# A comparative analysis of Decide Madrid and vTaiwan, two Digital Platforms for Political Participation

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# A comparative analysis of Decide Madrid and vTaiwan, two Digital Platforms for Political Participation

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**Declaration**

Disclosure of material contained in this thesis has received all of the relevant consents from practitioners and interviewees. All interviewees and participants in this research are treated anonymously, and their names have been changed into 'pseudo names' in this thesis. Parts of this thesis have been rewritten and submitted for publication. Chapter 3 has been revised and re-edited for a book chapter entitled 'Working with the Spanish and Taiwanese governments' in the book 'Navigating the Field: Postgraduate Experiences in Social Research' (Springer, 2020). Chapter 6 has been rewritten into a manuscript which is planning to submit to Geoforum Journal. Chapter 5 has the potential of submitting to Big data and Society Journal or Information Communication and Society Journal. This thesis is solely written by myself and on that basis I take full responsibility for any errors.

## Acknowledgement

Doing a PhD with a comparative study of Western and non-Western cases has been a massive challenge to me. It is also an invaluable experience for me to get to know myself better, and I hope by the very end of this journey I will remember all the crucial lessons that I have learned along the way. Very often, I have been haunted by a picture whereby I was drifting up and down upon the darkness of the sea. Sometimes I swam against the tide, other times I floated with the waves. Many moments during my research were very scary, confusing and even daunting for an immature researcher like myself. Yet, despite all these difficult moments, I have been persisted in my battle against the sea. I searched for the light in the sky, in remote lands, and at the edge of the sea. This feeling of hanging here, either feeling frustrated or making substantial progress, has been constitutive of this thesis. There are several persons to which I want to express my gratitude, who kindly showed me the direction of the light. I am truly grateful to see their wisdom through various conversations.

First and foremost, I want to thank my both supervisors — Colin and Andrés — who showed me the way of how to do research, how to think and write critically and how to be a proper researcher, with great passion, kindness and patience. Despite my slowness in practicing all these tasks, and in figuring out and polishing my ideas and arguments, they always encouraged and guided me to the right track with so much wisdom, both intellectually and emotionally. I am not sure I have learnt all of these tasks at once, but I vividly remember some of the key words and conversations which they both expressed to me in the supervision meeting and/or informally. I hope I am moving towards a great researcher like them.

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and old feminist. Thank you for telling me how you highly regard a woman like me who pursues her career and betters herself through education against all odds.

**Abstract**

This thesis is a comparative examination of the impacts of two so-called 'Digital Platforms for Political Participation' (DPPPs) — Decide Madrid and vTaiwan — on urban policymaking and citizen empowerment. DPPPs are a novel subset of digital platforms which are focused on facilitating online political participation and are designed and implemented by governmental institutions: the two cases under study here are designed by Madrid City Council and the Taiwanese government respectively.

This thesis utilises what I term a situated lens, which fuses the idea of relational comparative urbanism, Deleuzian assemblage thinking and theories of empowerment. This situated lens allows me to evaluate, compare and identify the similarities in the forms of digital political participation provided by the two DPPPs under study. It does this by breaking each DPPP down into three sets of assemblages: (1) the design process; (2) the dynamic User Interface (UI); and (3) the process of algorithmic decision-making. The term 'situated' is coined to highlight the dynamic and mutating nature of digital political participation. Via this situated lens, I stress that digital empowerment is highly changeable, constrained and opened up by rules set at design stage, the dynamic UI, contingencies introduced by algorithmic interactions with users, and the changing human/institutional contexts in which these processes are embedded.

This thesis demonstrates that my comparative study of the two DPPPs can enrich existing studies in digital urbanism and digital participation.

Firstly, drawing from theories of empowerment, the situated lens allows me to indicate the level of empowerment a DPPP provides should not be seen just as the provision of a fixed static set of participatory capacities. Rather, a DPPP should be seen as a fluid space in which empowerment is present to a greater or lesser extent, affected by a fast-moving environment in which a user can be disabled or enabled in making informed and collective decisions due to various contingencies (such as the dynamic UI and the processes of user data interacting with algorithms to produce decisions). The wider institutional context also drives this fluidity: the citizen/user's ability to impact on policymaking through reaching collective decisions through DPPPs is constrained or promoted by subsequent processes of governmental allocation of political legitimacy and resources.

Secondly, the situated lens offers a new view in digital urbanism, by deploying an innovative hybrid method to produce 'flashbacks' on specific processes of digital political participation. In doing so it reveals and question the ways in which political decisions on legitimating urban issues are mutably (re)configured by algorithmic interactions with users and by subsequent human interpretation in institutional policymaking processes. This serves to question what constitutes fairer and more empowered political decisions by pointing out exclusions which emerge during the decision-making processes of DPPPs.

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# Chapter 1 Introduction

People decide to conduct a PhD project for different reasons. I think it is worthwhile to start the introduction of this thesis by explaining my reasons for beginning it; mine are tightly bound to my previous experiences of studying Urban Planning at University College London (UCL) and subsequently working as an urban planner in the Deputy Mayor's Office at Taipei City Hall. This guided my choice of doing a comparative study of alternative smart urbanism, which became a study of two innovative digital platforms which I have termed 'Digital Platforms for Political Participation' (hereafter referred to as DPPPs): Decide Madrid, developed by Ayuntamiento de Madrid (hereafter referred to as Madrid City Council) and vTaiwan, developed by the Taiwanese government's Cabinet Office.

It was when I was working for Taipei City Hall that I decided to pursue PhD research on the general topic of alternative forms of smart cities. In 2015, I returned to Taipei from UCL with an MSc in urban regeneration and a six-month internship as a research assistant. I was young, naïve, and full of energy and enthusiasm to put what I had learned into practice. What I encountered was much frustration, confusion and unspoken disagreements between myself and Taipei City Hall on various strands of work related to urban policymaking and public participation. To cut a long story short, in contrast to the British academic environment — where individual and critical thought is appreciated and valued — in Taipei, I quickly found that having very little original ideas and almost no criticality was the way to get along with civil servants.

In Taipei, I found that I terribly missed the experiences I had had at UCL and my life in London more generally: in particular, the freedom and challenges that I was given and trusted with. Whilst life in London for a poor international student is not easy, there is always something new to learn and think about! At Taipei City Hall, I deeply felt that I could not learn enough, especially regarding how to face down 'myths' surrounding the deployment of ICT and digital technologies in Smart City initiatives, which day by day I found to be a greater and greater problem for urban governance, both in Taipei and the wider world. I will never forget several meetings I attended with ICT providers and experts on the subjects of smart meters/grids for social housing, where I watched the Deputy Mayor, his urban planners and other civil servants become pretty much speechless, overwhelmed and even 'lost' when technical experts began to 'explain' the technical operation of smart meters. It was at this

decisive moment that I felt a great urge to learn more about the entanglement between ICT/digital technologies and cities: to unpack 'unknown' aspects of digital technologies within a PhD project, and in the process carve an identity as an urban planner/geographer on the cutting edge of urban research.

Besides, whilst working in Taipei City Hall, I became increasingly concerned about the top-down approach to smart cities and urban development which I observed there, whereby even though many forms of public participation were launched and executed, the voices of citizens and wider controversies were often either sidelined or 'covered up' by political propaganda. It became clear that such an approach to urban development would end up inflaming controversy rather than avoiding it. A strong feeling arose in me that I wanted to learn from places where the smart city concept was implemented in a better way. Whilst this was not possible in Taipei at the municipal level, I was fortunate to have the example of vTaiwan on my doorstep, which was also located in Taipei, but at the level of national government rather than local government and consequently operating within a different set of institutions and stakeholders. Under the direction of Taiwanese Minister for Digital Affairs, Audrey Tang, vTaiwan was an example of a new type of digital platform focused on urban governance which was carving out a reputation as a world leader in the application of digital solutions to democratic governance. It focused on digital issues which affect everyday practices, such as e-learning, e-clinics, Uber and Airbnb.

I decided to pursue the idea of launching a study which compared vTaiwan with another DPPP which was also considered to be a leader in terms of digital political innovation. Both cases have been making waves at a global level as exemplary cases of innovation in practices of digital democracy (Simon et al., 2017; Miller, 2019; Tang, 2019a). Digital democracy, despite having a number of different models ranging from consensus-based to adversarial (Dahlberg, 2011), can be seen in general terms as:

> *the usage of information and communication technology and computer-mediated communication in all kinds of media (e.g. the Internet, interactive broadcasting and digital telephony) for purposes of enhancing political democracy or the participation of citizens in democratic communication* (Hacker and VanDijk, 2000, p. 1*).*

Building on Hacker and VanDijk's (2000) understanding of digital democracy as an addition to traditional 'analogue' political practices, in my thesis I will specify such practices as 'digital political participation': this can mean, for instance, giving opinions, making proposals, making comments on the opinions or proposals of others, and voting in participatory processes such as participatory budgets and petitions. I hoped to conduct in-depth research to explore whether it was true that such platforms could driver increased citizen empowerment and improve (urban) policymaking processes: these were the 'major claims' which were typically being made about the DPPPs (Simon et al., 2017; Miller, 2019; Tang, 2019a). I would do this through empirical research, which would focus on an examination of technical and 'hidden' details which had been hitherto ignored within the literature on smart cities, and in the process create a comparative study which would be able to make a significant contribution to urban research.

In addition to the focus on whether the DPPPs actually performed the functions they set themselves in terms of achieving better civic empowerment and urban policymaking, this PhD thesis should also be read as reflecting the concerns of a geographer who wished to see how a comparative study of two cases of digital political participation platform considered to be leaders in the field could inform those wider theories of digital empowerment and digital urbanism which are currently in use within academic contexts. Thus, informed by my personal experiences as an urban planner and researcher, I aim to push forward current studies of digital urbanism and digital participation by critically examining the effects of technical details within the DPPPs — logics embedded at design phase, effects of the visualisations produced via the User Interface (UI) and the processes of algorithmic calculation which produce political decisions based on user data — and in the context develop an explanatory theory allowing me to make sense of my empirical findings.

Here, I state four contributions my thesis will make to studies of digital political participation and digital urbanism.

Firstly, researching DPPPs can be seen as a timely and critical response to calls in geography and urban studies for research aimed at examining digital technologies. Over the past five years, digital geography and urban studies have shown increased interest towards studying the effects of digital technologies and algorithm-powered systems. In calling for a 'digital

turn' in geography, Ash, Kitchin and Leszczynski (2018) have sought for geographers to take serious and critical account of digital technologies: this is because digital technologies are working at pace to (re)shape new spatial relations, powers and regimes of algorithmic governance. The concept of algorithmic governance refers to a new model of governance in which algorithms actively 'search, collate, sort, categorise, group, match, analyse, profile, model, simulate, visualise and regulate people, processes and places' (Coletta and Kitchin, 2017, p. 4; Kitchin, 2017, p. 18). Algorithms are seen as increasingly becoming 'agents' or 'actors' within political processes; they appear to possess attributes which allow them to act autonomously, particularly where they are informed by types of Artificial Intelligence (AI) such as Machine Learning. Issues related to how to study algorithms — particularly their ontological status, their autonomy (or otherwise) and their increased salience within contemporary modes of governance — will only become more important as the 21st Century progresses (Amoore, 2009, 2013; Steiner, 2012).

Secondly, my usage of a hybrid method — which integrates participatory observation, interviews and the 'digital flashback' method — aims to contribute to solving long-term methodological problems in approaching how to investigate software and digital technologies within both urban studies (see Graham 2005) and, more recently, digital geography (Kitchin, 2017; Leszczynski, 2018). My hybrid method, particularly due to the use of digital flashbacks, has allowed me (with the help of data scientists) to directly or indirectly analyse data archives of DPPPs in terms of how users' online activities relate to algorithmic operations. The digital flashback recreates, simulates and visualises specific cases of online participation — such a daily section of vTaiwan online participation in relation to the case of Uber — which can be seen as similar to the use of the 'digital twin' approach (Guo *et al.*, 2019, p. 1189; Zohdi, 2020). The flashback method offers a partial view on the 'black-boxed' processes by creating and visualising flashbacks of instances of issue-based digital political participation. The importance of understanding how algorithms work 'behind the scenes' has been noted by Amoore and Piotukh (2015a, pp. 4, 14), who critically note that without 'careful attention to how it [data] is analysed, and to what can be said about the data on the basis of that analysis', researchers face risks when pressed to make claims about the impacts of data and digital technologies on governance of contemporary life; without focusing on processes of internal algorithmic calculation, such claims run the risk of being insufficient and therefore misleading. To provide a way through this problem, my hybrid method offers a way to collect

empirical evidence on which I ground my comparative study of the two DPPPs by viewing the platforms as three sets of assemblages, and on which I produce my overall theoretical framework — a situated lens.

Thirdly, my development of a situated lens — which is informed by relational comparative urbanism and fuses assemblage thinking with theories of empowerment — contributes to the field of digital political participation and smart/digital urbanism in several ways. Following the relational comparative urbanism which encourages researchers to discern similarities from cities that are very different in geography, culture or society (McFarlane and Robinson, 2012; Robinson, 2015), the situated lens is able to trace the genesis of Decide Madrid and vTaiwan in terms of how they both evolved from digitally-facilitated social movements through progressive institutionalisation; by doing so it is able to grounds both DPPPs within wider processes of democratisation in Spain and Taiwan. The genetic similarity between the two DPPPs I am studying (despite their apparent political, social and cultural differences) justifies my choice of taking a comparative approach to Decide Madrid and vTaiwan. The comparative approach in my thesis can potentially open up current studies of smart urbanism, which largely focus on *single case* studies located in Anglosphere, European or Latin American contexts. In particular, both the two DPPPs have not been investigated before within smart and platform urbanism, where there has been a prioritisation on 'directed/automated data' (Kitchin, 2014) and 'digital platform enterprises' such as Twitter, Uber, Airbnb and Google Maps (M.Graham and Zook, 2013; Leszczynski, 2016, 2019).

Fourthly, drawing on Deleuzian assemblage thinking, the situated lens pushes forward recent work to understand digital participation by going beyond viewing the capacity to participate digitally as being dependent on the possession of a fixed set of capacities such as familiarity with technology and the ability of the user to apply skills such as literacy and numeracy in digital contexts (Mossberger, Tolbert and McNeal, 2008; Isin and Ruppert, 2015, pp. 81–84). The situated lens highlights a contextual, open-ended and 'on-the-move' understanding of digital political participation which sees the DPPP as a constellation of assemblages (design, UI and algorithmic decision-making) that are respectively constituted and reconstituted by users, policymakers, software engineers and algorithms. In particular, a situated lens is able to grapple with the contingent and multifarious nature of algorithms (Kitchin, 2017; Amoore, 2019), seeing their in situ operation in DPPPs as an ongoing and mutable set of

human-algorithmic interactions located within wider political contexts which are locatable via the use of empirical case studies such as those I have conducted.

In the following sections, I will begin my initial comparative analysis on the two DPPPs by providing some introductory information which highlights the significance of Decide Madrid and vTaiwan by locating their inception in specific local and global contexts.

## 1.1 A relational comparison of Decide Madrid and vTaiwan

I draw my comparative method primarily from Robinson's (2015, p. 16) comparative urbanism in which she specifies a 'relational' comparative method, which aims to uncover 'genetic interconnections' between different cities. Robinson (2015, p. 16) enriches this relational comparative method with a 'generative' aspect which builds on the relational comparison to produce new theories to explain similarities between cities. In Robinson's (2015, p.16) own words, 'genetics' is defined as tracing 'the strongly interconnected genesis of often-repeated urban phenomena' across different cities. It is through this 'genetic' comparative method that I am able to find relationships between the two DPPPs — which are located in the divergent geographies of Taipei and Madrid City — by tracing the similarities in the trajectories which the two DPPP have developed along. By bringing out the relational contexts of the two DPPPs, I aim at demonstrating the strength and power of doing a comparative study. As I argue, the genetic differences and similarities between Decide Madrid and vTaiwan have important impacts on how the two DPPPs are shaped, designed and constrained in the context of citizen empowerment.

As I will detail in the following section, both Decide Madrid and vTaiwan evolved from what some have termed 'decentralised/horizontal' forms of digitally-aided social movements (Castañeda, 2012; Gibson, 2013; Fominaya, 2015; Tufekci, 2017) to being institutionally grounded in the apparatuses of governance within Madrid and Taipei City. Both trajectories can be traced back to the 1970s/80s, when social movements against authoritarian state structures in Spain and Taiwan were organised by pro-democracy elements in Spain and Taiwan (Bustelo, 1991); whilst these differed from each other because of cultural and political factors, they shared important similarities.

1.1.1 Similar trajectories in moving from authoritarianism to democracy

Taiwan and Spain share notable similarities in their historical trajectories; in both countries, long periods of authoritarian rule with 'strongmen' leaders — led by General Francisco Franco and his Falange party and Chiang Kai-Shek's KMT party in Taiwan — gave way to largely peaceful transitions to democratic rule in the 1970s and 1980s. In his comparative study of Taiwanese and Spanish democratisation, Bustelo (1991, p. 2) argues that the key drivers for these transitions were a combination of rapid economic growth, dramatic social change and a 'trend' toward democracy both within and without each authoritarian regime. Following fast economic growth in 1950s, well-educated middle classes emerged in Spanish and Taiwanese society (Bustelo, 1991, p.9-10); these middle classes then began to expect and demand democratic rights from the respective governments (Bustelo, 1991, p.9). In Taiwan, several social movements — such as the 'zhongli incident' (in 1977) and the 'Formosa incident' (in 1979) — were mobilized by political elites outside of the KMT party (also known as 'Dangwai' in Mandarin). In Spain, alongside a growing and vibrant citizen 'associational milieu' which empowered Spanish citizens to advocate for democracy in the 1960s (Radcliff, 2011, p. 3), a strong student activist movement emerged with international influences (especially from the USA); these have been considered to be 'substantial stimulus' encouraging dissent to Franco's regime (Tejada, 2014).

Despite this similarity, Taiwan's democratisation was slower than its Spanish counterpart. It was not until 1996 that Taiwan had its first direct general election, though martial law was lifted in 1987. By contrast the first general election in Spain was held in June 1977, shortly after Franco's death in November 1975 (Bustelo, 1991, p. 2). I note at least three factors that contribute this slow democratic transition in Taiwan: (1) 'the traditional Chinese authoritarian political culture'; (2) the existence of an authoritarian one-party state structure (rooted in Leninist organisational theory) which exerted stronger hegemonic power than its Spanish counterpart (Bustelo (1991, p. 11, 17); and (3) a relatively weak civil associational society (Lin et al., 2005). Firstly, due to the lack of democratic tradition and culture in Taiwan, most social movements from 1970s made relatively weak claims for democratic reforms (Bustelo, 1991, p. 17-18). Secondly, being heavily influence by theories of Leninist-style hegemonic governance, the KMT regime vanquished any political dissent expressed in various social movements in 1960 and 70s and presented itself as a strong, all-encompassing and paternalistic state (Bustelo, 1999). Thirdly, in contrast to a civil society in Spain which

remained relatively vibrant under Francoism (Racliff, 2011), Taiwanese civil society was weak, as 'the extent and depth of citizen participation [was] limited to certain CSO[civil social organisation] or certain social groups, and, on the whole, various forms of civic engagement [were] relatively weak' (Lin et al., 2005, pp. 8–9). In particular, the influence of civil society actions on informing and educating citizens about democratic values and political issues was limited in Taiwan (Lin et al., 2005, p. 84):

> *although today Taiwan is a democracy, with free access to all kinds of information, the public is still used to having a strong state as its source of education and information and it has only been within the past decade that civil society has been able to break into the state's monopoly on the dissemination of information.*

Via this comparative approach, we start to see how Spain and Taiwan are related to each other in their democratisation processes, with important similarities and differences. The works of Bustelo (1991), Rancliff (2011) and Lin *et al*. (2005) offer us a quick glimpse into Spain's rapid and solid democratisation, which appears to benefit from a civil society which has stronger consciousness of democratic claims and culture than Taiwanese society. From here, we can used the shared experience of democratisation in Spain and Taiwan in the past as grounds for comparing Decide Madrid and vTaiwan.

Moving forward to the 2010s, I track down the more recent relations between the inception of Decide Madrid and vTaiwan in terms of their evolution in the context of a global popular social movement, the Occupy Movement. I will note how the pre-existing cultural, political and social differences which have shaped Spanish and Taiwanese democratisation over the past 40 years continue to shape contemporary practices of political participation in the present.

1.1.2 From 'decentralised' social movements in Madrid and Taipei to institutionalisation
In tracing the trajectories from which Decide Madrid and vTaiwan were born, it is clear that both can be seen as specific offshoots of the global Occupy movement; more specifically, they can be seen as responses to economic crisis and various other forms of injustice (Financial Times, 2012) which take into account the local contexts of Taipei and Madrid. In the case of Taiwan, the protests were known as the Sunflower Movement: they were associated with opposition to a trade deal with China which was seen as a harbinger of

political union with China and the increased authoritarianism this implied. In Madrid, the movement known as 15M, composed of the so-called 'Indignados', began in early 2011 as a result of the austerity policies of the-then Spanish government, which was later the first movement to attach the 'Occupy' moniker to this set of protests (Castañeda, 2012). Crucially, the creation of both DPPPs exemplifies the integration of forms of resistance in the Occupy Movement into political institutions. Monterde *et al.* (2015, p. 934) state that '15M was born in 2011 and continued to evolve through 2014, in continuous transformation and development of new forms of collective action and identity, which currently appears to be veering towards institutional politics'. In Taiwan, in the wake of the Sunflower Movement, the Taiwanese government came under huge public demand to reform their mechanism of public participation; this included calls to meaningfully incorporate the use digital platforms into governance (Kuan, 2015).

The Occupy movement, either being facilitated or enabled by digital technologies and social media, is famous for its advocacy of 'decentralized/horizonal' forms of organisation (Hughes, 2011; Castañeda, 2012; Gibson, 2013; Fominaya, 2015; Tufekci, 2017). Heavily influenced by anarchism, the idea of decentralisation connotes a collective process of decision-making where citizens' are able to directly participate and thus become autonomous from the centralised state (Gibson, 2013, p. 342). This idea of decentralisation is often used to illustrate a 'leaderless' and 'horizontal' organisation where 'preexisting organisations whether formal or informal played little role' (Tufekci, 2017, p. 51, 78). The use of decentralised forms of social movement seems to be a characteristic of both Indignados in Madrid and the Sunflower movement in Taiwan (Fominaya, 2015; Gibson, 2013; Ho, 2018; Fenton, 2016). Based on the example of 15M, Fenton (2016, p. 36-37) also illustrates this horizontal form of social movement as 'a networked politics' which are 'leaderless, non-hierarchical, with open protocols, open communication, and self-generating information and identities'.

However, it is important to note that, in contrast to Tufekci's (2017) work in Turkey, which identified of an entirely 'decentralised/horizontal' Occupy movement, the Spanish and Taiwanese cases both involve greater elements of centralisation from the outset. Firstly, whilst Tufekci's work in Turkey noted there were no extant organisations prior to its Occupy movement; in the Spanish context, there was a lot of work and effort put into establishing

informal organisations such as 'the democratia ya' and 'hacklab'; similarly, in Taiwan, a formal organisation called 'island in progression' had already been established in the case of Taipei before the outbreak of the Taiwanese Occupy Movement. Secondly, the Taiwanese Occupy Movement did not entirely utilise a decentralised form of social movement. In what Ho (2018, p. 189) theorises as 'improvisation', the Sunflower Movement is considered as 'an intermediate pattern of movement participation' which involves some elements of decentralised decision-making yet proceeds towards a clear and consensus-defined goal. It 'was emphatically not a "leaderless movement" empowered alone by the mass participants who followed the principle of horizontality' (Ho, 2018, p. 199).

The similarity and difference between how the idea of a decentralised social movement is organised across Spain and Taiwan can be explained by further exploring the different culture and history of specific democratic movements in the context of wider democratisation in the early 1970s and 1980s. From here, we can see the strength of using relational comparison to unpack and challenge what has been termed as 'decentralised social movements'. The comparative lens notes how different cultural and historical contexts shape the specific levels of decentralisation that digital technologies were used for whilst organising the Occupy movement; these trends continue to influence the development of the two DPPPs and their impacts on democratic empowerment. This suggests a more critical and contextual analysis of digitally-facilitated social movement, as Juris (2012, p. 260) critically reminds researchers 'of the importance of deeply sedimented histories and politics of place for understanding the dynamics of protest in concrete locales or of the tendency for social movements to organize through decentralized, diffuse, and leaderless networks since at least the 1960s'.

Secondly, in line with Spanish anarchist-influenced culture — which organised autonomous and horizontal grassroots social movements against the Franco regime from 1960s onwards — (Hughes, 2011, p. 411; Alberola, Millan and Zambrana, 2000; Fominaya, 2009, p. 336, Juris, 2012), before the 15m movement in Madrid there were already several associations/centres created which gathered squatters and hackers for the purposes of developing, educating and using digital technologies for social movements. Fominaya (2015, p. 146) notes that such autonomous and horizontal form of social movement have 'become a more widespread feature of Madrid's and Spain's social movement culture' prior to 15M. Indeed, during my fieldwork, David, one of the 'digital guerrillas (hackers/squatters)' who

organized Hacklab and its associated Hackademy workshop in Madrid, expressed that:

> *....we give a lot of courses...when the movement [15M] came we are ready...anarchists, researchers, squatters, students, business who have been to our workshop which we gave them for free....[hacklab was able] create new ways of fighting that can be reached through a connection between that kind of people, high-tech people with social love and social warriors that have been already doing that in the street*

Therefore, with a strong pre-existing culture in anarchism and autonomous associations, Madrid in some ways was 'well-prepared' when the opportunity same for activists to call out a large scale social movement.
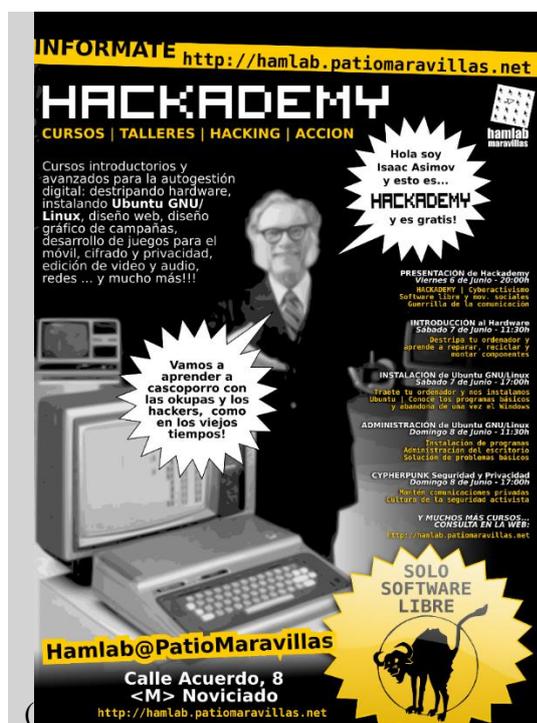


Figure 1 Hackademy Workshop organised by Hacklab (Source: provided by David)

Such an anarchistic and autonomous culture in Madrid can be contrasted to Taiwan where Sunflower Movement was the starting point when digital technologies were used specifically by tech-savvy activists for organising social movements. Vichy, an activist who was involved in live stream and logistics team during the Sunflower Movement, expresses that:

> *actually most social movement organisations are not very familiar with new*

*technologies, such as google spreadsheet, live-stream and other digital tools...it is during Sunflower Movement that some developers from g0v have exchanged their knowledge with activists, to reuse some digital tools for a social movement... [traditional]Activists are very good at organising an offline social movement, such as press conference.*

Moreover, being culturally different from Spanish anarchist-influenced autonomous social movements — which stress leaderless and direct forms of participation and decision-making (Castañeda, 2012; Fominaya, 2015) — the culture of social movements in Taiwan during the 1990s and 2000s can be seen as deploying highly-localised, grassroots-oriented, experimental yet professionalised organisations of specific academic scholars, activists and non-profit organisations (Chuang, 2013, pp. 47–48). In Taiwan, there has not been an emphasis on decentralisation, nor on direct democracy, as has been the case in the anarchist-influenced Spanish context. This was evidenced later on in the Sunflower Movement, when a power division emerged between a few participants who became members of the Taiwanese Parliament — and thus came to the centre of decision-making in Taiwan — and colleagues who remained outside of formal governmental institutions (Ho, 2018; BBC Chinese News, 2019). Such a division amongst participants suggests a *less* decentralised and direct form of decision-making process than in the Indignados.

Recognising these differences between the Spanish and Taiwanese Occupy movements thus provides me with an important and situated perspective to compare the development and invention of the two DPPPs within each's own cultural and political contexts. It is these cultural and political contexts that influence the ways in which participants from Occupy Movement approached institutionalisation. This is exemplified in both Spanish and Taiwanese cases, where activists and civic hackers not generally considered as 'politicians' — such as software engineers and political activists — began to 'occupy' and influence institutional politics in various ways, from launching a new political party to taking part as moderators or technical providers in numerous forms of public participation. Here, Decide Madrid and vTaiwan are seen as specific instances of the institutionalisation of the Occupy Movement. As I am going to illustrate, the cultural-political differences between Madrid and Taipei continued to shape how DPPPs were embedded and developed by different levels of government and designed for users with different functions and levels of

accessibility.

1.1.3 From the decentralised 15M movement to Decide Madrid

In the aftermath of 15M, a citizen organisation connected to the Madrid protests known as Movimiento Por La Democracia (Movement for Democracy) produced a Charter for Democracy (2011). It noted that the ethos of 15M had mutated and diffused, driving new possibilities, activities, and spaces in everyday life and political systems. The Charter claimed that:

> *the movement [15M] undeniably lives. Its form has been mutated, re-imagined, distributed, and coalesced into a swarm of activity and hacks to the system. We live here; we see it every day. These initiatives are not as easily seen, defined —or, for that matter, targeted —as a physical occupation may be; yet they permeate the hegemony, creating new possibilities and spaces* (Movement for the Democracy, 2011, p. 1).

One of the many trajectories that emerged from 15M was a journey which ultimately led to the development of Decide Madrid, which stemmed from the activity of so-called 'civic hackers' associated with the protest movement. Civic hacker is a loose term meaning software engineers who volunteer to code for various 'good causes' in societies. As I explained earlier, civic hackers were associated with anarchism in Madrid City due to a specific culture and history of social movements which existed there. After 15M, an 'electoral shift' (Ordóñez, Feenstra and Franks, 2018, p. 85) took place within some Spanish anarchist/civic hacking colelctives; they decided to 'get their hands dirty' by entering into governmental institutions to make changes. In Madrid, some civic hackers decided to establish a laboratory called 'labodemos' (loosely translated as 'our laboratories' in English but also having a connotation of the Greek *'Demos'*, i.e. the people in a democracy) with the intended purpose of continuing the ethos of 15M by inventing a new digital mechanism for conducting what they term 'direct democracy'. Here, we can see how the Spanish anarchist culture influenced how these civic hackers developed Decide Madrid to enable citizens to make direct decisions on policy-making processes.

In a twist of fate, Decide Madrid ended up in Madrid Ctiy Council rather the Spanish

government; this was related to internal conflicts and division within the politics of the Spanish left. Civic hackers originally plannned and worked with Podemos (a new political party in Spain which also emerged a consequence of the 15M movement), experimenting with the application of digital tools such as Loomio and Reddit within the internal decision-making processes of Podemos. However, this collaboration ultimately went sour, as the leaders of Podemos did not see eye to eye with hackers in regards to extending the usage of digital platforms for a wider scale of political participation-related activities involving the general public. Peter bemoaned that '[the collaboration with Podemos] didn't work out as we expected, the political party became a bit more vertical than we expected because it is difficult and subject to the electoral fight'. Vincent also lamented that:

> *we had the goal of pushing direct democracy with that tool [Loomio], but*
> *that was the difficult part to make them accept our idea of direct democracy*
> *were not very interesting [to Podemos].*

After the setback with Podemos, Spanish civic hackers turned to another newly-established political party, Ahora Madrid, which had been established in 2015 with the more limited goal of fielding a range of left candidates to stand in Madrid municipal elections. In this they were more successful: the civic hackers, in conjunction with Ahora Madrid, were granted a high degree of autonomy and were able to actualise their ideas into a new digital platform which could be used for large-scale and decentralised political participation in what they term as direct democracy: Decide Madrid. In 2015, Ahora Madrid, led by Manuela Carmena, was able to take control of Madrid City Council when Carmena was elected as the new Mayor of Madrid, putting an end to the 24 years-old Popular Party conservative administration. It was under the Carmena administration that civic hackers were able to enter Madrid City Council in a newly-established department of citizen participation, and created the digital platform of Decide Madrid. Medero and Alabaladejo (2018) praised Carmera's left-wing administration for adopting an inclusive and extensive system of citizen participation. In particular, this was done by extending participatory processes to the sector of urban redevelopment for the first time.

Based on the ethos of using decentralised forms of participation and decision-making (also termed as direct democracy), the Carmena administration attempted to articulate a

participatory-oriented 'smart city', which was contrasted with the previous neo-liberal model of the 'entrepreneurial city' (Pérez *et al.*, 2016, p. 163). Carmena's approach called to mind Hollands' (2008, p. 316) advocacy of a smart city which 'take[s] much greater risks with technology, devolve[s] power, tackle[s] inequalities and redefine[s] what they mean by smart itself'; his ideas were contrasted with predominant views of the smart city proposed by large multinational companies such as IBM, which are seen as facilitating corporate profit-making activities and providing limited capacity for civic participation and democratic decision-making (Hollands, 2015, pp. 62, 74). A senior officer in Madrid City Council strongly expressed to me that though IBM's idea of a smart city was a 'cool idea', their software did not provide any real way of either 'making a city smart' or 'making a city better'. To the Carmena administration, it was more desirable to implement a platform which empowered citizens to make decisions in urban policy: as the senior officer expressed, 'the idea is not to have a great control panel which shows the location of every public fountain, but to let people decide where to put a new fountain'.

Decide Madrid was developed to be an open-source participatory platform which embodies five different participatory processes: (1) debates (*Debates*); (2) citizen proposals (*Propuestas*); (3) votes (*Votaciones*); (4) collaborative processes (*Procesos)*; and (5) the 'participatory budget' (*presupuestos participativos*). Each participatory process has its own scope and time period of participation. My research will focus on the participatory processes of 'citizen proposals', 'votes' and the 'participatory budget', as they are the ones which were more active and which have been considered as successful cases by Madrid City Council. Regarding the process of 'citizen proposals': Madrid City Council committed itself to holding referenda on any urban issue addressed in a proposal made by citizens via Decide Madrid which reached a minimum support threshold of 1% of the population (27662 votes). Regarding the participatory process of 'votes': Madrid City Council committed to turning a certain proportion of pre-selected urban regeneration projects —those which were supported by a simple majority of votes inputted via the Decide Madrid system —into actual urban developments. With regard to the participatory budget, an annual budget of 100 million Euros (approx. 2.5% of the total budget for Madrid City Council) was allocated. This budget was made available through what was essentially an 'open competition': successful proposals made by users within Decide Madrid —those which gained majority support from Decide Madrid users —were able to access funding from this budget, which turned citizen proposals

from ideas into reality in a way expressly intended to be unmediated by 'traditional' political actors such as politicians and local planners. The ability to participate in these three participatory processes was reserved for residents who were registered within Madrid City Council and over 16 years old: as of 2017, there were approximately 300,000 residents registered (Decide Madrid, 2017).

1.1.4 From the Sunflower Movement to vTaiwan

On the other side of the world, in late 2014 the Taiwanese Government in Taipei was coming under pressure from the Sunflower Movement, also considered to be a subset of the Occupy Movement (Castañeda, 2012). The Sunflower Movement strongly opposed deeper economic integration with China, viewing a new trade deal as a harbinger of a coming political union with China which entailed a future without democracy for Taiwan. It demanded that the conservative KMT-run Taiwanese Government retract its plan to sign the Cross-Strait Service Trade Agreement with China, and to this end performed various protests, including an occupation of the Taiwanese Parliament in March 2014 (Wang, 2017). The protests successfully pressurised the Taiwanese Government into accepting part of the demands of the Sunflower Movement, including those related to advocacy of new mechanisms for public participation.

The huge success of the Sunflower Movement forced the KMT-ruled Taiwanese government to review its communication with the public on policy-making processes in two ways. Firstly, in a public speech at TEDxTaipei, the former chief of the Ministry of Development, Kuan Chung-ming, regretfully pointed out that the forms of public participation conducted by the Taiwanese government regarding China-Taiwan trade treaty (which was the main conflict point for the Sunflower Movement) fell short of meaningful consultation and were instead a form of 'paternalism' (Kuan, 2015). By paternalistic public participation, he meant that

> *we [the Taiwanese Government] are doing this for the sake of citizens, so citizens only have to listen to what we said….. [such a mechanism] does not work because it is top-down…, it is more propaganda than listening to what citizens say*.

Clearly, he confessed to the public that this 'paternalistic' mechanism did not work, because large sections of the public did not accept it and went on the street to express their concerns

as the Sunflower Movement. Thus the Sunflower Movement problematised the paternalistic, top-down mechanisms of public participation previously adopted by the Taiwanese government.

Another facet of the success of Sunflower Movement was that it demonstrated and performed the successful deployment of various digital technologies for political ends (such as social media, open-source participatory platforms and communication applications), which were re-appropriated, mobilised and deployed by civic hackers and participants. In this context, g0v, a civic hacking community consisting of software engineers, journalists and active citizens, became famous for providing crucial technical support for the Sunflower Movement. The particular alignment the Sunflower Movement used, whereby it harnessed digital technologies for political participation, was observed from aside by a Taiwanese government desperate to improve its mechanisms of public participation. A senior officer from the Taiwanese government, Derek, noted that

> *… technologies are evolving [through the Sunflower Movement] and have reached to direct democracy. This allows the Government to collect more diverse voices from the outside world…well as you can see, the new mechanism for public participation has to do with technologies.*

Derek believed that creating a digital mechanism for public participation could improve current mechanisms of public participation by enabling more citizens to take part in policy-making processes. By the same token, the former chief of the Ministry of Development, in a public speech at TEDxTaipei, also emphasised that digital technologies can not only make information more transparent but could also gather more citizens to discuss legislative issues: he referred to this as 'crowd-sourced intelligence' (Kuan, 2015).

In short, in 2014, the Taiwanese Government witnessed the power of digital technologies to recruit 'the crowd' to attend demonstrations and disseminate protest-related information and subsequently attempted to translate what it saw into an officially-sanctioned digital platform for political participation (Kuan, 2015; O'Flaherty, 2018). This DPPP became known as vTaiwan, a digital platform which fused previously existing open-source[1] software —Pol.is, invented and designed by a start-up in Seattle in the United States —with additional inputs from g0v, the native civic hacking community, who began working in collaboration with the

Taiwanese government in Taipei City. In late 2014, g0v was approached by the Taiwanese government because of its expertise in developing and using digital technologies for civic engagement and democratic discussion, in particular during the Sunflower Movement[1]. In 2016, Audrey Tang, a key actor of g0v, was appointed by the newly elected Taiwanese government (ruled by the Democratic Progressive Party, a centre-left political party) as 'digital minister' of the Cabinet Office; she continues to oversee the operations of vTaiwan at the time this thesis was written (early 2020).

Whilst Decide Madrid as a platform is focused on using one piece of bespoke software to facilitate civic participation, vTaiwan is actually a collection of five different pieces of software aimed at facilitating different aspects of civic participation, such as online forums and surveys. For the purposes of this research, I only focus on the functions which are conducted via one of these pieces of software, Pol.is, which I chose as an object of study because it deploys sophisticated Machine Learning algorithms which are able to identify similar opinions through the creation of clusters of so-called Opinion Groups, from which Common Opinions can be identified both within and between Opinion Groups. Thus, when I speak of vTaiwan, I am speaking of vTaiwan-Pol.is.

In the case of vTaiwan, technically anybody can be a user, Taiwanese citizen or not. However, in practice, the fact vTaiwan is only available in Mandarin using the Traditional Chinese script (the combination of which is used in Taiwan but not in China or Hong Kong) will tend to limit the user group to Taiwanese citizens and a limited group of foreign residents in Taiwan who understand both Mandarin and the Traditional Chinese script. Enable by Pol.is, users are able to vote and comment on digitally-related issues, such as Airbnb, Uber, and digitally-enabled sexual harassment and bullying via vTaiwan; however, users cannot propose new issues for political participation. Additionally, similar to Decide Madrid, vTaiwan was design to be embedded within wider policymaking processes, including those involved with the drawing up or revision of legislation. That is to say, after the online participation process has ended, the Taiwanese government pledged to draft a bill based on the results of the whole process, which would then be sent over to Parliament.

In addition to their online functionality, both Decide Madrid and vTaiwan also provide more

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[1] Interview with Derek on 22/03/2018

'traditional' (i.e. physically-located and non-digital) means of public participation —including the provision of facilities for physical voting on various issues raised within the platform, face-to-face consultations and forums —the results of which are then integrated (in different ways) into both DPPPs. Decide Madrid offers physical ways for users to act to vote and propose on specific parts of various participatory processes which take place via the platform. Citizens have the ability to vote physically on pre-selected urban regeneration projects or on citizen proposals which obtain a minimum support threshold (1% of the population registered in Madrid City council, 27662) via polling stations or via the post. In addition, citizens have the ability to propose participatory budgeting projects via local forums or with the help of civil servants in local district offices. vTaiwan provides a more limited face-to-face consultation process which is limited to selected key stakeholders, which allows them to further discuss those pre-selected issues which have gone through the digital participation processes on the vTaiwan platform. Due to the scope and this thesis being largely confined to examining the impacts of digital technologies on processes of civic public participation, I will not focus on the physical means of public participation in this thesis. I will, however, mention them whenever they can serve to further explain the unique character of digital forms of political participation.

To sum up, in this section I have outlined the similar trajectories that are shared by Decide Madrid and vTaiwan; despite some significant political and cultural differences in processes of democratisation and the organisation of social movements in Spain and Taiwan, the similarities between them mean that this is a reasonable focus for a comparative study in terms of the relational approach to urban comparison. The differences do not render my comparison of Decide Madrid and vTaiwan 'incommensurable' (Robinson, 2015); it is precisely the shared similar trajectory from digitally-mediated Occupy Movements to institutionalisation (within a broader context of democratisation) which the two DPPPs exemplify that makes them relatable and comparable, despite each of them being located within different levels of governmental institutions. It is worth noting that there is another DPPP —Join —which was created by the Taiwanese government; however, Join did not follow the same trajectory as vTaiwan. Join was not part of the legacy of the Sunflower Movement; its development and design were *not* based on open-source software and did *not* involve civic hackers and programmers from g0v and Sunflower Movement. Therefore, it makes more sense for me to compare Decide Madrid with vTaiwan rather than Join.

On another note, what makes my comparison important is its ability to point to significant cultural, social and political differences in processes of democratisation and social movement organisation between Madrid and Taipei. These differences have influenced the ways in which digital technologies for political participation were integrated and institutionalised as Decide Madrid and vTaiwan. Following what anarchist-hackers viewed as a decentralised form of direct democracy, Decide Madrid promises to give political legitimacy — meaning more empowering capacities, institutional reorganisation and participatory powers devolution — to citizens; in this, it goes further than vTaiwan (Fung and Wright, 2001; Baiocchi and Ganuza, 2014) (see more detail in Chapter 4).

In contrast to Decide Madrid, the design and development of vTaiwan has constrained its ability to empower citizens, because of a lack of political will to devolve wide participatory powers to users. The absence of a democratic tradition and culture in Taiwanese society and the continuing reliance on leadership-based politics continues to influence the empowering capacities of vTaiwan. In contrast to Decide Madrid, which allows for both non-defined and pre-selected issues to be commented and voted upon, vTaiwan is limited to issues which have been pre-selected by civic hackers, civil servants and policymakers. Such variation regarding user ability/capacity has important effects on expanding/limiting the empowering capacity of a user to perform specific political acts (Fung and Wright, 2001; Pateman, 2012).

## 1.2 The significance of Decide Madrid and vTaiwan

Both DPPPs under study are definitely within the purview of studies of platform urbanism, the aim of which is to examine the political impacts of profit-driven participatory platforms in urban politics and everyday practice (Rodgers and Moore, 2018; Leszczynski, 2019; Fields, Bissell and Macrorie, 2020). DPPPs can be understood as a subset of digital participatory platforms, such as Trip Advisor, Airbnb, Amazon and Facebook because they all can be seen to epitomise a model of value-generation which creates and extracts (economic) value from data that are inputted by users either unconsciously or consciously (VanDijck, 2013; Orlikowski and Scott, 2015; Morozov, 2016; Langley and Leyshon, 2017). Decide Madrid and vTaiwan do this by relying on participants to assist them in generating value through providing data such as comments, proposals and votes on various issues.

Despite this similarity, there are notable differences between DPPPs and other digital participatory platforms. These differences make it important for researchers to study DPPPs *as DPPPs* rather than simply as digital platforms. Firstly, the most striking difference between DPPPs and digital platforms is the fact that the two DPPPs are purposefully designed for improving political participation. This purpose can be seen in their promises and claims of providing a more democratic model (consensus or direct) of public participation in urban policies through affording new forms of empowerment to citizens. As a result of this different purpose, they have been praised as pioneers in digital democracy by various groups, such as Nesta, a British research foundation (Simon *et al.*, 2017).

Secondly, the 'business model' for both of the two DPPPs is non-profit and based on the desire to export the DPPP to other political communities at municipal/national levels. This focus has been accompanied by claims surrounding the potential of these new technologies to tackle the widespread perception that modern democracies increasingly exhibit what has been termed a 'democratic deficit' (Simon *et al.*, 2017; Miller, 2019; Tang, 2019). Since 2015, Decide Madrid has been installed and used mainly by various governmental and third-sector institutions and has quickly gained in popularity around the world (Madrid City Council, 2018). Considering their growing popularity and influence around the world, there is an urgent need to scrutinize their implications for citizen empowerment and the urban policymaking process.

Thirdly, DPPPs differ from larger platforms in that they manifest a high degree of transparency around their coding and algorithms, which are open to the public. This reflects the fact that these platforms are designed by software engineers who share a culture of 'civic hacking' and thus are keen to unleash the democratic potential of digital technologies. The civic hackers self-identify as adhering to the open ethos of the Open-Source Software (OSS) movement, which requires them to publish their coding and algorithms on the GitHub website. GitHub users can modify code in various ways to optimise it and potentially add new functions (although this would require the consent of the key software engineers). This openness towards code makes the DPPPs under study here different from other dominant participatory platforms such as Facebook and Google, which keep their algorithms as commercial secrets. Importantly, because of this openness in algorithms, those algorithmic calculations which have often understood as 'black-boxed' in other contexts within urban

studies (Graham, 2005; Kitchin, 2017; Fields, Bissell and Macrorie, 2020) are rendered *visible* and *publicly availabl*e due to their availability on the website of GitHub (Madrid City Council, no date; Pol.is, no date). By opening up their algorithms on the GitHub website, the two DPPPs present a rare opportunity for researchers to unpack processes which remain 'black-boxed' elsewhere.

Fourthly, DPPPs foreground the key role of custom algorithms which have specifically been designed to interact with user-generated data to produce *political* decisions, i.e. decisions which allocate some public resource or bring a subject to the concern of policymakers in some way, such as being the subject of new legislation or a modification or addition to existing policy. As has already been noted above, in the case of vTaiwan, complex Machine Learning techniques are employed which claim to be able to identify different Opinion Groups and issues of consensus within and between these groups (as opposed to forums such as Facebook and Twitter which are said to cause division). This is an important difference with other forms of platforms. However, it is important to note that DPPPs remain inherently tied to existing forms of civic governance. Whilst DPPPs have the ability to produce 'decisions' about civic issues, these decisions remain the 'raw output' of the DPPP to a greater or lesser extent: ultimately, the degree to which these decisions are binding/nonbinding is dependent on the level of 'post-filtering' they undergo by traditional political actors located within the wider political ecosystems in which the DPPPs inhabit. 26

Lastly, as I have illustrated in the previous section, the rise and development of both DPPPs are deeply connected to social movements in Taipei and Madrid City; this has given them a different trajectory to other participatory platforms.

### 1.3 Defining Research Questions

As I have illustrated in the previous section, as a frustrated urban planner in Taipei City Hall, I became interested in how new forms of digital participation might be developed that were better-suited to the modern age than traditional approaches. I have introduced how both Decide Madrid and vTaiwan were related to the context of Occupy Movements in Madrid and Taipei and more broadly to different cultures in democratic movements and democratization between Spain and Taiwan in 1970s and 1990s. It became clear to me that conducting an in-depth analysis of the implications of this phenomenon on wider issues of

policymaking and democratic practice would be a key research issue which I would like to pursue within my thesis.

With the aforementioned contextual information in mind, I would now like to specify in detail what research questions will pursue within this thesis. At the top level, I am seeking to answer four questions. These questions arise from my dual positionality, that of an urban planner, and that of a geographer:

1) What are the effects of Decide Madrid and vTaiwan on urban policymaking (in terms of making political decisions) and citizen empowerment?

2) How do Decide Madrid and vTaiwan differ in terms of potential for citizen empowerment and approaches to making political decisions?

3) How can the study of Decide Madrid and vTaiwan inform wider research on digital empowerment and on political impacts of algorithmically-powered devices in urban governance?

4) How can we develop an analytical lens which allows for an understanding of DPPPs at the various levels they operate and facilitates us in making meaningful judgments on impacts on political decision-making and issues of citizen empowerment?

The focus of this thesis, then, is to provide a comparative critical study on the effects and implications of DPPPs on citizen empowerment and politics and identify how such a study of DPPPs can inform wider research into digital urbanism and digital empowerment.

## 1.4 The structure of this thesis

In this introductory chapter, I have introduced the topic of my thesis whilst situating it in the perspective of personal, local and wider academic contexts, whilst also outlining my research questions, which are a reflection of my twin positionalities as urban planner and geographer. At the outset, I have delineated my contributions to the studies of digital participation, digital/platform urbanism and digital geography. I, then, portrayed the subject/object of this thesis —two DPPPs, Decide Madrid and vTaiwan —by delineating the contours of each in relation to the Occupy Movement and the governmental reforms it produced in Madrid and Taipei. I also explained the general functions of Decide Madrid and vTaiwan. I then

introduced my research questions. Now I will address how I am going to develop my argument on a chapter-by-chapter basis, paying attention to how each chapter will enable me to answer my main research questions.

In Chapter 2, I describe how I developed an approach to collecting data in regard to Decide Madrid and vTaiwan by conducting a hybrid method of participatory observation, interviews and 'digital flashback'. I aim to show how I conducted participatory research practices of observation and interview in order to collect relevant contextual information on both DPPPs in terms of their development and deployment within different policymaking processes in Madrid City Council and the Taiwanese government. I will explain how I employed specific method of 'digital flashback', to better capture the contingent and on-going algorithmic calculations and their inter-relationships with users' actions and dynamic UI visualisations. Also, I reflect upon my own dual positionality of researcher/intern within two governments and discuss the main ethical conflicts that arise from such dual positionality.

In Chapter 3, I will describe in detail how my chosen topic of investigating the political effects of two DPPPs, Decide Madrid and vTaiwan, is relevant to driving forward debate in the fields of critical studies of 'algorithmic governance', 'smart urbanism', and the 'digital citizen'. Within each study, I critically point out the key issues and challenges in understanding algorithm-driven technologies. Key issues include: (1) correcting the present focus of studies in algorithmic governance and smart urbanism, in particular the views of users as passive in the face of algorithms operating in automated systems; and (2) contributing to the methodological challenge of studying the invisible, inaccessible, contingent and heterogeneous nature of algorithms (Kitchin, 2017; Graham 2005). In response to these issues in studying algorithm-driven technologies, I will show how a fusion of relational comparative urbanism, assemblage thinking and theories of empowerment (relying particularly on theories of participatory democracy and the digital citizen can be used to develop a theoretical framework — which I term the situated lens — which has the ability to compare and contrast the two DPPPs by viewing each of them as a set of three assemblages: the assemblage of design, the assemblage of the dynamic UI and the assemblage of algorithmic decision-making.

In Chapter 4, I will begin the process of applying the situated lens to my empirical data. Guided by this notion, I compare and contrast the effects and ramifications of the design assemblages of Decide Madrid and vTaiwan, using as a main point of comparison the relative degrees of empowerment each DPPP grants to the user in terms of two key metrics, the level of political legitimacy and the capacity for empowerment. I will show that the degree of empowerment of the two DPPPs is both stabilised and destabilised through the (re)creation of majoritarian forms of future democracy and participatory calculus.

In Chapter 5, I examine the effects of the UI assemblage —which in both cases utilise dynamic systems which are co-constituted by users and algorithms —on digital empowerment. Through the situated lens, I am able to evaluate and compare the effects of the dynamic UI assemblage against a definition of empowerment which focuses on whether the DPPP provides an enabling environment where users feel engaged and capable of making informed and collective actions of political participation. Here, I will indicate how the dynamic UI creates a 'vacillating' state of digital empowerment. On the one hand, users are enabled to learn to conduct collective and informed actions in voting and proposing via the dynamic UI. On the other hand, users are disengaged and deprived of their capacity to vote, comment or propose due to an over-convoluted UI design (Decide Madrid) or a glitchy and ever-changing situation in vTaiwan's UI. Lastly, I also illustrate how the dynamic UI results in the rise of 'princelings', a group of users who gain more participatory power over the policymaking processes than other users.

In Chapter 6, I compare and contrast the ways in which political decisions on which urban issues can receive political resources (and thus receive legitimation in the public realm) through each DPPP are (re)configured by algorithmic interactions with users within the systems and by human (re)interpretation via 'post-filtering' within wider policymaking processes in which Decide Madrid and vTaiwan. In other words, I compare and contrast the assemblages of algorithmic decision-making which exist within the two DPPPs. I reveal how such assemblages exclude other urban issues from being considered as part of urban policymaking and show how despite this these tend to reappear within urban environments in later stages in unpredictable ways. I do so to raise the question whether such algorithmic decision-making produce fairer and more empowered political decisions.

In Chapter 7, I conclude this thesis with a summary of how the two DPPPs' impact on citizen empowerment within the political contexts in which they operate. I revisit key arguments made earlier which sees the capacity for digital empowerment of DPPPs not as predefined but as *emerging* from mutable human-algorithm relationships situated in broader political contexts, a situation which I term the situated lens. I then highlight the potentialities emerging from the changeable and ongoing human-algorithm relationship within these two assemblages in ways which suggest the need to rethink ethics and policymaking in digital age. Finally, learning from my PhD thesis, I identify areas of future studies in the field of digital urbanism and digital democracy.

