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Examining Digital Participatory Planning: Maturity Assessment in a Small Dutch City

Abstract

This paper calls for a rational and gradual transition to Digital Participatory Planning (DPP) as part of the **sustainable smart city** model. In recent years, the role that Information and Communications Technology (ICT) could play in advancing participatory planning has been widely acknowledged. The literature suggests that several factors are affecting the introduction of DPP into smart city planning. This study examines organization-related and society-related factors, aiming at identifying the level of **maturity** towards the introduction of DPP in cities, with particular attention to small European cities. These two groups of factors were examined in Schiedam, Netherlands via **a mixed-methods** approach and analyzed using NVIVO and SPSS software. The results suggest that for cities to be **mature enough** to introduce DPP, there should be an existing good practice of conventional participatory planning where the concept is extensively practiced, as well as a relatively high trust in the community engagement processes and sufficiently high digital technology literacy among the residents. **Thus, maturity levels in cities should be assessed and policies should be developed accordingly to ensure a successful transition toward sustainable smart cities, in light of the findings reported in this study.**

Keywords

Digital Participatory Planning, Community Engagement, **Co-creation**, **Smart Sustainable City**, **Government Openness**.

25 **1. Introduction**

26 The concept of public participation has evolved over the past 30 years with continued dialogue
27 between practice and theory. Participatory planning is one way of involving the public in
28 decision making processes. Generally, public participation is a vital aspect of democracy, trust
29 in governments, and a connection to the transition **toward sustainable smart cities (Levenda et**
30 **al., 2020)**. In addition, the positive effect that citizen participation has on social sustainability
31 is widely acknowledged (Bouzguenda, Alalouch, & Fava, 2019). This includes – but not
32 limited to – feeling more responsible for public matters, increasing public engagement,
33 encouraging people to listen to different opinions, and contributing to a higher degree of
34 legitimacy of decisions (Spyra et al., 2019). Nonetheless, it could have a negative effect if not
35 all relevant groups and interests are represented (Michels & De Graaf, 2017) or when
36 governments attempt to listen to citizens, but make their final decisions based on inputs from
37 their officers (Rosener, 1982). The introduction of compulsory public participation in most
38 occidental countries has created a challenge for public actors. One of the key administrative
39 issues confronting decision makers is how best to involve citizens in public decision making
40 (Levenda et al., 2020). In the presence of Information and Communications Technology (ICT),
41 **the evolution of e-government and open government, and smart city models (Anthopoulos,**
42 **2017)**, several governmental authorities foresee the incorporation of technologies, such as web
43 2.0, digital mapping tools, Geographic Information Systems (GIS), 3D-modelling, Global
44 Positioning System (GPS), and interactive screens (Wallin, Horelli & Saad-Sulonen, 2010) as
45 suitable responses to the challenges they are facing, particularly in terms of enhancing citizen
46 participation in city planning (Afzalan, Sanchez, & Evans-Cowley, 2017). Thus, suggesting
47 the incorporation of Digital Participatory Planning (DPP). **However, our assumption is that**
48 **prior to introducing technological interventions to the participation process, citizens' and**
49 **authorities' level of maturity and attitude toward participatory planning processes must**

50 **be understood.** This will inevitably foster smoother introduction and integration of DPP.
51 Smaller cities with a population between 50,000 to 100,000 that represent more than 50% of
52 the total number of cities in Europe (Dijkstra & Poelman, 2012) should be given more attention
53 (Hughes et al, 2018; Varela-Álvares, Mahou-Lago, & López Viso, 2019). This leads us to our
54 study question: **What factors affect a city’s DPP maturity? And when will a city be mature**
55 **enough to introduce DPP?** The aim of this study is two-fold. First, it aimed to identify some of
56 the factors that affect the introduction of digital technology to participatory planning. Second,
57 this study applied some of the identified factors to assess the maturity of Schiedam, a small
58 city in The Netherlands, using qualitative and quantitative methods. **These factors and the**
59 **proposed assessment method aim to inform the development of a maturity assessment method**
60 **that could guide small cities and towns on their way toward adopting DPP approaches,**
61 **especially with the current emphasis on smart cities around the world. Equally important, this**
62 **paper engages with the current debates around urban planning, sustainable smart cities, and**
63 **community engagement and participation in small cities, by addressing a significant gap in the**
64 **field that requires attention. Additionally, the factors could be utilized by cities to gauge their**
65 **level of organizational and social maturity, and to take appropriate steps.**

66

67 **2. Background**

68 Nasca, Changfoot, and Hill (2019, p. 2) defined participatory planning as *“a bottom-up*
69 *planning approach that employs non-traditional engagement techniques, combines citizen*
70 *knowledge with professional knowledge, promotes open dialogue, and involves community*
71 *members throughout all phases of the planning process”*. Participatory planning practices
72 provide intermediary spaces for knowledge sharing and consideration of local experiences that
73 close the boundaries between the state and its citizens (Spyra et al., 2019), and establish new
74 places in which collaborators can engage with each other to better envision their cities

75 (Cornwall, 2002). On the other hand, DPP can be defined, with reference to the definition by
76 Healey (1998), as arenas within which stakeholders can collaboratively develop and convey
77 visions of how the city could be by using ICT. DPP handled mainly by governmental
78 organizations can be incorporated to drive government evolution with the use of innovation
79 starting with the evolution of both digital (e-) and open government, and smart cities at a local
80 level towards a smart government (Anthopoulos, 2017). The e-government handles the
81 deployment of smart services (e.g., e-payments) and the open government operates based on
82 openness, with regards to service delivery and decision making (e.g., citizen participation). The
83 smart city addresses city government, while smart solutions helps improve local economy and
84 evidence-based policy making (Anthopoulos, 2017). Thus, DPP could be implemented within
85 the e-government context as a service deployed by the government, within the context of open
86 government as it engages citizens in decision making, and within the context of smart city, as
87 governance (Gil-Garcia, Helbig, & Ojo, 2014) and city management play a significant role in
88 smart city development (Anthopoulos, 2019). On the European level, different policies, such
89 as the European e-government action plan (2011–2015) (European Commission, 2010) and the
90 Malmö ministerial declaration on e-government (eGovernment policy of the European Union,
91 2009), have been proposed to increase citizen participation. This effort is important for
92 enabling greater participation and increased civic commitment (Komito, 2005). However, the
93 obsession with technology in the deployment of the smart city model has raised concerns over
94 the importance of emphasizing human and more-than-human-centered smart cities that are
95 collaboratively designed with citizens based on their needs, while respecting other living
96 creatures (see for example, Yigitcanlar, Foth, & Kamruzzaman, 2019; Foth, 2018; Dezuanni et
97 al., 2017). These concerns are emphasizing that cities cannot be smart without being socially,
98 economically, and environmentally sustainable. Works that largely sought to explore new
99 means to use ICT for sustainability (Foth et al., 2009) have begun over a decade ago. Yet, these

