Public Participation in the 15-Minute City. The Role of ICT and Accessibility to Reduce Social Conflicts

Beniamino Murgante[1] and Irina Di Ruocco[2(✉)]

[1] School of Engineering, University of Basilicata, Viale dell'Ateneo Lucano 10, 85100 Potenza, Italy

[2] University of Insubria, DIECO, Via Monte Generoso 71, 21100 Varese, Italy

idiruocco@uninsubria.it

Abstract. The 15-minute city is a well-known concept and widely analysed in academic research. Experiments have often taken place with top-down pilot cases, often without citizen involvement.

Experiences show that the 15-minute city has given rise to some syndromes, which leads us to reflect on how to realise an accessible city by incorporating participation and limiting oppositional phenomena. To support this, digital smart governance tools, such as e-democracy and e-participation, aim to provide citizens with information services, listening channels and promote their participation in public life and urban processes.

This research aims to analyse the 15-minute city in its critical aspects that have emerged in the literature, assessing whether it is a correct model in its approaches and what relationship exists between participation in public life, ICT and the 15-minute city. The study analyses the Italian national context to identify the relationship between accessibility, job satisfaction, and public participation, to understand whether the living conditions of citizens and the proximity and accessibility of places are linked to the emergence of syndromes. The objective is to identify possible relationships, to understand what happens in daily life that could lead to the emergence of syndromes, and to suggest practical measures based on the evidence from this survey.

Keywords: 15-min city · conflicts · participation

1 Introduction

Many urban planning measures introduced in recent years with the aim of reducing emissions, having greater inclusiveness in urban processes, and adapting urban planning to the needs of cities, have shown a phenomenon of opposition and mistrust towards measures to make cities eco-friendly, such as the creation of the 15-minute city. Such opposition is evident both from a scientific point of view, with the investigation of some scholars, and at the level of public debate. The '15-minute city' or 'x-minute city' as an urban planning theory aims to make neighbourhoods more liveable and walkable.

© The Author(s), under exclusive license to Springer Nature Switzerland AG 2024
O. Gervasi et al. (Eds.): ICCSA 2024 Workshops, LNCS 14817, pp. 77–92, 2024.
https://doi.org/10.1007/978-3-031-65238-7_6

Recently, conspiracy theorists around the world have branded this idea a secret scheme to take cars away from people and trap residents in 'ghettos' [1–3]. Some studies, in addition to finding the advantages of the 15-minute city, have analysed the cost-effectiveness and which indicators are crucial for the urbanist process. How-ever, downstream of the empirical evidence, the 15-minute city has become an instrument of conspiracy against motorists, or a model of segregation, in which there is no inclusiveness, but only reduction to closed neighbourhoods, could exacerbate inequality [3, 4], pointing out whether the 15-minute city oscillates between dystopia and utopia, contributing to conspiracy theory [5, 6]. Recent protests in cities such as Oxford (UK), Edmonton (Canada), or Madrid have been characterized by a variety of claims and objections about the 15-minute city model [7, 8]. Main criticisms towards 15-minute city policies include social engineering fears, dis-trust of centralized urbanism, automotive freedom concerns, and environmental and gentrification risk [1, 9].

The 15-minute city initially considered, presented itself as an innovative but also inclusive approach with a view to more resilient and smarter cities, topics much debated in the literature. According to Vinod Kumar [10–14], it is posited to consider up to six components of a smart city such as smart people, smart economy, smart mobility, smart environment, smart living, and smart government.

According to the author, any city has the potential to become a smart city if it can develop from its current state and move towards these six smart city elements in an integrated and comprehensive manner. Regarding the smart government and living component, in car to urban planning are the increasingly refined and wide-spread Information and communications technology "ICT", including the possibility of real-time indicators, big-data, up to Internet of Thing "IoT". Precisely to make urban measures more fluid, the Internet of Things can be used to govern the smart city as an ecosystem, but the management of the smart city as a socio-economic and cultural system would require more. Besides the IoT, two other systems are needed for a smart city: the governance network (e-Governance) and the Internet of People (also known as e-Democracy).

The right to the city has reverted to the 15-minute city, as they argue [16] its realisation requires social mix actions at the neighbourhood level, but these are insufficient to address the deeper structural issues that perpetuate spatial inequality and deprivation.

The link between the 15-minute city and e-democracy has not been fully analysed in the literature. Instead, concerns emerge about the nature of conflicts and revolts over the 15-minute city on a collective level, accusing the measure of not being inclusive and thus not improving citizen participation in the city. From the perspective of governance in urban processes Both the concept of e-democracy and e-participation are creating new opportunities and problems for involvement [17]. An incentive for democratic participation is provided by a strong system of e-democracy, also known as the Internet of People, which can ensure better policies for the community.

The existing research on e-participation has primarily focused on the technological solutions or implementation challenges, paying less attention to the role of e-participation in planning practice or the changes in the engagement processes. The studies tend to focus on the use of specific solutions, e.g. interactive websites, different geospatial solutions, planning support systems, mobile applications, or social networking sites. Few studies provide a comprehensive analysis of the planning context, participatory procedures, and

the use of digital solutions that support these processes [18]. This article analyses the phenomenon between e-democracy and participation in the context of conflicts emerging in the 15-minute city. Neighborhoods and cities are transformed through an inclusive approach using a range of techniques and tools for public involvement through participatory urban planning. The importance of neighborhoods is also demonstrated by many practical cases, e.g. [19] shows that the right of residents to oppose local projects and Swiss mechanisms of direct democracy strongly influence spatial development processes.