# Chapter 2 Engaging with the ephemeral world of Decide Madrid and vTaiwan

## 2.1 Introduction

In this chapter, I describe how I designed and conducted a set of participatory research practices which flowed logically from these initial assumptions and enabled me to collect adequate empirical data on Decide Madrid and vTaiwan. This process followed a broadly three-step approach: (1) building a new positionality as a 'learner'; (2) conducting observation of everyday institutional practices; and (3) unfolding algorithmic calculations and configurations of the dynamic UI through creating and visualising flashbacks of digital political participation. I will focus on explaining how I employed this set of participatory research practices with the aims of firstly obtaining access and secondly collecting two levels of data on both Decide Madrid and vTaiwan: (1) institutional data, i.e. on where policymaking, face-to-face consultation and usability testing take place (2) technical data on the operation of the internal algorithms of DPPPs and their interaction with user-generated data/users and on the configuration of their UIs. Institutional data provides contextual data regarding policymaking and user-interface relationships. Technical data offers information about how algorithms configure and visualise UIs through which users engage and interact and also opens up 'black-boxed' processes of internal algorithmic calculation.

It is important to note that these participatory research practices do not solely rely on a *pure* 'non-digital-centric' perspective, which can be said to employ a variety of participatory observation and visual methods to understand the digital's impacts in everyday life without using digital methods (Pink *et al.*, 2016). Instead, I employed a hybrid method which entails participatory observation, interview and a set of purposely-developed digital methods in order to examine algorithmic processes of Decide Madrid and vTaiwan in detail. Digital methods are defined by Leszczynski (2018, p. 473) as 'techniques for identifying, capturing, managing, analysing, and theorizing materialities, social praxes, and implications of socio-technical shifts associated with the proliferation of digital computing technologies'. Importantly, Leszczynski (2018, p. 473) highlight that digital methods/techniques should be 'developed and deployed within the broader context of approaches for knowing and making sense of the world' (see also a similar viewpoint in Pink *et al.*, 2016). That said, understanding the purposes of using digital methods matters more than the digital methods themselves.

For my research, I developed and deployed a method of 'digital flashback'. This can be seen as a form of analysis which uses simulation and visualisation of digital archives of users' online activities within the DPPPs. I use this method to better capture what has happened in digital political participation at a given time, with particular focus on trying to (1) get inside 'black-boxed' processes of algorithmic interaction with user data and (2) investigate how algorithms configure the User Interface (UI) of the two DPPPs. The digital flashback method can offer a partial yet important view on the invisible, unfolding and transformative nature of the algorithms (Kitchin, 2017) which are embedded within DPPPs. In short, one contribution this thesis makes is to develop and deploy digital flashback method which can offer empirical information about the algorithmic processes in digital political participation.

What follows serves to explain firstly how I built a learning position to assist my selection of comparative cases. In doing so it also describes how I used my on-the-ground identity and ethical 'statement' to gain access to the closed worlds in which the two governmental institutions in which the DPPPs under study are located. Secondly, I move on detailing how I conducted participatory observation with the Spanish and Taiwanese governments and discuss some of the emerging challenges and ethical concerns relevant to conducting a comparative study on DPPPs. Thirdly, I describe how I utilised a set of purpose-built digital methods to understand specific algorithmic calculations within DPPPS, both with respect to their users and towards their interfaces; this enabled me to flag ethical concerns regarding algorithms and user-generated data.

## 2.2 Building a positionality of a 'learner'

Why bother thinking about how your on-the-ground positionality will appear to those you are researching before conducting fieldwork? The main reason for building a new positionality of a 'learner' for myselt is to enable me to collect in-depth information from the political institutions and communities surrounding the DPPPs under study. If we understand that conducting any type of participatory observation is inherently political - involving different levels of impacts on local communities - it is crucial for us to decide which role we should play (Cook, 2005, p. 177). Taking the positionality of a learner assists me in forging an initial ethical partnership with gatekeepers within the two governmental institutions under study (Madrid City Hall and the Taiwanese government). It allows me to start to gain their trust and build interest in my PhD project. Obtaining such access to a community under study is

considered as one of the essential practices for practitioners of research in various contexts, such as participatory observation (Cook, 2005; Kesby, Kindon and Pain, 2005), focus groups (Conradson, 2005) and interviews (Valetine, 2005). The process of obtaining access is further complicated when the community under study is an elite institution, such as a governmental institution, access to which has long been considered as one of the biggest challenges facing ethnographers (Harrington, 2016, p. 135). Therefore, it is crucial for me to be strategic about planning in which ways am I going to get access and to forge an ethical partnership with the Spanish and Taiwanese governments before I conduct participatory observation.

2.2.1 Getting access to the Spanish and Taiwanese governments

After selecting my two case studies, I adopted a positionality of a learner in order to gain access to the Spanish and Taiwanese governments; in practice, this learning positionality meant adopting the role of a researcher/intern. It was adopted to strongly foreground and conveys my ethical stance to Spanish and Taiwanese officials: to indicate my desire of *learning from* them rather than patronising/judging them and thus holding less power than gatekeepers and practitioners. Ultimately, this learning position assisted me in getting access to these two governmental institutions.

I harnessed my understanding of the genetic bond that I had discovered between Decide Madrid and vTaiwan to show my ethical stance was essentially that of a learning researcher/intern, who not only *already knows* Decide Madrid and vTaiwan but *wants to learn more* from the two governments. During an interview with two gatekeepers in Madrid City Council, I introduced my comparative study with an emphasis on my interest in and commitment to learning from Madrid City Council. They were both pleased and highly surprised, not only by my choice of a rare comparison of Spanish and Taiwanese cases but also by my knowledge of Decide Madrid. By demonstrating the fact that I had knowledge of both Decide Madrid and its 'counterpart' (vTaiwan), I showed what I had already learned about Decide Madrid and what I wanted to learn more of. I remember one of the senior officers in Madrid City Council told me at the end of the interview in a tone of some delight that '*well, you found us'*.

After establishing initial contact, I was able to use my learning positionality to obtain direct

working access to two governments. This is significant, as obtaining such access has been considered as one of the biggest challenges facing ethnographers studying elite institutions (Harrington, 2016, p. 135). In the case of Madrid, after noticing the interviewees 'liking' of my idea of conducting a comparative study during our conversation, I was able to identify an opportune moment to request an internship within the team of Decide Madrid. I received an oral agreement on the spot, which was followed up with a formal official document accepting me as an intern in Madrid City Council. In doing so, I de-emphasised my role as an external researcher and created a new identity for myself: an intern in Madrid City Council. Whilst this suggested I held less power than the practitioners, the new position created an expectation I would be able to gain more access to valuable informants. By contrast, in the case of vTaiwan, the process of approaching the relevant gatekeeper in the Cabinet Office of the Taiwanese government was more straightforward and largely involved sending an email. I correctly assumed that I would encounter fewer barriers to access because as a native Taiwanese I had no problem in speaking Mandarin and reading Traditional Chinese. I received an official confirmation from the relevant gatekeeper, which accepted me via email as an intern in the Cabinet Office without the need for any further 'physical contact' as a preliminary.

To recap, it is evident to see that building a learning positionality has at least two implications for my PhD study.Firstly, this 'learning position' aids my ethical stance in negotiating and forging an initial partnership with the Spanish and Taiwanese governments. In recognising that conducting participatory observation, especially with elite governments, is highly political and infused with complicated power relations (Cook, 2005, p. 177), such a learning positionality clearly conveys a message to practitioners not only that I, as intern/researcher, were going to learn from them rather than patronising them.

Secondly, this learning positionality assisted me to get past elite gatekeepers because it equipped me with what Harrington calls (2016, p. 139) 'cultural and social capital' (seen as the pre-existing knowledge and background of a researcher) which is particularly crucial for researchers seeking to gain access to elite institutions[2].

**2.3 Observing everyday practices within the Spanish and Taiwanese governments as a**

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[2] One can see in detail how a lack of pre-existing connection with the researched communities can cause real problems for researchers to get access to them in Cook 2005, p.172.

**semi-insider**

As a result of my efforts, I acquired an internship with Madrid City Council's department of citizen participation (Participación Ciudadana del Ayuntamiento de Madrid) and the Taiwanese Government's Public Digital Innovation Service (PDIS), located in the Executive Yuan in Taipei (the Taiwanese Cabinet Office). I would be embedded in both of these institutions whilst conducting my fieldwork, which meant I would work there full-time as an intern. I stayed with Madrid City Council from 25th September to 22nd December 2017 (12 weeks, excluding two weeks leave in December) and with the Taiwanese Government from 3rd January to 30th March 2018 (12 weeks).

The main commonality I relied on whilst conducting my studies within the Spanish and Taiwanese governments was my dual identity, which fused the roles of researcher and intern. This dual identity allowed me to assume the role of a 'semi-insider': on the one hand I had given a commitment to work for both governments, and on the other hand as a researcher, I was at the same time collecting information via practices of participatory observation and interviewing. Interviewing and participatory observation have been considered as two of the six methods which Kitchin (2017, p. 24) recommends for providing 'a means of uncovering the story behind the production of an algorithm and to interrogate its purpose and assumptions'. He also notes the two techniques offer:

> *a wider understanding of algorithms… [allowing] their full socio-technical assemblage to be examined, including an analysis of the reasons for subjecting the system to the logic of computation in the first place (Kitchin, 2017, p. 24).*

In Spain, every day I went to my 'office' in Madrid City Council at 9:00 a.m. sharp, where I started my day by saying 'Hola, Buenos Dias' to the security guard and my Spanish colleagues. In Taiwan, every morning I passed through the wired security barrier to the Cabinet Office where I had been granted temporary access, after which I greeted my Taiwanese colleagues and was informed of daily meetings and events. Performing these practices became a routine part of my everyday life as an intern; in Madrid, as a semi-insider in both governments, I had an ID card and an individual desk inside the Madrid City Council (see Figure 2), and in Taipei, I was given access to the heavily-restricted Cabinet Office (see

Figure 3).

It was my dual identity of researcher/intern, which sprang from adopting the positionality of a learner, which allowed me to conduct participatory observation with access to both Madrid City and the Taiwanese Government. I played the role of an 'overt participant' (Cook, 2005, p. 177) who did not hide the fact to my colleagues that I had another identity as a researcher. Most of the time I was taking notes in various meetings and events, and sometimes I helped both institutions to deal with some tasks, such as observing off-line public participation (in the Taiwanese Government) and helping Decide Madrid to market themselves in Taiwan and Japan by phoning the relevant local authorities. During the internships, I also conducted on-site interviews, speaking to about 50 practitioners (software engineers, politicians, civil servants, activists, civic hackers and data scientists). With the follow-up interviews with former or off-site software engineers, policymakers and activists, this came to a total of 60 interviews (see the full lists of interviewees in Appendix 2).



Figure 2: my own desk in Madrid City Council (Source: owned by myself)

Figure 3: the Taiwanese Cabinet Office surrounded by a crowd control barrier (source: owned by myself)

Being 'a semi-insider' allowed me to make a closer observation of everyday institutional practices, such as meetings with authors of participatory budgeting proposals, with civil servants and volunteers in preparation for physical voting polls (see a full list of meetings and events that I took part in Appendix 1). These everyday institutional practices are important because they can be seen as what Pink *et al*. (2016, p. 15) call 'comings-together' of different material/digital devices, public, politicians, civil servants in the context of the overall policymaking process. To follow key actors wherever they went, from face-to-face consultations to international conferences, is to capture the two DPPPs *in-the-making* as being constitutive of policymakers, volunteers, software engineers, political documents, polling stations, voting papers, software, servers, users and so on.

## 2.3.1 The perks of being a semi-insider

I quickly realised that conducting participatory observation as an intern/researcher made me one who was 'always there' at almost every meeting and public event; this *meant a lot* to practitioners. In Madrid, some practitioners liked to joke that they saw me 'everywhere' at various events, from small private internal meetings to semi-private usability tests. In Taiwan, other actors nick-named me as a hacker or a 'shadow-er' who wanted to 'hack the Taiwanese Government' (see a full list of meetings and events that I took part in Appendix 1). The initial feeling of being immersed with my Spanish colleagues within Madrid City Council is seen in my diary entry of 3rd October 2017 in Madrid:

> *Mike is technically the boss of the whole team, so his presentation/introduction of me means a lot to other civil servants. I guess through shaking hands and kisses during the introduction, which means at least (no matter you like it or not) I am part of the team.*

From this point on, I saw a close working relationship with Spanish colleagues was developing, which differentiated myself from the pile of journalists who wanted quick and one-time interviews. Thus, I had a better chance of gaining trust from practitioners. What follows is a note of at least four points which indicate how I benefitted from my double positionality: (1) it aided in collecting contextual information and 'discovery' of additional

critical information; (2) it allowed me to gain trust from colleagues; (3) it helped to mitigate cultural and language barriers in Madrid City Council, and (4) it allowed me to trace offsite or former actors further. All these internal relations and knowledge assisted me in 'digging into' critical dimensions of Decide Madrid and vTaiwan during the follow-up interviews. I will now explain each of these four points in further detail.

Firstly, conducting participatory observation as an intern/researcher allowed me to collect valuable contextual information regarding digitally-mediated policymaking. Sticking to key practitioners gave me a sense of the ways in which the platforms I was studying operated as institutions within the policymaking processes of the Spanish and Taiwanese governments. By taking notes of routine and everyday practices in my diary, I observed and took part in the convoluted procedures of digital political participation which are entangled with legislative, political, material and digital infrastructures (see a full list of meetings and events which I attended in Appendix 1). Also, the collection of such contextual information helped me to construct interview questions that were tailored to each interviewee's capabilities and position within the team. I conducted 60 semi-structured interviews with identified practitioners by the end of both internships, and in addition, conducted less-structured interviews with key practitioners. I also repeatedly re-interviewed key actors on both sites during and after the internship.

Secondly, being an intern/researcher allowed me to gain trust from my temporary colleagues in the Taiwanese and Spanish government. Adherence to events made me visible and present to colleagues and allowed me to develop 'intimate' working relationships. Achieving this level of immersion —as was argued by Prasad (1997, p. 113) —can encourage practitioners to confide in the researcher or reveal aspects of their viewpoints on researched objects, which are not typically shared with others. Being known by practitioners, I could initiate informal conversations when they were not busy. As Cook (2005, p. 177) mentions, the juiciest information is often acquired when practitioners are not heavily guarded; I took advantage of using informal conversations not only to learn important information but also to acquire additional documentation. This included official or non-official reports on usability testing, internal reports on reports digital campaigning and the digital divide in the case of Decide Madrid and draft documents for conducting face-to-face public participation for vTaiwan.

Thirdly, I got help from 'colleagues' to mitigate the language barrier. Native Spanish speakers who also spoke fluent English within the team of Decide Madrid acted as my interpreters/translators during my 'lodging' at Madrid City Council. They were extremely helpful in translating proceedings of meetings and sat in with me on interviews with civil servants who did not speak English. As they were colleagues of those who did not speak English, their presence as interpreters was less intrusive in comparison to the alternative, which was to hire an outside interpreter. They also understood technical jargon in relation to Madrid City Council bureaucratic processes and Decide Madrid better than outside interpreters. This was very critical to me, as despite taking lessons my Spanish was not at an adequate level of proficiency. The information I received through colleagues in this way was enough to understand 'what is going on' with regard to civil servants' everyday work on Decide Madrid, such as on issues related to the digital divide, data protection, security, public relations and marketing. I then was able to cross-reference this information with internal or official documents such as news and reports, which were largely understandable to me with the assistance of Google Translate.

Fourthly, I was able to trace and recruit 'missing' practitioners. Harrington (2016, pp. 136–137) notes that a key contribution of conducting an immersive participatory observation is to provide deep insight into what has previously been taken for granted. By subjecting practitioners to enquiry and adhering to everyday political events, I gained knowledge which allowed me to identify and trace both former practitioners who were once highly-involved and present practitioners who worked 'off-site' (holding crucial information but not present in the context of my physical fieldwork). In addition, I used *my new identity* as an intern to ingratiate myself and negotiate with 'off-site' practitioners when recruiting them for interview. Before and during the interviews, I demonstrated my working relationships with both Taiwanese and Spanish government officials to practitioners were otherwise unable to verify my *bona fides*; in doing so, I increased my chances of convincing 'on-site' and 'off-site' practitioners to be interviewed. For example, I got connected to off-site actors who possessed very detailed, in-depth and crucial information on Decide Madrid and vTaiwan-Pol.is. They agreed to be interviewed by me because they understood that I had been working with critical practitioners in Madrid and Taipei City and because I demonstrated my knowledge about the two participatory platforms by asking deliberately provocative questions. Also, I got a fantastic opportunity to collaborate with a data scientist from the Pol.is team in the United

States to recreate a vTaiwan participatory process related to a consultation on Uber, on the basis of an email exchange and Skype chat.

## 2.3.2 Ethical conflicts in the field

I will now describe how I understand ethics in research in a relative context, which is to see ethics as not only perceived differently across different practitioners but also as being infused with power relationships, such as those existing between researchers and the researched. Cook (2005) and Harrington (2016) indicate that studying elite institutions throws up a power imbalance between the researcher and her object of study, which manifests at various points —such as at the point where initial access needs to be obtained —and indicates where the researcher needs to obtain more information. When compared to other researchers, such as those who conduct ethnography in vulnerable communities, my relationship with governmental institutions was different in the sense that they had the power of deciding what I should learn, which meetings I could attend and generally what I could acquire in the field. In contrast to the senior officers and practitioners who held different sorts of information on Decide Madrid and vTaiwan, I was only a semi-insider with limited and potentially unreliable knowledge. I observed that such a power relationship was entwined with the different degrees of 'conservation' adopted by practitioners, dependent on their positions within the hierarchies of the Taiwanese and Spanish governments. Shared between both governments is the fact that in general high-ranking officers were more defensive when critically questioned. Here, given the particular power relationship between myself and both governing institutions I was studying within, a crucial ethical conflict emerged related to how I could retain my own criticality without breaking ethical principles (Centre for Social Justice and Community Action, 2012), obtain consent, inform participants and keep information I collected anonymous and confidential.

Under any given circumstance, I made sure I got consent from interviewees (verbally or signed) before I conducted an interview. I provided a written consent form to interviewees, which briefly explained my PhD project in both English and the local language (traditional Chinese or Spanish) and how I was going to use the information, as well as providing a guarantee of anonymity within my PhD study. I also briefly explained what was written in the consent form again to the interviewee before I conducted each interview. In some particular situations, when I was not able to give interviewees the consent form, I verbally explained

what was written in the consent form and asked for verbal consent from interviewees; in doing so, I made sure that all interviewees acknowledged that the data and information they provided would be treated anonymously, transcribed and only used for my PhD research. In addition, I let them know that all interview data would be destroyed one year after I finished my PhD study and that they could withdraw from participating in my PhD research at any time.

During my PhD research, there were several moments where senior officers or policymakers attempted to interfere with the direction of my research in both the Spanish and Taiwanese cases. There were moments when some actors within both vTaiwan and Decide Madrid assumed me to be a researcher who was bent on producing negative criticism of their projects. Some practitioners were defensive or tried to dodge critical questions during the interview by either implicitly or explicitly expressing to me that they did not like to be critiqued or critically commented upon: in effect, they acted to 'protect' the official discourse on the DPPP which had been agreed within each governmental organisation, rather than answering questions honestly during the interviews. This situation was further complicated across different institutional cultures of Madrid City Council and the Taiwanese Government. It was clear that Spanish practitioners were more explicit about 'how far' I could ask and 'how much' data that I could obtain and use for my PhD project. By contrast, practitioners (in particular civil servants) in the Taiwanese Government were generally more reserved towards answering critical questions, such as a question on to what degree vTaiwan could empower citizens.

I attempted to *work through* the aforementioned ethical conflicts by finding exceptional practitioners who were more amenable to critical questioning. A relatively large number of actors were once civic hackers or activists, with international work experience and/or an ethos of 'openness' or 'revolution'. Those who held advanced university degrees could easily relate their previous research experiences to my positionality as a researcher and understand the point of the critical questions that I asked them during interviews. Even though they could be still defensive against such questions, they did not mind being pushed forward; this applied in both the Spanish and Taiwanese cases. Recognising their nature, I would repeat questions to them in different ways during the 'gap' in the interview until they provided a clear answer. Those who were young and revolution-minded did not mind critical questions at

all and were out-spoken. Whilst this was evidently seen in both Taipei and Madrid, in general people in Madrid City were more outspoken.

In addition, I continued to chase up former practitioners and researchers after I completed the internships, where I gained some key documents and interviews which were not possible for those who had a dual identity as an intern/researcher. After both internships were concluded, I conducted follow-up interviews with key actors during a revisit of Madrid City in 2018 and via Skype calls with Taiwanese actors. During the revisit and the post-internship interviews, when I stated my 'former' dual identity as intern/researcher, I can see the changes in interviewees' attitude. They shared with me a lot of information, and thus allowed me to explore deeper into users' performance in Decide Madrid, and to reconfirm the hidden power hierarchies and conflicts inside the team of vTaiwan I had observed earlier. As a result, I uncovered 'different viewpoints' from off-side or former practitioners, whose articulation of issues related to the DPPPs was not inhibited by restrictions stemming from political 'lines' which were issued from inside the Taiwanese and Spanish government.

There were situations when some Spanish participants offered critical information to me and told me that I could not use it in my PhD research. This information was related to a range of issues, such as party politics, strategic and resource prioritisation issues within Decide Madrid, hidden facts about the digital political participation process and information about the coding process of the rival platform (vTaiwan-Pol.is). In these cases, despite promising them not to use this data in my PhD, I would follow up the lines of inquiry with other practitioners, without revealing the identity of contributors (if at all possible). I also discarded and filtered out some information which did not relate to core research questions. With regard to information which did not bear on crucial research questions, I took this not as evidence but as insights for potential future research. In short, I used information only if they fit my aforementioned ethical protocol.

2.3.3 Challenges in comparing two different variations of digital urbanism
In the previous section, I mentioned how ethical conflicts can emerge differently in each case due to the different institutional cultures within the Spanish and Taiwanese governments. In this section, I want to draw out some challenges stemming from cultural, political and social differences which are relevant to carrying out a comparative study between Taipei and

Madrid. The biggest challenges that I encountered were almost the 'endless' work which I had to complete within very tight deadlines, and the feeling of 'disorientation' I experienced working between four different languages: English, Spanish, Traditional Chinese and programming languages (Ruby, JavaScript and Clojure).

Given the fact that my thesis was only funded for three years by the Taiwanese Government, I had a very tight schedule for doing participatory observation in Taipei and Madrid City. Each internship was assigned 12 weeks (with an additional pilot study for Madrid City completed in the summer of 2018). I spent every day as if it was my last day in the Spanish and Taiwanese Governments. On an everyday basis, I demanded myself to at least complete one of these tasks: attending meetings, acquiring 'the right information', obtaining 'the right connection to' potential interviewees and going through the websites of Github, Decide Madrid and vTaiwan. This work was a hard and highly stressful task; however, as I obtained more contacts as a semi-insider within the Spanish and Taiwanese governments, I gained essential and necessary help from my 'colleagues', who translated Spanish for me, offered me unpublished reports and so on (see the details in Section 2.3). With their invaluable help, I was able to collect adequate official documents, obtain more contacts with off-site or former actors and conduct around 50 interviews within a short period of time (a total of 60 interviews, including follow-up interviews after the fieldwork. This is particularly helpful in the Spanish context where I had to navigate through cultural and language barriers.

Of course, there was a time when I felt disoriented and lost between the four different languages I encountered, and had no idea where to start my comparative analysis. As an intern, my everyday practice in the field involved working in *at least* two different languages. I wrote my fieldnotes in English, yet I had to speak in Chinese or Spanish/English to communicate with my 'colleagues'. There was a lot of translation going on within my head when I was drafting interview questions, transcribing interviews or even just speaking to my colleagues. I felt especially disoriented when I completed transcription for the key interviews and attempted to tease out the comparative pillars through which I could systematically compare Decide Madrid and vTaiwan. This was perhaps the most painful period of my PhD research because I was lost in a sea of algorithms, fieldnotes in English, policy reports, user-generated data (citizen proposals and comments) written in Spanish or Chinese. It took me some time to work out the theoretical approach which allowed me to make meaningful

comparisons between the data I collected in each DPPP, and I will describe this process in the next chapter.

Reflecting upon what this comparative study means for my understanding of digital urbanism, my PhD project was definitely confined due to resource and time constraints, as well as by the 'short-lived' nature of the two DPPPs under study, which were only very active in very short time periods. Decide Madrid was only active from 2015-2019; whilst vTaiwan was mainly active from 2015-2017. It was lucky for me that I was able to witness and capture the 'fleeting' and 'growing' life periods of both Decide Madrid and vTaiwan, as each of them subsequently became 'less alive' as a result of politically driven changes. It did strike to me that these two DPPPs suggest a fast, short-lived and 'fleeting' style of digital urbanism, where effects appear and disappear within relatively short periods of time (in comparison, for example, to how much time has to spent in completing an urban regeneration project, such as King's Cross regeneration). The fleeting nature of digital urbanism certainly gives researchers some advantage, as results can be obtained via fast but intense fieldwork, but this is possible only if they arrive at the 'right time'! Also, the ephemeral nature of phenomena related to digital urbanism which I uncovered during my empirical research was a major contribute to my selection of using the assemblage approach as a theoretical lens (see Chapter 3), as both DPPPs indeed came together and went apart within a period of around 3-5 years.

2.3.4 Methodological challenges: where are the algorithmic processes?

Despite the advantages I obtained as a semi-insider in conducting participatory observation and interviews, I remained faced with a challenge: by the end of the internship, I had not collected adequate information about the 'actual' operation of the algorithmic processes in either of the two DPPPs. Data I lacked included: (1) information on the algorithmic processes (via ranking algorithms and Machine Learning algorithms[3]) which sorted and calculated user-generated data (such as proposals and comments) in the two platforms; and (2) data on the algorithmic visualisation of the dynamic User Interfaces (UIs) of the two platforms as they interacted with users[4]. Whilst this data would obviously be of a highly-technical nature, without knowing these algorithmic processes, my analysis on the impacts of DPPPs in empowerment would be largely confined to discourse analysis.

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[3]  Including K-means and PCA algorithms

The absence of data on the said algorithmic processes from the data I had already collected via interviews and participatory observation significantly highlights the limitation of using 'a non-digital centric' perspective of digital ethnography, which follows events via participatory observation and interview rather than using digital methods (Pink et al., 2016). Whenever I asked key practitioners about how I could get to know the in-situ process of digital political participation in the DPPPs, they simply shrugged and told me no one knows. I did not know how to solve this issue during my internships. Here, I see a real danger for researchers, who may make insufficient claims on both the effect and impact of algorithms as they lack the data to know how they actually work (Amoore and Piotukh, 2015). Furthermore, as Kitchin (2017, p. 25) has pointed out, algorithms do not 'play by the book':

> *First, what an algorithm is designed to do in theory and what it actually does in practice do not always correspond due to a lack of refinement, miscodings, errors and bugs.*

> *Second, algorithms perform in context — in collaboration with data, technologies, people, etc., under varying conditions — and therefore their effects unfold in contingent and relational ways, producing localised and situated outcomes.*

It is this nature of algorithms — the fact their effects unfold in 'contingent and relational ways' — which makes it very crucial for researchers to capture how algorithms actually shape and affect users engaged in digital political participation.

At this point, I realised if I wanted to develop a deeper analysis of the two DPPPs — one that was more attuned to the actual and material behaviours of algorithms as they are exposed to incoming data — additional methods had to be deployed. This focus on the role of algorithms is important for my comparative examination of the effects and impacts of the two DPPPs on empowerment, because the unfolding understanding I had of the algorithms status as non-human agents presented me with the opportunity; I could integrate an assemblage approach which recognised the importance of non-human actors within technologically-driven modernity and understand the concomitant challenge this brought to narratives of human exceptionalism (Bennet, 2005; Anderson and McFarlane, 2011). I realised that only by doing so could I obtain the theoretical key to make sense of what was

actually going on within and on-the-surface of the UIs of Decide Madrid and vTaiwan. If I did not do this, my research would be solely focused on the 'institutional context of policy-making' and the ancillary face-to-face political participation the two DPPPs conducted.

I decided to give this approach a shot; in doing so, I was helped by the fact that a data scientist in Pol.is (the software provider of vTaiwan) expressed a willingness to export and give to me the data related to a particular process of digital political participation (the Uber case, which I will discuss in detail in the next section). Also, data scientists offered me a report which performed data-driven analysis of user behaviour in Decide Madrid (a so-called usability report). With this information, I was more confident that I could develop my argument with a focus on the role of algorithmic calculations in the calculation of user data and on the display of the dynamic UI. In short, my decision to conduct a further investigation into the material effects of algorithms significantly affected the direction of my research.

## 2.4 Going down algorithmic 'rabbit holes'

After making a decision to change the direction of my research to focus more specifically on how the aforementioned algorithmic processes reacted with user data of various kinds to affect digital political participation, I realised that I needed to employ new methods, which I call 'digital flashbacks', in order to extend my understanding of the two DPPPs' internal process of algorithmic calculations, their processes for modulating user data and the processes which determined how the UI dynamically changed appearance for each user; in doing so, I would have the right equipment to descend into the 'rabbit holes' which algorithmic interactions hid down! This posed a huge challenge for an urban geographer like me, and reflected Leszczynski's (2018, p. 473) observations on this issue made in her recent introduction to digital methods. In her words, there are 'epistemological limitations of geographical methodologies for accessing and making sense of socio-spatial relations, practices, and processes of digital presences, practices, and spatialities'. Apart from Leszczynski's (2018) digital methods of triangulation (qualitative methods), representativeness (data analysis), digital-visual methods (2019a) and the digital mundane (2019b), other researchers have suggested the need to develop a post-phenomenological method for studying digital interfaces (Ash *et al.*, 2018b) and have posited a set of critical qualitative methods for studying the

operation of algorithms as they relate to broader political, political and economic contexts (Kitchin, 2017).

I developed an 'unfolding' approach which allowed me to sketch out both internal and external processes which involved algorithmic calculations and interface configuration. This was done by coordinating a variety of methods which together I term 'digital flashback', seen as an analysis, simulation and visualisation of digital archives of users online activities via the DPPPs. Here, 'unfolding' has two meanings, both of which have implications for my methodology. Firstly, this approach specifically recognises what Kitchin (2017) argues to be the ongoing, contextually-embroiled, and heterogeneous nature of algorithms. Such a recognition of algorithms matters because it fundamentally avoids producing an over-generalised view on algorithmic calculations. As Kitchin (2017) particularly notes, algorithms can do many different things (heterogeneity) and the things that they do depend on how their surroundings contextually unfold (contextual-embeddedness and ongoing-ness).

Secondly, this unfolding approach connotes the emergent and challenging research process through which I often had to strategically innovate and orchestrate different methods that were feasible and effective in showing the works of algorithms as my research went on. Working out and inferring how algorithms actually operate is a messy and non-linear process. This involves cross-referencing the transcriptions of the interviews with software engineers in relation to the 'real' situation where algorithms operate as indicated on the data-spread-sheet. One of the central challenges is the contingent, technically-convoluted, and un-folding natures of algorithms (Kitchin, 2017), which makes it extremely difficult for me to translate the technical complexity (such as the terminology of 'dimension-reduction' and 'multi-dimensional data') into something understandable and theoretically meaningful for social scientists even if I can describe how it works and I know which mathematical method it uses. In particular, this challenge gets more complicated when I also want to translate two sets of algorithms into a similar amount of evidence which allows me to develop the same analytical level. What this means is that I employ a range of different digital methods to the extent that they allow me to enquire and capture information regarding:

    (1) algorithmic processes (ranking algorithms and Machine Learning algorithms[5]) of

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[5]  Including K-means and PCA algorithms

sorting and calculating user-generated data (such as proposals and comments) for Decide Madrid and vTaiwan

(2) the algorithmic visualisations of the dynamic UI (i.e. how algorithms behind the UI interacted with user data to change appearance over time).

These two focuses are important because they offer me technical explanation and information about algorithmic operations that can be developed into my analysis of DPPPs by situating them within a wider context of policymaking and/or governments. Knowing how algorithms work and operation within the context of DPPPs is not just about understanding their technical meaning but is to develop a critical analysis of them by revealing their limitations and possibility in empowerment and policymaking as has been indicated by my research questions.

2.4.1 Digital Flashback

The digital flashback method can be seen similar to a combination of the 'digital archive' (Beer and Burrows, 2013) and 'digital twin' methods. It aims at analysing the digital data (the archive) in terms of the ways in which users act through and within algorithmic calculations at specific times within the context of digital political participation. The concept of the digital twin[6], despite various extant usages, can be broadly understood as 'a digital mirror of the physical world … [which] maps the performance of physical world' (Guo *et al.*, 2019, p. 1189; Zohdi, 2020).

In my digital flashback method, I firstly created a digital visualisation and simulation of data on users' actions (or what Beer and Burrow (2013) call 'by-produce data'/'digital archive') with the help of a data scientist working for vTaiwan; this related to a specific case of the operation of digital participation related to the vTaiwan consultation on Uber. Secondly, I inferred users' performance on historical processes of citizen participation and participatory budgeting processes by analysing data-driven reports produced by Decide Madrid. The use of visualisation and simulation in the case of Uber on vTaiwan makes my digital flashback method similar to the method of digital twin. However, different to digital twin method, my

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[6]

The usage and concept of 'twin' originates from Nasa's Apollo project which created two identical spaceships (one was created on earth to mirror and simulate the condition of the spaceship in space) in order to assist astronauts in making critical decisions (Arnarson, p. 3).

digital flashback on vTaiwan-Uber does not create a real-time connection and simulation of the real-time physical world. Rather, it only recreated a digital replica of a case of vTaiwan-Uber consultation which happened in 2015 with the same algorithm and same database.

(1) Creating a digital twin of vTaiwan-Uber case

I chose to apply the digital flashback method on the digital archive of online participation on VTaiwan related to the Uber case as the Uber issue was regarded by practitioners as the most successful case in improving citizen participation amongst other vTaiwan cases. I was able to get a data scientist from Pol.is Inc to recompute the data which was originally generated by users' activities (comment/voting pattern and opinions with time references) in 2015 with the same algorithms (Machine Learning algorithms, namely Principle Component Analysis and K-means) during the monthly online participation on vTaiwan. As a result, the vTaiwan online participation was digitally replicated into 30 daily sections, which were able to indicate temporal changes in the number of Opinion Groups, incoming votes and comments, voting patterns of each user and the selection of Intra-Group common opinions (comments that gain majority votes within *each* Opinion Group) within a monthly participatory process. To complete the digital twin, from here, I recalculated the Inter-Group common opinions (comments that gained majority votes *amongst all* Opinion Groups) following the consensus formula[7] (provided by the data scientist) for the first five days in the monthly participation via Excel. I then visualised the voting patterns of users and opinion groups in digital visual diagrams (see the column Y in Figure 4) via the visual functions provided in Excel.

| A | B | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| participant | group-id | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | |
| 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | 0 | 0 | 0 | 0 | 1 | 0 | |
| 1 | 0 | -1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -1 | | 1 | | | | | | |
| 2 | 0 | 1 | -1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -1 | | | | | | | | |
| 4 | 0 | 0 | | | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | |
| 5 | 0 | -1 | | | 1 | 0 | 1 | 1 | 0 | 1 | 1 | -1 | | 0 | -1 | 1 | 1 | 1 | 0 | |
| 7 | 0 | -1 | | | 1 | 1 | -1 | 1 | 1 | 1 | 1 | -1 | | 1 | 1 | -1 | -1 | 1 | 1 | |
| 9 | 0 | 1 | | | -1 | 1 | 1 | 1 | 1 | 1 | 1 | -1 | | -1 | 1 | -1 | 0 | 1 | 1 | |
| | | 0.5 | 0.25 | 0.375 | 0.75 | 0.75 | 0.875 | 0.875 | 0.75 | 1 | 0.875 | 0.25 | 0.125 | 0.375 | 0.375 | 0.25 | 0.25 | 0.625 | 0.375 | |
| 10 | 1 | 1 | -1 | -1 | 1 | 1 | -1 | 1 | 1 | 0 | 0 | 1 | | 0 | -1 | 1 | -1 | 1 | | |
| 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | |
| 17 | 1 | 1 | -1 | -1 | -1 | 1 | -1 | -1 | 1 | 1 | 1 | -1 | | | | | | | | |
| 20 | 1 | 1 | -1 | -1 | 1 | 1 | 1 | -1 | 1 | 1 | -1 | -1 | | 1 | -1 | 1 | -1 | 1 | -1 | |
| 24 | 1 | 1 | | | -1 | 1 | -1 | 0 | 1 | 1 | 0 | -1 | | 1 | | | | | | |
| 26 | 1 | 1 | | | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | | 1 | -1 | 1 | -1 | | | |
| 28 | 1 | 1 | | | 1 | 1 | 0 | -1 | 1 | 1 | 0 | -1 | | 0 | -1 | 1 | -1 | 1 | | |
| 29 | 1 | -1 | | | 1 | -1 | -1 | -1 | 1 | -1 | -1 | -1 | | 1 | -1 | 1 | -1 | 1 | 1 | |
| 30 | 1 | 1 | | | -1 | -1 | | -1 | -1 | 1 | -1 | | -1 | -1 | 1 | -1 | -1 | 1 | | |
| 31 | 1 | 1 | | | 1 | 1 | -1 | 0 | 0 | 0 | 0 | 1 | | 1 | -1 | 1 | 0 | 1 | 0 | |
| | | 0.818182 | 0.090909 | 0.090909 | 0.545455 | 0.727273 | 0.181818 | 0.272727 | 0.727273 | 0.454545 | 0.272727 | 0.363636 | 0.090909 | 0.545455 | 0.090909 | 0.727273 | 0.090909 | 0.545455 | 0.272727 | |
| 33 | 2 | 1 | -1 | -1 | 1 | 1 | 1 | 0 | -1 | 1 | 1 | 1 | 1 | | | | | | | |
| 37 | 2 | 1 | -1 | -1 | 1 | 1 | 1 | -1 | 1 | 1 | 1 | | | | | | | | | |
| 40 | 2 | 1 | -1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | |
| 41 | 2 | 1 | | | 1 | 1 | 1 | -1 | 1 | 1 | 1 | 1 | | -1 | -1 | 1 | 1 | | | |
| 46 | 2 | 1 | | | 1 | 1 | 1 | -1 | 1 | 1 | 1 | | | -1 | -1 | -1 | -1 | 1 | 0 | |
| 47 | 2 | 1 | | | | 1 | 1 | -1 | 1 | 1 | 1 | -1 | | -1 | -1 | -1 | -1 | 1 | -1 | |
| | | 1 | 0.142857 | 0.142857 | 1 | 1 | 0.857143 | 0.428571 | 1 | 1 | 1 | 0.714286 | 0.285714 | 0.142857 | 0.142857 | 0.428571 | 0.428571 | 0.428571 | 0.142857 | |

[7] [G1(number of positive votes+1)/(number of total votes+1)]*[G2(number of positive votes+1)/(number of total votes+1)] *[G3(number of positive votes+1)/(number of total votes+1)]

Figure 4: a screengrab of the creation of 'flashbacks' of digital political participation related to the Uber case on the vTaiwan platform as of 15th July 2015. It shows three different Opinion Groups (highlighted in grey, blue and yellow): each shares a similar voting pattern on the Uber issue amongst users, as visualised at the Y column. It also shows the result of calculating the inter-Group Common Opinions — i.e. what is common between different Opinion Groups — via specifying the consensus rate[6] (indicated in the bottom row).

The use of recalculation and visualisation of real-time data is essential because it offers a way to create a 'flashback' about how participants voted and were grouped by Machine Learning algorithms on a daily basis in 2015. The visual digital diagrams and real-time data allowed me to understand the entanglement between participants and algorithms that were involved in the participatory process. I was able to identify critical moments where changes occurred, including when participants were grouped differently by algorithms and incoming votes (as in 'Opinion Groups') and when the inter-Group Common Opinions were reshuffled by algorithms and incoming votes (the comments that gain the majorities from different Opinion Groups). Thus, these digital visual diagrams and information provided me with more insightful evidence on the ways to theorise algorithmic calculations with a consideration of both users and user-generated data for vTaiwan. Without recreating and visualising real-time digital political participation, I would not have been able to figure out two sets of rules through which algorithms interact with users between vTaiwan and Decide Madrid (see the details of my analysis in Chapter 6).

There were two issues which I encountered which highlighted problems in integrating visual digital diagrams in my analysis; these ultimately led me to take a decision not to present visual digital diagrams in my empirical chapters. Firstly, I needed to recalculate the consensus rate for each day on the basis of formulae from the data spreadsheet, which required a lot of time even though I employed Excel to help. As a result, I stopped recalculating at the fifth day in the Uber case where the most drastic changes happened; however this meant that I only had partial information on monthly digital political participation in the Uber case. Secondly, I discovered that visual digital diagrams were not easily-understood without a lot of works to explain and translate the technical capacities of Machine Learning algorithms.

(2) Inferring the impact of the online activities of users on Decide Madrid's UI via the use of
    data-driven reports

In the case of Decide Madrid, due to lacking direct access to the digital archive of users' activities, I was not able to create a digital twin of online participation in the same way as I did for vTaiwan. However, I was able to do this via different means by using online observation and data-driven analysis reports produced by MediaLab Madrid and Torresburriel Estudio. The data-driven report conducted by MediaLab was created to understand what obstacles and opportunities for users existed in online participation on Decide Madrid. As the report employed a data-driven network analysis on digital archive of users' activities in Decide Madrid and in Twitter (Leszczynski, 2019a), it was able to be used to trace and visualise the relationships or connections amongst users within Decide Madrid, as well as between Decide Madrid and Twitter. Another important report — a usability test — was published by Torresburriel Estudio on the commission of Decide Madrid by Madrid City Council; it intended to examine the ability and knowledge of users of how to participate in the UI of Decide Madrid.

By using these data-driven analysis reports, I was able to infer and understand how users' vote and propose via the Decide Madrid UI throughout different participatory processes such as the citizen proposal and participatory budgeting processes. The specific issues which were analysed and indicated in these reports can be seen as part of my digital flashback of Decide Madrid's online participation. To complete my creation of the digital flashback of Decide Madrid, I also carried out online observation on the changes to a specific UI feature — the yellow banner — within the citizen proposal process over a four-month period from June 3rd 2019 to October 30th 2019.

(3) A comparison of the digital flashback method to digital archive, digital twin and digital
    visual methods

In comparison to other digital methods, my method of the digital flashback shares some similarity to the understanding of the digital archive in terms of 'by-product data' that are generated by users' online activities to varying degrees (Beer and Burrow, 2013, p. 48). As the two DPPPs collect and document 'by-product data', they have created archives of users' activities and opinions with references on time and partial geographical locations. It can be said that these new sources of digital archives offer new and innovative possibilities and

method tools for social researchers to discover and unpack the entanglement between algorithms and different sections of life in terms of social, cultural and political, as well as opens up new fields of inquiries in social science (Beer and Burrow, 2013; Nicholson, 2013). However, as Beer and Burrow (2013, p. 54) point out, using conventional social science methods do not make it 'straightforward to study' and make sense of 'ebbs and flows of relationship change' in user-algorithms and thus the fast-moving nature of social media and popular culture. What they imply is that social researchers might want to use other non-conventional methods to further make sense and analyse these digital archives.

That said, despite the fact that digital devices can collect and create massive digital archives on users' online activities, precisely how to analyse these archives presents methodological questions for social researchers. From here, we can see how my digital flashback method can contribute such understanding and how it differs from the digital archive method precisely because the digital flashback method is more than collecting and browsing digital archives. Rather, the digital flashback method 'recreates' the process of digital participation or/and further analysis these digital archives through statistical and visual methods. It is this computational recreation that makes my digital flashback method resemble the method of 'digital twin' in at least two ways. Firstly, similar to the digital twin method, which involves an element of digital archive about the targeted physical object in its simulation of the physicalobject/system (Tao *et al.*, 2018, p. 356; Arnarson, 2019, p. 1), my usage of digital flashback analysis on vTaiwan recomputes and thus reproduces what has already taken place in one instance of vTaiwan online participation. Similarity, the data-driven reports on Decide Madrid only analyse past events. Secondly, the digital flashback method echoes the digital twin method as both are able to incorporate the visualisation effects into their production of a 'digital replica'. Often, the simulation of a physical system comes alongside the visualisation of such systems (Guo *et al.*, 2019). For instance, Arnarson (2019) has used software to simulate and visualise a physical robot's performance on the server; this digital visualisation is a visual replica (digital twin) of the physical robot.

Additionally, my digital flashback method differs from the digital twin method as it does not offer a real-time connection and analysis of the datafied 'physical world' as the digital twin does. As the concept of the digital twin develops, engineers and designers are increasingly using it as a tool to make design decisions and to test and optimise physical systems by

simulating physical systems in a real-time and interactive manner (Tao *et al*., 2018, p. 356). That is to say, a physical system and its digital twin are interconnected in real time through digital devices; the digital twin can also be connected to the data archive of the physical system (Tao *et al*., 2018, p. 356).

From the perspective of digital geography, the digital flashback method can be broadly seen as one interpretation of 'digital (visual) methods' which 'use digital technologies and computational techniques to collect, explore, and analyse visual media or to visualise data' (Leszczynski, 2019, p. 1144; Rose, 2014). The creation of a digital twin, as I did through visualising voting patterns of users in diagrams via my digital flashback method, can be seen as one variation of the use of visual materials, such as photographs, maps, paintings and videos, which are often used in the diverse 'visual method research' (VMR) across varied research topics (Rose, 2014). The digital diagram is similar to VMR in two ways. Firstly, I used digital visual diagrams to make the invisible and material working process of algorithms and participants *visible*, in a similar way as how Rose (2014, pp. 28, 30) describes the use of photos as visual materials to inscribe and make 'things' visible. Rose (2014) has argued that VMR makes things visible in the way that interviews, survey and other methods cannot. She points out that the use of visual material, in particular photography, functions as 'inscription devices' to generate evidence (Rose 2014). Secondly, my digital visual diagrams are similar to VMR because they are collaboratively created *with* and *by* participants. The real-time data was not generated by myself but by data scientists, participants and Machine Learning algorithms: I only visualised and recalculated this existing real-time participatory data into digital visual diagrams.

As noted by Rose (2014) within her idea of VMR, it is important to acknowledge that visual diagrams are mediated through and produced by in-situ work and arrangement of technical devices, experts and participants. Rose states that these visual diagrams are essentially partial facts which are produced by particular arrangements between human and nonhuman actors. For instance, scientists can use diagrams that are generated by inscription devices as evidence to support a scientific fact (Latour and Woolgar, 2013). Thus, whilst these visual diagrams can be seen as evidence for research purposes, they are only partially representing the facts of the world.

Echoing Rose (2014), I am aware these hybrid arrangements only represent a partial view of the object/subject of research and play a 'mediation' role in producing visual diagrams. In the context of creating my digital visual diagrams, their partiality largely comes from the contingent nature of Machine Learning algorithms, where algorithms perform with a degree of randomness (Kitchin, 2017). This means that given the same data input, the way in which Machine Learning algorithms perform calculations will be different and a different result will therefore be produced for each. Thus, there was a marginal difference between the recreated participatory process in 2019 and the 'original' participatory process in 2015.

Acknowledging the partial view inherent within the production of digital flashbacks is important. My intention of creating digital (visual) flashbacks is to present, visualise and incorporate Machine Learning algorithms, user-generated data and participants into my analysis. I want to provide a more 'in-situ' illustration which shows how the agency of Machine Learning algorithms 'actually' plays out in a contextual environment with users and data; this will highlight the differences in real-world performance as opposed to how algorithms were envisaged to be used at the design stage (Kitchin, 2017). This points to a significant possibility of using such digital flashback methods, which contextualise our understanding of algorithmic calculations within an empirically-grounded, 'already-happened' case study. This digital flashback method, despite the aforementioned limits, can significantly contribute to the challenges of studying algorithms in human geography.

To sum up, employing the digital flashback method has impacts on my PhD thesis and on the study of digital geography more generally. Firstly, the digital flashback method had a major impact on the direction of my PhD by providing solid evidence on how users' online activities shape or are being shaped by algorithms and data in the context of the two DPPPs. Based on this evidence, I was able to shift my focus from a wider understanding of 'the digital' in policymaking processes to a specific focus on examining the effects of algorithms in terms of their internal calculations and configurations of the interface of Decide Madrid and vTaiwan. As a result, my understanding of the three assemblages used within this thesis — design, UI, algorithmic decision-making — took shape based on the particular understanding of algorithmic calculations and configurations of interfaces with a consideration of users.

Secondly, the digital flashback method contributes to recent discussions over methods on studying algorithms (Kitchin, 2017; Leszczynski, 2018) and analysing different forms of digital archives (Beer and Burrow, 2013). It offers a way to analyse digital archives of users' online actions by recreating and recomputing the specific digital archive with the same algorithms. This can be seen as a form of 'digital twin'/digital visual method as it creates a digital replica of vTaiwan online participation for the issue of Uber legalisation.

2.4.2 Ethics for studying algorithms and user-generated data

In Section 2.3.2, I described how I dealt with the ethical conflicts which emerged due to the specific power relationships between myself and practitioners in the field during the processes of conducting my research. In this section, I discuss how I approached the ethical issues which were raised when studying the interactions between user-generated data and algorithms within the two platforms. The algorithms and user-generated data that I got access to and which are analysed and reproduced in my PhD study are all publicly available information, which the British Sociological Association (2017) considers as not requiring a need to acquire consent. Nor did these data contain any personal information of users that were not published by the users themselves.

Algorithms of Decide Madrid and vTaiwan-Pol.is (written in the 'source codes' which refer to any instructions written by programmers in a particular programming language, such as Ruby) are distributed in Github under the licence of the GNU Affero General Public License 3.0 (AGPL). APGL is a license for free software which gives everyone the freedom to distribute, download, run and modify the software that is subscribed under AGPL[8]. Therefore, I did not breach any legal right of the Pol.is Inc. and Madrid City Council by accessing to and downloading the algorithms of Decide Madrid and vTaiwan-Pol.is.

The fact the algorithms were published on Github gave me some advantages in understanding and verifying the information related to algorithms; even though I did not know how to code in Ruby, JavaScript and Clojure (the programming languages that are used to construct Decide Madrid and vTaiwan-Pol.is), Github shows how these algorithms were (re)programmed over time. Based on the information about algorithms on the Github website, I can ask software engineers why particular ranking algorithms were changed at a given time.

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[8] https://opensource.org/licenses/AGPL-3.0, access at 09/08/2019

Also, there was a strong commitment to openness among software engineers who worked for the two DPPPs. Most of them were genuine and very open to explain and discuss how they designed and programmed Decide Madrid and vTaiwan-Pol.is.

User-generated data from two platforms — which included user-generated proposals or comments and the numbers of votes — are publicly available information. Even though the BSA does not think acquiring these user-generated data requires gaining the consent from users for reproduction and reuse, consent has been gained directly or indirectly from users, when users agreed on the terms of use while registering or using the two participatory platforms. Users agreed that the proposals, comments or votes that they post on both platforms will be known by the public, including me, even though some of the proposals or comments have indicated their user name, which might be their real name.

Both Decide Madrid and vTaiwan platforms stressed in their terms of use that participants have to agree to publish their user-generated data in their platform. One of the terms of use on the website to Decide Madrid addresses that users must acknowledge and consent that all content generated and submitted by themselves will be shown and known by the public[9]. Also, a particular term of use indicates that participants have to acknowledge and accept the fact that Madrid City Council might publish user-generated data on its official website and via other means.

In addition to the content of user-generated data, I have acquired the real-time participatory data (containing the time, the group and the written text of User content) to generate digital visual diagrams for the Uber case, which was exported, given and reproduced by a data scientist from Pol.is Inc. I did not breach the data privacy as these participatory data do not contain any personal information (such as IP address) about users who are anonymous in the dataset. I did not breach any legal right of users as users have given Pol.is Inc. the right to store, transfer, reproduce and distribute the user content when they were submitting and generating the data on vTaiwan-Pol.is. This consent is written in Pol.is term of use[10]:

*By posting or publishing User Content, you grant Pol.is a worldwide,*

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[9] https://decide.madrid.es/condiciones-de-uso, access at 09/08/2019
[10] https://pol.is/tos, access at 08/08/2019

*non-exclusive, royalty-free right and license (with the right to sublicense) to host, store, transfer, display, perform, reproduce, modify, and distribute your User Content, in whole or in part, in any media formats and through any media channels (now known or hereafter developed).*

By using vTaiwan-Pol.is and agreeing to its terms of use, participants in vTaiwan-Pol.is gave their consent to allow Pol.is Inc. to store and reproduce their user data for research purposes, such as this PhD study. However, in practice, this does not mean all participants know this right they have granted to Pol.is Inc., especially given that the terms of use are written in English. This ethical concern has been pointed out by the British Sociology Association (2017) in Ethics Guidelines and Collated Resources for Digital Research, which is described in that:

> *even if you [researcher] are legally allowed to re-use some online information, there are still no absolute guarantees that those who share their information on the Internet will feel 100% happy with you using their information in your research, and will not feel they have been harmed in any way* (British Sociological Association, 2017, p. 7).

This ethical concern can also occur in Decide Madrid: it is not absolutely sure that every user has read through the terms of use even though they have clicked on the agreement on the terms of use when they register with Decide Madrid. I agree that this is undoubtedly an ethical concern I needed to take into consideration when I was researching participatory platforms in the future. However, I do not think this concern is an issue in the case of Decide Madrid and vTaiwan-Pol.is., because the user-generated data — proposals or comments, and numbers of votes and proposals — are *publicly available information*, which BSA considers not to require consent from users. For the real-time participatory data provided by Pol.is Inc., they are anonymous and non-personal information. There was no way for me to gain consents from users to make sure they read and understand the term of use because I do not even have their personal information.

Overall, my use of user-generated data and the participatory data does not breach data privacy requirements. I did not use or hold any unpublished personal data, such as IP addresses. The user-generated data and the participatory data are both *publicly available information* and both have been given usage consent from users who agreed the platforms

could publish them and that data could be made available to the public during the registration period: this is addressed in terms of use in both platforms. In particular, users have granted Pol.is Inc. the right to distribute and reproduce their user content for the purpose of my investigation.

