

Exploring the Characteristics and Application of Emerging Digital Technologies in Contemporary Ghana's Participatory Spatial Planning

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Abstract: This paper examines the nature and scope of new and evolving digital technologies as they are employed in contemporary spatial planning, focusing on the Ghanaian case and how these technologies facilitate inclusive and participatory planning. It has been seen that those digital technologies, including web-based and mobile-based technologies and apps, have been employed over the years in enhancing planning, that is collaborative and considers the public in spatial planning processes and practices. This has been much present in developed countries, including the UK, and the US, with the use of both computer-based and mobile technology applications for engaging the public in spatial planning. Developing countries, including Ghana, have also joined in the digital move, by employing some of these technology-driven applications and tools for their planning. However, in developing countries, and in this case with reference to Ghana, which is the focus of the paper, planners have mostly relied on geotechnical technologies and apps, such as “ArcGIS”, “Google Maps”, “Quantum GIS”, and “Map Makers” in their spatial planning. These technologies are very good but are seen to be more of SPDSS and less of PP-PSS. Several challenges have tended to affect Ghana’s utilization of new digital technologies, particularly those of the PP-PSS-based in spatial planning. The challenges have included low digital literacy, especially in rural parts of the country, low penetration of internet and web-based technologies across the country, and limited structures for continuously building the capacities of spatial planners. This has to an extent impacted negatively on the employment of such digital technologies in enhancing the maximum participation of the public in spatial planning. Nonetheless, as seen in the paper, Ghana has a high rate of penetration when it comes to mobile-based digital technologies and apps, with high usage among the people. Therefore, the restructuring of the spatial planning approach in Ghana to factor in the use of mobile-related apps and technologies, by districts and their planners would help provide space to have a two-way interaction where planners can interact with the public, in sharing ideas, information, and reporting on problems that people encounter in their communities and beyond.

Keywords: Digital Technology, Inclusion, Participation, Planning, Spatial Planning.

INTRODUCTION

The paper explores the nature and use of new and evolving digital technologies as avenues for enhancing the participation and inclusion of the public in activities of spatial planning in contemporary, Ghana. Over the years, it has been evident across the world and in developing countries in sub-Saharan Africa, including Ghana that the participation and inclusion of key stakeholders as well as the interested public in development programs, such as spatial planning are important for inclusive democratic development (Acheampong, 2019; Anafo, 2019; Asante, 2020; Botsyo et al. 2020; Graham, 2016; Takyi, 2016). Nonetheless, several challenges have tended to hinder the inclusive participation of people and the interested public in participatory planning and processes in Ghana and across the sub-region (Adade and Walter, 2023; Anafo, 2019; Asiana et al. 2017). The challenges have included low digital, internet, and web-based literacy especially in rural communities of the country, and low and unequal digital and internet access, mostly in rural communities, a hierarchical focus of spatial planning on the technocrats and planning officials with less attention for the populace, as well as a limited political will on the part of the national and local level government to adequately engage local people and communities through particularly public participation planning support systems, which mostly use mobile apps and other

digital communication apps in engaging people in the processes and programs of planning in the country (Acheampong, 2019; Anaafo, 2019; Takyi, 2016).

The paper, therefore, sets out to examine the nature and role that digital technologies play in facilitating more participatory and inclusive spatial planning. This looks at both the Spatial Planning and Decision Support Systems (SPDSS), as well as the Public Participation Planning Support Systems (PP-PSS) as technologies that have been used in spatial planning activities in Ghana and across the world. SPDSS mostly involves the use of geotechnical tools including geo-technologies, applications that are GIS-based as well as “Map makers” (Geertman and Stillwell, 2009; Wilson et al. 2017). PP-PSS, on the other hand, entails the use of apps such as “ichangemycity”, “fixmystreet”, and “fixmycity”, which are mostly mobile-based in facilitating collaborative spatial planning (Healey, 2003; Kahila and Kytta, 2009; Wilson et al. 2017). In looking at the two types, namely SPDSS and PP-PSS, it is realized that the former uses more of the technical apps which are expertise-driven, with the latter being more collaborative and people-centered. Hence, the paper examines the nature and roles that the new and evolving technologies are playing in participatory spatial planning and makes substantial attempts towards unpacking the challenges as stated earlier in this introduction. This will help the paper in addressing the problem it identifies regarding the limited use of new technologies in spatial planning in the country, and the factors that have facilitated this. Identifying the challenges to the adequate use of new technologies in spatial planning will further pave the way for solutions for addressing the problem, which will go a long way to serve the purpose of the paper.

METHODOLOGY

The paper employs a review of existing literature as its methodology. Thus, a systematic review of the literature on participatory spatial planning in Ghana and across the world is employed. This examines critically literature on spatial planning and the use of evolving mobile and digital technologies in understanding the nature of spatial planning vis-à-vis the employment of new technologies, with a focus on Ghana. With this, the literature focus is on new digital and evolving technologies in participatory spatial planning in Ghana especially, as well as in Africa and the developed world. This will help in understanding new digital technology use and its role in participatory spatial planning, in Ghana by considering what has also been done and seen in other jurisdictions, especially in the developed world. This will also serve as a path to learning from what has been successful in terms of digital technologies and participatory spatial planning, and how Ghana as a country can learn from employing such technologies in its planning processes and systems.

That is, in reviewing and examining the diverse literature on spatial planning, the contributions, and gaps in the literature are identified with the objective of highlighting ways to fill the literature gap, particularly in enhancing new and evolving technology use in contemporary spatial planning. In doing this, it aims at contributing to the literature on participatory spatial planning in Ghana and developing countries at large, considering the reasons behind the limited use of digital technologies in spatial planning in Ghana, despite the existence of digital technologies and the possibilities that are available for its use (Adjei-Mensah et al. 2017; Anaafo, 2019; Asante, 2021). The paper is significant as it helps in filling the literature gap on the factors that have necessitated the limited use of new technologies in spatial planning in the country, considering the fact that much of the literature has focused on the use of the technologies but not much on the reasons behind its less use.

It further contributes to the literature on spatial planning, by exploring the available digital technologies that are significant for enhancing the participation of the public. The paper is therefore premised on the argument that several digital, mobile, and web technologies and apps are available to enhance the participation of the public in spatial planning, but there is the need for maximum political will, as well as strong concerns by the state in ensuring the penetration and enhancement of digital technologies and literacies, and above all the transparency of governance (Asante-Yeboah et al. 2023; Asibey et al. 2023; Anaafo, 2019; Takyi, 2016).

The paper is structured into ten main parts. Following this introduction, the second part looks at the methodology used for the paper. The third part looks at an overview of spatial planning, with the fourth part conceptualizing spatial planning. The fifth part examines the importance of participatory planning, with the sixth part looking into the development of spatial planning. This considers the transformations that have taken place in spatial planning globally and in the case of Ghana. The seventh part explores the public participation mechanisms that encompass planning in Ghana. The eighth part looks at Ghana's use of new and evolving digital technologies in planning, with the ninth part examining public participation in spatial planning and the use of new technologies. The final part looks at the conclusions and implications of the paper.

