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Exploring the Smart Future of Participation: Community, Inclusivity, and People With Disabilities

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ABSTRACT

COVID-19 is having an enormous impact on civic life, including public services, governance, and the well-being of citizens. The pace and scope of technology as a force for problem solving, connecting people, sharing information, and organizing civic life has increased in the wake of COVID-19. This article critically reviews how technology use influences the civic engagement potential of the smart city, in particular for people with disabilities. The article aims to articulate new challenges to virtual participation in civic life in terms of accessibility, usability, and equity. Next, the article proposes a framework for a smart participation future involving smarter communities that utilize universal design, blended bottom-up, and virtual community of practice (VCoP) approaches to planning and connecting citizens with disabilities to smart cities. Policy and ethical implications of the proposed smart participation future are considered.

KEYWORDS

COVID-19, Design, Disability, Participation, Smart City, Smart Community, Technology, Virtual

1. INTRODUCTION

The COVID-19 pandemic has occasioned a sudden and drastic shift to digital technology-mediated, pervasive, applications across broad swaths of society, including education, business, health care and government with effects that are anticipated to extend beyond the immediate health crisis (Bevins, et al., 2020; Blackburn, et al., 2020, Dimson, et al., 2020, Howard & Borenstein, 2020; Torous, et al., 2020). Researchers anticipate that COVID-19 will accelerate the adoption of new technologies and operational practices (Castka, et al., 2020). Technologies such as the Internet of Things (IoT), big data analytics, artificial intelligence (AI), and a variety of tools for overcoming social isolation and enhancing digital lives, such as virtual reality, holograms and streaming video have been given a large boost by the pandemic (Mazzoleni, et al., 2020; Ting, et al., 2020). The increase in widespread digital technologies, while promising to enhance human capabilities, well-being and productivity, is also fraught with ethical challenges for the delivery of public services, governance and information

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tools for vulnerable and disadvantaged populations (Dubov & Shoptaw, 2020; Torous, et al., 2020). Disparities in digital literacy and access, affordability and usability, all facets of the digital divide, pose challenges for marginalized populations, and thus their redress must figure into any policy discussion of how advancing – 'smarter' - technologies can spur civic progress and participation.

The pandemic's immediate impact on public health and economics fuels COVID-19's role as a longer-term driver of more pervasive technology, leading to what is being termed a 'new normal' (i.e., Catska, et al., 2020; Torous, et al., 2020). It is reasonable to anticipate that this trend will accelerate movement towards further development of e-planning applications, with attendant benefits and challenges. Big data, AI, machine learning, and IoT are also anticipated to be drivers of data intelligence applications and use cases for 'smart cities' that incorporate information and communication technologies (ICT) and other technologies to foster infrastructure, services and culture in urban areas that promote citizen participation and well-being (Xu & Geng, 2019). The likely e-planning impacts are profound and merit consideration in the context of civic life. Particularly as vulnerable and marginalized populations, such as people with disabilities, experience the negative effects of COVID-19 disproportionately (Courtenay & Perera 2020; Kupper, et al., 2020).

2. CITIZENS WITH DISABILITIES

Any discussion on the civic impact of these digital technologies must recognize that their application in public, social and economic settings is contingent on designing for accessibility usability, and equity in their application, while factoring in the cost of adoption. In particular, enabling technology tends to evolve more rapidly than user adaptations or device usability, to the detriment of consumer participation and enlarging a digital divide (De Filippi, et al., 2019). The importance of accessibility and disability features is commensurate with the size of the population across the world, totaling more than one billion people who are living with disabilities (Armitage & Nellums, 2020). In this time of COVID-19, mitigation strategies must address communication, service provision, social distancing and health care barriers (Armitage & Nellums, 2020). Technology that is developed to be inclusive can play an important mitigation role for these barriers (Gandy, et al., 2017; Kupper, et al., 2020; Moon, et al., 2019; Denker & Baker, 2020). Similarly, technology designed to be ethical, accessible, and usable, can also ameliorate many of these barriers (Clever, et al., 2018; Ryan & Gregory, 2019; Suryotrisongko, et al., 2017). Until the relatively recent adoption of universal design principles in the past two decades, people with disabilities have been using capability-enhancing technologies to overcome barriers to social participation, and have a lived experience adopting and adapting technology, acquiring expertise and 'hacks' that in the remote working and social distancing world of COVID-19 are a net advantage (Shew, 2020). This is not to diminish the challenges posed by technology itself, arising from accessibility and usability barriers to people with cognitive and communication limitations for example (Courtenay & Perera, 2020).

