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Digital Platforms as (Dis)Enablers of Urban Co-Production: Evidence From Bengaluru, India

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Abstract

This article examines how digital platforms focused on citizen engagement affect urban transformation based on multiple case studies from Bengaluru, India. The research question is: What type of initiatives and designs of digital citizen platforms enable co-production? Co-production is defined as the use of assets and resources between the public sector and citizens to produce better outcomes and improve the efficiency of urban services. The study uses qualitative and quantitative approaches. Evaluative metrics of citizen engagement in digital platforms are done at two levels: platform metrics and initiative metrics. Each platform is evaluated under several variables that indicate the type of ownership, period of operation, aims and types of initiatives, and impact and levels of engagement. Then, the digital platforms are mapped for the extent of digital co-production that matches the type of digital interaction with a form of citizen–government relationship. The findings indicate that the orientation of digital co-production, where it exists, seems to be around the dimensions of co-testing and co-evaluation rather than co-design and co-financing. Furthermore, the digital platforms under study primarily view citizens as users rather than collaborators, limiting the scope of digital co-production. The involvement of urban local governments and private partners in a single platform strengthens the degree of citizen engagement, including the scope for co-production. Finally, there is a strong offline counterpart to citizen engagement through digital platforms where true co-production exists.

Keywords

Bengaluru; citizenship; co-production; digital platforms; India; urban transformation

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1. Introduction

Strategies for increasing the interaction between governments and citizens have been attempted throughout history in diverse ways. In some contexts, federal structures and decentralization have been used to achieve this end, and in other situations, people have been tasked with planning and social auditing (Muusse, 2018). The use of digital platforms to decentralize power structures and expand tools of interaction has been an ongoing process since the proliferation of platforms as a mode of intermediation (Srnicek, 2017). The involvement of digital platforms has enabled a spectrum of participatory modes ranging from interaction to collaboration and co-production of ideas and services (Falco & Kleinhans, 2018). This article examines how digital platforms focused on citizen engagement affect urban transformation based on multiple case studies from Bengaluru, India. The study advances the understanding of the type of citizenship participation that these platforms engender and of the idea of smart cities, an increasingly popular policy in the Global South.

India's Smart Cities Mission, launched as a flagship project by the Ministry of Housing and Urban Affairs in June 2015, included Bengaluru as one of its sites. The urban policy focus on the city was significant given its selection as the technology capital of India in the late 1970s. The Smart Cities Mission was rolled out in India in a specific sequence. Over 100 cities competed in a national-level urban competition for proposal funding. They were aimed at adding a digital technological interface to their urban core through urban plans and vision documents, attracting investment and driving economic growth. In many ways, an encouragement of digital platforms for governance is an extension of this approach.

From the initial stages of conceptualization, the idea of smart cities in India as the solution for urban renewal met with reasonable skepticism on the grounds that it might reduce the space for participatory governance. The idea of business innovation, technological application, and efficient urban governance appeared to be a private and differentiated setup attractive to the middle class, though it left behind other diverse citizens who were making rights claims (Datta, 2015, 2018). Building digital platforms and improving technological infrastructure was portrayed as the prominent method for communities to participate in urban governance (Burte & Kamath, 2017).

The research question is: What type of initiatives and designs of digital citizen platforms enable co-production? The study uses qualitative and quantitative approaches. The empirical framework used by Muusse (2018) was adapted to design evaluative metrics of citizen engagement in digital platforms at two levels: platform metrics and initiative metrics. Each platform was evaluated under several variables that indicated the type of ownership, period of operation, aims and types of initiatives, and impact and levels of engagement. Then, the digital platforms were mapped for the extent of digital co-production using the theoretical framework of Linders (2012), which matched the type of digital interaction with a form of citizen–government relationship.

The article is divided into the following sections: Section 2 outlines the theoretical framework of co-production and the strategy, technology, organization, people, and environment (STOPE) framework used to analyze the cases. The methodology used in the study, including data collection and data analysis, is discussed in Section 3. Section 4 elaborates on the findings. Section 5 concludes the study while pointing out strands for future research.