OVERVIEW OF SPATIAL PLANNING

Processes of spatial planning have traditionally been shaped by technocratic and top-down approaches (Anaafo and Inkoom, 2016; Asiama et al. 2017; Bolan, 2017). This is mostly framed with more systems that are comprehensive and rational in nature, with large technical know-how, particularly landscape and architectural design (Bolan, 2017; Graham, 2016; Okyere et al. 2019). Nevertheless, it has been seen over the last few decades how sociocultural dynamics have been incorporated as important facets of spatial planning (Akaateba, 2022; Anaafo & Inkoom, 2016). Spatial planners have therefore embraced consolidated approaches and systems with a large-scale comprehension of their practice within vital areas, such as urban sociology, urban economics, and urban geography (Bolan, 2017). Thus, processes of spatial planning have seen a profound broadening of its scope, considering aspects of collaborative, transactive, and deliberative planning (Acheampong, 2019; Friedmann, 1998; Forester, 1999; Healey, 2003). Hence there has been a gradual shift from technocrat-centeredness to embracing more of a process that is democratic and participatory to an extent in advanced and developing countries.

The broadening of spatial planning has been influenced a lot by advances in evolving digital technologies, with its information and communication systems, which have been employed mostly by advanced and some developing countries, in facilitating processes of participatory urban planning (Asante-Yeboah et al. 2023; Graham, 2016). This has seen the use of mobile, web, and other geo-technology planning systems and apps, that are largely referred to as "Planning Support Systems" (PSS) (Geertman and Stillwell, 2009; Healey, 2003). PSS encompasses the employment of geo-technologies as well as tools of information and communication technology for the purposes of planning (Wilson et al. 2017). Two key forms of the PSS as stated earlier in the introduction of the paper, that have been employed over the years have included "Public Participation Planning Support Systems (PP-PSS) and "Spatial Planning and Decision Support Systems" (SPDSS) (Geertman & Stillwell, 2009; Healey, 2003).

In the last few years, the employment of mobile-enhanced applications, geotechnical technologies, and computer-led systems, in aiding the visualization of spatial planning and its data use has seen much development (Adjei-Mensah et al. 2017; Bolan, 2017). This has been seen in the development and use of interactive services on the web, as well as grid technologies, and the evolution of map technologies, such as "Google Maps" and "Earth Maps" (Anaafo, 2019; Botsyo et al. 2020; Takyi, 2016; Tseklevs et al. 2022). Much transformation and growth have been witnessed in the development of these technologies since their inception and are thus seen as contributing significantly to the development and spatial planning at large. The application of these new technologies has become a significant part of numerous areas within planning, including environmental planning, health services planning, as well as collaborative planning projects across local and global spheres (Acheampong, 2019, p. 12; Graham, 2016; Kahila and Kytta, 2009). This has helped much in the work and applications within the development of smart health systems, smart water, smart energy systems, smart security systems as well as the broader facet of smart mobility systems within and across national borders (Anaafo, 2019; Graham, 2016).

The movement towards digital and technology-driven spatial planning has seen widespread acceptance across the world, with both developed and developing countries, taking advantage of its application in all aspects of planning and development (Darkwa, 2023). Across the world, the new technologies within the

PP-PSS that have been employed by countries, have included the “ichangemycity”, “fixmycity”, “fixmystreet”, etc. (Anafo, 2019; Bolan, 2017; Wilson et al. 2017). This to an extent has given room for people and the state to interact in a more progressive way when dealing with spatial planning. Hence, it has facilitated the development and creation of towns and cities that are more sustainable and good for people to live in and work in (Bolan, 2017; Graham, 2016). The systems provided by these technologies have thus come with the benefits of making spaces for more transparency (Darkwa, 2023), regarding planning and making spatial planning more participatory for people, communities, and at the national level. Notwithstanding the widespread acceptance of the PP-PSS technologies and their applications within spatial planning, in many developing economies, including sub-Saharan African countries, such as Ghana their utilization is still limited with minimal use of the system that is available in the technologies (Anafo, 2019; Bolan, 2017). In many of the developing countries in sub-Saharan Africa where the PP-PSS are employed, they have focused mostly on the traditional one-directional way of providing information (Acheampong, 2019, p. 12; Graham, 2016; Wilson et al. 2017). This does not allow for effectively utilizing the available technologies and hence continues to affect the effective and transformative spatial planning in those areas.

With regards to Ghana, which is the focus of this paper, and other countries in the sub-region, spatial planning has been less of the PP-PSS (Anafo, 2019; Takyi, 2016). In areas where PP-PSS is employed in Ghana, there is the continued use of traditional approaches, which is mostly seen as a single pattern to the provision of information and spatial planning, with little consideration for digital technologies (Takyi, 2016; Wilson et al. 2017). Ghana’s systems of spatial and urban planning turn out to be more of the systems of the SPSS, such as “map makers”, and applications that are GIS-based, with limited attention to the PP-PSS (Anafo, 2019). Thus, public engagement and participation in spatial planning in Ghana have given less attention to technologies that encourage participatory planning, which leads to the non-inclusion of most part of the public (Anafo, 2019). Therefore, with the view that digital technologies have the potential to enhance spatial planning understanding, and create wider spaces for participation, the paper aims at exploring the reasons behind the limited use of digital technologies, particularly PP-PSS in activities of spatial planning in Ghana and further identify digital technologies that are appropriate for enhancing deliberative and collaborative spatial planning.

CONCEPTUALIZING SPATIAL PLANNING

Spatial planning encompasses the approach and system of development that creates a clear coordination for effective focus toward territorial impacts that cut across administrative as well as boundaries of geography (Acheampong, 2019, p. 13; Baker, 2014). It, therefore, entails numerous terms within planning, including urban planning, land-use planning, physical planning, regional planning, and the larger level of country planning (Baker, 2014). This description often captures the dimensions of interventions within public policy which is factored within the systems and processes of land-use regulations as well as ordering in a more effective, and sustainable way with the public good as its main underpinning.

Considering the broad nature of spatial planning and its inclusion of systems and processes of regulation as well as ordering within land-use, physical, and environmental development (Acheampong, 2019, p. 13), it can be seen as a broad concept entailing many aspects that encompasses the various facets within dimensions and consequences that come in the diverse sphere of environmental, land-use, the economic, political, and the social frames and dynamics of the varying spatial sites. According to Cullingworth and Nadin (2006), “the principle of spatial planning is meant to crest a system of coordination that paves the way for effective territorial coordination that is horizontal in nature within the different sectors of the society at both the geographical and administrative scales of development”. That is, spatial planning with its role of effectively laying out the structures and systems of physical, land-use planning and territorial make-up of town, city, and rural landscapes with its horizontal dynamics, is meant to be bottom-up, employing a participatory approach (Anafo, 2019; Asante-Yeboah et al. 2023; Takyi, 2016). This

participatory approach is premised on the motive to make space for fruitful and more enabling interactions between spatial planners and the larger public, with regard, to information sharing, addressing land use, planning, and structural challenges the people may have. Therefore, participatory spatial planning engages in an interactive and collaborative approach to planning that takes into consideration not just the planners and administrators at the top hierarchy, but the views, ideas, questions, and concerns of the public in planning (Adjei-Mensah et al. 2017; Asante, 2020; Okyere et al. 2019).

