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Participatory cycling planning: challenges and strategies

The cases of Stockholm and Madrid

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Abstract

English / Engelska / Inglés

Cities develop cycling plans as a tool to promote urban sustainable mobility. These plans are usually open to the participation of current cyclists. In some cases, an intense debate among them arises. Part of them defend the integration of cyclists in a calmer urban traffic, while others prefer dedicated cycling infrastructure separated from motor vehicles. This debate is often framed in terms of what would be more valuable for potential cyclists. Taking this blocking debate as motivation, this thesis explores the cycling planning network of stakeholders generated by participatory planning initiatives. Two study cases with different observed intensities of the described debate, Stockholm and Madrid, are analyzed. The project identifies the stakeholders engaged in cycling planning, both from institutions and civil society; makes a characterization of their relations; and studies the claims they make in relation to the interests of potential cyclists. The research is based in snowball sampling, interviews, questionnaires and social media data mining. The resultant networks combine a set of institutions embedded in a multilevel cycling governance landscape with a set of civil society entities, many characterized by organizational informality partly due to the emergence of virtual communities among them. Accordingly, informal channels of participation are very relevant. The analyzed debate produces tensions, but these are transient frictions grounded in two coexistent systems of meaning rather than permanent antagonism. This is consistent with agonist planning theories. In regard of these challenges, two strategic approaches to the design of participatory cycling planning are suggested: disaggregated stakeholder analysis, in order to reach all the diversity of stakeholders; and big relational data analysis, in order to have a first approximation to the particularities of any cycling planning network.

Keywords: *cycling planning, public participation, stakeholder analysis, social network analysis, cycling advocacy, agonist planning*

Sammanfattning

Swedish / Svenska / Sueco

Städer utvecklas cykelplaner som ett verktyg för att uppmuntra hållbar stadsmobilitet. Cykelplaneringsprocesser är vanligtvis öppna för deltagande av nuvarande cyklister. I vissa fall uppstår en intensiv debatt bland de cyklister. Några av dem föredrar att cykla i blandtrafik medan andra förespråkar för dedikerad infrastruktur som separeras från motortrafik. Denna debatt uttrycks ofta i termer av vad som skulle vara mer värdefullt för potentiella cyklister. Uppsatsen tar detta komplexitet som utgångspunkt och utforskar cykelplaneringsnätet av intressenter som genereras av planeringsinitiativ. Två studiefall som presenterar olika intensiteter i debatten analyseras, Stockholm och Madrid. Forskningsprojektet identifierar intressenter engagerade i cykelplanering, både från institutioner och civilsamhället; karaktärisera deras relationer; och analyserar de påståenden som intressenterna gör i förhållande till potentiella cyklisters intressen. Forskningen är baserad på snöboll provtagningen, intervjuer, frågeformulär och datautvinning från sociala medier. De resulterande nätverken kombineras ett antal institutionella intresser som är inbäddade i en flernivå-system av cykelstyrning med några civilsamhällets enheterna, som många kännetecknas av organisatorisk informalitet delvis på grund av cykling virtuella gemenskaper relevans. Efter detta, informella kanaler för deltagande blir viktigare. Den analyserade debatten ger spänningar som är nära till övergående friktioner beroende på två samexisterande system av betydelser snarare än en ständig motsättning. Detta är förenligt med agonistiska planeringsteorier. Efter reflektioner kring dessa utmaningar, uppsatsen föreslår två strategiska tillvägagångssätt för utformningen av medborgardeltagande inom cykelplanering: disaggregerad intressentanalys för att fånga alla mångfalden av agenter; och användningen av big data källor för att analysera relationerna mellan intressenterna i syfte att få en första approximation till jämvikten och särdragen hos ett givet cykelplaneringsnät.

Nyckelord: *cykelplanering, medborgardeltagande, intressentanalys, social nätverksanalys, cykelorganisationer, agonistisk planering*

Resumen

Spanish / Spanska / Castellano

Muchas ciudades desarrollan planes ciclistas como herramienta para fomentar la movilidad sostenible. Dichos planes suelen ser abiertos a la participación de los ciclistas actuales, generando en ocasiones un debate intenso entre ellos: una parte defiende su integración en calzada junto a una pacificación del tráfico, mientras que otros prefieren dedicar infraestructura específica a la bicicleta separada del tráfico motorizado. Este debate se desarrolla habitualmente a través de referencias a la figura del ciclista potencial. Tomando esta cuestión como motivación, el proyecto explora las redes de agentes generadas por los procesos de planificación ciclista, analizando dos casos de estudio que muestran distintos impactos de dicho debate, las ciudades de Estocolmo y Madrid. El proyecto identifica los agentes involucrados en los planes ciclistas, tanto dentro como fuera de las instituciones; analiza sus relaciones; y estudia las referencias a los intereses del ciclista potencial. La metodología se basa en muestreo acumulativo tipo 'bola de nieve', entrevistas, un cuestionario y minería de datos de redes sociales. Las redes resultantes unen a una serie de agentes institucionales que operan en un marco de gobernanza multinivel con un gran número de agentes de la sociedad civil. Estos tienen una estructura cada vez menos rígida, en parte debido al impacto de las comunidades virtuales de activismo ciclista. En esta línea, se observa que las oportunidades informales de participación son muy relevantes. El debate sobre infraestructura ciclista produce tensiones, pero estas son fricciones transitorias causadas por la coexistencia de dos sistemas de pensamiento en torno a la bicicleta más que un antagonismo permanente, lo cual es consistente con el modelo de planeamiento agonista. Tras exponer estos retos, se sugieren dos estrategias que puede contribuir al diseño adecuado de procesos de participación ciclista: el análisis desagregado de agentes, para capturar la diversidad de entidades involucradas en planificación ciclista; y el uso de fuentes *big data* sobre relaciones entre agentes, para obtener una primera aproximación a los equilibrios existentes en las redes de planificación ciclista.

Palabras clave: *planificación ciclista, participación pública, análisis de agentes, análisis de redes sociales, colectivos ciclistas, planeamiento agonista*

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1. Introduction

1.1. What is participatory cycling planning?

After decades of car-oriented transport planning, the paradigm of sustainable mobility is gaining ground as an approach to address the future of cities (Banister 2008). Urban cycling is a valuable tool to achieve the goals of sustainable mobility (McClintock 2002). Notwithstanding some relevant exceptions in countries such as Denmark or the Netherlands, the modal share of cycling in European cities is very low (Pucher and Buehler 2008). Therefore, urban mobility plans aim to encourage more people to cycle. At the same time, public participation have become an essential element of transport planning (Bickerstaff et al. 2002). The vast literature about public participation and transport planning explores the advantages that result from this approach (Bryson et al. 2013). More specifically, the intensity of transformative changes that sustainable mobility implies makes the involvement of all the agents even more important (Banister 2008). The intersection of these two planning trends, urban cycling and public participation, shapes the object of study of this thesis, that is participatory cycling planning.

1.2. The debate on cycling infrastructure

Cycling planning initiatives aim to attract users from other modes of transport, preferably private vehicles (Redman et al. 2013). Consequently, the main addresses of the plan are the potential cyclists. As a result, extensive research on the motivations for starting to cycle has been developed, mainly through stated-preference surveying to potential cyclists (Hopkinson and Wardman 1996; Winters et al. 2011). Although these studies are a valuable resource for planners, their conclusions are not homogeneous (Aldred and Jungnickel 2014) and therefore they are far from being prescriptive about which measures to include in each planning situation. Furthermore, the participatory approach to planning enhances the relevance of the open debates. Even though the research contribution is not neglected, its rationality shares space with the rationalities emerging from the participatory forums (Bäcklund and Mäntysalo 2010). Naturally, this balance is related who is involved in the participatory processes within cycling planning. The problem at this point is that potential cyclists are difficult to concretize a priori in individuals or groups able to directly engage in such processes, given their potentiality.

Unlike potential cyclists, it is easy to recognize individuals or groups as current cyclists. Those relatively few who are already cycling do not need the plan for starting to do it, but the plan may change the conditions of their cycling experience. Therefore, they are legitimately involved in the participatory processes associated to the planning initiatives, an involvement that has been described as satisfactory (Aldred and Jungnickel 2012; Batterbury and Vandermeersch 2016; Deegan and Parkin 2011). However, current cyclists are far from being an homogeneous group in terms of preferences, opinions and identities (Aldred 2013a; Skinner and Rosen 2007). Hence, when they are engaged in participatory processes differences arise.

A recurrent point of disagreement has to do with the role of cycling infrastructure (Aldred et al. 2017; Wardlaw 2014). On the one hand, there are integrationists advocates, who support the idea of vehicular cycling brought by Forester (1993) and supported by Franklin (2014): bicycles are traffic and therefore they do not need additional infrastructure to the roads. On the other hand, there are dedicated infrastructure advocates, who make reference to the Netherlands and Denmark model of cycling facilities as the successful strategy to follow (Pucher and Buehler 2008).

Dissent is common in planning, but the particularity of the debate mentioned above is that regardless of their disagreements, all claim to speak for the sake of the potential cyclists (Aldred 2012; Cox 2013). This paradox has an impact: the extraction of valuable conclusions for transformative cycling planning from the participation of current cyclists becomes complex, given the divergences when referring to the needs of the potential cyclists. Moreover, the discussions have sometimes not reached the state of 'mutual respect' that is desirable in public participation even for those who criticize the consensus-building perspectives (Hillier 2002b). In these cases, discussions turned into severe conflicts within cycling advocacy, described as 'bitter' (Parkin 2015) and 'acrimonious' (Aldred 2016), which may be in line of what Mouffe (2000) understands as antagonism in planning. Following this reflections, the influence of the debate on cycling infrastructure in participatory cycling planning emerges as the research problem of this thesis.

1.3. Two study cases of participation in cycling planning

The nature of the research problem itself suggests that the observation of concrete cycling planning processes is crucial to unveil the mechanisms behind it. The project selects two cities where planning authorities are currently taking an effort to increase the relevance of cycling, Stockholm and Madrid. In both European capitals, planners frame the use of bicycle as low and have conducted participatory processes to develop their initiatives, as seen in the figures below.

Figure 1 – Planners, politicians and cycling advocates discussing cycling infrastructure in Stockholm. Source: Naturskyddsföreningen

However, this parallelism between Stockholm and Madrid hides some differences that are behind of choosing them as study cases. Firstly, the modal share of cycling is higher in Stockholm than in Madrid, even though the latter is still far from other European cities such as Copenhagen. Nowadays, around 12% of the total amount of daily trips within Stockholm municipality are made by bike, while this figure is limited to a 1% in the case of Madrid. This suggests a differential normalization of the cycling practice among society. Secondly, Sweden has a long tradition of strong civil society organizations in several sectors, seeking for influence in public decision-making; while Spain often lacks of structured advocacy organizations in many sectors. Cycling is one of these sectors, and this is proven to have a strong influence all over the research conducted in the thesis. Thirdly, the project starts by acknowledging the differences in the impact of the debate on cycling infrastructure in the development of participatory cycling planning. The notoriety of the debate and its impacts seems much higher in Madrid and in Stockholm. This can be assumed as an interpretation of the initial observations of the phenomenon, that leaded to formulate it as a research problem for this thesis. However, the parallel inquiry of the processes of these two cities bodes well for validating this initial assumption, facilitating the further exploration of the research problem.

Figure 2 – Workshop for the review and update of Madrid cycling plan. Source: Ayuntamiento de Madrid

1.4. Aim and research questions

This thesis interprets that it is not possible to reflect upon the debate on cycling infrastructure without developing a deeper understanding of the structures of stakeholders that surround participatory cycling planning initiatives. Following this, the aim of the thesis is to explore the network of stakeholders involved in participatory cycling planning, in order to develop a clearer interpretation of the influence of the debate on cycling infrastructure in these initiatives. The literature on public participation and transport planning has not focused in this issue, which is barely addressed in the literature on cycling advocacy. A better understanding of the dynamics under the related conflicts by filling this research gap can improve the participatory processes and ultimately the planning outcomes. In addition, the reflections on the different

methods used in the thesis to analyze participatory processes provide guidelines on how to identify and engage stakeholders, which contributes to an enhanced design and management of these processes.

1.4.1. Who are the stakeholders in participatory cycling planning initiatives?

The first research question of the thesis seeks to provide a description of all stakeholders involved in the initiatives objects of study, including not only entities from cycling advocacy but the different administrations that promote or participate in the cycling plans. Concretely, three groups of stakeholders are conceptualized: governmental stakeholders, political parties and civil society stakeholders. As a part of the description, the positions on the debate on cycling infrastructure are analyzed.

1.4.2. How are the relationships among these stakeholders?

The second research question of the thesis aims to analyze the relations among the identified stakeholders. This analysis combines interaction techniques through questionnaires with observational techniques through the new sources of relational data from social media platforms. The influence of the debate on cycling infrastructure in the relations is explicitly addressed.

1.4.3. How are the references to potential cyclists in the debate on cycling infrastructure?

Since the cycling advocacy literature links the debate on cycling infrastructure with the references of current cyclists to the interests of potential cyclists, the last research question puts the focus on this. The outcomes of the previous questions serves to select claims made by the most prominent stakeholders from each position. The research associated to this question is performed only for the study case where the debate on cycling infrastructure holds a high profile.

1.5. Limitations

1.5.1. One of the numerous debates within cycling planning

The scope of the thesis is limited to the debate which generates more tensions within these initiatives, that is the model of urban cycling infrastructure. There are other vivid debates among current cyclists, such as the mandatory use of helmet and the convenience of high-visibility clothes (Aldred 2013b), which are not addressed in this thesis. Moreover, this project does not aim to determine which is the model of infrastructure that attract potential users, but to explore what are the mechanisms behind the claims related to the representation of the potential cyclists when this issue is discussed in participatory processes.

1.5.2. The concept of stakeholder

The stakeholders playing a role in cycling planning can be both individuals or collective entities. Therefore, it would be desirable to develop an analysis that covers both types of stakeholders with the intensity that both deserve. However, a comprehensive individual stakeholder analysis cannot be addressed in this thesis. The objectives of the project make random sample techniques useless, since the point of including individual stakeholders would be

to understand particular roles rather than properties of the population of individual stakeholders. Hence, the choice is to develop a structured analysis for the collective stakeholders and only resort to individual stakeholders at certain points of the analysis as a complement needed to understand aspects of it.

The thesis does not include some entities that could be included as stakeholders in a project with more resources. This is the case of consultant companies in charge of cycling plans, that sometimes may act as advocates if they are somewhat specialized in cycling planning (e.g. *SpaceScape* in Stockholm, *Gea21* in Madrid). Their role seems to deserve a specific research effort. Furthermore, the civil society entities analyzed in the thesis, such as cycling advocacy organizations, have been studied under an 'unitary actor assumption', without detailing the possible different roles of groups within them.

1.5.3. Time and space in the study cases

In addition to the natural limitations of study case research, it is important to note that the roles of the stakeholders vary over time. For instance, politicians take government or opposition positions depending on the elections results. This thesis explores a limited time span in the chosen study cases, leaving apart longer trajectories that may play a role in the current stakeholders relations and claims. The time frame of the analysis starts in each study case at the moment when the current cycling plan in charge was suggested by the institutions (2010 in the case of Stockholm, and 2015 in the case of Madrid).

As the majority of cities, it is not trivial to determine a boundary for Stockholm and Madrid as single entities. The decision here is to focus on the municipal level instead of focusing on the metropolitan level, which would require the inclusion of more stakeholders.

1.6. Structure

The structure of the thesis is organized in chapters, each of one have a number of sections. After this introductory chapter, the structure continues as follows.

Chapter 2 gives details about the **theoretical background** of the thesis. It starts by positioning the thesis in the general narrative of contemporary planning theories, and continues by explaining stakeholder and social network theories, which shape the operational framework of the thesis. Finally, it introduces both social movements theory and representative theory, which are a valuable source of concepts that are used through the analysis and the discussion.

Chapter 3 introduces the **method** followed in the project. It sets the data structure of the thesis and explains all the research methods conducted to obtain and interpret the data.

Chapter 4 provides a brief **background analysis of the two study cases** used in the project. It describes the context where the planning processes happen, in terms of urban mobility, public participation and debate on cycling infrastructure. This chapter is part of the analysis and the initial observations of cycling planning in the cities used as study cases, which is something necessary in order to start with the assessment of the research questions.

Chapter 5 addresses the first research question, and therefore includes the **identification of the cycling planning stakeholders** for both study cases. This encompasses their acknowledgement, basic categorization and description.

Chapter 6 focuses on the second research question, analyzing the **relations among the identified stakeholders**, and comparing the methods used for this analysis.

Chapter 7 closes the analysis by interpreting the results of the third research question about the **representation of potential cyclists**.

Chapter 8 brings together the findings of the four analytical chapters in order to discuss the **challenges and strategies of participatory cycling planning** that emerge from the research.

Finally, the **conclusions** of the project are synthetized in the last chapter.

2. Theory

The project draws from several social and political theories that have been used to explore both cycling planning and public participation in the existent literature. These approaches provide concepts that frame the analysis and the discussion. This chapter situates the thesis in the *planning theories* that are contemporary to public participation practices. From that point, the section explains the operational framework of the research, which is provided by *stakeholder and social network theories*. This framework is powered by substantial contents from *social movements theory,* in relation to the analysis of current cycling advocacy; and from *representativity theory,* in relation to the representative claims about potential cyclists.

2.1. Planning theories and participatory cycling planning

The evolution of the planning activity in the last century had the role of the public at its spotlight (Lane 2005), so the analysis of participatory planning is usually related to contemporary planning theories. Many alternatives to rational approach in planning have been developed since Arnstein (1969): incrementalism (Lindblom 1959), advocacy planning (Davidoff 1965)... However, it is *collaborative planning* the model that has sustained higher interest. It has either reach a paradigmatic status for many theorists or cause interesting critique (Bond 2011). An important part of the critique has been coordinated around *agonistic planning*. Hence, this thesis uses concepts of both collaborative and agonistic planning approaches that can be applied to participatory cycling planning analysis, drawing from interesting comparative and integrative frameworks (Bäcklund and Mäntysalo 2010; Bond 2011).