Through community co-creation and participatory planning, cities can uncover prospects that were previously untapped, particularly when it comes to tackling problems like traffic, overcrowding, challenging governance, and social segregation. Behind e-democracy as a structural framework, empirical and practical evidence on policy acceptance demonstrates the existence of influence for both socio-political reasons, which change social and political boundaries, but also for individual reasons, creating a link between behavioral theory, e-democracy and urban measures. Many of e-participation solutions are perceived or promoted as an answer to the existing challenges of participatory planning, e.g. increasing public participation [20]. Collaboration requires taking step further and establishing a partnership among different stakeholders for joint plan-making and decision-making [18]. This research answers the following research questions: "Is there a correlation be-tween accessibility and political participation?" and "Can satisfaction in life and work lead to having trust in the institutions, to accept the measures proposed by the City of 15 Minutes?" based on the current trend of participation, the need to think of the 15-minute city in political and implementation terms, as well as on the basis of the living conditions of citizens. The article is structured in this way. The Sect. 1 describes the introduction to the theme of digital democratic participation, the 15-minute city, and the problem of the 15 minute city with public participation, avoiding clashes and syndromes. In the Sect. 2 we present the literature in line with the research. The Sect. 3 presents the methodology and the applied dataset. In Sect. 4 results and finally in Sect. 5 the conclusions and recommendations.

2 Literature Review

The effects of the 15-minute city have been thoroughly examined by empirical research, from its initial implementation [21] to its most recent applications in the context of the resilient and smart city. The idea is to reduce traffic demand, total time spent in traffic, congestion, and pollution by providing people with access to all daily necessities and important services (health care, education, etc.) within X minutes of active transportation (bicycling, walking, etc.). It should be noted that Moreno's first vision for an X-minute city does not incorporate public transportation and instead emphasizes accessibility to essential services [22].

Local governments across the world have embraced smart city agendas to address pressing urban issues. Technology and participation have always been crucial, but their importance has increased with the adoption of the 2030 Agenda and other sustainable policies by many national and municipal governments [23]. As shown by [24], people are more inclined to accept a policy if they believe it addresses an issue that they are responsible for, especially if that group also carries the financial responsibility of finding a solution.

For the promotion of democracy and strong decision-making process, the public participation in urban planning also acts as a tool for gathering information. [24] refer to the "middleman paradox," which is consistent with other earlier studies showing that a relatively small percentage of e-democracy proposals make it past the formal political decision-making stage and move on to become significant e-government initiatives on national or international agendas. Citizens are the providers and users of local knowledge and skills, which are essential for urban planning, achieving political and economic objectives, and allocating scarce resources, in addition to the strategic knowledge held by businesses [25]. There exist variations to the argument that urban design is considering the 15-minute city, which is a community that has amenities within walking distance [26]. Many authors have analysed the role of democratic participation, such as [27–29] analysing how the internet improves awareness and spreads political news. [27] analysis reveals that the Internet has raised high expectations of vitalisation and change of political democracy. [29] examine e-participation in Norway at the local level to investigate how municipal size affects online involvement and to learn that while traditional offline participation predictors similarly affect online participation, youth activity is encouraged by the Internet. Digital technologies supporting governance have emerged more recently, and they show both the intricacy and the ease with which participatory processes can be facilitated analysing the relationship with the rights to participation and inclusion [30–32]. [33, 34] declared that e-democracy is now feasible due to the adoption of a technology-enabled citizen-local government cooperation plan to enhance sustainable development. According to [35], many believe that ICT-enabled participation presents a clear and practical path toward developing a conversation tool between local government and urban residents for the joint improvement of urban sustainability.

Participation, ICT use, and e-democracy are related if it is true that technology may facilitate involvement and that we all own smartphones these days [36].

Several instruments are being examined to increase engagement to comprehend how to organize integrated participation to lessen possible disputes on the fifteen-minute city. These include, as stated by [37], aiming for an inclusive democracy of doing that is based on political investment, participation, and communication; [38] proposing self-organization in urban development; and [39] and [40] strengthening the socioeconomic conditions and geographic distribution of the population.

ICT applications' potential to change people's mistrust of political representatives and their indifference to public issues is questioned by experts as well as practitioners [41]. Since the deployment of these tools restricts participation to those with access to digital devices, the use of ICTs also raises concerns about exclusion, frequently ignoring the diverse viewpoints of citizens when making decisions or soliciting feedback on ICT-enabled participation processes [41–43].

The public can provide government agencies with insightful recommendations that will enable them to make better policy decisions [23]. Relevant elements include: (1) the degree of interaction between different citizen involvement modes in urban governance; (2) the population's representativeness; and (3) the incentives for citizens to participate [45]. Although it has been extensively studied in the literature, the 15-minute city is still applicable in certain circumstances but not in others. Thus, urban plans stress how important it is to reorganize cities. The C40 cities initiative, which includes 100

major cities in numerous countries, highlights that the implementation of policies based on the 15-minute city concept is an essential precondition for an equitable and long-lasting pandemic recovery [45–47]. [48–51] have examined it in Europe with respect to sustainability, accessibility, and indicator measurement. In Italy, studies are being conducted to determine a measure for the 15-minute city [50] for medium-sized cities or for metropolitan cities [51–54].

3 Data and Methodology

The approach is based on econometric modelling of the variables that could lead to conflicts or discontent in the public domain. We consider the analysis of the 2021 "daily life survey" dataset provided by Italian National Dataset "ISTAT" with a total of 25,000 families for all the Italian territory [55].