This also brings attention to inclusive communication and participatory planning as identified by Pfeffer et al. (2013). Pfeffer et al. (2013) have noted that the many varying forms of spatial knowledge are very strategic resources of inclusive planning that encompass the level of the sectoral, tacit, experts as well as the community, and its people, and as such engaging people through digital tools of communication create an inclusive space for ensuring the spatial knowledge of different groups and individuals. This paves the way for opening avenues for engaging varying knowledge when it comes to planning and factoring in the many concerns and ideas of different people and communities. Through this, local knowledge of people and ideas is incorporated into the planning process through a communication process that is inclusive and engaging for the people and not just driven by some sort of expert and technocratic knowledge. Mehmood and Imram (2021) make a similar argument by pointing out that engagement in inclusive communication comes as a key strength in ensuring participatory and democratic planning and as such the employment of new digital social innovations as inclusive instruments of communication help in building strong space- where the variety of people, groups, and communities can actively engage and participate democratically in pushing for the success of planning. Thus, it is evident that communication, and in this case inclusive communication, which can be facilitated through many participatory means (Darkwa and Acquah, 2022; Darkwa, 2023), including digital and web-based spaces and technologies in shaping democratic and people-centered planning systems for communities and the larger national landscape is very important for planning.

This comes in line with Afzalan and Muller (2018) argument that engaging in communicative practices that see to the inclusion and voices of all through new digital, internet technologies, and online participatory technologies provides a more diversified space where many different individuals and groups can interact and share ideas, concerns, and decisions on planning processes. That is, through this inclusive communicative and space-building process, many citizens are attracted to the process of spatial planning and are provided with the room to build through interactions and consensus that is significant for engaging in communication that brings people together and builds local knowledge. It further gives the opportunity for embracing diverse ideas, decisions, and opinions from different people and the space to make available multiple levels of information for people when it comes to spatial planning.

Similarly, Acheampong (2019, p. 12) has noted that the aims and roles of spatial planning within a country are to create the space for coordinating and planning structures, processes, and manifestations that runs within the physical, land-use, and broader environmental and human settlements at different sectoral policies in ensuring that there is equity for development outcomes and approaches for different places and settlements. This provides the needed room for addressing tensions and challenges that may characterize the social, economic, and physical development of different places and settlements- and thus pave the way for equality for different people and groups. Hence, spatial planning entails extensive impact with reference to the functional organization within land use, physical layouts, and the potential layout of cities, towns, and villages and the ultimate and equal distribution of a population in the social, economic, and political sphere (Acheampong, 2019, p.12). Through this, inclusive communicative spaces are provided for the citizenry both young and old, in interacting, sharing, questioning, and taking an active part in spatial planning processes and decisions. This brings attention to the imperativeness to employ an inclusive communicative approach towards spatial planning at local and national levels.

With the goals of creating cities, towns, and locations that are sustainable and enabling for human living and survival activities, including work and other socio-economic activities therefore, spatial planning

emerged (Baker, 2014; Bafarasat et al. 2022). Through this, various meanings and terminologies that are captured within spatial planning – including physical planning, town planning, land use, etc., are underpinned with the motive of planning, structuring, controlling, managing, and monitoring, the location of spaces of housing, industry, agriculture, and education to promote a sort of harmony and development among people and places, but there is also the significant view of creating the linkages that come within the different structures and aspects of spatial planning and people (Acheampong, 2019, p. 13-14). It also acts towards shaping and transforming the geographical and administrative allocation of people and places. Therefore, spatial planning as a public-centered activity (Acheampong, 2019, p. 13), should be shaped as a system that lays its design origins, architectural structures, and evolving principles, such as the technologies of planning, the effectiveness, efficiency, harmony, and the aesthetics of the development that encompasses it to be inclusive and participatory towards the development and growth of towns, cities, people, and places as a whole.

THE IMPORTANCE OF PARTICIPATORY PLANNING

Participatory planning, as stated earlier in the introduction of the paper, comes as very important in ensuring the collective development of communities and their people, both at the local and national levels. An important aspect of participatory planning that ensures that the voices of people are heard and factored in spatial planning decisions and processes are communication. As noted by Pfeffer et al. (2013) inclusive communication plays a significant role in planning, allowing for the concerns and knowledge of the masses to be incorporated in the larger planning decision and processes. This provides the spaces for including the very people and communities who are in one way or the other affected by planning programs, which facilitates inclusiveness as well as a solid sustainable living, especially for the vulnerable who reside in deprived local communities and neighborhoods (Keeton and Nijhuis, 2019; Todes, 2011). That is the engagement in inclusive communication processes that aims at involving the very people who are affected by planning decisions, especially the poor, and disadvantaged groups in society help to draw closer to these groups in identifying and understanding their challenges with spatial planning systems – in areas of market infrastructures and access, transportation systems, structures, and access, as well as educational access in communities for the less-privileged.

Furthermore, the communication dimension of planning provides room for an inclusive dimension of planning which helps in attending to the very needs of most disadvantaged and less-privileged people in society (Valencia et al. 2019). In engaging with the people through varying channels of communication and platforms in the course planning the everyday spatial structural challenges of people and communities can be brought out and addressed in the planning decisions and processes. This goes a long way to diversify the scope of planning, making it inclusive and above all incorporating the economic, political, social, and cultural needs of the local people into the planning process (Keeton and Nijhuis, 2019; Todes, 2011; Vajjhala and Walker, 2010). This ensures that development is made more democratic and sustainable, not just for the privileged and powerful ones in society but for the larger population. It also comes in line with the United Nations Sustainable Development Goals (SDGs), especially goal number ten which sees the promotion of inclusive development and spaces through the engagement of all people in a country, and the mobilization of resources together with people and the actors involved (Keeton and Nijhuis, 2019; Valencia et al. 2019). This is significant in enhancing a more connected form of grassroots and national development that facilitates a development that is holistic encompassing all aspects of the economic, political, social, cultural, and environmental.