2. Theoretical Framework

The idea of co-production has a long history in public management literature. The prominent early definition of co-production as the community's inevitable role in partnering with public service organizations to deliver meaningful goals was given by Ostrom (1972). Subsequently, this strand of literature has been expanded to include cases from the United States, Europe, and Australia (Osborne & Strokosch, 2013; Pestoff et al., 2012; Radnor et al., 2014; Verschuere et al., 2012) and evaluated in new contexts by Alford (2014). These studies espouse the idea of the participation of the public as much as the public's consumerism in using the services offered to them. In this manner, co-production is fused with the notions of intangibility and inseparability of the service offered.

Co-production is also a political issue involving practices of urban citizenship. An example of co-production in government services is participatory planning and budgeting as well as social auditing by which citizens are involved in the way a service is designed and delivered for public consumption. In the literature, co-production has been conceptualized as a bottom-up process with the potential for emancipation and civic change that encourages active citizenship (Burns, 2004). On the other hand, the advent of new companies and platforms demonstrates that co-production can also take the form of a top-down process of institutional change (Hanakata & Bignami, 2023). These contrary results suggest that co-production can expand or repress citizenship based on how it is institutionally set up.

Another strand of literature conceives co-production in terms of value propositions. In this conception, service is imagined as a process, rather than a tangible good, in which value is added at the moment of co-production (Edvardsson et al., 2011; Grönroos, 2008, 2011; Payne et al., 2008; Prahalad & Ramaswamy, 2004; Spohrer & Maglio, 2008; Vargo & Lusch, 2008). In this conceptualization, the interaction between the expectation and the realization of value leads to the co-production of services.

This study makes use of the definition of co-production from public service literature. Co-production can be broadly or narrowly defined. Co-production is narrowly defined as "the voluntary or involuntary involvement of public service users in any of the design, management, delivery and/or evaluation of public services" (Osborne et al., 2016, p. 640). However, this definition fails to take into account the intentional uses of co-production, including experimentation with novel technologies that governments engage in, which is relevant to the context of this study. Furthermore, this definition decontextualizes the use of co-production in a long line of political techniques for engagement that governments have adopted with various consequences.

Therefore, this study examines the literature on citizen engagement by the government through the broad classifications as both a one-way engagement and a two-way engagement (Falco & Kleinhans, 2018). While one-way engagement refers to the government sharing information with the citizens, the more interactive two-way engagement has expanded the scope of such activities to include collaboration in the design of policies and service delivery. Co-production in this context is defined as the "better use of assets and resources between the public sector and citizens to produce better outcomes and improve efficiency" (Falco & Kleinhans, 2018, p. 19).

This study engages with the broader definition of co-production in order to include not only citizen engagement in public service but also the use of various technologies that govern how this engagement is

made. For example, a simple interface with information could facilitate a passive form of citizen engagement through a minimum level of interaction while a more sophisticated interface that includes use, rating, and feedback could foster a more active form of engagement. Drawing out these differences and their political implications is possible only with the broad definition of co-production.

Digital technologies can evoke different impacts through co-production. First of these is the technology's ability to affect co-production indirectly. An instance of such an impact is digital technologies that coordinate co-production by enabling more efficient information flows and providing support functions. Examples include digital technologies that permit real-time data flow and monitoring such as electronic databases and digital signatures. The second type of impact is through those digital technologies that transform co-production by creating entirely new co-production practices or adding a digital layer on top of the traditional human-centered co-production. Examples of such transforming technologies range from assisted living technologies to living labs.

The third type of impact on co-production by digital technologies is the use of crowdsourcing methods that use gamification strategies, especially game-thinking, or in non-game contexts, incentivizing citizens to participate in and provide input for public service delivery or the ethos of the sharing economy (Mergel, 2016). In this vein, co-production can be seen in relation to the idea of governments as platforms (Linders, 2012). The advent of online platforms has been particularly conducive to improving the interaction between governments and citizens. Van Dijck and Poell (2016, p. 11) defined online platforms as "technological, economic and social-cultural infrastructure for facilitating and organizing online social and economic traffic between users and providers." Different platforms are often connected to each other as a network, resulting in an ecosystem for the organization of all kinds of connections between users and providers simultaneously. This feature influences the social and economic traffic of information and interaction. The main distinction that online platforms have in comparison with previous versions of digital technology such as the website is that they collect large amounts of data about their users both in the form of content data and user data and often use algorithms to process this data. This distinct feature of data generation and utilization allows for aggregating and disaggregating data in different forms and putting the data to further use in improving interactions from two-way to self-organization using algorithms (Muusse, 2018).