2.1.1. Collaborative and agonistic approaches to planning

Collaborative planning was explicitly conceived to combine two trends in planning practice at that moment (Healey 1997). On the one hand, the *communicative turn* of planning, which consists in reaching solutions through respectful intersubjective dialogue that could not be reached individually (Healey 1992). On the other hand, the *governance* concept which was incipient at that time (Rhodes 1997), characterized as an scenario where multiple agents are able to develop their public initiatives (Stoker 1998). The combination intentionally acknowledges the *complexity* of the planning context, usually depicted as a *network of agents*. This representation, that explains the use of social network theories in public participation studies, implies a less hierarchical conception of planning (Agger and Löfgren 2008) and a high level of agent interaction (Stoker 1998). Under the collaborative approach, *power* is not to be owned by an agent, rather it is spread and constitutes the relations within the network (Healey 2003). Planning must make use of the communicative rationality (Habermas 1984), which is based in a *deliberative dialogue* that allows an equal empowerment of the agents involved through argumentation and persuasion. If an *ideal speech situation* is achieved, the dynamics of this dialogue would lead to successful collaboration and even to *consensus-building* for some planners (Innes and Booher 1999). Interestingly, the centrality of the deliberation makes the *process outcomes* as relevant as the *substantial outcomes* of planning (Agger and Löfgren 2008).

The notions of power and consensus of collaborative planning are contested by the agonistic planning approach, based in the reflections of Mouffe (2000). Starting from the principle of *pluralism* and competition for recognition (Benhabib 1992), it argues that the eventual transitional consensus are actually *temporary hegemonies* driven by partial interests (Mouffe 2000). *Conflict* or *strife* is therefore inevitable (Hillier 2002a; Pløger 2004), and many times it happens through *informal channels* outside formal participation opportunities (Hillier 2002b). In such strife, argumentative reasoning may play a role, but is not the exclusive mechanism to take into account (Bond 2011), because even when agents concur in shared causes they may come from different systems of meaning (Bäcklund and Mäntysalo 2010). Instead of trusting in the rationality of communication, agonist perspective have its ontological ground in the potential for antagonism (Bond 2011). In order to reach some decision, planning consists in the transformation of *antagonism* between *enemies* into *agonism* between *legitimate adversaries* (Mouffe 2000). Instead of an ideal speech situation, that is not possible due to the existent inequalities (Vigar et al. 2017), it would be enough with a state of 'mutual respect' (Hillier 2002a), an '*agonistic respect'* (Connolly 1993). This view shifts the consideration of power, from something to be neutralized to something to be *mobilized* (Purcell 2009). This mobilization is not unproblematic, and some argue that agents may avoid conflict in order to "preserve the community capital" (Vigar et al. 2017:437). It is relevant to note that the network representation of the planning landscape is still hegemonic under agonistic interpretations (Hillier 2002a).

2.1.2. A critical agonistic perspective on participatory cycling planning

This thesis is not bounded to take a specific approach as its analytical framework. Even though some features of participatory cycling planning make the thesis to be closer to an agonistic interpretation, it acknowledges the *institutional ambiguity* (Hajer and Versteeg 2005) that characterizes the approach that planning authorities have with public participation: different rationalities and planning theories overlap in their practice (Bäcklund and Mäntysalo 2010). Taking into account this critical approximation, there are three main features that make agonist concepts more likely to appear in this thesis. Firstly, the evident *absence of an ideal speech situation*. The rationale of the thesis comes from an identified strife among agents involved in participatory cycling planning. The situations where this strife can be described as 'bitter' or 'acrimonious' (Aldred 2016; Parkin 2015) are reframed here as an *antagonism on cycling infrastructure*. Under these situations the debate does not even reach the desirable levels of agonistic respect: detractors and defenders of dedicated infrastructure would act like enemies and not like legitimate adversaries. Even if this intensity is probably not reached permanently, the ideal speech situation assumption seems not very realistic. Secondly, examples of *informal participatory cycling planning* are expected to arise in both cases. These are profitable participation channels without the transparency and accountability desired by collaborative planning (Agger and Löfgren 2008) and more close to other empirical works that put some distance with collaborative approach (Flyvbjerg 2002). Finally, Bond (2011) comments to Mouffe (2000) suggest the high compatibility of agonist concepts and *social movements* theory. The understanding of agonists of collective actions as oppositional to reinforce the inevitability of conflict matches the definition of social movements that is used in this thesis.

2.2. Stakeholder and social network theories as operational framework

The phenomena described by planning theories take place in a landscape with many contacting stakeholders. The nature of the research questions implies that this thesis is close to stakeholder and social networks analyses. Regarding this, two clarifications are needed. Firstly, these approaches are treated here as theories and not as methods. Salient researchers in the field recognize the dispersion of concepts related to the social network framework (Borgatti et al. 2009). However, the existence of some concepts that are not purely methodological (e.g. node, tie) requires to mention them before their emergence in an analysis or in a discussion. Secondly, these approaches are treated as integrated. Some scholars suggest a relevant different between stakeholder analysis and social network analysis: the unit of analysis. Although both approaches share the same data collection phase about a set of agents and their relations, the perspectives over an eventual matrix of stakeholders relations differ. For stakeholder analysis, the unit is the agent, and the relations with other agents are attributes of this agent. For social network analysis, the unit is each relationship and the agents are, if necessary, described in terms of these relationships (Caiani 2014). However, others have developed an integrative perspective when studying other participatory planning processes, such as resource management (Lienert et al. 2013; Prell et al. 2009). This thesis follows their approach.

2.2.1. A network of cycling planning stakeholders

The first stage of a stakeholder analysis consist in their identification (Reed et al. 2009). This requires to define a theoretical standpoint on who is to be considered as a stakeholder. There is certain vagueness in this definition (Mitchell et al. 1997) but the classical view provided in Freeman (1984:46) is adopted here: a stakeholder is someone that 'can affect or is affected by the achievement of the organization's objectives'. Furthermore, it is common not to restrict the definition of stakeholder to individuals but to include entities that have collective stakes (Reed et al. 2009). Indeed, this thesis makes a difference between *individual stakeholders* and *collective stakeholders*. Following this, a *cycling planning stakeholder* is an individual or collective entity that can affect or is affected by the achievement of the cycling planning initiative objectives. Their relations establish a *cycling planning network*. This thesis focuses in the collective stakeholders, that include many of the individual stakeholders as members. As it is motivated in the beginning of the analysis, the project deals with governmental stakeholders, political parties and civil society stakeholders. Moreover, it has to be noted that in many cases it is interesting to analyze only a part of the network, establishing *subnetworks* of stakeholders.

Stakeholders have a range of *attributes* that serve to characterize them. There are two types of stakeholder' attributes. On the one hand, there are pure *independent attributes* (e.g. if a stakeholder is officially registered as an organization or not) that can be analyzed before focusing on the relational network. On the other hand, there are *interdependent attributes*, which are to some extent dependent of the relations between stakeholders in the network (e.g. the proximity to cycling planners) (Caiani 2014). The latter are difficult to address only through the concepts of stakeholder analyses, a fact that turns the integration of stakeholder and social network

analyses a necessity (Lienert et al. 2013), since the *relational properties* of the stakeholders' links shape the features of each of them.

2.2.2. Graphs as particular representations of a network

The evaluation of these relational properties becomes central to social network studies, as they are their unit of analysis. Their status is primarily collected through *actor-linkage matrices* (Reed et al. 2009) which are commonly depicted as *graphs*, sometimes named as sociograms (Huang et al. 2007). A single network, e.g. the cycling planning network of a study case, can have different representations in graphs, depending of the relational property that is being evaluated and the scope of the graph, e.g. if it includes only a subnetwork and not all stakeholders. Graphs are constituted by *nodes*, representing the stakeholders, and *ties* between them, representing the analyzed relational property. Some features of the ties allow to identify specific types of graphs (Wasserman and Faust 1994). In particular, all the graphs used in this thesis are *directed graphs*. This means that their ties are asymmetrical, since a relational property from node A to node B can be different than the ones from node B to node A. Moreover, some graphs in this thesis are *bipartite graphs*. These correspond to the cases where there are two sets of nodes without ties within them but only with ties linking nodes from one set to another. Both types are shown in Figure 3.

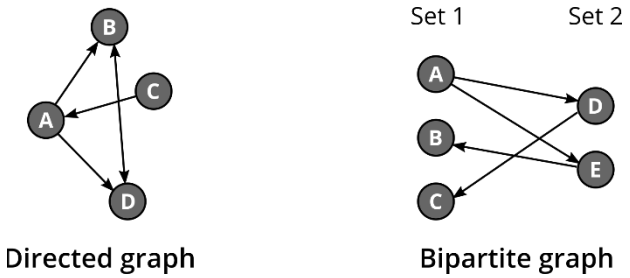

Figure 3 – Types of graphs used in the thesis

The visualization of the graph is a first manner to obtain information from it. The visualization is characterized by a *layout*, that disposes the nodes in terms of a specific algorithm, in order to highlight certain aspect (e.g. a central node in the middle of the layout) or to clarify the visualization (e.g. minimizing the crossing ties in the figure) (Cherven 2015). Although the visualization provides a general insight of the relations in the network that the graph is representing, its relevance is limited especially when the number of nodes is high. Fortunately, graphs have a range of properties drawn from algebraic graph theory, which are commonly known as *graph metrics* (Klein 1997). These metrics operates with three levels of analysis (Caiani 2014) and provide much detailed information than the mere visualization of the nodes and ties.

The upper level or *macro-level* looks at the whole graph. The corresponding metric used in this thesis is the *density of the graph*. It represents the proportion of the number of ties that exist in the graph over the number of all possible ties. The latter number depends on the number of nodes (Wasserman and Faust 1994). In a graph related to the cycling planning network, a high density suggests a high level of interaction between stakeholders. On the contrary, if a graph

has low density, it means that the stakeholders included as nodes do not interact very often. The concept is shown in Figure 4. This level does not provide interdependent attributes to the nodes, since the properties studied are of the whole graph.

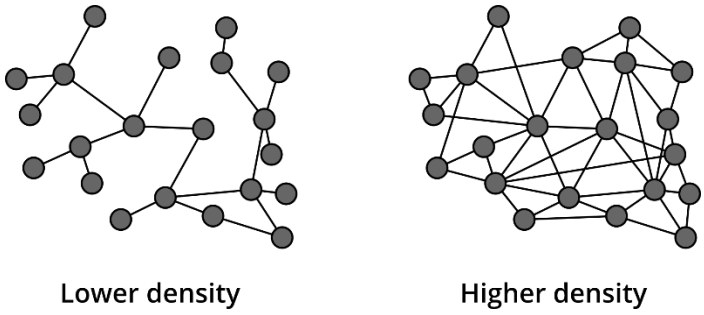

Figure 4 – Two graphs with same nodes but different densities

The middle level or *meso-level* aims to analyze communities or clusters within the graph, i.e. groups of nodes that are connected in a denser way than with the rest of the graph (Figure 5). Following this, the metrics at this level often aim to determine to what extent a group of nodes constitutes a community, i.e. the 'quality' of a community (Fortunato 2010). The analysis can combine two strategies. Firstly, it is possible to shape algorithms that optimize the clustering in a graph, maximizing a metric. This is known as *community detection* and the most used metric for it is *modularity*, which compares the density of ties in a cluster with the density of ties if the connections would be random (Blondel et al. 2008). Secondly, it can serve to test the quality of clusters that are previously hypothesized in terms of attributes of the nodes, i.e. if a group of nodes in the graph with a common feature are more connected than the average. A common algorithm for this purpose is the *performance* of the community, which calculates the proportion of existing ties that fall within the cluster and non-existing ties that would escape from the cluster (Fortunato 2010).

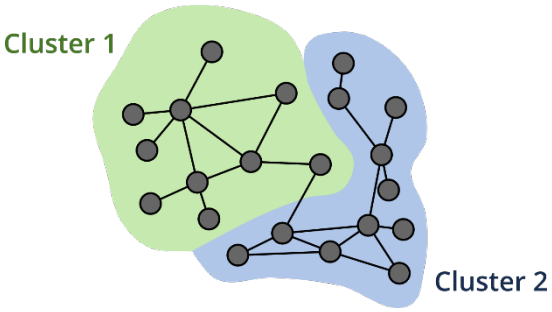

Figure 5 – Clusters in graphs

The lower level or *micro-level* is focused in each node, in this case in each cycling planning stakeholder. At this level, the metrics used in the thesis are two types of *centrality measures* widely extended in social network analysis (Figure 6). The first type is the *degree of centrality*. It measures the number of ties that a node has with other nodes. In directed graphs, such as the ones used in this study, it is possible to differ between *in-degree of centrality* and *out-degree of centrality*. The first one makes reference to the number of ties pointing to the analyzed

node, which can be understood as a measure of the *prestige* of the node (Wasserman and Faust 1994). The second one refers to the number of ties pointing to other nodes from the analyzed node, suggesting 'awareness' of other nodes (Cross and Cummings 2004) and interpreted here as *interest* in what other stakeholders do.

The second type is the *betweenness centrality*. It measures how many times a node is between other two nodes that are not directly connected. A node with high betweenness centrality is usually very relevant, since its presence makes closer sections of the graph that otherwise would be disconnected. This is generally interpreted as a source of *influence* (Wasserman and Faust 1994).

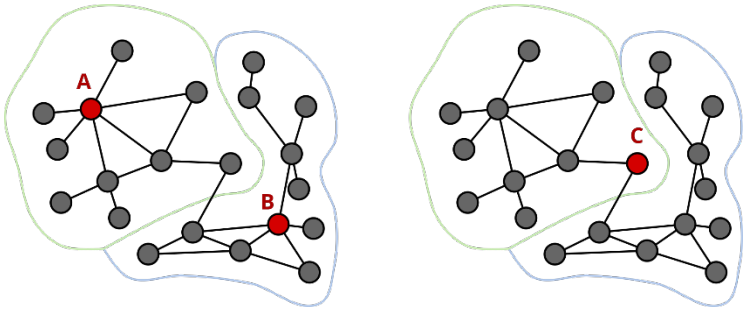

Figure 6 – Node A and B have high degrees of centrality, while node C has high betweenness centrality

The interpretation of the centrality measures of a node in a particular graph can be potentially incorporated as interdependent attributes of the stakeholder represented by that node. This is used in this project to assess the prestige, the level of interest and the influence of stakeholders in the cycling planning network.

2.2.3. Stakeholder and social network theory as operational framework

This operational framework clarifies what data about stakeholders is necessary to collect in this thesis, regarding the first and second research questions. It consists in a list of acknowledged cycling planning stakeholders, together with independent attributes that constitute a basic characterization. The characterization is to be completed through the interdependent attributes, that emerge from the analysis of the relational properties through some opportunistically generated graphs. Social movements theory provides valuable insights on which attributes and relational properties are worthwhile to include in the analysis.

2.3. Social movements theory and cycling advocacy

Current cyclists are often depicted as part of a community, claiming that cycling would not be just cycling, but also sharing interests with other cyclists (Andrews et al. 2003). This has a reflection in the numerous cycling advocacy groups that can be found in many cities, even in areas with low cycling modal share (Batterbury and Vandermeersch 2016). Consequently, the involvement of current cyclists in participatory processes often takes place through these groups. The research on cycling cultures and identities has focused sometimes in analyzing these groups, leading to a literature on cycling advocacy (Aldred 2012, 2013c; Balkmar and Summerton 2017;

Batterbury 2003; Cox 2013; Horton 2006). Some of them drew upon social movements theory to make their research. This is not surprising, since the constellation of collective entities that advocate for cycling shows many of the features and dynamics of social movements. This thesis follows this approach, which is highly compatible with the operational framework offered by stakeholder and social network theories.

2.3.1. Cycling advocacy as a social movement

The concept of social movement describes those collective initiatives in which three elements are present. Firstly, the existence of *conflictual relations* where an opponent can be identified. Secondly, the existence of a *dense network of informal relations*. Thirdly, the development of a *collective identity* through shared experiences or commitments to a cause (della Porta and Diani 2006). While the second and the third elements are present in cycling advocacy (Aldred 2010; Batterbury 2003), the first element can be more discussed.

The *opponent* that mobilizes the collective action of cycling advocacy is far from evident. This ambiguity is shared with environmentalism (della Porta and Diani 2006), something not surprising given the closeness of both movements (Horton 2006). Cyclists, their collective initiatives and the actions they back are often regarded as "anti-car" or "anti-drivers", also in the context of the study cases of this thesis (Hermansson 2014; PP Comunidad de Madrid [ppmadrid] 2017). However, it has been observed that current cyclists usually try to avoid "anti-car" labelling. Instead of focusing on drivers or cars, they appeal to other instances.

McCarthy (2011) found that they appealed to the undesirable absence of a 'bicycle culture'. This is anyway related to the hegemony of the car in the struggled urban space (Balkmar and Summerton 2017; Oldenziel and de la Bruhèze 2011). However, the turn allows to alleviate the pressure on "drivers", a condition which is often shared by the cyclists themselves (McCarthy 2011), and focus it on the *car-oriented development supporters*. Alternatively, some researchers have noted how cyclists blame other cyclists for being irresponsible or even for not understanding drivers' perspective (Aldred 2013b; Skinner and Rosen 2007). Together with the research problem addressed in this thesis, this shows how critical and conflictual can be the relations among cyclists, but in the social movements framework this may be interpreted as an internal friction and not as the defining opponent.

To sum up, cycling advocacy shapes a social movement that opposes car-oriented developments through a dense network of individuals and collectives, the shared experience of cycling and the shared commitment to improve conditions for cycling. Many stakeholders of the cycling planning network introduced in section 2.2.1 belong to this social movement.