For our case study, the final dataset collects from a total of 35 variables, divided into categories and analysing with an econometric model the relationship between the dependent variables linked to the 15-minute city, political participation, information, and use of the internet, as indicated in the literature. In line with the research question, we grouped the variables in groups related to the participation, digitalisation, political life, and accessibility. Therefore, the variables used can be grouped into the following groups (Table 1).

Table 1 shows some variables used according to the purpose of the research, in line with the empirical evidence. As spatial variables, the mode of travel (train, bicycle, car-sharing, bike-sharing) was considered to represent both proximity and accessibility. The dataset also provides the ease of reaching places of interest within 15 minute or with ease. For the transport section, we also considered the ownership and use of bicycles, motorbikes, as a counterbalance to car use, which is against the concept of the x-minute city, to place more emphasis on walkability and easy access between neighbourhoods [52, 53, 56–64]. Socioeconomic variables offer valuable insights on the working conditions and movements of the population, as well as the habits and features of the population. Regarding the "ATECO" (classification of economic activities) condition, we refer to the trade class defined in Italy as ATECO [55]. In Table 1, grouped variables are highlighted to simulate the role of public participation, in debates, associations and decision-making processes; indicators were taken on participation in public life, use of connections (internet, WIFI), information (newspapers, magazines, TV, radio, smartphones, etc.):

- Trust in institutions (Italian/European Parliament, government, municipalities, associations, scientists);
- Participation in political debates, associations, meetings (e.g. 'Comizi', 'Cortei');
- Political distrust and dissatisfaction in parties, associations, public bodies.

Considering the conflicts but also of the literature on e-democracy, these variables consider the information and debate habits of Italian citizens. The variables adopted can represent both the link between citizens' satisfaction in the 15 minute (measured by different indicators) and to assess any dissatisfaction and distrust in public life, which could give rise to nimby phenomena, or towards figures such as scientists, who promote

Table 1. Variables of the case study, elaboration of author

Sector	Name of variables	Type of variable
Socio-economic	Sex Marital status Working position Past works ATECO condition Income Citizenship Same common displacement Intra-municipal/intra-provincial/inter-regional trips Job satisfaction General satisfaction with one's life	Categorical/ Ordinary
Mobility	Use of train/metro/bus/carpooling Use car as driver/passenger Use of motorbikes/bikes	Categorical
Accessibility	Free time Perception and satisfaction of the environment Satisfaction on urban settlement Tram, bus, bike, train use Use of green vehicles such as bike-sharing and carsharing Confidence in walking	Categorical/ Ordinary
Trust in political life	Trust in political/scientific institutions	Categorical
Knowledge and know-how of citizens	Information and earning know-how	Categorical
Participation in political life	Participation in political debates, associations, Comizi, Cortei	Categorical

scientific measures in the practical field. The concept that "the citizen makes a journey lasting 20–35 min, so is willing to travel for 15 minute" can be expressed through the 15-minute accessibility, which has been measured in relation to bike ownership. The other variables do not allow us to measure the 15-minute city in terms of proximity and accessibility due to endogeneity problems, so they were treated as independent variables. Satisfaction in work and life was also used as a variable to represent the general course of the citizen's life.

The dataset contains the questions 'satisfaction with one's private life' and 'satisfaction with one's job'. The dependent variable chosen closest to the research question is 'satisfaction with one's job'. The variable bicycle ownership plays the role of an instrumental variable, which is linked to the possibility of commuting within 5 km, maximum 20 min. This variable implies that ownership implies use, so it is more likely to be used for short trips between neighbourhoods. Political participation measures how active the citizen is in decision-making processes.

Then, the dependent variables identified are:

- Overall job satisfaction;
- Accessibility to services;
- Bike ownership;
- Political participation.

Table 2. Descriptive statistics of dependent variables.

Variable	Observation	Mean	Std. Dev	Min	Max
Job Satisfaction	15,86	2.05	0.69	1	4
Politic participation	39,75	0.18	0.33	0	1
Accessibility	45,59	0.78	0.42	0	1
Bike ownership	45,59	0.59	0.49	0	1

The model chosen for the cross-sectional data is based on a regression analysis to identify the factors influencing the dependent variable, to understand the factors influencing the performance of participation citizens and thus the choice for the city of x minutes. For the current dataset, we chose more than one independent variable. For this reason, we adopt a multivariate regression analysis that helps to identify the relationship between the dependent variable and several independent variables simultaneously Table 2.

The model of multivariate regression [59, 60] follow the equation:

$$Y = X * B + \Xi \tag{1}$$

where Y be the n × p response matrix, the vector X is an n × (q + 1) matrix including the predictors. The matrix value B be an (q + 1) × p matrix of fixed parameters, Ξ be an n × p matrix such that Ξ∼N (0,Σ) (multivariate normally distributed with covariance matrix Σ. The examination of the correlations between the equations' residuals, needs the inclusion of the correlation option during the setting of the model, that is based on the $\chi 2$ statistic as Lagrange multiplier statistic, as provided by [61, 62]. In absence of pedestrian mobility variables, we considered bicycle ownership - which includes the use of bicycles as a means of transport, participation in bike-sharing programmes and the use of bicycles as an intermodal mode as an instrumental variable encouraging walking and general life satisfaction. Regarding the descriptive statistical analysis, 35% of the respondents were satisfied with their work. Of these, 71% gave positive feedback (highly satisfied), while the remaining 29% were moderately satisfied (Fig. 1).