## 2.5 What I have learned from using a hybrid method

I conclude this chapter by indicating what I learned from conducting a hybrid method of participatory research practices and purposely-developed digital methods for investigating DPPPs. These findings can be summarised under three key headings: (1) establishing research inquiries comes first before the deployment of digital methods; (2) obtaining digital archives of the two DPPPs matters more than knowing how to code; and (3) non-digital methods are useful.

Firstly, the most important thing that I learned is the limitations of employing non-digital methods in terms of participatory observation and interviews. Such methods do not guarantee researchers can understand changeable and mutable processes of digital political participation as they can lose sight on 'what is going on' within the fast-changing, unfolding and transformative nature of algorithmic calculations (Kitchin, 2017) and UI visualisations. In the context of digital political participation, this shows the limitation of using a non-digital-centric perspective which does not necessarily consider digital methods (Pink *et al.*, 2016). However, I do not reject the use of non-digital methods which provided me with important information regarding the institutional context of the DPPPs under study here, such as user actions in interaction with the UI and how algorithmic outputs are integrated into the policymaking process. In particular, the follow-up interviews I conducted with software engineers and designers were extremely useful as I discovered a lot of hidden facts and rationales behind the design process of Decide Madrid and vTaiwan. Agreeing with Leszczynski (2018), I note that an investigation of DPPPs does not necessarily require using digital methods, yet digital methods should be deployed 'specifically in relation to the particular research questions being asked' (Pink *et al.*, 2016, p. 10). Once digital methods are discerned as necessary for answering research questions and put into research practice, they can offer information about the material works of algorithmic calculations.

Secondly, regarding my development of the bespoke digital flashback method, I learned that getting access to the data archive of digital political participation process is as important as getting access to the institutions for gaining a critical view of DPPPs. In my case, getting access to the two DPPP's data archive was even more important than knowing how to code, because I could further analyse the digital archives in order to unpack the ways in which users participated and interacted with algorithmic processes.

That said, conducting digital methods — despite their ability to provide new perspectives and contributions to digital geography in studying algorithms-mediated actions via digital platforms/social media (Kitchin, 2017; Beer and Burrow, 2013) — requires only obtaining access to digital archives (including getting content from the authority and users) but also technical supports in distilling and analysing the data. If institutions say that it is not possible to get access to real-time data and algorithms, it would be apparent to researchers that they can only get 'so far' without being able to create digital flashback analysis. Thus, taking accounts of the accessibility of digital archive of the targeted digital devises will provide researchers with a better expectation how we can get the most from our fieldwork, and a more efficient plan for data-driven analysis (including acquiring data, preparing technical analysis skills or asking for technical supports and examining data).

Thirdly, it is important to note that I do not dismiss the use of non-digital-methods such as participatory observation and interview. As Kitchin (2017, p. 26) points out, conducting interviews with users can also effectively unveil 'how people engage with and are conditioned by algorithmic systems and how such systems reshape how organisations conduct their endeavours and are structured'. Similarity, Ash *et al.* (2018a) provide fruitful and critical analysis of the effect of the interface in shaping the emotion and actions of users by conducting interviews with users. In addition, Kitchin (2017) also notes that participatory observation can effectively work for revealing the rationale and the design process of a given algorithmic device. For instance, I addressed how the practice of participatory observation and interviewing with former, off-side and current practitioners were useful in providing contextual information in terms of the design rationale behind DPPPs, the policy-making processes and users online behaviours. In Chapter 7, I will offer an agenda for future research in digital democracy, and specify how a non-digital centric ethnography can contribute to unpacking users' actions and emotions in relation with various forms of political participation

and with democratic institutions.

Also, I discussed how I work through the central ethical conflicts due to the specific power relation between myself and the powerful practitioners within both governments. Here, I raise the pros and cons of conducting these participatory research practices as a semi-insider. On the one hand, it is easier for me to discover and follow-up with former, off-site actors and gain help from them. On the other hand, this duo-identity can be both emotionally and physically exhausting because of doing multiple tasks when I was acting as an intern within the field. Therefore, it is at best to carry on strict time management and clearly state my responsibility when I negotiated with gatekeepers in the Spanish and Taiwanese governments.

## Chapter 3 On the development of a situated lens

In the following sections, I will explain how I approached the task of developing a theoretical approach to analysing the empirical data I collected during my fieldwork. I found this theoretical approach through integrating relational comparative urbanism, assemblage thinking and empowerment theories, which allowed me to develop an analytical lens which compares and explores the impacts of DPPPs and thus allows me to answer the specific research question:

(1) How can we develop an analytical lens which allows for an understanding of DPPPs at the various levels they operate and facilitates us in making meaningful judgments on impacts on urban policymaking and issues of citizen empowerment?

The deployment of a situated lens serves several important functions in my thesis. It responds to the theoretical challenges of the subject of my research — DPPPs, and specifically Decide Madrid and vTaiwan — as they are interdisciplinary and situated at the nexus between citizen empowerment, urban policymaking and digital platforms (which includes the algorithmic calculations and User Interface). I found both studies of digital urbanism and the digital citizen lacked any real development of an analytical lens which had the power to assess the 'democratic effects' of DPPPs via nuanced and empirically-evidenced understandings of the nature and operation of algorithmic-driven technologies. One the one hand, reading through urban studies focused on the intersection between digital technologies and cities (which I term digital urbanism), I found that they have tended to focus on how such technologies are 'co-constituted' with cities. This focus has tended to neglect the invisible, inaccessible, contingent and heterogeneous nature of algorithms (Kitchin, 2017; Amoore, 2019); as a result, a key challenge for researchers studying these technologies is to investigate these hidden processes. In particular, within the critical challenge of studying algorithms, studies of smart urbanism have tended to overlook effects stemming from how algorithms interact with 'user-generated data' and users, and to reduce citizens to sensor points lacking meaningful democratic capacities (Gabrys, 2014). On the other hand, echoing Isin and Ruppert (2015), in what I term emergent studies of the digital citizen, there is a gap in taking account of the potential that theoretical understanding DPPPs can bring to deepening the analysis of the political impacts of algorithmic devices.

Furthermore, learning from relational comparative urbanism (Robinson, 2015), the situated lens was able to ground my comparative study of the DPPPs within their shared trajectories stemming from the Occupy Movement — despite significant cultural, political and technical differences — as I have already demonstrated in Chapter 1. To build from here, I draw on Deleuzian assemblage thinking and empowerment theories to offer a consistent, comparative and meaningful pillars and standards of analysis on the impact of Decide Madrid and vTaiwan on citizen empowerment and urban policymaking. Therefore, the situated lens serves as a bridge which connects and integrates emergent studies of the digital citizen and digital urbanism with those of assemblages and empowerment.

### 3.1 Challenges for geographers in studying algorithm-powered technologies

In a recent introduction to digital methods in human geography, Leszczynski (2018, p. 474) raised a big challenge for geographers who study digital technologies. She notes that there are 'epistemological limitations of geographical methodologies for accessing and making sense of socio-spatial relations, practices, and processes'. This methodological warning is relevant when considering the present mainstream understanding of 'digital urbanism', which predominantly focuses on 'co-constitutive' dynamics of 'networked (urban) infrastructures', such as between bundles of road, energy, pipelines, telecommunication, sensors, digital platforms and urban spaces (Graham and Marvin, 2001; Graham, 2004a; Rodgers and Moore, 2018, n.p.). The idea of co-constitution suggests the presence of mutually reinforcing relationships between cities and the technological network infrastructures which constitute the technological, economical and social aspects of modern cities; these infrastructures are also shaped and normalised by planners, engineers, regulations and institutions in cities (Graham and Marvin, 2001, p. 10-12). In their call for studying platform urbanism, Rodgers and Moore (2018) also pointed out what they term the 'co-generative dynamics between platforms and the urban'. The research challenge, with regard to our common understanding of digital urbanism as co-constitutive revolves around existing methodological limitations in studying digital technologies; Steven Graham (2004, p. 18) critically reflects that:

> *the realisation that urban life and new media tend to be constituted together means that social research must move beyond generalized and deterministic discourses about the "impacts" of "cyberspace" on society to*

*look in rich empirical detail at the complex ways in which new media*
*technologies are being used in real ways, in real places.*

In his other work, Graham (2005) identified that certain challenges, stemming from the limited tools geography has to understand of algorithmically-sorted processes, have not yet been addressed within contemporary geographical research on digital technologies. In particular, this manifests as a need to unpack the *invisible and unsensed* technical processes of automation and sorting in the operation of ICT:

> *... [g]iven the inevitably confidential, proprietary and highly technical nature of the core algorithms that now socially sort so many key social domains, what research techniques and paradigms can offer any genuine assistance here?...the worlds of software-sorting tend not to be amenable in any meaningful way to traditional geographical or social scientific research techniques or conceptualizations* (Graham, 2005, p. 576).

Graham (2005, p. 571) highlights the serious challenge posed by the invisibility of algorithmic processes (which he refers as software-sorting), which perform functions such as choice-making, simulation, ordering, and classification. He describes algorithmic processes as 'remain[ing] completely opaque and utterly unscrutinised' (ibid). Crang and Graham (2007, p. 812) discern the same challenge, from a more explicitly political perspective. They urge that invisible digital technologies be made visible to users within their embedded infrastructures, in order to give more opportunities for citizens to take part in the development of new technologies. Rather than merely rejecting or fetishising technologies, they suggest a need to work through the details to identify new 'shadows and opacities' produced by and within technological systems. Similarly, by understanding invisible algorithmic process as the 'technological unconsciousness', Beer (2009) urges researchers to investigate the operationality of specific digital platforms in order to unpack the forms of power that they may exercise in social, cultural and political life. In their critique of smart urbanism, Marvin and Luque-Ayala (2017) argue that only by questioning and scrutinising the underpinning logic and knowledge of computational systems can we develop a more progressive version of smart urbanism.

More recently, in addressing the challenge of examining black-boxed and often inaccessible algorithmic processes, Kitchin (2017, pp. 20–22) notes two other challenges which reflect

upon the convoluted nature of algorithmic calculation: (1) their heterogeneous and embedded natures; and (2) the unfolding, performative and contingent nature algorithms evince when performing their calculations. He explains that algorithmic calculation is not only invisible and inaccessible to researchers but also involve sets of different algorithms which 'are rarely fixed in form, and their work in practice unfolds in multifarious ways' (Kitchin, 2017, pp. 20–22). Kitchin (2017) stresses the first point by explaining any given algorithmic device is assembled via the use of hundreds of separate algorithms and is embedded in specific social and institutional contexts which consist of legal, working and data relationships. Due to differential entanglements with databases, software engineers, protocols and other contextual conditions, it is not straightforward for researchers to tease out the various logics and relationalities which lie behind the use of algorithms (Kitchin, 2017, pp. 20–21). It is very difficult for a single programmer to fully understand how a large and convoluted algorithmic system works, as it may be divided into parts and outsourced to different programming teams across the globe.

Secondly, Kitchin (2017) discerns that the unfolding and emergent nature of algorithms – which react to input, interaction and different situations as they emerge — makes it difficult for researchers to theorise about them if they base their views only on how a specific algorithm performs in a limited amount of situations. For instance, Bucher (2012) shows that Page Ranking algorithms in Facebook will order posts differently depending on how a user interacts with her/his friends. That said, Facebook's Ranking algorithms do not act from above in a static manner but operate 'fluidly' on how algorithms contextually react to each individual user. Considering the contextually embedded and unstable nature of algorithms, Kitchin (2017) demonstrates that algorithms pose an extraordinary challenge for a single researcher aiming to unpack their underlying logic.

The challenges of studying algorithms noted by Kitchin (2017) are entrenched in contemporary research into new digital technologies and platforms. Addressing this issue is a matter of urgency as digital technologies become increasingly influential, organising or controlling ever-more aspects of our everyday lives and perception of cities (Graham, 2004b; Crang and Graham, 2007; Lash, 2007; Zook and Graham, 2007; Beer, 2009; Amoore, 2013; Kitchin, 2017). Lack of knowledge on how exactly digital technologies operate through algorithmic sequences in calculating or circulating data is becoming a crucial set of empirical

and theoretical research problems. For instance, when studying the algorithmic process embedded in navigation platforms (Microsoft's Pedestrian Route Production, Sketch Factor and Ghetto Tracker), there is a lack of detail on how information such as 'demographic information' or 'crime statistics' within the app is produced and made visible in term of sources and composition (Leszczynski, 2016, p. 1697). As a result, researchers continue to try to tease out specificities regarding the nature and operation of data and algorithmically-embedded devices (Beer, 2009; Ruppert, Law and Savage, 2013; Kitchin, 2014, 2017; Aradau and Blanke, 2015). In a critical reflection upon current conceptualisation on smart urbanism, Luque-Ayala and Marvin (2015, p. 2112) ask researchers to understand how specific digital technologies operate in order to go beyond co-constitution to unpack the relationship with users, space, services and networks.

Learning from the above, it is clear to see that urban researchers are making either general claims or specific case-study-based claims on digital urbanism. These facts again suggest the methodological challenges in studying algorithmic devices for geographers, which I have attempted to overcome through employing a method of 'digital flashback' to recreate the process of digital political participation in the case of the Uber consultation on the vTaiwan platform (see details in Chapter 2.4.1). What is more, going beyond the current approaches to studying digital urbanism, I attempt to take up a comparative approach that can offer a more nuanced understanding of digital urbanism across Spanish and Taiwanese cities, which manifest significant contextual differences in economy, politics and culture. I assert that this comparative analysis can potentially sketch out a new direction for digital urbanism, which is currently confined to conceptualisations of a single case study or on making general claims about the operation of algorithmic technologies within Anglosphere contexts which I identified earlier.

## 3.2 Questions in the digital turn of studying data and algorithms

More recently, researchers have started to pay attention to the effect and influence of algorithm-empowered devices in both our everyday life and surveillance practices. Kitchin (2017) claims that algorithms, via their power to make suggestions and decisions, are increasingly influential in shaping social and economic aspects of our everyday practices. Diakopoulos (2013, p. 2) claims that 'we're living in a world now where algorithms adjudicate more and more consequential decisions in our lives.…Algorithms, driven by vast

troves of data, are the new power brokers in society.'

Marking a digital turn in geography, which aims to move beyond a technical definition of big data[11] and algorithms[12] via the use of a critical approach informed by wider disciplines, Ash, Kitchin and Leszczynski (2018) indicate the need to understand algorithm-powered devices and infrastructures as new regimes of algorithmic governance; such work is informed by works on governmentality (Foucault, 1977). Algorithmic governance is defined by Coletta and Kitchin (2017) as algorithms which control, mediate and regulate urban life and spaces. This can include monitoring 'the temporal rhythm', seen as the level of noise and traffic flow of urban spaces (Coletta and Kitchin, 2017), controlling financial markets and chances of receiving public goods such as organ transplants (Steiner, 2012, p. 214) and informing decisions made regarding risk and surveillance practices (Amoore, 2009, 2013). In short, new forms of algorithmic governance or governmentality are enacted through utilisations of algorithms to actively 'search, collate, sort, categorise, group, match, analyse, profile, model, simulate, visualise and regulate people, processes and places' (Coletta and Kitchin, 2017, p. 4; Kitchin, 2017, p. 18).

Rather than focusing on a single story of algorithms controlling users' behaviour and everyday life, Isin and Ruppert (2015) show the potential of digital citizens to act as subjects via cyberspace. Users can conduct digital actions of participating, connecting and sharing in order to enact and substantiate their status as a citizen-subject. They are, however, at the same time also submissive to digital forms of control, such as acts of filtering, tracking and behavioural regulation in digital space. Being a digital citizen can be considered as one form of resistance; Amoore (2013; 2019) describes this in terms of subjects who can use their agency to demonstrate the ability to doubt and challenge algorithmic decisions.

Central to these different approaches to unpack the impacts of algorithmic devices is to 'careful attention to how it [data] is analysed, and to what can be said about the data on the basis of that analysis' (Amoore and Piotukh, 2015b, pp. 4, 15). Without doing so, Amoore and Piotukh (2015b, pp. 4, 15) warn that those who argue 'an era of widespread algorithmic governance' where algorithms control a wide range of our everyday life and urban spaces are

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[11] which focuses on the four V (volume, velocity, variety and the scope) of data generation (Kitchin, 2014).
[12] Such as 'any form of calculation that takes input and yields desired output' (Crampton, 2016, p. 141).

making 'insufficient claims'. Without having 'clarity about how algorithms exercise their power over us' (Diakopoulos, 2013, p. 2), questions are raised for those who argue algorithms create new forms of power and control, such as via causing job losses in labour markets (Steiner, 2012), amplifying capital power (Lash, 2007), and controlling our everyday life and societies (Kitchin and Dodge, 2011).

Therefore, the questions of whether subjectivities — the 'identities, experiences, affect and perceptions' of users (Graham, 2005, p. 576) — are influenced by software technologies and whether there are new forms of power over individuals, society and politics embodied in new digital platforms and media (Beer, 2009, p. 698) remain on-going investigations in digital geography and information studies. Given the contingent and diverse nature of algorithmic governance, which varies from suggesting recommendations, to pattern recognition, data compression, auto-correction, routing, predicting, profiling, simulation and optimisation (MacCormick, 2013), critical questions raised include: how are algorithms effectively controlling our everyday life? Are they all exerting the same form of power, shaping the same regime of algorithmic governance?

After conducting a review of recent studies on data and algorithms, I divided them into three categories: (1) anticipatory governance; (2) smart urbanism and (3) the digital citizen. Taking the contingent, contextual and multifarious nature of algorithms (Kitchin, 2017) into consideration, I have teased out *two assumptions* in the first two categories' conceptualisations of data and algorithms*:* (1) that the nature of algorithms is stable in operation and anticipation of desirable futures; (2) that the user is essentially passive, being seen as 'data' without any capacity of rights-claiming, with limited democratic capacity (Crang and Graham, 2007; Gabrys, 2014; Chenney-Lippold, 2011) in the face of algorithmically automated systems. By engaging with other works on the digital citizen through the specific focus on digital interface, citizenship and resistance, I intend to show how in contrast to the embedded assumptions I have identified, in reality a more dynamic relationship between users and algorithmic devices/interfaces exists where different forms of power (resistance, obedience, control and so on) co-exist with each other.

### 3.2.1 Anticipatory governance

Central to all forms of study on algorithmic governance is a view that the mobilisation of

algorithms is a stable way of anticipating and thus regulating potential futures (Anderson, 2010). By virtue of the abilities to analyse 'big data' — typically about individuals and cities — in ways which have been designed by programmers to suit the needs of the organisations who have conceived them, algorithms are able to anticipate outcomes of real-world events and in turn select (i.e. govern) certain desirable futures (either profitable or risk-free) by pre-empting particular 'un-wanted' uncertainties, such as financial obstacles to investment in commercial drones (Crampton 2016), various forms of risks at the border (Amoore 2009, 2013) or impediments to the navigation of urban spaces (Leszczynski, 2016). This ability, known as anticipatory governance, however, raises a critical question: to what degree algorithms work effectively, successfully and seamlessly to expect and pre-empt risks and abnormal behaviours in practice? Does what is imagined to be pre-empted in the design of algorithmic systems match perfectly to what is actually pre-empted by the calculations made by algorithmic systems?

A presumption in both the theory and practice of anticipatory governance appears to be that algorithms are designed and work to cover all possibilities of risk and abnormal behaviours of users in a stable manner. In an early analysis of the impact of 'ubiquitous systems' on urban spaces, Crang and Graham (2007) suggest that ICT-ubiquitous systems enact 'an anticipatory seeing', which not only tracks and visualizes commodity goods and practices of consumption through Radio Frequency Identification (RFID) chips or other geo-identifiable sensors, but also anticipate[s] threatening and 'abnormal' behaviours and emergencies which can thus can be detected and dealt with before the point of terrorist or insurgent attack (Crang and Graham, 2007, pp. 801–2). Within the security context, central to Amoore's (2013, pp. 9, 58) argument is that anticipatory governance operates through data-analytics and risk calculus to create a desired future through pre-empting events which do not yet exist on the basis of their degree of risk. Risk calculus is able to preempt emergent risk by identifying it as 'high profile and low probability' within various projected possible futures. It is in this sense that it creates a future by making unknown future events and subjects knowable, locatable and identifiable, and thus controllable (also see Amoore 2009, p. 28).

Following Amoore (2013), Leszczynski (2016) and Crampton (2016) study forms of anticipatory governance within navigation-based and market analytics platforms respectively, each of which seeks to generate risk-free futures for privileged investors or residents in cities.

Leszczynski (2016) argues that in practice navigation-based platforms create classed, raced and spatially-differentiated urban futures, by identifying risks of crime and personal harm against privileged life that has to be secured against. Within the context of the market for commercial drones, Crampton (2016) uses economic forecasting and data-analytics as examples of algorithmic governance deployed by interested groups, which seek to pre-empt various obstacles and threats to neoliberal profit-making activities. The algorithms, in this case, are employed to govern and extend neoliberal practices within the commercial drone market to create a profit-guaranteed future.

In the context of videogaming, Ash (2010) argues that the interfaces of games are designed to anticipate positive encounters with users. They do so by preempting contingencies and frictions which might stop users from continuing to engage with the videogames. He describes how design practices in videogames anticipate and manipulate contingencies — such as the unpredictability of participant intelligence as well as how the game evolves through interacting with temporal and spatial rules — into *positively affective encounters* between participants.

However, the missing picture in all these forms of anticipatory governance, as raised by Leszczynski (2016), is how much the futures that are claimed to be anticipated (and thus governed) by algorithms are materialised into the actual present. It is clear that the aforementioned examples of anticipatory governance are largely based on the assumption that algorithms work effectively, steadily and impeccably to anticipate a risk-free future with well-behaved citizens. Some resistance to these claims, however, emerges from Amoore (2013) who notes the failures made in various risk management systems prior to the 9/11 attacks; in addition, Ash (2010) explains that not all videogames can successfully control the emotions and activity of users through the digital interface. Such arguments tend to 'look good in theory' at the design stage, but in practice we must take into account Kitchin's (2017, p.14) suggestion that algorithms 'are best understood as being contingent, ontogenetic and performative in nature, and embedded in wider socio-technical assemblages'. What this means, briefly, is that algorithms, even when operated within the same version of a piece of hardware or software, hardly ever produce the same results out of their calculations in a given circumstance because there are other contextual factors (such as input data) affecting how these algorithmic calculations and effects play out.

I will now summarise three key factors which allow me to elaborate on the contingent and changeable (fluid) nature of algorithms. Firstly, Kitchin (2017, p. 21) explains how some algorithms are designed to 'be reactive and mutable' to data inputs. For instance, ranking algorithms are designed to pick up the most popular news on a website by selecting the news which receives the highest number of 'clicks' within a day. In practice these ranking algorithms work contingently and fluidly, as they depend on contextually-generated data inputs (i.e. what is 'new in the news' on an everyday basis). Only at the point when they interact with a specific set of data inputs will static algorithms know which news to pick as the most popular one. That is to say, two different data inputs will suggest different results, so different news will be selected as the top ones, in the use of the same version of ranking algorithms.

Secondly, algorithms work 'contingently' and 'contextually' because the way in which they conduct calculations and thus their effects can be altered by software programmers and designers at any time. Kitchin (2017, p. 21) explains that in a case where algorithms are constantly being refined and (re)programmed by software designers, such as within Google and Facebook, they are 'different versions of an algorithm' running within a short period of time. As a result, there is no guarantee that the algorithm a user interacts with stays unchanged 'five seconds later'.

Thirdly, in addition to being subject to change at any point via external reprogramming, the calculations can be refined internally 'by 'themselves'. In the case of Machine Learning algorithms, Kitchin (2017) has noted that they have agency to 'evolve' to initiate different forms of calculations and therefore produce different results, as they observe and learn from data inputs. What this means is that algorithms can act differently in order to 'adapt' or 'react' to contextually-generated outputs (such as the different user histories with regard to participatory and interactive action) (Kitchin 2017).

Besides these form of contingency which I have identified, there are wider factors which can also influence the process of algorithmic calculations, including what Rose (2016) called 'frictions': human errors, bugs, and digital decay.

Due to all of these factors, it is difficult to say that algorithmic devices ever work the same in

practice as they were conceived to when they were designed and programmed (Mackenzie, 2006; Amoore, 2013; Parisi, 2013; Danaher *et al.*, 2017; Kitchin, 2017). In setting out a research agenda for exploring algorithmic governance, Danaher et al. (2017, p. 11) note that 'the apparent uncertainty regarding the effects of technological development was seen as a significant barrier to effective and legitimate algorithmic governance'. For Amoore and Piotush (2015b, p. 15), algorithmic devices 'exceed their design, producing effects that are undeniable and irrevocable political'. Amoore (2013, p. 147) continues to explain that whilst algorithms can indeed identify and locate suspected illegal immigrants at the border, the way they process a given life can make them act in ways beyond those their design was intended:

> *As a bridge between items of data, the algorithm gathers the elements differently and in ways that could not be anticipated. Though the presence of data elements guide the design of the algorithm (like Heidegger's banks that guide the building of the bridge), once built it is a thing that gathers, and gathers beyond its design, such that even the data "banks" look quite different.*

Understanding algorithms in such terms suggests that they could in a sense be said to have a' life of their own', exercising agency and potentially making mistakes and errors. This means that their powers of anticipation are never as great as they are assumed to be at design phase. Moreover, they *do not* imagine the future in the same ways. Algorithms that are deployed for the facilitation of democratic practices, David Lyon (2010) reminds us, can generate different possibilities from those that are designed as surveillance systems. That is to say, despite the fact surveillance systems of algorithmic governance which primarily seeks to provide new possibilities for securing a risk-free future (Amoore, 2013), there are apparently other possibilities that algorithms can offer to our societies in different contexts, such as when they are designed and used for democratic purposes. Considering the multiplicity of effects that algorithms can generate, it is, thus, not possible to assume that every algorithm implies 'racist' or 'classed' consequences in urban governance and space (Leszczynski, 2016), nor does every algorithm impose the same form of control over information and data flows in every city (Marvin and Luque-Ayala, 2017).

Consideration of the specific nature of a given algorithm, then, is an important point when

seeking to answer critical questions regarding algorithmic/anticipatory governance. For example, how does the presence of frictions and 'liveness' within a given algorithmic system influence our current conceptualisations of algorithmic governance? To what degree are algorithms effectively deployed to control the lives of targeted subjects? To what degree do frictions and 'liveness' within algorithms open up new possibilities for resistance and dissent against algorithmic powers, and does this change the common perception of algorithmic powers as exercising powers of control and modulation?

3.2.2 Smart urbanism: automated data and discourse analysis

Within the discourse of 'smart cities' or 'real-time cities' in urban studies (Graham, 2013; Gabrys, 2014; Kitchin, 2014; Kitchin, Lauriault and McArdle, 2015; Leszczynski, 2016; Marvin and Luque-Ayala, 2017), there has been a preference for studying what Kitchin (2014) called 'direct' and 'automated' data over 'user-generated' data (also known as volunteered data) and a preference of using discourse analysis as a method to study smart urbanism. These two preferences result in (1) portraying users as passive or with limited capacity; (2) questionable whether the narrative and techniques of smart-mentality can effectively transform citizenship and urban governance in smart/environmental directions (Luque-Ayala and Marvin 2015).

Both these types of data suggest more passive users who are not consciously and actively involved in the processes of data generation. In the case of 'directed data' generation, as Kitchin (2014, p. 4) explains, the details of users (such as fingerprints and identity profile) are *passively* generated into data by methods of data collection such as CCTV, finger-scans, or thermal scans, none of which require the user to *do* anything other than be present as a subject to be monitored. Similarly, Kitchin (2014, p. 4) denotes 'automated data' as being 'generated as an inherent, automatic function of the device or system', such as through the use of sensors, RFID chips, smart travel cards or GPS-embedded mobile devices; users do not play an active role because they are not consciously aware of their actions or behaviours, which are 'automatically' turned into data.

The over-reliance on studying automated data in urban studies has three implications for the contemporary understanding of algorithms. Firstly, it has largely downplayed the innovations that users can make in the production of data and the potential of exploring algorithms in relation to this user-generated data. As argued by Rose (2016), only a few researchers include

such a focus on the shift towards users becoming producers rather than passive consumers of data, *a new form of innovation* in digital participation via social media. However, the ability of participants to consciously post and upload comments and photos on social media (including Facebook or Twitter) or contribute to OpenStreetMap by coding GPS-traces (Kitchin and Dodge, 2011) is an essential component to modern digital participatory platforms (O'Reilly, 2005; VanDijck, 2013; Orlikowski and Scott, 2015; Langley and Leyshon, 2017).

Secondly, due to the inherently different relationships with users platforms relying on automated data have as compared to those relying on user-generated data, the prioritisation by researchers of automated data leads to *a limited understanding* of the diversity algorithmically-powered platforms shows in constituting users' everyday life and different facets of cities. That is to say, within systems working with user-generated data, users can do more than be just 'sensor points' in relation to algorithmic devices, and this had important implications for understanding modern platform urbanism. In participatory platforms such as TripAdvisor, without the data written and rated by users, not only algorithms will have no input to compute with, but also platform will fail in providing its hospitality service (Orlikowski and Scott, 2015). The lack of focus on user-generated data suggests that arguments commonly made around the smart city — that algorithms and data analytics can control and govern citizens and cities through indicator-embedded dashboards or sensor-based systems (Kitchin, 2014) — are only truly applicable within those platforms which utilise automated data.

The existence of algorithmically-mediated platforms reliant on user-generated data challenges a variety of other similar claims which have been made within smart urbanism: (1) that the proliferation of smart urbanism envisages a new modality of citizenship which is solely constituted by techniques of data management and monitoring (Gabrys, 2014); (2) that smart urbanism heralds new regimes of diagrammatic control over information and data flows (Marvin and Luque-Ayala, 2017); and (3) that indicators and dashboards can transform the ways in which cities can be controlled, tracked, visualised, known and governed (Kitchin, Lauriault and McArdle, 2015, p. 16) on a continuous and automatic basis (Batty *et al.*, 2012, p. 482). An acknowledgement that citizenship and cities in the digital age are also mediated by the existence of platforms relying on user-generated data suggests the need for a more nuanced understanding of algorithmic governance in the digital age, with the possibility of

different regimes applying depending on which algorithm is being used. Therefore, the reliance on analysis of automated data does not provide a full picture of algorithmic governance, specifically the existence of various relations between data which *exert different effects* in sorting citizens, infrastructures and urban spaces.

Thirdly, another key issue here is that those who argue for a new regime of smart governance or governmentality are largely arguing on the basis on 'discourse analysis' around the use of algorithmic devices. Luque-Ayala and Marvin (2015) disclose that for many technical providers of smart urbanism, technically, most smart technologies are not guaranteed to work out as they envisage. Similarly, Kitchin (2014, p. 11) highlights the inherently 'brittle and buggy' nature of smart systems — which are not void of glitches and failures or secure from being subjected to malicious cyberattacks — within what can be understood as a 'panoptic city'. That is to suggest that the caveat that analysing data-driven/algorithmic governance on the basis of 'discourse analysis' — which tends to suggest digital technologies always claim to effectively reduce risks and control user behaviours, increase efficiency and productivity in societies — should not be conducted without remembering to mention the inevitable presence of frictions and glitches. Given that the existence of glitches and frictions makes the actual practices of smart systems not function as they claim to do, the question arises of whether the so-called new regime of governmentality plays out as an actual influence on everyday practices, or is merely a rhetorical discourse in policy documents. As mentioned by Luque-Ayala and Marvin (2015), there is a lack of attention paid to empirically-evidenced material works of so-called smart technologies as they operate in the real world in relation to citizens and urban spaces. This is further complicated, as I have previously noted, by the need to take account of the contingent and ad-hoc nature of algorithms and the various forms of frictions that manifest during their operation (Mackenzie, 2006; Kitchin, 2017; Amoore, 2019). This raises a limitation for using the notion of 'smart governmentality', as this does not pay attention to the experimental, on-going, fleeting and emergent nature which is inherent within material practices within the deployment of algorithms in two DPPPs under study, which operates in non-Anglosphere contexts.

In response to this issue, scholars using the idea of 'dispositif' to highlight the material practices of digital technologies within wider political, social and cultural contexts (Ash, Kitchin and Leszczynski, 2018; Kitchin and Lauriault, 2018) have shown ways of responding to the

concerns raised by Kitchin (2017), who notes the importance of examining both the wider social context and the ways in which algorithms are initially designed in order to investigate which logics are forged in the deployment of algorithms, and to provide yardsticks against whether algorithms fulfil their promises and goals when deployed in the real world.

Adopting the modified Foucauldian concept of 'dispositif' (Kitchin and Dodge, 2011; Kitchin, 2014; Coletta and Kitchin, 2017; Kitchin and Lauriault, 2018), theorists such as Kitchin and Lauriault (2018) and Ash, Kitchin and Leszczynski (2018, p. 37) refer the idea of 'dispositif' to a 'thoroughly heterogeneous ensemble consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, [and] philosophical, moral and philanthropic propositions' (in Gordon, 1980, p. 194), which enhances and maintains the exercise of power within society. That is to say, a digital dispositif involves an interplay between discursive and material practices in a specific context where such interactions 'shape[s] the design, deployment, normalization and use of digital technologies' in order to 'serve and sustain particular kinds of interests (the economy, social capital) in society, consolidating and channelling the exercise of power' (Ash *et al.*, 2018a, p. 37). Sharing a similar view on 'dispositif', Kitchin and Lauriault (2018, p.8) define the 'data assemblage' as 'a complex socio-technical system, composed of many apparatuses and elements that are thoroughly entwined', which operate not only to produce data but also to 'enhance and maintain the exercise of power within society'. It must be noted here that this conception of assemblage is not the same as the assemblage theory which I will draw upon to develop my situated lens. For instance, other scholars do not view the idea of 'dispositif' and that of 'assemblage' as the same, in terms of the focus on different temporalities of assemblages (Legg, 2009; McFarlane, 2011, p. 655). Legg (2009) has discerned that Foucauldian scholars (including himself) tend to view the temporality of 'dispositif' as denoting a long-lasting period of time, whereas they view the temporal nature of 'assemblages' as ephemeral, emergent and experimental.

Despite taking different views on 'dispositif' and 'assemblages', theorists all both suggest that the ideas suggest ways of analysing the phenomenon of smart urbanism beyond 'discourse analysis', which is seen as one of the key approaches in analysing 'smart governmentality'. The notion of governmentality - used to explain sensor-based systems, such as smart meters — suggests that governments and private sectors can produce new strategies/discourses of 'smart-mentality' which are able to control the behaviours of citizens

(Ho, 2016), dominate the definition of a 'good city' (Vanolo, 2014) and define who is counted as a citizen (Gabrys, 2014).

3.2.3 The digital citizen: interface, subject and political movements

Looking beyond urban studies, there is an emerging attention towards trying to understand different forms of the digital citizen through their interaction with in-situ operations of digital interfaces (Rose, 2016; Ash *et al.*, 2018a) in the light of the citizen-subject (Isin and Ruppert, 2015) and the idea of digital social/political movements (Juris, 2012; Fenton, 2016; Tufekci, 2017) and resistance (Amoore, 2013). I call these studies works on the 'digital citizen' as they point to the diverse forms of dynamic relationships between users and algorithmically-visualised digital interfaces associated with various devices (Rose, 2016; Ash *et al.*, 2018a; Isin and Ruppert, 2015). These studies of the digital citizen attempt to argue against technological determinism by integrating a view of users as citizen-subjects who retain the ability to exercise their agency, as not always being passive and controlled by digital interfaces and algorithmic devices (Isin and Ruppert, 2015). However, Isin and Ruppert (2015) point out a gap in the approach of studying digital citizens as the need to investigate further into digital political participation.

(1) Digital/user interface

The digital interface, defined by Rose (2016, p. 341) as 'the mutual constitution of human practice, digital hardware and software codes creates what is visible on a screen', has been a key space where various forms of digital citizen are (re)configured. Rose (2016, p. 341) sees the digital interface as a distinctive and transient entity which cannot be reduced to 'an inert object'. This view of the digital interface suggests an inherently dynamic and unstable relationship with users: she stresses that due to being subject to frictions of various kinds, 'interfaces do not always work smoothly' (Rose 2016, p. 343). These frictions include 'crashes' in material infrastructures due to external events such as power cuts, 'glitches' in software and data caused by viruses or bugs, digital decay in computations, or human error during the 'drawing' of digital images of urban development projects.

Building upon Rose's (2016) understanding of the digital interface, Ash *et al.* (2018a) argue that the powers which can be exercised through of digital interface design cannot fully control the actions of users; rather interfaces configure discontinuous forms of guidance and modulation of

user activities. In their own words, the 'power in relation to interface design is, we argue, a matter of producing continuities and discontinuities that work together' (Ash *et al.*, 2018a, p. 1138). They show that the presence of frictions will tend to interrupt the control of behaviours, actions and experiences of participants if they are not mitigated.

In recognising the importance of frictions in the interface/algorithmic devices, Ash *et al.* (2018a) critically question the claim that algorithmic devices flawlessly and continuously modulate the subjectivities of participants (Deleuze, 1992; Cheney-Lippold, 2011); this claim can be seen in Deleuzian (1992) notion of societal control, which suggests that digital or algorithmically-configured systems exercise continuous, constant and complete modulation and control over users' actions. Following Deleuzian's notion of control (1992), Cheney-Lippold (2011) claims that individuals become digital subjects — dividable 'dividuals' — whose subjectivities are formed and identified through algorithms aggregating and analysing data within particular categories (gender, race, class and so on):

> *These dividuals become the axiom of control, the recipients through which power flows as subjectivity takes a deconstructed dive into the digital era. When we situate this process within questions around digital identity, dividuals can be seen as those data that are aggregated to form unified subjects, of connecting dividual parts through arbitrary closures at the moment of the compilation of a computer program or at the result of a database query* (Cheney-Lippold, 2011, p. 169).

Cheney-Lippold (2011) strongly argues that algorithms exert power of control over users by creating new digital subjects through data analysis and categorisation; however, it is questionable to what degree this power of control effectively regulates the identities of participants. As noted by Ash *et al.* (2018a), in Cheney-Lippold's argument *users are assumed as passive recipients* that are smoothly controlled via algorithmically-defined identities. Ash *et al.* (2018a, p. 1140) note such assumptions are widespread in 'accounts of control and modulation [which] can assume that those who design such systems have complete control over what they do'. Users, as Thrift (2004) and Rose (2016) highlight, are no longer passive audience but producers. In the case of soft computing, Thrift (2004, p. 183) has pointed out

the advent of new human-centred interfaces indicates 'computing is increasingly adapted to and modulated by the user' rather than having direct control over participants' attention.

In addition, the presence of unavoidable frictions has a significant implication for arguments made about algorithmic governance because they demonstrate that it is not always the case that digital systems operate in ways that effectively anticipate a knowledge production or exert the same control on users and societies. Due to an unfolding relation with frictions for each interface and algorithmic systems, the ways in which they control and modulate users vary. As a result, it is better to assess each system on a *case-by-case* basis.

(2) Digital citizen subject and political participation

Users do not always act as passive recipients subject to digital powers of control. In citizenship studies, Isin and Ruppert (2015) highlight that the power relationship between the digital citizen and cyberspace is always contested, and that there is no single narrative of control. Theorising citizens as new political subjects emerging from the Internet, they illustrate the power dynamics between the digital citizen and cyberspace. Here, the digital citizen is considered as a 'composite subject' (Isin and Ruppert, 2015, p. 22) who both acts as the political *subject of power* by claiming rights through cyberspace (submission and subversion) as well as being *subject to power* imposed by the sovereign and other authoritative subjects, such as filters and tracking in cyberspace. In their words,

> *[a] citizen is often imagined subjects as passive data subjects, but actually…The features of citizen subjects are not only obedient to the sovereign subject but (potential) subversive, transgressive expectation to make rights claims* (Isin and Ruppert, 2015, p. 4).

Importantly, Isin and Ruppert (2015) call for a situated approach to researching the geographically diverse practices of digital citizenship. They stress that the geographical differences — different legislation, imagination (history) and performance (unwritten convention) — 'make a huge difference in how citizen subjects uptake certain possibilities and act and organise themselves through the Internet' (Isin and Ruppert, 2015, p. 42). In other words, the ways in which a citizen makes right-claims through 'digital acts' in one city will be different to another city, even though the Internet promotes the homogenised concept of new digital 'activist'.

Moving to the subfield of the digital citizen, Isin and Ruppert (2015, p. 82-83) critically suggest there is still a lack of focus on digital political participation in terms of 'the potential of citizens' (Isin and Ruppert, 2015, p. 85) who produce and consume 'political content – political positions, opinions, demands, claims'. Digital political participation is absent in the discussion on digital interfaces (Ash *et al.*, 2018a; Rose, 2016) and digitally-enabled social participation (Beer, 2009); where they do exist, discussion is narrowed down into a narrative of 'digital divide/inclusion' (Mossberger, Tolbert and McNeal, 2008; Isin and Ruppert, 2015, p. 81-84). In one sense, with the advent of Web 2.0, Beer (2009, p.985-986, 994) calls for both an empirical and theoretical investigation on new forms of power playing out in the context of 'social participation', where social media constitutes new 'social and cultural relations' which have an impact in everyday life. This focus has clearly precluded focusing on digital political participation. In another sense, Isin and Ruppert (2015, p. 82-83) critically allege that recent studies have merely reduced the understanding of digital participation to the discourse of 'digital divide/inclusion', which sees digital participation as a matter of accessibility and a set of literacy and technical skills (also see Mossberger, Tolbert and McNeal, 2008, p. 1-2). They claim that such a discourse of digital inclusion, particularly in the UK, does not consider the digital political participation, such as 'participating in politics digitally through actions as petitioning, organising, recruiting, contributing, campaigning, blogging and so on' (Isin and Ruppert, 2015, p. 84). To put it differently, the discourse of digital participation understands 'participating' as a functional requirement rather than a political complex which involves contestation and struggle. As a result, this discourse leaves out the possibility of asking crucial questions on how citizens act beyond what they are imagined and defined within the discourse of digital divide/inclusion. For Isin and Ruppert (2015), it is critical to unpack the tension between how citizens are conceived within political agendas and the discourse of digital inclusion and how they act exceed or beyond these imaginaries.

(3) Digital political movements and resistance

Isin and Ruppert (2015) and others (e.g Micó and Casero-ripollés, 2014) have pointed out that there is no consensus in in digital studies and citizenship studies on accounting for the role of social media and the Internet in the Occupy Movement and other political events.

Some scholars argue that social media played a central role in causing, determining and even

inventing new decentralised and collective forms of social/political movement, from the example of 15M (Micó and Casero-Ripollés, 2014) and online-driven activism (Harlow, 2011). They argue that social media such as Facebook offers 'new forms of organization and communication' for social/political movement in terms of decentralised and real-time communication and circulation of news and information and mass-scale participation (Micó and Casero-Ripollés, 2014; Harlow, 2011). However, from a historical viewpoint, Fominaya (2015, p. 144) argues that claims of 15M establishing new horizontal, decentralised and autonomous forms of political movement are 'far from being novel, [as] this has been a hallmark and mainstay of Spanish autonomous movements since at least the 1980s'. For Fominaya (2015, p. 144), what has claimed about 15-M being new (such as being individualistic, leaderless and horizontal) are not new; rather activists exercise 'strategic amnesia' to 'emphasise the noteworthiness of the protests and distinguish them from previous cycles of mobilization'.

In contrast to suggesting a deterministic role for social media and digital technologies, others argue that social media plays a role of enabling, facilitating and mediating organised political movement (Juris, 2008, 2012; Fenton, 2016). Fenton (2016, p. 45) clearly notes this role of social media in that 'social movements of the last decade are enabled but not determined by digital media'. For her, whilst the internet can enable large-scale projects, 'it does not craft a politics' and 'may change nothing' (Fenton, 2016, p. 44-45) as what matters for a 'a critical democracy will, by its very purpose, call constantly into question the existing levels of achieved democratisation but crucially it will also translate this into an institutional reality' (Fenton, 2016, p. 46).

Fenton's critical view on digitally-facilitated social movements echoes Juris's (2012) focus on using a situated approach to unpack digital social movements through their specific cultural-political histories. What is more, in challenging the understanding of horizontally networked digital social movements, Gerbaudo (2012, p. 13) argues that there were essentially groups of leaders (what he terms as 'soft form of leadership') who carried out tasks of organising and mobilising people in 'social centrality' via digital medias and platforms. Moving beyond the said debates on digital social movements, Gerbaudo (2012) explores the ways in which the interactive and participatory character of the new communication technologies were used by activists-leaders to channel and craft participants'

emotions and actions.

In the context of security studies, Amoore (2013, 2019) has offered an insightful understanding of the digital citizen by pointing out the co-existence of resistance and sovereign power within the practices of using surveillance systems. She highlighted various forms of resistance/dissent conducted by artists and researchers aiming to challenge the role of algorithms as contemporary practices of sovereign power able to decide on the futures of individual lives. Drawing on Deleuze's idea of life, Amoore (2013, p. 26) notes:

> *the exercise of power at a threshold of what is possible must always and at the same time implicate relations of resistance at that same threshold, the two knotted together unless and if only power itself ceases to be.*

Amoore describes two forms of resistance to algorithmic governance which are available within the context of surveillance technologies. Firstly, she notes the ability to critique the 'sovereign decisions' (Amoore 2013, p. 163) made via (or informed by) algorithmic risk calculus, which she describes as partial and incomplete. The decisions are made 'too easy', Amoore (2013, p. 163) argues, and do not take into account either ongoing political conflicts or contestations around the judgements. By questioning and critiquing the objectivity of algorithmic decision and knowledge which is created through their use, she theorises a form of resistance to algorithmic power. In her recent work, Amoore emphasises the significance of seeking out 'the possibilities of an alternative orientation to doubt, one in which the subject necessarily doubts the grounds of their[algorithmic] claims to know' (Amoore, 2019, p. 4). For Amoore, it is particularly important to cast doubt over the supposedly objective output of algorithmic devices in surveillance contexts, which suggests a power of resistance co-existing with the sovereign power practised through algorithmic decisions. This can be seen in an example where a subject can *doubt* a political decision that is made on the result of algorithmic calculations which indicate a 'high' risk score for a passenger on the screen of border security for this passenger has travelled to Pakistan and stayed over three months and whose fee was paid for by a third party (Amoore, 2013, p. 59).

Secondly, Amoore describes how potentialities that are either ignored or rejected by the algorithmic logics embedded in surveillance technologies persist as 'indeterminate life'

(Amoore, 2013, p. 172-4). For Amoore (2013, p. 173), indeterminate life refers to the life of half-formed potentialities that are rejected and closed down through the operation of algorithmic devices; focusing on such indeterminate life can present a site of resistance to the reductive and determining power of algorithms. Giving the example of an algorithmic system designed for v-Bomb, such indeterminate life can be seen as 'the contingent chances' for lives in the targeted city that 'are not amenable to calculation' (Amoore, 2013, p. 75). Whilst to unveil such indeterminate life does not directly judge the decisions of algorithms per se, it offers a means of going beyond what an algorithmic system can imagine by highlighting 'possible subjects, subjects as yet unknown' (Amoore, 2013, p. 156-7). This critique remains significant for studies of contemporary algorithmic governance because studying indeterminate life presents new kinds of potentialities through opening up unexpected places and unknowable subjects that are yet to be actualised as possibilities through algorithmic devices.

### 3.3 Developing a situated lens from relational comparative urbansim, Deleuzian assemblage thinking and empowemrent theories

I will now focus on explaining how I developed an analytical framework — which I term a situated lens — for this thesis. Following the relational turn in comparative urbanism, which opts for an open and innovative comparative urbanism, I devised a comparative framework which allows me to trace and relate Decide Madrid and vTaiwan whilst acknowledging their geographical, political, cultural and social differences. I further build this comparative framework by integrating Deleuzian assemblage thinking and empowerment theories, which allows me to conduct a contextual-based analysis and examination of the two DPPP's democratic implications. In doing so, I respond to the call for geographically-situated perspective of studying digital citizenship in terms of political participation (Isin and Ruppert, 2015, p. 42), and answer the call for a situational analysis of the political impacts of algorithmic devices (Amoore and Piotush 2015).

The situated lens is seen as a three-fold conceptual framework. The initial concern, as I have illustrated in Chapter 1 is to discern the 'genetic' similarities and differences between Decide Madrid and vTaiwan. The second concern of the situated lens is to generate the object of comparison (comparator) by discerning shared features across Decide Madrid and vTaiwan

in terms of three assemblages focusing on: (1) processes of design of the DPPPs; (2) the dynamic UI, where real-time user participation takes place within wider political contexts; and (3) processes of algorithmic decision-making. Lastly, drawing on theories of empowerment (Fung and Wright, 2001; Mäkinen, 2006; Fischer, 2012; Baiocchi and Ganuza, 2014)), I develop a set of empowerment standards against which I examine and compare the degrees of digital empowerment offered by DPPPs.

### 3.3.1 Starting from a relational comparative urbanism

Robinson (2006, 2011, 2015) and McFarlane (2010, p. 732) call for a relational turn within comparative urbanism, which urges researchers to rethink 'comparison as a strategy for destabilizing the assumptions and limits of knowledge, ideas or theory and reveal its distinctiveness, and for formulating new positions and lines of inquiry'. In a nutshell, a relational comparison is to reconsider three trends to compare cities based on: (1) 'categories of success' (in terms of global cities, or developed cities); (2) the categorial division between developed and developing cities; and (3) the legacies of paradigmatic urbanism (McFarlane, 2010, p. 728).

McFarlane (2010, p. 728) explains the first type of trend has become entrenched in urban studies, where scholars tend to learn from 'usual suspects', places that are obviously from similar categories such as global cities: New York, London, Paris and Tokyo. He continues to point out the consequence of reproducing urban comparison from similar cases is to 'necessarily negate a range of experience across the globe that could prove useful' and which do not preclude 'the possibility of learning from a variety of different sites' (McFarlane, 2010, p. 728) outside of global cities.

Secondly, as urban studies have been influenced by categorisation and developmentalism, it has not been possible to compare cities across developed and undeveloped categories;. Robinson (2006, p, 41) illustrates that this trend has prevailed urban studies since the 1970s, where a division was set up by 'the hierarchical categorization of different kinds of cities as developed or undeveloped... This divide continues to form the basis for urban studies to this day, in which different kinds of cities are broadly thought to be incommensurable'.

Lastly, McFarlane (2010, p. 729) notes that urban studies has been heavily influenced by the LA school's paradigmatic urbanism, which prioritises Los Angeles as a model example of a world city or a paradigmatic city. As a consequence, urban comparison is reduced to a predefined assessment on how other cities were compared to a single paradigmatic city and has produced overgeneralised urban theory. Despite there being a few attempts to produce global urban theories from comparing different cities, McFarlane (2010, p. 729) warns that such attempts are problematic as urban studies has tended to produce 'accounts of urban economy, politics, public space or infrastructure [which] slip from the experience of a clutch of Western cities to claims about the city more generally'. It is also important to be aware of 'integrationist forms of comparison, where sites, people and processes are integrated into pre-given positions with limited openness on the part of the researcher to learning from different contexts' (McFarlane, 2010, p. 732; also see Robinson, 2015, p. 4).

Within the field relational urban comparison, there is a trend to openly understand urbanism 'not as discrete or self-enclosed, but as open and relational, embedded in networks and flows' (Ward, 2008), to compare cities that are deemed 'different' from 'usual urban suspects' within conventional urban comparison (Robinson, 2006; McFarlane, 2010). Robison (2015, p. 3) note that it is important to rethink and redefine the scope of comparative cases 'to avoid the restricting and territorializing trap of only comparing (relatively similar) cities'. Instead, she opts for comparing 'specific elements or processes in cities, or the circulations and connections which shape cities' in order to make urban experiences from different contexts 'comparable' (Robinson, 2011; 2015, p. 3) (also see McFarlane 2010 to open urban comparison from different theory cultures). That said, such relational comparative urbanism aims to discern the relationship between different cases and how this relationship is influenced and situated within wider processes (Robinson, 2015, p. 4). In particular, Robinson (2015, p. 4) has offered two comparative methods: the 'genetic' method, which aims to trace the 'interconnected genesis' of cases in comparison; and the 'generative' method, which aims to generate or revise concepts from the cases with shared features. Relational comparative urbanism, therefore, points to an experimental, relational and open approach to devising comparative studies.

As I have illustrated in Chapter 1, I began my comparative study by tracing the genesis of Decide Madrid and vTaiwan, two DPPPs which are seen as important cases for studying

digital democracy. My comparative method uses Robison's (2015) genetic tactic as I analyse and trace the genesis between Decide Madrid and vTaiwan, from similarities of wider processes of democratisation in 1970/80s to similarities in recent usage of digital technologies in Occupy Movement in 2010s. In other words, my comparative study on two DPPPs can be seen as one of relational comparative urbanism, as I trace the wider processes (both democratisation and digitally-mediated social movement) in shaping how Madrid and Taipei City designed innovative digital platforms for participatory democracy. In particular, within those genetic processes shared between Decide Madrid and vTaiwan, I further note cultural, social and political differences between Spain and Taiwan and describe how these differences continue to influence the development and invention of the two DPPPs.

I proceed by introducing a second comparative tier which discerns similarities between the two DPPPs as a common set of three assemblages. I develop my comparative framework based not on an a priori approach but on what is empirically shared between Decide Madrid and vTaiwan and between geographical and other different processes that also shape the two DPPPs. I do so by following Robinson's (2015) generative comparative method and thus am able to claim that this comparative framework can serve as a new conceptual opening within digital urbanism. That is to say, this second comparative tier — a set of assemblages of design, algorithmic decision-making and UI — may be applicable to examining the impacts of other variations of digital urbanism. Noting that Marvin and Luque-Ayala (2015) have critically flagged that there is very little research comparing the varied forms of smart urbanism across different geographical locations, my comparative framework has brought geographically remote cases together to enrich the current focus on *a single case study* of smart urbanism occurring within Anglosphere, European or Latin American contexts.

Lastly, to answer the research question on the degree of digital empowerment offered within the two DPPPs, I further create a set of comparative standards of empowerment from the concepts of participatory democracy and digital empowerment, which I will detail in the following section.