Nonetheless, due to the changes flowing from the COVID-19 pandemic, adoption of digital technologies for people with disabilities and their participation in the development of new technology has the potential to enhance their social participation and engagement (Courtenay & Perera, 2020). This movement towards engagement and participation is abetted by the increasing use of these universally designed technologies, grounded in the design philosophy shift from 'fixing' the individual, to one that aims to reduce the environmental barriers towards participation for people with disabilities. In other words, universally designed technologies, adaptive to users' needs, are inclusive and relational (person-in- environment), rather than compensatory and individual-focused, enhancing the societal participation of people with disabilities as citizens (Lid, 2013).

As citizens participating in public life during this era of COVID-19, people with disabilities experience the same dilemmas borne of complex social problems as the general population, only more acutely. They also could benefit from the inclusive design (Gandy, et al., 2017) of technologies and systems that are bringing new solutions and preventive action through social innovation to urban

challenges in the guise of smart cities, with information and communication technologies (ICT) as the digitalized backbone. Ideally, smart cities should be part of a deliberate planning process, rather than developed piecemeal, owing to the complexity of urban aggregations and the need for coordination operationally and technologically of the components (Tang, et al., 2019). Having said that, a new perspective offered by Feder-Levy and colleagues (2016) ties access to information to self-organization, shared among citizens. These data, aggregated into more useful and situated information, make for a well-informed city that itself drives change, organized from the bottom up (Feder-Levy, et al., 2016). Traditional top-down approaches and innovative bottom-up processes can complement one another, such that there is a blend of stakeholder perspectives and preferences (i.e., Breuer, et al., 2014).

We anticipate that the new normal for smart cities is one in which they co-exist with stakeholder groups defined by having shared identity, interests and values at a different level of aggregation; 'smart communities' are notable for an emphasis on grassroots and consumer-centered planning and design, owing to the need for more immediate feedback from primary stakeholders. These smart communities share in the ICT backbone of smart cities but their 'smart citizens' are not merely 'service users', rather, they organize around collective issues and are situated in a locale pointing to the inclusion of an inductive bottom-up planning approach (de Waal & Dignum, 2017). This avoids the peril of what De Filippi and colleagues (2019) call a 'techno-deterministic' environment and grounds urban social innovation in a collaborative relationship between public authorities and citizens.

Traditionally, planning, in the disciplinary sense of the word, generally falls within the domain of the public sector. New innovative approaches generated by the high-tech sector, has contributed to an instructive literature on artificial intelligence (AI) applications including robotics, autonomous vehicles and chatbots to improve and innovate the delivery of public services (Yigitcanlar, et al., 2020). In their recent review of the extant literature addressing the question of "how AI can contribute to and improve the livability and well-being of citizens of smart cities?" (Yigitcanlar, et al., 2020, p.10), Yigitcanlar and colleagues pointed to a number of challenges. Specifically, regarding the delivery of 'intended value', secure and valid information (i.e., privacy and checks against misinformation), upholding public values, safety, transparency, and ethical safeguards. As Bianchini and Avila (2014) point out, ethical considerations for smart cities extend beyond protecting data security, safety and legitimacy to include power differentials that may favor privileged groups and social classes and social classes.