Regarding travel habits, 32% make intra-provincial journeys, while only 26% travel within their city. These results have implications for the possibility of decreasing car use in favour of walking or cyclin (Fig. 2). On accessibility, the ease of reaching main services is rather low, only 16% easily reach the hospital, 19% the police office, and super-markets (19–20%).

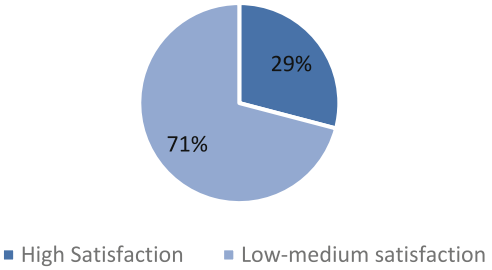

Fig. 1. Percentage of job satisfaction, elaboration of authors.

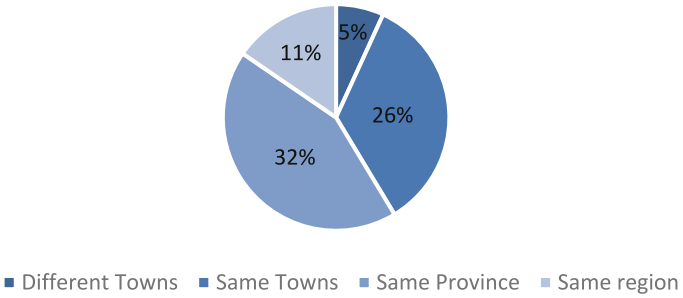

Fig. 2. Type of trips, elaboration of authors.

4 Results and Discussions

The analysis conducted highlights the relationships between accessibility, political participation, and citizen satisfaction.

The analysis of the dependent variables has been conducted for the socio-economic sector, the political sector, accessibility and proximity, mobility, and further variables (free time, use of other means of transport). The dependent variables such as ownership of a bicycle, the participatory political sphere, represent three moments for implementing the 15 minute city under three different aspects: the first is public participation, measured as technology and use of technology (both for information both in general and for politics), the bicycle is used to symbolize a tranquil existence that prevents uprisings by simulating a citizen's capacity to travel sustainably, across small distances, and for their own benefit.

The results are organized in Tables 3, 4, 5 and 6 into three groups: the first group collects the results for the bike use relating the socio-economic, mobility and accessibility sectors, the second for mobility and accessibility, and the third concerns the political sphere. The results generally show a positive correlation with trust in institutions. In detail, citizens' satisfaction in terms of work towards the Region and among scientists decreases, and participation in associations makes them dissatisfied. Regarding technologies, owning a television does not influence personal satisfaction or political participation and is of little importance to owning a bicycle. Personal satisfaction is

measured both as satisfaction with one's working life and in general, they are both self-reported (Likert scale) therefore we considered it valid to use the work environment as an indicator linked to accessibility and travel, rather than satisfaction with private life, which depends on much more subjective reasons, which go beyond the accessibility and proximity of services. In relation to the other variables, bike ownership and the ease of reaching green areas underlines that use decreases if there is a feeling of degraded landscape and environment of where one lives, just as accessibility is negatively influenced by neighbourhood conditions in very bad condition. The use of the car indicates an absence of bicycle use, while those who own a bicycle are more in favour of using two-wheeled means of transport but believe that it is dangerous to go around alone on the street. Those who own a bike seem to have a positive idea of trust in institutions and are satisfied with life in general. On the environmental aspect, bike ownership is not favoured by a polluted environment). These results lead us to believe that there are favourable conditions to encourage mobility within 15–20 min, as bike ownership is positively correlated with environmental, political, and socio-economic variables. Nonetheless, based on the findings about public engagement and personal satisfaction, individuals who are content are associated with higher incomes but have mistrust for government agencies. In conclusion, the use of digital tools (computers, Wi-Fi, information from radio and TV, etc.) has no impact on public engagement. Consequently, we may conclude that although possessing and using digital technologies alone does not always result in social and political participation or interest manipulation, they do so through the use of other digital typologies. The part on public participation is positive with the satisfaction of free and meaningful time, as well as participation in various social gatherings ('comizi', 'cortei', other associations). Citizens that participate in political debates have trust in the institutions and have shown themselves in favour of the use of bike sharing in the last year. Regarding accessibility and the environment, there is concern about air pollution, road safety and crime, and the ability to find parking. On accessibility, the use of the train is the only significant means of transport, while they do not easily reach destination places such as supermarkets.

In relation to the 15-minute city, the use of the bike positively influences indicators of proximity and accessibility, suggesting that owning a bike does not make citizens satisfied, but helps them reach city services such as municipal offices, supermarkets, pharmacies, is positive with the satisfaction of your free time, and also demonstrates an important aspect that emerged, or environmental sensitivity (Air pollutant variable).

Citizens that own bikes and travel by other sustainable means (carpooling) are also concerned about the environment, about air quality, noise and public safety. This result can be interpreted as an incentive to use the bicycle and both for the 15-minute city and by creating distances that can be covered by bicycle, citizens can reduce their sense of concern for the environment in terms of pollution. A further aspect to consider is safety, which indicates how safe citizens feel when walking. The safety variable responds to the variable "How safe do you feel walking down the street when it is dark and you are alone in the area where you live?" and being a Likert variable (1 = very safe, 6 = I never go out), it leads us to think that with the bicycle citizens feel safe walking at night because where they move there is a safe condition. The socio-economic variables are not significant except for age and gender. In relation to institutions, citizens who trust

Table 3. Results of variable use of bike.