It also draws attention to Setha Low's book "spatializing culture: the ethnography of space and place", where she points out spatializing cultures as not just a framework for understanding spatial dynamics but as a significant avenue for unraveling the exclusionary elements as well as social, political, economic, and cultural injustices that characterize the systems and structures of spatial planning (Low, 2017, p. 7). Thus, low makes a significant step at bringing us close to the significance of public engagement within processes and systems of spatial planning- as this provides the opportunity for local people and

communities to participate in planning and develop a critical understanding of the places where they encounter their everyday activities, including working, living, socializing, and the like (Low, 2017, p. 7). This is in line with Keeton and Nijhuis's (2019) argument that the engagement of people in planning processes creates room for people to substantially understand and contribute their ideas and knowledge to the planning activities and processes, ensuring their inclusion and meeting their needs in the larger planning structure. Hence, the spatial analysis offered in Low's books offers important insights into the need for the inclusion of locals and their communities in planning activities and decisions, through which people are offered the space to engage with planning officials and authorities in ensuring a collaborative and participatory planning process which is people-centered and not just based on some technocratic and top-down approach to processes of design and decision making (Low, 2017).

Participatory spatial planning, which engages the people through interactions and communication structures, considering the language, cultures, and practices of the local people, therefore ensuring that the key concerns, ideas, cultures, voices, and challenges of the people are included and given salient attention in the planning process. This comes in line with an article published on September 14, 2020, on the topic "urban planning needs to look back: three cities in Ghana show why", which points to the fact that considering how the processes and structures of planning in sub-Saharan African countries, including Ghana have been underpinned by colonial undertones and systems of planning, it becomes important to first and foremost consider the voices, ideas, knowledge, and cultures of the very local people who are affected by the activities of the planning process (The Conversation, September 14, 2020). It will allow for considering and engaging through communication the concerns and specific voices of the socio-cultural structures that underpin such communities in question, in ensuring a planning approach that is people-centered and takes a key focus on the knowledge base and concerns of the locals.

In addition, public participation in spatial planning activities is seen to provide avenues for local people to take an active part even in the decisions and concerns for the design and planning of public infrastructure for development. With this, Low (2017, p.7) has noted that people are able to through their engagement and participation in spatial processes oppose, question, and resist even the very architectures, structures, and designs of spatial planning, which could stand to deteriorate the socio-cultural lives of the people and their communal progress in society. Similarly, Tseklevs et al. (2022) have argued that providing spaces for people to be part of the planning process through systems communication allows the people to engage in and challenges planning processes that could destroy the socio-physical and cultural development and landscape. This helps in ensuring that the planning process is made effective in a way that focuses on the interests and needs of the very people that the planning is meant for. Thus, people's engagement in the planning process gives room for locals to share their ideas and concerns when it comes to ensuring and participating in meaningful planning activities and decisions that may stand to facilitate the people's inclusion in the creation of sustainable built environments. It is therefore evident that the structures of spatial planning with its dislocating features could go a long way to impact negatively people's livelihoods in communities and beyond, as such as noted earlier on, the continuous engagement of people in planning processes, especially those that directly or indirectly concerns and affect the people in a community or geographical landscape will provide a solid ground where individuals and groups can share through means of communication, pointing out their ideas, concerns, knowledge, suggestions, and contributing towards the entire planning process (Low, 2011). This will ensure that the people bear some sort of ownership, interests, and inclusion in the process and systems of planning in a more engaging and effective way.

Also, considering the ways in which circulation, as well as mobility, comes to underpin the embodied subject matter within place-making, it is imperative to see the inclusion and participation of people in spatial planning processes and activities (Low, 2017). The rhythms within the movements of people, therefore, play a key role in how we perceive and experience place-making (Low, 2011), as such in approaching spatial planning to ensure a sense of belongingness for people and the participation of local people and their connections to places, it is important to take into account the uses and experiences that

people may have with places (Vajjhala and Walker, 2010; Wilson et al. 2017). This could be approached in a way that embraces people through communication, giving room for the experiences, knowledge, and uses of the people to space and place-making at large. Through this, the experiences, culture, needs, and knowledge of the people are factored into all facets and processes of planning over time and space. It further brings attention to an earlier point made in the introduction of the paper that promoting participatory spatial planning that engages local people, their experiences, and knowledge paves incorporating the diverse experiences, cultures, knowledge, and concerns of communities and people into projects and programs on spatial planning.

Furthermore, considering the fact that conceptualizing within space entails a concern for language, it is necessary to draw attention to the essential role played by discursive as well as the linguistic foci that is present within the social constructivist character of spatial planning and its analysis across time and space (Low, 2017). This creates a critical understanding of the discursive dynamics of language and perspective structures within spatial planning and analysis, and how this helps in the production of space. It also brings in the relations within the embedded scope of emotions and affectivities that may characterize the inventories and structures of space-making and its influence in the effect that is spatially realized in the social construction of spaces, giving room for considering the relations that manifest in the significant relations between spaces and the very participants who occupy and share such space (Anafo and Inkoom, 2016; Asante-Yeboah et al. 2023; Asiama et al. 2017; Low, 2017). From this, it is seen that engaging people through language and a communicative structure that allows for sharing experiences and knowledge on space making and the broader umbrella of spatial planning and analysis allow for facilitating an inclusive and people-centered narrative within participatory planning. This gives room for considering the language, emotions, effects, and relations of people to the places they inhabit in making meaningful planning processes and systems in the interest and concerns of the people.

THE GLOBAL DEVELOPMENT OF SPATIAL PLANNING

Spatial planning globally has significantly changed drastically over the years (Acheampong, 2019; Bolan, 2017; Reed et al. 2021). Dating back to the early 1960s and beyond, spatial planning was structured in a more top-down approach with a centralized and technocrat-centered perspective (Graham, 2016; Sager, 2012). The perspective on spatial planning was largely criticized by scholars for its lack of concern for the social, cultural, and economic facets of planning (Graham, 2017; Sager, 2012). Its concentration was thus focused on the technical know-how of the experts who undertake the processes of spatial planning, with less attention to public participation. Hence, complexities within planning were ignored and rather an attention was placed on technical aspects of rural and urban planning (Murray, 2010; Sager, 2012). That is, less attention was given to the social constructivist aspect of spatial planning, which focuses on the emotional as well as symbolic, affective, and cultural dynamics of place-making (Low, 2017). The cultural, affective, and emotional characteristics of people were therefore given limited room to maneuver while planning and processes that followed it.

The perspective of procedural planning gradually came to take over the traditional centralized framework of spatial planning, as an appropriate form of planning (Anafo, 2019; Graham, 2016). The perspective of procedural planning encompasses systems of planning which are related to clear and regular consent for setting planning objectives, building up effective implementation, and an emphasis on regular monitoring (Graham, 2016; Murray, 2010; Sager, 2012). Notwithstanding the embracement of the procedural perspective and its widespread acceptance as a salient approach, it lost its interest by the larger global public due to its breakdown into many different forms (Graham, 2016; Sager, 2012). An aspect of this that welcomed much attention in the public sphere was the approach of bottom-up planning. This came with a social reformist view of planning (Anafo, 2019).