3.3.2 From Deleuzian assemblage thinking

Secondly, the situated lens, building on Deleuzian assemblage thinking (1986), centres its focus on the fluidities (coming-together and falling-apart) which are inherent within

human-algorithmic alignments. In their book 'A Thousand Plateaus', Deleuze and Guattari (1986, p. 9) describe rhizomatic assemblages in that:

> *Every rhizome [assemblage] contains lines of segmentarity according to which it is stratified, territorialized, organized, signified, attributed, etc., as well as lines of deterritorialization down which it constantly flees.*

For Deleuze and Guattari (1986, p.7-8), rhizomatic assemblages are characterised by principles of connection, heterogeneity and multiplicity. Rhizomatic assemblages are connected 'between semiotic chains, organizations of power, and circumstances relative to the arts, sciences, and social struggles', which suggests not only 'different regimes of signs' but also 'things of different status' (Deleuze and Guattari, 1986, p. 7). That said, an assemblage can change its nature as it expands its connections with other assemblages (rhizomes/multiplicities). This changing nature of assemblages is termed by Deleuze and Guattari (1986, p. 9) as 'the line of flight or deterritorialisation'. In relation to the movements of deterritorialization, assemblages can be also reterritorialized (or 'restratify') by 'starting up again on one of its old lines, or on new lines' (ibid, p. 9-10) and thus possibly to reinforce fascist power or any other power formation that comes into light. That is to say, in these 'becoming' processes, one rhizomatic assemblage can be deterritorialised by becoming into something new; whereas the other assemblage is reterritorialized by reinforcing its own order at the same time (see the example of the wasp reterritorializes the orchid by transporting its pollen whilst the orchid deterritorialises the wasp in p. 10).

From here, Anderson and McFarlane's (2011) reinterpreted what Deleuze and Guattari (1986) termed 'deterritoiralisation' and '(re)territorialisation' of assemblages as the destabilising and stabilising (coming together and coming apart) of heterogeneous parts/actants which can be seen as human and non-human, organic and inorganic, technical and natural (Anderson and McFarlane, 2011, p. 126; McFarlane, 2011, p. 653). Assemblages can claim their territory through stabilising their heterogeneous parts/actants (as the movement of territorialisation), but at the same time, assemblages are constantly subject to the movement of de/re-territorialisation as their stabilised heterogenous parts might change or broken because new actors appear.

Again, McFarlane's (2011) interpretation highlights the fluidity of assemblages. McFarlane's (2011) interpretation of Deleuzian's 'lines of flights/deterritorialisation' as stressing the

*changes* in interactions of heterogenous actants can (re)shape the agencement/agency of assemblages. Here, agency can be understood as, in Barnett's (2006, p. 447) word, 'the distinctive efficacy of a working whole made up, variously, of somatic, technological, cultural, and atmospheric elements'. Thus, assemblage thinking points us to pay attention to an open-ended, temporary and emergent process whose agency (efficacy) is functionally constituted by heterogeneous actants coming-together and going-away and situated within various wider contexts.

From this situated perspective, we can see how Deleuzian assemblage thinking can assist us in contextualising our understanding of the multifarious and contingent nature of algorithms (Kitchin, 2017). By looking at algorithms through their interactions with specific actors within the two DPPPs, we arrive at the point where algorithms are no longer existing by themselves but are becoming involved in processes of both stable (territorializing) and unstable (de-territorialising) interactions with users, data, software engineers or politicians. That is to say, algorithms are as more than a set of 'any form of calculation that takes input and yields desired output' (Crampton, 2016, p. 141) but are actants (defined) which 'move in and out' in complex alignments with users, data, politicians, software engineers which are situated within specific political context. Here, the term alignment should be seen as a way of describing the agency/agencement of the given assemblage is formed and determined (McFarlane, 2011).

Applying this assemblage thinking to explain the two DPPPs, we can define DPPPs as three common assemblages:

(1) The assemblage of design: the open-ended process of developing specific algorithms by politicians and civic hackers within DPPPs in specifically-conceived ways, such as to generate global solutions for solving alleged problems with democracies located in specific institutional contexts.

(2) The assemblage of the UI: how the algorithmically-visualised dynamic UI of the DPPPs influences user's actions during real-time participation.

(3) The assemblage of algorithmic decision-making: in the context of urban policymaking and participation, the ways in which these algorithms work 'in practice' via living interactions with user-generated data.

Again, the usage of Deleuzian assemblage thinking pays attention to both contextual 'situatedness' and 'fluidity' and thus better illustrates the contingent and contextually-embedded nature of algorithms without making assumptions on what algorithms by *themselves* can do or cannot do. Kitchin (2017, p. 25) stresses that:

> *algorithms perform in context — in collaboration with data, technologies, people, etc. under varying conditions — and therefore their effects unfold in contingent and relational ways, producing localised and situated outcomes.*

Kitchin (2017, p. 25) explains that the contexts where algorithms are formulated and operated matter, because contextual conditions — including hardware and legal/institutional infrastructures — will influence and frame how algorithms work in practice. For Kitchin (2017), it is critical to understand how any practice in data analytics is affected by its social and technical 'situatedness' within particular contexts; he also notes the existence of a feedback loop by which these contexts are in turn affected by the various contingent and heterogeneous effects which are part and parcel of any deployment of algorithms. As I have elaborated in Section 3.3.1, Kitchin (2017, p. 21) explains algorithms work 'contingently' (fluidly) and 'contextually' ('situatedly') because their operation in practice can *change* due to being reprogrammed by software programmers, due to the fact they are 'reactive and mutable' to contextually-generated data inputs and due to some Machine Learning algorithms can evolve to initiate new forms of calculations by learning from data inputs. Similarity, in theorising the data security assemblage, Aradau and Blanke (2015, p. 5) also assert that assemblage thinking helps to explain not just human-machine relationship, but also 'the content of the relationships that hold assemblages in place' (Allen, 2011, p. 156). They argue that 'what matters in the Big Data-security assemblage is how the relationship between humans and computers gains content' (Aradau and Blanke, 2015, p. 5). To put it differently: given the fact that algorithms can be deployed very differently in different cases, it is only by paying attention to how algorithms perform contextually in practice that researchers can analyse algorithms with due consideration of their specific contingent and ongoing (fluid) nature. As Kitchin (2017), Aradau and Blanke (2015) warn, without considering the social-technical context, there is a risk of fetishising and partialising the understanding of algorithms at the cost of other contextual meanings and impacts.

Thus, drawing from the assemblage thinking, the situated lens offers a way to begin an analytical contextualisation of the two DPPPs, which incorporated elements of heterogeneity of elements, contextual 'situatedness' and 'fluidity'. The situated lens is able to grapple with the contingent and multifarious nature of algorithms (Kitchin, 2017) in order to understand the particular type of relations algorithms have with data in the empirical case studies I have conducted. In particular, there is a need to pay attention to the material works of data and algorithms within digital technologies, to avoid assuming that every algorithmic device 'sorts' cities and everyday practices in the same way. For instance, an urban operating system incorporating digital technologies and the material-digital dimensions of cities, as suggested by Marvin & Luque-Ayala (2017, p. 84), will not exert the same controlling power as the interface of a loan-application system such as that indicated in Ash *et al.* (2018a). If they do not clearly differentiate specific algorithmic devices from each other, then, researchers face risks of over-generalising the effects of data and algorithmic devices. This situated lens, by further substantiating the importance of studying 'algorithmic devices in situ' (Amoore and Piotukh, 2015a, p. 3), is able to offer a response to the aforementioned challenges in studying and conceptualising black-boxed algorithmic operations in studies of digital urbanism and digital citizens.

3.3.3 Comparative standards from concepts of empowerment

As I have already noted, the assemblage approach is not by itself sufficient to answer one of my primary research questions, which is to do with how the DPPPs under study effect empowerment. The application of a hybrid of assemblage theory supplemented with theories of empowerment is therefore necessary in the context of the specific nature and purpose of the DPPPs I am studying. As Anderson *et al.* (2012) explain, it is perfectly possible to combine the use of assemblage theory with other theories for the purposes of answering different research enquiries. As such, I bring a focus on theories of empowerment from participatory democracy and beyond (Fung and Wright, 2001; Mäkinen, 2006; Fischer, 2012; Baiocchi and Ganuza, 2014; Isin and Ruppert, 2015) to assemblage thinking, which will enable me to specifically examine the effects of DPPPs in citizen empowerment in a comparative approach.

This allows me to develop a comparative standard against which I can assess the degree of

empowerment of the two DPPPs. Principally this will involve a focus on comparing the three assemblages: the design assemblage, the algorithmic decision-making assemblage and the dynamic UI assemblage against three comparative standards: (1) the provision of political legitimacy (2) the empowering capacity for individual citizens which are determined in the assemblage of design, (3) an enabling environment for users to feel engaged and make informed decisions through the assemblage of UI.

Empowerment theories, despite a lack of definitional precision and their diffuse usages across fields such as psychology, democracy, organisational/community and environment studies (Wilkinson, 1998), generally focus on both the process and results of empowerment which take place at individual and organisational levels (Perkins and Zimmerman, 1995). In a general sense, empowerment can be seen as an ongoing and intentional process through which citizens gain critical understanding and control over the social, economic and political institutions that directly affect their lives (Perkins and Zimmerman, 1995, p. 56; Wilkinson, 1998; Mäkinen, 2006).

It is this focus on both individual and institutional contexts (Perkins and Zimmerman, 1998; Fung and Wright, 2001; Baiocchi and Ganuza, 2014; Pateman, 1970) in which empowering processes may happen that makes empowerment theories particularly useful and important for my thesis: not only because the two DPPPs aim at improving the quality of political participation, but also because they are constituted across alignments of individual users, algorithms and wider political contexts (such as those within the Spanish and Taiwanese governments). To avoid using an unclear definition of empowerment, I have aimed to integrate the works of empowerment from various participatory democracy (Baiocchi and Ganuza, 2014; Fung and Wright, 2001) and digital citizenship theorists (Mäkinen, 2006; Isin and Ruppert, 2015) into my three comparative standards derived from the use of assemblage theory. I am aware that the idea of democratic empowerment is mostly evidenced from examples of participatory budgeting, such as that in Porto Alegre (Baiocchi, 2005; Fischer, 2012; Baiocchi and Ganuza, 2014). However, it is worth noting that Fung and Wright (2001) also applied the idea of democratic empowerment in other participatory initiatives in the US and India, such as public participation in education system reform in the city of Chicago, economic policy-making in the city of Milwaukee, environmental legislation reform in the US and participatory-centred developments to empower marginal groups in two Indian states,

Kerala and West Bengal.

Political legitimacy, in terms of its ability to ensure a particular practice is able to drive change within policy-making processes or wider society, is seen as an important quality for democratic empowerment by scholars of participatory democracy. Participatory democracy theorists have focused on participation in political/democratic institutions in terms of citizens' ability to access parliamentary structures (Macpherson, 1977) and the quality of participatory initiatives in local governance (Baiocchi and Ganuza, 2014; Fung and Wright, 2001). Within the recent focus on participatory budgeting processes, Baiocchi and Ganuza, Fung and Wright have provided more practical details of their understandings of political legitimacy. They have pointed to the importance in any reforms of the presence of some form of administrative reorganisation, with adequate financial support (Baiocchi and Ganuza, 2014), the ability of a process to given 'decision-making power devolution to participants' (Baiocchi and Ganuza, 2014) and a promise of 'the real prospect of exercising state power' in terms of political commitment over the medium to long-term (Fung and Wright, 2001, p. 27).

The importance of political legitimacy just noted by Habermas-influenced participatory democracy scholars such as Fung and Wright/ Baiocchi and Ganuza. Rather, political legitimacy is also considered an important aspect of conducting empowered democratic practices by pluralist/critical democracy theorist such as Mouffe (1999), who stresses that political legitimacy as the most important quality of deep democratic practice. Here, what Mouffe (1999, p. 755) means by radical or plural democracy is 'the recognition and legitimation of conflict and the refusal to suppress it by imposing an authoritarian order'. For Mouffe (1999, p. 753, 755), legitimacy is not grounded in rational consensus but is meant to recognise soemone who has different identities and opinion from oneself as a 'legitimate enemy, an enemy with whom we shared adhesion to the ethico-political principle'.

Whilst a legitimate democratic process will not eradicate power conflicts, it nevertheless possesses the capacity to, at a bare minimum, allow different individual, identities or groups to express themselves and to confront each other in an institutionalised political forum. In Mouffe's (1999, p. 756) own words, 'plural democracy needs to make room for dissent and for the institutions through which it can be manifested'. It is important to form 'collective identities forming around clearly differentiated positions, as well as on the possibility of

choosing between real alternatives'(Mouffe, 1999, p. 756).

At the micro level, the second standard of empowerment can be as the capacity of the individual to be able to perform certain acts considered as essential by scholars of participatory democracy (e.g. Fung and Wright, 2001; Baiocchi and Ganuza, 2014; Pateman 2012) and scholars from digital citizenship (Mäkinen, 2006; Isin and Ruppert, 2015). For these scholars, an empowering practice of participatory democracy is one which develops and improves the political capacities of an individual. Empowering practices encompass the ability to perform acts of deliberation, discussion and debate; these are considered as essential by various scholars of participatory democracy (Pateman 2012, Fung and Wright, 2001; Baiocchi and Ganuza, 2014). Pateman (2012, p. 8) clearly indicates that 'deliberation, discussion, and debate are central to any form of democracy, including participatory democracy'.

Vitale (2006) notes that participatory democracy theory is similar to deliberative democracy theory in that both emphasises the essential role of public debate and deliberation in achieving the goal of improving democratic decision-making. Yet, there are some differences in theoretical context, as deliberative democracy is directly influenced by Habermas idea of deliberation, whereas participatory democracy is more conceptually vague (Vitale, 2006, p. 749) and has a different interpretation of democratic modalities (Baiocchi and Gunuza, 2014, p. 35). Despite these differences, both Fung and Wright (2001) and Baiocchi and Ganuza (2014) clearly refer to Habermas' idea of deliberation in their recent work on empowered participatory democracy. From here, we can see how Habermas's idea of deliberation has influenced the deliberative turn in participatory democracy, where participants are urged to debate and develop shared understandings of political issues to forge a collective political will (Baiocchi and Ganuza, 2014, p. 35; Fung and Wright, 2001). Fung and Wright (2001) claim that empowered political participation requires participants to make 'collective' decisions by voting between alternative projects, in a way which does not hinge on self-interest but rather on a grasp of the 'reasonableness, fairness, or acceptability' of alternative options (Fung, and Wright, 2001, p. 20). They highlight that learning to be able to communicate and deliberate are key factors for citizen empowerment, as deliberation can lead to forming collective decisions in political participation.

My third standard of empowerment defines empowerment on the basis of the recent work of theorists of participatory democracy (Fung and Wright, 2001, Fischer, 2012) and digital empowerment (Mäkinen, 2006; Lerner, 2014; Hassan, 2017; Sgueo, 2017). Here, digital empowerment is defined as the provision of an enabling environment where users feel engaged and capable of making an informed and collective actions of political participation, namely voting, proposing and commenting (this is substantially predefined by design processes, such as those of the two DPPPs under study here). That is to say, I see digital empowerment as not only about users' participatory capacity in conducting whichever political actions that are granted by designers and policymakers but also about their 'feelings' and whether they are able to take consideration of 'a wide range of information' when they are voting, proposing and commenting.

In participatory democracy, the ability of a user to feel engaged and motivated is regarded as essential for increasing the degree of democratic empowerment by both Fung and Wright (2001) and Fischer (2012). Fung and Wright (2001) identified apathy as one of the problems of contemporary participatory democratic practices. They speculate that citizens can be politically disengaged and ignorant as a result of the institutional design of these practices. Fischer (2012) also illustrates that when it comes to building more empowered practices of political participation, a sense of engagement is even more crucial than having a strong participatory capacity, because it tends to be more difficult to motivate users to continuously participate in digital political participation (for a lot of hidden costs) than to build their participatory capacity. To tackle this issue, Lerner (2014) and Hassan (2017) advocated a reinvention of participatory modes of practice through the integration of interactive games. Despite there being no consensus on the definition of 'game' or 'gamification', Lerner and Hassan argue that embedding features drawn from video game design and mechanics into democratic processes can 'make democratic participation more fun, to increase citizen engagement and trust in democracy, and to empower people to democratically decide more issues that affect their lives' (Lerner, 2014, p. 25; also see Hassan, 2017, p. 252). In particular, Lerner (2014, p. 201) argues that good game design can produce 'competition [that] makes people care more about playing and try harder to succeed—and that it can even encourage collaboration'.

By integrating the use of these theories of empowerment, this situated lens is able to provide

a comparative assessment of the degrees of empowerment, with comparison between: (1) how the assemblages of design integrates capacity for empowerment and the provision of adequate political legitimacy; and (2) how the assemblages of dynamic UI presents or otherwise of an enabling environment where users feel engaged and capable of making informed and collective decisions in political participation differs between the two DPPPs under study; and (3) offering a point of reference on what constitutes a fair and meaningful political decision to question the assemblage of algorithmic decision-making.

## 3.4 Conclusion

I conclude this chapter by highlighting the contribution my development of a situated lens can make to studies of digital urbanism and the digital citizen, and explain how this theory guides me to assess and compare the two DPPPs' impacts on empowerment and urban policymaking within the next three chapters, which integrate this theory with my empirical research.

I devised this situated lens for the purpose of examining and comparing the two chosen DPPPs effects on citizen empowerment and urban policymaking processes, and for providing a new way of thinking about digital urbanism which integrates thinking on the role of a specific type of emerging platform, namely DPPPs which utilising interactions between user-generated data and algorithms. Informed by Deleuzian assemblage thinking and geographers' interpretations of his ideas of assemblage, then supplemented by wider theories of empowerment, this situated lens can systematically contextualise our understanding of the two DPPPs by diving them into three assemblages (design, UI, algorithmic decision-making), which are then analysed through the use of empowerment theory. Each assemblage is openly co-constituted by particular alignments between politicians, users, software engineers, digital interface, data and algorithms which are affecting and affected by the wider political contexts.

The ability to gain a rich description of DPPPs via a situated lens suggests four key contributions my research can make to wider studies of the digital citizen and digital urbanism. Firstly, drawing from assemblage thinking, this situated lens identifies contextual similarities between the two DPPPs — design, UI and algorithmic decision-making — points

of comparison. The situated lens does so to offer common grounds for researching other variations of digital urbanism across different contexts. Also, this situated lens can better illustrate the fluidity of algorithms embedded in the two DPPPs by paying attention to how algorithms stabilise and destabilise in relation with designers and/or users within a specific context (Kitchin 2017, Amoore 2019). In doing so, the situated lens can potentially open up what has been conceptualised as smart urbanism which largely uses discourse analysis of the effects of digital/automatic technologies in urban governance within Anglosphere contexts.

Secondly, this situated lens contributes to filling what Isin and Ruppert (2015) identify as a gap in studies of the digital citizen. It draws on theories of empowerment, as these are theories which offer the explanatory value over the nature and purposes of the DPPP which are appropriate in this context. As a result, the application of empowerment theory is also situated in the context of the DPPP. This situated lens provides a comparative assessment of digital political participation with a consideration of the dynamic UI (Ash *et al.*, 2018a; Rose, 2016) and the design processes of the two DPPPs. In particular, this situated lens shows that an empowered practice of political participation is not only a fixed set of participatory skills and capacities (Mossberger, Tolbert and McNeal, 2008) but an enabling environment where users feel engaged and are able to make informed decisions. In addition, by offering a comparative standard of empowerment, a situated lens makes it possible for me to assess the effects of the two DPPPs on citizen empowerment. As a result, it provides a comparative perspective in digital empowerment across Western and non-Western contexts. It can potentially inform policy guidelines for evaluating and monitoring the quality of digital political participation.

Now I will briefly delineate how a situated lens will guide me in assessing and comparing the two DPPPs' impacts on empowerment and urban policymaking in each empirical chapter.

In Chapter 4, the situated lens foregrounds the role of algorithms through the ways in which they are programmed and deployed by software engineers and politicians within *the assemblage of design*. Understood as 'the interpretative key' (Latour, 2013, p. 57) of the world, studying the process of design matters, as through it we uncover 'hidden' values, biases, and political effects underneath the apparent objectivity of digital technologies (Bowker and Star, 2000; Mackenzie, 2006; Amoore, 2013, 2019; Crawford, 2013; Kitchin,

2017). Guided by the situated lens (see in Section 3.4), I will reveal how this particular alignment between democratic narratives, algorithms and politicians has produced an agency/modality of anticipation which seeks to promote and produce self-celebratory democratic promises and outcomes via 'narrative of global solutions' and 'participatory calculus'. I, then, evaluate and compare the implications that two anticipatory modalities have against the common standards on empowerment — political legitimacy and individual capacity to perform participatory acts — in participatory democracy (Fung and Wright, 2001; Pateman, 2012; Baiocchi and Ganuza, 2014) and digital citizens (Isin and Ruppert, 2015).

In Chapter 5, the situated lens serves to contextualise algorithms through their use in the dynamic UI of the two DPPPs. In particular, it focuses on the interactions the dynamic UI has with users in real-time, and how this opens up and closes down the possibilities of digital empowerment for citizens. I call this *the assemblage of UI*. The chapter examines the possibility of digital empowerment: whether users are enabled to conduct collective actions of political participation via the dynamic UI within the wider political contexts. By considering the effects of emergent and unexpected frictions in shaping and reshaping the ways in which users act through the dynamic UI, the situated lens in this chapter is deployed to highlight the 'fluid' character of digital empowerment. It does not assume users are passive recipients of digital control and manipulation, or that they are necessarily subjected to 'smooth manipulation of user action and experience' (Ash *et al.*, 2018a, p. 1138); rather, it takes seriously the agencies users can manifest to contribute innovative inputs or forge collective forms of power through or against the control and modulation of the digital powers (Isin and Ruppert, 2015; Rose, 2016; Ash *et al.*, 2018a).

In Chapter 6, the situated lens works to investigate the internal operation of algorithms which produce political decisions via 'living' interactions with users and via human reinterpretation in policymaking. I call this *the assemblage of algorithmic decision-making*. The situated lens indicates how a comparison of the different processes of algorithmic decision-making which exist in the two DPPPs suggests, on the on hand, the production of political decision whose meanings are 'mutable' within their own processes of policymaking; on the other hand, they also close down other urban issues which have not been deemed legitimate within either algorithmic calculations or human reinterpretation. Here, it is by studying the process of making algorithmically-informed political decision that the situated lens is able to question

the fairness and empowerment of political decisions, as it points out what urban issues have been excluded alongside the (re)configuration of political decisions. By specifying the algorithmic rules of the two DPPPs, the situated lens makes it possible to not only reveal the impacts of algorithmic decision-making in urban policymaking but also raise the question of what constitutes an equal and empowered process of political decision-making. It does so to the salience of algorithmic devices which 'exceed their design, producing effects that are undeniable and irrevocably political' (Mackenzie, 2006; Parisi, 2013; Amoore and Piotukh, 2015a; Kitchin, 2017) and to consider the mutable nature of algorithmic calculations (as explained in Section 3.2) (see the contingent machine-human interaction which detours from its plan in Suchman, 1987).

# Chapter 4 On the design of Decide Madrid and vTaiwan

## 4.1 Introduction

I will now begin my comparative analysis of Decide Madrid and vTaiwan via the situated lens, which integrates assemblage theory which stresses situatedness and fluidity with those theories of democratic empowerment which are best situated to answer my research questions. In this chapter, I will focus on a comparison of the first assemblage, that of the design processes of Decide Madrid and vTaiwan, each of which are situated within their own political contexts. Studying the processes of conception and design of algorithmically-driven systems is important as decisions taking during these processes influence how algorithms work in practice and impact on our everyday lives. As Bowker and Leigh-Star (1999, p. 35) remind us, the design process of a piece of software integrates sets of decisions in which 'values, opinions and rhetoric [are] frozen into code'; such decisions, however, are generally not visible to the public. Though they are opaque, these decisions have been shown in recent years by studies of algorithmically informed surveillance practices to produce crucial 'political effects' (Amoore and Piotukh, 2015b). Besides, Amoore (2013, p. 54) has critically revealed how the design processes behind algorithmic analytics entail the use of intuitive judgements, incomplete knowledge and explicit or implicit biases held against the subjects under surveillance; therefore, algorithm-dependent technologies should not be taken as objective and neutral.

A 'situated' analysis of these design processes must make use of data which pays attention to the wider political and economic environments where technical aspects of Decide Madrid and vTaiwan — both algorithmic systems — are held together; in other words, where they gain specific 'content' in this case seen in terms of potential for empowerment. The situated lens emphasises that such design processes are open-ended because they can be changed by re-programming new algorithms, investing or withdrawing new financial or political resources and other potential changes stemming from various externalities. Essentially, viewing the design processes of Decide Madrid and vTaiwan as assemblages means they should not be seen as permanently fixed but as dynamic alignments between politicians, software engineers, algorithms, political narratives and political-economic recourses.

Drawing on the work of scholars working on the idea of empowerment in the context of participatory democracy (Fung and Wright, 2001; Mäkinen, 2006; Pateman, 2012; Baiocchi and Ganuza, 2014), and digital citizenship (Isin and Ruppert, 2015), my situated lens is able to reveal how crucial aspects of democratic empowerment are (often consciously) precluded via an array of decisions involved in the conception/design assemblages of Decide Madrid and vTaiwan. As I have previously noted in Section 3.4.2, we can establish two common standards for comparing the degree of empowerment in these assemblages: (1) are users' actions given political legitimacy?; and (2) is the individual given the capacity to be able to perform certain participatory acts seen as key to empowerment (e.g. deliberation and debate)?

Adopting these standards allows me to answer three research questions via the focus on the design process of Decide Madrid and vTaiwan:

(1) What are the effects of Decide Madrid and vTaiwan on citizen empowerment?
(2) How do Decide Madrid and vTaiwan differ in terms of potential for citizen empowerment?

Using the aforementioned standards of empowerment, I will now critically examine various constituents of the design process assemblages of the two DPPPs, with a focus on their production of democratic narratives and the creation of a 'participatory calculus' (an algorithmic design which preconditions the participatory actions available to users within the platform).

Firstly, I will investigate the 'global narratives' of democratic solutionism which surround the design and execution of Decide Madrid and vTaiwan, via examining statements made about them in the media and at international conferences. Such narratives anticipate a future in which democracy is able to fix widespread perceptions of a crisis in democratic participation by technological means. I argue that lying beneath these claims is a very 'thin', self-celebratory and quantitative narrative of democracy, where the future of democracy is one in which issues can be solved easily via decisions made within DPPPs by fairly crude majoritarian means which lack critical aspects of empowerment. Also - particularly in the case of vTaiwan - this supposedly global solution comes without any guarantee of a meaningful level of economic and political support into the future, which has been widely

noted as a critical necessity of participatory democracy (Fung and Wright, 2001; Mäkinen, 2006; Pateman, 2012; Baiocchi and Ganuza, 2014).

In the second part of this chapter, I review the 'participatory calculus' which is inserted into the operation of the DPPPs at design stage, which associates a machine code with the specific actions of a given user. This participatory calculus seeks to anticipate any action from the user side by assigning it a value and thus making it countable, which holds similarities to Amoore's (2013, p. 15) understanding of software design as 'as a means of rendering mobile and circulating things, people, money, and objects calculable'. Crucially, I note that designing a participatory calculus precludes or reduces the quality of some important actions such as deliberating, commenting and communicating, which are considered as essential abilities of an empowered subject (Fung and Wright, 2001; Pateman, 2012; Baiocchi and Ganuza, 2014; Isin and Ruppert, 2011). Therefore, I argue that the deployment of participatory calculus has crucial implications limiting the potential of DPPPs to provide empowerment, by precluding non-calculable and qualitative actions for political participation. By disclosing the preclusions which occur in the construction of a participatory calculus at design stage, I not only problematise this process, but also propose how (re)think the ethics of such practices through highlighting the potential for questioning decisions made within design processes. I do so by engaging with Amoore (2019, p.4)'s work on posthuman ethics in which she argues that 'the possibilities of an alternative orientation to doubt, one in which the subject necessarily doubts the grounds of their[algorithmic] claims to know'.

It is essential to point out that highlighting the web of elements which surround processes of design is only the first step for examining the impact of DPPPs on citizen empowerment in the digital age. The full impact of algorithms embedded in DPPPs on empowerment and urban policymaking processes will be revealed more clearly when we move to examine the dynamic User Interface in disabling and enabling citizens to make informed actions in political participation (Chapter 5) and to question the algorithmic interacting with user-generated data to produce political decisions (Chapter 6).

### 4.2 Problematising DPPPs as global solutions for the future of democracy

This section explores one aspect of the assemblage of design of Decide Madrid and vTaiwan; it critiques the narratives made by configurations of actors working in and around the

platforms about how DPPPs can be seen as global solutions for securing the future of democracy, by focusing on how these processes of articulation of narrative foreground the idea of anticipation (Anderson 2010, p.784-786). Anticipation is defined by Anderson (2010, pp. 778–779) as the use of different performative, calculative and imaginative techniques which make potential 'futures known and rendered actionable'. To avoid confusion, I strictly use Anderson's idea of anticipation to describe the *logic* behind the design of Decide Madrid and vTaiwan, which seeks to 'imagineer' a majoritarian and machine-calculable vision of democracy. This is done via the encoding of what I have termed 'participatory calculus' into the operation of the algorithms, which is underneath the self-promoted yet widely-publicised democratic narratives in the media, professional conferences and other stakeholder fora.

In the first and second parts of this section, I will illustrate in turn how the designs of Decide Madrid and vTaiwan are driven by narratives which consider DPPPs to be global solutions for the future of democracy, heralds a consensus-oriented future which will be made possible by their deployment and suggests that societal division and polarisation can be pre-empted via technology. This narrative is a textbook example of what Morosov (2013) calls 'solutionism' — the supposed ability of technology to solve the problems of humanity — at a global scale. It is circulated through news, reports and presentations curated and written by a wide variety of institutions and individuals; research foundations (i.e. Nesta, Consul), international media (i.e. the BBC, the New York Times, Wired, Open Democracy, G0vInsider), international conferences (i.e. Consulcon in Madrid City and the g0v Summit in Taipei City) and Open Government Partnerships. These wider networks should be considered as part of the design assemblage of the DPPPs.

In the third part, I critically examine and compare how these global narratives of digital democracy, mediated via the political contexts of Madrid and Taipei City, can be judged against the essential elements of empowerment I pointed out in the previous section. Here, it is clear to see that vTaiwan, — despite its claims to be delivering digital democracy — has largely failed to obtain political legitimacy, as it fails to redistribute its decision-making power to participants and did not guarantee the necessary financial and political support in the same way as Decide Madrid.

4.2.1 vTaiwan

In recent years vTaiwan has been heavily deployed by the Taiwanese government as a brand for portraying Taiwan as a global leader in digital democracy to the outside world. Taiwan is depicted as a leader in providing new solutions to the various problems faced by democratic countries, from decline of trust and political engagement between citizens and the government (Simon *et al.*, 2017) to polarisation caused by social media (Miller, 2019). vTaiwan is claimed as a new form of digital democracy on the basis that its algorithms can identify areas of consensus between groups of people who on the surface seem divided in their options on political issues; with vTaiwan these are known as 'Opinion Groups'. By identifying areas of consensus between Opinion Groups via the use of algorithms, divisive and trolling actions which can potentially occur during online participation are pre-empted (Miller, 2019; Tang, 2019a, 2019b). The narrative of vTaiwan as a way of solving conflicts between Opinion Groups has been circulated around the world via various international conference and workshops, such as Consulcon in Madrid in 2017 and workshops at MediaLab in Madrid and at New York City Hall in 2018.

In the New York Times, Audrey Tang (2019a) clearly stated that vTaiwan 'remains one of the best ways to improve participation — as long as the focus is on finding common ground and creating consensus, not division'. This promise of a consensus-oriented future is praised in Wired (Miller, 2019) as a crucial lesson for democratic countries to heed:

> *vTaiwan has allowed citizens to sidestep the gruelling divisions that define online politics. vTaiwan didn't necessarily try to resolve the areas of bitter disagreement, but instead to forge a way forward based on the numerous areas most people agreed on…vTaiwan proves that the character of political debate is partly down to platform engineering. Polarised and angry content keeps us engaged, and that is exactly what platforms have been designed to show us. Design a platform [Taiwan-Pol.is] to find consensus, and you see it arise in the debate…*

Again, the same illustration of vTaiwan as a world example for digital democracy is seen in the Economist, where Audrey Tang (2019b) claimed that through a combination of A.I. and a Taiwanese government that listens to diverse demands from citizens, vTaiwan creates a new

form of digital democracy. Tang (2019b), indeed, mentions the role of the Taiwanese government as a listener; however what she does not point out are the contextual details of how this so-called new democracy will work in practice within the Taiwanese Government. Everything is portrayed as working out magically and smoothly. There were no metrics or wider evaluative processes offered which would be able to know to what degree Pol.is actually creates consensus; in addition, there is a lack of clarity on how the Taiwanese government is able or willing to translate the outcomes of digital democratic processes into legislative actions[13].

It thus seems that despite the wide-ranging claims offered in the narrative around vTaiwan, this discourse offers remarkably little explanation on offer regarding either the definition of consensus or how a supposed new form of digital democracy is better than the previous version. If we look closely at the deployment of algorithms, underneath the narrative of a global solution, a consensus-oriented future, is a limited and quantitative understanding of democracy, devoid of the richness and depth it is given by theorists of empowerment. What is meant by 'consensus' within narratives around vTaiwan seems to be no more than those sets of comments which gain simple majority support from the user base. Diana[14], a consultant from Pol.is software Inc., concedes that those comments that are considered as a '(rough) consensus' by A.I. algorithms are not that *different from a simple majority-based consensus*. In her words, the consensus in Pol.is, being supported a majority number across minority and majority groups of users, 'tends to be a majority opinion statement. There is a lot of overlap between Pol.is consensus and majority consensus' [15]. Crucially, here we can see how the old idea of a majority-based consensus is 'rebranded' within the narrative of DPPPs, in a way in which it turns into an apparent saviour of global democracy in the 21st century. What this majority-based consensus demonstrates is a minimal and thin understanding of democracy. Can democratic futures really be resolved by a majority number of users?

4.2.2 Decide Madrid

In an official press release, Madrid City claimed itself to be the largest open-source platform for participatory democracy in the world. It did this on the basis that it had been adopted by

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[13] This opinion is derived from an in-depth participatory observation with the Taiwanese Government and it 'promotion' tours of vTaiwan in Consulcon conferences in Madrid City, as well as from a recent informal conversation with one of the researchers in Nesta, who has been investigating vTaiwan platform
[14] Interview conducted on 25/09/2018
[15] Interview on 25/09/2018

93 institutions located in 18 different countries, largely in the Spanish-speaking world: these included Porto Alegre, the Uruguayan government, and municipal authorities in Buenos Aires, Paris, Turin, Quito, Lima, La Paz, Zamora, Valencia and Gran Canaria (also see BBC, 2019). In another press release for Consulcon, the international conference of Decide Madrid, Madrid City celebrated itself as 'the epicentre of citizen participation and democracy' initiatives around the world (Madrid City Council, 2018). Also, in the context of an EU-funded project on 'e-government', López (2016) claimed that Decide Madrid is a 'scalable software solution' for e-participation. He notes such a solution has interested many municipalities around the world:

> *some other municipalities, including Fuenlabrada and Cádiz, are also keen to adopt the platform. According to official sources, more than a dozen administrations are already installing the Consul framework used by Decide Madrid. Even the city of Nariño, in Colombia, has expressed interest in this eParticipation and transparency solution.*

Here, I want to indicate how Decide Madrid narrates a discourse of a future democracy which is reduced to governance via a simple majority of supporters; this solution is described as being potential of use to any government worldwide. The emphasis on governance via simple majority came out vividly when I was working as an intern for Madrid City Council, Mike, a senior advisor in Decide Madrid, often told me their primary concern is about 'numbers': whether citizen proposals meet a numerically-defined threshold (1%, or approximately 26,000 registered residents) and whether participatory budget proposals achieve a simple majority of support from voters. They do not consider the results of other participatory processes, such as deliberative participation (via Local Forum) as legitimate unless these processes decide to incorporate their results into the process within Decide Madrid which works on the simple majority principle. A simple majority becomes the decisive criteria in defining which proposal or idea should be incorporated into the future of Madrid City by Madrid City Council. In this regard, Decide Madrid is not at all different from vTaiwan. They both conceive and anticipate that the determination of a simple majority number of support within their user base is adequate for defining and securing future democracy.

Should we let our future democracies be defined by reliance on majoritarian rules in which a small majority of participants might be enough to green-light highly contentious issues? I

note that Decide Madrid not only reduces the future of global democracy into a single narrative of majoritarianism but also sidesteps the crucial issue of integrating the wider empowerment agenda; this means that such global solutions do not guarantee citizens will be empowered at the expense of governments. Thus I feel it is safe to conclude that traditional forms of governance, rooted in state and sub-state structures, appear to have simply installed participatory platforms which use ranking algorithms which operate on traditional logics of majority support.


4.2.3 The missing dimension of empowerment: political legitimacy

In this section, I use the situated lens to analyse the effects of the design assemblage in citizen empowerment. I have illustrated how networks of actors within the design assemblage of DPPPs come together to anticipate a particular form of democratic future based on a majoritarian logic. What is missing from this anticipated future, this narrative of DPPPs as a global solution to fix democratic problems is a consideration of whether their functions provide adequate legitimacy from the perspective of theories of participatory democracy (e.g. Fung and Wright, 2001, Baiocchi and Ganuza, 2014).

Drawing on my comparative study of Decide Madrid and vTaiwan, I will offer evidence that the level of economic and political support given by a government can make a significant difference in increasing the level of empowerment within a potential democratic future, as it is this support which will provide the requisite legitimacy for results of digital political participatory processes in the medium to long-term. Here, the main issue in the development of future democracy is not whether a specific algorithmically-powered platform is developed or not, but that the results of such a new initiative can have real political impact in processes of policy-making by being granted with sufficient economic and political support.

By redistributing an annual 100 million Euro budget for city-wide and district-based participatory budgeting proposals, Madrid City Council has mobilised not only strong political will and resources (such as administration and legislative time) but also financial support, both of which (according to empowerment theory) are critical to ensuring the democratic future envisaged by the designers. These supports provide substance to the claim that citizens' decisions have power in the policy-making process. Madrid City Council is committed to taking up any decision in Decide Madrid which reaches a majoritarian standard

(including a minimum support threshold of 1% of the population/27662 votes or a simple majority) into its policy-making processes. Simply put, participants indeed have some 'participatory power' (Baiocchi and Ganuza, 2014, p. 31) over the public budget.

Andy[16], a software engineer of Decide Madrid, has pointed out that citizen empowerment means more than simply installing and using a piece of software. In addition, the wider political will must exist to make participatory processes legally binding or to invest real money into the projects over the medium to long-term. Echoing this point, Andy, Jean[17], a former software engineer of Decide Madrid, described how the uniqueness of Decide Madrid was based on the fact that Madrid City Council pays attention to the ideas of people and had committed to devolving real power to the user through the commitment to turn their ideas into projects if they are supported by a certain number of votes (1% of the registered population of Madrid, approx. 26,000). Decide Madrid allows the:

> *ideas of people organising to get something done that goes against the opinion of the government of Madrid…like your government right now, the local government in Madrid does not want to do this thing, but if a certain number of you vote yes, they will do it… I would not call it direct democracy — its too strong a term I think. But yes, it is important in the thing that I said: that you can do things the government doesn't want to do. That's a tool for doing that, and that is really cool I think.*

As Jean has clearly noted, the platform of Decide Madrid is not in itself a solution for direct democracy but a 'tool' which enables users to ask the government to do things that are proposed by users if they have 1% support from the registered population of Madrid City. What matters is that Decide Madrid is used by citizens and allocated political commitment and resources from Madrid City Council. Without them, Decide Madrid can only function as a platform which can provide for 'publicity awareness', as Andy notes that

> *the tool [Decide Madrid] can be just publicity measure for making into the newspapers, but I mean Consul [Decide Madrid] is not the solution, it is*

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*just a tool, the solution is you actually changing your gov into adopting participatory democracy*[18].

What these software engineers remind us is that the political legitimacy of a DPPP has to be backed up by governmental institutions which can incorporate the result of participation into the policy-making process. In Jean's words, it is more about 'how it [the platform] is used, because the system is made by the people inside Decide Madrid, where the government decided they were gonna do it — whether they like it or not'[19], than merely installing a participatory platform.

From this viewpoint, then, we can start to see the difference between Decide Madrid and vTaiwan. Madrid City Council committed to turning proposals into real projects which were able to draw on resources from a 100 million Euro budget; this includes even those proposals which were against the will of the elected government. However, there has not been the same level of political and economic support from the Taiwanese Government to take the results of vTaiwan into their policy-making processes. As a conclusion, we can say that Decide Madrid has *a higher degree of empowerment* than vTaiwan, because it gave political and economic support for incorporating the conclusions of digital political participation into political decisions/ processes of policy-making.

A vital issue raised by my 'situated' account of empowerment is the fact that in contrast to Decide Madrid, vTaiwan does not highlight the importance of devolution of political decision-making power to participants, which has been considered as an important factor in constituting a deep democratic practice (Baiocchi and Ganuza, 2014; Fung and Wright, 2001). The absence of meaningful devolution of political power to participants can be seen by studying a TED talk made by the former chief of the Taiwan Ministry of Development (Kuan, 2015). Kuan (2015) explicitly states that vTaiwan was not designed to create conflicts with pre-existing regulations and configurations of political power inside the Taiwanese government. By not explaining *who can make a real decision* in vTaiwan-facilitated participation, Kuan (2015) implies that participants' inputs (votes and ideas) in vTaiwan will not necessarily be legitimated. In acknowledging that participants' decisions are not given

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[18]  Interview on 28/10/2017
[19]  Interview on 22/11/2018

any political power and legitimacy, Kuan (2015) almost guarantees that vTaiwan will not pose any challenge to existing power relations within the policy-making process.

In addition, in an interview I conducted with Derek[20], a senior officer from the Taiwanese Cabinet Office, I heard that officials had made no firm commitments to legitimating any decisions which are agreed within vTaiwan. On the contrary, Derek stated that the Taiwanese government was delighted with the new mechanism of vTaiwan as it had not required them to make any meaningful commitments. In his own words:

> *there is no binding…for governments to take on [the result of vTaiwan]…. For the government, even though it is part of the consultation…it didn't commit anything that it is going to be part of decision-making, but it gets a proposed solution [which has undergone some consultation from vTaiwan].*

Looking at the design of the vTaiwan interface it is evident to confirm that vTaiwan is not willing to redistribute any decision-making power to ordinary citizens because there is no button which enables users to propose an issue of their choice. Instead, it is only the Taiwanese government and civic hacking community who can 'propose' issues. Not having a 'propose' button indicates a significant constraint over possibilities for empowerment, which we will see more clearly when comparing vTaiwan to Decide Madrid.

Taking into account this issue and the comments made by the two Taiwanese civil servants, it is clear to see that vTaiwan leaves vague the issue of whether citizens can use the platform to make meaningful inputs into the policy-making process. Contrary to claims of empowering citizens, there is a danger that platforms can be repurposed by governments as tools of depoliticisation to 'open-wash' the existing power structures between governments and citizens (Tseng and Lee, 2017, p.3). In the report 'Taiwan Open Government', which focused on several governmental projects including vTaiwan, Tseng and Lee (2017, p.3) critically pointed out this 'open-wash' situation in Taiwan, noting that the government 'pretends to be 'open' with pretty slogans or superficial work while, in practice, does not take views from civil society into consideration. Openwashing turns 'participation' into mere propaganda for government and something that has no tangible impact'. Simply put, 'open-wash' describes

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[20] Interview on 22/03/2018

when participation is merely a 'tokenism' where the Taiwanese Government is not politically held accountable for public participation (Chiang, 2017; Tseng and Lee, 2018).

Despite Madrid City Council appearing to secure a degree of political legitimacy (and therefore a higher degree of empowerment) for Decide Madrid, I note that it is important to consider the influence of party politics in the political contexts in which Decide Madrid and vTaiwan are embedded. Drawing on the Deleuzian assemblage thinking, the use of a situated lens reminds us that the degree of empowerment for a DPPP should be viewed as *fluid*. This is because due to the wider political contexts in which they are embedded, heterogeneous actants which constitute the design assemblage, from voters to political parties will '*come together and come apart*' (McFarlane, 2011, p. 653; Anderson and McFarlane, 2011, p. 126), gather and disintegrate. In the wider political context of the two DPPPs, we can see how over time both the Spanish and Taiwanese governments withdrew political and economic resources from the design processes of both DPPPs. Therefore, it is the transient and open-ended design processes that make the degree of empowerment for each DPPP not fixed, able to be significantly decreased due to the impacts that are imposed by wider political contexts.

In June 2019, the Carmena Administration lost the mayoral election for Madrid City Council (Gilmartin, 2019), which left the operation of Decide Madrid in limbo and in the hands of the Conservative Party (Popular Party) in coalition with the centre-right Ciudadanos party and far-right Vox Party[21]. What this meant for Decide Madrid was that both the political and economic support, the political legitimacy of allocating an annual 100 million Euro budget and administrative support, for Decide Madrid was withdrawn by the new Conservative Administration in 2019. Here, it is clear to see that the degree of empowerment of Decide Madrid has begun to fall apart.

For vTaiwan, the issue is similar, in that as the Taiwanese Government has gradually lost interest in 'using' vTaiwan for discussing new digital issues. Since 2018, there has been barely any new cases inputted into vTaiwan for the purposes of conducting political participation. The low interest the Taiwanese government has in conducting new political participation initiatives via vTaiwan is accompanied by a significant drop in the number of

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[21] An information conversation with Mike, the key actor of Decide Madrid, in London, on November 13th 2019.

users. In 2015, there were approx. 1220 users taking part of Uber consultation, whereas, by 2017, there were only around 150 users who took an interest in contributing to a debate on the issue of online abuse/violence regarding the dissemination of images of nudity (vTaiwan, no date). Simply put, the degree of empowerment (as it is derived from the level of political legitimation) for both Decide Madrid and vTaiwan is in flux, highly influenced by uncertain political environments; this complicates their ability to deliver certainty (and thus legitimacy) over the medium to long-term.

## 4.3 On participatory calculus: the role of preclusions in the restriction of empowerment

This section highlights how calculative practices — the creation of numerical formulae, numbers and machine codes for specific purposes — have been embedded within the design processes of Decide Madrid and vTaiwan for the purpose of anticipating particular democratic futures. I term the calculative practices within DPPPs their *participatory calculus*. Participatory calculus can be seen as any set of associations which translates participatory actions into machine codes, making every participatory action calculable by the Machine. For example, in the DPPPs under study here, participatory calculus is seen in the digital action of 'voting' which consists of options which are associated with machine codes (such as agree/disagree/null/pass).

By applying the situated account of empowerment, I assert that the creation of such participatory calculus largely reduces the individual's capacity of conducting participatory acts and thus reduces empowerment. Participatory calculus precludes or restricts certain non-calculative and qualitative actions — especially, deliberation and speech acts — in favour of purely digital acts of political participation which are restricted to machine-readable choices such as 'voting/supporting' and 'commenting/proposing'. Acts of deliberation and speech are considered as essential acts for empowering citizens by scholars of participatory democracy (e.g. Fung and Wright, 2001; Baiocchi and Ganuza, 2014; Pateman, 2012) and the digital citizen (Isin and Ruppert, 2015). For instance, the ability to express a wide range of speech acts — such as feelings, ideas and claims — is restricted to allowing the user to 'comment' on proposals in a limited and digitally-mediated way.

Here, we can see the degree of empowerment for the two DPPPs varies as a result of the different sets of participatory calculus they employ. For example, by restricting qualitative actions (such as vTaiwan's imposition of a 140-word limit), such as posting and communicating, the design of vTaiwan restricts *the ability of empowermen*t for users to express themselves in digitally mediated participatory processes more than Decide Madrid. Thus, the question of the existence of participatory calculus within each DPPP should not be read in empowerment terms as a binary on/off, but should be seen as producing outcomes along a varying spectrum of empowerment; this is because how the two DPPPs under study impose their logics of participatory calculus is different.

4.3.1 Participatory calculus: how machine coding closes down acts of deliberation with a digital act of voting

In her study of risk calculus, Amoore (2013) has indicated that algorithms promise to pre-empt potential risks such as terrorism and illegal immigration. Amoore shows how by transforming the unknown future into a defined output on a numerical risk score, algorithms exclude particular forms of life from being seen and prevent the ability of subjects to protest against algorithmic decisions. Using the example of Doll — a woman who becomes a terrorist suspect — in William Flanagan's novel of 'The Unknown Terrorist', Amoore (2013, p. 83, 93) vividly describes how an anticipatory model excludes the life events of Doll and transforms her into a different person:

> *the series of her life events that she might recount to protest her innocence*
> *(the circumstances of her childhood, the death of her own child, her job as*
> *a pole dancer, her friendships as more than associations) are torn apart as*
> *variables and reassembled as a chain of events signalling emergent*
> *dangerous intent.*

Just as Amoore (2013, p. 157) has illustrated how risk calculus renders lives 'definable, locatable, and securable', the participatory calculus in vTaiwan-Pol.is reduces the rich life of a citizen — the user - by reducing her to a set of potential actions and responses expressed in binary machine codes (1, -1) or (1, -1, 0 or _/null). Any given participatory behaviour is

translated into a digital action which is rendered as a user 'decision' — essentially, a vote - via the logic of participatory calculus. For instance, participatory calculus will give the action of 'agree' the machine-code '1'. Users can only be represented as humans within the system via a restricted list of designated code associations, which include:

1. a participant agrees with/supports a comment (code '1')
2. a participant disagrees a comment (code '-1')
3. a participant pass a comment (code '0')
4. a participant didn't evaluate a comment ( code 'null')

In the case of Uber, as Figure 5 shows, participant No.7 is inscribed as a particular set of machine-calculable association, which can be represented as (-1,_,1,1,1,1,1,1,1,1,-1,_,1,_ ,_ ,_ ,_ ,_ ,_ ,_ ,_ ,_ ,_ ,_……………). This example shows that no matter how complicated a users' actions are in the 'real world', their actions can always be anticipated and translated into a line of machine code, a voting pattern that represents a user and is stored in the database of a DPPP.



| | participant | group-id | n-comments | n-votes | n-agree | n-disagree | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | participant | group-id | n-comments | n-votes | n-agree | n-disagree | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 2 | 0 | 0 | 46 | 101 | 44 | 12 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | | |
| 3 | 1 | 1 | 0 | 29 | 14 | 10 | 1 | -1 | -1 | 1 | 1 | -1 | 1 | 1 | 0 | 0 | 1 | | 0 | -1 | 1 | -1 | 1 | 1 | -1 | -1 | 1 | 0 | | |
| 4 | 2 | 1 | 5 | 88 | 58 | 15 | 1 | -1 | -1 | 1 | 1 | 0 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | -1 | 1 | -1 | 1 | 0 | -1 | 0 | 0 | 0 | | |
| 5 | 4 | 1 | 0 | 31 | 13 | 16 | 1 | -1 | -1 | 1 | 1 | 1 | -1 | 1 | 1 | 1 | -1 | | 0 | -1 | 1 | -1 | 1 | 0 | -1 | -1 | -1 | 1 | | |
| 6 | 5 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | |
| 7 | 7 | 0 | 0 | 11 | 9 | 2 | -1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -1 | | 1 | | | | | | | | | | | |
| 8 | 9 | 0 | 0 | 11 | 8 | 3 | 1 | -1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | -1 | | | | | | | | | | | | | |
| 9 | 10 | | 0 | 1 | 1 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 11 | 0 | 0 | 11 | 9 | 2 | 1 | -1 | -1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | |
| 11 | 14 | 0 | 0 | 26 | 14 | 8 | -1 | | 1 | 1 | 1 | 1 | 1 | 1 | -1 | | 1 | -1 | -1 | -1 | 1 | 1 | 0 | 0 | -1 | 1 | | | | |

Figure 5: An example of some of the calculable relationalities produced in the case of the Uber consultation in vTaiwan (source:

https://github.com/audreyt/polis-tally/blob/gh-pages/vtaiwan-uberx-08-09-participants-votes.csv, access at 16/Jan/2019)

It is important to note for the purposes of this study that in reducing user actions to a set of machine codes — digital actions of 'voting' — digital design not only acts to create 'categories' which render reality as 'calculable' information (Marvin and Luque-Ayala, 2017, p. 89) but also closes down the ability of users to be empowered. It limits the potential of public participation because it puts constraints or exclusions on participatory actions that are non-calculable within the system of the two platforms, in particular acts of deliberation such as debate. Acts of lively deliberation are considered as an essential element in participatory democracy (Mouffe, 1999, Pateman 2012, Fung and Wright, 2003; Baiocchi and Ganuza, 2014), which are lost and displaced under the logic of participatory calculus.

Despite different views existing on the possibility of having a rational consensus and resolution in participatory democracy[22], what is shared across all theorists is a desire to highlight the possibility that diverse participants can have the ability to speak up for their interests and engage with different viewpoints. Pateman (2012, p. 8) clearly indicates that 'deliberation, discussion, and debate are central to any form of democracy, including participatory democracy'. Deliberative processes are also at the core of the concept of the participatory budget, which has been scrutinized by Fung and Wright (2001) in terms of its contribution to democracy.

I was given a profound sense of the importance of such lively deliberation whilst I was observing the polling stations at Madrid's Plaza de Los Misterios during the voting on the Decide Madrid participatory budget in November 2017. Whilst users of Decide Madrid could vote purely online, they were also given the option to vote in a physical space in their own communities in Madrid. Voters were asked to choose between two proposed options for a regeneration project by ticking a box, and could also tick a third box indicating no agreement with either proposal; these choices were later manually inputted into the Decide Madrid platform by civil servants. However despite the suggested potential for additional community involvement, actual input into the platform was limited by prior design to recognising three machine-coded options: Agree with Plan A, Agree with Plan B, or Disagree with both plans.

However, despite this limitation imposed by the prior design process, whilst I was observing the voting it was clear that I was viewing much richer participatory 'content' than was

suggested by the three machine-coded options. Before actually voting for the regeneration plans, participants (residents of specific voting areas, single people, couples and families) read explanations and diagrams of two regeneration plans carefully and discussed them with friends, family members, or other voters. The conversation was very lively and vibrant, supplemented with bodily movements. Some of the participants would point to the plaza which was to be regenerated to discuss and imagine the potential implications of each plan with their kids, friends or families (see Figure 6). Some would discuss why they liked Plan A instead of Plan B with volunteers at the polling stations.