Bike Use	Coefficient	Std. Err	t	P > |t|	95%	conf. interval
Age	–.024	.006	–3.75	0.000	–0.036	–.011
Sex	.026	.009	2.64	0.008	.006	.045
Instruction	–.001	.001	–2.77	0.006	–.001	–.000
Tram	.034	.004	7.78	0.000	.025	.043
Train	–.039	.005	–7.10	0.000	–.050	–.028
Landscape	–.050	.010	–4.93	0.000	–.071	–.030
Motorbike	–.015	.003	–4.00	0.000	–.022	–.007
Car Use	–.035	.003	–10.48	0.000	–.042	–.028
Life satisfaction	.014	.002	5.44	0.000	.009	.019
Hospital	–.039	.006	–6.28	0.000	–.051	–.027
Commercial office	–.030	.009	–3.33	0.001	–.048	–.012
Safety	–.011	.003	–3.11	0.002	–.019	–.004
Trust Institution	–.008	.002	–4.15	0.000	–.013	–.004
Parking facility	.046	.004	11.57	0.000	.038	.054
Connection to means of transport	.012	.003	3.53	0.000	.005	.018
Air pollutions	–.032	.005	–5.72	0.000	–.043	–.021

the government have access to associations but also a good connection with the territory, as emerges from the proximity and accessibility indicators.

These results show that public participation is not linked to the use of smartphones but to how active citizens are in communities and participation associations, therefore it suggests that citizens, rather than informing themselves online, prefer to dialogue and discuss, participating in the sector. Furthermore, it shows that sustainability measures can favour measures to reduce pollution, since we tried to analyse the car variable (such as driver and passenger) but it was never significant. Citizens who own a bicycle use alternative means of transport and may be in favour of green policies to reduce pollution.

The only sociological problems that arise with the emergence of syndromes are mistrust of scientists and local government. There are several possible causes for this result. First, since the dataset is for the year 2021 and we are during the COVID-19 pandemic, there was a lot of misunderstanding about the scientific role at the time. To help citizens and prevent them from feeling abandoned, we believe that measures for the 15-minute city must start with a bottom-up approach and institutional interventions. This is because the measures promoted at regional level do not seem sufficient to build citizens' trust. Finally, there is the question of how to integrate means of mobility.

Table 4. Results of job satisfaction.

Job satisfaction	Coefficient	Std. Err	t	P > |t|	95%	conf. interval
Age	.024	.010	2.37	0.018	.004	.044
Sex	.057	.015	3.64	0.000	.026	.088
Income	.077	.016	4.76	0.000	.045	.110
Train	.027	.008	3.30	0.001	.011	.044
Free time	.154	.006	23.04	0.000	.141	.167
Environment	.156	.008	19.20	0.000	.140	.172
Landscape	.042	.014	2.82	0.005	.012	.071
Safety	.025	.005	4.89	0.000	.015	.035
Car use	.013	.004	2.88	0.004	.004	.022
Life satisfaction	–.173	.003	–47.24	0.000	–.180	–.166
Trust institution	–.014	.002	–7.32	0.000	–.018	–.011
Noise	–.035	.008	–3.92	0.000	–.052	–.017
Commercial Office	.041	.013	3.04	0.002	.014	.069
Market	.044	.018	2.43	0.015	.008	.079

Table 5. Results of mobility and accessibility.

Accessibility	Coefficient	Std. Err	t	P > |t|	95%	conf. interval
Tram	–0.023	0.003	–6.43	0.000	–0.030	–0.016
Train	–0.023	0.004	–5.01	0.000	–0.032	–0.014
Police office	–0.079	0.009	–8.26	0.000	–0.098	–0.060
Commercial Office	–0.042	0.007	–5.62	0.000	–0.057	–0.027
Market	–0.069	0.009	–7.01	0.000	–0.088	–0.050
Environment	–0.018	0.004	–3.82	0.000	–0.027	–0.008
Landscape	–0.064	0.008	–7.45	0.000	–0.081	–0.047
Safety	–0.019	0.003	–6.31	0.000	–0.026	–0.013
Car Use	0.008	0.002	2.85	0.004	0.002	0.013
Scientist trust	0.005	0.001	3.56	0.000	0.002	0.008
Connections	0.058	0.002	20.80	0.000	0.053	0.064

(*continued*)

Table 5. (*continued*)

Accessibility	Coefficient	Std. Err	t	P > |t|	95%	conf. interval
Traffic	0.014	0.004	3.05	0.002	0.005	0.024
Air pollution	–0.023	0.004	–5.06	0.000	–0.032	–0.014
Criminality	–0.0139	0.004	–3.26	0.001	–0.021	–0.005

Table 6. Results of politic participation group

Political particitpation	Coefficient	Std. Err	t	P > |t|	95%	conf. interval
Age	0.043	0.005	8.18	0.000	0.032	0.053
Sex	–0.027	0.008	–3.37	0.001	–0.043	–0.011
Instruction	–0.000	0.000	–2.24	0.005	–0.001	–0.000
Free time	0.018	0.003	5.57	0.000	0.012	0.025
Association participation	0.293	0.020	14.09	0.000	0.253	0.334
Participation in “Comizi”	0.437	0.017	25.32	0.000	0.403	0.471
Participation in “Cortei”	0.263	0.022	11.85	0.000	0.220	0.307
Safety	0.025	0.005	4.89	0.000	0.015	0.035
Car Use	0.013	0.004	2.88	0.004	0.004	0.022
Life satisfaction	–0.173	0.003	–47.24	0.000	–0.180	–0.166
Trust institution	–0.014	0.002	–7.32	0.000	–0.018	–0.010
Bike sharing	0.097	0.023	4.22	0.000	0.052	0.142
Parking facility	–0.008	0.003	–2.73	0.006	–0.014	–0.002
Air pollution	–0.011	0.004	–2.64	0.008	–0.019	–0.002