100 works have been criticized for their limited consideration of new means to influence and impact
101 the broader political, societal, and planetary dimensions (Foth & Caldwell, 2018). However,
102 this is changing because governments are currently developing participatory approaches to
103 address sustainability challenges (Boukherroub, D'amours, & Rönnqvist, 2018; Fuldauer et al.,
104 2019) in the attempt to help societies become more sustainable (Clarke et al., 2019). One of
105 the latest generations of smart city model is described as the “Responsive Smart City”
106 (Yigitcanlar, Foth, & Kamruzzaman, 2019). This is a city that provides citizens with active
107 engagement in the usage of smart solutions to improve living standards and urban sustainability
108 (Goldsmith & Crawford, 2014). This type of cities gives the citizens the power to use smart
109 technology to contribute toward planning, designing, and managing their cities (Yigitcanlar,
110 Foth, & Kamruzzaman, 2019). Thus, attention should be devoted to the mature incorporation
111 of technologies. This is particularly important when dealing with technologies that have a
112 social perspective or could affect the social sustainability of the society, such as citizen
113 participation (Bouzguenda, Alalouch, & Fava, 2019). Several studies on the implementation of
114 digital citizen participation were focused on the organization, administrative, and managerial
115 aspects of the professionalization of public participation (Slotterback, 2011; Bherer, Gauthier,
116 & Simard, 2017; Afzalan, Sanchez, & Evans-Cowley, 2017). Other research fields are focused
117 on the community’s abilities and citizens’ perspectives, and their level of satisfaction with such
118 processes (Michels & De Graaf, 2017), as well as the level of acceptance to such technologies
119 in terms of their features and functionalities (system quality) (Kimathi, Zhang, & Hu, 2019).

120 However, an extension of these efforts is recommended (Okyere-Kwakye, Nor, & Ologbo,
121 2016; Sichone, Milano, & Kimea, 2018) to explore the mutual perspectives between the
122 community (users) and the organization (facilitator). In the same context, Anthopoulos and
123 Tougountzoglou (2012) suggested that the cooperation between the provider (organization)
124 and the receiver of the service (citizen) is considered even more crucial to ensure the viability

125 of such smart initiatives. The viability of digital interventions has been questioned because of
126 low participation, poor input quality, and managerial inefficiencies and trust. The success of
127 smart initiatives has to be secured since huge funding supports its implementation and social
128 implications accompany its deployment. Nonetheless, smart cities initiatives are contemporary
129 projects; therefore, insufficient data can hinder the job of decision makers. Information on the
130 economic and social dimensions of these projects is also scarce. Indices and factors concerning
131 geographical, financial, socio-political, cultural, legal, technical, environmental, and social
132 perspectives can indicate the viability of DPP. They can also contribute to a smooth and mature
133 introduction of digital initiatives.

134 **2.1 Factors contributing to the introduction of DPP**

135 Several factors could be taken into consideration when introducing digital technologies to
136 participatory planning to ensure an effective process.

137 The first group of factors deals with the **maturity** of the organization itself and the factors that
138 are related to issues within the organization (Lodato & DiSalvo, 2018). Blahna and Yonts-
139 Shepard (1989) suggested several conventional evaluation “themes,” or criteria that are related
140 to efficient deployment of public participation in planning. Such criteria include
141 representativeness, transparency, influence, and information access. In light of the ubiquity of
142 ICT, Rowe and Frewer (2000) suggested a set of acceptability features that could make a
143 participatory method acceptable to the wider public to ensure effective functionality. These
144 features include the representativeness of the targeted population, the independence of
145 participants’ selection, the early involvement of the participants, and the clear and effective
146 management of expectations. Laurian and Shaw (2009), on the other hand, argued that
147 “increased trust” is a central factor when deploying participatory planning. Mutual trust
148 between the organization and the community does influence the efficiency of public

149 participation, and the same is applicable when introducing technologies to the participation
150 process. Other factors that were discussed are the attitudes and perceptions of the planners
151 towards public participation (Slotterback, 2011; McAfee et al., 2012), whether they were
152 negative, cynical, indifferent, positive, or enthusiastic (Schroeter and Houghton, 2011).
153 Additionally, their personal experience in the use of technology (Houghton, Miller and Foth,
154 2014) , can influence the usefulness of the proposed technological intervention. Furthermore,
155 the significance of strategic support (Kahila-Tani et al, 2016) and policy support (Fredericks,
156 Caldwell, et al, 2019) for the planners were emphasized. First, expertise in designing the
157 participation processes, and information regarding the variety of digital tools and supporting
158 software. Second, policy support for the participatory planning process in terms of city
159 coverage, nature, and maturity. Afzalan, Sanchez, and Evans-Cowley (2017) were able to
160 identify factors that can influence the adoption of ICT technologies by planning organizations,
161 such as the organizations' attitudes toward public participation, and the planners' behaviors
162 and attitudes.

163 The second group of factors is related to the characteristics and attitude of the concerned
164 community. Putnam (1993) related the quality of life among local communities to different
165 levels of civic engagement. On the other hand, the community's overall level of education,
166 attitude, and perception toward the concept of public participation in general, and toward
167 utilizing technologies in particular, were seen as influencing factors (Harrison & Thomas,
168 2009; Palen et al., 2010). The socio-demographic characteristics of the concerned community
169 should also be considered when utilizing ICT in participatory planning as they might affect
170 how people receive and use these technologies (Mallan, et al., 2010; Afzalan & Muller, 2014;
171 Lopez, 2016). Krasnova et al. (2009) & Fredericks and Foth (2013) , argued that the community
172 perception of privacy and sharing their identities in online environments need to be carefully
173 considered (Table 1).

174 Another group of factors that was discussed in the literature is the project-related factors.
 175 Brown and Chin (2013), and Schroeter, Foth and Satchell (2012) argued that the place
 176 component and the geographic coordinates of the planning project could contribute to the
 177 usability of the DPP practice. Felin and Zenger (2014), and Gil-García, Ramón, and Pardo
 178 (2005) further argued that the characteristics of the project and its environment, and the
 179 effectiveness of introducing DPP technologies are related. However, our concern was that the
 180 project-related factors are specific to each project and might not indicate the **maturity** of the
 181 city as a whole. Thus, this group of factors was not considered.