2.3.2. Cycling advocacy network and organizations

The concept of *social movement network* provides a way to represent that the involvement of individuals in the movement is possible without being part of an established collective. As nodes of the network, the *individuals* develop many *interpersonal links* within the movement that shape *social movements organizations (SMOs).* These diverse structures play a relevant role as sources of identity, as collectors of resources and members and as providers of

organizational aims (della Porta and Diani 2006). They depend on the mobilization of their *constituency*, i.e. their supporting individuals, and they are oriented towards the shared commitment that shapes the collective identity of the movement (Kriesi 1996). The virtual dimension of social movements has challenged the concept of SMO. In this thesis, some entirely virtual collectives appear, but the analytical framework of SMOs is generally valid to them also. These are either *virtual communities* operating in entirely *virtual settlements* (Jones 1997; Van Laer and Van Aelst 2010) or *virtual extensions* of offline SMOs (Diani 2000). The literature provides features of SMOs (Kriesi 1996; della Porta and Diani 2006) that under the operational framework of stakeholder theory can be used as attributes (see Table 1).

Table 1 – Examples of attributes of SMOs

Attribute	Range
Formalization of existence	From illegal SMOs to institutionalized SMOs
Formalization of membership	From free and open to paid membership
Internal specialization	From no specialization to territorial and sectorial units
Integration model	From loose horizontal coordination to strong leadership

Within a movement, an individual can have three types of relations with SMOs (della Porta and Diani 2006). In some cases, individuals are *not affiliated* to any SMOs, so their involvement in the movement is through punctual collective actions such as campaigns or events. In other cases, individuals develop a relation of *exclusive affiliation* to a single SMO. Finally, it is also possible to develop *multiple affiliations* to various operating SMOs. The latter is more common and generates *overlapping membership*, which provokes links that are to the SMOs what interpersonal links are to individuals. The relations between SMOs can be analyzed through a *matrix cooperation-competition*, as seen in Table 2. The cooperative relations can lead to *joint mobilizations* and even to *network organizations*, that act as spaces to share information and coordinate strategies while maintaining the SMOs independence (della Porta and Diani 2006).

Table 2 - Matrix cooperation-competition of relations between SMOs (della Porta and Diani 2006:157)

	Cooperation	Lack of cooperation
Competition for the same constituency	Competitive cooperation	Factionalism
Lack of competition	Non-competitive cooperation	Neutrality

In this case, it is possible to map a *local cycling advocacy network*, where the nodes are the *cycling advocates*. This is a sub-network of the cycling planning network conceptualized in section 2.2.1. Their interpersonal links can evolve into *cycling advocacy organizations (CAOs)* with all the attributes of SMOs explained above. Within the cycling planning network, CAOs

are collective stakeholders, and these are entities to be identified in the analysis as part of the civil society stakeholders.

2.3.3. Political opportunity structures for cycling advocacy

Social movements take advantage of certain *political opportunity structures* (Eisinger 1973), which make the authorities' institutions open to their demands, to introduce their views and reach their goals. This concept has become important for social movements where authorities are more open to participation. Dialogue attempts tend to surround protest (della Porta and Diani 2006), with the authorities developing an *integrative strategy* (Kriesi 2004). The general factors of the openness of such opportunities are the power territorial decentralization, the functional dispersal of power in different agents (e.g. lack of absolute majority in a parliament) and the public bureaucracy resources. Regarding the latter, the externalization of former public activities closes up opportunity structures (della Porta and Diani 2006). The concept of opportunity structure can be generalized to embrace also the negative side: movements face *alliance and opposition structures*. These structures are found among governmental stakeholders, but also among political parties or even among non-institutional agents (e.g. oppositional *countermovements*). As discussed in relation to planning theories (Hillier 2002b), evidently these structures can be *formal* or *informal*. In relation to the alliance institutional structures, the role of *reform professionals*, public officers that sympathize with the social movement, is very relevant. In general, the greater the closure of the political system, the more important are alliance structures within institutions (della Porta and Diani 2006). Cycling advocates operate with these concepts when engaging in participatory cycling planning.

2.4. Representativity theory and the references to potential cyclists

The references to potential cyclists by the stakeholders in the cycling planning network involve representative claims. Therefore, the content and conditions of these claims formulated by many stakeholders can be studied through representativity theory concepts. The relevance of representativity in participatory planning is not surprising. Representative mechanisms could enable the inclusion of an actor without its direct involvement, something in which public participation researchers put hope (Agger and Löfgren 2008). Under the operational framework of this research, the evaluation of the representative references to potential cyclists from a stakeholder results in new attributes that characterize such stakeholder.

2.4.1. Representative claims with potential cyclists as the referent

The concept of *representative claim* is developed by Saward (2006) to stress out the perspective over representation as a claim-making issue rather than as a fact-checking task. It serves to understand why representation can be always contested, since it depends on the robustness of the claims. Saward (2006) also offers five elements of representative claims, that have been extensively commented (e.g. Thompson 2012):

- *Maker* of the claim: the entity who releases the claim. A variety of stakeholders in the cycling planning network emit representative claims.

- *Subject* of the claim: the entity who is depicted in the claim as representative. In many occasions the maker depicts itself as the subject of the claim.
- *Referent* of the claim: the entity who is intended to be represented in the claim. In the case of this thesis, the focus is on claims that have as referent the potential cyclists.
- *Object* of the claim: the interpretation of the referent that the maker develops in the claim. These interpretations are usually contested.
- *Audience* of the claim: the entity who is intended to be the addressee of the claim.

This particular representativity syntax, shown in Figure 7 with a trivial example, provides a framework for the analysis of the collected representative claims.

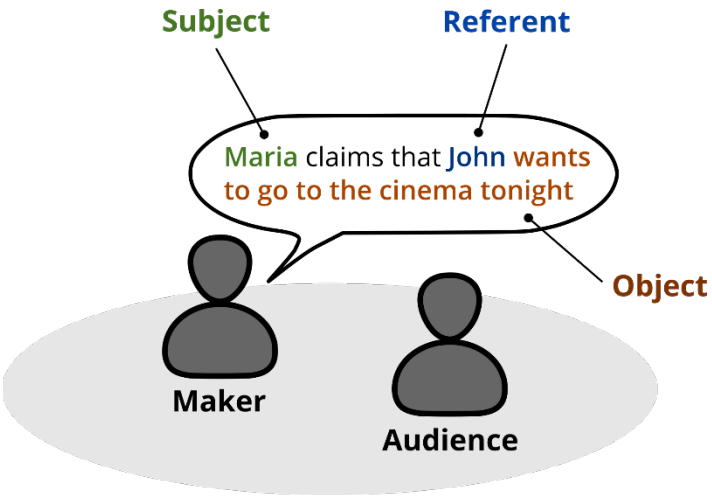

Figure 7 – Representativity claim elements

2.4.2. Four mechanisms of representativity in the cycling planning network

Representativity theory provides an additional tool to analyze representativity claims. The seminal work of Pitkin (1967) presents four mechanisms of representativity that have become classical.

The first mechanism is *formal representativity*, which is based in the authority carried by a delegate who plays as subject of the claims. The legitimacy of the subject is sustained by accountability. In the cycling planning network, this mechanism is found mainly in two places. Firstly, it is the representativity mode sustaining the legitimacy of democratic governments. Politicians claim to represent their constituency. Secondly, the formal representativity is also found in the social movement organizations that are more based in delegation. The members of these organizations elect a governing board which is responsible for the decisions during a given term.

The second mechanism is *descriptive representativity*, which is based in the ability of 'standing for' an object due to the similarities between the representative subject and the ones represented. This mode has two possible interpretations (O'Neill 2001). On the one hand, there

is a statistical representativity point of view in which many social scientific methods ground (Barnes et al. 2003). This is the case of the research agenda about preferences among potential cyclists, that trust in a sample to make its claims. One the other hand, there is a 'politics of presence' (Phillips 1995) view, which depends on the existence of shared identities.

The third mechanism is *substantial representativity*, which is based in 'acting for' others, which means to advocate for perspectives of an object without the need of a shared identity. The subject alludes to its expertise, or 'epistemic values'. Within policy fields, it is not surprising to find stakeholders who claim to "have a better grasp of the objective interests of some [represented] group than others in that [represented] group" (O'Neill 2001:490). In relation to cycling planning network, these types of claims are behind the conceptualization that Golbuff (2014) uses for analyzing cycling blogging as a reaction to 'expert system representatives'. These agents are representatives which claim that they know what is better for cyclists, without being necessarily cyclists and thus without a clear shared identity.

The fourth mechanism is *symbolic representativity*, which is based in images and lures that appeal to the ones represented. They can generate attention and trust from the ones represented, not by their identity but by symbolisms. This mechanism is detected in bottom-up representative claims, those in where the makers are the objects –represented– arguing that a subject is representing them. Sometimes this subject is not able to accept or refuse this role, which is the case of inanimate images and lures. However, sometimes the subject is an entity that may be involuntarily appointed as symbolic representative (Rehfeld 2006).

3. Method

This chapter explains the methodological grounds of the thesis. The choice of double case study methodology is motivated in relation to the features of the research problem and the aim of the project. The operational framework suggested by the stakeholder and social network theories is explained in detail. This encompasses both the research tasks to be conducted and the structure of the data collected. Finally, all the research methods employed to collect the data are described.

3.1. The choice of case study methodology

The choice of a multiple case study framework for the thesis is very much related to the circumstances of the research problem. It follows general recommendations on how to conduct case study research (Yin 2014) and also valuable reflections on the utility of this methodology in urban studies (Flyvbjerg 2006). Case studies are appropriate for studying current phenomena that is not possible to control by the researcher (Yin 2014), and the cycling infrastructure debate in the cycling planning network is an ongoing issue that matches this profile. The developed methodology attempts to deal with one of the classical criticism of case study research, which is the lack of systematic handling of data (Yin 2014). This is the reason for insisting on the data structure and the relation between each data category in a specific section under this chapter.

As stated in the introduction, the use of two study cases, and more specifically Stockholm and Madrid, is motivated by the conditions of the research problem. The selection is partly based in an initial assumption: the impact of the debate about cycling infrastructure in planning is not equal in both cases. This assumption, that is validated at the early stages of the research, makes multiple case study the natural choice for the project. The selection of the cases is not random but theoretical, as they are expected to be 'particularly suitable for illuminating and extending relationships and logic among constructs' (Eisenhardt and Graebner 2007). Moreover, the selection is guided by the difference rather than similarity, which is common in governance studies (Stewart 2012).

The validation of the initial assumption has an influence in the analysis of the cases. After analyzing the background conditions and characterizing the cycling planning network stakeholders in the first research question, it is found that the impact of the debate about cycling infrastructure is much higher in the case of Madrid than in the case of Stockholm. Hence, the third research question about representativity claims in the context of the debate is only applicable to the case of Madrid. Far from implying a bias towards one of the cases, this aspect gives more value to the use of a multiple case study approach and to the relevance of the Stockholm case in the research. Focusing in the case of Madrid would have had the risk of being working with a single 'black swan' that would seriously weaken the potential generalizations that the thesis could imply, an aspect commonly mentioned as case-study drawback in the context of urban studies (Flyvbjerg 2006).

3.2. Research tasks

The research is organized through a stakeholder and social network analysis, drawing from the concepts provided by the operational framework described in section 2.2. The analysis consists of six tasks:

- The first task is to *explore the relevant background conditions* for both cases, which include basic urban mobility patterns, trends of participatory governance, and cycling planning evolution in the cities. This is done through document analysis, by reviewing institutional sources; and complemented with the data from the semi-structured interviews with agents from governmental stakeholders.

- The second task is to *acknowledge the stakeholders* that are part of the cycling planning network, including them to the analysis. Document analysis provides a set of seed stakeholders, that are the basis for an observational snowball sampling. The sample is obtained by skimming through the websites and social media profiles of the seed stakeholders.

- The third task is to *evaluate a set of independent attributes* for each acknowledged stakeholder. The independent attributes are those which are not linked to the relations between stakeholders. Document analysis provides information on these attributes, that is complemented by the data from a questionnaire in the case of civil society stakeholders.

- The fourth task is to *review the relations among different categories of stakeholders*. The relations among civil society stakeholders are reviewed through two quantified relational properties: the revealed collaboration status, evaluated through a questionnaire; and the observed social media linkages, evaluated through data mining techniques. The relations among the stakeholders belonging either to governmental or political parties categories are evaluated through the data from the semi-structured interviews with agents from governmental stakeholders. Finally, the relations that cross these two categories are evaluated with qualitative data from the mentioned questionnaires and interviews, and with data from the observed social media linkages.

- The fifth task is to evaluate a set of *interdependent attributes for each stakeholder*, which derive from the quantified relational properties applicable to each stakeholder. This is done through graph analysis techniques. The task includes a brief comparison of similar attributes obtained from the two different relational properties, to reflect upon the differences between revealed questionnaire data and observed social media data. Once finished, the characterization of the cycling planning network is complete.

- The sixth task is to *evaluate the references to potential cyclists* made by stakeholders in the cycling planning network where the debate on cycling infrastructure is intense. This is done through document analysis, focusing if possible in the stakeholders proven to be most relevant after the outcomes of the previous tasks. The interviews also provide some claims to be analyzed.

These tasks are iterative. For instance, many stakeholders are acknowledged thanks to the research done for evaluating attributes or relational properties. The definition of a systematized framework for data handling aims to avoid the messiness that iterative approaches could generate in case study research (Stewart 2012).

3.3. Data structure

The research tasks described above suggest a data structure that entails the vast majority of the empirical results of the research, since there is a connection between stakeholders, attributes and relational properties that is natural to the social network approach chosen for the thesis. As the previous section explains, this structured data is complemented with the results of the document analysis, the data from the semi-structured interviews, and qualitative inputs from the questionnaires handed out to civil society stakeholders.

3.3.1. Elements and datasets of structured data

The *primary structured data* comes directly from the observation of the phenomena affecting the research problem. The primary elements of structured data are the acknowledged stakeholders, the evaluation results of their independent attributes and the evaluation of the relational properties of the ties between stakeholders. The *derived structured data* comes from operations with the primary data. It is composed by the evaluation of the interdependent attributes, which come from the analysis of the graphs that represent the relational properties. Each data item is identified with an unequivocal index, as shown in Table 3.

Table 3 – Indexes for the elements in the stakeholder and social network analysis

Index	Type of element
i	Stakeholder
i-j	Dyad of stakeholders
a_k	Independent attribute
a'_k	Interdependent attribute
p_w	Relational property between stakeholders

In order to conduct the analysis, the elements are combined in datasets in form of matrices and graphs. Both study cases have an own version of each dataset. The datasets are the following, ordered by their chronological appearance throughout the research:

- A matrix $\mathbf{I}$ that has in rows the list of stakeholders $\mathbf{i}$ and in columns the independent attributes $\mathbf{a_k}$. Hence, the values in the matrix $\mathbf{m_{ik}}$ evaluate a stakeholder $\mathbf{i}$ in terms of the attribute $\mathbf{a_k}$. This is the result of the second and third research task, and encompasses the data needed to discuss the first research question.

- A set of square matrices $\mathbf{R_w}$ that have both in rows and columns the set of stakeholders $\mathbf{i}$. Each matrix of the set corresponds to a relational property $\mathbf{p_w}$ between stakeholders.

Therefore, the values in the matrices $\mathbf{r^w_{ij}}$ evaluate the relation of a dyad of stakeholders **i-j** in terms of the property $\mathbf{p_w}$.

- A set of graphs $\mathbf{G_{wn}}$, which are generated to study the cycling planning network and relevant subnetworks within it, from all or part of the matrices $\mathbf{R_w}$. From the analysis of the graphs it is possible to obtain the interdependent attributes of the stakeholders $\mathbf{a'_k}$, and the meso-level and macro-level valuable graph measures explained in the theoretical background.

- A matrix **I'** that has in rows the list of stakeholders **i** and in columns the set of all attributes, both $\mathbf{a_k}$ and $\mathbf{a'_k}$. Hence, this is an extension of the matrix **I**, reaching all the potential of the structured characterization of the stakeholders in the cycling planning network of each case. It should be reminded that this is to be complemented by the non-structured data to discuss the second research question.

3.3.2. Independent attributes

The selection of the independent attributes $\mathbf{a_k}$ to be considered is made according to the purpose and limitations of the thesis, as well as to the concepts developed in its theoretical background. The attributes are summarized in Table 4. The Appendix 1 contains an extended review of these attributes, with the evaluation values used in the matrices I.

Table 4 – Independent attributes considered in the research

a_k	Name	Comments	Application
1	Type of stakeholder	Basic categorization	All
2	Identification source	Method of acknowledgement	All
3	Governmental stakeholder role	Characterization of governmental stakeholders	Governmental stakeholders
4	Governmental stakeholder political sign		
5	Political party municipal role	Position in the municipal council	Political parties
6	Civil society stakeholder formality	Adaptation from the features of social movements organizations observed in literature (Kriesi 1996; della Porta and Diani 2006)	Civil society stakeholders
7	Civil society stakeholder members' nature		
8	Civil society stakeholder membership type		
9	Civil society stakeholder internal specialization		
10	Civil society stakeholder coordination model		
11	Civil society stakeholder activity format		
12	Period of activity	Time span when the stakeholder has been active	
13	Involvement in public participation	Opportunities in which the stakeholder has been involved	
14	Existence of the debate on cycling infrastructure	Existence of the debate revealed in the questionnaires	Civil society stakeholders, only in Madrid case
15	Revealed position in the debate on cycling infrastructure	Position in the debate revealed in the questionnaires	
16	Position in the debate on cycling infrastructure	Revealed position completed with observational data	
17	Number of followers in Twitter platform	Characterization of social media profiles of the stakeholders	Civil society stakeholders
18	Number of tweets in Twitter platform		

3.3.3. Relational properties and associated graphs

The set of relational properties to analyze is also determined according to the purpose, limitations and theoretical concepts of the thesis. There are two relational properties to analyze, that imply two squared matrices.

Firstly, the property $\mathbf{p_1}$, which is the *revealed collaboration between civil society stakeholders*. This property applies only to civil society stakeholders. It reflects the collaboration status between dyads **i-j** of this kind of stakeholders, as reported in a questionnaire handed out to them which is detailed in the next section. The property is evaluated through the matrix $\mathbf{R_1}$, called *matrix of revealed collaboration*. The elements $\mathbf{r^1_{ij}}$ can take the value 0, if no collaboration was reported; the value 1, if punctual collaboration was reported; or the value 2, if regular collaboration was reported. Since for each dyad **i-j** there is an answer from stakeholder **i** and another from stakeholder **j**, this matrix is not symmetrical. Thus, it generates the directed graph $\mathbf{G_{11}}$ where civil society stakeholders are nodes and the ties represent different levels of collaboration.