The use of buses and couriers is not significant while other proximity variables prevail, except for the train. This leads to considering greater capillarity between neighbourhoods that cannot be reached by trains and buses as the stations are located further away. From the analysis carried out, a national trend emerges from which Italian citizens do not seem to show syndromes towards accessibility and proximity indicators, while they show difficulties towards the central government. Institutional strengthening of the idea of governance applied to urban processes is consequently suggested. In conclusion, the lack of technological results does not provide much insight into digital democratic participation. Nevertheless, it does highlight the necessity of prioritizing institutional consensus and public participation when considering technological participation.

5 Conclusions

The analysis provides several results. Services are undoubtedly a component of the city of x-minutes, but its implementation is influenced by other individual factors. People enjoy quick excursions yet find it challenging to get to the key services, and their mobility is impacted by safety and environmental comfort. Concerning participation, there is little evidence of digital connectivity and ICT, however, as already mentioned, this figure is only an indicator of use and information, it does not prove that participation can be improved or not with ICT.

Based on these results, this study highlights possible areas for scientific and practical study. Firstly, analysing the role of the car that is still present and strong, and noting that if intermodally is reduced, the use of the car is still fundamental to getting around, and it creates discomfort in people that green means cannot offer. Secondly, lifestyle leads to the assumption that in rallies or associative participation, extensive and widespread accessibility measures should be considered, while many services are still out of reach. Conflicts may arise from imposing cycling without improving neighbourhood conditions, such as safety, decay, noise, crime, and pollution. Measures on the 15-minute city should be carried out on intermodality and the location of workplaces, to offer a mode of travel that makes people satisfied with their work and life.

ICT use of e-democracy and e-participation, as expressed in the literature, does not emerge from the results. The implementation of urban initiatives is limited by public trust in science and government, which may result in discontent given the correlation between political involvement, life satisfaction, and work satisfaction. From the results, we can conclude that reaching consensus depends more on the surroundings. Based on the data, we can conclude that people are sensitive to political debates regardless of the medium, and that car use still predominates [63, 64].

Disclosure of Interests.. The authors have no competing interests to declare that are relevant to the content of this article.

References

1. Marquet, O., Mojica, L., Fernández-Núñez, M.B., Maciejewska, M.: Pathways to 15-Minute city adoption: can our understanding of climate policies' acceptability explain the backlash towards x-minute city programs? Cities **148**, 104878 (2024)
2. Ratti, C.: Don't let the culture wars sabotage 15-minute cities (2024). https://www.japantimes.co.jp/commentary/2024/01/05/world/15-minute-cities-study-conspiracy/. Accessed 08 May 2024
3. Michollek, N., Baig, R.: Fact check: Are 15-minute cities a plan to create lockdowns? (2023). https://www.dw.com/en/fact-check-are-15-minute-cities-creating-new-lockdowns-and-movement-restrictions/a-65226117. Accessed 08 May 2024
4. O'Sullivan, F.: Where the '15-Minute City' Falls Short (2021). https://www.bloomberg.com/news/articles/2021-03-02/the-downsides-of-a-15-minute-city?embedded-checkout=true. Accessed 08 May 2024
5. Chamberlain, L.: The surprising stickiness of the "15-minute city" (2022). https://www.weforum.org/agenda/2022/03/15-minute-city-stickiness/. Accessed 08 May 2024