3. SMART CITIES AND COMMUNITIES

There are many definitions of data-enhanced contexts, such as smart cities, depending on the specific frame of the observer (e.g. industry, planners, policy analysts, etc.), but the overarching aims of these settings are to be more sustainable, equitable, and livable (Toli & Murtagh, 2020). There are many conceptions of what constitutes a smart city. Most often, the smart city concept emphasizes the importance of data, sensing, collection, manipulation and transport as the infrastructures for investing strategically in human and social capital to enhance citizen well-being and participatory governance, with ICT as the undergirding communication architecture (Karppi & Vakkuri, 2020).

Policy design, policymaking and the collective goals of public authorities and private interests, with inputs from citizens in the context of social values, the political and economic environments, in combination adds to this picture, serving to legitimize governance (Bednarska-Olejniczak, et al., 2019). In recent years, the operation of ICT in smart cities has expanded to include the Internet of Things (IoT), cloud computing, big data and digital public repositories, and mobile applications (Bednarska-Olejniczak, et al., 2019; Yigitcanlar, et al., 2020). It has become common to make a distinction between the more data-centric 'smart-city' and the contextually focused 'smart communities.' (De Filippi, et al., 2019).

Smart communities prioritize citizen participation, investments in human and social capital, benefiting from the cost-savings and efficiency of ICT service delivery, while emphasizing shared

stakeholder interests and concerns (De Filippi, et al., 2019). Smart cities are frequently associated with ICT and 'smart' components (i.e., smart homes, smart mobility, smart governance) but also with collaboration between community, research institutes, and providers of technology, in an iterative, developmental process of re-learning that is future-oriented, measurable and adaptive (Musakwa & Gumbo, 2017). Six distinct aspects often articulated in discussions of smart cities are 'smart economy' (innovative and entrepreneurial), 'smart mobility' (sustainable and safe transportation), 'smart governance' (transparent and participatory public services), 'smart environment' (natural and sustainable), 'smart living' (quality of life, personal and collective), and 'smart people' (human and social capital valued) (Vanolo, 2014 p.887).

Citizen participation in a 'citizen-focused' city e-planning process is important for a variety of reasons, including the integration of their perspective into decision making, service design and infrastructure, the development of sustainable, creative, and cost-effective solutions and a boost to citizen trust, satisfaction and government productivity (Gohari, et al., 2020). There are many complicating factors in actually achieving citizen engagement, including clear and comprehensible information, adequate citizen knowhow, fostering a culture of engagement, government and local organization investment, and public trust in technology (Massey, et al., 2018). In a deliberative democracy, policy is characterized by trade-offs, rather than concentrating power and decision making in the citizenry as a whole, and in a non-homogeneous, pluralist society, diverse perspectives are valued, as is assessing the effectiveness of policy outcomes (Gohari, et al., 2020). Among those diverse groups, the most vulnerable and least represented such as people with disabilities, must be engaged, and their voices incorporated into the planning and implementation of smart cities.

4. POLICY AND PLANNING

Integral to planning, public policy plays a critical role in terms of processes (ensuring the transparency of data and processes in smart cities, service negotiation, quality, feedback, and support) (Money, et al., 2015), as well as in the development of community wide objectives and outcomes. These practices are supportive of social innovation as well as addressing smart city objectives (Cohen, et al., 2014; Money & Cohen, 2015, 2015; Nam & Pardo, 2012). Policy innovations in support of social innovation within smart cities encompasses management innovations and can help coordinate strategies across facets of government in an integrated fashion, across sectors, actors and levels, for example linking health and transport polices for the benefit of healthy transportation choices (Nam & Pardo, 2012).

It is important to remember that policy, like planning, does not emerge in a vacuum, but is an iterative process by which the convergence of actions yields a change in societal structure and interactions. Policy emerges from a set of interrelated decisions around achieving situation-specific goals that in principle should be within the actors' power to achieve (Jenkins, 1978). Traditionally, this formulation follows a loose hierarchy where high level abstract principles set the framework that provides the environment in which low-level approaches are implemented, with more recent scholars noting the various degrees to which policy goals are met is a function of the gap between setting goals and achieving stemming from the policy formation process (Hill & Hupe, 2003). An alternative approach, ideally suited toward technology related interventions, is an inductive design-oriented process, intentionally inclusive of citizens.