Building on the idea of platforms in combination with algorithms, the fourth type of impact can be conceived as the potential to substitute for traditional co-production practices. This means that digital technologies can alter the co-production process by fully or partly automating them and changing the role of co-producing citizens from active to passive participants. This ties with earlier studies such as Chandoke (1991) as well as more recent observations by Abraham and Rajadhyaksha (2015), who argue that the digitization of services produces new costs and barriers to accessing the entitlements of citizenship because access is accompanied by a new set of risks.

These four strands of digital co-production situate the digital platforms in the framework of platform urbanism, defined by Barns (2020) as how the particular dynamics of platform ecosystems entangle public and private organizations as well as citizens. Understanding digital platforms in this conceptual framework reveals different layers of governance structures and relationships that extend from traditional platforms to urban institutions.

Furthermore, the concept of co-production can be deconstructed to understand it as a stratified concept with different types of public involvement (Muusse, 2018). At the basic level is co-testing, in which an idea that has already been conceived is applied through a digital platform to evoke responses that citizens use to co-test the process for efficacy. The process is very similar to pilot programming an initiative. At the second level, digital platforms are used to co-evaluate the process with the help of citizens. At this level, the process or idea is tested by the users in comparison to other options, and a feedback loop is created to modify the process. A higher level of co-production is enabled through co-design, in which citizens participate in the design of the initiative in addition to testing and evaluating it. A further level of co-production incorporates co-financing along with co-design, transforming the ownership of the initiative more comprehensively to the users' end.

It is in this context of multiple trajectories of technology impact that this study examines the use of digital platforms and their impact on shaping co-production. The theoretical framework of different ways of interaction between technologies and citizens includes interaction, co-production, and self-organizing as different types of engagement. Based on these analyses, this study attempts to build a typology of interaction that digital platforms enable in this context.

3. Methodology

3.1. Data Collection

In India, 100 cities have been selected for rapid and comprehensive digitization as part of the smart city framework (Kylasam Iyer & Kuriakose, 2023). Bengaluru, in the southern state of Karnataka, is one of the foremost among them. In the postcolonial governance of Bengaluru, its designation as a technological city was established through setting up industrial parks where the municipal government provided a range of infrastructure services that enabled its growth. The role of a private and parallel system of governance through infrastructure includes both service delivery and a decongestion of services (Gopakumar, 2015; Idiculla, 2016). The establishment of digital platforms is a continuation of this process of construction and decongestion of the infrastructure of urban governance.

Having a natural ecosystem of technology start-ups and global multinational corporations, Bengaluru's experimentation with digital urban governance is politically significant. At the primary level, Bengaluru is being touted as an exemplar for not only other Indian cities but for the Global South in the discourse surrounding smart cities. At another level, the presence of numerous players enables the possibilities of diverse models of engagement through digital platforms in urban affairs. Furthermore, Bengaluru's historical attempts at decentralized governance as mandated by federal law have conflicted with the local government's priorities to compete and expand its potential as an investor-friendly destination. Comparing digital platforms' ability to co-produce is also a measurement of the city's ability to decentralize governance.

The first step of data collection was the creation of a long list of digital platforms dealing with urban affairs operating in Bengaluru. The list included platforms operating at a national level that also included a separate platform for Bengaluru as well as platforms specifically tailored for the city. The reason to include the former type of platform was mainly because digitization under the smart cities framework in India has been a multi-city project that incorporates citizenship initiatives as well.

Thematically, digital platforms that included both public and private players were included. The functionally diverse set of platforms ranged from providing urban services to creating awareness and lobbying for specific policy changes, making this a multi-sectoral study. Similarly, digital platforms that engaged in a wide set of tools and target groups were included. By adding these comparative frames, a typology was created during analysis.

In the second step of data collection, a shortlist was created from the longlist by keeping the five variables of the STOPE framework. If data was not available for the given period on all the five variables, then those cases were dropped. Table 1 lists the variables and their definitions. The STOPE framework operationalizes the concept of co-production to understand the level of co-producing involvement ranging from co-testing to co-evaluation, co-design, and co-financing. For each of the platforms (Next Bengaluru, Karnataka One, Reap Benefit, I Change my City, and Bengaluru Political Action Committee), the data on each individual indicator was manually tabulated from their publicly accessible websites since their conceptualization till December 2021. These findings are presented in Tables 3–5.