Secondly, the property $\mathbf{p_2}$, which is the *following status between stakeholders in the social media platform Twitter*. This property applies to the stakeholders that have a profile in this platform, regardless of their category. When an user A of the platform follows other user B, the user A is kept updated with the contents created by the user B. The data is obtained through data mining techniques, explained in the next section. The property is evaluated through the matrix $\mathbf{R_2}$, called *matrix of social media linkages*. The matrix collects the following status between dyads of stakeholders **i-j**. The elements $\mathbf{r^2_{ij}}$ can take the value 0, if the stakeholder **i** does not follow the stakeholder **j**; or the value 1, if the stakeholder **i** follows the stakeholder **j**. Since the platform Twitter do not require reciprocity, the following status of **j** from **i** may differ from the following status of **i** from **j**. Therefore, this matrix also generates directed graphs. Concretely, the following subgraphs are generated:

- $\mathbf{G_{21}}$ – a bipartite directed graph with a set of nodes representing the governmental stakeholders and political parties, and another set of nodes representing the civil society stakeholders. The ties between nodes of the same set are removed in this subgraph. This seeks to provide insights on the relations between these categories of stakeholders.

- $\mathbf{G_{22}}$ – a directed graph only with the nodes representing the civil society stakeholders, in order to study the relations in this subnetwork and to compare the results with the outcomes of the graph G_{11}.

3.3.4. Interdependent attributes

The interdependent attributes that complete the list of attributes come from the centrality and clustering measures referred in the literature on social network analysis, reviewed in the theoretical background. Table 5 shows the interdependent attributes $\mathbf{a'_k}$ evaluated from measures in the graphs $\mathbf{G_{wn}}$.

Table 5 – Interdependent attributes considered in the research

a'_k	Name	Graph measure	G_{wn}	Application
1	Revealed prestige	In-degree of centrality	G_{11}	Civil society stakeholders
2	Observed prestige from governmental stakeholders and parties	In-degree of centrality from governmental stakeholders and parties	G_{21}	Civil society stakeholders
3	Observed level of interest from governmental stakeholders and parties	Out-degree of centrality to governmental stakeholders and parties		
4	Observed prestige from civil society stakeholders	In-degree of centrality from civil society stakeholders		Governmental stakeholders and political parties
5	Observed level of interest from civil society stakeholders	Out-degree of centrality from civil society stakeholders		
6	Observed prestige within civil society stakeholders' subnetwork	In-degree of centrality among civil society stakeholders	G_{22}	Civil society stakeholders
7	Observed influence within civil society stakeholders' subnetwork	Betweenness centrality among civil society stakeholders		
8	Community membership within civil society stakeholders' subnetwork	Community detection membership among civil society stakeholders		

3.4. Research methods

The research tasks are faced from a range of methods that are common to relevant studies with similar theoretical framework.

3.4.1. Review of institutional documents

The processes that take place in the case studies are extensively documented by institutions and authorities. Hence, 'document analysis' techniques (Bowen 2009) seem to be useful in this research. Indeed, the review of such documents is seen as a natural starting point in stakeholder analysis (Reed et al. 2009). Four documental layers can be identified:

- The *final reports of the plans*, in this case the Stockholm Cycling Plan (Stockholms stad 2012) and the Madrid Cycling Plan (Ayto. de Madrid 2016c).
- The *participatory reports* or administrative communications that describes the public participation processes. For instance, both cities have developed such documents in the consultation process of the plans (Ayto. de Madrid 2016a; annex 2 to Stockholms stad 2012).
- The *complementary reports* that the institutions ask for to consultants or technical departments to feed the cycling planning processes (Spolander 2011).
- The *governance documents* that describe the allocation of competences and responsibilities (Ayto. de Madrid 2018; Stockholms stad n.d.).

This method allows to draw the cases background outlined in the next chapter, and it is also very relevant to the first research task, since the documents provide many references to a variety of stakeholders in the cases. Moreover, it is also applicable in the second research task

since it provides many of the independent attributes of the governmental stakeholders and political parties.

3.4.2. Review of non-institutional documents

Many cycling planning stakeholders produce other types of documentation that can be useful for all research tasks. There are two types of non-institutional documents that are reviewed in this project.

- The *storytelling documents* about the events in the participatory processes and about advocacy activities (Chevalier and Buckles 2008). These are usually more informal than the reports mentioned above and provide more information about the attributes of the stakeholders. This category includes posts and publications in social media that describe these activities.

- The *organizational documents* that non-institutional collective stakeholders post in their websites documents, such as statutes, meeting minutes or organigrams. These are a valuable source for unveiling their organizational attributes and the memberships of individual stakeholders. Social media communications sometimes contain information about organizational attributes, so those cases can be interpreted as organizational documentation as well.

3.4.3. Observational snowball sampling

The observational snowball sampling technique consists in observing a limited set of identified stakeholders in a relational environment in order to collect other stakeholders not yet identified (Yang 2014). Hence, this method is valuable for the research task that consists in acknowledging stakeholders. The initial set of stakeholders is called *seed stakeholders* and it is shaped by two groups: the ones identified by the review of documents and events, and some incorporated by the researcher given its experience with the issues at stake in both cities. The high usage of social media among cycling advocacy (Aldred 2012) allows to use Internet as a prolific relational environment. Concretely, two strategies are used:

- Review of the stakeholders' *websites* to search for recommended links and for internal groups within collective stakeholders.

- Review of the *social media profiles* of certain stakeholders, in line with Grabowicz et al. (2012).

3.4.4. Questionnaires to civil society stakeholders

The goal of the questionnaires is to complete the information about the civil society stakeholders and to reach a deeper understanding of their relations. The questionnaire is handed to all civil society stakeholders in both cities, contacting them by email.

The original version is created in Spanish for the Madrid case. The content is tested in a trial version with three stakeholders from Madrid case. Once the Spanish version is validated, the questionnaire is translated into Swedish for handing it in Stockholm. The translation is

checked by colleagues and the supervisor of the project, and takes into account the risks of 'word-for-word' translations (Andretta and della Porta 2014). For instance, it was observed how the loosest forms of organization may be described by the term *grupp* in Swedish, while in Spanish *grupo* seems to be less general than *colectivo*.

The content of the questionnaire is guided by the attributes that shape the stakeholder analysis. It has three stages. The first one poses questions about organizational aspects and the involvement in public participation (independent attributes a_6 to a_{13}). The second one asks about the relations with other stakeholders, in order to shape the matrix R_1 of revealed collaboration. The answers of this part are stored in a .csv format that is suitable for using the data in the construction of graphs. The third one deals with the state of the cycling infrastructure debate within the entity (independent attributes a_{14} to a_{16}). A large proportion of the questions are closed, mainly through checkboxes and multiple choice frameworks. The questionnaire of the research project DEMOS, well-known among social movements scholars (Andretta and della Porta 2014), served as a guideline. The structure is common for both cases, with minor differences regarding the questions about cycling infrastructure, in order to adapt to the observed local context of the debate. The structure of the questionnaires can be reviewed in Appendix 2.

The civil society entities are contacted by either email or social media profiles, introducing the aim of the project and the role of the questionnaire in it. This contacts are made during the month of November 2017. The total number of questionnaires matches the total number of stakeholders identified after conducting the tasks associated to the first research question of the thesis: 29 in the case of Stockholm and 56 in the case of Madrid.

The rate of answer to the questionnaires has a relevant impact in the utility of the matrix of revealed collaboration. The goal was to achieve at least a 50% of answers in both cases. This goal was achieved in the case of Madrid (51.7%) but not in the case of Stockholm (33.3%). The impacts of this performance are detailed in the analysis, and the causes and implications for further research are examined in the discussion.

3.4.5. Interviews with individuals in the cycling planning network

Interviews enable to gain valuable insights from agents who are relevant to the research problem (Rowley 2012), in this case, from individual stakeholders within the cycling planning network. The main purpose of this method is to understand the governance landscape of cycling issues in the study cases. Therefore, the focus is in agents from governmental stakeholders. A total of 5 interviews are conducted, 2 related to Stockholm' case and 3 related to Madrid' case. In the case of Stockholm, the two interviewees are from governmental stakeholders. In the case of Madrid, two interviewees are from governmental stakeholders as well, and the third one is from a cycling advocacy organization. This last interview with an advocate is added to the initial list due to the need for further information about the debate on cycling infrastructure in Madrid.

The examination of the organigrams and planning documents produced by the governmental entities leaded to identify a set of key agents that play a relevant role in planning processes. The four agents interviewed come from this set. Therefore, the selection of the

interviewees is based in the allocation of competences regarding cycling planning in both cases. As a consequence, in the case of Stockholm the interviewees come from municipal and county administrations, and in the case of Madrid both come from the municipal administration. The specific departments where each of them work are not revealed in order to preserve anonymity. As it happens with the questionnaires, the interviewees are contacted via email together with a brief description of the project and the role of the interviews in it.

The conducted interviews can be classified as *semi-structured interviews*, since it is a balance between approaches with a set of closed questions and completely open and flexible layouts (Rowley 2012). The *interview grid* is the tool that structures the method, following the suggestion of Della Porta (2014). It includes a list of topics to be covered in the interview, and each of one has a list of draft questions. While all interviews deal with public participation processes related to cycling planning, the interviews with individuals from municipalities cover specifically the governance landscape around cycling and the interviews with advocates include questions about the relations between collective stakeholders. The selection of questions is linked to the topics that underlie the research questions, as well as to the elements that arise from the empiric research conducted in previous stages of the thesis (Rowley 2012). The interview grids can be seen in Appendix 3.

The interviews do not choose explicitly between a positivist approach where an objective gathering of data is the goal and a constructivist approach where the data is produced rather than gathered. Instead, they are based in active listening, leaving room for open results from the interviewee but avoiding assertions from the interviewer (della Porta 2014). Four of the five interviews are conducted in person during November 2017 while one of them is conducted by email in the same month. In the case of the four face-to-face interviews, all of them are designed to take between 45 and 60 minutes, which is finally the case except for one of the interviews with an agent from governmental entities in the case of Madrid, which is extended to 90 minutes. Moreover, the interview via email entails the same interview grid than the face-to-face interviews. However, it is expected to take less time given the format of the interview itself.

The face-to-face interviews are recorded, and the analysis of their content is based in a partial transcription. The interviewees verbally agree to be recorded during the interview, once anonymity is ensured. This transcription has three elements: statements answering the questions, complementary statements and representativity claims about potential cyclists. This exercise allows to have available and organized information when conducting the analysis.

3.4.6. Social media data mining

The appearance in the last decade of social media platforms have increase the visibility of networks in social interaction processes (Borgatti et al. 2009). As such, advocacy processes are not an exception in this trend. Indeed, due to the prominent online activity of many movements, social media platforms have gained attention from scholars as a data source for understanding relations between stakeholders. Among the different platforms, Twitter is seen as particularly determinant in many mobilizations since its appearance and therefore profitable as data source (Grabowicz et al. 2012; Tremayne 2014). This thesis follows this trend and uses Twitter as a

source of network data for the relational analysis to be collected in the matrix R_2. The analysis of the Twitter relations is conducted in November 2017. This specification is important given the dynamic environment of social media platforms.

The code used for retrieving data from Twitter is developed in the programming language Python, and it is based in the package *Tweepy*, which interacts with the Twitter Application Programming Interface, or Twitter API, to access the platform database. The code has the following structure:

- Input: the list of usernames of the Twitter accounts associated to the acknowledged stakeholders. The percentage of acknowledged stakeholders with associated accounts is 90% in both cases. The matching between stakeholder and Twitter account is made by looking at the official websites of each entity, in order to avoid associating unofficial accounts.

- Output 1: the code makes a first request to Twitter API consisting on the number of followers and the number of publications (tweets) of each analyzed user. The data is stored in a Python dictionary that has as key the username of each account and as value a list of this two elements:

  {username: [number_of_followers, number_of_tweets]

- Output 2: the code makes a second request to Twitter API consisting on the status of the relationship of each user in the input list with the rest of users in the list. The data about each pair of users includes if user A is following user B, and viceversa. The API limits this requests up to 15 user reports each 15 minutes. Since the number of users is higher than 15 for both cases, this process has to be repeated until all the possible relations are looked up. The data is stored in a Python list of rows with the username as first element and the sequence of following status (0 for not following, 1 for following) with the rests of users:

  [username, follow_with_user_1, follow_with_user_2,…]

- Output 3: the partial matrices generated in the output 2 are assembled in this step in order to shape the matrix R_2 of social media linkages explained in the previous section. The format of the output is the same as in the previous step, but containing the total number of users analyzed in each of the both study cases.

3.4.7. Graph analysis software

The matrices of relational properties lead to a series of graphs, that are to be analyzed through their visualization and measurement according to the concepts provided in the theoretical background.

The code used for transforming the matrices into graph objects is based as well in a Python package, *Networkx*. The developed code has the following structure:

- Input: the matrices R_1 and R_2, respectively obtained with the questionnaires and the data mining from Twitter. As mentioned above, the matrix R_1 is stored as .csv. The matrix R_2 is an output of the code that retrieves data from the social media platform.

- Outputs: the code takes both R_1 and R_2 and extracts from the matrices the parts that are needed for each graph. These parts are interpreted an adjacency matrix, allowing to create the graph objects G_{11}, G_{21} and G_{22}. Moreover, the code analyzes these graphs objects in order to retrieve the graph measures that are required for the analysis.

This code is complemented with the graph visualization software Gephi, that need as input the graph objects created and returns as output the graph figures that can be seen in the analysis chapter.

4. Cases background

The purposes of this chapter are to complement the theoretical framework as a source of explanatory elements for the issues that arise in the thesis, and to make a necessary analysis of the governance conditions regarding public participation and cycling planning. Concretely, it outlines the mobility patterns of the cities and its factors, especially those identified by the literature as crucial for cycling (Heinen et al. 2010), as well as the openness to public participation. Furthermore, it describes the evolution of cycling planning in both places and the current participatory cycling planning initiatives.

4.1. Urban mobility

4.1.1. Explanatory factors

A relevant factor associated to urban mobility is the *population density*. As capital of Sweden and as a dynamic economic center, Stockholm concentrates an important part of the country' population. By 2016, the municipality hosts 935,000 inhabitants, with a density remarkably high in the context of the country, 4,937 inhabitants/km^2. The population in the rest of the metropolitan area has outnumbered it, with more than 2,000,000 inhabitants in the county. Even though a relatively high density, the urban morphology is not compact, as seen in Figure 8.

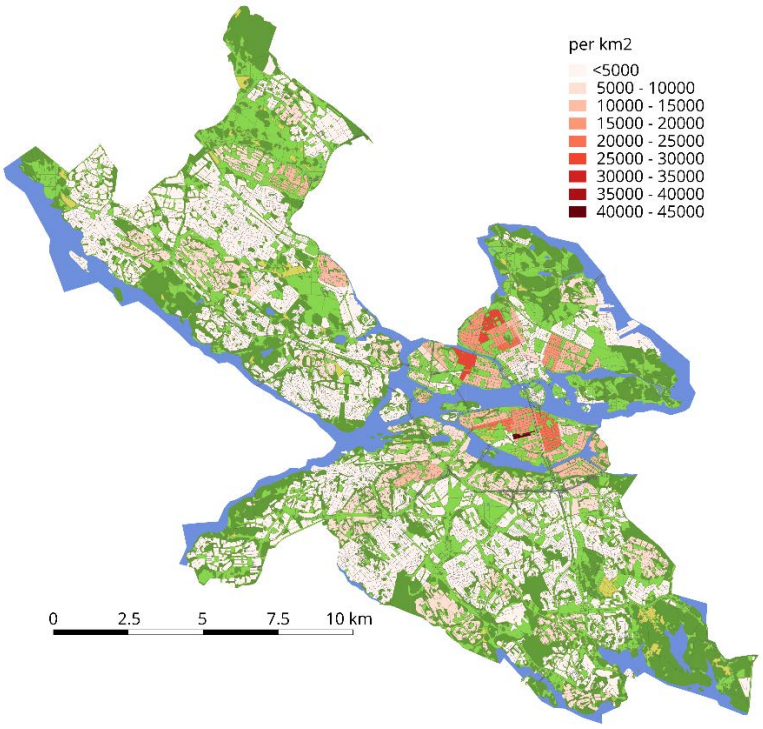

Figure 8 – Stockholm city density by neighborhoods. Source: Own elaboration from Stockholms stad data.

Conversely, the city of Madrid has a more compact structure, even if its average density (5,187 inhabitants/km^2) is similar to the one reached by Stockholm. The municipality has 3,141,000 inhabitants and the metropolitan area has 5,989,000 inhabitants. Figure 9 shows how the separated concentration of green and populated areas triggers its compactness.