182 Table 1. Factors related to digital participatory planning

Factors	Source
Factors Related to Governmental Organization	
G.1. Level of trust expressed by the organization in the citizens' opinions and ideas	Laurian & Shaw, 2009
G.2. Planner's behavior and attitude toward citizen participation	Briones et al., 2011; McAfee et al., 2012; Slotterback, 2011; Kahila-Tani et al., 2016; Nelson et al., 2008; Schroeter and Houghton, 2011
G.3. Strategic support/availability of online resources (IT experts + software)	Afzalan, Sanchez, & Evans-Cowley, 2017; Houghton, Miller and Foth, 2014
Factors Related to the Society	
S.1. Neighborhood/population demographic characteristics	Putnam, 1993; Afzalan & Muller, 2014; Lopez, 2016; Afzalan, Sanchez, & Evans-Cowley, 2017; Mallan, et al., 2010

S.2. Level of trust in the concept of citizen participation in city planning	Palen et al., 2010; Stutzman, 2006; Harrison & Thomas, 2009
S.3. Level of trust in the influence of the community's opinion on the organization's decision.	Laurian & Shaw, 2009
S.4. Technology utilization tendencies	Palen et al., 2010; Stutzman, 2006; Harrison & Thomas, 2009; Lopez, 2016; Afzalan, Sanchez, & Evans-Cowley, 2017
S.5. Privacy concerns within online environments	Krasnova et al., 2009; Foth, Forlano, et al., 2011; Fredericks and Foth, 2013

183

184 **3. Methodology**

185 To address the objectives of this study, a mixed method approach was adopted and applied to
186 the case study, namely, Schiedam City, Netherland. Semi-structured interviews were
187 conducted to examine the **maturity** of the municipality to introduce DPP, with regards to the
188 governmental organization factors. Factors related to the society were determined via a citizen
189 questionnaire. In addition, the city demographics were obtained from the municipality's
190 official records.

191 **3.1. The Case study: Schiedam, Netherlands**

192 The field of inquiry was The Netherlands, one of the leading countries where public
193 participation is mandated by law and widely practiced. The Netherlands has a broad experience
194 with various forms of participatory decision making since citizen participation gained its
195 importance by the late 1960s (Michels, 2006). Schiedam is a small city located in the
196 province of South Holland, which is part of the Rotterdam-**The Hague** metropolitan area. In
197 2018, it only has 77,897 residents compared to **Rotterdam with a population of 651,446**.

198 Historically, the city has faced a substantial increase in residents with lower socio-economic
 199 background. Towns and cities of this size play a significant role in the economic and social life
 200 in Europe (Hughes, et al, 2018). The city’s local authority has introduced a program to promote
 201 the smart city initiatives, including DPP. Generally, participatory planning is practiced in
 202 Schiedam according to a protocol that follows Arnstein’s (1969) ladder of participation. The
 203 main goal of the administration is to maximize participation, with no restrictions on the applied
 204 methods, aiming for the higher rungs of the ladder (Arnstein 1969). Participatory projects are
 205 often focused on the development of central areas, the renewal of old neighborhoods, and the
 206 construction of public amenities.

207 **3.2. Governmental Organization Interviews**

208 Qualitative semi-structured interviews were conducted to assess the municipality’s **maturity** to
 209 introduce DPP. The interview guide was designed based on the governmental organization
 210 factors that were previously identified from the literature, and all questions were sourced from
 211 relevant sources (Table 2).

212 Table 2. Main questions in the interview guide and the source for each one.

Category	Question	Source
Level of trust expressed by the organization in the citizens’ opinions and ideas	<ul style="list-style-type: none"> • Do you believe in the communities’ capabilities of generating new knowledge and ideas? • How far do you respond to the participant’s requests? • How do you describe the level of maturity of the participants’ requests and comments? 	Edmiston, 2003; Gillett, Lehr, & Osorio, 2004; Innes & Booher, 2004
Planners’ behaviors and attitude toward citizen participation	<ul style="list-style-type: none"> • How important do you think it is to apply the concept of citizen participation in city planning? • What are your main goals when working on citizen participation projects? 	Estevez & Janowski, 2013; Palfrey & Gasser, 2012; Townsend,

		2013
Strategic support/availability of online resources	<ul style="list-style-type: none"> • Does the organization have a dedicated city office for information technology (IT)? • If yes, do planners or community engagement specialists within the city benefit from this office? • Was there any technology introduced to the participation projects? • If yes, how skilled were the planners in terms of using this technology? 	Briones et al., 2011; McAfee et al., 2012; Palen et al., 2010; Stutzman, 2006; Harrison & Thomas, 2009; Krasnova et al., 2009

213 In total, 14 interviews were conducted in September 2017, with representatives from the local
214 government in Schiedam city. Interviewees were carefully selected to include the different
215 expertise and specializations involved in the participatory planning processes within the
216 municipality, as well as from different genders and different educational backgrounds.
217 However, all participants have experiences in participatory planning activities run by the
218 municipality (Table 3).

219 Table 3. Sample breakdown of the semi-structured interviews ($n = 14$)

	Gender		Position					Background				
	M	F	Project managers/leaders	Policy advisor	Community engagement specialists	Architects	Administration	Engineering	Landscape architecture	City planning	Economics	Unknown
Number	8	6	9	1	1	1	2	4	3	3	3	1

220
221 Interviews lasted between 45 to 90 minutes and new questions that followed interviewee's
222 replies were asked. All interviews were recorded, transcribed, and analyzed using thematic
223 content analysis using NVIVO software, as suggested and used by several authors (Dooling,
224 Simon, & Yocom, 2006; Woolley, Limperos, & Oliver, 2010; Neuendorf, 2016).

225 3.3. Citizen questionnaire

226 Society-related factors were examined through an online questionnaire. The questionnaire was
 227 posted on the official municipality website and Facebook for two weeks, and a total of 148
 228 responses were collected. Flyers containing a brief introduction about the survey and a QR
 229 code with a link to the survey were distributed among the local community during two
 230 participatory events, and delivered to the mailboxes of local residents. No incentives of any
 231 kind were provided to the community members to complete the questionnaire. The
 232 questionnaire covered the four factors related to the society, as well as questions related to the
 233 frequency of participation in citizen engagement events, education, and demographics. The
 234 sample was as wide ranging as possible and varied in gender, age, education level, and area.
 235 Although efforts were made to ensure a suitable balance across these variables, no claim is
 236 made about the representativeness of the sample for the general population as a whole. The
 237 sample breakdown is shown in Table 4.

