to reach an agreement. That’s the exhibition’s starting point for the futures of democracy. (Futurium, 2023b)

Here again, technology comes front and center – *digital* democracy is the “starting point for the futures of democracy.” The role of the participatory subject is also rehearsed in the museum’s interactive displays, including in the Futurium Lab – a space in the basement to actively engage visitors with digital experiments. Here, visitors can play with the AI and digital technologies built by corporate partners, which all gamify the democratic process: Data Correlations (by Studio Brüll), Opinionator (by Tactical Tech), Simulating Democracy (by Imaginary), and Smile to Vote (by Alexander Peterhänsel) (Futurium, 2023b).

In *The semisovereign people*, E. E. Schattschneider (1960) offers an important critique to the myth of popular choice in democracies. “The hero of the system is the voter who is commonly described as the ultimate source of authority” (Schattschneider, 1960, p. 97) he writes, but popular choice is meaningless if

the issues subject to voter input are themselves meaningless: “The power of the people in a democracy depends on the *importance* of the decisions made by an electorate, not on the *number* of decisions they make” (Schattschneider, 1960, p. 136). In the Futurium, and in many other social and political realms in Germany, participatory subjects (voting citizens) are called upon to make essentially meaningless or uncontroversial decisions. This is aided by the habit of technowashing discussed above, which uses scientific nationalism to circumvent real citizen input. Indeed, as Ribeiro and Soromenho-Marques (2022) explain, technowashing has a critical depoliticizing effect:

Thus, there are several reasons to use this practice, given the fact that it may: (1) deflect attention from the necessary and urgent reflection on the model of the neo-classical economy that governs the world’s largest economies (and which are these with the most severe ecological footprint), (2) strengthen the human dominator of nature status, under the pretext that humans will always be able to develop better technology to address the problems they have caused with technology that is now obsolete, (3) legitimise economic markets freed from constraints or moderation mechanisms, ensuring continued business growth, financial returns and corporate image and reputation, since (4) investment in these techniques will divert attention away from planet-damaging practices promoted by both countries and companies, and (5) divert attention away from the responsibilities of policymakers as their action plans become dependent on what science and technology provide. (Ribeiro and Soromenho-Marques, 2022, p. 5)

In Germany, technowashing also deflects attention away from the fact that the country’s leaders are not interested in upsetting the prevailing political economy that is intimately tied to energy-intensive, technoscience-focused industry.

So while the Futurium suggests that it might spark creative thinking about diverse approaches to solving the climate crisis, in reality, its celebration of consumerist technoscience suggests a narrow, singular approach to the nation’s future. If there is only one “right” answer (*more science! more technology!*), this is not a space of open politics. None of this is to suggest that people should not engage in debates about contemporary climate problems. Rather, the nationalist story of democratic participation is simply misapplied in this realm. In the gamified museum experience, it becomes performative and ultimately works to erode popular understandings of democracy as something that involves serious debate about morals, ethics, values, and justice. Instead, those ethical questions are taken for granted and “democracy” becomes a performance of which techno-fix is the best one and how to encourage people to creatively engineer new approaches. This is not democracy: this is a technoscience fetish masquerading as politics.

In the UAE, technowashing similarly helps deflect attention from the fact that the government is completely reliant on oil exports and has no intention of giving up fossil fuels before they are exhausted (Koch, 2022b). In the Museum of the Future’s Tomorrow Today exhibit mentioned above, one display features environmental technologies under the organizing question of “How can we heal our planet?” The description is revealing in its silences, reading:

According to the United Nations the last decade was the warmest ever recorded. Researchers scientists and designers from all over the world are working tirelessly in a joint effort to find innovative ways to minimise the negative impact of human activity on the environment. The next decade will be crucial to stopping the irreversible damages from climate change. Pollution prevention and waste minimization are two key focuses for mending human impact on the land, water and air. From devices for safely storing CO₂ to innovative alternatives to plastic these projects make use of the latest technologies to provide solutions for repairing the planet and minimise damage in the future.