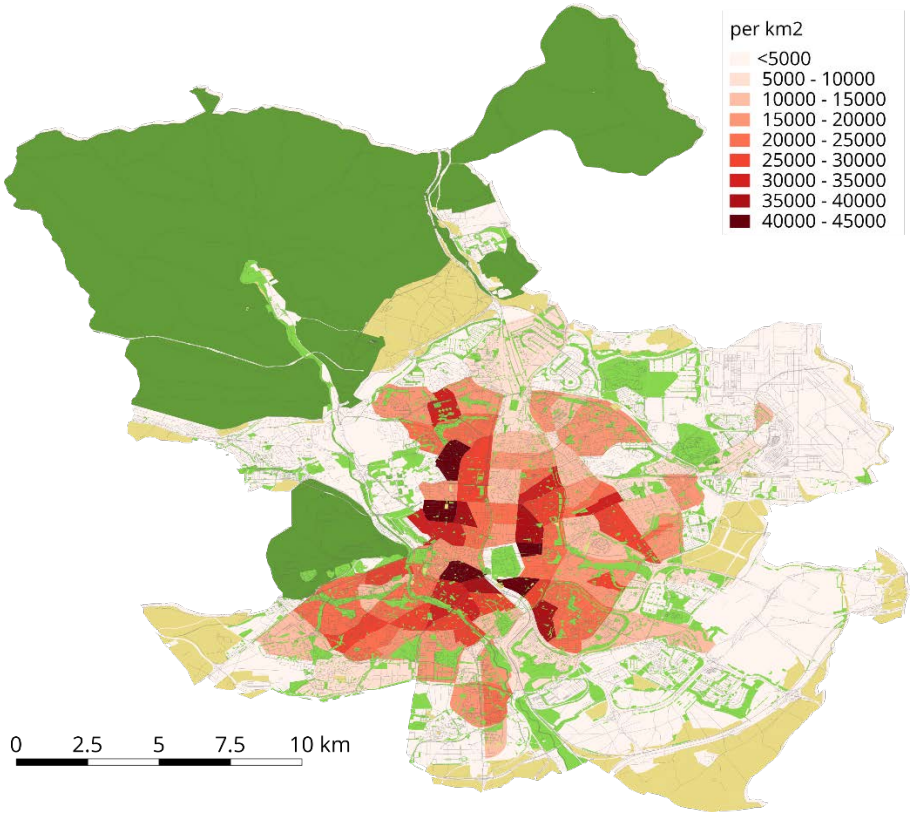

Figure 9 – Madrid city density by neighborhoods. Source: own elaboration from Ayto. de Madrid data

Regardless of these differences in compactness, both urban areas show a delimited inner city (*innerstad* in Stockholm, *almendra central* in Madrid), where the density is much higher than the city average.

Apart from population density, it is worth to review two geographical factors that are relevant to cycling, the *hilliness* and the *climate* (Heinen et al. 2010). In the case of Stockholm, the hilliness seems not to play a big role among current cyclists' attitudes possibly due to the lack of long slopes (Wahlgren and Schantz 2012). However, climate is proven to be relevant for cycling variability through the year. The traffic counts in some places of the city show a reduction of a 60% in cycling between October and February (Stockholms stad 2012). Indeed, one of the recurrent topics in cycling policy in the city is the winter maintenance of the cycling infrastructure. In the case of Madrid, the climate is not that problematic for winter cycling. On the contrary, the average slope is higher so the importance of hilliness is acknowledged by the research on the city' cycling conditions (Fernández-Heredia et al. 2014). In this regard, the cycling planning initiatives explore different alternatives of cycling infrastructure depending on the slope of the street where the intervention takes place (Ayto. de Madrid 2016c).

4.1.2. Mobility patterns

Commuting distance and modal share provide a consistent overview of the mobility patterns in the cities. Regarding the first feature, the population density is correlated with commuting distance (Levinson and Kumar 1997). Accordingly, the inner cities of both areas have shorter commuting distances due to its compactness. Furthermore, Madrid shows shorter commuting trips than Stockholm, as can be seen in Table 6. The relevance of commuting distances is acknowledged by cycling planning initiatives in both cities. In Stockholm, it serves as a criterion for setting a typology of cycle paths (Stockholms stad 2012). In Madrid, the high number of shorts trips made in the inner city are seen as an opportunity for increasing the modal share of cycling (Ayto. de Madrid 2016c).

Table 6 – Commuting average distances. Sources: Comunidad de Madrid (2004, 2016); SLL (2015)

Area	Stockholm	Madrid
Inner city	10 km	4 km
Municipality	12 km	8 km

Both cities have a rather distributed modal split among different modes. The quality of public transport is high in both areas, with extensive metro, bus and commuting train systems. The metropolitan areas are more car-dependent due to the lower density, as Table 7 shows. The non-motorized mobility accounts for around a third of the trips in both cities. However, in Stockholm cycling levels are higher to the detriment mainly of walking trips. Cycling levels are rising in the last years, especially during the summer months (Stockholms stad 2012). The cycling levels in Madrid are among the lowest in European capitals, even though there has been an incipient growth during the last years, which are not covered yet by any mobility survey. The traffic counts in several points within the inner city reveal this increment, more intense after the opening of the bike hire system (Ayto. de Madrid 2016c).

Table 7 - Modal split in Stockholm and Madrid. Source: own elaboration from SLL (2015), Ayto. de Madrid (2016) and Comunidad de Madrid (2004)

Mode	Stockholm		Madrid	
	Municipality 2015	County 2015	Municipality 2012	County 2004
Cycling	11%	7%	1%	1%
Walking	21%	15%	28%	31%
Public transport	38%	32%	42%	35%
Private vehicle	26%	41%	29%	35%
Other	4%	5%	0%	3%

4.2. Openness to public participation

Public participation has become part of the decision-making process in the cities used as study cases, but this presence is a result of a slow evolution from technocratic planning and confidence in representative democracy towards open participation.

In Stockholm, consultation processes are mandatory in urban planning according to the Swedish law since late 1980's. However, this requirement is usually seen as too weak (Khan and Henecke 2002) and most institutions recommend deeper initiatives such as dialogue opportunities with citizens (Boverket 2016; SKL 2017). Nowadays, participation is an important part of planning activity (Loit 2014) and the municipality itself is putting resources in analyzing possible improvements for public participation (Tahvilzadeh 2016).

In the case of Madrid, the prominence of public participation is increasing fast during the last years. The development of community plans in collaboration with multiple associations in 2009 was a turning point (Bonet i Martí 2012), although the formal participatory channels were still regarded as not sincere efforts to open the decision-making processes (Fernández-Heredia et al. 2014). The 15M movement developed in 2011 had a relevant political impact in Madrid, since part of its political capital turned into a grassroots candidature which rules the municipal government from 2015 (Dowling 2016). This explains the high current commitment to increase public participation relevance, which can be seen at initiatives such as the participatory budgeting.

4.3. Cycling planning initiatives

As it happens with public participation, both studied cities have set cycling as a priority in their attempts to improve their sustainability conditions.

4.3.1. Planning background of the current initiatives

In the case of Stockholm, cycling did not really come part of the municipal political agenda until the mid-1990's. Nowadays, all parties claim to be committed to increase cycling (Emanuel 2013) and differences only arise when cycling planning initiatives reduce the capacity for car traffic in certain streets (Mitti 2017). Until this consensus was reached, the institutional openness to cycling was changing depending of the attitudes of those who were in office at each time. While the 1998 plan is framed as a success, doubling the quote of bikes in the vehicle traffic from 4% to 8% (Stockholms stad 2007), the plans of 2005 (suburban city) and 2006 (inner city) were affected by the shifts in municipal government. The new majority brought into office politicians that were against cycle paths in main streets, delaying many investments. Interestingly, it was not necessary to wait for a new majority to return into an open attitude towards cycling. Under the same majority, the politicians in charge of environmental and transport issues changed, and the new ones were much more committed to urban cycling and had a new cycling plan in the agenda (Emanuel 2013). Under the guidelines established in the Urban Mobility Strategy (*Framkomlighetsstrategi*), they developed the current cycling plan, in which the study case focuses (*Cykelplan Stockholm 2012*).

Madrid has a much shorter history of cycling planning initiatives. The lack of political willingness has been related to the reluctance to adopt potentially unpopular measures against car traffic interests (Lorenzi Fernández and Acero 2016). However, this negative framework for cycling planning has rapidly changed both among local officers (Fernández-Heredia et al. 2014) and citizens (Morales 2014), together with the growing debate of air pollution in the city. This led to the first cycling plan in 2008 and to the introduction of the public bike hire system in 2014. The poor financial situation of the municipality delayed many investments and encouraged the adoption of more integrationists' measures such as the 30 km/h lanes for shared traffic (Fernández-Heredia et al. 2014), that were also supported by some cycling advocacy groups. The government change in 2015 brought a perspective more open to infrastructure solutions and the commitment to update the 2008 plan, leading to the current version in which the study case focuses (*Revisión y Actualización del Plan de Movilidad Ciclista de Madrid*).

4.3.2. Processes of the current cycling planning initiatives

Both Stockholm Cycling Plan approved in 2012 and the Madrid Cycling Plan approved in 2018 incorporated public participation as a relevant part, so they fit the concept of participatory cycling planning initiatives.

The development of the Stockholm Cycling Plan started in March 2010, when the municipal Transport Office accepted the proposal raised by the Traffic and Waste Management Committee for developing a new cycling plan for the city. The claimed reasons for this initiative were the new extensions of the city not considered by the previous plan and the increase in bicycle traffic from 2006. While the plan should have been handed in autumn 2010 (Stockholms stad 2010), it suffered a considerable delay and it was not until March 2012 when the consultation over the draft version started. The municipal council approved it in February 2013. The municipality allocated around 150,000€ for the process, which represents a 0,045% of their investments in that year. Table 8 shows a selection of relevant participation opportunities acknowledged in the study regarding cycling planning since the plan was announced. The 8 workshops and 2 meetings for the preparation of the County Cycling Plan are excluded from the list.

Table 8 – Non-exhaustive list of participation opportunities since the announcement of Stockholm Cycling Plan.

Participation opportunity	Date	Comments
Hearing	Sept 2010	Promoted by Transport Office
1st planning workshop	Spring 2011	Conducted by *SpaceScape*
2nd planning workshop	Spring 2011	Conducted by *SpaceScape*
Round table	Sept 2011	Promoted by Urban Environment Vice-Mayor
Seminarium	Mar 2012	Promoted by *Trafikverket* and the municipality
Consultation process	Mar-May 2012	Promoted by Transport Office
Meeting about Götgatan	Feb 2014	-
Meeting for prioritizing	Jan 2015	Promoted by Green Party
Open meetings 'Ser du möjligheterna'	May 2017	Promoted by Transport Office and *Naturskyddsföreningen*

The development of a new Madrid Cycling Plan was an electoral compromise of the grassroots platform Ahora Madrid which acceded to the government after May 2015 elections. Accordingly, the staff started to prepare the bidding phase for the planning process in the following months. The first fatal accident of a user of the bike-sharing system in March 2016 suddenly put urban cycling in the political agenda and the municipal council (*Pleno*) approved in March 2016 a package of 22 measures to improve cycling conditions in the city. One of the measures was the updating of the existent cycling plan with an imposed deadline in January 2017 (Ayto. de Madrid 2016a). According to the interviews conducted in the case, this tight deadline imposed many limitations on what could be developed compared to the initial ideas that the planners had before that date. The consultant company Gea21 was in charge of the participatory updating process, under the supervision of the Sustainable Mobility Planning unit (*Subdirección de Planificación de la Movilidad Sostenible*) within the Sustainable Urban Development department (*Área de Desarrollo Urbano Sostenible*). They were hired by around 20,000€, which represents a 0,004% of the investments in that year. It has to be noted that this consultant company was already in charge of the original plan developed between 2006 and 2008 with a budget of 240,000€. Given the demanding task that the updating process represents, it has not been until January 2018 that the new version of the plan has been formally approved in the municipal council. From March 2016, several participation opportunities have taken place and they are shown in Table 9.

Table 9 – Non-exhaustive list of participation opportunities since the announcement of Madrid Cycling Plan.

Participation opportunity	Date	Comments
Round table	Mar 2016	First broad initiative after the 2015 elections
1st Cycling Forum	Apr 2016	The Cycling Forum (*Foro Ciclista*) replaced the Cycling Plan Monitoring Commission as the main participatory platform for cycling planning, opening it up to more collectives. It is promoted by the Sustainable Mobility Planning Unit.
2nd Cycling Forum	Sept 2016	Promoted by the Sustainable Mobility Planning Unit
1st planning workshop	Oct 2016	Conducted by *Gea21*
2nd planning workshop	Nov 2016	Conducted by *Gea21*
3rd Cycling Forum	Dec 2016	Promoted by the Sustainable Mobility Planning Unit
Consultation process	Jan-Jun 2017	Promoted by the Sustainable Mobility Planning Unit
4th Cycling Forum	Jun 2017	Promoted by the Sustainable Mobility Planning Unit
Review process	Oct 2017	Promoted by the Sustainable Mobility Planning Unit

4.3.3. Outcomes of the current cycling planning initiatives

The documents of both plans contain several goals and measures that are entitled to guide the actions that the municipalities would take regarding cycling. These planning outcomes are summarized in Table 10.

The Stockholm Cycling Plan aims to increase the modal share of cycling from 7% in 2011 to 12% in 2018 and 15% in 2030. The long term goal comes directly from the Urban Mobility Strategy in which the plan is framed (Stockholms stad 2012). This quantitative goal is complemented with other objectives, from which safety is prominent. The plan proposes indicators about the safety of crossings and about the number of severe accidents. The winter maintenance, which is the particularity of cycling issues in the city, is also treated. The plan implementation is linked to an investment package of 100M€ (*cykelmiljarden*) which leaves room for upgrading and developing new dedicated infrastructure, and improving parking conditions for bicycles.

The Madrid Cycling Plan has as goal to increase the modal share of cycling up to 5% in 2025. It has to be noted that it adds partial modal share goals depending on the user profile, since it aims to increase cycling especially among younger and older population. It is also relevant that a gender equality goal is explicitly included. The plan focuses also on the institutional conditions of cycling, aiming to develop a Cycling Office to centralize the information, although not necessarily the planning processes. The plan proposes 430 km of new cycling itineraries and a separated plan about cycling parking (Ayto. de Madrid 2016c).

Table 10 – Main features of the current cycling plans

Goal or measure	Stockholm	Madrid
Cycling modal share basis	7% in 2011	1% in 2016
Cycling modal share goals	12% in 2018 **15% in 2030**	**5% in 2025** (10% among students) (5% among >65 yrs)
Other goals	• Increment in cycling among children • Improvement of maintenance standards • 80% of the crossings marked as safe in 2030 • 50% reduction in the risk of severe accident in 2020 • 500 new parking spots per year • Increase in the perception as a cycling city	• Establish a Cycling Office • Gender balance: 60 male / 40 female in 2025 • Reduction in the number of accidents • Reduction in car space and traffic • Increase in active mobility trips among vulnerable collectives
Main measures	• Upgrading of current paths and new 200 km: 100 M€ in six years • Faster winter maintenance • Allocation plan for new cycling parking spots • Signaling system	• New 430 km of new cycling itineraries • Elimination of cycling paths in sidewalks • Allocation plan for new cycling parking spots • Signaling system

4.3.4. Role of the infrastructure debate in the current initiatives

As can be guessed from the introduction to the research problem, the debate on cycling infrastructure plays a role in the process and contexts of both plans. However, there are interesting difference between the two cities. This section explains why the initial observation of cycling planning in both cities leaded to assume a different impact of the debate on cycling infrastructure.

In the case of Stockholm, the debate in terms of defenders and detractors of dedicated cycling infrastructure seems not to be intense. The background analysis unveils some elements that may have an influence in this fact. Firstly, the research on the city contains evidences of strong preference to have specific cycle paths among local current cyclists (Jansson 2013). The constant comparisons against Copenhagen, which has a consistent dedicated infrastructure model, may also reduce the influence of integrationist arguments. Secondly, the debate on the degree of separation between pedestrian flows and cycling has larger visibility (Sjögren 2014), questioning the common mixed cycling-walking paths (*GC-bana*) as the one shown in Figure 10. There are only few evidences of dissents in virtual communities linked to the separation with motor traffic (Gillinger 2014; post comments in Happyride 2016). Most of statements makes reference to the rule of 30 km/h: only when the car speed is lower than this should integration be the solution (e.g. Cykelfrämjandet n.d.). These evidences are further explored when identifying the stakeholders in the next chapter, reinforcing the conclusion drawn here.

Figure 10 – Local particularities of cycling infrastructure: mixed cycling-walking path in Stockholm. Source: happyride.se

In the case of Madrid, the role of the debate is closer to the complexities depicted in the introduction section. The current Cycling Plan develops the concept of dual network to try to overcome the conflict, a model that would leave room for both preferences among cyclists (Ayto. de Madrid 2016c). Meanwhile, the opposition governing until 2015 still defend the integrationist model that they developed (Blasco 2017) based in the sharrows (*ciclocarriles*), such as the one shown in Figure 11. The debate among cycling advocates has caused confronted reactions and manifestos (integrationist in Madrid Ciclista, 2016; pro-infrastructure in Bicilineal, 2017) and several tensions in the participatory processes when the commitment with dedicated infrastructure was introduced. Sometimes the collaboration between collectives with different points of view is explicitly subject to avoid the debate on cycling infrastructure, as is the

case of the recently constituted Cycling Associations Platform (Blanco 2017). These aspects are also further explored in the next chapter.

Figure 11 – Local particularities of cycling infrastructure: Sharrow in Madrid- Source: circulaseguro.es

5. Nodes in the network: who are the stakeholders?

This chapter contains the results of the project related to the first research question. In line with the theoretical and methodological framework, it presents the list of identified stakeholders in the study cases and also reflects upon their independent attributes.

The overarching finding of the analysis on this question is that cycling planning stakeholders are diverse in nature. This diversity, which is in the essence of the governance paradigm (Stoker 1998), implies that the analysis should avoid predefined analytical categorizations. Instead, it would better stay closer to 'reconstructive' methods that are guided by the perspectives of the own stakeholders (Reed et al. 2009). The implication for this thesis is that the identified stakeholders are not meticulously classified in terms of 'key', 'primary', etc. as policy guidelines usually do (Kelly et al. 2004; Wefering et al. 2013). On the contrary, only substantial classes are developed, in terms of the stakeholders' roles. These classes are not predefined but emerge as part of the analysis. Following this, it is possible to distinguish between three wide categories of stakeholders in cycling planning: the *governmental stakeholders*, the *political parties* and the *civil society stakeholders* (Figure 12). The separation of political parties from both governments and civil society is based on three reasons. Firstly, clustering them with authorities would result in a broader 'political' category that may wrongly suggest that civil society activity is not political. Secondly, the category of political parties does not exist only for the inclusion of opposition parties which are not present in governmental stakeholders. Instead, the parties that have members in charge of governmental stakeholders have also to be analyzed separately from this presence in governments. This is due to the fact that many times they show differentiated roles inside and outside the government (Laver 1999). Thirdly, introduce them under the civil society umbrella would blur their deep operational differences with civil society entities (Cohen and Arato 1992).