Here, it is clear to see how the logic of participatory calculus precluded a vast range of potential user actions by channelling them into trinary pre-defined categories. In an informal conversation with Lily and Joseph, who both play a leading role in designing participatory community projects in Madrid, they indicated to me that Decide Madrid views on public participation were 'too narrow'. Joseph pointed out that public participation is not just about 'voting' but also about 'strengthen[ing] the community bond to create new social tissue like talking, deliberating. It is like building and learning together'.



Figure 6: The discussion before voting in Puente de Vallecas (Source: owned by myself).

What Joseph emphasised is that the particular non-calculable action of deliberation is a staple in public participation performed under 'real-world' conditions; it builds a sense of

'togetherness' amongst participants which is arguably essential for real political discourse to take place. He indicated that deliberation can really bring people to work together to write proposals and create networks of support for particular issues before voting.

These observations exemplify how a simplistic design of the participatory calculus, by excluding such non-calculable lively acts of discussion, purposefully closes down opportunities for democratic expression. That this design choice was consciously-made was confirmed by Mike, a key actor of Decide Madrid. When I went back from the polling station to the office in Madrid City Hall and told Mike about the lively interactions I had observed in the voting venue, he replied that 'we only care about numbers because that's the key to the success of direct democracy' (derived from fieldnotes). Apparently, Mike sees numbers as the only way of making public participation practices calculable and knowable; this is the essence of anticipatory logic. This short story is reminiscent of Orlikowski and Scott's (2015) critique of TripAdvisor's evaluative functions, in which they problematised the standardisation of the uniqueness of the content written in the comments via the imposition of a five-point quantitative scoring mechanism:

> *[the five quantitative scores] ignores these subjective reviews [what is written in the comment].........This eradicates idiosyncrasies and conflates differences in user reviews, algorithmically enacting a standardized view that excludes vital relationships and context details that help make sense of the review as part of the process of travel* (Orlikowski and Scott 2015, p.211).

Therefore, it is evident to see the design of participatory calculus anticipates and turns uncertainties inherent in participatory actions into a calculable number, a quantitative machine code, a digital action of 'voting'. The implication of such participatory calculus is critical, as it precludes and eradicates what has been considered as important acts by various scholars of democracy (Mouffe, 1990; Pateman 2012, Fung and Wright 2001): the quality of deliberation, seen in terms of the richness and liveliness of a particular conversation or debate.

4.3.2 The restriction or removal of digital actions of commenting and communicating

In this section, I will introduce another example to substantiate how participatory calculus can further restrict the ability of a DPPP to empower an individual by reducing or eliminating certain digital actions for political participation, with particular regard to acts of 'commenting/proposing' and 'communicating'. Just as verbal acts of deliberation and discussion are reduced to machine-coded acts of 'voting' via the logic of participatory calculus, participatory calculus can also restrict and remove digital actions of commenting and communicating. Here, both of these digital actions are considered as equivalent to 'speech acts' (Isin and Ruppert, 2015); the ability to make these are practically and theoretically considered as necessary for empowerment because they allow citizens to express, articulate and exchange their ideas as subjects with other users (Isin and Ruppert 2015). It is important to note that the design decisions of the interfaces understudy precondition and confine digital actions of 'commenting/proposing' and 'communicating' to different degrees, and in bringing out how the two DPPPs understudy compare in this regard, I will further unveil the significant implications of interface design on restricting user freedom before the actual practice of digital political participation had begun.

VTaiwan-Pol.is has established two important restrictions on the digital actions of 'commenting/proposing' and 'communicating'. For 'commenting', the platform only allows a user to write a comment which contains 140 characters or fewer; this is indicated clearly in the interface. Bryon, Matthew and Felicity[23], practitioners who work for vTaiwan-Pol.is, express that what they seek to anticipate via this restriction is to encourage users to generate 'short and sweet' comments, rather than lengthy, unclear and out-of-focused narratives. Matthew[24], a software from vTaiwan, explained that the decision taken within the design process to include a 'word limit' seeks to 'push them [users] to think a different expression...or to refine your explanation'. That is to say, the process of design, by delimiting the length of the user's action of 'commenting', expects users to have the capacity to 'sort out' or 'improve' their writing. The individual is thus presumed to have the capacity to rationally outline her goals and views in a particular manner.

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[23] Derived from fieldnotes
[24] Interview on 03/03/2018

Secondly, the design process has completely prevented users from practising the digital action of 'communicating': users are unable to write comments in reply to other comments, and as a result, they are completely impeded from performing any communication with other users. Key actors from Pol.is Inc. and vTaiwan, such as Felicity and Diana[25], have explained this particular design decision as being aimed at pre-empting 'trolling': users writing in an aggressive and emotionally 'irrational' way toward each other. This restriction on supposed 'trolling' is considered by the designers to be a benefit, as it is seen as improving the quality of public participation.

This restricted ability is a direct constraint on the user empowerment. As mentioned in Section 4.1, theorists see an important element of the ability of empowerment in cyberspace is being able to conduct a wide range of different 'speech acts', including communicating, commenting, blogging, messaging, tagging, posting, emailing, filtering, liking, friending and so on (just to name a few) (Isin and Ruppert, 2015, p. 69). These digital speech acts make it possible for a citizen to conduct the '*act of saying and doing something* — whether through words, images or other things' as a rights-claiming subject (Isin and Ruppert 2015, p.53, 60). Therefore, by reducing and removing the digital actions of 'commenting' and 'communicating', the design of vTaiwan-Pol.is has directly restricted the *ability of empowerment for a user,* and thus their status as a subject.

By contrast to the views of the designers of vTaiwan, the importance of digital actions of 'communicating' amongst users without constraints on word count was emphasised by Mike, a key actor from Decide Madrid. Mike considers writing replies to other users as one of the fundamental actions of participation in Decide Madrid. It is the undefined nature of writing that generates what he calls 'collective intelligence':

> *The most interesting part of the consul is to produce the collective intelligence that is from the parts that are not defined. Even though we define some steps in participation, most of the things are not really defined…we just let people communicate between them, but we don't tell them what to communicate…there is no strategy…we just have an open communication…and we know that we will lead to collective intelligence.*

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[25] Interview on 05/01/2018 (for Felicity), 25/09/2018 (for Diana)

Following this strategy of open communication, Decide Madrid decided not to set up a word limit for users to write a proposal or a comment, and thus, in Mike's view, empowered users. For Mike, this unlimited writing indicates the ability of empowerment by creating communication amongst users and possibly leads to what he calls 'collective intelligence'. Here, we arrive at a point of difference between Decide Madrid and vTaiwan in terms of how their anticipatory powers restrict and regulate the ability of users. As I have shown, the design of vTaiwan prevented users from writing a comment in reply to any comment, which left users with no ability to communicate with other users through words in vTaiwan. In doing so, there is no possibility for users to develop a 'conversation-thread', as is possible in Decide Madrid platform.

In addition, in contrast to vTaiwan, Decide Madrid provides users with an ability to write in reply to proposals and comments, and thus enables digital actions of 'commenting' and 'communicating' (Isin and Ruppert, 2015, p. 69). Users can leave a comment to any proposal as a way of communicating with others in Decide Madrid, in what Mike and Paul call a 'conversation-thread' (derived from fieldnotes) around citizen proposals. For example, one of the most controversial citizen proposals is to ask all Catholic churches to pay property tax, which has received more than 449 comments with numerous 'answers' (sub-comments) to them (see Figure 7).

As Isin and Ruppert (2015, pp. 69, 71) point out, digital actions are vital components for users to conduct speech acts of saying and doing using statements such as 'I, we, they have a right to'. What this 'conversation thread' highlight is that the digital design of participatory calculus plays an essential role in preconditioning which participatory actions users can conduct. The clear differences between Decide Madrid and vTaiwan which were set up in the design processes show that digital design can both open up and close down the ability of users to conduct digital actions for political participation, such as 'commenting' and 'communicating'; this has implications in closing down and opening up the overall ability of users to become empowered.
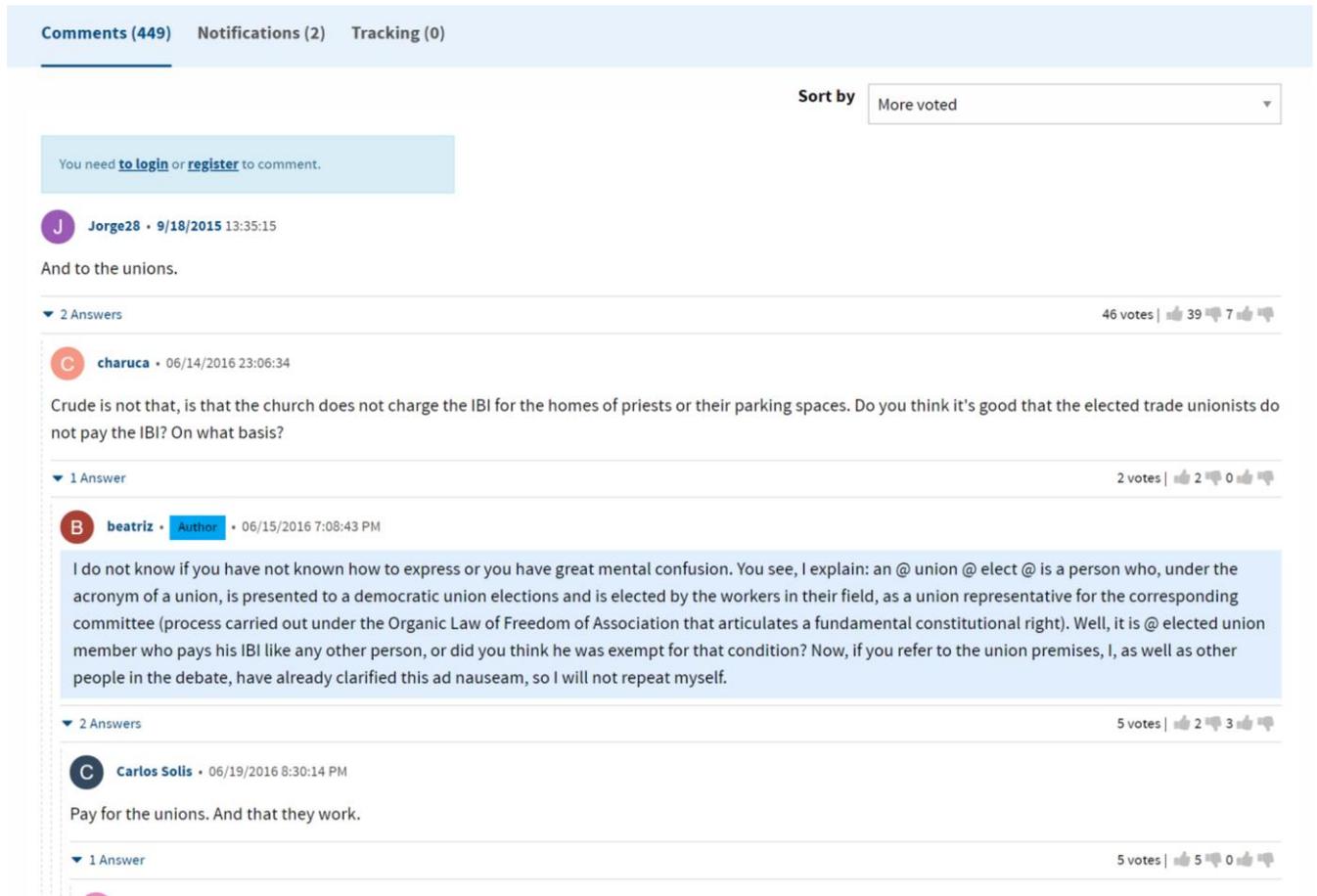
Figure 7: Part of a conversation thread in Decide Madrid related to whether Catholic churches should pay property tax to local authorities (Source:

https://decide.madrid.es/proposals/965-aplicacion-del-ibi-a-los-bienes-inmuebles-de-la-iglesia, access at 31/01/2019)

Understanding empowerment in this particular way, I show how the creation of the participatory calculus can preclude *the ability of empowerment* for individuals, which entails those acts of deliberation, including acts of communicating and commenting, which have been understood by scholars as critical actions to empower users to make rights-claiming statements as digital subjects (Isin and Ruppert, 2015). By critically disclosing what is precluded by the design of vTaiwan and Decide Madrid as a result of their desire to make all actions calculable, I substantiate Amoore's (2013, p.54) unravelling of the 'political effects' of 'partial and incomplete judgement and decisions*'* masquerading beneath the supposedly objective and democratic claims of surveillance technologies. Designing the participatory calculus has political implications on empowerment precisely because it forecloses or restricts the ability of users to deliberate and express themselves with others.

**4.4 (Re)considering ethics in an anticipated democratic future via the situated lens**

In this chapter, I have demonstrated how the situated lens can critically examine the design of two DPPPs by combining an assemblage approach with theories of empowerment; this provides a 'situated' account on the varied networks which bring themselves to bear on the design/articulation of the DPPPs and affect the capacity which individual users have to perform certain practices of empowerment: such as to be able to debate in a meaningful way and make decisions which have a real impact in policymaking. This can be seen through viewing processes inscribed through the design of the DPPPs through what I discern as the common standards for empowerment, with a focus on (1) general issues of political legitimacy; and (2) the ability of an individual citizen to become empowered. These two levels of focus have been seen as constituting the nitty-gritty of democracy by various scholars (Baiocchi and Ganuza, 2014; Fung and Wright, 2001; Isin and Ruppert, 2015). Adhering to these standards, I went 'beneath' the 'solutionist' global narrative espoused by both DPPPs to interrogate the particular arrangements of algorithms (including machine coding), user actions, economic/political resources and attitudes towards various aspects of political communication; these are shown to constitute the particular democratic futures permitted under each platform. I unveiled how such arrangements render a minimal and thin understanding of the future of democracy as majoritarian 'consensus' which is produced on the basis of legitimising calculable user actions of voting, whilst eliminating other user actions, such as deliberating, commenting and communicating. It is important to note that these insufficiencies, which preclude the ability to deepen practices of empowerment, are not easy to detect on the surface, as they are concealed underneath a glamorous and self-celebratory narrative of DPPPs as global solutions to the democratic deficit.

The sense of empowerment specifies that real democracy should entail political legitimacy (defined by sufficient economic and political support) and participatory ability (deliberation and digital acts for political participation) (see Figure 8). The existence of such elements of empowerment is not a binary yes/no; existence is more like a spectrum in which these elements can be present to greater or lesser extents. In other words, the situated lens can uncover how empowerment can exist to varying degrees. It is clear that Decide Madrid has a higher degree of empowerment than vTaiwan, but neither platform can be seen to possess the full range. It is in this sense that I not only problematise the design processes of the two

DPPPs in terms of the empowerment they preclude but also note that their anticipated futures raise important ethical and political concerns.

Figure 8: a table of empowerment assessment

| Dimensions of empowerment | Decide Madrid | VTaiwan |
|---|---|---|
| Economic and political support | 100 million Euro and administrative resources from Madrid City Council; temporary | With limited commitment; temporary |
| Citizens' ability of political participation: acts of deliberation | Replacing with 'voting' | Replacing with 'voting' |
| Citizens' ability of political participation: digital acts of petitioning, organising, recruiting, contributing, campaigning, blogging | Restricting 'proposing' and 'commenting' | Reducing to 'commenting' with a word limit 140 characters, no 'communicating' |

The situated lens also stresses on examining the degree of empowerment for the design processes in the two DPPPS via a comparative approach. Taking a comparative approach offers nuances in the 'situated' understanding of empowerment, in that it highlights the fact that there are *different degrees of empowerment* embedded in the design processes of Decide Madrid and vTaiwan, and that both the creation of participatory calculus and the allocation of political legitimacy are key factors in determining the degree of empowerment for both DPPPs. On one level, a comparative approach indicates the significant role that the existence of medium to long-term economic and political support plays in 'securing' the political legitimacy of empowering practices by showing how the Taiwanese Government and Madrid City Council allocate different political commitment and resources. Madrid City Council guarantees financial security by allocating a 100 million Euro municipal budget and giving

political power into the hands of a simple majority of citizens, in a way which is not possible in vTaiwan. In this sense, Decide Madrid provides a more empowering practice for citizens, as seen by comparing it with vTaiwan, where participants have no guarantee that their comments and decisions have an impact in the policy-making process.

On another level, a comparative approach reveals the crucial role that the creation of participatory calculus plays in determining the capacity of individuals to act in digitally mediated political participation. Section 4.4 illustrates that the decisions made by software engineers and politicians whilst designing a participatory calculus have largely eradicated or reduced users' ability to perform acts of political participation — such as deliberating, petitioning, organising, recruiting, contributing, and campaigning (Isin and Ruppert, 2015, p. 65, 69) — into sets of machine-coded options for voting, algorithmic calculations of voting actions. Of course, there is a difference between Decide Madrid and vTaiwan in how the making of participatory calculus serves to reduce the degree of empowerment for users. Participants in Decide Madrid can 'write' to express themselves and can exchange their ideas with others without much restriction; in comparison, vTaiwan users' ability to express themselves is largely restricted to 140 characters and the ability to communicate with other users is therefore eradicated. Therefore, a comparative approach can highlight the two specific 'factors' (political legitimacy and individual ability of participation) in determining the degree of empowerment for both DDDPs, which are shared and evidenced across two different cultural, political and social contexts.

Whilst the existence of such a commitment in Decide Madrid is a necessary aspect of empowerment, borrowing from assemblage thinking (Anderson and McFarlane, 2011), the situated lens highlights the design processes as *open-ended* and *fluid*. As a result of this fluidity, the impacts of the design assemblage on degrees of empowerment can rise or fall due to the changes within the actors who constitute the design processes or the contexts in which they are situated. Such a situated understanding has two implications for our understanding of DPPP's degrees of empowerment. Firstly, both the Spanish and Taiwanese governments have recently withdrawn their political and economic resources from the design processes and have therefore significantly decreased the degree of user empowerment within the DPPPs (see in Section 4.3.3). Secondly, understanding the design of DPPPs as open-ended processes can offer a way to (re)consider ethics around practices which aim to anticipate certain

democratic futures. How should we conceptualise problems of ethics in the digital age? Indeed, decisions made by software engineers and politicians in arranging and associating machine codes with users' action and claims for democracy have posed ethical-political concern because they attempt to determinate how futures will be 'solved', and because they preclude legitimacy and abilities of empowerment. Can our democratic futures be solved and decided by using a system of voting which relies so much on the concept of the rule of simple majority? Or in vTaiwan's case, will such anticipated futures simply become empty promises from the government, which has not committed to endorsing political power and economic support to legitimate decisions made by users? Recognising these concerns, I propose that the situated lens can provide a way of thinking about such ethical issues.

By viewing the design processes as open-ended, the situated lens recognises the potentialities within the design processes of DPPPs, which are unknown or half-form possibilities that are not fully actualised but are potentially transformative and possibly progressive. Highlighting this potential dimension in the design process can be seen as an ethical response to the creation of algorithmic-driven technologies: this view allows us to take up and assemble half-formed potentialities, unknown futures, into something else. As noted by Amoore (2013, p. 168), an ethical response to the use of algorithms in risk calculus must be able to understand that the calculated possibilities such calculus produces have 'to live with the unknowability of the future' and recognise the partiality in understanding the world as a singular output which is contained within the calculus. What is left 'unscanned', 'unanticipated' or 'understood' by the risk calculus is *the unknown potentiality of futures.* Amoore's focus on of future potentialities enriches a situated account of ethics in that ethics in the digital age should recognise futures as ones whose potentialities lie beyond what can be anticipated by the design of a democratic future by a given DPPP. Only in doing so can we seize and harness unknown futures to produce something more productive and progressive by changing the design processes. What this means for more ethical practice in the design of the two DPPPs is that majoritarian futures must be open to the potential that alternatives might exist which contain greater degrees of empowerment.

Considering the ethics in this way, then, how should we foreground it into action? As a situated lens understands the design of DPPPs as an on-going process which is constituted by human and nonhuman, there is always room for doubting and dissenting the inherent

preclusions within design processes.

Building on Amoore's (2019) work on posthuman ethics in relation to algorithms within the context of surveillance, I explain that the use of a situated lens serves to reiterate that ethics in the digital age should interrogate whether any given subject is permitted to doubt and question the decisions made in the design process which potentially preclude other possibilities of empowerment, with the knowledge that design of any digital technologies cannot anticipate and determine the whole potentiality of our futures. Here, Amoore (2019, p. 3) specifically explains that 'this doubtful subject' is not:

> *a unitary individual, but is a composite subject in whom the doubts of human and non-human beings dwell together, opening onto an undecidable future, where one is permitted to ask new questions on the political landscape.*

What may such a composite subject look like in the context of DPPPs? I have observed negotiations for more inclusive design being conducted between the team of Decide Madrid and participants within Madrid City Council, where dissent against a consensus-based future was expressed by former or current members from vTaiwan team, where software engineers in Pol.is Inc. and Decide Madrid expressed doubt and challenges on decisions that were made by Machine Learning algorithms grouping users. Here, I saw what Amoore (2019) considers as 'doubtful subject' takes on posthuman forms because there was a formation of an 'inquisitive' or 'curious' relationship between participants/software engineers and algorithms. Not only can participants and software engineers doubt the decisions made by participatory calculus, but also (specifically Machine Learning algorithms) can doubt their own decisions on dividing users into Opinion Groups. However, I can foresee that the most critical issue is whether the software engineers or politicians who hold the power to anticipate and determining a future are willing to take negotiations and dissent into serious consideration. For vTaiwan in particular, this process must be more than 'listening' to different ideas but should also produce real opportunities to empower citizens with decision-making power.

Finally, the situated lens shows the importance for researchers to pay attention to the broader political and local context when considering the design of a democratic future. Viewing the design of DPPPs via the situated lens, then, researchers can examine its effect on

empowerment on the basis of how a platform is locally assembled and interpreted by a local government. The situated lens echoes what Kitchin (2017) and Suchman (2007, p. 168) calls researchers to examine the context in which algorithmic technologies are 'interpreted vis-`a-vis the world', where they are designed, perform and operation, preciously because of the heterogeneous nature of algorithmic technologies. Algorithms can do various tasks depends on how they are designed and interpreted in a particular context (Kitchin, 2017). By analysing how DPPPs are designed and given a meaning within its political context, the situated lens again highlights the benefits of using the idea of data assemblage is to really examine the nature of algorithmic systems through its embeddedness with technological, political, social and economic systems (Kitchin, 2017; Kitchin and Lauriault, 2018; Ash, Kitchin and Leszczynski, 2018, p. 37). It is only in doing so that we can see how designing a platform for democracy opens up and closes down possibilities for democratic futures.

# Chapter 5 On the dynamic User Interface: the production of waves of possibilities and limitations in digital empowerment

## 5.1 Introduction

In Chapter 4, I compared how differences in the design processes of the two DPPPs influenced the degree of empowerment they could offer the user, based on my deployment of a situated lens which draws on the concept of participatory democracy (Fung and Wright, 2001; Pateman, 2012; Baiocchi and Ganuza, 2014). I discovered that the participatory calculus in Decide Madrid and vTaiwan largely prelimits digital participatory actions users can perform into: (1) the ability to propose/comment; and (2) the ability of a user to vote on a proposal which has either been inputted into the system from elsewhere or inputted by another user. This participatory calculus has limited the ability of users to be able to deliberate with each other and thus limited the degree of empowerment that the two DPPPs could offer. In this chapter, I explore the effects of the interactions between the user and the digital interfaces of the two platforms, in the context of the aforementioned 'limited' degree of empowerment of the two DPPPs which has already been discovered. It is the interaction between users and the digital interface which constitutes the assemblage that I will investigate here.

A digital interface is the medium through which a user interacts with a computer. It constitutes that which is visible on the screen when a user logs into the platform, and what allows them to perform the various functions of the DPPPs I have described. Rose (2016, p. 314) sees the digital interface as a distinctive and transient entity which cannot be reduced as 'an inert object'. Decide Madrid and vTaiwan both utilise what is known as a dynamic User Interface (dynamic UI). A UI is a digital interface which has been designed to operate through a web browser to allow a user to perform the various functions which each platform possesses, such as proposing, voting or commenting. It is 'dynamic' because the appearance of the UI to a given user is mediated and visualised by algorithms, which interact with user data so that each time the UI appears to the user, it is different from every other time. The appearance of the dynamic UI to the user at any given time has the potential to change due to changes in the user data inputted into the DPPP (levels of support for proposals, for example); therefore, the actions of the user affect the UI, and the UI affects the ability of the user to act. The dynamic nature of the UI of the two DPPPs under study is most interesting from the

point of view of empowerment.

In line with my deployment of a situated lens, I will refer to the user-interface relationship specifically as a *dynamic UI assemblage,* whose visible existence is mutually and dynamically constituted by user practices and algorithms which are located within wider policymaking processes. In doing so, I intend to answer these questions, which have a specific focus on the dynamic UI:

(1)     What are the effects of Decide Madrid and vTaiwan's dynamic UIs on citizen empowerment?

(2)     How do the dynamic UIs of Decide Madrid and vTaiwan differ in terms of potential for citizen empowerment?

Why does emphasising the dynamic UI matter in an examination of how the two DPPPs' impact on citizen empowerment? I argue that studying the particular form the digital interface matters for this form serves to constitute the space where digital political participation takes place. In these cases, the specific form the digital interface takes - a dynamic UI - is particularly of relevance, due to the mediation by algorithms which is integrated into the system. The digital interface has been identified by Ash (2010), Rose (2016) and Ash *et al.* (2018a) as an important space where agencies between the human and the non-human interact and play out. Rose (2016, p. 341-342) channels our attention towards thinking of the interface not only as an 'active' entity in its own right but also as being part of the whole operation of software and as 'part of the human practices that shape and are shaped by engagements with interfaces'. The interface as such:

> *is a transitory pulsing of electrons, temporarily convened on a phone*
> *screen, a consequence of relations between and among hardware, software*
> *and practices, showing a few of millions of other messages and snaps that*
> *reside on Twitter's servers* (Rose, 2016, p. 341).

From here, it is evident that the digital interface matters for it is both an assemblage of human-software in its own right and is also part of the wider assemblage of the digital ecosystem. We need to avoid viewing a digital interface as a fixed entity which does not have any impact on my assessment of empowerment and of assuming the digital interface is a

stable object which 'plays by the rules' that were programmed and designed by software engineers. In order not to fall into this way of thinking about the digital interface, we must find ways of uncovering how the interactions between the interface and users serve to both enable and restrain certain user capacities related to empowerment.

Building upon Rose's (2016, p. 324) definition of a digital interface, the situated lens sees the UI as a dynamic UI assemblage which is defined as co-generating and co-functioning both users' actions and algorithmic visualisations within a given political context. Both algorithms and users can destabilise or reinforce the ways in which *the visual existence of a UI* plays out in terms of the experience of a specific user. This understanding of digital interface as a UI assemblage is important for my assessment of the two DPPPs' effects on empowerment because the dynamic nature of the UI assemblages used by the DPPPs may have a new and significant implication in our understanding of digital empowerment. It is even more crucial due to the theoretical and empirical contributions this idea of dynamic UI assemblage can make to current understandings of digital political participation. As Isin and Ruppert (2015, pp. 81–84) point out, there is very little social research investigating political perspectives on digital participation which does not reduce users to a fixed set of participatory skills and capacities, such as those which are set out in the discourse of digital divide/inclusion (Mossberger, Tolbert and McNeal, 2008; Isin and Ruppert, 2015, pp. 81–84). By integrating an understanding of the role of unexpected effects stemming from interactions between users and algorithms, the concept of dynamic UI assemblage also avoids a *reductive* analysis of participants as passive users whose behaviours and identities are controlled by algorithms (Lash, 2007; Cheney-Lippold, 2011).

Considering digital interface as dynamic UI assemblage, then, can we make any claims about how it should be viewed in terms of ability to provide digital empowerment? Following the situated lens, I define digital empowerment as an enabling environment where users feel engaged and capable of making informed actions of political participation, namely voting, proposing and commenting (which have been predefined within the design processes of the two DPPPs). That is to say, digital empowerment is not only about users' participatory capacities to conduct whichever political actions are granted to them by designers and policymakers, but is also about their 'feelings' and whether they take consideration of relevant information when voting, proposing and commenting (Mäkinen, 2006; Fung and

Wright, 2001; Fisher, 2012). I have developed this specific definition of digital empowerment from theories of (digital) empowerment (Mäkinen, 2006; Fung and Wright, 2001; Fisher, 2012; Barry, 2001). First, developing a sense of engagement amongst users is regarded by Mäkinen (2006) and Fisher (2012) as a staple in increasing the degree of (digital) empowerment. In an early investigation of the impact of digital technology on empowerment in Finland, Mäkinen (2006) noted that by feeling part of the wider community or society, users can increase their motivation to take part in political and other forms of social participation. Fisher (2012) also illustrates that when it comes to developing more empowered practices of political participation, having a sense of engagement is even more crucial than having a strong participatory capacity because it is more difficult to motivate users to participate in digital political participation (for a lot of hidden costs) than to build their participatory capacity.

Apart from a sense of engagement and motivation, having a capacity to learn and make an informed and collective decision-making is another important pillar for empowerment. In developing the idea of 'empowered participatory governance', we can see both Fisher (2012) and Fung and Wright (2001) note that learning to be able to communicate and deliberate are key factors for citizen empowerment. In particular, Fung and Wright (2001) highlight the central role of collective feeling when it comes to making a decision (voting) in political participation. They claim that empowered political participation requires that participants are able to make 'collective' decisions between alternative projects through voting; a collective decision is one which does not just revolve around consideration of self-interest but also around having considered the 'reasonableness, fairness, or acceptability' of other options (Fung, and Wright, 2001, p. 20). Though he does not explicitly mention political activity, in exploring the empowering effect of using interactive devices in museums, Andrew Barry (2001) proposes that citizens are likely to learn how to participate and be empowered as subjects through using and interacting with digital systems. He describes how such empowered subjects are not disciplined by technology but are enabled to co-produce new ideas and thoughts through interactivities with digital devices (Barry, 2001, pp. 129, 136, 151).

To recap, within the goals and confines of the two DPPPs as sites for providing the ability to conduct digital political participation (as in voting, commenting/proposing), I see the concept

of empowerment as an enabling situation in which participants can feel a sense of engagement and learn to make collective actions, such as proposing and voting, which take into consideration information which has been provided to them about the feelings of other users through the interaction of users and the digital interface. As we are going to see in the following sections, I will stress the importance of understanding how unexpected actions of users and algorithms can play a role in influencing UI assemblages. I argue that the dynamic UIs of the two DPPPs produce a fluid and changeable situation in which new possibilities for digital empowerment are being produced whilst others are becoming constrained. In one sense, the dynamic UI can offer new possibilities of empowerment by *enabling* users to feel part of an online participatory community and to learn to make informed and collective decisions on voting and proposing/commenting. On the other hand, in other instances the dynamic UI can introduce limitations on empowerment by disabling and depriving users' capacity to vote and propose/comment. To put it simply, my focus on the dynamic UI as an assemblage of co-actions of users and algorithms located in wider political contexts shows the potent implications for empowerment that a digital interface can provide within the context of digital political participation.

To elaborate my argument with a detailed analysis on the effects of the dynamic UI on empowerment, I will use the analytical devices of 'thresholds' and 'barriers', which I borrow from Ash *et al.* (2018a)'s analysis of interface design in an online credit system. Ash *et al.* (2018a, pp. 1138, 1140) describe how the interface design 'modulates' users' behaviour and emotion by mitigating frictions (emerging emotional or technical obstacles) in ways which allow users to apply for a loan in an interface of an online credit system. Importantly, these analytical devices allow me to illustrate the ways in which the dynamic UI enables and disables user actions (and thus empowerment) in digital political participation. I use the term 'thresholds' to denote how the dynamic UI enables users to feel engaged, motivated, and reflective in conducting digital acts of political participation and thus open up possibilities in digital empowerment. I use the term 'barriers' to indicate limitations that the dynamic UI places on empowerment. The word 'barriers' suggests a 'hostile' situation in which the dynamic UI in some way confuses or disables users' participatory capacities, generally seen in these cases as the ability to vote and comment/propose. These barriers are referred by Ash *et al.'s* (2018a, p. 1138) as 'frictions*'*, which are defined as:

> *a series of bodily and technical obstacles or hesitancies that…..**stop a user***

*from completing a task within a digital interface,* such as choosing a service or buying a product [highlighted by myself].

Additionally, I will note that the dynamic UI assemblage can impose a further limit on digital empowerment because the 'participatory power' of a given user — seen as the ability of a user to make decisions which can have a real impact in policymaking — is *unevenly* distributed amongst all users. I will describe how this unevenly distributed participatory power amongst users results in the favouring of small groups of powerful users, which I will term 'princelings'. What this power imbalance indicates is a basic inequality in users' participatory knowledge and capacity to take part in digital political participation. This shows a further limitation of the dynamic UI assemblage in terms of digital empowerment.

I now outline how I am going to develop my argument in this chapter. In Section 5.2, I will illustrate how the dynamic UI design of Decide Madrid acts to create *barriers* which reduce users' capacity to vote and propose and to produce *soft thresholds* (Ash *et al.,* 2018a) which highlight suggested information which enables users' capacity to make informed and collective decisions in voting and proposing. In Section 5.3, moving to the dynamic UI of vTaiwan, I will offer a detailed illustration of how vTaiwan's UI manifests effects of *gamification* (Hassan, 2017) to increase users' sense of engagement and thus conduct collective and informed actions of 'voting' and 'commenting'. However, at the same time as this both of the dynamic UIs also produce *barriers* which confuse and disable users' capacity to vote and comment. In Section 5.4, I disclose how the 'participatory power' of individual users is not evenly distributed, meaningful more powerful users emerge known as 'princelings'. Last but not least, this chapter concludes by identifying the implications of the dynamic UI assemblage of the two DPPPs for digital empowerment and discusses how understanding this better can make an important theoretical contribution to recent understandings of digital (political) participation.

## 5.2 Decide Madrid's dynamic UI

This section aims to explore the ways in which Decide Madrid's dynamic UI enables and disables users' capacities to vote and propose and thus both creates and limits possibilities for

empowerment. By using the analytical devices of 'soft thresholds', I am able to detail how the dynamic UI indicates a possibility of digital empowerment for users by gently guiding and informing them whilst they are conducting collective actions (making proposals). The soft threshold connotes a 'double management' (Ash *et al.*, 2018a, p. 1141) of users, encouraging users to continue to make an informed decision in digital political participation in terms of 'what to propose'. Firstly, the dynamic UI encourages users to *continue* to conduct an informed action of voting and proposing. Secondly, the dynamic UI purposefully *pauses* and informs users with other similar proposals in ways to make *an informed action* in writing proposals.

Whilst the dynamic UI offers potential to empower the user, it also has the potential to constrain their digital empowerment through the creation of *'barriers',* where the dynamic UI does not work to guide users but rather becomes a technical/emotional obstacle to the ability of users to conduct important practices of empowerment such as voting and proposing. Describing the consequences of the existence of such barriers is important as they appear in both the interface of Decide Madrid and vTaiwan, serving to confuse and disengage the user; however in each case the specific nature of the barriers differs.

5.2.1 Soft thresholds: making a collective proposal

This section will employ the analytical device of 'thresholds', taken from Ash *et al.*'s (2018a); it will emphasise how the UI design in Decide Madrid creates *soft thresholds* which can potentially offer a possibility of digital empowerment through encouraging users to make an informed action in writing a new citizen proposal. It will describe how Decide Madrid's UI design attempts to mitigate frictions — obstacles obstructing a user's ability to navigate the interface — through the soft threshold of an automatic suggestion function designed to reduce the chance of very similar/repeated proposals appearing to the user within the interface. This effect of a soft threshold on users is called by Ash *et al.* (2018a, p. 1140) as 'double management'. A soft threshold not only pauses and gives users specific information but also 'encourage[s] the user to cross or move beyond' (Ash *et al.*, 2018a, p. 1141).

The need of a user to navigate her way through highly repetitive comments and proposals has

been seen as an important aspect in digital political participation, and this is not limited to the two DPPPs under study. In a similar vein to vTaiwan-Pol.is and Decide Madrid, Farina et al. (2011) analysed online participation in the USA and found that there were

> *hundreds of thousands of duplicate and near-duplicate "e-postcards" that express passionate support or opposition, and not much more – [which] have become the poster child for public participation that completely misses the point of the process* (Farina et al., 2011, p. 417)*.*

For the various groups I spoke to, including researchers (Farina et al. (2011), politicians (interview with Felicity) and practitioners (interview with Bryon and Matthew), this situation of unnecessary duplication was seen as not at all helpful for progressing the participatory process, not only because of their duplicated contents but also because of their generally highly-emotive nature.

In the digital participatory process, users of Decide Madrid have tended to write new proposals with the same or similar content to other existing proposals. In a presentation entitled 'constructing collaborative communities' for Decide Madrid, Saulière *et al.* (2018a) argue that the highly repetitive nature of citizen proposals produces unnecessary competition and frustration between citizen proposals:

> *....the participation is given individually, uninformed and fragmented; hindering the operation of the mechanism. The participants are shown to be unmotivated due to the perception that their proposals generate no change and **frustrated by the amount of duplicate content** and the difficulty of adding knowledge....*[highlighted by myself] [no page indicated in the presentation].

The high rate of repetition can be also found by looking at data on the 2016 participatory budget process, where a large percentage of proposals shared the same descriptions of Madrid City. Almost one-fifth of proposals were about public libraries and cultural centres; one-tenth were about proposals for bike lanes, one-tenth were proposals for sport centres; one-tenth of proposals were for green energy and spaces, and almost one-tenth of proposals were for pedestrian pavements (Decide Madrid, no date).

To mitigate this friction, the designers of Decide Madrid purposefully designed an automatic suggestion function whereby 'similar proposals' which already existed would be highlighted by search algorithms to a user who was in the process of writing a new proposal. Mike,[26] a key advisor for Decide Madrid platform, described the 'similar proposals' auto-suggestion feature to me:

> *from the very beginning the platform [searching algorithms] tells you these five...other proposals that have similar titles to your proposal...and then it already shows you what other people write similar things... why don't you take it into consideration.*

## Create a proposal

**How do citizen proposals work?**

**Title of the proposal**

ciudadana

There are proposals with the term 'citizen', you can participate in them instead of opening a new one.

- Open cultural spaces to citizen proposals
- Phone 010 free citizen attention
- Allow to vote against in the citizen proposals
- Civic education
- Citizen education in street cleaning

You are viewing 5 of 3174 proposals that contain the term 'citizen' View all

Figure 9: the automatic suggestion function which highlights 'similar proposals' (source: https://decide.madrid.es/proposals/new, access at 03/03/2019)

What Mike describes is that when participants type in a potential title for their proposals, a search algorithm will automatically look for proposals using similar wording and highlight them to users via its interface. As a result, other proposals made by participants who share similar keywords will come into view, as shown in Figure 9. When a user types a word, such as *ciudadana* ('citizen' in English) in her citizen proposal, the search algorithm will

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[26] Interview at 05/07/2018

automatically suggest other proposals which share the keyword 'citizen'. This automatic suggestion interrupts a user when they are writing a proposal by visualising other similar proposals. Users are *paused* at this moment to consider similar proposals through the automatic reminder made by a search algorithm before they decide to continue writing their proposals. This automatic suggestion is reminiscent of what Ash *et al.* (2018a, pp. 1143, 1144) describe as 'the slider threshold', which intend to slow down and open up the process of loan applications by allowing the applicant to experiment and play with different schemes whilst showing the interest rate and maximum loan. In Decide Madrid, the function of automatic suggestion works as a *soft threshold* which carves out time and space for users to propose a new idea without repeating the same ideas which have been addressed in existing proposals (for Decide Madrid).

Importantly, this automatic suggestion is not intended to discourage users from completing their proposals. It is to suggest and guide users to write a new proposal without duplicating content which already exists. In doing so, this automatic suggestion attempts to mitigate the friction of repeated citizen proposals.

I stress that through the creation of this soft threshold the dynamic UI can produce new possibilities for digital empowerment; this is because by highlighting the existence of similar content already inputted by other users, it encourages a user to make an *informed action* in creating a new citizen proposal. The dynamic UI creates a *'nudging'* effect on users by redirecting the attention of users to similar proposals. Understanding of nudging effects, originally derived from studies of behavioural economics, have been employed via ideas of 'digital nudging' to explain how interface design can influence users' behaviour and decision-making actions in predictable manners in crowdfunding websites (Schneider, Weinmann and Brocke, forthcoming). In the context of DPPPs, similar 'nudging' effects can be seen in the dynamic UI of Decide Madrid, where a soft threshold is introduced to *remind and inform* users to make proposals collectively. This soft threshold not only *stops* users from writing a proposal individually in the course of participation but also ultimately *guides* users to propose *a collective proposal* which has considers other similar proposals at sight.

5.2.2 Barriers in digital empowerment: feelings of disengagement and frustration

I will use examples from Decide Madrid to illustrate how the design of its dynamic UI can create implications for digital empowerment, due to the ability of the interface to hinder a users' capacity to vote and propose. The UI design of Decide Madrid frustrates or confuses a large number of users due to a convoluted participatory process and the use of difficult-to-grasp terminologies. Due to the convoluted interface design, many users cannot work out how to propose a citizen proposal in way which locates it within the right participatory processes; in addition, they cannot understand how to comment or vote on other users' proposals. I describe convoluted interface design as a 'barrier' to digital empowerment which results in users becoming disengaged and frustrated.

The overly-convoluted design of Decide Madrid UI

The overly-convoluted design of UI in Decide Madrid acts as a *barrier* in digital empowerment because users are deprived of the participatory capacities of voting and proposing that were formally granted to them in the design process. As specified in a usability report conducted by Torresburriel Estudio in September 2017, Decide Madrid suffers from a convoluted interface where users might require additional instructions or technical guidance to help them to participate. The report points out that:

> *users perceive a certain complexity on the web and it is an aspect that must be taken into account, and that users consider the web to be somewhat complex in its usage…and that users perceive insecurity (with doubts) in the management of the web* (Torresburriel Estudio, 2017a, p. 1).

This example shows that the dynamic UI of Decide Madrid is too complicated for users to understand how to practice their capacity in terms of voting and proposing in in a right participatory process. Another usability report, written by Torresburriel Estudio, also indicates that the key terms for different participatory processes are not easily-distinguishable in the interface. It indicates that:

> *the vast majority of users selected for the test did not distinguish between 'debate' and 'proposal', being equivalent terms for debate process and citizen proposal process. In addition, other terms like 'expense project'*

*were also not all clear, since many users do not linked to participatory budgets* (Torresburriel Estudio, 2017b, p. 7).

What this report points out is that there are too many participatory processes with very similar names going on within Decide Madrid's interface. The expression of each participatory process is not distinguishable to a casual user engaging with the UI. For instance, the section name of the specific participatory budgeting projects is 'expense project' ('*proyecto de gasto*' in Spanish) in the interface, which a large number of users find difficult to link to the term 'participatory budget process' ('*Presupuestos Participativos*' in Spanish), which is the name of the wider process which the expense projects are a part of. Also, many users find it difficult to differentiate 'citizen proposals' from 'debates' ('*propuestas*', '*debates*' in Spanish). These terms and expressions which are applied by Decide Madrid to participatory processes serve to confuse users rather than to shed light on what participatory processes are available. In addition, the usability report published by Torresburriel Estudio (2017b, p.16) also points out that the button of 'create a proposal' is buried alongside other functions at the right-hand side in the UI of Decide Madrid, which makes it less visible to some users (see Figure 10).
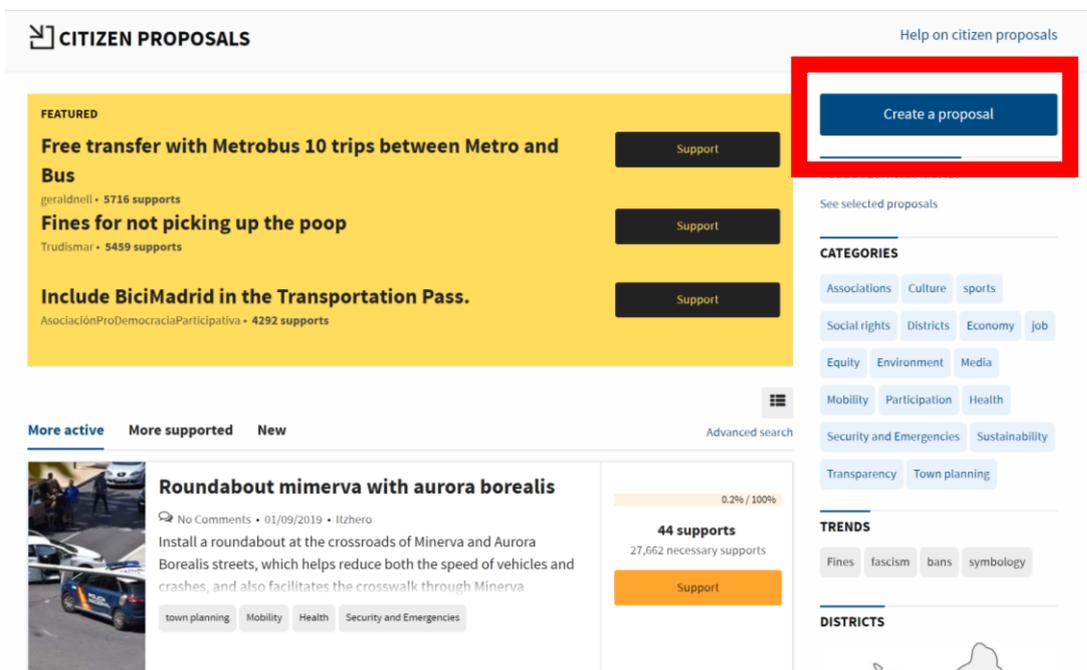


Figure 10: This screenshot of Decide Madrid indicates that the button of 'create a proposal' is not visible enough for users, highlighted and modified in a red frame by myself (source: https://decide.madrid.es/proposals, access at 01/09/2019)

These reports show that the over-convoluted UI of Decide Madrid has become a barrier for users which has to be 'overcome' to complete actions of political participation such as creating a participatory budget proposal. When I was observing and taking notes during the usability test of Decide Madrid in Madrid City Council, one of the tasks for users was to propose a participatory budget proposal. I saw that six out ten users were confused by the difference between a citizen proposal ('*una propuesta*' in Spanish) and a participatory budget project ('*un proyecto para los nuevos presupuestos participativos*' in Spanish). They got lost in the UI and struggled to find the right place to propose a participatory budget proposal. After working on the problem for a while, two of them were still unable to create a participatory budget proposal. This observation from the usability test is in consistent with the report 'Digital Analysis of Decide Madrid' which suggests that a large number of participants might not know there are two *different* participatory processes: the citizen proposal process and the participatory budget process (Saulière and Díez Escudero, Rebeca Abellán, 2018b, p. 12):

> *only 2% (262) of the users who have made a citizen proposal have also made a proposal in participatory budgets. This may mean that the users who take part in citizen proposals do not know about the existence of participatory budgets, that they do not understand the dynamics of the different mechanisms of Decide Madrid, or that there is greater accessibility which makes citizen proposals easier for users to propose a project than the participatory budget.*

The over-convoluted design can also lead to a reduction in the number of users taking part in digital political participation. A report written by Participa Lab indicates that *very few* participants took part in writing proposals in the process of the participatory budget in comparison to the process of citizen proposal in both 2016 and 2017 (Saulière andDíez Escudero, Rebeca Abellán, 2018b, pp. 10–11). In 2016, 479 users wrote one or more than one proposal in the process of participatory budget; however, 4952 users wrote one or more than one proposal in via the citizen proposal function. In 2017, 438 users wrote one or more than one proposal in the participatory budget process, yet 4818 users wrote one or more than one proposal in the citizen proposal process. Importantly, this gap of the number of users between two participatory processes suggests a reduction in the number of users taking part in the participatory budget process.

I highlight that these examples show that UI design can work to add *'barriers'* to digital empowerment because a large percentage of users are not only deprived of their capacity in voting and proposing via the interface, but also develop feelings of frustration and disengagement.

*The most active ranking algorithms*

Looking at the example of Decide Madrid's 'most active' ranking algorithms shows how the design of UI has set up barriers to digital empowerment, in terms of contributing towards the likelihood of a user becoming disengaged and discouraged from voting. Replicated from those used within the Reddit website (an online forum), these ranking algorithms were designed to ascertain 'hot' citizen proposals (those have obtained the highest amount of supports from users) in an attempt to keep Decide Madrid users interested in evaluating and proposing. However, in practice, this use of ranking algorithms within the UI discourages users from conducting more evaluation on citizen proposals because ranking algorithms do not select the 'hottest' proposals but only the most 'recent' proposals.

It is clear that the 'most active' ranking algorithms were intended by design to show the 'hottest' citizen proposals to users: they are literally named as 'hot_score' in the Decide Madrid source code (available on Github[27]). Here, the 'hottest' citizen proposals refer to proposals which are both new and highly supported by users. Mike, a key actor in Decide Madrid, describes how these ranking algorithms can sort out and visualise the most important citizen proposals from thousands of other proposals on the UI. Mike notes that the algorithms are very important for they sort out and visualise the 'hottest' citizen proposals on the UI for users and thus keep them engaged whilst evaluating citizen proposals. In Mike's words:

> *the active [the most active ranking algorithms sorted] proposal is very*
> *important. Since we have thousands of proposals the first one you show in*
> *the list is going to have more attention and more likelihood getting*
> *supported and so on. And you have to choose which one you are showing of*

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[27]

https://github.com/consul/consul/commit/ef835bef1c803170091e99cd19a448149ffe43ae#diff-f6bf9b67a80a3607668a4df3f12e4498, access at 30/09/2019

*course you can choose like this general orders in like top support or the new ones but they are not very efficient because the new ones show contents that could be not interesting at all that just being created…. The [most active ranking] algorithms that we have now has too much weigh on new things…..*[28]

What Mike emphasises in the interview is that the 'most active' ranking algorithms do not work properly in selecting and visualising the hottest citizen proposals within the Decide Madrid's UI, because what this UI shows to the user are not the 'hottest' but merely the most recent citizen proposals. Such dynamic visualisation within the UI does not serve to keep users in a state of engagement where they feel interested in conducting more evaluation. Similar to the previous example, this feature of the UI becomes a *barrier* for users to continue to take part in digital political participation because it does not really sort out what Mike describes as 'both new and popular' citizen proposals which can encourage users to continuously vote on proposals.

Taken together, I employ these two examples — the most active ranking algorithms and the convoluted design — to account for the moments when the UI design functions as a barrier to digital political participation, either by interrupting or discouraging users from conducting or completing actions of political participation. The existence of barriers signifies a particular form of discontinuity through which the interface design discourages users from further engagement with the interface. The existence of barriers also shows that there are more moments when the interface of Decide Madrid *does not* guide users to complete their actions of political participation on a continuous basis. The existence of barriers is described by Ash *et al*. (2018a, p. 1142), who state that when interface design

> *Fail[s] to manage these frictions…the necessary transitions are not made and the threshold disappears. In this case, the user may hesitate to apply or not apply [the loan application] at all.*

The existence of barriers highlights the important implications that UI design has for actual

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practices of digital political participation within Decide Madrid, because the UI is a key site for users to learn and practice their capacity in digital political participation. UI design can impose a critical limitation in digital empowerment precisely because users get lost, feel frustrated and disengaged in the process of digital political participation and do not wish to further conduct actions of political participation. For instance, since the establishment of Decide Madrid platform in 2016, there have been only three citizen proposals achieving more than 1% support of the whole population in Madrid. Also, the report 'Digital Analysis of Decide Madrid'(Saulière and Díez Escudero, Rebeca Abellán, 2018b, p. 28) indicates that there was a significant lack of evaluating action in citizen proposal process during 2016-17:

> *73% of the citizen proposals do not reach 100 votes and 99% do not reach 1,000 votes. Only 4 citizen proposals have reached more than 50% of the votes that are needed [50% out of 27662 votes].*

Considering how the process UI design sets up such barriers for users to take part in digital political participation, I argue it does not necessarily offer a 'definite' possibility for empowering users as it does not offer a stable enabling environment where users can act as a subject in practice their political participation. Rather, it enables an uncertain, 'vacillating' space in which users both experience being disabled and enabled depending on the particular alignments of software designers, users and algorithms which exist at a given period; this produces a cycle of possibilities and limitations.

**5.3 vTaiwan's gamified UI**

In this section, I use the dynamic UI in vTaiwan as an example of how a *highly* dynamic UI, due to its deployment of Machine Learning algorithms, can create *a fluid situation* where on the one hand new possibilities for digital empowerment exists but on the other hand, these co-exist alongside significant limitations on empowerment. We could also describe this situation as volatile*:* VTaiwan's UI can both *enable* users to feel a sense of engagement and make an informed action of voting and *disable* users from practising their capacities in 'proposing' and 'voting'. On one level, vTaiwan's dynamic UI opens up new possibilities in digital empowerment as users can make an informed and collective action of voting and commenting whilst considering other users' opinions, and can feel a sense of collective engagement as part of the 'community'. VTaiwan's UI suggests and encourages users to keep

up evaluating or/and writing comments and to think and act through different opinions. On another level, the same UI is likely to disable users from 'commenting' and 'voting' by generating glitchy and inconsistent information set for a user to view. It, therefore, restricts the ability of a user to conduct their collective and informed actions in digital political participation.

As I will explain, in contrast to Decide Madrid, vTaiwan's interface is less stable which makes it more prone to glitches yet also offers distinct additional possibilities for political participation: these involve creating a sense of engagement and providing information on the different Opinion Groups relevant to the topic under discussion. Both a sense of engagement and the ability to easily obtain relevant information has been considered as effects of the 'gamification' of political participation (Hassan, 2017; Sgueo, 2017). Despite no agreement on what elements can be considered as 'gaming', gamification is broadly conceived as 'the use of elements taken from video games in the design of no-gaming platforms, to increase user engagement and to enhance the user experience' (Hassan, 2017, p. 252) under the context of policy-making and civic engagement platforms.