The approach of bottom-up planning thus comes with an inclusive communication facet that tends to bring planners, the public, beneficiaries, as well as non-beneficiaries together in a process of spatial planning (Graham, 2016; Murray, 2010, p. 6-7). This has come to encompass new and digital technologies

that have shaped spatial planning over the years (Graham, 2016). Digital technologies have over the years seen an acceptance globally with their potential to enhance participatory planning, despite their limited use in some developing parts of the world, including Ghana (Anafo, 2019; Takyi, 2016). Thus, despite the significance of digital technologies in creating and enabling an environment for participatory planning, its application is still lacking in Ghana, and as such, the paper would help in understanding the limited use of the approach despite its availability.

In the case of Ghana, spatial planning over the last two decades has seen much transformation and development (Anafo, 2019; Takyi, 2019). Ghana's physical planning structure dates to the "1945 Cap 84" when the country had the "Town and Country Planning Ordinance" (Anafo, 2019). This was captured under "Cap 84 of the physical planning system" (Alhassan, 2011; Ayee, 2008). Within the "Cap 84 of the physical planning system" in Ghana, a centralized structure of planning was used- with members of the planning committee encompassing government ministries, agencies, departments, and representatives from the national level government apparatus (Takyi, 2016). In terms of how "Cap 84" operated in planning, the emphasis was mostly placed on the traditional aspects of planning (Anafo and Inkoom, 2016; Takyi, 2016). This entailed the use of spatial ordering systems to physically lay out villages, cities, and towns in the country. It also operated through the layout and ordering of human settlements and the efficient use and management of land resources (Anafo, 2019; Anafo and Inkoom, 2016).

The spatial planning structure of Ghana continued to feature a form of a centralized system, which was characterized by a top-down approach in its urban planning (Anafo, 2019; Takyi, 2016). It was not until the 1990s, with the country's return to a liberal democratic government that elements of a bottom-up approach started to show in the physical planning structure of the country (Anafo and Inkoom, 2016; Ayee, 2008). In the year 1993, "Act 462", which captured the "Local Government Act 1993", was established, and gradually paved the way for the form of a decentralized system, and more openings within the country's physical planning structure. "Act 936", which was also captured in the "Local Governance Act of 2016" was the next Act that followed the "1993 Local Government Act" (Anafo and Inkoom, 2016; Government of Ghana, 2016). The development of the Act provided for the delegation of decentralized authority to the local authorities- including the Metropolitan, Municipal, and District Assemblies (MMDAs) to see to the planning and management of towns, cities, and villages in their jurisdiction (Anafo, 2019; Government of Ghana, 2016). Therefore, the planning and development of the local areas regarding the District, Municipal, and Metropolitan Assemblies were placed under the power of the assemblies, with the authority to ensure the economic, political, social, and cultural growth of the areas.

Ghana's system of decentralization comes with a three-tier structure (Anafo, 2019; Alhassan, 2011). This encompasses a structure of hierarchical framework that entails the central government, as well as the regional, and local planning levels (Ayee, 2008; Takyi, 2016). With regards to local planning, authority is given to the MMDAs with the power to initiate, plan, and implement programs and systems that see to the development and sustainability of local units, including towns and villages that come under them (Alhassan, 2011; Takyi, 2016). Within this, the planning in the local areas is meant to be democratic and participatory with the use of different platforms and spaces, including media outlets to bring together major stakeholders and people towards participating in the planning and processes of governance and development (Anafo, 2019). Through this, the 1992 Constitution of the country, as well as other provisions and Acts, including the National Development Planning Commission (NDPC) "Act 1993- Act 479", and others such as the "Local Governance Act 2016- Act 936", states clearly the need for public planning to be inclusive and take a participatory framework (Anafo and Inkoom, 2016; Takyi, 2016). In doing this, the people, together with the local and national authorities can interact and share ideas on shaping the effective planning and development of cities and towns within the local areas.

From this, it is seen that the decentralized structure of Ghana takes a comprehensive system that takes as a major condition the relevance of participation and inclusion of local and the public in all aspects of decision-making and planning. This includes decisions and procedures involving the planning and

development of policies, programs, and projects at the local and national levels. Also, significant is the provision of space for the public and major stakeholders to come together and interact in a progressive way in enhancing inclusive and participatory spatial planning with benefits for the entire population and not just for a few privileged ones (Acheampong, 2019, p. 13). Hence, the decentralized structure is meant to significantly encompass critical elements within a communicative, deliberative, and inclusive system of planning and doing together with people, stakeholders, and the government.

Nonetheless, little is done by the MMDAs on encouraging and enhancing the participation of the public in decision-making that concerns urban and rural planning of the local areas (Anafo and Inkoom, 2016). That is, the participation of the public continues to be low, with much attention on the experts and technocrats, and little attention placed on the public's engagement and participation (Anafo, 2019; Aryee, 2008; Takyi, 2016). Hence, the objective of the paper is to examine the nature of new technologies and applications within spatial planning- these technologies, including PP-PSS would help enhance the participation of the larger public in planning and will be significant for facilitating participatory and inclusive planning in the country. In the next part of the paper, I examine the public participation mechanisms within planning in Ghana.

PUBLIC PARTICIPATION MECHANISM WITHIN PLANNING IN GHANA

Decisions and approaches toward the management and use of land in the process of spatial planning are very significant for any country. In Ghana, the rapid growth of the population has to a large extent made it important for efficient measures that are necessary for enhancing effective spatial planning and development (Anafo, 2019; Aryee, 2008). Contemporary democratic governance and practice make it clear that the planning of towns, cities, and villages should be made inclusive and participatory for the public to take part in processes and decisions on spatial planning (Aheto et al. 2016; Alhassan, 2011; Asiama et al. 2017). This is meant to allow for more ownership and a sense of feeling part of the development and the physical planning. Unfortunately, in Ghana, the spatial planning process despite the numerous constitutional provisions and Acts, that have been made on the need for decentralization, participation, and inclusiveness of the people, has to an extent remained more of the top-down approach (Anafo, 2019; Takyi, 2016). With this, decisions are mostly taken at the top hierarchy with limited space for the public to take part in the processes that come with spatial planning (Adjei-Mensah et al. 2017; Asante, 2020). The process of the land tenure systems and the entire structure of planning have mainly remained in the hands of the experts and technocrats alongside the hierarchies at the top of the administration, with mostly less engagement and participation on the part of the populace (Takyi, 2016).

However, under the constitutional provisions of Ghana, the participation of the public in the planning of urban and rural areas is stated as legal and made very explicit (Anafo, 2019; Gaisie and Cobbinah, 2023). Specifically, in the "National Development Planning Act 480, 1994", it is stated that MMDAs should make it a point to include the local people in the initiation, planning, and implementation of local structures and physical development in their areas of jurisdiction (Anafo, 2019). That is, through the provisions of the constitution, the MMDAs under the designated planning authority are to factor in discussions and hearings from the public and make all efforts to take into consideration the ideas, views, and suggestions of the people in all stages and processes of their planning (Acheampong, 2019, p. 13). This is intended to ensure continuous participation and inclusion of the public in planning activities and programs and ensure the ownership of the public in planning structures and systems.