This relatively new approach to the development of policy, the application of design thinking processes, (Lewis, et al., 2020), can be loosely understood as a 'human-centric' approach to policy development that draws from the techniques used by industrial designers. Design thinking is an approach that may help mitigate undesirable technology related problem elements. Design thinking encourages citizens, policy designers, planners, and agencies to work in a collaborative and iterative manner. The most important skill for a design thinker is to 'imagine the world from multiple perspectives – those of colleagues, clients, end-users, and customers (current and prospective). One helpful categorization of stakeholders is the following framework: citizens, members of industry, members of a community,

not-for-profit groups, and government entities. By gathering and consolidating a varied and healthy representation of different stakeholders who reciprocally affect, and are in turn, affected by, the policy formulation process, smart city policies can more closely approach an inclusive outcome. Traditionally, and too frequently, there is a delay in the gathering of these stakeholders until late in the development process. Specifically, according to Mintrom and Luetjens "…after problem definition has occurred, options have been analyzed, and broadly acceptable ways forward have been explored. Consulting at this later stage reduces the risk of policy work being subjected to major challenge and being sent back to the drawing board" (Mintrom and Luetjens, 2016, p.393). The rationale for inclusion of key stakeholder from the initial phases of any smart city design and development springs from this.

In terms of populations that planners might want to be especially cognizant of, people with disabilities are particularly vulnerable to the economic as well as health ravages of COVID-19 (Armitage & Nellums, 2020; Turk & McDemott, 2020). As vulnerable populations, they would especially benefit from inclusive technologies for connecting with government services, information, and social participation found in smart contexts (Kumar & Rawat, 2014; Grigoryeva, et al., 2014). For these stakeholders, the increased impetus towards digital information, communication and exchange holds great promise for keeping pathogens at bay while simultaneously bringing resources closer to hand.

There is, however, room for better accessibility and usability, in terms of brokering social connections, connections to services, vital information and even employment opportunities. While 'smart city' planning has been inclusive of smart governance, consideration of multiple stakeholder perspectives has been inadequate, and the voices of diverse citizen stakeholders are not adequately represented (Marrone & Hammerle, 2018). Engaging citizen participation through shared interests and values is critical to redefining the relationship between people and their city (De Filippi, et al., 2019). Local awareness at the level of neighborhoods as fundamental units of community is an important outgrowth of this approach (De Filippi, et al., 2019; Wahlstrom, et al., 2020) but the bonds of shared interest and values are uncircumscribed by geography. People with disabilities have the same right to having their basic psychological and physiological needs and opportunities as other people, sometimes expressing itself in different or differently emphasized public service needs for accessibility, safety, security, and inclusion (Suryotrisongko, et al., 2017). Properly ensuring access to those rights and needs constitute shared values and interests of people with disabilities, as well as others from excluded groups who are then recognized and made known (Simplican, 2019). One notable example is the way in which online systems are increasingly taking on roles in such domains as employment, education, public safety and access, and healthcare, which have implications for individuals with disabilities and older individuals in the wake of the social and economic changes brought about by COVID-19 (Trewin, et al., 2019).

Community is a defined 'space' geographic or otherwise, associated with feelings of belonging, identity and shared purpose. Inclusion is a key characteristic of community in this context. For people with disabilities cogent arguments have been made for community not necessarily as a place apart, but rather a place that is inclusive and 'convivial,' and safe (Simplican, 2019). For people with disability the 'smart community' can serve as nexus for participation and profound connection in the urban context. Smart Homes, mobility resources, including smart wheelchairs, mapping, parking and routing apps, as well as accessibility data projects can inform the development of inclusive, safe, informative and flexible infrastructure for 'disability-friendly' smart cities (Suryotrisongko, et al., 2017). The COVID-19 digitalization inflection point presents us with an opportunity to conceptualize design features of smart communities facilitating the self-determination of citizens with disabilities.