The five platforms under evaluation are comprehensively described using each of the five variables in the STOPE definition in the Supplementary File.

3.2. Data Analysis

The analysis of data proceeds in three steps. In the first step, each of the platforms was evaluated using a platform metric composed of 15 indicators as described in Table 2. These indicators decompose the five variables of the STOPE framework into measurable entities that can be compared. Based on the theoretical framework of co-production chosen for this study, in order to test the level of co-production, the comparable indicators chosen are ownership, engagement, and interaction.

In the second step, the descriptive statistics of these indicators, especially comparing ownership with types and number of initiatives and tools and level of engagement, are mapped to understand how the platforms differ qualitatively along these indicators. In particular, for the ownership indicator, how the type of interaction differs is examined through the mediating variable tools of engagement.

The objective of operationalizing the variables into indicators is to arrive at the underlying phenomenon that could bring out the relation between the indicators.

Table 1. Variable definitions using the STOPE framework.

Variable	Description
Strategy (S)	A statement on the vision and mission of the platform
Technology (T)	The type of communication infrastructure used
Organization (O)	The type of institutional setup
People (P)	The stakeholders including the managers of the platform, users, investors, the municipality, and other partners
Environment (E)	Knowledge, economy, and management of the platform

Source: Authors' work based on Muusse (2018).

Table 2. Platform metrics.

Indicator	Description
Name	Name of the digital platform
Type of ownership	Private organization Municipality Private organization with the participation of the municipality Collaborative project between private organization and municipality
Type of platform	Website, social media, physical space, and/or a combination
Presence of physical space/office	Yes/no If yes, what type of physical space (office, studio, open space)
Purpose of platform	Objective as given on the digital platform
Timeframe	Year(s) of operation
Location	Pan-city or neighborhood
Number of initiatives	Number of initiatives available currently as accessed on the website
Type of initiative	The sectors of involvement
Status of initiative	Completed, in process, or abandoned
Type of tools	Tools of interaction available on the website, including those for information, sharing, reaction, rating, and feedback
Level of interaction (scale of 1 to 5)	1. Overview/map 2. Sharing possibilities 3. Reaction possibilities 4. Voting/rating possibilities 5. Asking help/feedback
Involvement of government	Yes/no If yes, description (observer, partner, not involved)
Level of citizen–government relationship	Information sharing Interaction Self-organization Civic engagement (co-production)
Number of followers	Number of followers/subscribers on social media platforms
Number of reactions	Number of reactions on social media platforms

Source: Authors' work based on Muusse (2018).

4. Findings

After eliminating the rest of the digital platforms because they lacked one or more indicators on the STOPE framework, five cases were selected. In the remaining cases, the variables were operationalized using 15 indicators to create platform metrics for the digital platform cases. First, the indicator ownership type was compared with the levels of interaction through the tools of engagement. From Table 3, it is clear that there are three types of ownership of digital platforms: those that are entirely not-for-profit, those that are not-for-profit with government partners, and those that are government-owned with private partners. It is interesting to note that none of the cases are entirely owned by the government. For each of the ownership types, there are seven types of initiatives: housing, heritage, good governance, safety, sustainability, transport, and utilities. The maximum number and diversity of initiatives are found in not-for-profits with government partners.

Table 3. Number of initiatives.

Type of initiative	Number of not-for-profits involved	Number of not-for-profits with government partners involved	Number of government-owned platforms with private partners involved
Housing	1	0	0
Heritage	1	1	0
Safety	0	2	0
Good governance	0	2	0
Transport	1	2	0
Sustainability	1	2	1
Utilities	0	1	1

The next comparison was made between ownership type and the number of initiatives. Table 4 shows that platforms that are owned by governments with private partners have the maximum number of initiatives, and those that are exclusively not-for-profits have the least number of initiatives. This may be because governments tend to bring together various departments under a single platform catering to a number of utilities and services. On the other hand, not-for-profits tend to be cause-based. Furthermore, financial constraints might also explain why partnered digital platforms serve a higher number of initiatives than non-partnered ones.