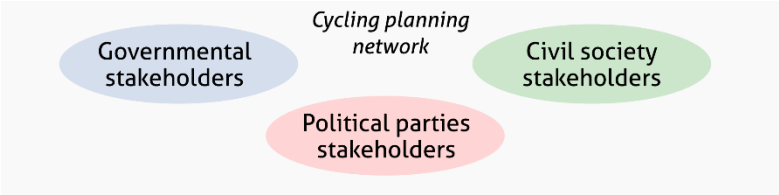

Figure 12 – Basic categories of stakeholders in cycling planning networks

5.1. Governmental stakeholders in cycling planning networks

By particularizing the definition of stakeholder in Freeman (1984:46), a governmental stakeholder is an institution embedded in the governmental system of the city that can affect the development of cycling planning initiatives. The number of governmental stakeholders in the

network appears to be determined by how transport governance is organized in the city, a phenomenon that can be depicted through two axes as seen in Figure 13. This two-dimensional conceptualization of competence allocation is the basis of multi-level governance studies (Bache and Flinders 2004). On the one hand, the transport planning competences can be allocated to different territorial administrations, leading to a vertical separation of competences. On the other hand, there are many policies influencing transport, and more specifically cycling. The competences over these policies are often allocated in more than one area of the municipal government, which leads to a horizontal separation of competences. Following Kriesi (2004), the segmentation of governments in departments imply that advocates have more potential access points to cycling planning, so it is important to dissect municipal government in this horizontal manner.

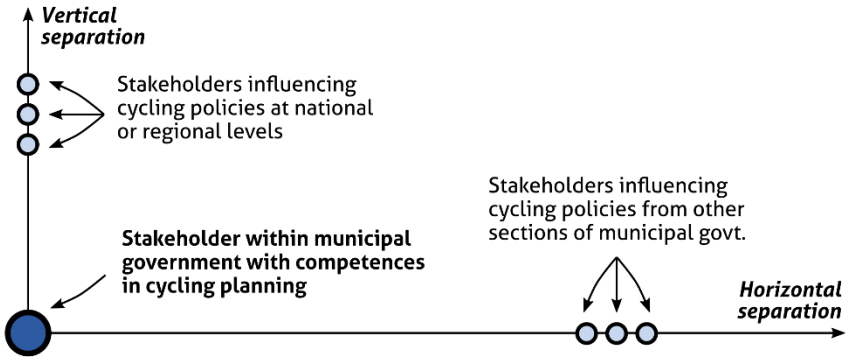

Figure 13 - Position of governmental stakeholders in terms of separation of competences. Source: own elaboration from multi-level governance frameworks (e.g. Bache and Flinders 2004)

5.1.1. List of governmental stakeholders in the study cases

The identified governmental stakeholders in both cases are listed in Table 11 and Table 12. The differentiation between external and internal to the municipal government corresponds to the scheme of vertical and horizontal separation explained above.

Table 11 – Governmental stakeholders identified in Stockholm

i	Name	Role
External to municipal government		
101	Trafikverket Region Stockholm	Delegation in Stockholm area of the Swedish national transportation agency
102	Lansstyrelsen i Stockholms län	Delegation in Stockholm of the Swedish government
103	Polismyndigheten i Stockholms län	Delegation in Stockholm county of the Swedish police
104	Stockholms läns landsting: Tillväxt, Miljö och regionplanering (SLL - TMR)	Regional planning department within the county administration
105	Stockholms Lokaltrafik (SL)	Public transport agency in Stockholm county
106	Cykelkansliet i Stockholms län	Coordination office for cycling policies, a partnership among Trafikverket, Lansstyrelsen and SLL
107	Stockholm' bordering municipalities	Municipalities surrounding Stockholm
Internal to municipal government		
108	Stockholms stad trafikroteln	Transport Vice-Mayor Division

109	Stockholms stad miljöroteln	Environment Vice-Mayor Division
110	Trafikkontoret	Transport Office
111	Trafikplanering avdelningen	Transport Planning section within Transport Office
112	Strategisk planering enheten	Strategic Planning unit within Transport Planning section, with competences in cycling planning
113	Exploateringskontoret	Urban Development Office
114	Stadsbyggnadskontoret	Urban Planning Office
115	Stockholms stadsdelarförvaltningar	Districts administrations
116	Stockholm Business Region	Municipal company for city marketing
117	Stockholms Hamnar	Municipal company for port operation
118	Stockholms Parkering	Municipal company for parking operation

Table 12 - Governmental stakeholders identified in Madrid

i	Name	Role
External to municipal government		
401	Consorcio Regional de Transportes de Madrid	Public transport agency in Madrid region
Internal to municipal government		
402	Área de Desarrollo Urbano Sostenible	Urban Planning Department
403	Dirección General de Estrategia de Regeneración Urbana	Urban Regeneration Strategy section within Urban Planning Department
404	Subdirección General de Planificación de la Movilidad Sostenible	Urban Mobility Planning unit within Urban Regeneration Strategy section, with competences in cycling planning
405	Dirección General del Espacio Público, Obras e Infrastructuras	Public Space and Infrastructures section within Urban Planning Department
406	Subdirección General de Implantación de Transportes y Movilidad	Transport and Mobility Projects unit within Public Space and Infrastructures section
407	Área de Medio Ambiente y Movilidad	Environment and Mobility Department
408	Empresa Municipal de Transportes	Municipal company for bus, parking and bike-sharing operation
409	Dirección General de Sostenibilidad y Control Ambiental	Sustainability and Environmental Control section within Environment Department
410	Dirección General de Gestión y Vigilancia de la Circulación	Traffic Management and Safety section within Environment Department
411	Juntas de Distrito	District Administrations

5.1.2. Factors beyond vertical separation of competences

The analysis of governmental stakeholders discloses the factors beyond the vertical separation of competences. These are based in the ownership of cycling infrastructure and in the metropolitan governance structures around transport and cycling.

The first factor is the infrastructure ownership. The ownership determines who is responsible for the maintenance of the facilities, a task that requires a constant effort. In the case of Stockholm, part of the infrastructure is not owned by the municipality but by the national transportation agency *Trafikverket* (i=101), as it goes along national roads. Interestingly, the responsibility is not always clearly defined, leading to conflicts between municipalities and this agency (Kristoffersson 2017). In this line, cycling organizations have proposed to make the agency responsible of all the regional cycling network to enhance the accountability of the

infrastructure quality (Svensk Cykling 2017). This sets a difference with Madrid case, where none of the national level institutions are identified as stakeholders because all cycling infrastructure in the city relies on the action of the municipality.

The second factor is the allocation of transport competences to metropolitan authorities. There is nowadays a tendency to delegate responsibilities from municipalities to metropolitan authorities, although these processes are often complex and partial (Lefèvre 1998). Both municipalities have delegated competences in terms of public transport. Stockholm went through this delegation process between 1967 and 1971, through a change of the ownership of the public transportation company *Stockholms Lokaltrafik* (SL, i=105) from the municipality to the county. Madrid did it similarly in 1985 through the creation of the institutional alliance *Consorcio Regional de Transportes de Madrid* (CRTM, i=401). However, cycling governance does not follow the same pattern. With the exception explained above for national roads in Stockholm, cycling planning remains as a competence of each municipality, given that the provision of cycling infrastructure often comes with urban development projects. This has a drawback in terms of metropolitan coherence of cycling networks (Sjögren 2014).

Despite of this absence of delegation mechanisms, it has to be noted that there are some metropolitan coordination efforts regarding cycling. This constitutes a third factor for the vertical spread of competences and stakeholders. In the case of Stockholm, the potential lack of coherence in the infrastructure networks has triggered institutions to seek some level of coordination through the Stockholm County Cycling Office (*Stockholms regionalt cykelkansliet*, i=106) and a Stockholm County Cycling Plan (*Regional cykelplan för Stockholms län*). In the case of Madrid there are no coordination mechanisms, although the mentioned CRTM has recently put resources in studying cycling links among municipalities (En bici por Madrid 2016b). Apart from stable coordination institutions, it is remarkable how surrounding municipalities are involved in cycling planning in Stockholm (i=107) in contrast to their absence in the Madrid case.

These factors, together with other differences such as the different allocation of urban traffic surveillance responsibility –through national police in Stockholm (i=103), through municipal agents in Madrid (i=410)–, imply that in the Stockholm case the vertical diversity of governmental stakeholders is higher than in the Madrid case.

5.1.3. Factors beyond horizontal separation of competences

Regarding horizontal separation, the interviewed officers from both cases remarked that cycling is an issue that can be addressed from different sections of a municipal administration. Three factors are identified to be beyond this horizontal separation: the administrative system of the municipality in a given country, the allocation model of sectoral competences and the frequency of managerial governance solutions.

Regarding the administrative system of municipal governments, it has to be noted that Sweden and Spain represent different approaches (Wollmann 2012). Swedish municipalities are closer to a 'committee system': the administrative areas of the municipality do not depend

directly on politicians from the governing majority, but are technical *offices* under the supervision of sectoral committees. Spanish municipalities are closer to a 'quasi-parliamentary system', where the Mayor appointed by the elected municipal council decides the administrative structure, and the politicians from the governing majority become leaders of the administrative *departments* within the government. This blurs the borders between politicians and officers, while in Stockholm it is necessary to acknowledge the difference between the political-oriented *Trafikroteln* (i=108) and the technical-oriented *Trafikkontoret* (i=110).

Since cycling lays between urban planning, transport and environmental issues, the sectoral allocation of the competences on these issues constitutes a second factor. In the case of Stockholm, cycling planning is a competence of one of the units of the Transport Office (i=112). The lack of integration with Urban Planning Office (i=114) has been seen as a relevant drawback, since it can lead to contradictory approaches in some projects (Koglin 2015). In the case of Madrid, cycling planning is attached to a Sustainable Mobility Planning Unit (i=404), within the department dedicated to urban planning. Even though this would overcome the inconvenience detected in Stockholm, it separates transport planning from transport management, which is allocated together with environment issues due to the relevance of the debate around air pollution (Fernández-Heredia et al. 2014). This influence of each department or office depend on the political willingness of the different responsible for each issue. For instance, the role of Environment Vice-Mayor (i=109) in during the launching of Stockholm Cycling Plan was prominent as an ally to cycling advocacy. In the next government, which put in office a Transport Vice-Mayor (i=108) closer to cycling advocacy positions, the role of Environment Vice-Mayor becomes less central. Table 13 and Table 14 show the allocation of competences through different municipal governmental sections in both cities.

Table 13 - Allocation of competences related to cycling within Stockholm local government, at the moment the 2012 Cycling Plan was launched

Offices and sub-areas	Cycling competences	Political responsibles
Transport Office Transport Planning Section Strategic Planning Unit	• **Cycling Plan** • Contribution to cycling planning handbook	Transport and Waste Management Committee and Vice-Mayor
Transport Office Transport Planning Section Rest of the units	• Cycling signals • Dialogue with citizens	
Transport Office Rest of the sections	• Winter maintenance • Public bicycle-sharing contract	
Urban Planning Office	• Contribution to planning handbook • Cycling infrastructure planning in big urban projects	Urban Planning and Sports Committee and Vice-Mayor
Environmental Office	• Sustainability strategies	Environmental and Health Committee and Vice-Mayor
Development Office	• Contribution to planning handbook • Cycling infrastructure implementation in new areas	Development Committee and City Mayor

Table 14 - Allocation of competences related to cycling within Madrid local government, at the moment the 2016 updating of the Cycling Plan was launched

Departments and sub-areas	Cycling competences
Sustainable Urban Development Department Urban Regeneration Strategy Section Sustainable Mobility Planning Unit	• **Cycling Plan** • Public participation initiatives related to mobility planning
Sustainable Urban Development Department Public Space, Works and Infrastructures Section Mobility and Transport Implementation Unit	• Implementation of cycling projects
Mobility and Environment Department Sustainability and Environmental Control Section	• Sustainability principles • Environment Education – projects related to cycling and schools • Contract that includes the provision of cycle parking stands and signaling
Mobility and Environment Department Traffic Safety and Management Section	• Traffic municipal police
Mobility and Environment Department Municipal Transport Company	• Public bicycle-sharing system

The third factor found is the proliferation of managerial governance procedures, which consist in the allocate responsibilities in institutions that follow private management standards instead of doing it within existing sections (Mäntysalo et al. 2011). This situation multiplies the number of stakeholders to be considered. Firstly, it does it in a direct manner, if some aspect affecting cycling is managed through one of these institutions (e.g. Stockholms Hamnar, i=117, which participates in cycling plans consultation processes). Secondly, it also contributes to it in an indirect manner, including as stakeholder those administrative sections that promote comprehensive contracts that affect cycling. For instance, Madrid' local government that was in charge until 2015 decided to manage some mobility and urban space elements through comprehensive contracts with private companies, including cycling parking urban furniture. The role of Sustainability and Environmental Control section (i=409) is therefore reinforced since it is the responsible for the supervision of this contract.

5.2. Political parties in cycling planning networks

Those political parties that can affect the development of cycling planning initiatives must be included as stakeholders, since they operate in the area where the planning initiative is being developed. The criteria for inclusion is to have representatives in the municipal council of the cities. Table 15 and Table 16 collect the identified parties in both cases.

Table 15 – Political parties identified in Stockholm, with their seats and roles in the Municipal Council

i	Party	Ideology	Seats 2010-2014	Role 2010-2014	Seats 2014-2018	Role 2010-2014
201	V	Left	8	Opposition	10	Government

202	S	Social democracy	25	Opposition	24	Government
203	MP	Green	16	Opposition	16	Government
204	C	Center	3	Government	3	Opposition
205	L	Liberal	10	Government	9	Opposition
206	M	Conservative	38	Government	28	Opposition
207	KD	Christian democracy	1	Government	2	Opposition
208	SD	Nationalism	0	-	6	Opposition
209	FI	Feminism	0	-	3	Government

Table 16 – Political parties identified in Madrid, with their seats and roles in the Municipal Council

i	Party	Ideology	Seats 2011-2015	Role 2010-2014	Seats 2015-2019	Role 2010-2014
501	Ahora Madrid	Left – Grassroots	6*	Opposition	20	Government
502	PSOE	Social democracy	15	Opposition	9	Support govt.
503	Ciudadanos	Liberal	5*	Opposition	7	Opposition
504	PP	Conservative	31	Government	21	Opposition

*Ahora Madrid 2011-2015 seats corresponding to IU, Ciudadanos 2011-2015 seats corresponding to UPyD

Both cities have a multi-party system where agreements between parties are needed to set a governing majority. Contrary to the case of governmental stakeholders, the number of political parties in the network is given by factors entirely external to cycling governance. However, it is worthwhile to mention that parties close to green movement adopt cycling as a basis of their mobility manifestos. This aspect arises when reviewing the relation between political parties and civil society stakeholders.

5.3. Civil society stakeholders in cycling planning networks

A civil society stakeholder is a non-governmental and non-partisan entity that can affect or be affected by the development of cycling planning initiatives. The diversity of civil society stakeholders is the highest among the three defined categories of stakeholders. It fully reflects the complexity associated to the governance paradigm (Stoker 1998). Consequently, each attribute analyzed for these stakeholders show a very wide range of states. Under this category, the analysis focuses in providing the list of acknowledged stakeholders and to derive some results from the evaluation of their independent attributes.

5.3.1. List of civil society stakeholders in the study cases

Table 17 and Table 18 show the civil society stakeholders identified in the research, together with the source of identification: 'process participant' (identified as participating in planning processes thanks to document analysis) or 'snowball sampling' (derived after these).

Table 17 – Civil society stakeholders identified in Stockholm

i	Name	Description	Identification
301	Cykelfrämjandet Storstockholm	Local group of the biggest cycling advocacy organization in Sweden	Process participant

302	Företagsgrupperna Stockholm	Federation of enterprises associations in the city	Process participant
303	Fotgängarnas förening FOT	Pedestrian advocacy organization	Process participant
304	Klimataktion Stockholm	Local group of climate advocacy organization	Process participant
305	Kollektivtrafikant Stockholm	Public transport-users advocacy organization	Process participant
306	Motormännen Riksförbund i Stockholm	Local group of motor vehicle-owners advocacy organization	Process participant
307	Naturskyddsföreningen Cykelgruppen Stockholms län	Cycling advocacy group within ecologist organization	Process participant
308	NTF Öst	Regional group of traffic safety advocacy organization	Process participant
309	Stockholms Handelskammare	Commerce Chamber of the city	Process participant
310	Stockholms län Sveriges Bussföretag	County section of the bus companies branch	Process participant
311	Svensk Cykling	Cycling advocacy platform including business branches	Process participant
312	Svenska Cykelsällskapet	Recreational cycling advocacy organization	Process participant
313	Sveriges Åkeriföretag ABC	Delivery companies branch	Process participant
314	Synskadades Riksförbund Stockholms stad	Local group of visually impaired advocacy organization	Process participant
315	Yimby Stockholm	Local network of urban development advocacy group	Snowball sampling
317	Bicycling Isaksson bloggen	Cycling advocacy blog	Snowball sampling
318	Cycleville Stockholm	Cycling advocacy blog	Snowball sampling
319	Cykelköket Solna	Cycling workshop	Snowball sampling
320	Cykelliberalen	Cycling advocacy blog	Snowball sampling
321	Cykelpendla Hässelby	Cycling advocacy blog	Snowball sampling
322	Cyklandeombud Stockholms län	Cycling advocacy network of cycling infrastructure problems reporters	Snowball sampling
323	Cyklist i Stockholm	Cycling advocacy blog	Snowball sampling
324	Cyklistbloggen	Cycling advocacy blog	Snowball sampling
326	Ecoprofile	Network of blogs with cycling advocacy posts	Snowball sampling
327	Karins miljöblogg	Cycling advocacy blog	Snowball sampling
328	Liv utan bil	Cycling advocacy blog	Snowball sampling
329	Miljöbilisten	Cycling advocacy blog	Snowball sampling

Table 18 – Civil society stakeholders identified in Madrid

i	Name	Focus	Identification
601	A Pie	Pedestrian advocacy organization	Process participant
602	Ahora Movilidad	Urban mobility advocacy group linked to the party Ahora Madrid (i=501)	Process participant
603	Asociación de Bicicletas y Marcas de España – AMBE	Bicycle business branch	Process participant
604	Cermi Madrid	Functional diversity advocacy organization	Process participant
605	Club Ciclista Chamartín	Sportive cycling district association	Process participant
606	Club Ciclista Hortaleza	Sportive cycling district association	Process participant
607	En bici por Madrid	Cycling advocacy blog	Process participant