5. INTEGRATING STAKEHOLDER VOICES

Smart cities and more generally smart communities are in part a response to 'wicked problems' resolved by simple or single-faceted solutions. Wicked problems instead require systemic approaches

that encompass transportation, education, energy, and social inequities, leveraging human and social capital, while endeavoring to capture the voices of citizens (Marrone & Hammerle, 2018; Souza, et al, 2016; van Waart, et al., 2015). In the era of COVID-19 with its multi-faceted health, economic and social deprivations particularly afflicting people with disabilities as a wicked problem, a 'smart city' or more broadly, an inclusive, smart environment, approach adapted to their situation and needs is desirable. Moreover, cities are 'multi-actor' and complex containing disparate groups and populations (Wahlstrom, et al., 2020), complicating community problems.

For technology to be responsive to the social and ethical needs of a specific community of interest, it is important to make a paradigm shift for policy design, from 'borderless' technology to technology that is participatory and situated in a locale, be it a community or a neighborhood (Cauvain, et al., 2018; Karvonen, 2013; Viitanen, et al., 2015). Machine learning (ML) is one approach that yields design algorithms suitable for smart cities. Machine learning is a computational approach using large amounts of data to minimize errors, learns patterns, makes predictions and recalibrates accordingly (Canonico, et al., 2018).

The notion of smart aggregations of people with disabilities engaging in citizen participation can be expanded to incorporate networked artificial intelligence autonomous vehicles, intelligent agents, Internet of Things (IoT) where multiple technologies converge (Traunmüller, 2017). Ethical issues around transparency and confidentiality of data, as well as economic and digital divides that make the technological infrastructure less accessible to marginalized populations warrant consideration in the policymaking process (de Wijis, et al., 2016). Information infrastructure is the backbone of smart city architecture and effectiveness, with the aim not only of solving complex urban problems, but also of preventing them, through integrated IT systems, wireless infrastructure, service-oriented systems, real-time awareness, believed to be trustworthy (i.e., confidence-building and caring) empowering consumers and service providers (Cohen, et al., 2014; Money & Cohen, 2015). Trust is a key issue, and a key vulnerability of smart cities in the face of misinformation, inaccessible data, and policies predicated on the interests of particular parties, rather than on the public good. When considering vulnerable populations, such as people with disabilities these issues become more acute – trust, a fair 'marketplace', for exchanges between service providers and consumers, as well as policies that not only protect, but also build capacity. Smart cities are vulnerable to what Joss and colleagues (2017) term a 'techno-bureaucratic governance mode' (p.44) in which complexities are reduced to a small number of readily monitored parameters, social justice concerns are marginalized, and too little public scrutiny is given to governance data, while collective normative concerns are not typically articulated or addressed (Joss, et al., 2017). This supports our argument, advanced above, for including a bottom-up approach to making smart cities grassroots participation within smaller, 'known' communities where trust already exists.

6. SMARTER COMMUNITIES

Smart communities are place-based aggregations that incorporate a bottom-up, organic approach to exerting community-level voices and building capacity using the ICT infrastructure of smart technologies that can blended with top-down engagement approaches (Kim, et al., 2007). Smart communities not only engage community members but also promote social inclusion and a sense of belonging (Zavratnik, et al., 2020). Another permutation of smart community involves hyper-local environments reflecting complex urban landscapes, such as community-university partnerships to foster equitable civic engagement (Leigh, 2017). We propose the concept of volunteer 'smarter communities', which is an overlay, based not on locale, but rather upon shared interests, identity and values. People with disabilities can self-organize into voluntary smarter communities rooted in the experience of disablement, while also participating in a place-bound smart community.