In this framing of planetary illness, the museum’s designers do not attribute responsibility for climate change to any industries or actors. Instead, innovative scientists are held up as heroes working against an abstract threat.

Technowashing in the UAE’s scientific nationalism also justifies a number of dubious decisions about the country’s future development plans, including the leadership’s utopian plans to colonize Mars (Emirates Mars Mission, 2021). Now a core pillar of the UAE Space Agency’s work, the UAE’s Mars

program “reflects a relationship to the future that is different from the aspirational elements of national modernization projects that focus on the perfection of an existing territorial state. Its aspirational horizon is one of escape and rebirth rather than the actualization of an already existing settlement” (Grove, 2021, p. 1035; see also Determann, 2018). The UAE’s Mars project is nonetheless a nationalist project, which grows out of the authoritarian space-time impulse of colonizing the future (Koch, 2022a), while simultaneously colonizing the resources of the present. “After all,” Barbara Adam (2010, p. 369) writes, “future generations cannot charge us for the use of their present. They cannot hold us to account if things go wrong with our exploitations. They have no voice or vote to register their concerns.” The Mars program thus reframes Emirati leaders’ abdication of their “transgenerational responsibility” (Andina, 2020) through continuing to promote fossil fuel energy systems and stymying climate crisis action (Carrington, 2023). The UAE’s scientific nationalism surrounding the Mars Mission instead transforms this transgenerational injustice into a new set of promises for techno-utopian solutions, all the while continuing to exclude young people’s right to choose life on planet Earth.

The Mars agenda is featured prominently in the Museum of the Future, where the entire visitor experience begins with a ride in an elevator, dressed up as a space module, to visit the UAE’s Mars colony in 2071 (Fig. 5). This floor of the museum is the only space where visitors are guided, by both human and AI guides, and the only time they are forced into the role-play fantasy of the UAE’s grand Mars colonization program. Techno-utopian promises are the dominant theme at the Museum of the Future. Prototypes of new technologies or simple mock-ups of them fill its exhibits, where reality and science fiction constantly blur. This is evident not just in the Tomorrow Today exhibit, but in other parts of the museum like the Mars 2071 floor, as well as the HEAL Observatory floor focused on planetary health. Displays here rehearse a number of fictional ideas, such as the “Library” – “HEAL’s DNA vault, where we store the genetic code of thousands of species” and the “Observatory” – “our space for growing new species designed by citizen scientists like you.” To reiterate, these are entirely fictional spaces, but visitors are brought to see and experience what they might look like in a fantastical experience of bright colors and, just maybe, inspiration (Fig. 6).



Fig. 5. Elevator as a pretend rocket ship to Mars, Museum of the Future. February 2022. Source: Author.



Fig. 6. The DNA “Library” room, Museum of the Future. February 2022. Source: Author.

The space of fantasy and prototyping is in fact a common theme in Dubai, “where the demonstration of concepts – through wave after wave of billboards, mock ups, pilot programmes, conventions, and tests – rather than the creation of the actual thing itself, shows how value is generated off of promises rather than the realization of those promises. One never actually has to make good on what is anticipated, only on the promise of what could be” (Grove, 2021, p. 1040). The fixation with prototypes follows the same logic of what Bulkeley and Castán Broto (2013) describe as “government by experiment,” which allows politicians and technocrats alike to skirt accountability by working within the space of the “one-off” experiment to achieve their political and economic interests. By encouraging visitors at the Museum of the Future to engage in the role-playing of colonizing Mars or creating new species, visitors are enlisted in this project of governing by experiment in a meaningless fashion. That is, they are given a sense of agency and active participation, even though it is entirely fictional. As in Germany, participatory subjects are idealized and so too is their (potential) labor and innovation in the realm of technoscience – all held up as the key to achieving national prosperity and glory in the future.