608	FAMMA	Federation of functional diversity advocacy associations	Process participant
609	Federación Madrileña de Ciclismo	Sportive cycling regional federation	Process participant
610	FRAVM	Federation of communities associations	Process participant
611	Madrid en Bici	Cycling advocacy blog	Process participant
612	Madrid ProBici	Bicycle business branch	Process participant
613	Muévete en Bici Por Madrid	Cycling advocacy blog	Process participant
614	Observatorio de la Bicicleta Pública	Cycling advocacy blog	Process participant
615	Oficina de Urbanismo Social	Grassroots urbanism advocacy group	Process participant
616	Urbanas Mad	Feminist urbanism advocacy group	Process participant
617	Amadores de la Bici	Cycling advocacy group in a school parents association	Snowball sampling
618	Asociación de Ciclistas Profesionales	Sportive cycling association	Snowball sampling
619	Bici y Buen Rollo BBR	Sportive cycling group	Snowball sampling
620	Bicicivica	Critical mass	Snowball sampling
621	Bicicletos – Recicletos	Cycling workshop in a social center	Snowball sampling
622	Bicicrítica Madrid	Critical mass	Snowball sampling
623	Bicidenuncias	Cycling advocacy blog	Snowball sampling
624	Bicienjambre	Cycling advocacy group from 15-M movement	Snowball sampling
625	Bicilineal	District cycling advocacy group	Snowball sampling
626	Bicillecas	District cycling advocacy group	Snowball sampling
627	Cazavelocidades Madrid	Cycling advocacy blog	Snowball sampling
628	Cicliátrico	Feminist cycling advocacy group	Snowball sampling
629	Ciclobollos	Queer cycling advocacy group	Snowball sampling
630	Cicloguinda	District critical mass	Snowball sampling
631	Ciclosfera	Cycling advocacy magazine	Snowball sampling
632	Club de Debates Urbanos	Urban planning debate forum	Snowball sampling
633	ConBici	National cycling advocacy coordination space	Snowball sampling
634	Coordi Anti Carril	Integrationist cycling advocacy blog	Snowball sampling
635	Coordinadora de Asociaciones Ciclistas de la Com. de Madrid	Regional cycling advocacy coordination space	Snowball sampling
636	Corazón Verde Chamberí	District public space advocacy	Snowball sampling
637	Ecologistas en Acción Madrid	Regional group of an ecologist organization	Snowball sampling
638	Ecomovilidad	Urban mobility blog	Snowball sampling
639	El Biciclista	Cycling advocacy blog	Snowball sampling
640	En Bici Arganzuela - Meloncleta	District cycling advocacy section of a district grassroots group	Snowball sampling
641	En Bici por tu ciudad - Cyclists school	Adults cycling school	Snowball sampling
642	Equo Bicis	Ecologist cycling advocacy linked to the party Ahora Madrid (i=501)	Snowball sampling
643	Federación Española de Cicloturismo	Recreational cycling advocacy association	Snowball sampling
644	Madrid Ciclista	Integrationist cycling advocacy group	Snowball sampling
645	Madrid en Bicicleta	Cycling advocacy blog	Snowball sampling

646	Madrid en Transporte Público	Public transport-users advocacy coordination space	Snowball sampling
647	Mejor en Bici	Cycling advocacy blog	Snowball sampling
648	Mesa de la Bicicleta	National cycling advocacy coordination	Snowball sampling
649	Moratacleta	District cycling advocacy group	Snowball sampling
650	Nación Rotonda	Sustainable land use advocacy blog	Snowball sampling
651	OMUS Madrid	Sustainable mobility advocacy coordination space	Snowball sampling
652	Pata de Cabra Radio	Cycling advocacy radio	Snowball sampling
653	Pedalibre	Cycling advocacy association	Snowball sampling
654	RideMyBike Madrid	Cycling advocacy blog	Snowball sampling
655	Taller Social Guindostán	Cycling workshop	Snowball sampling
656	Vikalvacleta	District cycling advocacy group	Snowball sampling

The questionnaire asked to the identified stakeholders to report other stakeholders not included in the list, which serves as validation of the identification. A majority of stakeholders answered that there were not missing any, with two exceptions in the case of Madrid: the stakeholders based in other municipalities of the metropolitan area (e.g. *Bici Norte*, *Getafe en Bici*) and a distrital critical mass (*Rollercleta*). These were reported by more than one stakeholder. As stated in the introduction, the analysis focuses in the central municipalities of the metropolitan areas and their conurbations.

5.3.2. *Involvement of non-cyclist focus organizations*

The first outcome of this analysis is that planning authorities try to engage certain entities without focus in cycling, claiming that they are also users of the public space and therefore affected by cycling planning initiatives. This enables these entities as stakeholders in the process.

In the case of Stockholm, this attitude guided the planning process of the current plan. Some public statements from politicians provide evidence to this (Moderaterna Stockholm 2010), but also the effective inclusion of stakeholders such as the Commerce Chamber (i=309) in many participation opportunities during the process. Interestingly, in the interviews with institutional agents in the city it was shown that this conceptualization is still present nowadays even with a different municipal government, closer to cycling advocacy positions. This sets an important difference with Madrid case, where the presence of stakeholders without specific mobility or cycling focus is limited to the functional diversity advocacy sector (i=604, 608) and community associations (i=610) as Table 18 showed. However, the interviews with institutional agents revealed that the intention was to open the process to other kind of entities in a similar manner to the Stockholm case, but that the lack of interest from these potential stakeholders set difficulties to their inclusion, since they would not attend the participation opportunities even when they are invited. Furthermore, the interviewee from cycling advocacy in Madrid case was explicitly open for the inclusion of these non-cycling focus entities.

This relevance of non-cycling focus organizations is to be confirmed through the centrality measures of the graph analysis conducted in the social networks associated to the study.

5.3.3. Wide diversity of organizational forms

During the evaluation of the organizational forms of the acknowledged stakeholders, a broad range of structures emerged. Even leaving aside the particularities of virtual communities, the groups based in attendance are not homogeneously organized. It was found that the civil society environment is very relevant to determine how diverse can be this aspect.

In the case of Stockholm, the cycling advocacy landscape is dominated by big groups listed in an administrative registry (e.g. *Cykelfrämjandet*, i=301). Apart from virtual communities, most of these groups are territorial sections of organizations that have a national scope, as shown in Table 19. This follows the "strong tradition of popular organizations" that can be seen in Sweden (Jeppsson Grassman and Svedberg 2007:134). On the contrary, in the case of Madrid the organizational forms tend to be much looser and the entities are generally not sections of national organizations. This can be linked to the very low levels of civil organization in Spain until the rise of 15M movement in 2011 (Sampedro and Lobera 2014). Many of the identified entities appeared after this breakdown and inherited the assemblearism from 15M movement as organizational form. The best exponent of the influence of this movement is the existence of a cycling advocacy group that started as a section of 15M mobilizations (*Bicienjambre*, i=624). This aspect is also reflected in the fact that many entities are not registered in any official list of civic organizations, as Table 20 depicts.

Table 19 - Formalization towards government of the identified civil society stakeholders

Type	Stockholm	Madrid
Registered entity	14 (48.3%)	18 (32.1%)
Unregistered entity	15 (51.7%)	34 (60.7%)
No data	-	4 (7.1%)
Total	*29*	*56*

Table 20 – Specialization level of the identified civil society stakeholders

Type	Stockholm	Madrid
Standalone entities	21 (72.4%)	44 (78.6%)
Sectorial group within an entity	1 (3.4%)	2 (3.6%)
Territorial group within an entity	7 (21.1%)	2 (3.6%)
No data	-	8 (14.3%)
Total	*29*	*56*

The different level of formalization has an impact in the suitable methods for public participation. Those processes based in formal channels of participation, such as consultation process, count with the involvement of those organizations that are registered. Hence, the percentage of stakeholders involved in the consultation process is higher in the case of Stockholm than in the case of Madrid. On the contrary, the informal methods tend to leave room for the

inclusion of entities that are unregistered. In some cases, the interviewees from governments declared that is difficult to know to what extent some groups exists or not (Interviewee from Madrid municipal government).

5.3.4. *Development and impact of cycling advocacy virtual communities*

The number of virtual communities within cycling advocacy is increasing fast. In both cases, a plethora of blogs and social media pages have been opened in the last years. These complement the already existing traditional organizations. It has to be noted that the evolution of virtual communities is far from being homogeneous. Some of them have already finished their activity (e.g. *Karins miljöblogg*, i=327) or have passed through format transformations where the blog is abandon but a social media page is still opened (e.g. *Madrid en Bici*, i=611). These interruptions are more common in Stockholm than in Madrid, though the reason remains unclear. However, the trend is positive, both in number of virtual communities and consolidation of the existent ones. Figure 14 and Figure 15 reflect this evolution.

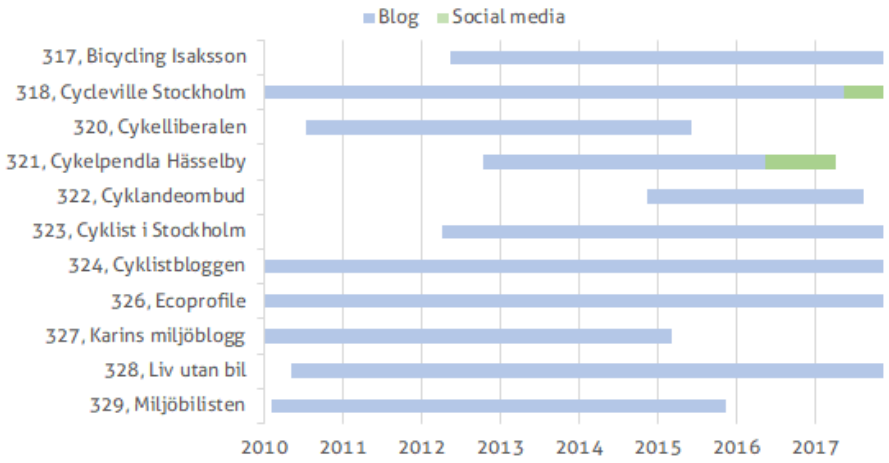

Figure 14 – Chronogram of virtual communities in Stockholm case

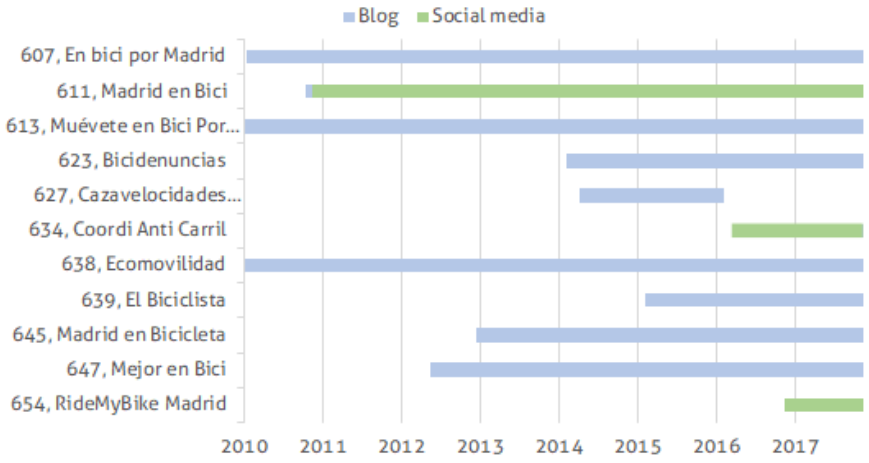

Figure 15 – Chronogram of virtual communities in Madrid case

In addition, it is significant that some entities have evolved towards practices that are not exclusively virtual. This has been revealed through the administered questionnaires. In the case of Stockholm, some initiatives have participated in planning meetings (e.g. *Cyklistbloggen*, i=324) or promoted press meetings to explain their demands (e.g. *Cyklandeombud*, i=322). It is significant that similar trajectories can be reported in the case of Madrid. The blog *En Bici por Madrid* (i=607) is the most prominent example within cycling advocacy, though the more mobility-generalist blog *Ecomovilidad* (i=638) has been also directly engaged in participation opportunities analyzed in the thesis. The boldness of virtual communities is a driver for a more intense use of Internet as a tool for participation in cycling planning processes.

5.3.5. Evolution of the concept of membership

The project has evaluated two attributes related to membership in these entities: the formalization through payment of a fee, and the admission of groups as members. The result is again a broad range of membership models that provides interesting outcomes.

Firstly, the emergence of virtual communities challenges the notion of membership. Many of these communities are individual initiatives. The conceptualization of such initiatives as virtual communities allows precisely to update the approach to membership, based in the high level of interactivity that these blogs and social media pages offer. Following this, the individual that conducts the initiatives emerges as administrator or moderator and the recurrent 'others' that comment and share contents in the community become free unregistered members. This interpretation is common in the literature (Wellman and Gulia 1999).

Secondly, even in the case of the entities that are not shaped as virtual communities there is no homogeneous pattern of the membership conditions. In the case of Stockholm, it is more common to find a paid membership model, which correlates with the more frequent presence of established and registered organizations. In the case of Madrid many of the groups do not require any fee for active participation, as can be seen in Table 21.

Thirdly, not only individuals but also other entities can be members of certain groups (Table 22). Hence, the phenomenon of network organizations (della Porta and Diani 2006) that serve as coordination and collaboration spaces is very present to cycling planning network. There are spaces that fit completely that definition, such as *Svensk Cykling* (i=311) in the case of Stockholm or the recently established *Coordinadora de Asociaciones Ciclistas* (i=635) in the case of Madrid. Moreover, this diversity is enhanced in the case of Madrid, where some not entirely formal entities admit both the membership of groups and individuals.

Table 21 – Types of membership in the identified civil society stakeholders

Type	Stockholm	Madrid
Paid membership	14 (48.3%)	15 (26.8%)
Free membership	15 (51.7%)	35 (62.5%)
No data	-	6 (10.7%)
Total	*29*	*56*

Table 22 – Nature of the members in the identified civil society stakeholders

Type	Stockholm	Madrid
Individuals	6 (20.7%)	15 (44.1%)
Groups	23 (79.3%)	7 (20.6%)
Both individuals and groups	-	6 (10.7%)
No data	-	6 (10.7%)
Total	*29*	*56*

This has a consequence in public participation processes, since the perception of representativity that each civil society holds cannot be validated in quantitative terms, but is left to the judgement of those in charge of the participatory processes.

5.3.6. Complexity of decision-making procedures

The diversity observed in the attributes analyzed above appears as well when reviewing how these entities structure their decision-making processes. It can be seen that the civil society environment has again a big impact on how leadership is understood within the entities involved in cycling planning.

Following this, in the case of Stockholm almost all organizations that are not virtual communities reported to follow a model where an executive group is appointed in ordinary assemblies with annual frequency. In the case of Madrid, the evaluation of this attribute confirms the influence of the assemblearism from 15M movement mentioned above. A vast majority of groups celebrate horizontal assemblies with relatively high frequency –higher than one year, in any case–. Some of this groups reinforce the structure with a coordination group that may meet even more regularly. The atomization of the advocacy landscape, that causes that some groups have limited membership, is reflected in the fact that almost 20% of the stakeholders do not require coordination mechanisms, as seen in Figure 16.

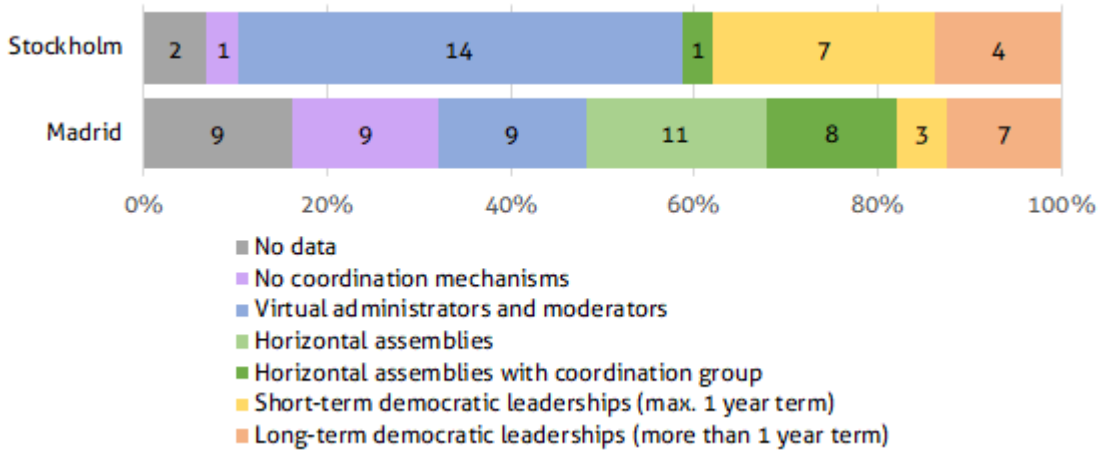

Figure 16 – Decision-making models observed in the identified civil society stakeholders

The looseness of certain entities in terms of decision-making procedures poses another challenge to those organizing public participation in terms of legitimacy. Those agents from civil society stakeholders made references to the difficulty to know who are some of the entities speaking for (interviewee from Stockholm municipal administration).

5.3.7. Civil society stakeholders and the debate on cycling infrastructure

In line with the research problem of the thesis, one of the focal points of interest when identifying the civil society stakeholders was their position in the debate on cycling infrastructure. Hence, the identification included specific attributes regarding this issue. This serves as a reinforcement for the assumption made from the initial observations of the phenomenon, which states that the debate on cycling infrastructure and its impacts are not equally intense. Effectively, it is found that in Stockholm this debate is not characterized by the bitterness described by the literature in other contexts (Aldred 2016; Parkin 2015), while in Madrid this description is much closer to the reality.