6. Jackson, J.: What is the 15-minute cities conspiracy theory (2023).https://www.thebureauinvestigates.com/stories/2023-10-04/what-is-the-15-minute-cities-conspiracy-theory/. Accessed 08 May 2024
7. Evans, E.: How opponents of LTNs are adopting the climate-sceptic playbook. The Guardian (2023). https://www.theguardian.com/uk-news/2023/may/18/how-opponents-of-ltn-are-adopting-the-climate-sceptic-playbook. Accessed 08 May 2024
8. The Globe, Opinion: The '15-minute city' controversy is based on bunk. The fear behind it is worth considering, The Globe and Mail, (2023). https://www.theglobeandmail.com/opinion/article-the-15-minute-city-controversy-is-based-on-bunk-the-fear-behind-it-is/. Accessed 08 May 2024
9. Carlton, R.: 15-Minute-City Conspiracy Theories Insane Says 15-Minute-City Creator (2023). https://www.forbes.com/sites/carltonreid/2023/02/08/15-minute-city-conspiracy-theories-insane-says-15-minute-city-creator/. Accessed 08 May 2024
10. Vinod Kumar T.M : Geographic Information System for Smart Cities. 1st edn. Copal Publishing Group, New Delhi (2014)
11. Vinod Kumar, T.M.: E-governance for Smart Cities. 1st edn. Springer, Singapore (2015). https://doi.org/10.1007/978-981-287-287-6_1
12. Vinod Kumar, T.M: Smart Economy in Smart Cities. 1st edn. Springer, Singapore (2017). https://doi.org/10.1007/978-981-10-1610-3_1
13. Vinod Kumar, T.M.: Geographic Information System for Smart Cities. 2nd edn. Copal Publishing Group (2016)
14. Vinod Kumar, T.M. State of the Art of E-Democracy for Smart Cities. In: Vinod Kumar, T. (eds.) E-Democracy for Smart Cities. Advances in 21st Century Human Settlements. Springer, Singapore (2017). https://doi.org/10.1007/978-981-10-4035-1_1
15. Olokesusi, F., Aiyegbajeje, F.O.: E-Democracy for smart city lagos. In: Vinod Kumar, T. (ed.) E-Democracy for Smart Cities. Advances in 21st Century Human Settlements. In: Smart economy in smart cities. Springer, Singapore (2017). https://doi.org/10.1007/978-981-10-4035-1_2
16. Casarin, G., MacLeavy, J., Manley, D.: Rethinking urban utopianism: the fallacy of social mix in the 15-minute city. Studi urbani **60**(16), 3167–3186 (2023)
17. Grönlund, Å.: E-democracy: in search of tools and methods for effective participation. J. Multi-Criteria Decis. Anal. **12**(2–3), 93–100 (2023)
18. Akmentina, L.: E-participation and engagement in urban planning: experiences from the Baltic cities. Urban Res. Pract. **16**(4), 624–657 (2023)
19. Mueller, S., Vatter, A.: Switzerland (Swiss Confederation) governing with 26 cantons, 4 languages and frequent referendums. In: The Forum of Federations Handbook of Federal Countries 2020, pp. 341–352. Springer International Publishing (2020). https://doi.org/10.1007/978-3-030-42088-8_25
20. Granier, B., Kudo, H.: How are citizens involved in smart cities? Analysing citizen participation in Japanese"smart communities". Inf. Polity **21**(1), 61–76 (2016)
21. Moreno, C., Allam, Z., Chabaud, D., Gall, C., Pratlong, F.: Introducing the "15-minute city": sustainability, resilience and place identity in future post-pandemic cities. Smart cities **4**(1), 93–111 (2021)
22. Khavarian-Garmsir, A.R., Sharifi, A., Sadeghi, A.: The 15-minute city: urban planning and design efforts toward creating sustainable neighborhoods. Cities **132**, 104101 (2023)
23. Stratigea, A., Papadopoulou, C.A., Panagiotopoulou, M.: Tools and technologies for planning the development of smart cities. J. Urban Technol. **22**(2), 43–62 (2015)
24. Manville, M., Cummins, B.: Why do voters support public transportation? Publ. choices private behave. Transp. **42**, 303–332 (2015)
25. Pagliara, F., Di Ruocco, I.: How public participation could improve public decisions on rail investments? Reg. Sci. Policy Pract. **10**(4), 383–404 (2018)

26. Willberg, E., Fink, C., Toivonen, T.: The 15-minute city for all?–Measuring individual and temporal variations in walking accessibility. J. transp. Geogr. **106**, 103521 (2023)
27. Åström, J.: Mot en digital demokrati?: teknik, politik och institutionell förändring (Doctoral dissertation, Örebro universitetsbibliotek) (2004)
28. Abu-Shanab, E., Knight, M., Refai, H.: E-voting systems: a tool for e-democracy. Manag. Res. Pract. **2**(3), 264 (2010)
29. Saglie, J., Vabo, S.I.: Size and e-democracy: online participation in Norwegian local politics. Scand. Polit. Stud. **32**(4), 382–401 (2009)
30. Yu, Z., Wang, Z., Jie, W.: Effect of digital skills on citizens' digital participation: mediating effects of political interest, social issues concern and national identity. Kybernetes, (2024). https://doi.org/10.1108/K-08-2023-1567
31. El-Sherif, D.M., Khalil, E. E.: Policy instruments for facilitating smart city governance, Smart Cities Policies and Financing, pp. 305–317 (2022). https://doi.org/10.1016/B978-0-12-819130-9.00052-8
32. Guziana, B.: Only for Citizens? Local political engagement in Sweden and inclusiveness of terms. Sustainability **13**(14), 7839 (2021). https://doi.org/10.3390/su13147839
33. Anastasiadou, M., Santos, V., Montargil, F.: Which technology to which challenge in democratic governance? An approach using design science research. Transform. Gov. People Process Policy **15**(4), 512–531 (2021). https://doi.org/10.1108/TG-03-2020-0045
34. Mahrer, H., Krimmer, R.: Towards the enhancement of e-democracy: identifying the notion of the 'middleman paradox.' Inf. Syst. J. **15**(1), 27–42 (2005)
35. Tomor, Z., Meijer A., Michels A., Geertman S.: Smart governance for sustainable cities: findings from a systematic literature review. J. Urban Technol. **26**(4), 3–27 (2019).
36. Macintosh, A.: E-Democracy and E-Participation Research in Europe. In: Chen, H., et al. Digital Government. Integrated Series In Information Systems, vol. 17. Springer, Boston, MA (2008). https://doi.org/10.1007/978-0-387-71611-4_5
37. Bassoli, M.: Participatory budgeting in italy: an analysis of (almost democratic) participatory governance arrangements. Int. J. Urban Reg. Res. **36**(6), 1183−1203 (2012)
38. Boonstra, B., Boelens, L.: Self-organization in urban development: towards a new perspective on spatial planning. Urban Res. Pract. **4**(2), 99–122 (2011)
39. Conroy, M.M., Evans-Cowley, J.: E-participation in planning: an analysis of cities adopting on-line citizen participation tools, environment and planning. C Gov. Policy **24**(3), 371–384 (2006)
40. Cropf, R. A., Benton, M.: Towards a Working Model of e-Participation in Smart Cities: What the Research Suggests, In E-Participation in Smart Cities: Technologies and Models of Governance for Citizen Engagement, edited by, M. P. Rodríguez Bolívar, and L. Alcaide Muñoz, 99–121. Cham: Springer, (2019)
41. Royo, S., Yetano, A.: "Crowdsourcing" as a tool for e-participation: two experiences regarding CO_2 emissions at municipal level. Electron. Commer. Res. **15**, 323–348 (2015)
42. Molinari, F., Ferro, E.: Framing Web 2.0 in the process of public sector innovation: going down the participation ladder. Eur. J. ePract. **9**(1), 20–34 (2009)
43. Edelmann, N., Höchtl, J., Sachs, M.: Collaboration for open innovation processes in public administrations. Empowering Open Collaborative Governance Technol. Methods Online Citiz. Engagem. Public Policy Making, 21–37, (2012)
44. Arnstein, S.R.: A ladder of citizen participation. J. Am. Inst. planners **35**(4), 216–224 (1969)
45. C40 Cities Climate Leadership Group. How to build back better with a 15-minute city (2020).https://www.c40knowledgehub.org/s/article/How-to-build-back-better-with-a-15-minute-city. Accessed 08 May 2024
46. Miller, D.: Mayors engaging with the G20: Make COVID-19 recovery green and just to deliver a successful COP26 (2021). https://www.c40.org/news/mayors-engaging-with-the-g20-make-covid-19-recovery-green-and-just/. Accessed 08 May 2024