The Museum of the Future and the Futurium both adapt local scripts of scientific nationalism to frame broad global challenges like climate change not through despair and eco-catastrophism, but through hope and techno-optimism. In so doing, they advance the depoliticizing impulse of scientific nationalism that both takes for granted and perpetuates nationalist futures defined by capitalist ideals of technoscience – futures that are inhabited by entrepreneurial, participatory subjects. Their displays rehearse democratic input and citizen engagement, but in a farcical manner, predicated on an impoverished notion of civic participation. And despite the distinct democratic and authoritarian political organization of Germany and the UAE, the Futurium and the Museum of the Future point to a strikingly similar vision of productive, compliant national subjects. In this, the museums of the future show that the easy divide between

democratic/authoritarian regimes breaks down when utopian futures are colonized by technowashing scientific nationalisms.

4. Conclusion

Examining contemporary narratives about the future is especially important at a time when the climate crisis is already upon us and will invariably shape the economic and political organization of society for all generations. Modernist thinking about the future tends to cast it as spatially and socially open. It is anything but: “Every deliberate future-making inevitably involves future-taking: it prefigures and shapes successors’ future present” (Adam, 2010, p. 368). In Germany and the UAE, stories about the future – of future-making and future-taking – are promoted through a wide range of institutions, sites, and social practices – inviting residents and citizens alike to become entrepreneurial subjects motivated by their desire to participate in the technoscientific economy celebrated by the countries’ scientific nationalism. The Futurium and the Museum of the Future do not fly the flags of Germany or the UAE anywhere on their grounds, but they are distinctly nationalist in their orientation. Drawing on national tropes of excellence in science and technology, their stories about the future are populated with nationalist glory in helping to “saving the planet” through technological innovations. These state-supported visions of the future serve the interest of elites today insofar as they encourage residents of the two countries to understand themselves as nationalist subjects emotionally bound to the prosperity of the nation through feelings of pride and aspiration.

Intentionally or not, these museums also support elite agendas by failing to encourage visitors to reflect on consumerism or the organization of politics or social life writ large. They instead tap into aspirational capitalist and nationalist ideals to technowash imagined futures firmly *within* a capitalist global economy. By placing undue hope in science and technology to solve the world’s environmental and social problems, they help social and political leaders to uphold “the appearance that they are committed to working on solutions and taking measures or commitments, even if they are not sufficient or sustainable enough,” while allowing “more robust, inclusive, ethical, fair and multidisciplinary public measures and policies to be postponed” (Ribeiro and Soromenho-Marques, 2022, p. 9). Instead of engaging seriously about the social and political organization of society in the future, visitors at the two museums are encouraged to embrace the ideals of scientific nationalism and put blind faith in technoscience as a solution to any social ills it might hold.

Germany and the UAE are not alone in the way that social and political leaders use scientific nationalism to colonize hope in the face of adversity. Hope is inherently future-facing and raises many important questions about how geographers might advance research on the “future” and map the differential political geographies of narratives about the future. The two museums analyzed here illustrate how the future animates nationalist visions through stories of science, and how science animates nationalist visions through stories of the future. In light of their troubled relationship with ethnonationalism and exclusionary xenophobia, it may be tempting to look favorably on such expressions of scientific nationalism in places like Germany or the UAE. Yet in both places, scientific nationalism works to preempt political debate and, in so doing, quietly divert attention from the most basic but essential questions about the geopolitical and economic architecture of our common future. Today, these questions are inescapably about the challenges of life and justice in the time of climate crisis.

The environmental visions on display at Berlin’s Futurium and Dubai’s Museum of the Future are rooted in the admirable desire to generate hope and positive energy for finding solutions to climate change. But as I have written elsewhere, “ostensibly ‘positive’ or ‘progressive’ narratives of techno-science and environmental consciousness can nonetheless re/entrench the violent and unjust power structures of imperialism and settler colonialism, which are felt around the world” (Koch, 2021, p. 44). It can also re/entrench the violent structures of nationalism. As this article shows, the celebratory spectacle of science at Berlin and Dubai’s museums of the future are nonetheless defined by *nationalist* visions of the future, which continue to promote consumerist technoscience – simply rebranding the political economic order that is responsible for the climate crisis and its transgenerational injustices. By taking the *future* seriously,

geographers can continue to unmask the authoritarian move of such branding projects that crowd out alternative visions of the future.

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