The smarter community could, for example address bureaucratic impediments to participatory self-determination such as a lack of transparency, usability and ease of use barriers that stand-alone

technologies, such as health information technologies, cannot. People with disabilities, whether living in proximity (i.e., within a facility or housing unit) or independently at a remove, could avail themselves of these networked technologies *as a community* to benefit their collective health and well-being. In so doing they can tap into the advantages accruing from aggregated resources and influence. In this fashion, the smarter community can advance the smart future of participation for people with disabilities.

The idea is to engage and connect the core constituents of this community, while identifying assets and building capacity. Virtual linkages to public policies and services that are of particular concern to people with disabilities, such as transportation, employment, and education can invite them to join electronic commons with the aim of increasing the responsiveness of those policies and services. In this effort, partnerships between disability advocacy, service provider and public agencies will be critical to provide coordination and resources for information and exchange, including blogs, bulletin boards and immersive online environments promoting formal and informal encounters, meetings and forums. Undergirding these efforts will be community inventories, asset evaluations, and generate opportunities for participation in the design, as well as continuous assessment of, new services and policies to best respond to the aspirations and needs of those in this smarter community.

Citizens with disabilities also participate in the larger communities in which they reside, work, learn and recreate, so these smarter communities will need to link virtually, as well as physically, with them. Bridging events, issues, services and policies are one component, but so too are shared aspirations and concerns, addressing not only barriers to exclusion, but also common causes and inclusion, while retaining the right to opt for specialized or group-centered actions as needed. Given the broad spectrum of people with disabilities, much as for the general population, the parameters of the smarter community for – and with – people with disabilities will necessarily be flexible and fluid. This reflects the reality that people with disabilities are not a monolithic group, and indeed reflect the underlying diversity (socioeconomic, ethnic, sociocultural, sociopolitical, etc.) of the general population. The essential point is that there will be an increasingly robust and responsive space for people with disabilities to participate as full-fledged community members and citizens of smart cities in this COVID-19 era of pervasive technology.

7. A NEW FRAMEWORK

7.1. Virtual Communities of Practice

Virtual communities of practice (VCoP) provide some guidance as to how to constitute smarter communities. Communities of practice (CoP) are 'social learning systems' built around groups with shared knowledge and interest in a subject for which the CoP is a vehicle for enhancing their skills and knowledge and build reciprocal social exchanges (Ceran & Bahadir, 2019; Cheung, et al., 2013). The virtual environment permits virtual communities of shared priorities, goals and ideas with the potential to traverse geographical, political and psychological boundaries (Jiminez-Zarco, et al., 2014). The interactions that take place virtually in a VCoP enable members to advance their knowledge, grounded in shared investments in a topic, set of problems or concerns (Gould, et al., 2019). The overarching goal is to promote community-driven leadership, member participation, collaboration, networks, problem solving and knowledge sharing to build capacity, that is, activities, resources and infrastructure to bolster individual and collective capabilities (Gould, et al., 2019). There are clear parallels to the mechanisms, purpose and functioning of VCoP and smart cities, with the caveat that VCoP as voluntary associations, place learning and knowledge building at the heart of the shared enterprise.

Smart cities have more functions than VCoP as they also provide access to concrete services, such as transportation, and an assortment of opportunities for social participation beyond knowledge building and sharing, such as e-government. Moreover, smart cities have a greater focus on problem solving and prevention, rather than knowledge capture and transfer, serving diverse populations. For

instance, 'smart prevention' of cancer as an extension of smart cities, with an emphasis on population shifts in behaviors using micro-environmental level data, and monitoring threats, while leveraging 'smart governance' to modify the context of the threat, rather than altering individual behaviors (Wray, et al., 2018). So-called 'smart tools' deployed by public managers for sustainability, to avoid environmental destruction, such as planning tools (e.g., programmed land use) to mitigate the effects of climate change (Karppi & Vakkuri, 2020). Alberto Vanolo has ascribed the net effect of smart systems for governance and design in service of 'smart urbanity' to a 'smart mentality,' with the caution that a techno-centric vision, uncontested, celebratory and uncritical not prevail over genuine consensus and open discourse (Vanolo, 2014; Karppi & Vakkuri, 2020). A concern with developing genuine consensus as to the means and ends of smart cities, rather than to a default technological determinism presents an argument for smarter communities that engage stakeholders in the issues of highest priority to them.