5.3.1 How gamification can provide a better sense of engagement and encourage collective action

The dynamic UI of vTaiwan offers a new possibility of digital empowerment by crafting a sense of engagement for users as part of the online participatory community. Digital empowerment, as I have defined in Section 5.1, is an enabling situation where users feel engaged as part of the online participatory community and thus motivated to make a collective action in voting and proposing. Here, it is because of the 'gamified' effects of vTaiwan's UI that enables users to feel a sense of engagement. and motivated towards taking part in political participation. These gamified effects are what Hassen (2017, p. 249) terms as 'a utilisation of motivational affordance'.

For the software engineers of Pol.is Inc. and civic hackers who employ Pol.is in vTaiwan platform, the idea of creating a sense of engagement through introducing elements of 'playfulness' into the UI design was seen as being particularly important in terms of

encouraging digital political participation. Felicity[29], a key civic hacker in vTaiwan, claimed that vTaiwan's UI is a game-changer in digital political participation because it turns political participation which is often perceived as 'boring' or 'serious' into something fun, engaging and playful. In her own words:

> *When you have thousands of people with more than a hundred comments, if you don't use this visualisation method, no one would be patient enough to view all of comments. [Question: Do you think Pol.is has possibly changed the way that public participation conducts] It just to save time, to make it fun and playful….it is not fun if you need to read like 5000 comments.*

What Felicity claims is that the vTaiwan's dynamic UI can create a sense of playfulness and engagement for users. But how does the dynamic UI create a sense of engagement? How does it make users feel as if they are 'gamified'? The dynamic UI emphasises where a user stands in relation to other users as different 'Opinion Groups' (see Figure 11). A user is converted into a 'moveable' picture-icon (known as an 'avatar') sitting within a particular Opinion Group. Software engineers in Pol.is explained to me that the interface deliberately visualises a photo of the user and their friends or politicians to create a particular sense of engagement, a sense of gamification. Users can see their own position as a moveable avatar in an Opinion Group, located in relation to other users who they are related to or know in everyday life (friends, politicians) in the same or different Opinion Group. Users can see themselves moving from one Opinion Group to another remaining in the same Opinion Group throughout sequential actions of evaluating or writing comments.

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[29] Interview on 05/01/2018
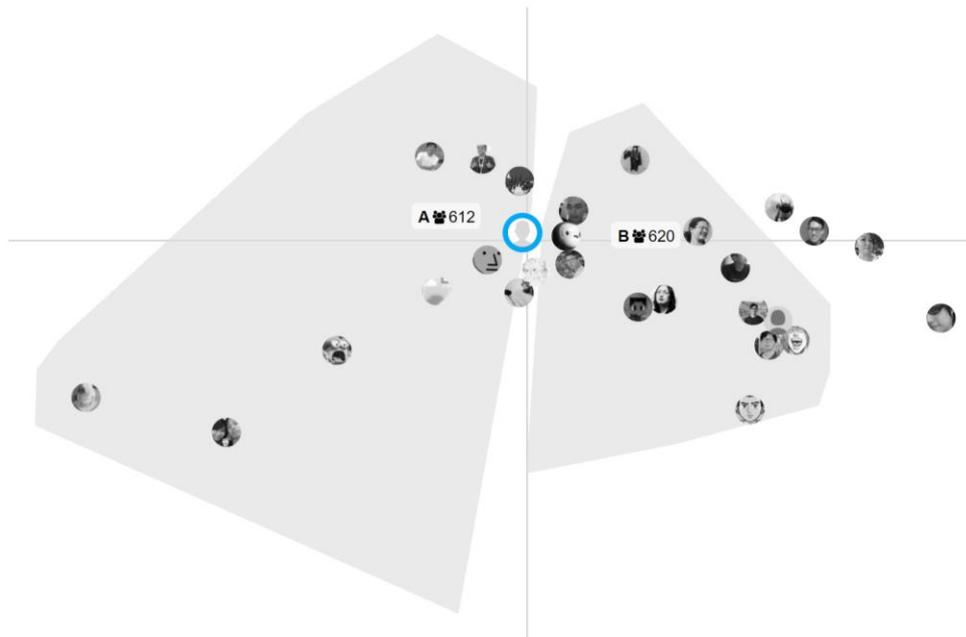
Figure 11: an example of 'avatars' (see photo-icons in the Opinion Groups) in vTaiwan-Pol.is' dynamic UI (Source: a screengrab from the vTaiwan platform)

Chandler[30], a software engineer in Pol.is Inc., explains that visualising an image of users is a classic engagement tool, which aims to create a sense of engagement: without having to provide a lot of explanation to a user, users can understand their position relative to other people's opinions by visualising Opinion Groups within the interface, which will encourage them to vote more. In his own description:

> *if we show the profile images then you will be able to see there are people not just to sort like interpret that somewhere…[talking about if there is no such visualisation]. Putting people's images in there it went from people being able to get it when you took a minute to explain it to them to **people just instantly vote on few comments and they see their twitter images showing up** and that's where I am in the conversation and where the [other] people are. It went from leading explanation to something just happen (highlighted by myself).*

For Chandler, the existence of a visualised interface was key to providing users with a sense

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of engagement, where users 'intuitively' find themselves part of the online participatory community in relation with their friends or public figures. As a result of gamification, he claimed that users are more likely to continue to submit and votes on more comments.

The claim from Chandler that the visualised interface of vTaiwan can *create a sense of engagement* by encouraging users to evaluate or write more comments was further evidenced by an experiment in Taipei City which Diana[31], a consultant at Pol.is Inc, told me about in an interview. She described how she went to Taipei City to interview users who took part in the experiment. During the experiment, she said users were given two interfaces: one with visualisation and one without visualisation. She pointed out that the visualised interface made users vote or comment more (which she describes as 'more interaction' indicated in the quote) and she very much preferred the visualised interface because

> *it gives the participants a sense of participation, more interaction so that changes the experience of participants….. I like, I very much prefer the opinion group visualisation, I do feel like it gives people a sense of participation [engagement].*

This example shows how the dynamic UI can encourage users to evaluate more comments via gamification effects. As Hassen (2017, p. 259) notes, one of the key effects of gamified civic engagement is to positively motivate users to become active participants. It is in this sense I argue that vTaiwan's UI opens up a new possibility of digital empowerment because users are potentially feeling a sense of engagement and thus are encouraged to keep up evaluating more comments. As Fisher (2012) and Mäkinen (2006) remind us, a sense of engagement plays a key role in digital empowerment for it can motivate users to take part in (digital) political participation. They highlight that feeling engaged as part of a wider community is more important than having the 'right' set of participatory capacity. In particular, Fisher (2012, p. 459) mentioned the less-educated citizens are highly engaged in a participatory budgeting project which was conducted in Proto Alegre.

However, this example only explains part of the effects of gamification within vTaiwan's

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dynamic UI; it can also inform and urge users to reflect upon specific information in terms of the visibility of different Opinion Groups related to the issue under discussion. Users can see different viewpoints towards a given issue, which can possibly aid them in reflecting upon their opinion. Hassen (2017, p. 260) explains this particular gamified effect as 'the provision of information related to real-life concerns' which encourages users to reflect upon their own experiences and opinions.

By dynamically visualising changing attitudes towards different ideas via the interaction between user data and the algorithms within the UI, vTaiwan encourages users to think through different ideas rather than working out stances on complex issues by themselves. This UI effect is considered by both my contact Felicity and theorists of participatory democracy (Fung and Wright, 2001) as a key staple in creating empowerment within (digital) political participation. For Felicity, it is important for users to understand and reflect upon 'both sides' of the topic in discussion. Felicity pointed out to me that often people are entrenched to their own 'comfort zones' without being aware of different opinions.

Chandler[32], the software engineer from Pol.is Inc., Pol.is visualises 'people who are on both sides of the process [of participation]'. For him, the key message of a visualised interface which changes due to incoming user data is that it is 'making it possible to listen to lots of people and really digest and synthesise what it is they are thinking and saying'. He notes that by singling out and visualising different voices as 'Common Opinions' from different 'Opinion Groups' in the interface, Pol.is is doing something that social media does not. He unpacks this statement in detail:

> *Internet and social media make it possible for people to say loads of stuff and now they make it possible for someone to become well-known for that…but without the ability to take a step back and look at that big-picture and really see how contextually really things fit together. You just lost in the sea …and we recognise the 'tech' that makes it possible again for lots people say lots of stuff but not for us to listen to people saying lots of stuff and that was really the part we start to change. To make people aware of other people.*

By visualising and showing different viewpoints, the dynamic UI in vTaiwan presents a type of discontinuity; it holds users *at a pause* which makes them think about ideas and opinions in digital political participation which have been submitted by people with different ideas from themselves. When writing or evaluating a comment, users are interrupted by *different* Common Opinions across and within Opinion Groups that are popping up and visualised in the UI. These visualisations of opinion are able to change dynamically as more user data is inputted into the system. This effect of the UI is also addressed by Simon *et al.* (2017) in their report 'Digital Democracy'. They point out that the visualised interface provides a possibility for users who share the similar opinion to become aware of themselves in relation to other Opinion Groups (Simon *et al.,* 2017, p. 41). They note that this possibility is very different from a traditional forum, which only rewards the most 'liked' opinion (Simon *et al.*, 2017, p. 41).

Importantly, the dynamic UI in vTaiwan offers a new possibility for increasing citizen empowerment as it means that users may not just vote in terms of their individual interest but for what is sensible and reasonable within the whole online participatory community. Fung and Wright (2001) have highlighted that the ability of a group to vote collectively or make a collective decision which goes beyond reflecting the interests of the individuals who take part in the vote plays a significant role in delivering empowered political participation. Here, the difference is that vTaiwan's UI does not create the same enabling environment as what is made possible within a physical venue for deliberation; this is because users have already been deprived of the capacity to deliberate in this way due to limitations imposed during the design process of vTaiwan (see details in Section 4.4.1).

To sum up, as I have shown in this section, vTaiwan's UI suggests *new possibilities for digital empowerment* because it creates pathways which enable users to feel engaged and act (vote/comment) collectively through considering different ideas in the process of digital political participation, Firstly, by offering a sense of engagement for users, users 'feel' more motivated to take part in digital political participation because they want to know which Opinion Groups they belong to in relation to other participants. Willingness and motivation to participate in political participation has been regarded as a key pillar in increasing citizen empowerment. In Mäkinen's (2006) elaboration of 'digital empowerment', she notes that it is

important for citizens to feel included and have a feeling of belonging because they are more likely to participate and make collective actions in political or social activities. In a similar view to Mäkinen (2006), Fischer (2012) points out that increasing the motivation of citizens to conduct political participation is more important than being capable to participate in itself. This constitutes what he calls as 'empowered participatory governance'.

Secondly, by providing the ability to view different ideas and see how opinions on those ideas differ and change across groups over time, vTaiwan's dynamic UI creates a new possibility for digital empowerment because users are encouraged to reflect upon their positions in the discussion and thus learn to make a collective decision in voting and commenting. Fung and Wright (2001) have addressed that making a collective decision is key in carrying out an empowering practice of political participation because participants are given the ability to vote in a way which transcends their own individual interests. Here, we can see how the UI is a political interpretation of what Andrew Barry's (2001, p. 148) description of the empowering possibility that digital devices can offer by designing interactivities which guide citizens to learn and work with others.

In the following section, I will stress how the algorithmically-visualised interface of vTaiwan, whilst offering potentialities for user empowerment, at the same time also acts as an 'emergent barrier' which disables users from 'voting' and 'commenting'. In Ash *et al.*'s (2018a) terms, this indicates the existence of specific forms of discontinuity in which the interface fails to modulate users' action and emotion: these instances can be termed 'glitches'. These 'glitches' highlight that what Ash *et al.* (2018a) refer as frictions — both technical or emotional obstacles in digital political participation — are not always modulated by or are under the control of the interface.

5.3.2 Glitches as emergent barriers

I first encountered a glitch in the interface of vTaiwan-Pol.is on the 7th of November 2018. At that time, I was browsing through a new participatory case on 'opening up data in the public sector' in vTaiwan-Pol.is, which had been launched between 1st October and 30th October 2018. Although the official period for the consultation had passed, I was curious about whether there were new comments and votes still appearing on the interface of vTaiwan.

Interestingly, as I entered the interface of vTaiwan-Pol.is at 12:00 and at 14:47 on the 7th of November, I realised that in a short period of time vTaiwan's interface had configured two very different visualisations of Opinion Groups. I consider these two different visualisations to be examples of 'barriers' in digital empowerment, as they confuse and possibly stop users from voting and commenting by providing inconsistent information.

At 12:00, there were only two Opinion Groups (A and B). Opinion Group A highlighted that governments should establish open data regulations and make it easier for citizens to know where to assess to open data; whereas Opinion Group B stressed that the Taiwanese government should adopt structural management on its open database and monitor the quality of open data via setting up a consultancy team at the central government and other necessary measures on advocating the usage of open data (see Figure 12).
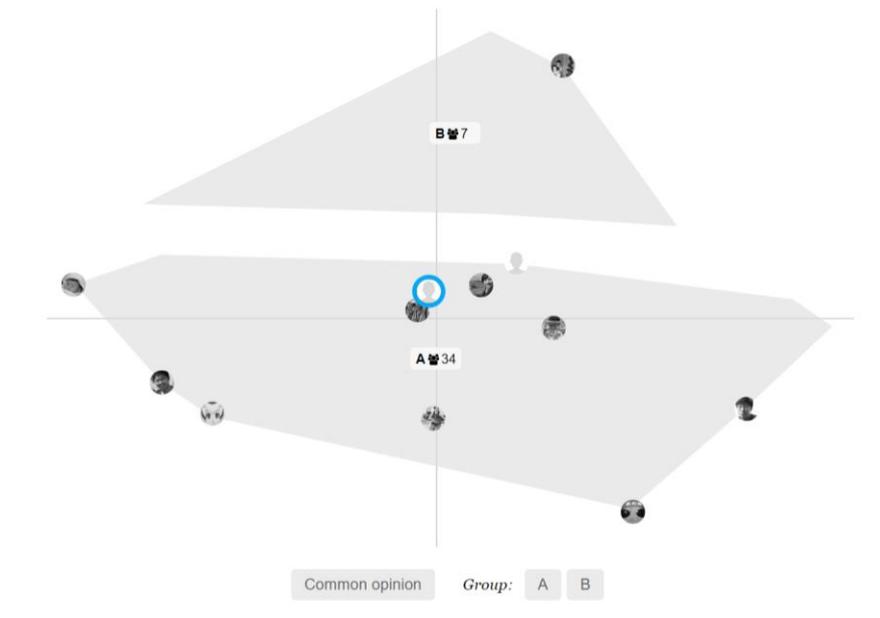


Figure 12: vTaiwan-Pol.is participation at 12:00 7th of November in 2019 (Source: https://polis.pdis.nat.gov.tw/5nckzdszrc, assess at 07/11/2019).

However, vTaiwan's UI visualised the number of Opinion Groups as *four* at 14:47, as indicated in Figure 13. This shift in UI visualisation showed a significant change in the number of Opinion Groups, which changed from two to four within a short time. Looking closely, in Figure 13, there was a difference between the number of Opinion Groups indicated in visual clusters (4: A, B, C, D) and the number of Opinion Groups indicated in Common Opinions (2: A, B). This difference in the number of Opinion Group showed inconsistent

information for users. How many Opinion Groups were there? Was it four or two?



**The number of visual clusters of Opinion Groups: 4**

A 🐾 6

B 🐾 13

D 🐾 7

C 🐾 5

**The number of Opinion Groups: 2**

Common opinion    Group:  A  **B**    Statement:  **7**  27  33  49  53

**#7**    I believe that the responsibility of civil servants to provide information should be reduced by regulations.

🚫    100% of those in group B who voted on statement 7 disagreed.
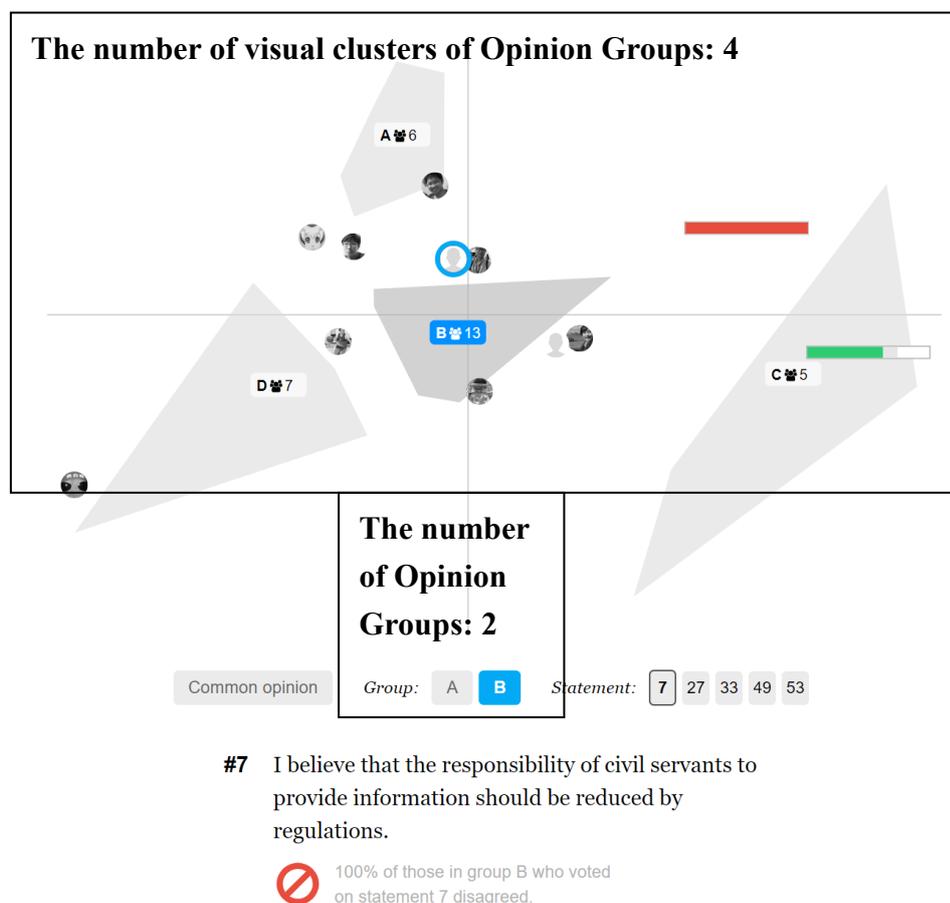
Figure 13: The glitchy moment at vTaiwan's digital political participation at 14:46, 7th of November in 2019 (source: https://polis.pdis.nat.gov.tw/5nckzdszrc, assess at 07/11/2019).

Encountering this confusing situation, I went to ask Linda - who I know to be a key facilitator in vTaiwan - about why the UI was changing inconsistently. She replied to me that other participants and herself were aware of these two strange configurations in the interface of vTaiwan-Pol.is. The appearance of these different configurations was not seen only by me but also by other participants. If other participants shared the same experience as me, it can be inferred that these different configurations are not just a one-time event that takes place in my encounter with the interface, but also exist in other participants' encounter with the interface. Importantly, I understand this inconsistent information as friction mainly because it confuses participants such as Linda and me, who have no idea either why it happens or how to proceed with the participation accordingly. What this inconsistent information represents is a barrier in digital political participation.

As Linda told me that vTaiwan has no idea why these two different configurations happened, I went to ask Felicity, who is a highly-skilled leading civic hacker, why this friction appeared in the interface. Felicity replied to me in an email that she would call this splintered information an example of 'glitches'. She explained that glitches happened when algorithmic calculations in the background of the interface did not synchronise with new emerging actions of political participation, namely new user-generated data. In other words, the glitch is the consequence of a disconnection between the algorithmic visualisation and new user-generated data; algorithmic calculations do not fully update with new user-generated data. If we go back to Figure 13, we can clearly see this disconnection from the difference between the number of visual clusters and the number of Opinion Groups, which as a result creates a *barrie*r for participants. In other words, this glitch did not take place at the start of digital political participation, rather it *emerged* in the particular moment of disconnection or de-synchronisation between algorithmic calculations and new user-generated data. In the judgement of both Linda and myself, this glitch has a direct impact on digital political participation because it creates a barrier for users to fully grasp and understand the information in the interface. Therefore, users might not know which information to believe and not be able to conduct the aforementioned collective actions of voting and commenting with a consideration of others' opinions.

Glitches are also likely to *emerge* where there is some form of 'extreme' engagement with the interface: for instance, when a large volume of users submit or/and evaluate comments in a short period of time or almost at the same time, or when a participant submits one hundred comments without voting or votes yes on every comment. Diana[33], a consultant from Pol.is Inc, indicated to me that as the visualised interface highly depends on having the requisite computing power to process incoming user-generated data, any extreme engagement with the interface from users could trigger a glitch in the visualised interface as this would potentially overload the ability of the algorithms to process the data. Diana strongly evidenced that glitches are *barriers* in digital political participation because they prevent users from receiving stable and consistent information. Diana says that it is better to provide an appropriate and stable amount of information which can be fully understood and perceived by participants. In Diana's words:

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*Once the comments coming in and the opinion group is changing a lot that visualisation gets very unstable especially in mobile and so we have been finding the balance between making people feel that the Pol.is giving them enough information and making this [participation]. If you have too many participants the visualisation does become unstable.*

The visualised interface can, therefore, emerge as a barrier which disables users' ability to conduct acts of political participation because it confuses users with inconsistent information in a glitch moment. It can discourage users from completing their actions or further engaging with the interface. This barrier, thus, evidently verifies Rose's (2016, p. 343) argument that 'the interfaces do not always work smoothly'. The fact that the interface can emerge as a barrier during such a 'glitch' situation backs up the argument that 'frictions are inherent to the interface' (Rose, 2016, p. 343).

Ultimately, I argue that vTaiwan's UI creates waves of possibilities and limitations on digital empowerment, by both enabling users to feel engaged and make collective decisions and disabling users from commenting and voting in digital political participation. What the existence of such waves suggest is that vTaiwan's ability to offer digital empowerment is characterised by fluidity and volatility which is inherent in the way its dynamic UI operates. One the one hand, in the previous section, I have explained how new possibilities for digital empowerment are produced for users, who are able to feel a sense of engagement and act collectively with other participants in voting and commenting due to the dynamic UI in vTaiwan. On the other hand, such empowering possibilities are affected by the highly unstable dynamic UI configuration between users and algorithms at the same time. This instability suggests the volatile state of digital empowerment when it emerges as moments of 'glitches' when the UI provides inconsistent information for users and thus either decreases their motivation to further participate or prevents them from acting collectively with other participants.

## 5.4 Unevenly distributed 'participatory power': 'princelings'

In this section I will focus on how the dynamic UI assemblage further imposes a limitation on digital empowerment due to the imbalances of 'participatory power' which exist between

users, which mean that certain users have much more power than other users. Here, 'participatory power' equates to the ability of a given user to make a real impact in policymaking processes. As we are going to see from the results of digital political participation, those people who acquire the most participatory power are the ones who have the greatest knowledge and capacity to make the dynamic UI work in their own interests rather than in a collective interest. This result in an unequal situation where participatory power is mostly in the hands of active and well-educated citizens and/or the organisations they represent; I will describe the most powerful users as 'princelings'. The existence of unevenly distributed 'participatory power' indicates another limitation on digital empowerment; as users are not given equal power to influence the outcome of digital political participation, this increases the likelihood that users will work for their own interests rather than for the collective good. These two risks are both mentioned by Fung and Wright (2001) as they develop their idea of empowered participation, which says that that empowered political participation requires that decisions are made collectively and on the basis of a balance of power between participants.

'Princelings' tend to exercise 'participatory powers' at the expense of others, or at the expense of others. I have found that groups of active citizens or collectives such as NGOs and other organisations tend to emerge as 'princelings' in digital political participation. These 'princelings' constitute a significant part of the winners of the participatory budgeting process (for Decide Madrid) and are the major contributors of proposals (for vTaiwan) in digital political participation. 'Princelings' have a greater capacity to ensure their proposals or comments become *more important than* other users by getting more positive votes throughout the process of digital political participation; therefore, they gain greater participatory powers than others.

In Decide Madrid, Mike (the political advisor), Sandra, Paul (researchers) and Jean (the former software engineer) have noted that proposals which are submitted and written by collectives such as NGOs, local forums or associations are more likely to gain support and positive votes; therefore they tend to become the winners of a participatory budget. Examples of collectives which can be described as 'princelings' include an offline association of parents, offline local forums for the official 21 districts in Madrid City (the more active ones are Chamberi, Salamanca and Hortaleza), Rabbit Rescue Spain, Canine Park in Latina,

Ecologists in Action, Aluche Neighbourhood Association, Association against Light Pollution, Plena Inclusión Madrid[34] and the Neighbourhood School of Orchestra[35].

Looking at the results of user voting on participatory budgeting proposals on the Decide Madrid website, we can see that in 2016 22% of the winners of participatory budgets were organisations and in 2017 37% of the winners of participatory budgets were organisations. I note that the real number is probably higher because some of the proposals were anonymous and did not indicate if they had been proposed by an organisation. Mike said that the proposals of these organisations are more likely to receive more votes because they know how to disseminate their proposals amongst and beyond their networks. For instance, the former software engineer, Jean, was very surprised that a collective composed of parents of schoolchildren won a participatory budget vote to create a rugby field in a particular district, as rugby is not a very common sport in Spain.

In the report 'Digital Analysis of Decide Madrid', Saulière et al. (2018) indicate that users (both individual and organisations) who are able to initiate a digital campaign in Twitter for their proposals are more likely to gain support for their proposals. Based on a digital analysis of hashtags related to Decide Madrid, they find that

> *the most popular proposals on Twitter (if they are viable) have managed to*
> *achieve the necessary support to move on to the next phases, which gives us*
> *clues to think that the digital strategy is fundamental to mobilize a network*
> *to support a given initiative* (Saulière et al., 2018, p. 20).

What they point out is the fact that the power that 'princelings' can summon and gather via their greater knowledge and ability to access wider networks tends to make their proposals dominant over other proposals. Here, I highlight that the existence of 'princelings' raises critical questions in digital empowerment. Is it fair that some users are more capable of getting votes for their participatory budget proposals than others? This question calls to mind Fung and Wright's (2001) work on how the pre-existing social-economic and political stature of any given participant in a participatory budget determines their participatory capacity and knowledge; when the positionalities of all participants are taken into account, this clearly

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[34] Federation of Organizations in favour of people with Intellectual Disability in Madrid
[35] Escuela del Barrio Orchestra Association

impacts on the overall quality of the participatory budgeting process.

In vTaiwan, civic hackers or citizens who are more active-minded know how to navigate via the interface better than other users. Gwen[36], a vTaiwan participant who was also a contract worker for a government institution, told me that because she understands that the purpose of the vTaiwan-Pol.is is to single out a unique idea with supports from a different range of participants, she had the capacity to make her comment very clear and 'agreeable' to different participants, which would maximise the chance it would be voted positively and gain valuable comments. Participants like Gwen likely gain an advantage in digital participatory processes as they have the capacity to make the interface work in their interest. This coincides with what Paul[37] pointed out in his earlier commenting on cultural frictions:

> *If people do not understand how they work, some people will be able to make a profit out of them and some people will not…exactly, like how you, how meant votes you have to receive per day to keep tour proposal at the top….Some people know how to do that, and how to use marketing campaigns to maximise it, and some don't. Like in real life, some people know how to put their topics up to the agenda. When you have to take a decision to implement, in most cases the simplest option is the best idea. Making things too complex means you need too many skills to understand it[38].*

What Gwen and Paul both indicate is a new division amongst users in digital political participation. Users, such as Gwen, can become 'princelings' if they have a better capacity to participate through the dynamic UI than other users. This division further accounts for what Steve Graham (2004, p. 324) terms 'urban digital divides'. Graham claims that the urban digital divide is not only about uneven access to the internet and technical devices but also about how software and algorithms marginalise certain citizens from the ability to access urban spaces and services. In the context of digital political participation, a precise knowledge of how the algorithmically-visualised dynamic interface works to prioritise urban proposals and comments will give users an advantage in making their comments or proposals

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[36] Interview conducted on 28/06/2018
[37] Interview on 27/11/2018
[38] Interview conducted on 15/12/2017

matter than others. Mike[39], a key actor from Decide Madrid, stressed that a divide can be created by not making algorithms understandable to users. He calls this divide a 'bias' and describes that:

> *the problem is when you introduce an algorithm that is not clear at all about how it is using[working] then the user cannot understand what is happening behind the algorithm…Without knowing [how algorithms work] could produce bias that some proposal might get more supports whilst others not [because some users know how algorithms work whilst others do not]…if you use too complicated formula, nobody will understand….what it is [participation]…in that sense to have algorithms open is not enough.*

Additionally, some cases in vTaiwan show that only having a small number of well-educated users challenges the self-claimed idea that the platform represents the views of 'the community' and 'the public'. If every participant is a 'princelings', then where is the public? Gwen[40] notes when there is a lack of participants, the so-called 'community' is simply a collection of 'princelings':

> *I feel some part of vTaiwan is a bit 'guilty', well, for example, we said about the public and the community, but there are not many people there…we did not give polis to anyone….I know Felicity sent the link of the polis to Taxi associations, Taxi line [like What's app] groups for Uber Case. But I usually don't do this for most of the cases [for participation], this is why sometimes there are not many people attending to the Pol.is-participation because we have not done enough promotion…..*

If every participant is a 'princeling', where is the voice of the public or citizens in so-called 'public' participation? Here vTaiwan shows that when the participatory platform is not used by enough users to submit ideas and comments, the process of digital political participation becomes primarily dominated by a very small group of 'princelings'. It is highly questionable whether 'princelings' are representative of the public interest, especially when the proposals submitted by 'princelings' clearly focus on 'trendy' issues in the digital tech space rather than

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[39]  Interview on 18/10/2017
[40]  Interview on 28/06/2018

reflecting the wider concerns of less well-informed citizens; see Abers (2000), who pointed out how such a situation amounts to 'clientelism' in participatory democratic projects.

In comparison with the 'princelings' in vTaiwan, I note that it is important to mention that those active in Decide Madrid are more diverse in composition and include such organisations as associations for promoting animal protection and protecting the rights of the disabled. Even though ;princelings' exist and dominate the participatory process in both cases, the difference between Decide Madrid and vTaiwan lies in the diversity and quantity of proposals between two cases; this suggests that participatory power is diluted and distributed among different 'princelings' not centralised in one organisation.

What these examples suggest is that due to effects stemming from how the dynamic UI is constituted via interactions between users, user data and algorithms, there is an unequal divide of participatory power amongst users. 'Princelings' are likely to benefit in digital political participation because their knowledge and capacity to get their proposals or comments supported via both online and offline networks outside of the UI of Decide Madrid and vTaiwan, such as Twitter. They are capable of making the dynamic UI work towards their interests due to their greater knowledge. For example, some 'princelings' such as Gwen are able to make the interface work for them by proposing an easily-agreeable comment. Some 'princelings' disseminate their proposals through Twitter, and other offline networks, because they know their proposals need positive votes as many as possible to stand out in the interface.

Here, it is clear to see that the presence of 'princelings' further jeopardises the ability of DPPPs to enhance, digital empowerment because participatory power, in terms of making an influence in policymaking, is not evenly distributed amongst all users. Some users hold better knowledge and capacity to make their proposals get more votes than others by understanding how the dynamic UI work. This is not what Fung and Wright (2001) would conceive as empowered political participation, as 'princelings' are largely focused on their own interest instead of on making 'collective' proposal or votes in consideration of other users' interest. What this means is that there is a need to question the 'participatory power' gained by 'princelings' within DPPPs.

## 5.5 Fluidity and volatility in digital empowerment

Here, I conclude this chapter by explaining why my situated examination of digital empowerment with a focus on the dynamic UI is particularly important. Through the use of the situated lens, I have examined and compared the effects of the dynamic UI on digital empowerment within the context of two DPPPs, Decide Madrid and vTaiwan. I view the user-interface relationship as a UI assemblage, which is defined as a transient, lively and ongoing arrangement of users, software engineers and algorithmic visualisation located within wider political contexts. Taking the dynamic nature of the UI into account within this assemblage, I argue that the two DPPPs offer a fluid and volatile state of digital empowerment, in which users can be both enabled to feel engaged and have the capacity to make collective and informed action of voting and proposing as well as potentially being disabled and disengaged from digital political participation by the dynamic UI.

My 'situated' analysis of the dynamic UI's impact on digital political empowerment directly contributes to what Isin and Ruppert's (2015, p. 82-83) suggestion of a lack of focus on empirically-account of digital political participation in studies of the digital citizen. Isin and Ruppert (2015, p. 85) point out there is so much about 'the potential of citizens' who produce and consume 'political content – political positions, opinions, demands, claims', yet the current research focusing on digital participation is confined to the discourse of 'digital divide/inclusion', which sees digital participation no more than 'a matter of access, skill and usage'[41] (also see Mossberger, Tolbert and McNeal, 2008). Here, my focus on the dynamic UI has provided an empirical and theoretical contribution to renewing and enriching the current understanding of digital participation as social relationships (Beer, 2009) and functional demands and skillsets (Mossberger, Tolbert and McNeal, 2008). This 'situated' sketch of digital empowerment provides empirical evidence of how users and their data interact with the dynamic UI within an assemblage located in a specific political context.

Building from Rose (2016) and Ash *et al.* (2018a) who argue that the digital interface can play a crucial role in affecting digital participation and everyday practices; I demonstrate and detail the ways in which two different dynamic UIs can create different sets of possibilities

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[41] This includes a set of technological competence, information literacy and the Internet affordability, which can be improved and worked on by governments, corporations and civic organisation (Mossberger, Tolbert and McNeal, 2008)

and limitations in digital empowerment due to their differential effects. Whilst both Decide Madrid and vTaiwan dynamic UIs produce *barriers* which confuse and disable users' capacity to vote and comment, they also produce different possibilities for users to be empowered in digital political participation. The dynamic UI design of Decide Madrid acts to create *soft thresholds* (Ash *et al*., 2018a) which highlight suggested information which enables users' capacity to make informed and collective decisions in voting and proposing. vTaiwan's UI manifests effects of *gamification* (Hassan, 2017) to increase users' sense of engagement and thus conduct collective and informed actions of 'voting' and 'commenting'.

# Chapter 6 (Re)assembling political decisions in urban policymaking

## 6.1 Introduction: the assemblage of algorithmic decision-making

In this chapter I attempt to answer two questions: (1) what effects do the DPPPs under study — Decide Madrid and vTaiwan — have on decision-making in wider policymaking processes in which they are located? ; and (2) how do Decide Madrid and vTaiwan differ in terms of their general approach towards decision-making? I will continue my deployment of a situated lens to examine the assemblage of algorithmic decision-making, defined as the process of making political decisions via algorithmic interactions with users, which are then (re)interpreted by humans located within wider urban policymaking processes. Here, political decisions specifically refer to the process of legitimisation through which urban subjects can receive political support such as funding, legislative time or incorporation into policy. I will indicate how this assemblage produces both 'inclusion' of certain urban issues through legitimisation and 'exclusion' of others through the operation of the decision-making assemblage, and in doing so question whether such assemblages produce *better (fairer and more empowered)* decisions in urban policymaking. In the conclusion, I will also discuss another view of legitimisation, which focuses on how the state uses (digital) political participation as a means to maintain and reassert its political power and legitimisation (Juárez Toledo et al., 2007; Chadwick, 2001; Meijer and Zouridis, 2004; Jiang and Hu, 2009, p. 175).

This chapter will focus on two case studies: the 2016-17 participatory budgeting processes in Decide Madrid and the 2015 Uber consultation in vTaiwan. By employing the method of 'digital flashback' (see details in Section 2.4.1), I was able to track how user data on these issues interacted with algorithms to produce specific outcomes, stressing how the assemblage of algorithmic decision-making is constituted by algorithmic interactions with users and by moderators and politicians within wider policymaking processes.

In this chapter I explore the implications of the use of algorithmic calculations in political decision-making through a discussion on what constitutes fair decision-making, incorporating insights taken from theories of participatory democracy (Fung and Wright, 2001; Baiocchi and Ganuza, 2014). Here, I take their idea of fair decision-making as a point of reference to question and open up the discussion on what can be considered as fair decision-making. Both Fung and Wright (2001) and Baiocchi and Ganuza (2014) have suggested that fair and

empowered decision-making in participatory budgeting project needs to meaningfully devolve decision-making powers to participants. Participants' decisions should have a real impact in policymaking processes (Fung and Wright, 2001; Baiocchi and Ganuza, 2014). In particular, Fung and Wright (2001, p. 26-27) have asserted that equal and fair decision-making should be based on 'rules of deliberation' rather than on merely 'aggregating votes' from participants; participants should learn, debate and reflect upon different perspectives before they make a decision.

I argue that it matters to gain an understanding of how political decisions are made through the often 'opaque' human and algorithmic interactions which take place within DPPPs, because such processes tend to exclude certain urban issues and thus have implications on the ability to make empowered and fair decisions within political participation. As we are going to see, exclusions will occur within three consecutive steps through which urban issues are sorted and prioritised into political decisions within the two DPPPs under study. Firstly, users tend to focus on certain aspects of urban issues when generating urban participatory data (i.e. when they input votes, comments or proposals). Secondly, algorithmic interactions with user data within DPPPs determine and prioritise urban issues on the basis of different rules; whilst Decide Madrid's algorithmic interactions prioritise the 'most important' urban issues through a rule of simple majority, vTaiwan's interactions highlight urban issues through both the rule of simple majority and through a process by which different perspectives on issue are identified through the application of Machine Learning. Thirdly, what has been determined by these algorithmic rules will be reconfigured into political decisions by policymakers and moderators located within wider institutional and cultural contexts, which operate on the basis of norms external to the DPPP. As a result, urban participatory data which focus on specific urban issues, such as the need to provide public libraries and disputes between Uber and Taxi drivers, are discarded alongside the (re)configuration of political decisions.

My use of assemblage thinking has three important functions. Firstly, it focuses attention on the importance of examining invisible, contextually fluid, unfolding and changeable processes of algorithmic calculations as they interact with user data (Amoore, 2019; Kitchin, 2017; see how the situated lens is able to explain the fluidity of algorithms in Section 3.4.1). In announcing a digital turn in geographical research, Ash, Kitchin and Leszczynski (2018) stressed that 'big data' has to be understood through looking at how is sorted and processed

into new data as the result of algorithmic calculations. Their viewpoint has been addressed by Crampton (2016) and Amoore and Piotukh (2015a); without 'careful attention to how it [data] is analysed, and to what can be said about the data on the basis of that analysis', Amoore and Piotukh (2015a, pp. 4, 14) indicate that there is a risk of researchers being unable to fully understand the impact of algorithmically-mediated data processing on the governance of everyday life.

Importantly, a situated lens pushes forward the understanding of the algorithmic calculations by situating them in relation to users and data and within wider political environments. It conceptualises the contextual fluidity (stemming from various contingencies) of algorithmic calculations (Kitchin, 2017) as *living interactions between users, user-generated data and algorithms*. It does so by not seeing algorithmic calculations as just 'any form of calculation that takes input and yields desired output' (Crampton, 2016, p. 141) but rather as emergent and 'autonomous interactions' between human and non-human [parts] which have their own autonomy (Anderson *et al.*, 2012, p. 181). This autonomy of assemblage is described by Bennett (2010, p. 23) as 'living, throbbing confederations'. Here, I specifically explain these 'autonomous interactions' (Anderson *et al.*, 2012, p. 181) through using Amoore's (2013, p. 130) reading of 'life' as 'things [rather than objects] with a life that is never quite caught by the design of a security measure itself'.

I use the term 'living' as an attempt to capture the ways in which algorithms prioritise certain urban issues over others by interacting with users who input data. The idea that they have 'life' or 'a life of their own' is an attempt to capture the fact that the effects of these interactions are contextually fluid and specific (Kitchin, 2017; Amoore, 2019) and thus go beyond the range of purposes which software engineers and policymakers could envisage. Amoore (2019, p. 6) argues that 'computations are infinitely malleable and contingent on plural interactions of humans and algorithms' and describes how 'a small change in the weighting of probabilities in the model will transform the output signal', Software engineers can never envisage the quantity, quality or timing of data which is to be inputted by users, nor at what time it is inputted, nor can they fully comprehend (in the case of vTaiwan) how Machine Learning algorithms act in response to incoming data (Kitchin, 2017). To clarify, I do not argue that such living algorithmic interactions are capable of doing anything without limit, as they are partially constrained due the specific capacities with which they were programmed during the design

process. Rather, I illustrate that the way in which (Machine Learning) algorithms act *in response to* incoming user data and thus generate the rules determining which urban issues matter. These algorithms, via their ability to process user information in non-deterministic ways, possess 'responsiveness': the ability to react to external stimuli to produce effects in the outside world (Kitchin, 2017). This has been described as a necessary (but insufficient) characteristic of 'real' biological life (Ferreira Ruiz and Umerez, 2018, pp. 495–496). Despite the fact that algorithms raise some interesting philosophical issues regarding the definition of what is 'alive', I will confine my use of the term 'life' and 'living' to that of metaphor.

Moving forward on this basis, we can see that there are different 'ways of living' which emerge via the results of various algorithmic interactions, depending on how much they can act unexpectedly beyond their design. I assert that interactions through Machine Learning algorithms (vTaiwan) manifest a more dynamic way of living than ranking algorithmic interactions (Decide Madrid) because of their 'materially unstable' nature (Mackenzie, 2006, p. 177). Thus, I find assemblage thinking useful in explaining the ways in which urban issues are prioritised through what I term 'living interactions' between changing user inputs and the specific capacity of the algorithms (that is partially confined to what they were programmed). This approach will avoid the mistake of viewing algorithmic calculations as automatic, self-sustainable and non-human processes, which generate the same form of interactions in all circumstances and therefore prioritise identical urban issues.

Secondly, by taking a comparative approach, a situated lens emphasises the contextual specificity of algorithmically-mediated decision-making processes. As a comparative approach indicates that in the case of the two DPPPs under study here, usage of a specific algorithm leads to contextually *specific forms of interaction* with users and urban participatory data, which results in particular outcomes in terms of which urban subjects are/are not constituted as issues of political concern. As a result, two *different rules of selecting urban issues* emerge from the DPPPs, which have been determined through interactions between particular sets of algorithms and user data. The comparative approach, therefore, adds the contextual nuance to our consideration of what are 'algorithmic interactions' and what are the 'political impacts' of algorithms by showing the difference between the two different sets of algorithms used in Decide Madrid and vTaiwan.

I develop my argument in four steps. Firstly, I show how users write and evaluate urban subjects to produce user data, which I define specifically as 'urban participatory data'; this is done via the generation of votes, comments or proposals within Decide Madrid and vTaiwan. I then describe how users and urban participatory data interact with algorithms to select urban issues as worthy of concern and thus able to be made into political decision by policymakers to receive public resources of various kinds in the policymaking processes. Thirdly, I critically question whether these political decisions are fair and empowered by pointing out what are excluded from the making of political decisions.

## 6.2 Urban participatory data: votes, comments and proposals

The creation of user-generated data/content is considered to play a key role in generating the economic value of platforms such as Facebook and TripAdvisor (Van Dijck 2013; Orlikowski and Scott 2015). The study of how user-generated data is produced provides critical material for geographers exploring those facets of cities which most strongly engage with a user/citizen's ideas, experiences and feelings (Graham, 2013; Shelton *et al.*, 2014; Leszczynski, 2016). Here, I specifically focus on users who write and generate data for Decide Madrid and vTaiwan. I will refer to this as *urban participatory data*, seen as proposals, comments and votes, each of which contains particular urban subjects which users think are important to them.

I will emphasise two key points around urban participatory data. Firstly, the creation of urban participatory data is a first step in creating assemblages of algorithmic decision-making; the user, through the formulation of an idea in her mind and the encoding of this idea via data fed into the DPPP, introduces a specific urban subject to the algorithm, which modulates it via calculations taken in relation to other user data with the result of either: the (re)assembly of political decisions (which I will explain in Section 6.3 and 6.4), or alternatively, with the delegitimisation of certain issues, which may then resurface outside the system (such as in the case of protests around Uber in Taipei City: see Section 6.4.3). Here, the specific ways in which data is modulated matters, as means of data modulation can imply the legitimation of radically different urban issues. Dalton (2019) points out that the same set of housing data can foreground different urban issues when used in different ways by software engineers and activists, such as by developing arguments against dispossession through the use of countermapping or by facilitating estate property transactions through the use of digital

platforms such as Zillow and Zoopla.

In the context of DPPPs, urban participatory data is created by *users*, who are provided with the ability to comment on issues and evaluate different urban subjects by casting votes. In doing so, a user thinks up an evaluation of various urban subjects presented to her, and then turns this evaluation into data by casting a vote via the UI. This initial evaluation is important because it gives a specific value to urban subjects, which are then fed into the mathematical formulae deployed in the algorithmic calculation. For instance, by clicking on 'agree' on a particular participatory budget proposal advocating for building a new park for dogs, a user gives a value of '1' to this proposal within the algorithmic system. It is the input of urban participatory data that makes it possible for algorithms to determine what counts as possible urban issues. Without the initial evaluation made by a user, algorithms will have no points of reference to interact with, thus, no possible issues will be configured. From here, we can start to see that algorithms have to work with users in prioritising the importance of urban issues.

By highlighting the active role of users in creating urban participatory data, I want to note firstly that urban participatory data is very different to both what Kitchin (2014) called 'directed data' and also to 'automated data', in which users *are not* consciously and actively involved in the processes of data generation. In the case of 'directed data' generation, as Kitchin (2014, p. 4) explains, the details of users (such as fingerprints and identity profile) are *passively* generated into data via methods of data collection such as CCTV, finger-scans, or thermal scans, none of which require the user to *do* anything other than be present as a subject to be monitored. Similarly, Kitchin (2014, p. 4) denotes 'automated data' as being 'generated as an inherent, automatic function of the device or system', such as through the use of sensors, RFID chips, smart travel cards or GPS-embedded mobile devices; users do not play an active role because they are not consciously aware of their actions or behaviours, which are 'automatically' turned into data. As we have seen, in the two DPPPs under study here, users can actively express their ideas and judge other ideas by turning their thoughts into urban participatory data by generating input into the UI. Because of this key difference in how data is generated, the two DPPPs should not be seen as the same as other sensor-based platforms and surveillance technologies, which typically rely on algorithms for more limited functions, such as to give value to GPS data to forge connections between various data elements to identify persons of interest for security reasons (Amoore and Piotukh, 2015b, p.

344) or to control the infrastructural flows of city (Marvin and Luque-Ayala, 2017).

Secondly, the fact that urban participatory data only presents fragmented and partial facets of urban issues is of importance to the study of DPPPs. This fragmentation imposes an initial limitation on the algorithmic configuration of political decisions by deciding which urban issue is worthy of being written down as urban participatory data (proposals or comments) within Decide Madrid and vTaiwan. It is clear to see that the urban participatory data generated by users of Decide Madrid and vTaiwan, despite differences in terms of the relative representation of the scope of urban issues, only cast partial views over the cities in which they are situated.

We can see the existence of such fragmented data by looking at examples from our two case studies. In the case of Decide Madrid, by looking at 169 participatory budget proposals written by local residents and collectives in 2016, we can see that Madrid City is represented via a number of different urban participatory data; however, this is limited to specific urban subjects, such as public libraries, music and dance schools, elderly care centres, bike lanes, pedestrian pavements, recycling bins, LED lights, solar panels, public toilets, green spaces, the homeless, sexually-abused women, Alzheimer patients, dog parks, dog poo and abandoned urban animals (Decide Madrid, no date). In the case of the Uber consultation in vTaiwan, urban participatory data consists of 100 comments and approx. 46000 votes that were cast and inputted by 4592 Taiwanese users. From data on the Github website, where vTaiwan publishes its outcome of civic participation, we can see Uber is only understood in terms of limited perspectives, which include anonymous users asking the Taiwanese government to open the market to Uber, urging the Taiwanese government to express its position on Uber, thinking of Uber either as a service company or as a technological company or a platform, a political proposition against Uber as a sharing economy business, or calls for the Taiwanese government to publish all reports and investigation related to Uber (*vTaiwan-Uberx-08-09-Tally*, 2017).

Such limited representation of urban issues seen in the case of inputs of urban participatory data into Decide Madrid and opinions around the Uber issue in vTaiwan data resonates with Amoore's (2013, p. 63) description of the character of data in a surveillance system. She points out that whilst data can be selected, differentiated, and reintegrated to give the

appearance of a whole — from the projection of risks to definition of borders — such data can only present an incomplete and distorted representation of risks, a person or a border. Such partial representation of urban issues has implications in delimiting the scope of political decisions — which urban issues can be highlighted as worthy of public concern within policymaking processes — within the two DPPPs.

These are further limitations which exacerbate the impacts of such partial representations of urban subjects. Whilst it is certain that proposals and comments can emphasise potential parts of cities which are perceived as important for users and local residents (which are not necessarily valued by policymakers), Decide Madrid has pre-defined which urban subjects can be turned into urban participatory data in a different way to vTaiwan. Importantly, such pre-restriction indicates that both the creation of participatory calculus and the configuration of the UI, despite having effects in citizen empowerment as I have shown in Chapter 4 and 5, have an implication in making wider political decisions because they affect which urban issues can be written on and advocated for within the confines of the two DPPPs.

In vTaiwan, the algorithmically-configured issues are pre-restricted by the designers, who imposed a word-limit of 140 characters to the evaluation process (see Chapter 4), which not only reduced the ways in which users can say and express their ideas and judgements but also by extension which urban subjects can be narrated and judged within the system. In the Uber case, it is apparent that users are constrained in both saying what they feel and in explaining why comments made by other users are important or otherwise. There is a general lack of 'communication' and 'deliberation' between users in terms of elaborating their views on urban subjects such as Taxi-drivers or Uber drivers that are relevant in the Uber consultation.

In Decide Madrid, effects from the partial representation of urban subjects are further exacerbated by the existence of *a large degree of repetition* within proposals; there are many very similar proposals, which produce a large number of data containing very similar representations of urban issues. Almost one-fifth of proposals are about public libraries and cultural centres; one-tenth of proposals are for bike lanes; one-tenth of proposals for sport centres; one-tenth proposals for green energy and spaces; and almost one-tenth of proposals are for pedestrian pavements (Decide Madrid, 2016). The ways in which users think and write about Madrid City — even though their input covers a fairly diverse range of issues —

are largely confined to public facilities, infrastructure and urban sustainability. As a result, urban participatory data in the context of DPPPs can be limited due to self-recycling and repetitive representation of urban issues.

In the next section, I illustrate significant differences in the ways in which algorithms interact with urban participatory data in Decide Madrid and vTaiwan, which as a result leads to the foregrounding of different ways of prioritising urban issues.

## 6.3 Algorithmically-prioritised urban issues

In this section, I show how a situated lens is able to explain the algorithmic calculations in terms of *living interactions between users, urban participatory data and algorithms*; these interactions function in a way which sorts certain urban subjects as legitimate issues of concern, whilst closing down possibilities for other issues by delegitimising them within a DPPP's system. 'Being prioritised' as an urban issue in the cases described here means that this issue is more likely to be made into a political decision which receives part of a 100 million Euro participatory budget (for participatory budgeting process in Decide Madrid) to be put to a referendum (for citizen proposals in Decide Madrid) Madrid), or to be the subject of a bill drafted in parliament (for vTaiwan).

As I have detailed in Chapter 3.4.1, a situated lens stresses the contextual specificity and fluidity of algorithm-human alignments by reading it as the emergent interactions between heterogeneous parts which make up an assemblage. A situated lens refers the fluidity to the capacity of parts to changes or become unstable, and notes that in doing so the same components or actors can create different assemblages (Anderson et al., 2012, p.183, 186). This approach thus stresses the transformative potential inherent within an object which is composed of multiple assemblages, in this case DPPPs. Informed by assemblage thinking, I use the term 'living' as a metaphor which is able to explain and grasp the contingent, fluid and on-going character of algorithmic calculations due to the malleable human-algorithms interaction, which is influenced by changes in user-input, in the model of a calculation and in the wider environment (Amoore 2019, Kitchin 2017). The term 'living' can describe the ways in which algorithmic interactions operate; we can best understand them by proceeding *as if* they have a 'life' because what can be prioritised as urban issues *changes* throughout time

due to algorithms processing and calculating emergent votes and proposals that were generated inputted by thousands of users. From a vote to a proposal, algorithms respond and react to incoming urban participatory data to (re) prioritise urban issues. Considering Amoore's (2013, p. 130) understanding of 'life' as data that acts beyond the design of a security system, here, we can see algorithmic interactions operating 'as if' they are alive because their operation goes beyond what was envisaged by software engineers in the design processes. To clarify, by living, I do not make an ontological claim that such algorithmic interactions act in the same capacity as biological forms of organic bodies (plants, cells and humans), nor they have a life of their own (Ferreira Ruiz and Umerez, 2018). Rather, they act as if they are alive because they have the ability 'to animate, to act, to produce effects dramatic and subtle' (Bennett, 2010, p. 6) by (re)prioritising urban issues.

### 6.3.1 Decide Madrid: the 'subtle life' of algorithmic interactions

In this section, I explain how algorithms interact with users and urban participatory data by looking at two cases in Decide Madrid: the 2016-17 participatory budgeting processes and the 2018 citizen proposal processes. I depict Decide Madrid's algorithmic interactions as manifesting 'subtle life', which stresses that the 'life' is more subdued in comparison to vTaiwan's algorithmic interactions, whose living patterns are more 'dynamic'. This is because whilst Decide Madrid's ranking algorithms interact with incoming urban participatory data (both proposals and votes) generated and inputted by users to produce decisions, these interactions can only make 'incremental' changes in the prioritisation of urban subjects whereas vTaiwan can produce more sudden changes. In Decide Madrid, ranking algorithms act 'as if' they are alive and operate beyond how they were programmed due to the processing and reprocessing of emergent votes and proposals that are generated by users; they take 'clues' from users which allow them to be able to build a hierarchy of urban subjects that are implicated and described in proposals via a rule of simple majority. For instance, a proposal for building shelters for abused women ranked higher than a proposal for a reforestation plan because it has received more votes from users. Without users generating data, the algorithms themselves would have nothing to interact with, and would therefore not be in a position to operate and determine what facets of urban subjects are to be prioritised as urban issues. Importantly, as users continue to generate votes and proposals over time, ranking algorithms have to arrange and rearrange current hierarchies of urban subjects

through constantly considering incoming data. It is by adapting and responding to incoming data that ranking algorithmic interactions act 'as if' they are alive.