238 Table 4. Sample breakdown of the citizen questionnaire ($n = 148$)

Variables		Percentage
Gender	Male	41.9%
	Female	58.1%
Age	18–30	7.5%
	31–40	11.5%
	41–50	16.2%
	51–60	25%
	60+	34.4%
	Missing	5.4 %
Education level	Lower than high school	1.4%
	High school	11.5%
	MBO* or similar	15.5%
	HBO** or similar	56.7%

	WO***/University or higher	13.5%
	Missing	1.4%
Participation in participatory planning events	Always	10.1%
	Sometimes	48.6%
	Never	39.9%
	Missing	1.4%
Participation in online debates regarding the neighborhood	Always	10.8%
	Sometimes	33.1%
	Never	56.1%

*MBO: middle-level applied education

**HBO: applied university education

***WO: academic university education

239 A five-point Likert scale was used to capture the participants' perception of carefully designed
240 attitudinal statements pertaining to the factors related to the society. For the purpose of this
241 study, only eight Likert items are reported, as listed in Table 5.

242 Table 5. Survey items related to societal factors.

Seq.	Statement	Code
Level of trust in the concept of citizen participation in city planning		
1	I trust the concept of citizen participation.	SF.1
2	Engaging the citizens in participatory planning has positive effects on the community.	SF.2
Level of trust in the influence of the community's opinion on the organization's decision		
3	The municipality is giving high priority to engage the citizens effectively.	SF.3
4	I trust that my opinions are influential in the planning projects I participate in.	SF.4
5	I am satisfied with the participation methods applied by the municipality.	SF.5
Technology utilization tendencies		
6	I am an active online citizen (i.e., I do most of my tasks online).	SF.6
7	I am satisfied with the online services provided by the municipality.	SF.7
Privacy concerns within online environments		
8	I use my real name when I participate in online participation activities.	SF.8

243

244 The collected data were statistically analyzed using the IBM SPSS software. Jamieson (2004)
245 recommended to first analyze the Likert items using the mode, median, inter-quartile, and
246 nominal levels of disagree vs. agree. This method was also used in other studies when analyzing
247 Likert data (see Alalouch, 2018). Then, the data were inferentially analyzed using the Mann-
248 Whitney U and the Kruskal-Wallis tests. The Monte Carlo Exact significant method and
249 Jonckheere's test were also performed to unveil the underpinning differences among the
250 subgroups of the population, as categorized by age, gender, previous experience participating
251 conventionally, and previous experience participating online. These tests are recommended by
252 Field (2013) when the data is nominal, similar to the Likert scale data collected in this study.
253 The Monte Carlo Exact significant method was used for both tests since this method is more
254 accurate in calculating the significance level compared with the conventional asymptotic
255 method. In addition, the effect size was calculated using Rosenthal's (1991) method (i.e., $r =$
256 Z/\sqrt{N} , where Z is the z-score of the test, and N is the number of observations) for the statically
257 significant results.

258 **4. Results**

259 **4.1. Factors related to the governmental organization**

260 The results of the interviews are shown in Table 6. The first factor (G1) was related to the level
261 of trust expressed by the organization in the citizens' opinions. This was addressed by
262 examining the organization's belief in the community's capabilities of generating new
263 knowledge and ideas. Results showed that the municipality representatives who are engaged
264 in public participation have different opinions. 80% of the interviewees clearly expressed their
265 belief in the community's ability to generate new ideas. However, they did emphasize that
266 these ideas should be well refined. Others confirmed that residents' ideas should be totally
267 incorporated and responded to. However, 20% argued that the municipality is giving too much

268 power to the citizens. Additionally, 60% of the interviewees linked the level of trust in citizens’
 269 ideas to their level of education.

270 The second factor (G2) was focused on planners’ behaviors and attitude toward citizen
 271 participation. Results showed that 80% of the interviewees agreed on the importance of the
 272 concept of the residents being the everyday users, and thus, the experts of the districts. The
 273 majority of the interviewees stated that when it comes to citizen participation, their main goal
 274 is to create higher quality plans that respond to the public interests. However, 10% of the
 275 interviewees indicated that their main goal is only to satisfy the participation obligation.

276 The third factor (G3) was related to strategic support, and the availability of online and IT
 277 resources. Interviewees clarified that there is a dedicated team in the organization, who
 278 specialize in online communications. Planners do refer to this team to facilitate their online
 279 communications with citizens during the participation process. In terms of the introduction of
 280 digital resources to citizen participation projects, results suggested that a variety of online
 281 resources are employed, such as online surveys and digital voting tools, as well as social media
 282 and specialized webpages. Advanced digital tools, such as virtual reality are also used.
 283 However, external assistance at some stages was required.

284 Table 6. Factors related to the governmental organization, along with the related qualifiers

Factor	Qualifiers
G.1. Level of trust expressed by the organization in the citizens’ opinions and ideas	<ul style="list-style-type: none"> <li data-bbox="584 1603 1331 1693">• “Yes, communities are capable of generating new ideas, but you need to work on it” (I12)* <li data-bbox="584 1727 1369 1877">• “It is very important to reflect the residents’ comments in your plans and reflect them boldly. It is very good for them to say; “Oh, this is the idea I gave,” or “This is the plan we agreed on.” (I11)* <li data-bbox="584 1910 1366 2000">• “We shouldn’t allow the citizens to participate in the design because we are good in design and not the people” (I9)*

	<ul style="list-style-type: none"> • “The level of maturity of the participant’s comments depends on the education level” (I4, I5)*
G.2. Planners’ behaviors and attitude toward citizen participation	<ul style="list-style-type: none"> • “I believe that participation is very important for planning because the residents always see the space differently as they are the everyday users” (I14)* • “My personal goal from participation is to create higher quality plans that respond to public interests” (I11, I12)* • “I engage citizens to satisfy mandates” (I9).
G.3. Strategic support/availability of online resources	<ul style="list-style-type: none"> • “We have a specialized communication team on the 13th floor” (I4)* • “There was a Facebook page made specifically for the project” (I1)* • “Virtual reality, to get the people to experience the feeling of cycling inside the tunnels, to get their opinions about the existing tunnels in the city” (I8). • “A digital voting tool was used for the parking problem. And there is a plan to introduce a digital platform (Next Door), for neighborhood activities and news” (I12)*