Once the levels of engagement were established, we also delved into the technology aspect, which refers to the tools of engagement. Table 5 demonstrates that there are ten different tools of engagement used by these platforms, ranging from polls and newsletters serving subscribers to more sophisticated functions such as maps and prototypes. Furthermore, training on active citizen engagement through leadership programs and workshops is also provided on some platforms. Not-for-profits with government partners tend to use a wide variety of tools as compared to others. This can be explained by the fact that most private players who enter the field already have some capacity of technology that they put to broad use to understand the market for users based on their partnering government's interests. On the other hand, governments with private players as partners tend to use the least diverse tools of engagement. This can be explained by the fact that governments tend to be focused on utilities and service provision over other types of engagement. It is also interesting to observe, juxtaposing Table 5 with Table 3, that platforms with diverse tools of engagement are also more engaged in the co-production type of engagement.

The additional data from the platform metrics that is worth examining is the level of outreach that is indicated by the different types of social media following that each of the platforms has. Table 6 indicates

Table 4. Type of initiatives.

Type of platform	Less than 10 initiatives	10--100 initiatives	More than 100 initiatives
Government-owned		✓	
Not-for-profit with government partners	✓	✓	
Not-for-profits	✓		✓

Table 5. Tools of engagement.

Tool	Not-for-profits	Not-for-profits with government partners	Government partners
Poll	✓		
Newsletter	✓	✓	
Map	✓		
Dashboard	✓	✓	✓
Toolkit		✓	
App		✓	✓
Payment gateway		✓	✓
Research articles		✓	
Leadership programs/workshops	✓	✓	
Prototypes/models of products		✓	

the distribution of social media use and the platform's active following. Those that are left blank are cases where accurate figures could not be obtained with certainty. All data is self-reported by the platforms themselves. Facebook was the most popular social media used to interact with users and Twitter (now X) was catching up in numbers. This could be because Twitter is newer than Facebook and older users tend to use Facebook for social interaction more than Twitter. Comparatively, Instagram, the most recent and the most patronized by the younger generation, had less uptake.

Another lens to look at this data is through the type of information dissemination possible through these media. While Facebook and Twitter strongly combine photo and text messaging, Instagram is primarily visual. LinkedIn, which is a professional networking site, had the least uptake. Another point worthy of note is that three of the five co-producing platforms maintained an offline physical component to their activities. This could be to engender trust and continuity in delivering service face-to-face or because the nature of the service itself called for in-person interaction.

After comparing various indicators of interest from platform metrics that examined ownership with tools of interaction (technology of outreach), the fundamental mechanism of operation of digital platforms in terms of levels of engagement was mapped. As Table 7 demonstrates, two underlying concepts govern levels of engagement, namely ownership and tools used. The underlying concept of ownership ranges from the

Table 6. Platform and social media following.

	Platform 1	Platform 2	Platform 3	Platform 4	Platform 5
Facebook	1,887	212,893	18,252	4,881	5,123
Twitter		6,397	699	1,026	1,852
Instagram		20	1,205		2,251
YouTube		409	15,500		501
LinkedIn			656		1,815
Physical component	Yes	No	Yes	No	Yes

Table 7. Mapping typology.

Ownership (y-axis, vertical)/tools used (x-axis, horizontal)	Overview/map	Share	React	Vote/rate	Design/feedback
No involvement	Information				Self-organization
Partners: Implementation	Information	Interaction	Interaction	Co-production	Co-production
Partners: Data sharing	Information	Interaction	Interaction	Co-production	Co-production
Owners	Information	Interaction	Interaction	Co-production	Co-production

government being involved as owners or as partners in terms of implementation or data sharing to not being involved at all. The second underlying category, tools, ranged between five types: map, share, react, vote or rate, and design or feedback. For each ownership category, the tools of engagement were mapped. The reaction type was the most passive form of engagement, and feedback was the most active. From the combination of these underlying axes, four theoretical types of engagement (information, interaction, co-production, and self-organization) emerged. While the information type was the most passive form of citizen engagement, self-organization with the most active. Interaction and co-production were the categories with moderate types of engagement, with co-production involving more active citizens than interaction.