In contrast to a risk-based algorithmic system where users only play a passive role, such as being a subject which is 'identified' during algorithmic calculations (Kitchin 2014, Amoore and Piotukh, 2015b, p. 344). In Decide Madrid, users play an active role within the processes of algorithmic calculation. Ranking algorithms operate depending on particular values (1, 0, or -1) which are given and inputted by users to proposals. Here, users have a dual function: they can make proposals on which urban subjects (implicated in proposals) matter to them, which can then be voted or commented on by other users, or they can vote or give (positive or negative) comments on the proposals of other users.

For Decide Madrid, I characterise the 'life' of the ranking algorithmic interactions as 'subtle' in the sense that one vote can only make a small change in how the ranking algorithms prioritise the hierarchy of urban subjects. During the process of the 2016-17 participatory budget, it took at least 1596 votes from users which were in interaction with ranking algorithms to prioritise those urban issues which were likely to be funded by Madrid City Council. In addition, I note that the algorithmic interactions do not just choose one single proposal that gains majority support but are able to choose more than one proposal which obtains majority support within a given participatory budget. As an example, 30 million euros was specifically ring-fenced for various proposals focusing on city-wide issues, the most popular of which received funding if they obtained majority support.

As a result, in the 2016-17 participatory budget process, which evaluated multiple city-wide proposals, algorithms interacted with user data to prioritise 57 proposals (Decide Madrid, no date). These 57 proposals reflected the concerns expressed by the majority over various issues related to infrastructural, ecological, social and cultural dimensions of urban sustainability, such as proposals for LED lights, solar panels, bike lanes and infrastructures, electronic buses, more pedestrian pavements, ecological corridors, reforestations and greener spaces (Decide Madrid, no date). Other successful proposals focused on more marginal aspects of urban life, aiming to assign additional care to those physically, financially or/and socially excluded from particular parts of Madrid City, such as low-income families and homeless who are excluded from obtaining sufficient food, babies who are excluded from

using play-grounds in public spaces and Alzheimer patients who are excluded from receiving health and mental care (Decide Madrid, no date).

Now, I use another case study — the Decide Madrid citizen proposal process — to delineate how algorithmic interactions with users again manifest 'subtle life'. Here, ranking algorithms featured three citizen proposals that obtained majority support from users by highlighting them within a yellow banner (see Figure 14); this served as a way of driving additional attention from other users on these featured proposals. Similar to the process of the participatory budget, ranking algorithms arranged proposals based on the number of support that proposals received within a fixed time period. Ranking algorithms operate in a 'living' condition because they dynamically (re)count the amount of support that is given by users over a period of time. Again, algorithmic interactions are subtle because each interaction between ranking algorithms and a users' vote can only result in a small change in the ranking of citizen proposals. Once a citizen proposal has accumulated a large quantity of interactions with algorithms over a period of time, its ranking position in the hierarchy becomes more difficult to be altered by an incoming new proposal, which may have only had time to receive a few votes.

In the case study of citizen proposal process, we can see clearly that once citizen proposals received more than five thousand algorithmic interactions giving positive votes, they stayed unchanged at the top of the citizen proposal page for four months (during my online observation from July 3rd to October 30th 2019). From Figure 14 and 15, we can find that two featured citizen proposals — free transfers within different modes of public transportation and fines for not picking up dog poo — remained unchanged during this period. This shows that during this period no other proposals were able to collect as many 'subtle' algorithmic interactions with positive votes which allow them to displace any of three proposals that were already featured. What this suggests is that the algorithmic interactions within Decide Madrid, despite operating in a 'living' way, are making *incremental changes* in how urban subjects were ranked and prioritised, in comparison with vTaiwan, which has the capacity to produce much more radical changes in prioritisation. This is because algorithmic operations heavily depend on users inputting data to rank urban issues. As I will describe below, vTaiwan's algorithmic interactions are 'living' in a more drastic way, which means that the ways in which urban subject prioritised are more changeable because the use of Machine Learning

algorithms enriches the potential effects of algorithmic interactions with users. We can see, then, that this has an implication in terms of the urban issues which can be configured within Decide Madrid: algorithmic interactions in Decide Madrid based on the rule of simple majority only highlight those urban subjects which receive simple majority support, whereas in vTaiwan Machine Learning algorithmic interactions prioritise urban subjects by their importance to different Opinion Groups (e.g. pro- and anti-Uber Opinion Groups).
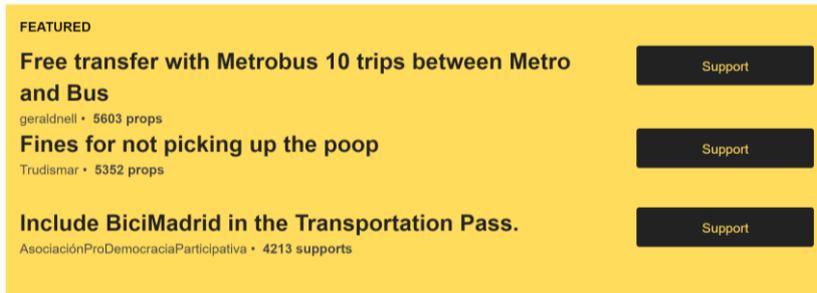


Figure 14: Screenshot of 'featured' proposals in Decide Madrid on July 3rd 2019. Featured proposals appear at top of citizen proposal frontpage (source: https://decide.madrid.es/proposals, access at 03/07/19).
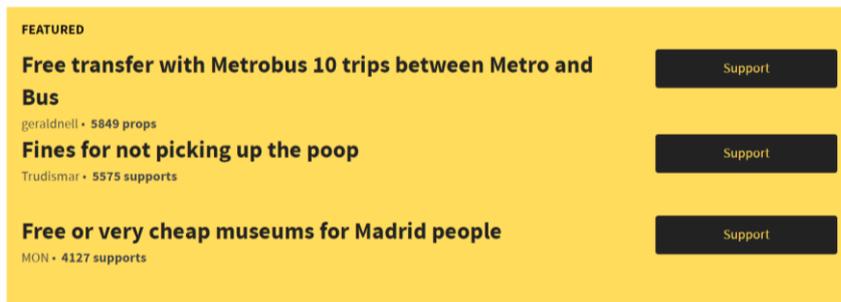


Figure 15: Screenshot of 'featured' proposals in Decide Madrid on October 30th 2019 (source: https://decide.madrid.es/proposals, access at 30/10/19).

6.3.2 VTaiwan

In contrast to the subtle changes to highlighting of urban subjects that algorithmic interactions make in Decide Madrid, Machine Learning algorithms[42] in vTaiwan interact with users in a way which allows them to make drastic changes in highlighting urban subjects in relatively short amounts of time based on the input of potentially very small amounts of users. It can thus be said that in comparison to the subtle operation of 'life' within Decide Madrid, the operation of living interactions in vTaiwan is more dynamic and fluid. This can

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[42]  Including K-means and PCA algorithms

be illustrated when Machine Learning algorithms change the way in which urban subjects are prioritised by interacting and responding to only a small amount of votes and comments (which can range from a couple to a hundred). vTaiwan's algorithmic interactions 'live' more dynamically precisely because the way they operate is more sensitive and adaptive towards 'environmental' changes related to various fluctuations in the user base. Such Machine Learning algorithmic interactions have the ability to 'change their mind' in ascertaining which urban subjects are to be prioritised by reacting quickly to fluctuations in user-generated data. As a result, they can dynamically map out changes in user perspectives towards a given urban issue through the formation of 'Opinion Groups' (groups composed of different users sharing similar voting patterns) and 'Common Opinions' (opinions which are shared within and across different opinion groups) (see Figure 16). I will explain why the environmental changes in Machine Learning algorithmic interactions imply the potential for more empowered decision-making because they stress the different perspectives (not just he majoritarian viewpoint) towards an urban issue.
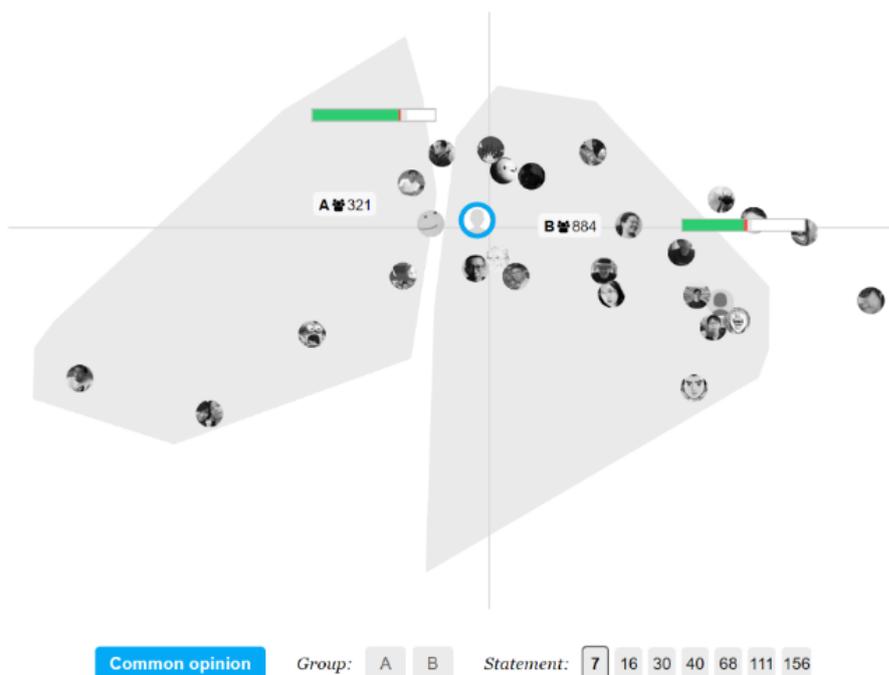
Figure 16: Screenshot of the Opinion Groups (in grey clusters) and of an inter-Group Common Opinion in Uber consultation (the common opinion shown in the diagram) (source: http://pol.is/3phdex2kjf, access at 20/01/2019).

In contrast to Decide Madrid's ranking algorithmic interactions, which operate by a simple majority rule, vTaiwan prioritises preferences on urban issue under consultation through algorithmic interactions in two broad ways. Firstly, the algorithms highlight similar voting patterns on urban subjects amongst users by constituting 'Opinion Groups' from interactions with at least a thousand voting patterns (each user has one voting pattern, a thousand users have a thousand voting patterns). Each 'Opinion Group' is composed of users who share similar voting patterns on urban issues (see Figure 16). Secondly, from here, the algorithmic interactions go on to visualise what dimensions of urban issue matter within and between Opinion Groups: these can be described as intra-Group and inter-Group Common Opinions (see Figure 16). Intra-Group Common Opinions refer to the calculation of similar perspectives on urban issues through a process of sorting comments that receive majority support within Opinion Groups; inter-Group Common Opinions refers to the identification of shared perspectives on urban issues across Opinion Groups through identifying comments that receive majority support across different Opinion Groups. The first instance of algorithmic interactions, intra-Group Common Opinions, can be seen as an operation of a rule of sorting out *different perspectives* on an urban issue under discussion. The second instance, inter-Group Common Opinions, can be seen as an implementation of a rule of the simple majority because it singles out *majoritarian perspectives* on urban issue. Inter-Group common opinions are seen as so-called consensus across different Opinion Groups.

Now, I will explain how this process works by looking at a specific case of consultation on Uber which was conducted using vTaiwan-Pol.is platform from 15th June to 15th August 2015. In this case, we can see more closely how Machine Learning algorithmic interactions are acting in a dynamic way as if they are alive. At the very beginning of the process, during a period from 15th to 17th June 2015, new data, including 22 new comments about Uber and hundreds of new votes, were inputted by 93 new vTaiwan users; the data subsequently interacted with the Machine Learning algorithms. By considering these incoming comments and votes, Machine Learning algorithmic interactions (re)configure the number of Opinion Groups from four (on the date of 15th) to three (on the date of 16th). By changing the Opinion Groups on the basis of changes in user data, the concern that 'taxi and Uber drivers should be

able to work for different taxi companies' *disappeared* as an inter-Group Common Opinion and the concern that 'Uber cars should take insurances for their passengers' *appeared* as an inter-Group Common Opinion.

Here, we can see how Machine Learning algorithmic interactions are inherently 'materially unstable' (Mackenzie, 2006, p. 177) and act as if they are 'alive' because the ways in which they decide and prioritise both different and majoritarian perspectives on the Uber issue as both inter-Group Common Opinions and intra-Group Common Opinions cannot be envisaged by software engineers in the design stage. Instead of relying on pre-defined rules, Machine Learning algorithmic interactions decide and prioritise specific perspectives on Uber by configuring bespoke rules in individual cases depending on how such an issue is voted on by users. The Machine Learning algorithmic interactions are *living* because they generate the rules (both a rule of a simple majority and of finding different perspectives) in prioritising urban issue by constantly (re)computing the effects of incoming votes and comments. They have to recompute with new votes and comments generated by different users in real-time and are thus likely to adapt the current prioritisation of urban issues. This calls to mind Parisi's (2013, p. 158) description of algorithmic procedures, which are shown to configure innovative rules to control and generate possibilities for architectural design.

In the Uber case, the 'living' algorithmic interactions are exemplified by a shift of inter-Group Common Opinions, from focusing on the concerns of traditional taxi drivers to focusing on the risky status of Uber cars and passengers. This shift towards highlighting different perspectives on the Uber issue indicates a transformative moment: these new user-generated data interrupted what was previously assembled and prioritised, via a process of adaptation to user-generated data. This transformative moment exemplifies what McFarlane (2011) described as assembling and reassembling, because it allows 'new agencies to take shape that we might not otherwise see'. It signifies a critical chance for a new perspective on Uber issue, in this case, the safety of Uber passengers, to be seen and recognised as a legitimate issue within policy-making processes. It is in this sense that the living algorithmic interactions rule shows the contextually fluid and unfolding nature of algorithmic calculations (Kitchin, 2017), which fluctuate 'between accounts that emphasize the stability of assembled orders and those that emphasize dynamic change' (Anderson *et al.*, 2012, p. 183). On the one hand, the fact that *some* perspectives on the Uber issue are

highlighted by algorithmic interactions does not change. On the other side, *which* perspective on the Uber issue can be determined as important can potentially change due to incoming data interacting with algorithms, which includes new votes or comments written and cast by participants.

By the end of the consultation process, Machine Learning algorithmic interactions winnowed three Opinion Groups down to two (which I will call Opinion Groups A and B), which highlight the intra-group Common Opinions (the controversial urban subjects) that received the highest supporting rates within the two Opinion Groups. Thus we have two Opinion Groups each with a different set of intra-Group Common Opinions which are in conflict with each other. Here, I describe intra-group Common Opinions (controversial urban subjects) that were highlighted by the two Opinion Groups by the end of Uber-vTaiwan consultation process as follows:

- The first intra-Group Common Opinion toward Uber in Opinion Group A sees Uber as an illegal business, as it has threatened the livelihoods of existing domestic transportation workers and jeopardised the safety of the public. By contrast, the 'equivalent' intra-group opinion in Opinion Group B does not care if Uber is an illegal mode of transportation, nor does it consider Uber a risky transportation/service.
- The second intra-Group Common Opinion in Opinion Group A thinks Uber is a direct competitor to traditional taxis and feels that Uber should be registered as a transportation business [rather than as a platform/software business] liable to pay tax to the local government; Opinion Group B, however, prefers to take Uber over a conventional taxi and prefers Uber's provision on the basis of it being of better quality/newer than a taxi.
- The third intra-Group Common Opinion in Opinion Group A demands that the Taiwanese government has to intervene to control illegal Uber cars and drivers, feels all cars and drivers of Uber should be covered by insurance, and thinks Uber cars should be marked as 'cars for carrying passengers'; the corresponding intra-Group Common Opinion in Opinion Group B, however, thinks Uber offers a win-win service for both passengers and drivers.

Such living algorithmic interactions thus open up what forms and priorities for urban subjects are considered as relevant by different sections of the public, by emphasising and visualising

the existence of *both the majoritarian and the conflictual perspective* toward Uber as *important urban issues*. Such urban issues are configured by a confluence of Machine Learning algorithms and users which sort out and analysis tens of thousands of pieces of votes and hundreds of comments into different Opinion Groups, intra and inter-Group Common Opinions. Here, I note that what makes vTaiwan-Pol.is special and different to Decide Madrid is its ability to sort out the *conflictual perspectives* towards Uber. This conflictual aspect matters because it shows that vTaiwan's living algorithmic interactions do not exclude *the voice of difference perspectives* towards Uber. Perspectives from both Opinion Group A and Opinion Group B are emphasised and retained. That is, Uber is not only seen as an entity which should be made illegal as it is dangerous to passengers and Uber drivers (by Opinion Group A), but is also seen as a legitimate and convenient urban transportation mode for passengers (by Opinion Group B).

My conceptualisation of algorithmic calculation as living interactions between users, algorithms and data not only details but also further foregrounds the claim that contingencies (or the fluidities) in human-machine interactions in algorithmic calculation can result in very different outputs (Amoore, 2013, 2019, Kitchin, 2017) and, thus, highlight a different kind of urban issues. As noted in the previous examples, employing different algorithmic interactions leads to creating different ways in determining urban issues via both the rule of a simple majority and/or a rule of finding different perspectives). In vTaiwan, the living interactions (re)configure urban issues through the (re)generation of bespoke rules which rearrange both the number of Opinion Groups and inter/intra-Group Common Opinions in real-time. Opinion Groups related to Uber, for example, change by adaptation as the algorithm interacts with votes and comments being inputted into the system. It is the (re)generation of bespoke rules that allows for multiple possibilities for 'transformative moments' where new user-generated data, namely proposals or comments generated by participants are fed into algorithmic interactions, which in a short period can reassemble urban issues as in intra-Group Common Opinions and inter-Group Common Opinions regarding the case of Uber in vTaiwan; by extension opinion Groups are able to be quickly rearranged. This can be contrasted to Decide Madrid, where the potential for such transformative moments is much more strictly limited due to the use of the simple majority rule, which prioritises older proposals which have had more time to acquire a large number of votes.

Crucially, the specific living interactions between user and algorithms in vTaiwan, thus, indicate the existence of more empowered and fairer decision-making, because they highlight both majoritarian and controversial perspectives towards Uber issue. Fung and Wright (2001) have noted that it is important to include and highlight different viewpoints in making fair decisions in participatory budgeting processes. Though Fung and Wright (2001, p.19) and others (Pateman, 2012; Baiocchi and Ganuza, 2014) note the important role that deliberative actions play for users with different and conflictual viewpoints to listen, exchange and persuade others, vTaiwan does not offer such actions of deliberation for users (see Section 4.4.1). However, vTaiwan's living interactions stress the existence of controversial perspective toward urban issues, which offers the potential to produce fairer algorithmically-informed political decisions.

Here, considering that Amoore (2019) and Kitchin (2017) suggest the role of contingency should be considered as a major issue in studies of digital urbanism, the situated lens suggests two implications for digital urbanism by paying attention to contextually fluid and specific algorithmic interactions in the two DPPPs. If algorithms can potentially act in so many different ways, most previous claims which have been made about their use in digital technologies are not sufficient to explain the diverse and innovative potentialities within the interactions of users, Machine Learning algorithms and big data: this is the challenge of digital urbanism. Even though algorithms may share the same logic of anticipatory governance (Amoore, 2013; Leszczynski, 2016), not every algorithm necessarily implies 'raced' or 'classed' consequences in urban governance and space (Leszczynski, 2016), nor does every algorithm impose the same form of diagrammatic control over cities (Marvin and Luque-Ayala, 2017). As we have seen, Machine Learning algorithmic interactions can prioritise conflicting views towards urban issues such as during the Uber consultation; this process is significantly different from the deployment of Machine Learning algorithms in other contexts such as surveillance in which potential illegal immigrants or terrorists are identified through a logic of pre-emption of risks informed by automatic and sensor-based data processed by algorithms (Amoore, 2013). The existence of different logics shown between platforms such as vTaiwan and algorithmically-mediated surveillance technologies is suggested by David Lyon (2010, p. 334) as being an important difference between what is made possible through new technologies used for surveillance and those used for democratic governance.

Seconldy, the situated lens implies that codes are certainly not 'constantly in a state of becoming', automatically transforming code/space (Kitchin and Dodge, 2011, p. X), precisely because each algorithm acts with its own 'character', governed though not determined by pre-defined programming rules. As shown in the example of vTaiwan, the prioritised urban subjects are *only* able to facilitate change in particular conditions when algorithmic interactions with new user-generated data produce a refresh of the previous rule on how similarities in voting patterns are sorted.

## 6.4 'Human' (re)configuration of political decisions

In this section, I look at how urban issues prioritised through algorithmic interactions within DPPPs are incorporated into formal policymaking processes located in the wider institutional environments in which the DPPPs are located. This focus on the wider policymaking process is particularly important in order to facilitate questioning of the quality of political decisions made on the basis of issues selected via DPPPs. Are these 'subsequent' political decisions really reflective of the ideas of DPPP users as determined by the interactions between user data and algorithms? Are these political decisions fair? My research makes clear that the algorithmically-sorted issues are not *smoothly* translated into political decisions by politicians or civic officials; as a result, the ultimate policy outcomes are not *equivalent* to those which came out of the DPPP. This is because processes of policymaking involve translation and reintegration by policymakers, moderators and civil servants, who operate in institutional environments bound by their own internal norms and wider cultural contexts; this produces unavoidable changes in the meaning of the algorithmically-sorted issues.

There has been little study detailing how algorithmically-sorted issues have been integrated into wider processes of political decision-making involving human beings possessing various roles, such as politicians, civil servants and public officials of various types. In a security context, Amoore (2013) critiques that decisions around immigration and citizenship made by the Home Office directly and simply apply algorithmic analysis of big data rather than judging each case within its own context. In her words, 'the algorithmic security decision, we might say, is no longer a decision as such but only the application of a body of knowledge',

because this decision is 'knowledge-based, objective, and free of the fallibility of human judgment' (Amoore, 2013, p. 163). However, we do not know *how* exactly immigration officers apply algorithmic output into their decision-making and implementation processes.

By situating algorithmically-sorted issues within the policy-making processes of Madrid City Council and the Taiwanese Government, I indicate that the algorithmically-sorted issues produced as 'raw output' of DPPPs can undergo significant mutation due to the various types of 'reinterpretation' which they are subjected to due to human agency/interpretation. 'Issues' ultimately turn into 'policy' only through conscious decisions taken by human actors. Whilst Madrid City Council claims that it has a philosophy of translating the raw algorithmic output of Decide Madrid directly into policy, in reality the actual process of translating it into policy unfolds via a messy process of negotiation and execution. In vTaiwan, various layers of human 'reinterpretation' (moderator, civil servant, politicians) of the algorithmic possibilities occur within the legislative process, meaning the output can be very different to that produced within the DPPP. This focus on policymaking processes beyond the DPPP directly speaks to critical studies of data and algorithms (Kitchin, 2017; Kitchin and Lauriault, 2018) which point researchers towards the need to analyse any given algorithmic production of data within broader political, social, cultural and technical contexts.

6.4.1 Two policymaking processes

I will now discuss two processes of policymaking in the DPPPs under study in which user data interacts with algorithms to produce the 'raw output' which legitimates certain policy ideas. This 'raw output' then undergoes a further process by which it is interpreted by human actors in the policymaking space. For Decide Madrid I will discuss the results of the 2016 participatory budget, and for vTaiwan I will discuss the outcome of the consultation around Uber in 2015-2016.

For the 2016 Decide Madrid participatory budget process, an annual 60 million Euro budget was distributed via two categories: a district-based element (70%, 42 million Euro) and a citywide element (30%, 18 million Euro). From 2017 onwards, Madrid City Council increased the amount of budget available to 100 million Euros. There is an initial stage where users can propose, support participatory budget projects, a second stage where technicians

check the feasibility of participatory budget projects, and following with the voting stage where users can vote on those projects which are technically feasible and supported by users in the initial stage. The final stage will sort out which participatory budgeting projects receiving simple majority support from participants (as I have illustrated in section 6.3.1). After this voting stage, there is a bureaucratic policymaking process in which civil servants have to check the feasibility of participatory budgeting proposals again and confirm a certain amount of budget to the proposals by consulting with experts and technicians. Afterwards, civil servants have to create bidding announcements for each winning proposal (if it meets all legal and financial criteria) to find private providers to implement and carry out winning proposals into action plans.

In the case of the Uber consultation in vTaiwan, the Taiwanese government and g0v (a civic hacking community in Taipei) preselected the issue of Uber as an issue which would be subject to consultation through vTaiwan. This is in contrast to Decide Madrid, which allows users the freedom to define the issues and does not give issues which have been pre-selected by the authorities. In this instance, the specific issue up for debate within vTaiwan was the issue of whether Uber should be legalised in Taiwan. There were two stages to the public consultation. Firstly, users were invited to express their views on the Uber issue by generating comments or voting on other existing comments; this was possible via the vTaiwan platform only. Secondly, after the result of online consultation via the vTaiwan platform, a working group, consisting of volunteers from the civic hacking community (g0v) and contracted workers from the Taiwanese government, will identify stakeholders who are relevant to the issue under consultation and invite them to a physical face-to-face consultation along with representatives from the Taiwanese government. In this physical face-to-face consultation, the moderator from the civic hacking community (g0v) would present the results of the online consultation and facilitate a stakeholder consultation (around the results of the earlier consultation). After the two stages of consultation, the Taiwanese government drafted a bill based on the results of the whole process, which would then be sent over to the Parliament.

6.4.2 En route to action plans

In the case of Decide Madrid, Madrid City Council made a strong commitment, backed up with significant resources, to implement and execute the algorithmically-sorted issues produced by the DPPP — i.e. those participatory budget proposals that gained majority

votes — into urban projects. During the four years in which various participatory budget processes have been carried out, Madrid City Council has committed to spending 360 million Euro on 132 proposals generated via Decide Madrid; in addition, it has deployed a lot of labour to conduct administrative work to turn these proposals into real projects. This entails (but is not limited to) making commitments on negotiating between different departments and the authors of the proposal (to track whether the proposals are being implemented faithfully) and designating staff to write contracts to implement the project.

An important additional point is that Madrid City Council agreed to report on the progress of each proposal in a dedicated section within the Decide Madrid platform. This meant that the progress of each proposal was able to be visualised 'en route' to being actualised as a project. The progress of implementing each proposal can be viewed in the 'tracking' section of the proposal section nested within the participatory budget section of Decide Madrid. For instance, a citizen can follow how a successful 2016 participatory budget proposal— one that demands more charging points for electric cars in Madrid City — proceeded, including details of how it was contracted out to a private-sector provider and when it was finally completed (see the detail of this process in Figure 17).

**Posted on 07/30/2017**

**The project has changed to the status**

In process

Started the contracting file: Preparation of the Specifications Technical Requirements for open competition for supplies of fast charging points for electric vehicles

Posted on 11/01/2017

Started the contracting file: in the process of awarding the contract for supplies of fast charging points for electric vehicles.

Posted on 12/18/2017

It will run in 16 locations. 12 contracts are awarded and 4 are in the initial processing phase of the contract.

Posted on 06/28/2018

**The project has changed to the** Running **state**

The project is being executed as a Financially Sustainable Investment. There are 16 fast charging points (50 kW), of which 4 have already been installed in the Plaza de Colón and 11 sites are already designated: Calle Fuencarral; Paseo de la Castellana 160; Goya Street; Paseo de la Castellana 106; Fernández de los Ríos Street; Alfonso XII Street; Cerro de la Plata 4; Round of Valencia 1; Loyalty Square 3; Castelló Street 105 and Santa Engracia Street 115. Pending valuing a site.

**Posted on 09/18/2018**

**The project has changed to the status**

Completed

Figure 17: Screenshot of a process of materialising a participatory budget proposal as a project (source: https://decide.madrid.es/presupuestos/2016/proyecto/3694#tab-milestones, access at 01/09/2019)

After reviewing the process of execution of urban projects, I concluded that it was clear Madrid City Council was making the best endeavours to carry out what was demanded from proposals which were successful within the participatory budget section of Decide Madrid, even when there are legal and capacity-related constraints. A senior politician in the team of Decide Madrid, Peter, expressed to me that Madrid City Council strived to implement participatory budget proposals despite the various legal and capacity-related constraints which existed. Owing to its delineated constitutional relationship with wider elements of the

Spanish state, Madrid City Hall has a limited amount of political power to deploy in governing Madrid: key areas such as Education and Transportation, for example, are governed by the Regional Government of Madrid (as opposed to Ayuntamiento de Madrid / the City of Madrid). On top of this, some policymakers are not used to adopting citizens' ideas: this is not how they have worked in the past. Considering these constraints, Peter stressed that the team of Decide Madrid spent a lot of time negotiating and persuading other parallel departments to execute proposals as best as they possibly could. To give one of many examples: whilst having no formal powers over education, Madrid City Council attempted to buy musical instruments for primary schools by working around the current legislation. In Peter's description:

> *schools belong to the regional government, not the local government. One of the proposals was to buy musical instruments for schools and we were not able to do so because it is out of our competencies, but we found a way which was to buy musical instruments for public libraries because libraries are governed by Madrid City Council and then lend them to the schools for free. We found our ways (laugh) and then that worked.*

We can see what has been algorithmically configured as urban issues — the participatory budgeting proposals which gain the simple majority support — mutate into an actualised present reality; as of now, most of the 2016 participatory budget 'winning' proposals have been executed and completed. New supported housing and facilities have been acquired for victims of gendered-violence, new public toilets and drinking fountains have been installed, new municipal nurseries built, new pedestrian pavements installed in Plaza of the Sun (Puerta del Sol), a new daycare centre for Alzheimer's patients and a new shelter for special animals have been built (see Figure 18).

For Decide Madrid, therefore, we can conclude that the ability of the DPPP to contribute towards providing citizens with empowerment through giving them the 'participatory power' to enable them to contribute to municipal policymaking in ways which they previously could not do, as this power was reserved for politicians and public officials (Baiocchi and Ganuza, 2014). The prioritised urban issues which emerge via the living interactions between users and algorithms within Decide Madrid are having a real impact in Madrid City. For Biocchi and Ganuza (2014, p. 31-32, 36-37), an empowered practice of participatory budgeting is to

make sure decisions made by citizens concerns are fed back and incorporated into subsequent governmental policymaking processes. In what they term the 'chain of popular sovereignty' Biocchi and Ganuza (2014, p. 36) explain that decisions made by participants were protected and documented until their implementation. Here, by being committed to respecting and incorporating the urban issues which have been prioritised by the interactions between citizens and algorithms, Decide Madrid strongly aims at foregrounding the ability to produce meaningful political decisions. However, as Decide Madrid's algorithmic calculations prioritise a majoritarian view on urban issues — what Fung and Wright (2001) terms as 'aggregating votes' — rather than seeking to make 'collective' decisions through deliberative rules, a crucial question emerges: is sticking to majoritarian rule really facilitating political decisions which are fairer?

Figure 18: a collection of urban projects from 2016 participatory budgeting winning proposals (source: https://decide.madrid.es/presupuestos/2016/ejecuciones, access at 01/09/2019)

| | |
|---|---|
|  |  |
| Dog parks[43] | A municipal school for pre-school children[44] |
|  |  |

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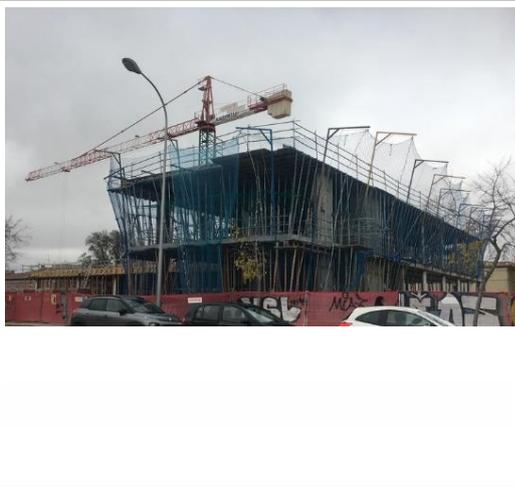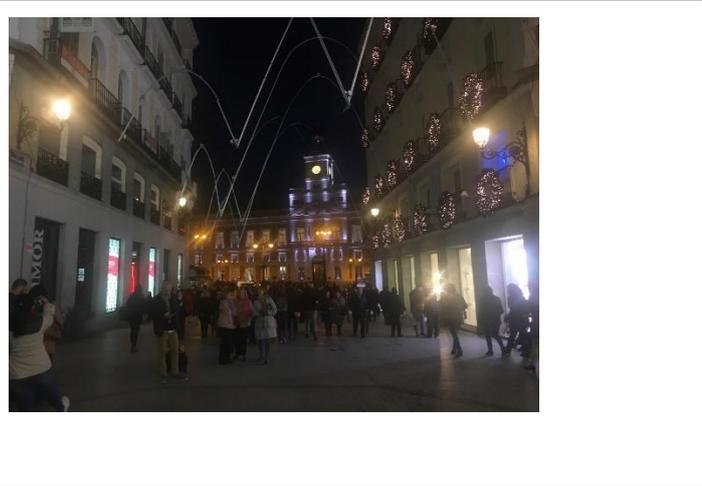
[43] https://decide.madrid.es/presupuestos/2016/proyecto/4517#tab-milestones, access at 01/10/2019
[44] https://decide.madrid.es/presupuestos/2016/proyecto/5480#tab-milestones, access at 01/10/2019

| A daycare centre for Alzheimer patients [45] | A new pedestrian pavement near Puerta de Sol (source: author's own) |
|---|---|
|  a new shelter for abandoned special species of animals[46] | |

### 6.4.3 vTaiwan: human post-filtering of algorithmically-sorted issues

In the case of vTaiwan, it is clear that algorithmically-sorted political possibilities undergo significant mutation as they encounter human interventions within the policymaking process once the 'raw output' of the DPPP has been produced. In contrast to Decide Madrid, where public officials acted on the basis that they were to respect the outcomes created by the DPPP as much as possible, in vTaiwan, this process of 'post-filtering' significantly constrains the potential of the DPPP to deliver fair and empowered political decisions.

In the vTaiwan context, the whole policymaking process requires a face-to-face consultation with stakeholders (identified by policymakers and moderators) to be carried out after the online participation with citizens has been concluded within vTaiwan. Only after this physical consultation do officials draw up concrete measures, which may include drafting a new policy or revising current legislation. With regard to vTaiwan, the organisational culture within the wider institutional context the platform is embedded does not reproduce the same willingness to implement in full the raw output of the DPPP as exists in Madrid City Council; this means that it is the policymakers and moderators from the Taiwanese government and civic hacking community (g0v) rather than users who have the final say on deciding which of the algorithmically-sorted issues will be presented and incorporated into the policymaking process.

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[45] https://decide.madrid.es/presupuestos/2016/proyecto/5177#tab-milestones, access at 01/10/2019
[46] https://decide.madrid.es/presupuestos/2016/proyecto/5578?spending=true#tab-milestone, access at 01/03/2019

For example, within the Uber case, the outcome of the consultation produced strong intra-Group Common Opinions and relatively weak inter-Group Common Opinions; this reflected the controversial nature of the subject matter. However the existence of controversy in the Uber case — essentially, fundamental disagreement over whether Uber should be legalised (see details in Section 6.3.2) — was dialled down by politicians and moderators in the subsequent face-to-face consultation, reduced to a debate over a proposition for amending legislation which was much more favourable to traditional taxi drivers. As I will elaborate, this clearly shows that the 'raw output' of the DPPP, the issues sorted by algorithmic interactions with users, mutated into something else due to the imposition of political interests from outside the DPPP. This action of post-filtering has clear implications from an empowerment perspective on the quality of the political decisions that vTaiwan configures; both Fung and Wright (2001) and Baiocchi and Ganuza (2014) feel that real empowerment means that participants should be able to make political decisions with consideration of a wide range of different perspectives and which have a real impact in policymaking processes. By filtering out the existence of widely divergent/controversial perspectives of the Uber case, chances are lost for policymakers and stakeholders to be able to fully consider these perspectives when they are making political decisions.

Gwen[47], a contract worker who prepared presentations and summaries of the results from vTaiwan online participation for the face-to-face consultation, confessed to me that algorithmically-sorted different perspectives on Uber issue, the divergent intra-Group Common Opinions, would not be presented in the consultation. In her own words:

> *I won't put the opinions from the minority group [intra-Group Common Opinions] into the presentation…there are loads of discussion which will be deleted during the translation from data exported from Pol.is to the presentation in the face to face consultation…when it comes to the summarisation you need to delete and trim…like we only preserve the head of the octopus but not the legs as the head can represent the leg-comments, that is what they care about.*

Gwen points out that even though representatives of different Opinion Groups, or groups in

conflict would be invited to the consultation, the algorithmically-configured intra-Group Common Opinions from the online participation will not make it into the summary presentation in the face-to-face consultation.

This intentional 'reinterpretation' of the algorithmically-sorted minority opinions was confirmed to me by Felicity, a moderator of the face-to-face consultation. Felicity said that she only presents what is common between different Opinion Groups, such as common feelings, ideas and suggestions, rather than emphasising the 'different perspectives' which have been sorted out by the algorithmic interactions. She expressed that

> *if it is a comment that nobody agrees on, like a negative consensus, then maybe it's just a really bad idea. I don't actually present those,…a majority of people disagree with that. I shouldn't, strictly speaking, show it in the presentation, minority groups do get representation, but not those minority comments that are ignored by everybody.*

From the interviews I have conducted I concluded that it is clear to say that the civic hacking community and the Taiwanese government worked together to filter out different perspectives when presenting and incorporating the results of vTaiwan into wider policymaking processes. The case of the face-to-face consultation on Uber gives a vivid example of how the civic hacking community and the Taiwanese government strongly de-emphasised the antagonism between pro and anti-Uber factions which had been clearly apparent by looking at variations in intra-Group Common Opinions within different vTaiwan Opinion Groups. The intra-group Common Opinions of different Opinion Groups were very different from each other; they suggested fundamental disagreements between Opinion Groups on the basic issue of whether Uber should be legalised as well as strong divergence over the perception of various risk factors which Uber was suggested to pose which informed these judgements of (il)legitimacy. However, the moderators in control of the consultation process which occurred after the algorithmic interactions chose to completely ignore these facts and instead only presented a simplified set of bullet points which were solely based on the inter-Group Common Opinions — represented as 'consensus' — in practice this is the same as following a principle of simple majority. The set of simplified bullet points is shown here:

1. Drivers should be scrutinised in order to ensure the safety of passengers.
2. The Ministry of Transport should take responsibility to control illegal cars functioning as taxis.
3. The Taiwanese government should not be biased toward a particular business model.
4. Uber should pay tax to the Taiwanese government.
5. Uber should be treated like taxi companies where each driver has to show and display their licence and registration in their car.
6. Non-commercial cars can only be used for 'taking customers' twice a day in order to fulfil car-sharing purposes and have to take out insurance.
7. Drivers should be able to work for different taxi companies.

After the conclusion of the face-to-face consultation, the Ministry of Transportation (MoT) — as the Taiwanese government had pledged — went on to incorporate the views of the vTaiwan from the face-to-face consultation into draft legislation which revised the current Transportation Act. However, it did so only on the basis of the conclusions in the bullet points, which as has already mentioned only represented a simplified majority consensus based on a human reinterpretation of the inter-Group Common Opinions. This set of conclusions, which did not seem to me to be strongly hostile to Uber, was somehow translated by the Ministry of Transport into an anti-Uber proposition (via a process which remains obscure to me despite having asked several senior officers in the Taiwanese Government why). It seems that the department chose to emphasise the anti-Uber strands of the consensus, which strongly implies that the civil servants responsible were minded/directed to view the document through the lens of external political imperatives surrounding the taxi driver protests. The subsequent press release from the Ministry of Transportation (MoT) demanded that a revision to the Transportation Act should mandate Uber to 'pay tax, take insurance, take control' (Ministry of Transportation and Communications, 2017). This clearly ignores the third inter-Group Common Opinion that the Taiwanese government should not be biased toward a specific business model.

By observing this process, we can clearly see how the algorithmically-sorted issues created in vTaiwan undergo mutation, which is apparent in at least two ways. Firstly, controversial issues selected by the algorithmic interactions of vTaiwan — the intra-Group Common Opinions — were selectively reinterpreted by the moderator in the face-to-face consultation

(which dialled down the controversial dimension of Uber issue). Secondly, the simplified document for the consultation which stressed inter-group consensus was again reinterpreted by the Ministry of Transport into an anti-Uber proposition, in a move which seems to have been obviously intended to impose the 'correct' judgement of the ministry on the results of the consultation. However, as I will discuss in the next section, this attempt to erase controversial dimensions identified within the vTaiwan process would ultimately be unsuccessful; these controversial issues would make themselves known again 'outside the system' through the appearance of on-going protests in urban spaces, both on the part of taxi drivers, who remained displeased that Uber was being allowed to operate at all, and Uber drivers, who felt that the results of the vTaiwan process had unfairly discriminated against them.

The case of Uber indicates that algorithmically-sorted issues can mutate as they cross various stages in the policy-making process. The conclusions of the platform — the 'raw output' — can be easily re-explained, translated or ignored by more powerful actors at play in policymaking, such as the civic hacking community and the Taiwanese government. Importantly, this example reinforces what has been highlighted in other critical studies of algorithms (e.g Kitchin, 2017) which have stressed that algorithmic calculations have to be understood within both technical and wider contexts. Lacking an understanding of either one of these contexts will significantly affect the ability to grasp the complexity of algorithms as they relate to data, users and other actors within wider contexts. Adding to Kitchin's (2017) critical study, I note that this emphasis on analysing the effect of algorithmic calculation within the policymaking process has an important implication on the quality of political decisions. What has been considered as an important input in making a fair political decision by Fung and Wright (2001) — the strongly conflictual view on Uber which were identified by vTaiwan's algorithms — can be post-filtered by policymakers and moderators before political decisions are made.

## 6.5 Re/Deterritorialization: discarded urban participatory data stay within/resurfaces outside the DPPP

I will now direct attention towards those urban participatory data which were excluded by the two DPPP decision-making assemblages. This will be done by conducting a close reading of

147 proposals in Decide Madrid which were not legitimated as urban issues in the 2016 participatory budgeting process, and by highlighting conflicts between Taxi drivers and Uber drivers in Taipei which persisted in the world beyond the assemblage of vTaiwan. My study and comparison of two different sets of discarded data is important, as it shows two different types of algorithmic decision-making assemblage in a state between being deterritorialised and therefore emerging as ongoing protests in urban space and being reterritorialized in a way which reinforces algorithmic majoritarian rules. It therefore raises a challenging question for algorithmic decision-making: are the political decisions made through the two DPPPs fair and empowered enough?

DPPPs, as much as security-related algorithmically-dependent systems, 'close down what is partly-formed and render it actual' (Amoore 2013, p 173). Here, we can see that Deleuze (1986) would describe the DPPPs decision-making assemblage as being (re)territorialised and deterritorialised. We can also see as relevant Amoore's idea of 'indeterminate life'. Similar to the Deleuzian notion of deterritorialisation, Amoore (2013) describes the concept of indeterminate life as referring to half-formed potentialities that are rejected and closed down through the operation of algorithmic devices (assemblages) in order to present a site of resistance to the reductive and determining power of algorithms. Giving the example of an algorithmic system designed for v-Bomb, such indeterminate life can be seen as 'the contingent chances' for lives in the targeted city that 'are not amenable to calculation' (Amoore, 2013, p. 75). Whilst to unveil such indeterminate life does not directly judge the decisions of algorithms per se, it offers a means of going beyond what an algorithmic system can imagine by highlighting 'possible subjects, subjects as yet unknown' (Amoore, 2013, p. 156-7).

For DPPPs, I note that such 'indeterminate life' entails but not limited to the whole system of the DPPP: whilst they necessarily include those 'lost' proposals which did not make the grade, they also includes proposals which did make the grade but got rejected by policymakers later on in the policy-making process, as well as those issues which did not even come to be inputted into the system in the first place. The algorithmically-mediated assemblage via which user proposals are evaluated and discarded by other users, can be read as Connolly's (2011, p. 158) 'seer dwelling within a nest of potentialities, jostling within and against each other during a forking moment' in which multiple potentialities for urban participatory data

are determined into specific issues of legitimate public concern. This observation is supplemented by the realisation that discarded urban participatory data, such as a proposal in Decide Madrid or a comment in vTaiwan, do not *disappear* just because the systems do not consider them as issues worthy of concern: they remain potential spurs to future political actions, both within the platforms and outside them in urban spaces.

### 6.5.1 Decide Madrid

The discarded proposals I look at in this section are 147 city-wide proposals in Decide Madrid, a selection made from 5072 total proposals (although this full total includes district-wide proposals which are not analysed in this thesis) which were generated and/or evaluated out of a pool of 55185 participants (Decide Madrid, 2016). Study of the discarded proposals from Decide Madrid reveals how an algorithmic decision-making assemblage can reterritorialise its majoritarian rule and thus exclude other dimension of urban subjects. This is evidenced from looking at a wide array of local, everyday potentialities of Madrid which are closed down during 'forking moments' within the platform: these included articulations of the need for libraries, cultural centres and sports centres in particular neighbourhoods or municipal districts[48] that reflect distinctive local knowledges and experiences. Though they have been rejected as issues of public concern, these proposals nevertheless highlight the important role these cultural facilities and spaces play in constituting the everyday life of some local residents. In particular, some proposals addressed what residents 'feel' about not being able to access cultural facilities and spaces. One proposal detailed the challenging experience of accessing public libraries for residents who live in peripheral districts:

> *In the whole neighbourhood we don't have access to any library, only a reading room. The closest libraries are in Camp (municipal) or Aluche / Aviation (community of Madrid), so you have to take public transport. Peripheral districts are very discriminated against on the cultural issue; what in other neighbourhoods is part of everyday life, going through the library to study, in ours it is almost a luxury if there is no time and / or money for transportation.[49]*

This rejected proposal highlights the essential but neglected role that libraries play in the

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[48]  Neighborhoods such as Almagro, Gaztambide, Vallehermoso, Valdebebas. Districts or areas such as Arganzuela, Ensanche de Vallecas, Moncloa-Aravaca, Puerta del Angel, Alto de Extremadura, Villaverde.
[49]  Retrieved from https://decide.madrid.es/presupuestos/2016/proyecto/5673. Access at 13 September 2019.

everyday life of residents. It is an example of widespread concern over the cultural life of Madrid, which is seen in 57 out of 147 discarded proposals under study, which ask for provision of facilities such as sports centres, music schools and dance schools for children. One proposal demands the creation of a music school that serves all the children in the area because 'there is no music school nearby and parents who want to give this training to our children have to move far, with the consequent disorder if we do not have a car'[50]. Other proposals request swimming pools and sports centres for the neighbourhoods of Matadero, Valdebebas, Las Tables and La Elipa, because they can 'improve the health of residents'[51] and 'give residents the life that they need'[52]. Such concerns, related to the inability to access cultural spaces, highlight a wider desire to support marginal groups such as the disadvantaged, the disabled, and animals (Decide Madrid, no date).

The rejected proposals indicate the existence of a minority perspective of urban issues which are excluded and dismissed by the algorithmic operation and therefore reterritorialises its simple majoritarian rule within Decide Madrid. What this implies for digital democracy is a fundamental issue around the exclusion of particular views via algorithmically-powered rules in policymaking processes, which in the case of Decide Madrid is done through a majoritarian rule. However, Machine Learning algorithms within vTaiwan-Pol.is, despite excluding comments which receive a high percentage of votes on 'pass', visualise both the minority and majority viewpoints on the Uber issue. Crucially, what this comparison shows is that attention must be paid to the algorithmic calculations underneath the interfaces of digital platforms under study in order to understand what is excluded in a given instance of digital democracy through its own algorithmic rule.

6.5.2 Urban protests in Taipei City

Within vTaiwan and the wider urban space in which it operates, indeterminate life can be shown to 'break out' after the face-to-face consultation (organised by the Taiwanese government and a civic hacking community, see details in Section 6.4.3) worked to post-filter (i.e. ignore) the algorithmically-sorted conflictual dimensions surrounding the Uber issue which were identified by vTaiwan's algorithms in interaction with user data. This can be seen

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[50] Retrieved from https://decide.madrid.es/presupuestos/2016/proyecto/3907. Access at 13 September 2019.
[51] Retrieved from https://decide.madrid.es/presupuestos/2016/proyecto/4352. Access at 13 September 2019, and https://decide.madrid.es/presupuestos/2016/proyecto/5079. Access at 13 September 2019.
[52] Retrieved from https://decide.madrid.es/presupuestos/2016/proyecto/3780. Access at 13 September 2019.

by the reality of on-going protests between Uber and Taxi drivers in central Taipei City, which have not been resolved since 2016 despite attempts to do close down the issue within the DPPP and the subsequent face-to-face consultation. Here, my point is not to indicate how the Taiwanese government rejects controversial issues (see in section 6.4.3) but to highlight how these rejected issues will tend to make themselves known in urban space as a form of deterritorialisation; for example, they emerge as on-going protests against the result of vTaiwan's algorithmic decision-making assemblage. This then raises a challenging question for algorithmic decision-making: on what criteria should we evaluate the fairness of political decisions made through the algorithmic assemblage?

From the perspective of the Taiwanese Government, Uber was classified as a 'solved' case on the vTaiwan platform in 2016 (vTaiwan website, no date). After the Uber consultation within vTaiwan ended, Uber made changes to its operating procedures in Taipei in return for the Taiwanese government allowing it to continue to have an operating license, which included agreeing to use cars from external rental companies and introducing verification to make sure drivers had correct insurance and owned a driving license. However, despite this agreement, the presence of Uber continued to remain an object of concern to 'traditional' taxi drivers; also, part of Uber's operation continued to be in breach of legislation. On the 23rd of May 2018, 3000 taxi cars protested against Uber in front of the Ministry of Transport. On the 31st of January 2019, around 3000 taxi cars drove slowly around the Cabinet Office in Taipei, in protest against what they claimed to be an inability to compete with Uber. Taxi drivers demanded the Ministry of Transportation place additional controls/sanctions on Uber and its drivers because they considered them to be an illegal transportation business under the terms of the Public Road Act in Transportation Management regulation (Strom News, 2019)[53]. On the 21st of April 2019, around 5000 Uber drivers protested in front of the Presidential Office in the hope that the Ministry of Transport would look at the issue of Uber's use of a flexible and algorithmic calculation on the fee) when the revised Transportation Management regulation was produced (Technews, 2019)[54]. In this they were successful: after the revised regulation became effective in June 2019 (Inside news, 2019)[55], Uber was banned from charging passengers via a flexible fee calculation.

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[53] https://www.storm.mg/article/897140, access at 01/10/2019
[54] https://technews.tw/2019/04/24/uber-invalid-protest/, access at 01/10/2019
[55] https://www.inside.com.tw/article/17472-taxi-uber-103-1, access at 01/10/2019

This on-going protests about Uber signify that the issue was not 'solved' within the bounds of the DPPP, as the architects of vTaiwan-Pol.is might have hoped. However, is this a bad thing? The whole issue can be seen to foreground the democratic significance of the ongoing conflict between pro and anti-Uber Opinion Groups, which has been pointed out and visualised by algorithmic interactions within vTaiwan-Pol.is as intra-Group Common Opinions. By attempting to close down controversial protests by 'gating off' the Uber consultation within vTaiwan, the Taiwanese government and civic hacking community arguably inflamed the fire of the protestors further. Here, the presence of on-going protests outside of the DPPP point to *disagreement against* political decisions made through vTaiwan's assemblage of algorithmic decision-making, a rejection to the Taiwanese government's revision on the Transportation Act. Such protests question the consensus-based democratic future which vTaiwan advocates. The divide between Uber drivers and traditional taxi drivers did not go away or was 'solved' because of the one-time consultation via vTaiwan in 2015. By not considering the controversial dimension of Uber case in making the political decision, vTaiwan's exclusion raises a crucial question: what should we make of these political decisions made through the assemblage of algorithmic decision-making? Are these decision fair enough in the view of participatory democracy? Especially, in a more controversial case like Uber, we have seen that both Uber drivers and Taxi drivers certainly do not think the algorithmically-informed political decisions are fair and equal.

Viewing this result in the light of Fung and Wright's (2001) idea of fair decision-making, we can see at least two reasons why stakeholders do not agree with vTaiwan's political decisions. Firstly, it is policymakers in the Ministry of Transport who make the final political decision on how Uber is legalised in Taiwan, rather than stakeholders. This suggests a weaker devolution of decision-making power to key stakeholders like Uber drivers and Taxi drivers, whose voices and actions seem not to have any real impact in the vTaiwan policymaking process. Secondly, due to the use of 'post-filtering' — essentially the imposition of external political decisions over the results of the consultation — moderators and policymakers preclude and deemphasise the controversial viewpoints on the Uber issue in the hope that controversy would go away. However, we have seen that rather than making difficult issues disappear, the opposite result happened and they erupted into physical urban space (see Section 6.4.3). By not presenting the controversial viewpoints identified in vTaiwan as intra-Group Common Opinions at the face-to-face consultation, chances were lost for key

stakeholders to learn and reflect upon different viewpoints. In Fung and Wright's (2001) discussion on making an equal decision in the participatory budget project, it is a must that practitioners should include and deliberate on the different and conflictual viewpoints on the issue; otherwise, decisions are likely to make in favour of interest groups who have more political influence.

## 6.6 Conclusion

I conclude this chapter by returning to the questions: (1) what effects do the DPPPs under study — Decide Madrid and vTaiwan — have on decision-making in wider policymaking processes in which they are located? ; and (2) how do Decide Madrid and vTaiwan differ in terms of their general approach towards decision-making? Via a situated lens, I have approached these questions here by examining the ways in which political decisions on legitimating urban issues are configured and reconfigured through the algorithmic calculations within policy-making processes in Madrid City Council and the Taiwanese government. The situated lens is effective in analysing the algorithmically mediated political decision, seeing them as generating intersections with users, user-generated data, policymakers and moderators located within wider institutional processes; as a result, particular urban issues are considered worthy of public concern. Here, the situated lens highlights both the contextual specificity and fluidity of the technical and political contexts in which algorithmic political decisions are (re)configured. Considering the contextual specificity and fluidity playing out within the assemblage of algorithmic decision-making matters for it shows how these two elements affect the fairness and empowerment of political decisions made by both Decide Madrid and vTaiwan. It is the situated lens that shows the quality of political decisions which highly rely upon the contextually unfolding interactions between users, data and algorithms, as situated within specific political institutions.