Within Ghana's spatial planning system of rural and urban areas, the guidelines of the planning process are outlined by the NDPC under "Act 480" of Section 3 (Anafo, 2019). Under this, all planning by the assemblies is to follow the procedures and guidelines provided by the NDPC (Anafo, 2019; Gaisie and Cobbinah, 2023). The approach of planning here is to be participatory- to include the public in all physical discussions and processes. Most of the planning has mainly been underpinned by the traditional processes of planning. Nonetheless, in recent times, there has been a gradual shift to new technologies of planning

which have come with a participatory nature to embrace the views and concerns of the public (Asiama et al. 2017; Botsyo et al. 2020).

In terms of processes of spatial planning within MMDAs in the country, the traditional authorities and chiefs mostly initiate the proposals (Anafo and Inkoom, 2016; Asante-Yeboah et al. 2023; Adade and Walter, 2023). In some cases, the “Public Planning Department” (PPD) also initiates proposals for physical planning in the assemblies (Anafo and Inkoom, 2016). In the case where the planning is initiated by the traditional authorities and chiefs, it gradually goes through a process of review by the PDD (Alhassan, 2011; Ayee, 2008). The proposal may be on how an area of land is demarcated and used for the purposes of spatial planning and development. Upon approval of the proposal that is initiated, the PPD works together with the “Survey and Mapping Division” in executing the process and practices of the planning (Takyi, 2016). With the completion of the planning, the plan is officially put before the “Statutory Planning Committee” (SPC) that sees to the regulation of all spatial planning and its review within all the MMDAs (Aheto et al. 2016; Anafo et al. 2019; Moomen et al. 2016).

After the acceptance by the SPC, the plan is presented to the local-level legislature, which is at the local governance structure within the MMDAs (Anafo, 2019). In terms of participation in planning, the elected representatives of the people who form the general assembly, as well as some officials who are appointed by the government are included in the planning process (Alhassan, 2011; Takyi, 2016). The unfortunate thing is that these people are merely included mostly after a larger part of initiation and processing (Anafo and Inkoom, 2016; Takyi, 2016). Therefore, many of these people are not heard during the planning process, which makes their participation very limited (Akaateba, 2022; Anafo and Inkoom, 2016; Adolf et al. 2023).

Another aspect of participation in the process of planning has to do with the use of different kinds of durbars, including forums with traditional leaders, community groups, neighborhood committees, and interest groups (Botsyo et al. 2020; Takyi, 2016). It also involves the use of community panel discussions, workshops, and meetings with civil society, consultants, as well as youth groups (Anafo, 2019; Ayee, 2008). Through this, some sort of engagements and discussions take place between these groups of interested public and the SPC concerning the spatial planning process and its practices. Within this, discussions and further detailing are made towards the gradual layout of marking of the residential, educational, commercial, as well as industrial, and health purposes (Armah et al. 2014; Asante, 2020; Moomen et al. 2016).

It is without a doubt that, the participatory aspect of spatial planning through the inclusion of traditional authorities and other interested public, including community associations, committees, and youth groups is not that engaging, as the focus is not placed much on the inputs of these groups. Thus, the participatory planning feature within the assemblies is reduced to a mere representation of the communities and traditional leaders in the process, with less attention given to their efforts and decisions in the process itself (Asante, 2020; Takyi, 2016). As a result, the process is not completely transparent and as such does not follow strictly the provisions of the NDPC under “Act 480”, which states that the planning process should be completely participatory from the start to the end, entailing the initiation to the final implementation of the plan (Anafo, 2019; Alhassan, 2011; Takyi, 2016).

Despite the challenges with participation within the spatial planning process in the country, there have been efforts by the assemblies towards strengthening public participation at the local and national levels (Adade and Walter, 2023; Anafo and Inkoom, 2016; Asante-Yeboah et al. 2023). This has mostly been done through employing the needs assessment of communities and utilizing new digital technologies in enhancing planning (Anafo, 2019). The use of these approaches has mainly evolved with the view of increasing and enhancing the participation of the public in the planning process. With this, efforts have been made by the MMDAs in making available their spatial layouts, spatial plans, and processes online and on the inclusive website to encourage easy access by the public and their engagement with the planning process (Anafo, 2019; Botsyo et al. 2020). Therefore, putting in place drastic and innovative systems and policies- and the application of new digital technologies in planning will be essential for

increasing and enhancing inclusive and widespread public participation at the local and national levels. The next part of the paper explores Ghana's use of new technologies in spatial planning.

GHANA'S USE OF NEW AND EVOLVING TECHNOLOGIES IN PLANNING

Over the last decade, the use of new and evolving digital technologies and tools has been present in spatial planning in Ghana (Asante-Yeboah et al. 2023; Botsyo et al. 2020). More of these technologies are mostly seen with the use of the SPDSS, with little use of the PP-PSS (Anafo, 2019; Takyi, 2016). Many of the technologies used have included "Quantum GIS," "ArcGIS," "Map Makers", and "Auto Photos" (Botsyo et al. 2020). Other technologies that are used include the "GPS" used by the Ghana Post, as well as the "Auto CAD systems" (Anafo, 2019; Gaisie and Cobbinah, 2023). From this, it is evident that there exists mostly the use of SPDSS technologies in spatial planning in the country. Most planners who are engaged in planning rural and urban areas in the country in many cases use the SPDSS technologies, with some variance in their use regarding the different planning officers and technocrats involved (Anafo, 2019). The difference in the planning technologies and systems among the different planners within the regional and district levels have been due to numerous reasons including, the different levels of education, the availability, and existence of the technologies in different parts, and regions of the country, as well as the programs and practices of training and skills development within regions and districts (Adolf et al. 2023; Anafo and Inkoom, 2016). Ensuring a system of standardized training, and education within the field of planning for the technocrats and planners would be important for improving the skill level of the planners in executing vital practices and plans in their work.

With the planning processes that are carried out in Ghana, different digital technologies and tools are employed within varying areas of the planning system. This is largely used in the creation of key areas including the marking of thematic maps, in explaining the development schemes and proposals (Anafo, 2019; Botsyo et al. 2020). It comes at the time of making plans for medium-term development frameworks (Takyi, 2016). Additionally, digital technologies are utilized by planners in the analysis of patterns of growth, aspects of digitalization, analysis of land suitability, modeling of projects, and geo-referencing systems (Botsyo et al. 2020). The technologies play a significant role in helping the planners regarding processes of decision-making, especially in bringing out alternatives and the employment of appropriate mechanisms of implementation within spatial planning. It, therefore, helps a lot in vital areas including the assessment of strategic environmental plans and impact assessments within the environment (Anafo, 2019; Asante-Yeboah et al. 2023; Botsyo et al. 2020). Here, it is evident that different technologies, which are mostly SPDSS related, are used in most parts of spatial planning in the country. Furthermore, the spatial planning system in Ghana has also encompassed digital technologies that have to do with the internet and web-based applications (Adade and Walter, 2023; Anafo, 2019). This has included the social media platforms, such as Facebook, and web pages of the MMDAs, as well as the contact emails and sites of the concerned officials and planning officers (Asiama et al. 2017; Akaateba, 2023). Notwithstanding the availabilities of these digital spaces, web-related platforms, social media pages of the assemblies, and their official planning representatives, its utilization by the assemblies and planners in interacting and providing information for the public is limited (Anafo, 2019; Takyi, 2016). In most instances, the emails are used with minimal utilization of all other sites and platforms (Anafo, 2019; Asante-Yeboah et al. 2023; Botsyo et al. 2020). That is, many of the assemblies run functional sites and platforms, as well as social media pages but are used minimally as a space for linking with the public, engaging in planning processes, and sharing information with them.