* Interviewee ID

285

286 4.2. Factors related to the society

287 4.2.1. Neighborhood demographic characteristics

288 The first society-related factor is the neighborhood demographic characteristics. The data
289 regarding the city’s characteristics, population, and demographics were available from the
290 official department of city data (Municipal Register of Inhabitants, National Institute of
291 Statistics, and Regional Employment Service). Percentage of adults aged between 18 and 64
292 years old, who were able to participate was 63.4%. Percentage of inhabitants with Dutch

293 background, who were the dominant participants according to the municipality representatives
294 was 58.3% compared to 76.9% in the Netherlands as a whole. Percentage of inhabitants with
295 migration background was 41.7% compared to 23.1% in the Netherlands as a whole. The
296 average household net income was 35,000 EUR/year, which was lower than the average
297 household net income in the Netherlands of 39,600 EUR/year. The percentage of inhabitants
298 with a university degree or other higher professional education was 24.3% compared to 36%
299 in the Netherlands as a whole. The percentage of non-employed jobseekers aged between 15
300 to 75 years old was 6.7%, which was higher than the percentage in The Netherlands as a whole
301 at 4.8% (Labor Market service, n.d.). Thus, several demographic characteristics of Schiedam
302 city appeared to be lower than the national average, mainly in terms of the education level, the
303 average household net income, and the percentage of non-employed jobseekers. However, the
304 percentage of inhabitants with migration background was higher than the national average.

305 *4.2.2. Level of trust, technology tendency, and privacy concern*

306 The four societal factors were examined using a citizen survey and analyzed using SPSS
307 software. The results showed that the evaluation of the statements ranged between neutral to
308 positive (median and mode between 3 and 5), as shown in Table 7. The level of trust in the
309 concept of citizen participation in city planning was positively evaluated by the participants
310 (median and mode of 3.5; Agree at 64.4%, Disagree at 18.9%). The test of differences
311 confirmed that the differences between the Agree and Disagree groups were statically
312 significant. However, respondents tended to agree more on the positive effect of engaging the
313 citizens has on the community, as shown in the results of statement SF.2. This is in contrast to
314 the results of statement SF.1 within the same factor, where respondents felt neutral about their
315 trust in the citizen participation concept. Unlike the first social factor, respondents felt neutral
316 toward the influence their opinions might have on the organization's decision (median of 3.0

317 and mode of 3.3). In fact, the nominal levels of agree/disagree suggested that they have no trust
 318 in the fact that the community opinion is influential in the planning process, and they were
 319 relatively unsatisfied with the participation methods applied by the municipality. Regarding
 320 the technology utilization tendencies, the results suggested that the community has a decent
 321 level of technology utilization (median of 3.5 and mode of 3; Agree at 76%, Disagree at
 322 18.1%). Respondents agreed that they are active online citizens, in which they do most of their
 323 tasks online and they felt neutral regarding the online services provided by the municipality.
 324 Lastly, respondents showed minimal privacy concerns regarding utilizing online environments
 325 where they tend to use their real names (median and mode of 4 and 5, respectively; Agree at
 326 75.3%, Disagree at 12.8%).

327 Table 7. Survey results as per the method recommended by Jamieson (2004).

Item*	Median	Mode	(Q1-Q3)	Agree %**	Disagree %	Differences (Agree vs. Disagree)
Level of trust in the concept of citizen participation in city planning						
SF.1	3.0	3.0	(2-4)	27.2%	33.3%	
SF.2	4.0	4.0	(4-5)	78.3%	7.0%	
<i>Average</i>	3.5	3.5	(3-4)	64.4%	18.9%	$t = 18.4; df = 118; p < 0.01$
Level of trust in the influence the community opinion might have on the organization's decision						
SF.3	3.0	3.0	(2-4)	36.7%	28.8%	
SF.4	3.0	3.0	(2-4)	31.1%	35.5%	
SF.5	3.0	3.0	(2-3)	23.2%	36.2%	
<i>Average</i>	3.0	3.3	(2.3-3.7)	42.3%	44.4%	$t = 18.6; df = 116; p < 0.01$
Technology utilization tendencies						
SF.6	3.5	3.0	(3-4)	50.0%	19.3%	
SF.7	3.0	3.0	(3-4)	37.6%	19.9%	

<i>Average</i>	3.5	3.0	(3-4)	76.0%	18.1%	$t = 15.1; df = 100; p < 0.01$
Privacy concerns within online environments						
<i>SF.8</i>	4	5.0	(3.5-5)	75.3%	12.8%	$t = 21.1; df = 101; p < 0.01$

* Full text of each Likert item is given in Table 5.

** Agree/disagree values do not add up to 100% because of the “Neutral” answers.

328

329 The analysis presented in this section proved that the community of this case study has a decent
330 level of trust in the concept of participation. They were good technology users and they had no
331 major concerns regarding online privacy. On the other hand, they had no trust that the
332 government organization would consider their opinion and that the outputs of the participation
333 process were influential factors in the planning process.

334

335 4.2.3 The differences among subgroups

336 This study analyzed whether the gender, age, frequency of conventional participation, and
337 frequency of online participation have any effect on the participants’ perceptions of the societal
338 factors. The non-parametric Mann-Whitney U test and the Kruskal–Wallis test were also used
339 and the results are shown in Table 8. The results showed that Gender can be associated with
340 the differences in the participants’ responses for one statement only, which was SF4 ($U = 1882,$
341 $Z = -2.133, p < 0.05$). The mean rank showed that female participants (mean rank = 75.98)
342 were significantly more confident than male participants (mean rank = 61.90) that their
343 opinions would be taken into account by the authority and have a real impact. Meanwhile, both
344 Age and Education showed no significant association with the differences in the answers of
345 any of the statements. This result indicated that the introduction of DPP is not affected by age
346 groups or by the variation in the education level of the population. Interestingly, the frequencies
347 of conventional and online participations have shown significant influence on statements SF1