The term "co-production" is unpacked in Table 8. Depending on the ownership involvement and engagement levels scored on a scale of 1–5 with 5 showing the highest interaction based on tools and outreach of engagement, co-production is determined as intermediation or advocacy (denoted in blue). Engagement through merely voting and sharing involves co-testing as a form of co-production with minimal levels of engagement, which Platform 4 facilitates (denoted in white). In the highest category of engagement, two platforms that engage with citizens at the level of design and feedback perform functions of co-design and belong in the self-organization category (denoted in pink). The medium type of interaction is provided by other platforms. They provide space for voting or sharing, which is a form of co-evaluation. The type of ownership is as partners either in terms of data sharing or delivery of services. Based on these indicators, they can be co-producers aligning with advocacy functions or intermediation.

Table 8. Platform vs. type of relationship.

Platform	1	2	3	4	5
Engagement level	Designing/feedback	Voting/rating	Voting/rating	Using/sharing	Designing/feedback
Engagement score	5	4	4	2	5
Involvement of government	No	Partners for implementation	Partners for implementation	Owner	Partners for data sharing
Type of relationship	Self-organization	Co-production Intermediation	Co-production Advocacy	Interaction	Co-production Advocacy

5. Conclusion

This study compares five digital platforms based in Bengaluru, India, to understand the extent of co-production they enable in urban affairs. The indicators used to examine co-production are derived from the STOPE framework and comprise strategy, technology, organization, people, and environment. "Strategy" refers to the method of initiating citizen participation, while "technology" indicates the actual tools of participation. "Organization" describes the institutional form the digital platform takes to function, and "people" are the individuals who are situated within the organization. Finally, "environment" refers to the functional boundaries within which the organization operates.

The main conclusion of the study is that the orientation of digital co-production, where it exists, seems to be around the dimensions of co-testing and co-evaluation rather than co-design and co-financing. The four dimensions of co-production are an analytical tool to evaluate the degree of autonomy and participation available to the groups involved in co-production. Co-testing and co-evaluation imply the functional use of an existing design for efficacy and efficiency. On the other hand, co-design and co-financing imply an increased scope for ownership of the digital platforms for citizens. The presence of the first two types of features indicates that what comes out of these digital platforms is a patron–client type relationship between the government and the citizens.

The other observation from this research is that the majority of the digital platforms perceive citizens as users rather than collaborators in their activities and limit the scope of digital co-production. This means that services are provided by the digital platforms to be consumed by the citizens with a narrow feedback loop. The users do not participate much in generating these tools or designing them. This aspect mirrors the hierarchical mode of governance of urban affairs in the non-digital world and deviates from the ideals of people-led planning and participatory governance that Bengaluru adopted after India's liberalization in 1991. The explanation could be that while liberalization has enabled increased participation of the entrepreneurial class in urban affairs, the role of citizens has been limited to using the services of government, rather than creating them using decentralized governance principles.

The third feature to note from the study is that the involvement of urban local governments and private partners in a single platform strengthens the degree of citizen engagement including the scope for co-production. This inference stands in line with research that demonstrates that the presence of multiple types of stakeholders increases the accountability of the mechanism. For example, if a platform has public and private partners at different levels of ownership, the platform produces a wider range of engagement than the ones that are owned by just the government or are just not-for-profit-owned. However, the absence of social groups or intermediaries to citizens indicates that there is a lack of conceiving of the citizenry as investors in the process in the same way as the government and private players are perceived.

Finally, there is a strong offline counterpart to citizen engagement through digital platforms where true co-production exists. The offline components are in-person interactions such as meetings, leadership training, and workshops. The presence of offline activities that complement online digital platforms might indicate several things. The first point is that citizens may be inclined to trust urban local government activities in person more than online. Comfort with technology might be another factor that explains this. Additional factors such as time and resource constraints could also be of note. What is interesting is that exclusion from a true online co-production has led to the emergence of an offline component.

There are a few lines of exploration that can take this study forward. The question of what conditions enable co-design and ownership in co-production is preeminent among them. The demographics that are shifting to digital co-production are another feature worth examining. The impact of the Covid-19 pandemic on the adoption of a digital urban service model is another question that might have a lasting impact on the field.

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Conflict of Interests

The authors declare no conflict of interests.

Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

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