The idea is to apply some lessons from VCoP in the development of smarter communities built on a foundation of shared interests, knowledge and trust to virtual communities of people with disabilities. Active member participation is critical to the development of VCoP and works best when there is a framework into which participants can build their virtual community space (Hamel, et al., 2012). Although participation in VCoP is often voluntary, leading to fluctuating participation that can be problematic, communities by design tend to work poorly (Hamel, et al., 2012), leading to formally constituted CoP with administrators and built-in maintenance resources in an effort to ensure sustainability (i.e., Antonacci, et al., 2017; Cheung, et al., 2013; Jiminez-Zarco, et al., 2014). Greater sustainability of virtual CoP is, however, actually associated with voluntary communities of learning arising from grassroots organizing or emergent community-based leadership (Bradbury & Middlemiss, 2015; Ceran & Bahadir, 2019). By analogy, we propose smarter communities of people with disabilities designed with a strong emphasis on participatory processes for them to be effective and sustainable.

7.2. Universal Design

There are any number of ways of achieving public objectives. Here, we are interested in increasing the inclusivity and facilitating impact of smarter communities. This typically requires a change process which could include (e)planning, policy development, or market mechanisms. Looking specifically at implementation approaches, design thinking can be one that emphasizes inclusive, equitable co-design of a number of key features of the smarter community. Co-design that emphasizes the role of stakeholders most affected by a technology, termed 'participatory design,' is an inclusive approach that facilitates the engagement of people with disabilities in the design process (Trewin, et al., 2019). Accessibility, voice, influence and increased opportunities for participation are key components of realizing an inclusive future for people with disabilities. The concept and practice of participatory universal design (UD) approaches align well with the proposed architecture of smarter communities for people with disabilities. UD, alternatively framed as 'design for all,' is a term that interpreted differently depending on the use context (i.e., product design, rehabilitation, architecture, policy). The core concept is to reduce contextual load and facilitate as many uses of a space (or object, technology, policy, etc.) by as many types of users as possible (Gossett, et al., 2009; Jones, 2014; Lid, 2013). The seven UD principles are equitable, flexible and simple use, perceptible information, error tolerance, low physical effort, adequate size and space (Jones, 2014).

Universal design, as used in this article, incorporates user choice obtained using a participatory design process in which all the community stakeholders - government, citizens and industry - provide design inputs and evaluative feedback on prototypes to achieve more effective options, understanding, and (ideally) a shared vision of the desired community in collaboration (van Waart, et al., 2015). This is consistent with the UD vision of inclusivity, and advances the development and sustainability of a smarter communities by creating broad coalitions of collaborators who engage in a vision and

implementation process, rather than a smaller group of privileged stakeholders that would in any event, be less representative of the wider community.

At its best, UD mitigates ridged ideological and physical boundaries promoting participation beyond the bounds of legal or regulatory requirements of barrier-free or special adaptations, and exceeds the usual scope of accessibility, to encompass all people, regardless of ability status (Gossett, et al., 2009; Jones, 2014). For people with disabilities UD can be a tool to help achieve full citizenship: facilitating 'presence', fostering relationships, promoting dignity, inclusion (Lid, 2016). The end-point is ethical engagement, social inclusion, and spatial participation, aligned with the values and knowledge base of planning philosophy (Lid, 2016). Thus, we argue that, UD is more than simply a design approach, but can inform innovative community decision-making that is integral to the formation and deployment of smarter communities for people with disabilities.