348 and SF2. These two statements measured one societal factor related to the trust in the
349 participatory planning as a concept. First, the level of trust in the concept of participatory
350 planning was significantly affected by the frequency of participating in participatory planning
351 events ($H(2) = 14.024, p < 0.01$). This finding was further analyzed using the Jonckheere's test.
352 The results revealed a significant trend in the data whereby the more frequently a participant
353 participate in participatory planning events, the more he/she will trust the concept of
354 participatory planning ($j = 2194.5, z = -3.558, p < 0.01$). The mean rank of the independent
355 variable confirmed this trend (mean rank: Always = 104, Sometimes = 76.81, Never = 61.70).
356 The frequency of participation in online debates regarding the neighborhood had a significant
357 effect on the participants' agreement to the statement related to the positive effect of citizen
358 engagement practices on the community ($H(2) = 6.138, p < 0.05$). However, Jonckheere's test
359 did not show a significant trend in the data ($j = 2546, z = -1.47, p = 0.14$). Inspection of the
360 mean rank showed a noticeable difference between those who "always" participate in online
361 debates (mean rank = 95.97) and those who "sometimes" do (mean rank = 69.83). On the other
362 hand, the difference in the mean ranks between those who answered "sometimes" and those
363 who answered "never" (mean rank = 69.67) was negligible. To further explore this issue, a new
364 Mann-Whitney U test was performed between the "always" and "sometimes" groups. The
365 results confirmed that these two groups have significantly different answers ($U = 223, Z = -$
366 $2.306, p < 0.05$), with the "always" group significantly agreeing more to the statement than the
367 "sometimes" group. Therefore, citizens who frequently participate in online activities related
368 to planning are more likely to appreciate the positive effects that the citizen participation
369 process might have on the community. Meanwhile, occasional participation in online
370 engagement activities did not improve citizens' perception about the positive effects of the
371 process. The other significant results were related to statement SF6 ($H(2) = 8.885, p < 0.05$),
372 with Jonckheere's test showing a significant trend in the data ($j = 2565.5, z = -2.860, p < 0.01$).

373 Those who were active online citizens had participated more in online debates regarding their
 374 neighborhoods. This finding indicated that if participatory planning processes are to be
 375 digitized, then, the general use of the internet should be first promoted and encouraged, internet
 376 accessibility should be facilitated, and all segments of the population should be granted online
 377 access.

378 Table 8. The differences among subgroups

Independent variables (Likert items)		SF.1	SF.2	SF.3	SF.4	SF.5	SF.6	SF.7	SF.8
Gender ^a	Mann-Whitney <i>U</i>	2614.5	2522	2019	1882	2160.5	2378	2009.5	1632.5
	Wilcoxon <i>W</i>	6269.5	4413	3730	3652	3930	4148	3839	3777.5
	<i>Z</i>	-.084	-.041	-1.352	-2.133	-.767	-.052	-1.853	-.334
	Monte Carlo Sig.	.934	.970	.174	*.033	.446	.956	.063	.741
	<i>r</i> ^c				-0.18				
Age ^b	Chi-Square	7.709	6.279	1.723	2.357	1.367	2.705	.464	8.262
	df	4	4	4	4	4	4	4	4
	Monte Carlo Sig.	.104	.181	.791	.678	.859	.616	.979	.077
Education ^b	Chi-Square	8.164	6.600	1.699	8.499	4.409	6.946	9.458	7.900
	df	4	4	4	4	4	4	4	4
	Monte Carlo Sig.	.077	.156	.804	.063	.369	.135	.051	.083
Frequency of participating in participatory planning events ^b	Chi-Square	14.024	4.819	4.037	1.749	4.960	4.760	4.849	1.965
	df	2	2	2	2	2	2	2	2
	Monte Carlo Sig.	*.001	.088	.133	.414	.079	.095	.086	.385
	<i>r</i> ^c	-0.13							
Frequency of participation in online debates regarding the neighborhood ^b	Chi-Square	.269	6.138	.314	.073	.550	8.885	.246	3.151
	df	2	2	2	2	2	2	2	2
	Monte Carlo Sig.	.874	*.047	.857	.961	.763	*.011	.881	.208
	<i>r</i> ^c		-0.13				-0.24		
^a Mann-Whitney U test		^b Kruskal–Wallis test			^c <i>r</i> = Z/\sqrt{N} (Effect size)		*Significant at 0.05		

380 The next question was which participation method (conventional or online) has contributed
 381 more to the social factors that were found to be associated with the differences in the previous
 382 analysis? To answer this question, the average Likert score for each group of statements that
 383 measured the first two social factors were calculated. The independent variables were also
 384 transformed into the binary format (Yes, No). Then, new Mann-Whitney U tests were
 385 performed on these variables, as listed in Table 9. Having previous experiences in participating
 386 in a conventional engagement activity has a significant effect on two social factors ($U = 1843.5$,
 387 $Z = -2.504$, $p < 0.05$; $U = 1695$, $Z = -2.278$, $p < 0.05$). Those who have participated in
 388 participatory planning events showed a higher level of trust in the participatory planning as a
 389 concept (mean rank: yes = 78.55, never = 61.28), as well as in the influence the community
 390 has on the authority's decision (mean rank: yes = 74.31, never = 58.82). Unexpectedly,
 391 previous experience in online engagement activities has no significant effect on any of the two
 392 social factors.

393 Table 9. The effect of having previous experience in the conventional vs. online participation
 394 on the social factors.

Independent variables (Likert items)			Level of trust in the concept of citizen participation in city planning	Level of trust in the influence of the community's opinion might have on the organization's decision
Participated in participatory planning events (Yes, Never) ^a	Mann-Whitney U		1843.5	1695.0
	Wilcoxon W		3554.5	3235.0
	Z		-2.504	-2.278
	Monte Carlo Sig.		*0.012	*0.022
	r^b		-0.21	-0.20
Participated in online debates regarding the	Mann-Whitney U		2468.5	2265.5
	Wilcoxon W		5789.5	3976.5

neighborhood (Yes, Never) ^a	Z	-0.176	-0.112
	Monte Carlo Sig.	0.86	0.91
^a Mann-Whitney U test		^b $r = Z/\sqrt{N}$ (Effect size)	
		*Significant at the 0.05	

395

396 5. Discussion

397

398 The purpose of this study was to allow small cities in Europe to critically reflect on their level
399 of **maturity** toward the introduction of digital participatory planning. This is critical due to the
400 exponential increase in digital interventions that has left little time for critical reflection and
401 effective self-assessment. Cities are racing toward being smart without identifying if they are
402 ready to be smart embracing the co-creation of the smart city model (Boyd, 2015). This seems
403 to be more crucial in small cities, because these cities have attracted less attention from the
404 research community. They often have fewer resources compared to larger cities and thus, need
405 to optimize the use of these resources (Manda & Backhouse, 2019; Varela-Álvares, Mahou-
406 Lago, & López Viso, 2019). Additionally, (Dezuanni, et al. 2017) argued that small cities need
407 different policies, instead of just blindly copying “smart city” and “growth” strategies and
408 policies from their metropolitan counterparts (and by doing so, introducing the same problems
409 large cities face). Small cities should not start the transition to DPP before testing their **maturity**
410 **because the social and economic costs would be higher in case of failure**. This study considered
411 two main groups of factors that might be affecting the **maturity** of the city to introduce DPP,
412 namely, factors related to governmental organizations and factors related to the society. These
413 factors were examined in Schiedam city, Netherlands, using a mixed-methods approach to
414 answer the question of whether Schiedam city is **mature enough** to be introduced to DPP.