47. Spirakis, G., Spiraki, C., Nikolopoulos, K.: The impact of electronic government on democracy: e-democracy through e-participation. Electron. Gov. Int. J. **7**(1), 75–88 (2010)
48. Bartzokas-Tsiompras, A., Bakogiannis, E.: Quantifying and visualizing the 15-minute walkable city concept across Europe: a multicriteria approach. J. Maps **19**(1), 2141143 (2023)
49. Vale, D., Lopes, A.S.: Accessibility inequality across Europe: a comparison of 15-minute pedestrian accessibility in cities with 100,000 or more inhabitants. npj Urban Sustain. **3**(1), 55 (2023)
50. Gaglione, F., Gargiulo, C., Zucaro, F., Cottrill, C.: Urban accessibility in a 15-minute city: a measure in the city of Naples. Italy. Transp. Res. procedia **60**, 378–385 (2022)
51. Staricco, L.: 15-, 10-or 5-minute city? A focus on accessibility to services in Turin Italy. J. urban mobility **2**, 100030 (2022)
52. Murgante, B., Patimisco, L., Annunziata, A.: Developing a 15-minute city: A comparative study of four Italian Cities-Cagliari, Perugia, Pisa, and Trieste. Cities **146**, 104765 (2024)
53. Molinaro, D., Santarsiero, V., Saganeiti, L., Murgante, B. (2023). The 15-minute City Model: Assessment of the Socio-Economic and Environmental Impacts Associated with the Location of Essential Amenities. In: Gervasi, O., et al. Computational Science and Its Applications – ICCSA 2023 Workshops. ICCSA 2023. Lecture Notes in Computer Science, vol. 14107. Springer, Cham. https://doi.org/10.1007/978-3-031-37114-1_32
54. Patimisco, L., Annunziata, A., Murgante, B.: Spatial and Configurational Analysis for the Implementation of the 15-Minute City Model. The Case Study of Perugia, Italy. In: International Conference on Innovation in Urban and Regional Planning, pp. 681–692. Springer Nature Switzerland, Cham (2023). https://doi.org/10.1007/978-3-031-54118-6_60
55. Italian National Institute ISTAT Homepage. www.istat.it. Accessed 08 May 2024
56. Vale, D.S., Saraiva, M., Pereira, M.: Active accessibility: a review of operational measures of walking and cycling accessibility. J. Transp. Land Use **9**(1), 209–235 (2016)
57. Knap, E., Ulak, M.B., Geurs, K.T., Mulders, A., van der Drift, S.: A composite X-minute city cycling accessibility metric and its role in assessing spatial and socioeconomic inequalities–a case study in Utrecht, the Netherlands. J. Urban Mobility **3**, 100043 (2023)
58. Kneuer, M.: E-democracy: a new challenge for measuring democracy. Int. Political Sci. Rev. **37**(5), 666–678 (2016)
59. Allison, P.D.: Multiple Regression. Pine Forge Press, Thousand Oaks, CA (1999)
60. Berry, W.D.: Understanding Regression Assumptions. Sage Publications, Newbury Park, CA (1993)
61. Breusch, T.S., Pagan, A.R.: The lagrange multiplier test and its applications to model specification in econometrics. Rev. Econ.Stud. **47**, 239–253 (1980)
62. Oberfichtner, M., Tauchmann, H.: Stacked linear regression analysis to facilitate testing of hypotheses across OLS regressions. Stata J. **21**, 411–429 (2021)
63. Päivärinta, T., Sæbø, Ø.: Models of e-democracy. Commun. Assoc. Inf. Syst. **17**(1), 37 (2006)
64. Manville, M., Cummins, B.: Why do voters support public transportation? Public choices private behave. Transp. **42**(2), 303–332 (2015)