8. CONCLUSION

The current state of social flux, a consequence of the changes wrought by social adjustment to a global pandemic, perversely offers the opportunity to effect transformation that results in more inclusive, rewarding communities. Bringing into conversation, inclusive smart technologies, inclusive design approaches, and innovative community processes can create synergies of community change for people with disabilities. While this can work independently — smarter communities for instance could at minimum be just smart cities, designed and functioning in isolation. Similarly, they are not restricted to a specific physical, or contextual environment, or by political boundaries. The focus of communication and action within the smarter community may be unique to the interests of that community, or it may overlap with larger interests nested in the contextual metropolitan (or organizational) construct. Smarter communities are, ideally, responsive to problems of import to their community members, which may or may not translate into the larger, complex 'wicked' problems.

The relationship of a smart community 'overlay' to associated planning context is critical for leveraging the collective community power (social, economic, or political influence) which will compound the return on the investment for members. Becoming a learning community is a key opportunity for communities, smart or otherwise, and learning (or, if you will - becoming smarter) – is an outcome of sharing experience and perspectives. In the era of COVID-19, which has stimulated so many novel socio-technical responses, reflective data collection as a purposeful tool for adapting to rapid change is key to over-the-horizon planning. The smarter community provides a platform for articulating and advancing the needs and aspirations of people with disabilities.

There are three synergistic outcomes of smarter community sustainability: engagement, evaluation and leadership, which emerge from the underlying inputs - inclusive smart technologies, inclusive design approaches, and innovative community processes noted above. Engagement in enhanced by availability of an accessible ICT environment, involvement in social networks, and an emergent community that has the knowledge and skills collectively to engage on the issues of shared interest. The ecosystem of public, non-profit and private organizations that provide services for people with disabilities can purvey the necessary context, education and training.

Participatory-designed mechanisms that allow members to give and receive evaluative feedback on progress towards common goals provide opportunities for continued engagement, as well as information for making needed changes. Relationship building with the larger city social infrastructure becomes an avenue through which extant feedback mechanisms hosted by the smart city provide access. Hence, the smart community need not replicate the communication infrastructure of an associated smart city, and smart city constituents can avail themselves of the feedback mechanisms already in place. Leadership in the smart community dependent on the stakeholder can range from formal and traditional informal and situational, as determined by the needs of the community. This has the benefit of facilitating adaptive responses to changing circumstances and membership. Leadership emerges organically based on group composition, salient issues, developmental goals, and smart city context

through discourse. Virtual communication modes and social networking can form a key component of that discourse and help foster an emergent sense of community as has begun in the Global South with examples in India and China (Muggah, 2015). Community-based organizations, advocacy groups and other social network 'nodes' can provide some underlying structure and sustainability, while remaining flexible. Smarter community cohesion and identity will likely modify over time in response to changing contexts.

The coevolution of smart communities and smart cities as they strive to meet the changing needs and aspirations of their citizens with disabilities, as well as other communities of interest, will present planners with useful data that can inform new visions of communal life undergirded by ICT and other digital technologies. With its many impacts on social, economic and political life, COVID-19 has the potential to alter communal life significantly in ways that we cannot yet predict. The COVID-19 era turn towards technology as an intermediary in the transformation of social, economic and political life is another change vector that is illustrative rather than prescriptive. Moreover, digital technologies have important ethical consequences as a "…social ordering entity whose detrimental effects (unintended results caused by technological developments) cannot be predicted" (Biachini & Avila, 2014, p.37).

The challenge of COVID-19 for smarter communities from a planning perspective is formidable as it involves integrating what has traditionally been a deliberated, top-down public process with an organic bottom-up digital transformation for citizen participation in a blended approach that gives voice to the marginalized citizens. Policy approaches such as funding for time-limited technology-related demonstration projects, on one hand, and technology-related regulations aimed at protecting the rights of vulnerable populations, on the other, provide guardrails on the pace of change and update the social contract to reflect new realities. The process of planning in the face of digital transformation, can be more facilitative and less directive, but still critical in ensuring that the policy and ethical contexts in which smarter communities evolve support the stakeholder self-determination, transparency in governance, data privacy, and accessible services. It involves working with multiple stakeholders and sectors as a good faith agent promoting a harmonization process that does not squelch marginalized voices, but rather works to reconcile competing views and values without compromising them in the process.

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