415

416 *5.1. Factors related to the governmental organization*

417 Varying results were obtained regarding whether governmental representatives trust the
418 citizens' opinions and whether they think participation processes are important. However, most
419 of the interviewees showed reasonable levels of trust in the citizens' input, while others
420 expressed resistance to the participation as a concept and thought that the government is giving
421 too much power to the citizens. Similarly, the results showed that the majority of the
422 governmental representatives believe in the positive effect of the concept of citizen
423 participation and they often aim to create high quality plans that respond to the public interests.
424 This suggests that while there is a general acceptance among the governmental representatives
425 regarding the importance of applying the concept of citizen participation in city planning, they
426 seemed to still question the community's capability and maturity to generate feasible ideas and
427 new knowledge. However, the level of trust in the community's opinion was linked to the
428 education level of citizens who are involved in the participation activities. This result is in line
429 with previous research, which suggested that citizen's education level could affect the quality
430 of participation (Palen et al., 2010). Nevertheless, the perceptions of several governmental
431 representatives, who were against participatory planning and whose goal was just to satisfy
432 mandates, were indeed alarming and might affect the readiness of the city to introduce DPP.
433 This undesirable attitude toward the participation concept might be due to a complex array of
434 reasons that starts with not wanting to deal with opposition from the community and does not
435 end with the extra workload often associated with the participation process. Christensen and
436 McQuestin (2019) found that the time required for citizen participation is the biggest challenge
437 facing governmental representatives while delivering participatory planning projects, which
438 might cause resistance or dis-appreciation. Finally, in terms of the availability of IT resources
439 and the familiarity of utilizing ICT to facilitate participatory planning, the city's level of
440 **maturity** for introducing DPP was found to be adequate. Having a dedicated team in the
441 organization that is specialized in online communication was found to be useful and effective

442 in facilitating the transition to DPP. However, attention should also be given to emerging ICT
443 that might better facilitate the participation process. Technologies, such as virtual reality and
444 augmented reality could have great potential (Alatalo et al., 2017; Mueller et al., 2018).
445 However, cautionary from the bedazzlement effect (Foth, Caldwell, et al, 2018) such
446 technologies can trigger should be carefully addressed.

447

448 *5.2. Factors related to the society*

449 First, the collected data for the city of Schiedam suggested that it generally has lower
450 socioeconomic levels compared to the national average. However, this generalization does not
451 apply for the whole city because participation levels were claimed to be higher in
452 neighborhoods with upper socioeconomic levels. Additionally, the sociodemographic
453 characteristics seem to influence their **maturity** to being introduced to DPP (Mallan et al.,
454 2010). Public administrations **might** consider the customization of the participation processes
455 according to the sociodemographic characteristics to improve competences and facilitate the
456 participation of certain under-represented social groups (Wood & Landry, 2007; Parra-
457 Agudelo et al., 2018). **Anthopoulos (2019) suggested that social coherence challenges can be**
458 **addressed by aligning with the latest ICT policies. By focusing on the needs of the local**
459 **population, meeting citizens' expectations, and solving community problems, the successful**
460 **evolution into a smart city can be achieved.** Second, the results have revealed that the
461 participants trusted the positive effect of the community engagement practices on the society
462 more than their trust in the citizen participation as a concept. This might be related to the level
463 of trust in the government itself. Previous work in this field suggested that trust in
464 administrative organizations does affect the levels of involvement and conviction for the citizen
465 participation concept and processes (Smith et al., 2013; **Spyra et al., 2019**). Age, gender, and
466 education level have no effect neither on the level of trust in the participation concept nor on

467 its impact. However, the inferential analysis provided evidences that those who frequently
468 attend conventional participation activities were more likely to trust participation as a concept,
469 whereas those who frequently participate in online debates were more likely to appreciate the
470 positive effect of the process on the community. This observation suggests that the higher
471 frequency of participation would lead to more trust. Similarly, Fredericks and Foth (2013)
472 suggest that people who are sympathetic to local issues and are already informed are more
473 likely to seek out public participation activities, both through traditional channels or online.
474 Therefore, municipalities should strive to attract citizens to attend participation activities more
475 frequently to enhance their **maturity to the introduction of DPP**. Third, the participants showed
476 relatively low levels of trust that their opinions were influential. They were also relatively
477 unsatisfied with the participation methods applied by the municipality. In particular, males
478 were significantly less confident that the output of the participation activities would influence
479 the decision of the municipality when compared with female participants. Other demographic
480 characteristics, such as age and education showed no association with this factor. This seems
481 to be a very important finding, which is likely to hinder the introduction of DPP. Authorities
482 should take this issue seriously if they want to smarten their participation processes and transit
483 to DPP. They should demonstrate to the community that their opinions are being taken into
484 consideration during the planning process and that some of the requests of the community have
485 been implemented (**Anthopoulos, 2019**). They should also explain the reasons, the practical
486 obstacles, and the administrative limitations in cases where the community's desires could not
487 be met. Fourth, the participants have shown a high level of technology utilization tendencies.
488 They were familiar with online environments, and they were satisfied with the online services
489 provided by the municipality in which they tend to do most of their administrative tasks. The
490 results also showed that participants who are active online users participated more in online
491 debates regarding their neighborhoods. The findings confirmed that technology utilization

492 tendencies are a significant factor when introducing DPP. Accordingly, the concerned
493 community showed relatively high level of **maturity** to the introduction of DPP against this
494 factor. However, as recently argued by Costa and Oliveira (2017), Almeida, Doneda, and Costa
495 (2018), and Yigitcanlar et al. (2019), technology by itself cannot create smart cities. Thus, the
496 high levels of technology utilization tendencies do not contradict the fact that the city is not
497 fully **mature** to the introduction of DPP based on its performance against other social factors.
498 Lastly, citizens showed minimal privacy concerns when it comes to utilizing online
499 environments, given the high levels of digital literacy. This observation confirmed their
500 familiarity with technology utilization and the community's **maturity toward** the introduction
501 of DPP.