This brings attention to the point that there is the availability of new technologies for planning in the country, but the assemblies and planning officials have used less of them in engaging the public. This to an extent has affected inclusive and participatory planning within the assemblies and beyond. It is, therefore, essential for the assemblies and planning officials, together with technology experts and teams to make use of digital technologies, including the configuration of Google+ and other social platforms, such as Facebook pages that creates spaces for engaging and collaborating with the public on

participatory planning processes and decisions (Adade and de Vries, 2023; Anafo, 2019; Botsyo et al. 2020).

In addition, the existence of the public complaints systems which comes as a mechanism within the PP-PSS is another significant aspect of the new technologies that are utilized within participatory spatial planning in Ghana (Anafo, 2019; Assibey et al. 2023). This system exists as a legal structure that has been implemented by the assemblies through the “Local Governance Act 2016” (Anafo, 2019; Takyi, 2016). It has the aim of providing a space for the public to voice out through its platforms any concerns they may have about decisions and processes of spatial planning. This as a matter of fact is supervised by the “Public Relations and Complaints Committee” (PRCC) of the various assemblies (Anafo, 2019; Asante-Yeboah et al. 2023). It is led by the presiding members of the assemblies together with selected members of the general assembly, within the large assembly (Adolf et al. 2023; Gaisie and Cobbinah, 2023; Takyi, 2016). The challenge that is seen here is that there is limited use and monitoring of the public complaints system by the assemblies, which to an extent limits the participation of the public in planning (Adjei-Mensah et al. 2017; Anafo, 2019). The complaints and concerns raised by the public through the public complaints system are in most cases reviewed on a quarterly basis by the committee concerned, and planning officers (Anafo and Inkoom, 2016; Takyi, 2016). Nonetheless, the massive bureaucratic and manual process that characterizes the process limits and delays participation in public planning. Considering this, the use of new digital technologies that enhance participation will be essential for increasing the participation of the public.

The challenges to the limited use of digital technologies in enhancing participatory spatial planning by the public in the country have been partly due to the low technology literacy and penetration among members of the assemblies, particularly in the rural areas of the country (Adade and de Vries, 2023; Anafo, 2019; Asante-Yeboah et al. 2023; Botsyo, et al. 2020). Nonetheless, the use of the internet and mobile telephony usage among the people is largely seen in both urban and rural areas of the country (Adade and Walter, 2023; Anafo, 2019; Takyi, 2016). The low literacy and penetration are largely seen with web-based systems and not with the internet and mobile usage (Asante, 2020). It is important to note that the low literacy and penetration of digital technologies across the country to an extent hinders the use of new technologies in ensuring the large-scale participation of the public in planning processes. The National Communication Authority (2018) has noted that mobile digital technology use and penetration in Ghana is very high around 80.33 percent. This is very high when compared to web application penetration and use in the country. Therefore, employing digital technologies that encompass the digital-based technologies that are used with mobile phones and their application would be much more relevant for promoting the inclusion and participation of the public adequately in spatial planning. This comes in line with Anafo (2019), that employing appropriate technologies, and in this case with regards to mobile digital technologies and their applications within spatial planning would be very essential for creating spaces for the public to take an active and inclusive part in planning. That is, the high rate and usage of mobile-based digital applications and technologies would provide the necessary platforms for bringing the populace closer to engaging in spatial processes and their outcomes. In the next part of the paper, I examine public participation in spatial planning and the use of new and digital technologies in Ghana.

PUBLIC PARTICIPATION IN SPATIAL PLANNING AND THE USE OF NEW TECHNOLOGIES

The utilization of new and evolving digital technologies, including mobile applications and web-based systems is very important for spatial planners, in adequately getting close to the public and having the benefits of a vivid understanding of the various challenges of the people- when dealing with urban and rural planning processes and practices. This will be faster and less costly compared to employing and relying on more costly practices, such as the needs assessments and field collection of data, considering

the current nature of the mobile and internet-based digital applications and their high rates and penetration amongst the Ghanaian populace (Akaateba, 2022; Botsyo et al. 2020). It will further be essential for major aspects of the PP-PSS, such as creating a system of building consensus with the public (Asante-Yeboah et al. 2023; Asiama et al. 2017), enabling spaces for problem sharing and reporting, and the grounds for engaging in collaborative encounters with the public on the concerns and ideas on ensuring inclusive participatory planning.

Even though the penetration of web-based apps and systems is not that widespread in the various assemblies of the country, mobile-based digital technologies and apps are very present and have seen wide usage and penetration by more than 80% of the public (Adolf et al. 2023; Anafo, 2019; NCA, 2018). As such, engaging more with the use of mobile-based technologies and apps by the assemblies and their planners will be very essential for bringing the process of planning closer to the public and serve as means of factoring in the participation of the people. It is also imperative for the National Development Planning Commission and the assemblies to work hand in hand with the technology experts and key stakeholders (Takyi, 2016), in developing more mobile-based apps to ensure maximum participation of the people.

The use of new technologies, particularly mobile-based technologies, and apps will be significant for assemblies and spatial planners in Ghana in developing the needed appreciation and understanding of public participation and the challenges that they encounter regarding urban and rural planning, as well as the planning and utilization of resources, including land (Adjei-Mensah et al. 2017; Anafo et al. 2019; Asiama et al. 2017). Through this, the people will be provided with maximum space that allows for sharing their views, and ideas, and giving alerts and reports on current planning problems that affect their places of residence and other places within their larger assembly. The public complaint systems that already exist in the assemblies could be improved by employing some mobile-based applications and increasing their scope for the public's access (Anafo, 2019). This will provide an enabling environment for the people to interact with the authorities at their local assemblies and planners through the various platforms and mediums that are provided.