I will make three points to elaborate on how a situated lens allows me to examine and compare the effects of algorithmic interactions with user data on the quality of political decisions.

Firstly, a situated lens assists me in conceptualising the contextual fluidity and specificity of algorithmic calculations (Kitchin, 2017) as 'living' interactions between algorithms and users in making political decision. Here, the situated lens shows the living ways in which

algorithmic interactions with emergent user-generated data and thus act beyond the strict intentions of their design. In noting that understanding the role of contextual fluidity and specificity of algorithmic calculations matters - in terms of how users generated urban participatory data and how algorithms respond to emergent user data - Kitchin (2017) describes how this leads to different rules in (re)prioritisation of urban issues and thus has an implication in influencing the quality of political decisions. The different forms of algorithmic interactions between Decide Madrid and vTaiwan open up different sets of urban issues as objects of public concern. For Decide Madrid, urban issues are (re)organised largely based on how a simple majority of users write on and assess Madrid City. vTaiwan, by contrast, identifies both conflictual (intra-Group Common Opinions) and majoritarian (inter-Group Common Opinions) perspectives on urban issues on the basis of living algorithmic interactions with fluctuating user data. By highlighting the conflictual perspective on urban issues, vTaiwan's living algorithmic interactions indicate the potential for creating a more empowered decision-making process.

Secondly, I do not argue that algorithmic interactions themselves have the ability to make political decisions. Instead, the situated lens shows the importance of contextual specificity in terms of how politicians and other powerful actors at play can reconfigure political decisions. Importantly, such a focus shows how the quality of empowerment of specific political decisions might *vary*. By showing the different fate of two sets of urban issues in the policymaking process, I assert that the two DPPPs configure political decisions on a qualitatively-different basis. Despite Madrid City Council allocating an annual 60 million Euro budget for implementing urban issues as projects which are algorithmically-sorted through Decide Madrid in 2016, there is a limited commitment from the Taiwanese Government to guarantee that all algorithmically-configured issues will be presented at a subsequent face-to-face consultation/converted into a draft bill. To put it differently, as the wider political context in which vTaiwan operates and produces political decision can override and erase controversial viewpoints on the Uber issue prioritised and determined by the living interactions, a lesser degree of citizen empowerment is available. It is politicians and policymakers (rather than stakeholders) who have the ultimate power in making political decision.

Thirdly, by drawing on theories of participatory democracy, I highlight that the

human-algorithmic (re)configuration of political decisions exclude other urban issues from being seen, stressed and prioritised as legitimate political decisions in policymaking processes; by highlighting this we can see how there is a way to question the fairness of the political decisions generated with the assistance of DPPPs. As we have seen in the case of Decide Madrid, libraries, cultural centres, sports centres and music schools — which are seen as an essential part of every life for significant amounts of local residents — are excluded from decision-making processes. In a more extreme case of the Uber consultation in vTaiwan, both Uber drivers and Taxi drivers surface in various 'real-world' urban protests against the political decision made by the DPPPs. Are these exclusions suggestive that taxi drivers and Uber drivers are able to be empowered to make fair political decisions? Building on Fung and Wright's (2001) ideas of making equal decisions, I show the importance of not erasing the controversial perspectives of the Uber issue within vTaiwan and subsequent processes and also of the need to devolve decision-making power to participants/stakeholders. I consider these points are important as guidelines rather than hardcore criteria of an equal decision-making process because I consider the question of what constitutes a fair political decision open to discussion with stakeholders.

On another note, it is vital to mention another perspective focused on the function of DPPPs in terms of legitimisation. DPPPs or non-digital mediated public participation have been used as a means to reinstate and support political power and legitimacy (Chadwick, 2001). This critique has not only been targeted at the deployment of (digital) political participation mechanisms by the British and American governments (Chadwick, 2001) but is also relevant in the cases of Chinese and Mexican government-led political participation projects (Jiang and Xu, 2009; Juárez Toledo et al., 2016). However, as Chadwick (2001) notes, political legitimisation as such is an ongoing process where the state or other political institutions have to constantly mutate their strategies, languages and symbols to maintain political legitimacy in terms of reasserting their power and status in society (Lipset, 1959) The short life of the two DPPPs under study here has not been able to prove the claim that they are essentially new ways to legitimate the state/local government, though politicians may desire them to be used in this way. This can be particularly seen in the case of Decide Madrid, where Decide Madrid did not guarantee winning the political election for the Carmera Administration in 2019. This echoes Papagianni's (2008) view on any given participatory project does not necessarily contribute to the process of state legitimatisation.

Finally, I would like to suggest the implications of using a situated lens, which speaks to wider debates whether to research outside or open up the 'black-boxed' algorithmic processes in digital urbanism (Field *et al.*, 2020; Kitchin 2017). Considering the contextual situatedness and fluidity of algorithmically mediated political decisions, the situated lens speaks to Kitchin (2017) and Crawford (2016, pp. 89–90), who remind us that it is important to 'look beyond algorithms as fetishized objects to consider them in relation to the developers in cubicle farms, the teenage hackers, the Amazon book buyers, the hoteliers on trip advisor, and the multitude of flesh and blood scenes where humans and algorithms engage'. It avoids a fetishistic analysis which does not see algorithmic calculations in the broader environments in which their operation and effects depend. It avoids the presumption that algorithmic technologies will inherently transform urban politics and spaces in the same manner, and by contrast highlights the different potentialities inherent within forms of algorithmic calculation. Whilst there are practical and methodological challenges to overcome in investigating the invisible and often confidential algorithmic systems, as algorithms continue to embed or intervene our everyday and different aspects of urban life, researchers should not shy away from using innovative methods and conducting inter-disciplinary collaboration to further the current understandings of digital urbanism without discrediting its algorithmic calculations.

# Chapter 7 Looking forwards on digital empowerment and digital urbanism

## 7.1 Revisit a situated account of digital political participation

In the introduction to this thesis I set myself four research questions as the purpose of this thesis, which sprang from my positionality as an urban planner and geographer:

1) What are the effects of Decide Madrid and vTaiwan on urban policymaking (in terms of making political decisions) and citizen empowerment?

2) How do Decide Madrid and vTaiwan differ in terms of potential for citizen empowerment and approaches to making political decisions?

3) How can the study of Decide Madrid and vTaiwan inform wider research on digital empowerment and on political impacts of algorithmically-powered devices in urban governance?

4) How can we develop an analytical lens which allows for an understanding of DPPPs at the various levels they operate and facilitates us in making meaningful judgments on impacts on political decision-making and issues of citizen empowerment?

I have developed a situated lens, which draws primarily on a fusion of assemblage thinking and theories of empowerment in ways to allow me to gain the explanatory power over the two DPPPs which will allow me to answer my research questions. This situated lens serves as an analytical lens which enables me to explore the fluid and contextually-embedded nature of digital political participation by breaking DPPPs down into three different assemblages (design, the dynamic User Interface and algorithmically-mediated decision-making). Each of assemblage has a distinctive agency which emerges through specific alignments with software engineers, algorithms, policymakers and users. All of assemblages are located within wider contexts of (urban) policymaking. Here, digital political participation is seen essentially as an on-going, mutable and extensive process involving algorithms, public budgeting, the allocation of other political resources such as legislative time and various human actors such as software engineers, users and politicians, all of whom are located within wider environments and embroiled with uneven distributions of participatory power and capacity amongst users. To this end, I assert that my account of DPPPs has problematised previous understandings of how digital participation has been understood, which have focused on whether citizens have access to appropriate literacy and technical skills and are situated within discourses of digital divide and the digital citizen (Mossberger, Tolbert and

McNeal, 2008; Isin and Rupport, 2015).

The capacity of either of the two DPPPs to offer a fixed and stable degree of empowered political participation to the user is inhibited by the fluidities which manifest due to the changeable algorithm-human alignments. This understanding can offer a suggestive insight into the operation of these DPPPs in other contexts and more broadly can help towards understanding practices and theories of digital empowerment, political decision-making and ethics in the digital age. Most importantly, the fluid nature of such digital political participation does not make it particularly easy for researchers and politicians to grasp and sketch out a picture of it. What is more, this fluid nature indicates that it is rather difficult to maintain a high level of empowerment via a DPPP for an extended period of time because any degree of digital empowerment can be subject to 'vacillation' due to a wide range of factors, from governments withdrawing political legitimacy to software engineers making a change in UI design. That is to say, digital empowerment can be seen as a fluid situation in which its degree of empowerment changes through the coming-together and going-away of users, algorithms, software engineers and politicians who are located in wider political contexts.

For instance, despite Decide Madrid securing a higher degree of digital empowerment than vTaiwan due to how its participatory calculus was structured and how the allocation of political resources was determined at the design stage (the assemblage of design), the degree of digital empowerment it offers users can be easily affected by changes in municipal administration and by the various barriers for users which can manifest when navigating through the convoluted UI. vTaiwan shares the same issue, as the degree of digital empowerment it offers depends heavily on shifting governmental allocations of resources and legitimacy, as well as on its dynamic UI which provides a fluctuating sense of engagement and potentially glitchy visualisations of different opinions on the issue under consultation. What this means is that in either DPPP it is difficult to ensure a more empowered practice of digital political participation, which I term as digital empowerment, for a long period of time.

In the following sections, I will summarise my key arguments specifically regarding the implications of my study of DPPPs for studies of digital empowerment and digital urbanism, with a discussion on wider understandings of digital ethics. I will elaborate how my situated

account of DPPPs impacts on recent understanding of digital empowerment and digital urbanism, stressing that a situated account offers an inter-cultural understanding of digital empowerment and digital urbanism drawn from a comparative analysis of two DPPPs in different contexts, Spanish and Taiwanese. I will then propose a suggestion for areas of future study in 'digital urbanism' and 'affective democracy'.

7.1.1 Rethinking digital empowerment

My approach to the analysis of DPPPs sees them as dynamic and open-ended combinations of human and nonhuman agencies which are located within three distinctive assemblages: design, the dynamic User Interface (UI) and algorithmically-mediated decision-making. The situated account highlights both the stable and unstable (vacillating) nature of digital empowerment. As a development of this point, I argue that the degree of empowerment that is offered by a DPPP — in this case, Decide Madrid and vTaiwan — cannot be seen as *a priori* but as *emerging* from and *forged by* specific human-algorithm relationships situated within the broader political and urban contexts which a DPPP such as Decide Madrid and vTaiwan have been developed in.

In the design assemblage, we can see how the degree of digital empowerment for both Decide Madrid and vTaiwan is both stabilised and destabilised through the creation of democratic narratives and participatory calculus which occurs within wider political contexts. On the one hand, this design process stabilises the degrees of digital empowerment a DPPP offers in terms of (1) providing a certain degree of political and economic support, which can convert citizen's participatory decisions into projects; (2) by determining the capacity to participate which a DPPP gives to users (i.e. the creation of specific *participatory calculus* in a given DPPP). These criteria have been considered as essential standards of empowerment by democratic theorists (Fung and Wright, 2001; Baiocchi and Ganuza, 2014; Mäkinen, 2006; Fisher, 2012). On the other hand, at the same time, as I have mentioned, the degree of empowerment of a DPPP is entwined with the wider political and urban contexts where a DPPP's life both began and terminated, and as a result, is constantly under threat of fading away when there is a change in the wider political weather. As of March 2020, the new conservative-governed Madrid City Council has already withdrawn all political resources (including annual 100 million Euro budgets, political will and administrative resources) from Decide Madrid; as a result, Decide Madrid does not offer the same degree of empowerment

as it was before. In a similar vein, the Taiwanese Government has re-shuffled its resources and interests from vTaiwan to another digital platform for political participation (namely JOIN) (interview with a senior officer, Gary, at the Taiwanese government), thus leaving vTaiwan with no new participatory activities and no further allocation of financial and political resources.

With regard to the assemblage of the UI within both Decide Madrid and vTaiwan, I have demonstrated another facet of the fluid nature of the digital empowerment of the two DPPPs under study. Considering the dynamic nature of the UI assemblage, where algorithmic visualisations heavily rely on users' inputs, here, the quality of digital empowerment is seen as fluid and volatile. Whilst the dynamic UI design of Decide Madrid acts to create *soft thresholds* (Ash *et al.*, 2018a) which highlight suggested information which enables users' capacity to make informed and collective decisions in voting and proposing, such UI can produce barriers which confuse and disable users' capacity to vote and comment. Whilst vTaiwan's UI manifests effects of *gamification* (Hassan, 2017) to increase users' sense of engagement and thus conduct collective and informed actions of 'voting' and 'commenting', it can also disable users from conducting these political actions due to its glitchy visualisations.

With regard to the assemblage of the algorithmic decision-making, I have illustrated how the quality of algorithmically-mediated political decisions is affected by contextual specificities and fluidities which are associated with algorithmic-human alignments. I have shown that it is the living nature of algorithmic interactions with users that makes it possible to prioritise both the majoritarian and conflictual viewpoint towards urban issues in vTaiwan and thus offers fairer and more empowering decision-making. Yet, such quality of fairness and empowerment is highly affected when Taiwanese politicians and moderators within their specific institutional contexts override and erase controversial viewpoints on the Uber issue which were prioritised and determined by the algorithmic interactions with users. Again, as the political actors play out in the particular institutional context, this process of algorithmic decision-making in vTaiwan should be seen in contrast to Decide Madrid which produces more empowered decision-making by giving users 'participatory powers' through the capacity to materialise participatory budgeting proposals into actual projects.

Therefore, the degree of empowerment offered by Decide Madrid and vTaiwan, rather than existing a priori, is *forged* by contextually unfolding and changeable human-algorithm relationships situated within broader political and urban contexts. The specific degrees of empowerment provided by Decide Madrid and vTaiwan is both predetermined and re-determined by the shifting of political resources and interest allocated by a given government, but also by the (re)creation of participatory calculus through software engineers over time. As I have demonstrated, both design, dynamic UI and algorithmic decision-making assemblages have developed their own patterns of stability and instability, thus each of them can distinctively affect the quality of digital empowerment offered in a different way. Whereas the degree of empowerment can be stabilised for a longer period once it is arranged by politicians and policymakers within the design assemblage, the possibilities of digital empowerment play out in a rather 'vacillating' manner in which users can only be empowered under very strict circumstances where both algorithms and users which constitute the dynamic UI have to create an enabling environment for users to feel engaged and make a collective and informed decision in voting and commenting.

What does my account of digital empowerment within Decide Madrid and vTaiwan imply for developing ethical guidance in the digital age? Here, I engage with the broader idea of posthuman ethics (Amoore, 2013, 2019) in order to try and rethink digital empowerment within and beyond the context of digital political participation. Drawing from Katherine Hayles' (1999) work on the posthuman, Amoore (2019, p. 3) explains posthuman ethics is 'a composite subject in whom the doubts of human and non-human beings dwell together, opening onto an undecidable future, where one is permitted to ask new questions on the political landscape'.

Taken from what Amoore (2013, p. 168) understands as ethics is to acknowledge 'the unknowability of the future' and thus to live with them by questioning, reinventing or resisting in the surveillance context, here, ethics in the situated lens is to harness the indeterminate potentialities as a way to question, recreate or reject the DPPPs. One characteristic of my approach, as informed from the Deleuzian's assemblage thinking, is that I have tried to emphasise potentialities which are as-yet-emerged as being part of the make-up of assemblages. The idea of indeterminate potentialities matters because it crafts out room for users to question and (re)invent the current design, algorithmic decisions of digital

technologies.

Within the context of digital political participation, an ethical approach should seek to open up the assemblages of DPPPs in order that users can question and recreate participatory calculus within the design assemblage, to reengage with the dynamic UI to make informed decisions and to reconstruct the rules in algorithmically mediated political decision. There are other non-majoritarian means of conducting participatory democracy. Discussion can be initiated with users and other stakeholders (in particular those who might be affected and excluded from digital political participation) on exploring the alternative ways of design DPPPs. I will return to this point in Section 7.1.2, where I explain how this idea of ethics can be taken into account more practically in producing ethical guidelines concerning AI decision-making.

Return to Amoore's (2019, p. 3) idea of posthuman ethics as 'an embodied posthuman form of doubt matter in relation to an age where collaborations of humans and algorithms are making ethico-political worlds', I wonder if users are learning to problematise and even recreate the DPPPs, are they not also imagineering a potential democratic future lying beyond what can be anticipated by the current design and operation of the DPPPs; thus are they not, in some ways, 'posthuman'? Thus, is digital empowerment not just a matter for humans but rather 'posthuman'? Who should be held accountable for the low degrees of the DPPPs?

7.1.2 Learn from the differences between Decide Madrid and vTaiwan: practice and policy

This section addresses how I use the situated lens to answer my research question of how Decide Madrid and vTaiwan differ in their ability to effectively facilitate enhanced user empowerment. My usage of this situated lens allows me to conduct a comparative study of Decide Madrid and vTaiwan. Such a comparative study reinforces my argument that digital empowerment is contextually embedded, as it shows how empowerment is differentially affected by flows of government allocations of political legitimacy, the (re)creation of participatory calculus and the dynamic UI situated within the political contexts. These common factors shape the quality of digital empowerment across the contextual differences which exist between Decide Madrid and vTaiwan. What is more, I assert that such a comparative approach has important implications in both policy and practice. Learning from

the differences in terms of degrees of empowerment between Decide Madrid and vTaiwan, I will offer some insights on how ethical guidelines for the use of AI-powered devices used for political participation may be formulated, and on what makes for fair political decisions in digital urban governance.

By making comparisons between the two DPPPs, I was able to show their differences in degrees of empowerment, to offer a sense of the different possibilities they suggested for digital empowerment and thus to highlight the contextual specificity for ensuring a better practice of digital empowerment. For instance, in the design assemblages of Decide Madrid and vTaiwan, I have shown that it is the specific institutional commitment that Madrid City Council has a higher degree of empowerment over vTaiwan due to allocating a specific set of political commitments and resources (an annual 100 million Euro municipal budget and administrative support) which 'secured' a four-year-term political legitimacy for the participatory practices. Decide Madrid's degree of empowerment is also reinforced by offering a wider range of participatory options for users to act upon. Whilst users' actions in Decide Madrid have a higher impact on policymaking processes, by contrast, vTaiwan has no guarantee that users' comments and decisions will be incorporated into the policymaking processes.

In the dynamic UI assemblages of the two DPPPs, a comparative study again stresses the importance of contextual specificity for a better quality of digital empowerment. Both DPPPs here offer different possibilities of digital empowerment because of the different effects their algorithms produce to visualise the UI differently to different users and at different times. Whilst Decide Madrid's UI can encourage users to make collective proposals by offering and visualising information on other similar proposals, vTaiwan can offer more possibilities of digital empowerment. Due to effects of gamification, vTaiwan's UI can provide users with a sense of engagement by visualising users as an avatar which can move from one Opinion Group to another alongside users' actions. vTaiwan's UI thus can provide users with the ability to make informed and collective votes by visualising different perspective (different Opinion Groups and inter and intra-Group Common Opinions) on the topic in discussion. Additionally, when it comes to the further limitations of DPPPs on digital empowerment, due to the imbalance of participatory powers amongst users, vTaiwan has a more serious issue then Decide Madrid. As opposed to Decide Madrid, the greater degree of centralisation of

participatory power within a few actors (the relatively greater prevalence of princelings) in vTaiwan suggests more limitations in digital empowerment.

Also, the comparative study has demonstrated the necessity of paying attention to the existence of contextual fluidity and volatility in terms of both algorithmic interactions with user and the institutional policymaking processes in which urban issues are either excluded or legitimatised (the assemblage of algorithmic decision-making). The situated lens, drawing on the theories of participatory democracy (Fung and Wright, 2001; Baiocchi and Ganuza, 2014), indicates to the quality of such algorithmically informed political decisions is not *a priori* fair or empowering. Contingent events (contextual fluidity), form 'post-filtering' to living algorithmic interactions with emergent user data, can affect the quality of the political decisions. For instance, vTaiwan's algorithmic decision-making assemblage, despite its capacity to highlight controversial dimensions of an urban issue via Machine Learning (such as in the case of the Uber consultation), is subject to 'post-filtering' (i.e reinterpretation) by moderators and policymakers in the subsequent face-to-face consultation and ensuing policymaking processes. vTaiwan's model thus does not guarantee a high level of empowered political decisions, as what have been sorted as important by users and algorithms can be subject to eradication or reinterpretation by policymakers and moderators at a later phase. The on-going protests on Uber in Taipei City evidences the fact that key stakeholders — taxi drivers and Uber drivers — do not think such political decisions are fair and empowering enough. Decide Madrid's algorithmic assemblage, on the other hand, indeed commits to turn urban issues that are selected by the majority of users into action plans. Yet, the question for Decide Madrid is whether its majoritarian model produces a fairer political decision than other algorithmic models.

Learning from the aforementioned difference in digital empowerment between the two DPPPs from different technical, political and cultural contexts, we can potentially sketch out a guideline for digital empowerment evaluation. Importantly, by collating what Decide Madrid and vTaiwan have done well in empowerment, a comparative study stresses that ensuring best practice regarding digital empowerment is to work through contextually embedded factors: (1) a sufficient allocation of political legitimacy; (2) a provision of an adequate empowered capacity for users; and (3) an enabling UI which allows users to feel engaged and make informed and collective decisions. These factors have the potential to be

further developed into a detailed set of indicators for governments which want to evaluate and monitor the outcomes of their digital political participation. Finding best practice guidelines stemming from an understanding of contextually embedded factors of digital empowerment is crucial because it not only goes beyond the political discourse of 'good practice in digital participation' as being the possession by a user of a set of participatory skills and capacities (Mossberger, Tolbert and McNeal, 2008; Isin and Ruppert, 2015) but also offers a new way for practitioners and policymakers to assess the degree of citizen empowerment within specific political and technological contexts. Having such an evaluative framework remains crucial as there is currently a lack of policy tools for evaluating the performance of DPPPs in citizen empowerment. Due to the experimental and emergent nature of the DPPPs, both Spanish and Taiwanese policymakers told me that so far there has not been developing a method for them to assess the performance of DPPPs. This issue is also indicated in the recent report on digital democracy by Nesta (Simon *et al.*, 2017, pp. 94–95):

> *other metrics and analysis of the impact of new digital democracy tools are also lacking. There is little consideration, for example, of the costs vs. the benefits of such tools, or indeed evaluations of the impact of greater citizen engagement in democratic decision-making.*

On another level, considering the design processes of the DPPPs as open-ended through the situated lens has significant potential for policymakers, who will be more able to produce policy guidelines around AI devices used for making political decisions. In doing so, we will be closer to understanding what constitutes a fair political decision made through AI devices, which at present remains a difficult challenge for policymakers and software engineers.

Here, I argue that what constitutes a fair political decision should be open to public consultation. Stakeholders, from users to software engineers, should have a say on what they think of the algorithmic-human process of making political decisions. As the situated lens considers the processes of algorithmic decision-making as open-ended, room can be created for users and other affected stakeholders to doubt, raise ethical concerns and intervene in the ways in which AI devices are designed in making political decision. Room can be generated for stakeholders and policymakers to discuss *alternative possibilities* of configuring the political decisions through AI. Amoore (2019) has argued that it is important for subjects to

doubt and inquire into what is provided by new AI devices as these doubts can help 'map out' both new possibilities and risks of AI in our everyday life. By sketching out such potentialities for making political decisions via AI, such a 'map' offers valuable material for policymakers to create a better understanding of AI decision-making. In the context of DPPPs, it would allow affected stakeholders to raise concerns and question the design features in digital political participation (such as participatory calculus and majoritarian rules) because they inevitably preclude a wide range of empowered capacities and non-majoritarian means of making decisions. Participatory workshops can be conducted with stakeholders to integrate their concerns into the design processes of DPPPs. In this way, users will be given chances to become what I previously term as 'empowered posthumans' as their knowledge of AI evolves through learning from other stakeholders within participatory workshops.

## 7.1.3 Reapproaching digital urbanism

By examining DPPPs through the situated lens via integrating empowerment theory with assemblage thinking, I was able to then locate my analysis of DPPPs within wider studies of digital urbanism to show how this analysis may inform and develop such studies. The situated lens casts a new comparative perspective on digital urbanism by identifying the contextual similarities between the two DPPPs as the assemblage of design, UI and algorithmic decision-making. It opens up the 'block-boxed' algorithmic processes embedded within the two DPPPs by taking seriously the development of empirically grounded analysis of the fluidity in algorithmic calculations located within wider environments. The situated lens, thus, provides a way to go beyond a focus on platforms as vehicles for capital accumulation and economic value extraction (Leszczynski 2019, p. 2; Barns, 2018) by pointing out what 'other' variations of platform urbanism can offer. It is in this sense that the situated lens provides a solid and critical analytical lens for researchers to study digital urbanism as the composing of the assemblage of design, UI and algorithmic decision-making.

I will now outline some major contributions that the situated lens can make for driving forward the field of digital urbanism. Firstly, my study of the two DPPPs opens up what has been previously investigated within platform urbanism by going beyond a focus on capital accumulation and economic value extraction (Leszczynski 2019, p. 2; Barns, 2018). Here, both Decide Madrid and vTaiwan can be seen as examples of urban platforms using 'open'

modalities (Barns 2018, n.p.) because they release algorithms under open-source licences on the website Github which are available for downloading, modification and reuse. Sarah Barns (2018) points out the significance of open modalities in which platforms utilise open data and create spaces for citizen dialogue about cities; Leszczynski (2019) indicates how everyday life practices and participatory platforms are interwoven. By focusing on and examining the impacts of Decide Madrid and vTaiwan in urban policymaking, I show how previous understandings of digital urbanism with regard to algorithmically-powered platforms have been limited by their lack of diversity in research subjects. As I have drawn out in Section 3.3.3, within urban studies, there remains a profound need to expand the scope of research to other 'alternative' types of data production which are placed into relationships with algorithms: in smart urbanism, this implies the need to study municipal-led open data platforms (Luque-Ayala and Marvin, 2015). Therefore, my thesis provides a way to highlight how the existence of DPPPs can supplement and enrich our current understanding of digital urbanism.

Secondly, engaging with the recent debate over whether to 'open up' or to 'bracket' black-boxed processes of algorithmic calculations that are embedded within platforms (Field *et al.*, 2020; Kitchin, 2017), the situated lens offers an approach which avoids making an argument which does not pay specific attention to technical details and without fetishizing algorithms. The situated lens highlights algorithmic calculations in the broader political and urban environments on which their operation and effects depend. Such a 'situated' analysis avoids an undue focus on the technological details of each platform, which Kitchin (2017, p. 25) described as algorithmic fetishism. Also, this situated lens does not reproduce the argument that users and more generally 'humans' are essentially passive and have only limited capacities to resist new regimes of algorithmic governance (Coletta and Kitchin, 2017; Leszczynski, 2016; Amoore, 2013; Cheney-Lippold, 2011; Gabrys, 2014). The use of the situated lens has evidenced that algorithmically-mediated processes making political decisions inside DPPPs are not just composed of algorithms alone but of algorithms operating in living interactions with data inputted from users, as well as policymakers and moderators in the later stages of wider policymaking processes. As indicated by Decide Madrid and vTaiwan, not only do algorithms not act in an entirely 'automatic' manner, their calculations contain a complicated interplay between a certain level of contingency, a transformative change dependent on user input and their inherent design. In doing so, it hopes to open up

what previous understandings of algorithmic governance in digital urbanism by offering a nuanced, empirically-grounded understanding of under-studied yet important cases, such as the two DPPPs I have studied here.

The situated lens shows that algorithms have different impacts in (urban) policymaking processes, and more broadly on urban governance. On one level, algorithms can reinforce the majoritarian rule by producing political decisions selecting which urban subjects matter via interaction with users via algorithmic decision-making assemblages (what Deleuzian would call re/territorialisation). On another level, the case of vTaiwan-Uber has shown that what has been territorialised within its assemblage can be deterritorialised and thus turned into an on-going protest against the results of algorithmic decision-making. Here, this project reminds us to look at the different forms of resistance which can occur with the help of (or be focused on opposing) digital technologies (Rose, 2017, pp. 782–783; Dalton, 2019). Via a 'situated' understanding of DPPPs, we can understand the politics of digital urbanism as being less about algorithms automatically in control of users and urban spaces as has been claimed by scholars of 'algorithmic governance' and more about the co-existence of resistance and empowerment within practices of citizenship.

Thirdly, drawing on theories of participatory democracy, which offer a reference point in discussing on what constitutes a fair political decision-making (Fung and Wright, 2001; Baiocchi and Ganuza, 2014), the situated lens questions the two assemblages of algorithmic decision-making located within Decide Madrid and vTaiwan by highlighting differences in the fairness and quality of political decisions which they produce. By paying attention to the decision-making processes in which political decision are (re)configured by algorithms, users, policymakers and moderators, the situated lens is able to point out the exclusions on particular voices on urban issues which are produced during such processes. Decide Madrid does not consider minority viewpoints on urban issues when making the decisions, such as spending money through the participatory budget; whereas vTaiwan filters out controversial viewpoints on Uber issue during the stakeholder consultation phase. These exclusions are evidence which suggests we should question the fairness of political decision-making which emerges through the two DPPPs. This is seen especially in the on-going protest on Uber legalisation in Taipei City, which has strongly articulated disagreement against the political decisions made through vTaiwan.

These exclusions raise a pressing question for digital urban policymaking: can DPPPs actually resolve controversial urban issues or do they simply move them elsewhere? Is it possible for DPPPs to make political decisions which have been considered as fair by affected stakeholders, despite its lack of deliberation? It seems that vTaiwan does not serve to mitigate but rather to inflame debates over the legalisation of Uber in Taipei and other Taiwanese cities. The on-going protests between Uber company, Uber drivers and Taxi drivers have meant the Taiwanese government has had to spend more time and resources in negotiations with stakeholders outside of vTaiwan (Strom News, 2019; Technews, 2019)[56][57]. This instance indicates a significant question that DPPPs raise for urban governance: how can we better handle urban controversies through the usage of algorithmic devices?

Lastly, by pointing towards the need to conduct a comparative study of cross-cultural issues, my work has contributed to digital urbanism by identifying the contextual similarities of algorithm-human alignments between Spanish and Taiwanese experiences of digital urbanism. Identifying such contextual similarities infers that digital urbanism, as evidenced by this comparative study, is constituted by the three assemblages: design, UI and algorithmic decision-making. As McFarlane (2010, p.726) and Robinson (2015, p.188) advocate, taking a comparative approach to studying different cities can bring a new perspective or challenge the current theorisations of the urban. Here, this comparative understanding of digital urbanism is important as it may be applicable to examine other variations of digital urbanism through the identification and comparison of other relevant assemblages, which may be different to those of the DPPPs under study here. This comparative study is more important in the context of digital urbanism where Marvin and Luque-Ayala (2015) have noted that there is very little empirical research comparing the varied forms of smart urbanism across different geographical locations, for most studies have tended to focus on *a single case study* of smart urbanism occurring within Anglosphere, European or Latin American contexts. Besides, this comparative approach helps to reorient the 'core' of digital urbanism by encouraging moves beyond focusing on examples of platforms operating in the Anglosphere. Looking beyond the Anglosphere, the situated lens demonstrates that there is more than one type of digital urbanism. By acknowledging the richness of Decide Madrid and vTaiwan, the situated lens

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[56] https://technews.tw/2019/04/24/uber-invalid-protest/, access at 01/10/2019
[57] https://www.storm.mg/article/897140, access at 01/10/2019

shows that understandings of digital urbanism do not have to be confined studies of indicators-based data dashboards, Airbnb, Uber (and other navigation applications), sensors, control rooms, CCTVs and others (Batty *et al.*, 2012; Gabrys, 2014; Kitchin, 2014; Kitchin, Lauriault and McArdle, 2015; Marvin and Luque-Ayala, 2017).

7.1.4 Limitations of the situated lens

The major limitation of using my approach, particularly regarding the use of Deleuzian assemblage thinking, is its orientation on the 'presence' and the 'becoming' of the human and nonhuman alignments, with an attention to both the instability and stability of such alignment. This focus could potentially downplay some of the historical and economic perspectives of actors in shaping the stability and instability of human-nonhuman alignments in the present and in the near future. In the context of Decide Madrid and vTaiwan, one can ask: how do pre-existing economic and political factors within cities like Madrid and Taipei influence policy on public participation as expressed by the creation and decline of Decide Madrid and vTaiwan? How long can a DPPP continue to maintain its degree of digital empowerment? These are important questions.

From a historical perspective, Abers (2000) reminds us that it is critical to question whether a given participatory process offers and redistributes real decision power to newcomers and those who are previously excluded from taking part of public participation. Her research has studied the empowerment potential of a non-digital version of the participatory budget in Brazil for 10 years. To answer this question would require researchers to either to trace the historical perspective of a single DPPP back in time or to continue to follow a DPPP who actively survive for a reasonably long time (5-10 years) to monitor the ways in which both users are actively taking part in making decisions which have a real impact in policymaking processes. In particular, there is another critical question in terms of 'who' have been participating in these processes. If it has always been the same group of participants which hold power over other participants and those who are excluded from participatory processes, then under such circumstances the effect of a given DPPPs on empowerment is largely restricted. Abers (2000) has pointed out such a situation is 'clientelism', whereby the outcome of participatory processes is largely controlled by small and similar groups (which I term as 'princelings'). Therefore, more evidence is needed to monitor whether digital participation reproduces traditional power hierarchies in Taipei and Madrid City, or if it shifts

the power from the old 'clients' to new groups, on a long term basis.

From an economic perspective, it is of note to point out that Decide Madrid may have been influenced by or have an impact on the wider austerity context in Spain, as Madrid City Council used 2% of its annual budget (100 million Euro) on Decide Madrid's participatory budgeting process between 2017-2019 (60 million for 2016). The annual 100 million Euro budget was derived from the existing budget for investment, common good and welfare, which was agreed by the coalition of the Socialist party and Ahora Madrid in the municipal assembly (as Mike the policy advisor for Decide Madrid told me). However, there was not enough information for me to argue that Madrid City Council can use its spending on Decide Madrid as a means of asking for more budget from the Spanish government (as the Spanish government has gained more power in distributing and supervising budgets to local governments during the time of austerity — see Pino and Pavolini, 2015). Nor did I have enough evidence to argue that massive spending on Decide Madrid's participatory budgeting processes actually served to deepen inequality in Madrid. When I was in Madrid, civil servants from Madrid City Council liked to highlight the fact that the Spanish economy was bouncing back (this can be also seen in a Financial Times article[58] showing the strong and steady economy recovery in Spain since 2015). Therefore, more studies would have to be conducted to answer the questions: to what degree did this massive invention on Decide Madrid's participatory budgeting initiatives have a direct impact on inequality and political situation? Did Decide Madrid demonstrated a 'better way' of spending public money?

**7.2 Future study**

Now, I suggest two areas for future research in digital urbanism and digital democracy, which I have identified from my collection of the 'fragmented' evidence during my fieldwork. These two areas thus can be seen as an extension of my PhD thesis.

7.2.1 Exploring the politics of digital urbanism: resistance and centralisation/territorialisation

Digital technologies, including social media and digital platforms, increasingly mediate our everyday lives and political practices in various ways. They enable us to order everyday

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[58] https://www.ft.com/content/12155b0c-3f56-11e9-b896-fe36ec32aece, access at 07/12/2020

necessities (food, commodities, taxi and so on), support a petition, apply for a job, and other activities, which seems to obscure the role of cities. However, as I have argued in Chapter 6, digital urbanism, because of its inherent modes of exclusion which manifest design and usage, will always provoke or generate unintended consequences, such as conflicts which are unresolved within the DPPP and emerge as forms of resistance in urban spaces.

These new forms of resistance in urban spaces make 'what is excluded' from algorithmic calculations or/and from being presented in DPPPs visible (see Chapter 6, the case of Taxi/Uber protest). Recognising the presence of resistances suggests that for future research, it would be important to explore a variety of forms of resistance playing out in urban spaces as part of a wider *politics* of digital urbanism. Here, the situated lens serves as a useful approach as it can unpack the politics of digital urbanism by revealing 'lost' possibilities within a given digital technology/platform concerning the becoming potentialities that digital urbanism can offer' as McFarlane (2011) indicates, the potentialities of urban life are more than what is materialised within any particular (urban) assemblage (what Deleuze terms as 'deterritorialisation'). Understanding digital urbanism via the situated lens, then, points to a more nuanced and critical view which shows how both political possibilities and forms of resistance against DPPPs play out in urban spaces. Rose (2017) has specifically pointed out the importance of paying attention to 'untheorised' posthuman agencies of resistance which persist in digitally-mediated cities. Also, Dalton's (2019, p. 7) work has employed Deleuzian assemblage thinking to highlight how housing data can be both centralised and dissolved into 'multiple data resistances, counter-narratives and possibilities for new, alternative formations' .

From here, I intend to further explore the politics of digital urbanism. Do these forms of politics consist of both resistance (as 'deterritorialisation') and the legitimation or centralisation of specific forms of knowledge and power ('re/territorialistaion') as DPPPs operate via interactions with users, data and wider environments? Can we say more about the relationship between deterritorialisation and resistance? Does any given deterritorialisation necessarily cause a form of resistance or some other effect?

## 7.2.2 Affective democracy

One area of future research emerges from my analysis on the digital political participation is the ways in which users' emotion and knowledge of political issues under discussion in Decide Madrid and vTaiwan are influenced by algorithms, as well as to what degree users are influenced by algorithms to conduct other activities outside of both DPPPs. These questions are important because they aim to further examine the degree of digital empowerment in relation to users' emotion, learning capacity and activity, which can be considered as affective democracy.

It appears that our democracies are becoming more affective by the everyday usage of social media. Emerging from my research, it is clear to see the influence of social media (Twitter, What's App/Line and Facebook) on the digital participatory actions of Decide Madrid and vTaiwan. However, I did not have enough data due to methodologically difficulty and limited time and manpower. For Decide Madrid, initial research has shown the positive connection between online activities on Twitter and Decide Madrid. Those proposals from Decide Madrid, if mentioned or hashtagged in Twitter, would be more likely to gain support for Decide Madrid. In the case of vTaiwan, some practitioners informally told me that most users who knew and took part in vTaiwan were already friends on Facebook or connected via some online forum. What this means is that our everyday practices on social media in terms of who we make friend with, browsing and liking various posts, are becoming parts of constituting everyday democracy. Formal practices of democracies, from presidential elections to participatory democracy such as Decide Madrid and vTaiwan, are infiltrated by online everyday practices and algorithms on social media.

Here, I propose the idea of affective democracy to indicate a situation where digital interfaces and algorithms are able to manipulate and create different affective states of users, from frustration to pleasure, which then affects users' democratic practices and activities. Here I see democracy as both formal (voting in political election) and informal (as a way of life, as lived conditions and learning experiences for individuals to openly communicate between different interests for social growth, see John Dewey 1916). Both informal and formal practices of democracy are mutually interrelated and influenced.

By understanding democracies in this way, I speak to the notion of affect under the interpretation of James Ash. Ash (2010) has demonstrated that interface design can affect various emotional statuses and activities of users in videogaming. In his other work (2015), Ash develops an approach out of the Deleuzian concept of affect to explore the affect of digital technologies, which influence both emotion and action of users. For Ash (2015, p. 85), the idea of affect here does not only refer to emotional states of users which are influenced by digital technologies but also 'as force that has the capacity to transform the corporeal and material basis of the human body'. Understood affect in this way, I will explain how I come up with the idea of affective democracy, both from my fieldwork and a brief review on recent research and news.

*An emerging affective democracy*

The influence of social media appears to turn our democracies into a more 'affective' situation whereby social media impacts users' emotion, political knowledge and political actions. Recent studies have argued that algorithms on Twitter and other social media deliberately interfere with both formal and informal democratic practices. Ferrara *et al.* (2016) indicate that algorithms on social media such as Twitter can influence the result of the political election by crafting and making up support for a particular candidate, as well as by spreading abusive languages or misinformation of its counterpart opponents. This results in a more entrenched political polarisation and wide-spreading misinformation at an unprecedented scale (Deb *et al.*, 2017). In particular, the New York Times[59] showed that the 2019 general election in the UK was likely to have been manipulated by widespread misinformation emanating from various sources, from the Russian government to the Conservative and Labour parties and their political candidates. Memes and exaggerated contents are quickly created, posted and circulated by algorithms embedded within Twitter and Facebook to attract users' attention. The problem here is that the content of posts contains a large level of misinformation and lies about key political agenda and issues, which appears as objective facts and information to voters and potentially influence their perception and understanding of political issues. As a consequence, these posts are likely to inflame outrage reactions against their political counterparts.

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[59] https://www.nytimes.com/2019/12/10/world/europe/elections-disinformation-social-media.html, access at 03/01/2020

Issues stemming from the widespread prevalence of dis/misinformation is also considered as a very significant threat to Taiwanese democracy. A Swedish research project, V-Dem (Varieties of Democracy), has revealed that since 2011 Taiwan has been saturated by the largest amount of misinformation within a sample of 180 countries; this was deliberately released by the Chinese government (Lührmann *et al.*, 2019). The study suggests that such misinformation is likely to have a negative impact on Taiwanese's democracy (Lührmann *et al.*, 2019, p. 35). The Guardian[60] points out that the unprecedented scale of misinformation, such as 'pro-Beijing content', in Taiwan can possibly manipulate voter's opinion and understanding of important political agendas, and distract their attention from serious debates. Recognising the potential impacts of misinformation in political elections in the US, Facebook has set up a 'war room' in its Taipei Office on the 1st of January in 2020. This 'war room' involves members examining and working on public relations policy, political advertisements, the content of posts, and system safety on a 24-hour basis. This war room will keep in touch with legal institutions and election commissions in Taiwan (Focus Taiwan News, 2019). However, despite the claims on the significant consequences of online misinformation on formal and informal practices of democracy, there is a lack of evidence on what degree it has changed and manoeuvred voter's opinion, emotion, and actions.

Here, I propose that the notion of affect (Ash, 2015) is useful to further explain and unentangle the current situation of democracies which are largely influenced by 'misinformation' and other abusive events, which are disguised and entwined with our everyday usage of social media. It shows a way of explaining 'affective democracy' by answering the question that to what degree algorithmically configured information transforms and manoeuvres users' emotion, political opinion and actions. The idea of affect can highlight both the emotional and bodily transformation of users in response to digital technologies, such as the interface design of videogaming (Ash, 2010) and iPhone (Ash, 2015). In particular, it emphasises the 'non-cognitive' or the reflex reaction of users, which seems to be a character in using digital technologies. It allows us to explore 'affective democracy' by examining the political implications of such 'non-cognitive' affect on users. Users may, in turn, to write and express their political opinion, debate with others online and offline (i.e.

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[60]

https://www.theguardian.com/world/2019/dec/30/taiwan-presidential-election-referendum-on-ties-with-china, access at 03/01/2020

learning to participate, interact and readjust with different viewpoints in a controversial issue, see Dewey 1916), and conduct political activities in relation to formal practices of democracy (i.e. voting or joining and helping out political campaigning for political parties).

*Temporality*

One character of affective democracy appears to be its *temporality* in terms of how long it takes a hashtag to become viral and travel at a 'global' scale, how long it takes users to understand, to make a decision (from supporting to voting on citizen proposals or comments), and to take actions to take part in a political issue. Whilst I do not have enough information to understand and elaborate the temporality of DPPPs, I find this theme interesting because when I was conducting my fieldwork, practitioners and data scientists showed me that digital participation follows a centralised temporality where very often a citizen proposal, hashtag or a picture got 'viral' or 'popular' very quickly within a very short period. In other words, most participative actions are centralised around more or less a similar time period across different physical spaces. This centralised temporality suggests users may make a very quick decision within a more existing mood and emotion, yet there is not sufficient evidence to show what implications of such centralised temporality in affective democracy in terms of users' decision-making and political actions (voting in political elections, supporting a political campaign/rally/protest). This centralised temporality has the potential to give details to what Andy Merrifield (2013, p. 63) understands as a new centrality of urban politics 'which represented the culmination of encounters, a new capacity for concentration, a tipping point, mediated by social media, which helped marginality centre itself and helped it do so horizontally.

*Method*

I highlight a methodological issue of unpacking 'affective democracy' is the difficulty of getting hold and analysing of data of online activities. Not only governmental institutions or software providers were less likely to disclose such data for their sensitivity and privacy but also it would require digital methods to systematically and meaningfully analyse the bulk of data, which presents as a challenge for a single social scientist. This is because most methods to explore online activities are usually conducted by a research team. Yet, I note that traditional methods such as ethnography and interviews will be still useful in discovering user's feeling and perception in relation to algorithmically configured information.

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A variety of methods are deployed by researchers to examine and identify fake accounts and news. Non-digital method such as crowd-sourcing via recruiting users/annotators is employed to detect misinformation or fake accounts (Ferrara *et al.*, 2016). Digital methods, entailing harnessing machine-learning algorithms to discern the different behavioural patterns of accounts, and digital network-analysis which visualises the community structure of accounts, are utilised to differentiate algorithmic bot-accounts from human accounts. Other methods include finding the 'masters' of creating fake accounts through analysing fake accounts' targets, contents and temporality (Ferrara *et al.*, 2016, p. 103), or 'ground-truthing' of users' click history and timing information, which are served to differentiate human-accounts from algorithm or bot-accounts. Additionally, Kitchin (2017) also notes that traditional methods, such as interviews and participatory observation, are still useful when being deployed to understand users' emotional, cognitive and physical reactions to interface and algorithmically configured information.

## 7.3 Entanglements between algorithms and cities

One of the biggest challenges in my PhD thesis is to unpack previously-unknown entanglements between algorithms and cities. Even though I had an experience of using Geography Information Science and learning to code via Visual Basic language when I was an undergraduate, understanding algorithms and dynamic UI present a huge methodological challenge for me. However, due to a combination of good luck and my methodological approach enabled me to gather help from data scientists, software engineers, policymakers and civic hackers who embrace the ethos of transparency and explainability in how they program, I was able to gradually tinker and grasp a partial view into the 'black-boxed' processes in terms of algorithmic calculations and visualisations of UI. What is interesting is that these rare chances would not be made possible if I were not doing ethnographic fieldwork in the cities. I have encountered the urban potentialities as a researcher in numerous conferences, workshops and meeting across Durham, Newcastle, Taipei, Madrid, Barcelona, Tokyo and London. In some ways, the development of my thesis and my understanding of algorithms is a solid example of how the process by which urban potentialities surface out relies in part on the capacity of contingent events to 'surprise' me; of course, not every surprise is positive. Cities can give a life for a DPPP like vTaiwan and Decide Madrid, and thrive together. Cities can also take the liveliness of a DPPP away. My

thesis, then, sits between the liveliness and falling-away of Decide Madrid and vTaiwan, between Madrid and Taipei City.

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# Appendix 1

The events/meetings I attended in Madrid (derived from the fieldnote)

| Type | What | Date/Time |
|---|---|---|
| Skype meeting | Skype meeting with Paraguay, national level | 16-10-17 16:00 |
| | Skype meeting with Jalisco | X |
| | Skype meeting with developers | 26-09-17 18:00 27-10-17 06-11-17 17:00 |
| | Skype meeting with a conference about Decide Madrid in Quito | 18-10-17 17:45 |
| | The interview from mysociety (UK) | 02-10-17 16:15 |
| Visit a district- Ciudad Lineal | To introduce Decide Madrid | 04-10-17 10:00 |
| Comision | 9:30 a pre-meeting between political parties and councillors before the plenary | 20-10-17 |
| Plenary session | For single-ticket | 27-09-17 |
| Usability test | Usability test for Decide Madrid | 28-09-17 to 29-09-17 |
| | taking a usability test for Wikum. | 13-11-17 13:00 |
| Simulation of counting the physical votes | they are testing the voting (with photos) | 17-10-17 10:00 |
| Physical meeting | About democratic cities and Consulcon conference | 02-10-17 10:00 |
| | A training session for the | 05-10-17 |

| | | |
|---|---|---|
| | volunteers who are going to help the la mesa for the upcoming votacion in next week. | 12:00 |
| | To Once with Paula and Chema to promote Decide Madrid | 06-10-17 18:00 |
| | A meeting with the authors of the 100% sustainable Madrid proposal from the citizen proposal. | 07-11-17 11:00 |
| | meeting with people of local forums | 20-11-17 16:30 |
| | Meeting with people from Seoul Community Support (NGO) | 22-11-17 10:00 |
| | Public consultation about reflection on PB process | 23-11-17 17:54 |
| Interdisciplinary meeting | Visit the Government of Equity, Social Rights and Employment for the Sectorial Council for Older People | 18-10-17 12:00 |
| Physical Voting for 11 plazas | Start the process of physical voting. | 21-10-17 10:00-19:00 22-10-17 10:00-19:00 |
| | Count the physical voting | 23-10-17 |
| | Press conference | 24-10-17 |
| | Award winners of the 11 Plazas | |
| Workshop | Collective Intelligence for the democracy | 06-11-17- 17-11-17 |
| | Workshop in Villaverde | 27-11-17 |

|  | About Decide Madrid |  |
|---|---|---|
|  | Codingmadrid | 28-10-17　10:00 |
| Conference | Consulcon | 16-11-17 to 17-11-17 |
|  | Democratic Cities | 17-11-17 to 18-11-17 |

The events/meetings I attended to in Taipei

| Type | What | Date/Time |
|---|---|---|
| Monday working in progress meeting within the Cabinet office | Meeting with team members from PDIS | Every Monday, from 12:00 |
|  | Report on the progression |  |
| vTaiwan little hackathon | To make progress on the participation (discussing working with policy-makers, civic hackers and other stakeholders) and to discuss various issues related to vTaiwan | Every Wednesday evening |
| G0v Hackathon | A big hackathon which gathers a variety of participants (software engineers, policy-makers, domestic researchers and international journalists and researchers), approximately around 100 participants | Take place on Saturday in the first week of every two months. Been there twice on 13/01/2018 and |
| Non-public discussion | Discussion around vTaiwan and other offline participation within the team of PDIS. Such as the design process, method, procedure and contents. Sometimes with civil servants. | Happening from time to time |
| Participatory officer training | To introduce the concept of | 22-23/01/2018 |

| camp | open government, collaborative participation and 'participatory officer' to civil servants | |
|---|---|---|
| Offline participation on various issues | Such as transitional justice, allowing dogs to enter the national parks, charging a fee for Taiwanese expats or with dual nationality to use national health insurance and so on. | Once a while, 05/01/2018 and 25/01/2018 |
| A small conference about cities and participation with Japanese visitors | | 21/03/2018 |

# Appendix 2

The list of interviewees for Decide Madrid

| Interviewee (in pseudo names) | Position in Decide Madrid | Number of interviews | Date |
|---|---|---|---|
| Daniel | Civic hacker in Madrid | 1 | 28/11/18 |
| Peter | Senior officer in Madrid City Council | 1 | 19/06/17 |
| Mike | Key practitioner (heavily involved) in the team of Decide Madrid | 11 | 19/06/17 26/09/17 02/10/17 12/10/17 18/10/17 27/10/17 07/11/17 10/11/17 20/12/17 05/07/18 20/11/18 |
| Paul | Researcher in Medialab | 2 | 15/12/17 28/11/18 |
| Sandra | Researcher in Medialab | 1 | 18/06/19 |
| Young | Researcher in Medialab | 1 | 19/06/17 |
| Ben | Officer in International Relationship in Madrid City Council | 1 | 14/12/17 |
| Victor | Former practitioner in labodemos | 1 | 19/12/17 |
| Jean | Former practitioner in Decide Madrid | 1 (also communicating via email) | 22/11/2018 |
| Victoria | Officer in Public Relationship in Madrid City Council | 2 | 26/09/17 20/12/17 |
| Pauline | Civil Servant in Madrid City Council | 2 | 05/10/17 15/12/17 |
| Ann | Digital Manager of Decide Madrid | Informal conversation | |
| Andy | Software Engineer (interface) of Decide Madrid | communicating via email | |

| Bertie | Software Engineer of Decide Madrid | 2 | 28/10/17 06/12/17 |
|---|---|---|---|
| Richard | Software Engineer of Decide Madrid | 2 | 05/12/17 24/11/18 |
| Lily | Researcher in Medialab | 1 | 29/09/17 |
| Danny | Software Engineer in Madrid City Council | 1 (also communicating via email) | 26/11/18 |
| Neo | Software Engineer | communicating via email | |
| Jonny | Software Engineer | communicating via email | |
| Joseph | Activist in Madrid | 1 | 24/11/18 |
| Total | | 35 | |

A list of interviewees for vTaiwan

| Interviewee (in pseudo names) | Position in vTaiwan-Pol.is | Number of interview | Date |
|---|---|---|---|
| Felicity | Senior officer in the Cabinet Office (also communicating via email) | 4 | 05/01/18 19/01/18 19/02/18 15/03/18 |
| Judy | Senior officer in the Cabinet Office | 1 | 29/01/18 |
| Gwen | Key practitioner and participant | 2 | 26/02/18 28/06/18 |
| Chandler | Software Engineer (also communicating via email) from Pol.is Inc | 1 | 15/10/18 |
| Derek | Senior officer in the Cabinet Office | 1 | 22/03/18 |
| Bryon | Civic hacker and former participant in vTaiwan | 1 | 06/03/18 |
| Matthew | Software Engineer in the Cabinet Office | 1 | 03/03/18 |
| Diana | Consultant from Pol.is Inc | 1 | 25/09/18 |
| John | Former software engineer in the Cabinet Office | 1 | 10/02/18 |
| Vivian | Civic hacker and former participant | 1 | 28/03/18 |

| Tim | Participant in vTaiwan | 1 | 28/03/18 |
|---|---|---|---|
| Will | Civic hacker and former participant in vTaiwan | 1 | 18/12/18 |
| Three Technicians | Software Engineers in the Cabinet Office | 1 | 27/01/18 |
| Sue | Senior officer in the Cabinet Office | 1 | 23/03/18 |
| Fanny | Contracted officer in the Cabinet Office | 2 | 12/01/18 29/03/18 |
| Yang | Participant in vTaiwan | 1 | 14/03/18 |
| Linda | Participant in vTaiwan | 1 | 08/03/18 |
| Roy | Participant in vTaiwan | 1 | 29/01/18 |
| Lin | Former participant in vTaiwan | 1 | 22/03/18 |
| Gary | Senior Officer in the Taiwanese government | 1 | 29/03/18 |
| Total | | 25 | |