502 Further analysis showed that having previous experience in attending conventional
503 participation activities has significant effect on the first two social factors, which were both
504 related to trust. Participants who previously took part in participation activities showed a higher
505 level of trust in the concept of participation, as well as in the influence the community has on
506 the authority's decision. Nonetheless, having previous experience in online engagement event
507 has shown no significant effect on any of the two social factors. Therefore, it was concluded
508 that during the planning process, conventional participation methods that are based on getting
509 people together to discuss and deliberate the future of their cities are still a pre-requisite for
510 successful participation practices. Such engagement events seemed to nourish citizens'
511 appreciation of the participation concept and enhance their confidence in the authorities.

512

513 *5.3. Practical Implications*

514 This study proposes a framework that would allow governmental and administrative
515 organizations to assess their level of **maturity** to be introduced to DPP as part of the transition
516 toward sustainable smart cities. This framework allows them to identify their strength and

517 weakness that might foster or hinder the introduction of DPP. The findings of this study could
518 be utilized beyond the field of citizen participation or smart governance and be cast on other
519 smart city initiatives, such as smart mobility or smart economy. At the organizational level,
520 raising awareness on the importance of applying the concept of participatory planning among
521 employees is an important part of enhancing the social sustainability of a city. Civil servants
522 who are engaged in citizen participation activities should be well-informed of the positive
523 impacts of the process. They should be carefully selected to ensure successful implementation
524 and full **maturity for** the introduction of DPP. Municipality might run periodic training courses
525 to explain the challenges involved in participatory activities and ways to deal with them based
526 on best practices and findings from credited research. In addition, adequate resources and staff
527 should be allocated for the participation process. This might be best practiced by allocating
528 specialized staff, who are responsible for engaging the public in participatory planning, in
529 addition to having community engagement specialists. In all cases, digital support should be
530 available to everyone involved in the participation process at any time. To enhance the level of
531 **maturity** of the city, the organization should also initiate awareness campaigns and reach out
532 to citizens, especially male citizens, via a variety of online and conventional channels to explain
533 the participation process, encourage involvement, and nourish interest. Governmental
534 organizations should also foster the involvement of female citizens in participatory planning
535 and enhance the level of trust in their decisions by considering citizen input effectively.
536 Similarly, when the community desires could not be met, the reasons and rational behind them
537 should be made clear to the community. Such information might be communicated to the
538 citizens via online channels, flyers, reports, seminars, and social events. However, this effort
539 might come with some time and cost limitations. Although we agree that the future is geared
540 toward smartening cities via participatory planning, our results suggested that DPP should be
541 coupled with conventional methods that encourage freedom in expressing opinions, in-person

542 discussions, direct feedback on the process, and face-to-face deliberation among community
543 members. This is likely to enhance trust and improve the mutual relationship between both
544 parties. Hence, our general observation is that to be fully **mature** for the introduction of DPP,
545 cities should already have good conventional citizen participation practices, where the concept
546 is well known, the trust in the process and the government is relatively high, and technology
547 utilization tendencies are high.

548

549 *5.4. Study limitations & recommendations for future research*

550 Although this study has shed light into several significant, yet underemphasized issues related
551 to DPP, it has some limitations. First, the list of factors that were analyzed in this study might
552 not be exhaustive. Thus, future research should build upon our work and include additional
553 factors in the assessment framework. Second, this study was focused on a single city. Although
554 no claim is made regarding the generalization of the results, the findings of this study have
555 provided useful insights into what could foster or hinder the introduction of DPP in small
556 European cities. These findings could form guidelines for other governmental organizations to
557 reflect on and act upon to improve their readiness to develop **sustainable** smart cities. **Third,**
558 **the field of inquiry (The Netherlands) hosts a highly "open-minded" and advanced community**
559 **with high rates of digital literacy. Results derived from such case studies might not be**
560 **applicable to cities with extremely different circumstances. Accordingly,** future research
561 should compare the results presented in this work with the results from other cities and look
562 for common trends and shared characteristics. Future endeavors **should** explore the role of the
563 “invisible voices” in the development of an inclusive and socially sustainable smart city.
564 Lastly, **the capabilities of the technocratic approaches for addressing environmental,**
565 **economical, and social challenges should be investigated. Recent studies have reported that**
566 **smart cities initiatives are failing to live up to environmental sustainability expectations**

567 (Yigitcanlar, Foth, & Kamruzzaman, 2019). This, in turn, opens up questions about social and
568 economic sustainability expectations.

569

570 **6. Conclusion**

571 This paper calls for a rational and gradual move toward implementing DPP in small cities in
572 an effort to smarten these cities. This study has tested a framework that would allow
573 governmental organizations to assess the extent to which their civil servants and their
574 communities are **mature enough** to introduce DPP. The findings suggested that in cases where
575 the city is not fully **mature** to introduce DPP, efforts should be made to overcome issues related
576 to the governmental organizations themselves, and issues related to the society. Both civil
577 servants and the community appeared to be adequately literate in terms of using digital tools.
578 However, issues related to the attitude of some of the planners involved in the participation
579 process, and the lack of trust in the community's ability to generate feasible ideas in one hand,
580 and the citizens' uncertainty over the influence that their opinions has on governmental
581 organization's decisions in the other, were found to be the main obstacles that might hinder the
582 transition to DPP **in this city**. This study has found that male participants trusted the
583 governmental organization lesser than their female counterparts; and that more frequent
584 attendance to conventional participation activities is likely to enhance citizens' trust in the
585 participation process. This paper concludes with a call for widespread awareness campaigns
586 targeting at male citizens, promoting the participation of more female citizens, and maintaining
587 the practice of conventional participation methods, which are based on in-person interactions
588 and face-to-face deliberations, parallel to the gradual transition to DPP. **The proposed maturity**
589 **assessment method can be used by municipalities to guide the development of evidence-based**
590 **and tailored policies, and remedial solutions to enhance the transition to smart and sustainable**
591 **participatory planning practices under the umbrella of smart cities concept. The findings have**

592 emphasized that participatory planning is a matter of attitude, which has to be developed
593 gradually in a community and not imposed due to the availability of technology. Social choices
594 and behavior can influence how technologies evolve, implemented, and achieve their
595 performance,

596

597 **Competing interests**

598 The authors declare that they have no competing interests.

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600 To be added later

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