The digital applications can be made more interactive to include the use of the local language of the people with a voice feature that enables the people to easily interact with the assemblies and planners in a more collaborative way. With the high penetration rate within mobile applications, the employment of many of these mobile-related applications will facilitate smooth interactions between the people, together with the assemblies and their planners (Anafo, 2019; Asante-Yeboah et al. 2023; Asibey et al. 2023). Through mobile applications, therefore, the public can easily report everyday problems that they encounter in their communities, including potholes on highways, road damage, and closures, lighting problems on major and minor streets, as well as fire outbreaks (Anafo, 2019; Takyi, 2016). Such techniques of reporting have been very successful and valuable for many in other countries, including the United Kingdom (Aheto et al. 2016; Anafo, 2019; Takyi, 2016). Social media mobile technology apps including Facebook and WhatsApp, which is the most popularly used in the country by people can also be utilized by the assemblies and the planning department in setting up WhatsApp and Facebook platform, where members of the assembly can easily share information with the planning authorities and vice versa.

Considering the United Kingdom's use of similar mobile-based technologies for creating spaces for people in sharing ideas on spatial planning, and acting as an avenue, for reporting on problems that people across communities face (Anafo, 2019; Okyere et al. 2019), it will be relevant for Ghana to engage in more policy adoption and technology transfer from countries, such as the UK and others in adopting those technologies for their use. A clear example here is the "fixmystreet" application that has been employed by the United Kingdom over the years to enhance public participation in spatial planning and further helped in increasing public inclusion in effective planning through their sharing of ideas and reporting on planning problems (Anafo, 2019; Asante-Yeboah et al. 2023; Botsyo et al. 2020).

Another innovative mobile-based technology system that can be adopted by Ghana is the "street bump app", which has been used by the city of Boston (Anafo, 2019; Botsyo et al. 2020). The "street bump app" provides space for the public to put forward their concerns, issues at hand, and ideas to the public services

and planning provision, using the feature of the “mobile sensing app” (Anafo, 2019; Okyere et al. 2019). Through this, the app is made to automate and detect through its accelerometer where the public can report their problems on issues, including road closures, potholes fixing, and the like (Anafo, 2019; Dantec et al. 2015). With this, quality information in terms of geo-data can be put forward by the planning and public services authority of the city, and the needed attention is provided as the reports are received. Considering the fact that mobile technology penetration and use are very high in Ghana, the employment of such a technology that is mobile-based will be very relevant for enhancing participatory planning. In addition to this, the utilization of non-internet-based applications, including SMS will also be relevant for Ghana in strengthening participation in spatial planning (Okyere et al. 2019; Takyi, 2016). This will allow for low internet penetrated areas and those who lack internet access to also have the space to participate and share their concerns and ideas on planning in the country. It will provide room for a broader and more diverse approach to mobile and digital-based mechanisms toward planning participation in the country, making the system multi-directional.

Furthermore, the use of mobile-based digital technologies can be used to enhance the PP-PSS, by enabling the generation of discussions and meetings with the spatial planners and the public (Anafo, 2019; Asiama et al. 2017). Through the use of mobile apps, such as WhatsApp and Facebook, where groups can be created, the planners can easily interact with the public through meetings in groups and facilitated discussions on significant topics that will be beneficial for planning. Dantec et al. (2015) for instance, explored how the use of information that was crowdsourced through the mobile application, namely the “Cycle Atlanta” helped in a fruitful discussion at a stakeholder meeting. The process encompassed the employment of data and information, including metrics, and others, such as “street widths” as well as “traffic counts” in understanding the practices that come within the built and social environment respectively (Dantec et al. 2015). With the examination of the practices of some cyclists, the data and information that was gathered helped a lot in the decisions and discussions regarding the making of routes for cycling (Dantec et al. 2015). The overall process proved very successful considering how the available information gathered through crowdsourcing was very relevant to the approach. Therefore, Ghana’s use of mobile-based apps will contribute a lot to facilitating meetings and discussions between stakeholders and the public. This will go a long way to positively impact participatory spatial planning across the country, which will help in including the views, experiences, ideas, and interests of the public in spatial planning processes and systems.

CONCLUSION AND IMPLICATIONS

The paper has examined the nature and scope of new and evolving digital technologies as they are employed in contemporary spatial planning, focusing on the Ghanaian case and how these technologies facilitate inclusive and participatory planning. It has been seen that those digital technologies, including web-based and mobile-based technologies and apps, have been employed over the years in enhancing planning, that is collaborative and considers the public in spatial planning processes and practices (Anafo, 2019; Botsyo et al. 2020; Takyi, 2016). This has been much present in developed countries, including the UK, and the US, with the use of both computer-based and mobile technology applications for engaging the public in spatial planning. Developing countries, including Ghana, have also joined in the digital move, by employing some of these technology-driven applications and tools for their planning. However, in developing countries, and in this case with reference to Ghana, which is the focus of the paper, planners have mostly relied on geotechnical technologies and apps, such as “ArcGIS”, “Google Maps”, “Quantum GIS”, and “Map Makers” in their spatial planning. These technologies are very good but are seen to be more of SPDSS and less of PP-PSS. Several challenges have tended to affect Ghana’s utilization of new digital technologies, particularly those of the PP-PSS-based in spatial planning (Anafo, 2019; Asante-Yeboah et al. 2023; Botsyo et al. 2023). The challenges have included low digital literacy, especially in rural parts of the country, low penetration of internet and web-based technologies across the country, and limited structures for continuously building the capacities of spatial planners (Anafo, 2019;

Asante, 2020; Gaisie and Cobbinah, 2023). This has to an extent impacted negatively on the employment of such digital technologies in enhancing the maximum participation of the public in spatial planning. Nonetheless, as seen in the paper, Ghana has a high rate of penetration when it comes to mobile-based digital technologies and apps, with high usage among the people (Anafo, 2019; NCA, 2018). Therefore, the restructuring of the spatial planning approach in Ghana to factor in the use of mobile-related apps and technologies, by districts and their planners would help provide space to have a two-way interaction where planners can interact with the public, in sharing ideas, information, and reporting on problems that people encounter in their communities and beyond.

The implications of the paper are that considering how the use of new digital technologies and apps by some developed countries, including the UK and the US, with useful apps, such as “fixmystreet.com”, and others including “Cycle Atlanta”, as well as the “Street Bump App”, which has been used in the city of Boston to enhance public participation in planning, will be significant for Ghana in adopting such technologies (Anafo, 2019; Dentac et al. 2015). In addition, considering the fact that Ghana has a high rate of usage and penetration in terms of mobile-based digital technologies and apps, the utilization and recontextualization of the mobile apps will help a lot in creating the public’s interactions with districts and their planners in processes of spatial planning. Also, drastic efforts from the national government, the various assemblies, and other stakeholders, including the civil society, and development planners in putting in place policies, and mechanisms in restructuring the planning systems, and reshaping digital literacy, internet, and web technology penetration in the country, will be appropriate for ensuring spatial planning that is participatory, collaborative, and inclusive. The implementation of measures to regularly train and have refresher sessions and workshops for districts and planners will help in advancing the skills and capacities of spatial planners, with the new digital technologies and tools, and go a long way to shaping their interactions with the public. This will ensure more effective, efficient, and inclusive planning across the country. Also, it is important to consider an approach to planning which takes as a key concern an inclusive communicative planning perspective- which factors in the participation of both the people and planning experts in the country.

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