It was found that in Stockholm there is a high degree of consensus towards the provision of dedicated cycling infrastructure among the civil society stakeholders. The three methods employed in relation to this issue resulted in this conclusion. Firstly, all the respondents of the questionnaire preferred either the most intense or the nearly most intense level of separation from motorized traffic among the options offered. Moreover, this position was framed as unanimous among their members. Secondly, the interviewees from governmental stakeholders pointed out that they have noticed a strong preference towards separation from motor traffic among the civil society stakeholders holding relations with them. Thirdly, the review of the public statements from civil society stakeholders in their websites and social media sites disclosed few cases where the debate on cycling infrastructure was specifically framed in the exposed terms. The element that lays behind these cases is the use of cycle lanes (*cykelfält*). This solution provides a dedicated space for cyclists but within the existent road, by painted marks. Therefore, it constitutes a middle-point solution between cycle paths and mixed traffic. This makes emerge arguments such as the legitimation of cyclists to use the roads, classic in places where this debate is more intense (Aldred 2015). Two examples from virtual communities illustrate this. In one of the interviews that *Cycleville* (i=318) conducted with a municipal officer, the main topic was to enhance the safety of cycle lanes against cycle paths (Rådmark 2011). A post in *Cyklistbloggen* (i=324) revealed positions even closer to integrationist points of view. The author reflects about how a cycle lane has reduced the legitimation to use the road compared to the previous situation, suggesting that in context with low speeds mixed traffic should be preferred (Gillinger 2015). Even though the comment sections of these posts show evidence of incipient debates about this issue, these are more exceptions than general trends.

The situation in Madrid is different. The diversity of opinions about the model of cycling infrastructure is higher. The questionnaires already reveal this diversity. A vast majority of the stakeholders that answered the questionnaire reported that they have debated about cycling infrastructure. Although this was the case also in Stockholm, in Madrid the stakeholders admit much lower levels of consensus among their members as shown in Table 23. Half of the surveyed

stakeholders disclosed that the internal debates did not started from common points of view, and only half of these succeeded to reach a shared perspective on cycling infrastructure.

Table 23 – Answers to the question "Has the group debated about cycling infrastructure in terms of integration in the road vs. use of dedicated cycling infrastructure?" in Madrid case.

Answer	Number	Share
No	**2**	**7,1%**
Yes	**26**	**92,9%**
From common points of view	12	46.2%
From different points of view but reaching a common one	7	26.9%
Without reaching a common point of view	7	26.9%

Furthermore, the support for the provision of cycling infrastructure is not unanimous across the spectrum of civil society stakeholders, as Figure 17 reveals. Even so, the majority of stakeholders prefer a model that follows the dual network approach that characterizes the cycling plan. This consists in providing dedicated cycling infrastructure in the main streets of the city while keeping the 'sharrows' developed in the last years, a model present also in cities such as London (Aldred 2015). Remarkably there was no support for the strongest level of separation from motorized traffic based only in cycle paths.

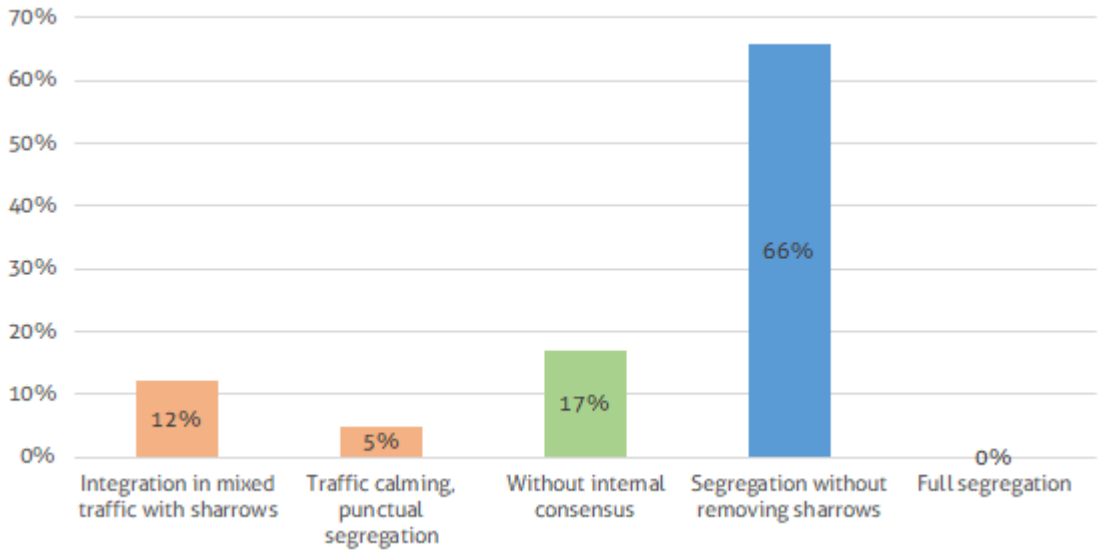

Figure 17 – Models of cycling infrastructure preferred among civil society stakeholders in Madrid case.

The interviewees from governmental stakeholders and the review of public statements from civil society stakeholders revealed also the high profile of this debate in the city cycling planning network. The best exponent of this is the manifestos promoted by several stakeholders for (Bicilineal 2017) and against (Ciudad Ciclista 2016) the investments in cycling

infrastructure. In this line, the analysis of the relations between stakeholders in the next chapter have the ties between these entities as one of the points of attention.

6. Ties in cycling planning networks: how are the relations?

This chapter presents the results of the thesis related to its second research question. Therefore, the relations among the stakeholders identified in the previous chapter are reviewed. This revision is structured following the substantial classes of stakeholders introduced in the analysis of their identification.

6.1. Ties within the subnetwork of governmental stakeholders

The ties between governmental stakeholders affect participatory cycling planning. As it is revealed in the previous chapter, the responsibilities over cycling planning are spread out across different governmental stakeholders, either horizontally or vertically. Both the existing literature (e.g. Koglin 2015) and the interviews conducted in this thesis stress the importance of coordination for the success of planning. The tone of the interviewees regarding this topic in both study cases was similar: the cross-sectional character of cycling makes relations complex, but the available coordination spaces are helping to smooth relations. This section collects some interesting outcomes from the analysis of the relations within the municipal governmental stakeholders.

6.1.1. Features of the vertical ties

The relations in the vertical axis of governmental stakeholders are more relevant in the case of Stockholm, since the influence in cycling planning is much more spread along this axis. Two elements can be extracted from the research regarding this aspect.

On the one hand, it is clear that the ownership of the infrastructure is a source of complexity in the relations between the stakeholders that own different levels of the cycling network. This emerges specially when users present complaints about the quality of the infrastructure. Virtual communities are a good source of evidence for this situations, since they compile a lot of cases where the national *Trafikverket* (i=101) and the municipal *Trafikkontoret* (i=110) have to derive questions between each other. This is common in the complaints collected by *Cyklandeombud* (i=322) which was explicitly aimed at funnel these complaints.

On the other hand, Stockholm case show that it is possible to develop spaces to promote relations between governmental stakeholders. The Regional Cycling Office (i=106) plays an outstanding role in the strengthening of these relations. This stakeholder does not only provide a shared space for the organizations that officially form part of it, but also for the municipalities in the metropolitan area.

6.1.2. Features of the horizontal ties

There were a set of elements of interests that the analysis wanted to inquire. Firstly, it was meaningful to check the conceptualization of the different municipal instances from themselves, as a constitutive part of their relations. The case of Madrid shows that the concurrence of two administrative units under the same department seems not to imply that they

have better relations than if they were under different departments. The interviewees made little difference between the two broad departments with responsibilities within cycling planning (i=402 and i=407) but rather between the different sections under these departments. This nuance was also present in the analysis of the Stockholm case.

Secondly, the relations between the entities in charge of the planning phase and the entities in charge of implementation and operation phases are conditioned by many factors that go beyond cycling. In this sense, it could be said that the planning sections already know that their proposed solutions will suffer modifications due to their integration in an urban mobility system where all users of roads have to be taken into account. The interviewees expressed this as the main reason for preferring an alternative competences model, where the provision of cycling facilities is dealt from the planning phase to its operation by a single institutional actor. This preference was more intense among the interviewees in Madrid.

Thirdly, the size of the city implies a higher level of decentralization, which in turns make more relevant the relations between the sectoral departments and the district administrations. In the case of Madrid, the interviewees stressed the difficulty to develop cycling infrastructure that meets at the same time the needs of the whole city and the needs of each district. In both cases the district administrations were included in the participatory processes that accompanied cycling plans (i=115, i=411).

Finally, the analysis looked at the consequences that the coexistence of different political parties in a coalition government may have in the relations between departments in a municipality. Coalition governments imply that different departments can be leaded or guided by politicians from different parties, increasing the potential for conflictual relations. In the case of Stockholm, the two governments in charge during the time horizon of the research were formed by coalitions. In the case of Madrid, the current government is formed by a grassroots platform that includes many parties in its candidature. Neither the current Madrid government nor the current Stockholm government showed evidence of disagreements regarding cycling planning that could be connected to this fact. However, this was not the case of the previous government in Stockholm, the one that developed the current cycling plan. In that cabinet, there was public disagreements about cycling planning between the Transport and the Environmental Vice-Mayors. They were politicians from Moderate Party (i=206) and Center Party (i=204), respectively. It was noted that the Environmental Vice-Mayor was supporting in a more determined manner the investments in cycling infrastructure than the one that it was actually in charge of transport issues (Lundberg 2013). This element is highlighted when reviewing the relations of the municipality with civil society stakeholders.

6.2. Ties between governmental stakeholders and political parties

In democratic systems, governmental stakeholders are guided by the objectives and basic assumptions hold by the political majority of each term. These stakeholders need to find support in the municipal council formed by political parties to get resources for developing their initiatives, such as cycling plans. This enhances the relevance of this relations, particularly in contexts with a multi-party system where a single party is unlikely to get an absolute majority.

Both study cases correspond to this situation. The analysis of the relationships between these two categories revealed two prominent outcomes.

It was found that the relations can be clustered in three levels of support of cycling policies from political parties. The lowest level of support corresponds to an overall confrontational relation, from opposition parties that do not share the cycling policy orientation of the government. This was the case of the relation between opposition parties in Madrid (i=503, i=504) and the different departments of the municipal government. The middle level of support corresponds to an amendment relation, from opposition parties that share the policy orientations but raise different opinions on concrete actions. This was the case of the relations with the opposition parties in Stockholm. Finally, there are supportive relationships, which are the ones that the governmental stakeholder uses for promoting their projects in the council. This is the case of the parties that are part of the government, but also the ones that have some kind of stable agreement in the municipal council.

The above description of the relationships between these two categories starts from the unitary actor assumption, which has proven to be incomplete when analyzing the role of parties in local governments (Bäck 2008). Although the above description is still true, the second outcome worthwhile to highlight here is that in some cases the parties do not behave as a single actor in terms of supporting cycling strategies. The evidence for this results comes mainly from the case of Madrid. The interviewees from the governmental stakeholders remarked that the party providing external support to the government in the municipal council (i=502) showed different behavior at a city level than at a district level. While the cycling plan and the overall strategies have support from this party in the municipal council, some of the projects that come from these plans were challenged in the district councils by the representatives of this party.

6.3. Ties between civil society stakeholders and the rest of the network

The objects of study of the thesis, the participatory cycling planning initiatives, try to engage civil society stakeholders in the decision-making processes. Therefore, it is very relevant to analyze the relations of the categories that constitute the political institutions (governmental stakeholders and political parties) with the civil society stakeholders, in both directions.

Regarding the intensity of the ties, it is possible to differ between the perspective from the political institutions (governmental stakeholders and political parties) and the perspective from civil society stakeholders. The former allows to unveil the factors behind the inclusions and exclusions that are natural to these participatory processes, as well as the differential attention given to the ones included. Following social movement theory concepts, the latter explains the usage of political opportunity structures by the civil society stakeholders, and also their propensity to participate in cycling planning. Apart from these two mirrored perspectives, the focus is also in the nature of this relations in terms of their formality.

The information necessary for the analysis is provided by the methods deployed in the project: the interviews with governmental stakeholders (e.g. giving clues about who is included and how), the questionnaires to civil society stakeholders (e.g. revealing the participation

opportunities where they were present, and the social media data mining (e.g. providing an indicator of the prestige of civil society stakeholders among institutions).

6.3.1. Perspective from governmental stakeholders and political parties

The project assumes that the participatory planning methods observed in the study cases imply an intensification in the attention that governmental stakeholders and political parties give to civil society stakeholders, since the point of developing participatory planning initiatives is to include these entities. Effectively, the research reveals that enhanced degree of attention.

In both cases, the interviewees from governmental stakeholders revealed the increasing importance that they are giving to the ties with civil society stakeholders. The interviews revealed that for governmental stakeholders is not only important to open the planning process but also develop trust ties with some of these entities. This follows an assumption of the collaborative planning approach, which consists in giving relevance to the process outcomes (Agger and Löfgren 2008). This aim was either implicit or explicit in the narratives of the interviewees in both cases.

For governmental stakeholders, the main reason for nurturing these ties seems to be that cycling advocacy organizations are seen as valuable diagnostic platforms for how the cycling conditions are evolving in the city. However, there were differences in the perceived representativity of cycling advocacy organizations. In the case of Stockholm, this was understood strictly as formal representativity, so it was interpreted that the entities represent exclusively their own members. This does not imply a lower level of collaboration or recognition, just a different conceptualization of the advocates' role. In the case of Madrid, the diversity of opinions within the advocacy sector leads to perceive a broader capacity for representation of current cyclists through these entities. The generally looser forms of organization and membership in Madrid, reviewed in the previous chapter, may be also behind these interpretations. Even with these differences, there was coincidence in admitting the limitations that cycling advocacy organizations have for representing potential cyclists.

The status of the ties between these sub-networks can be also evaluated from the social media linkages data available. This method allowed to construct directed bipartite graphs, that put in one side the political institutions and in other side the civil society stakeholders, deploying in this manner the links between these two. If only the links from political stakeholders to civil society stakeholders are shown, like in Figure 18 for the case of Stockholm and in Figure 19 for the case of Madrid, the graph provides two types of information. Firstly, the out-degree of centrality of political institutions suggests the awareness or to what extent are they interested in civil society stakeholders. Secondly, the in-degree of centrality of civil society stakeholders may reveal to what extent are these catching the attention of political institutions, i.e. measures the prestige of civil society stakeholders among governmental stakeholders and political parties in the cycling planning network.

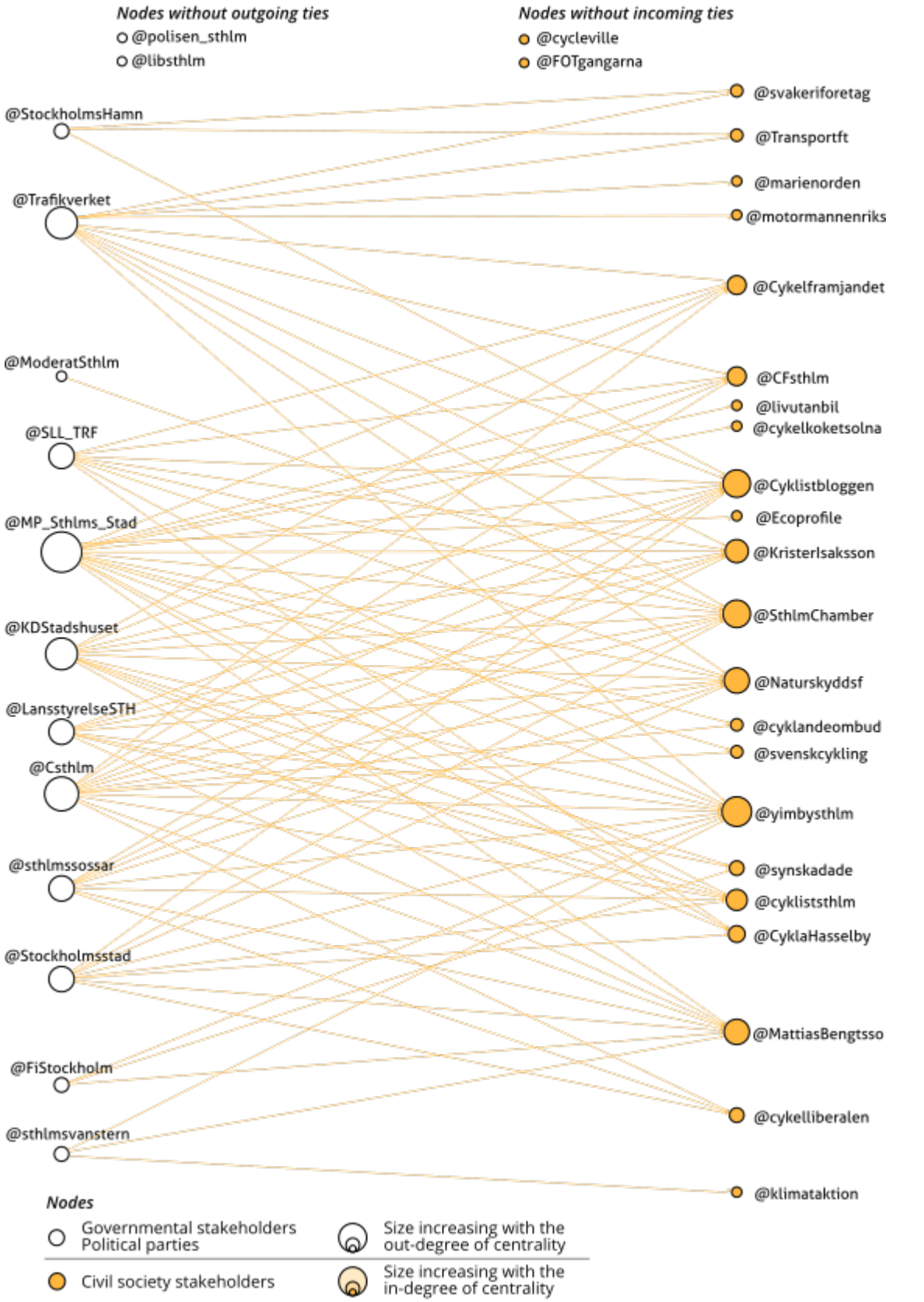

Figure 18 – Bipartite graph of social media linkages with civil society stakeholders in Stockholm case

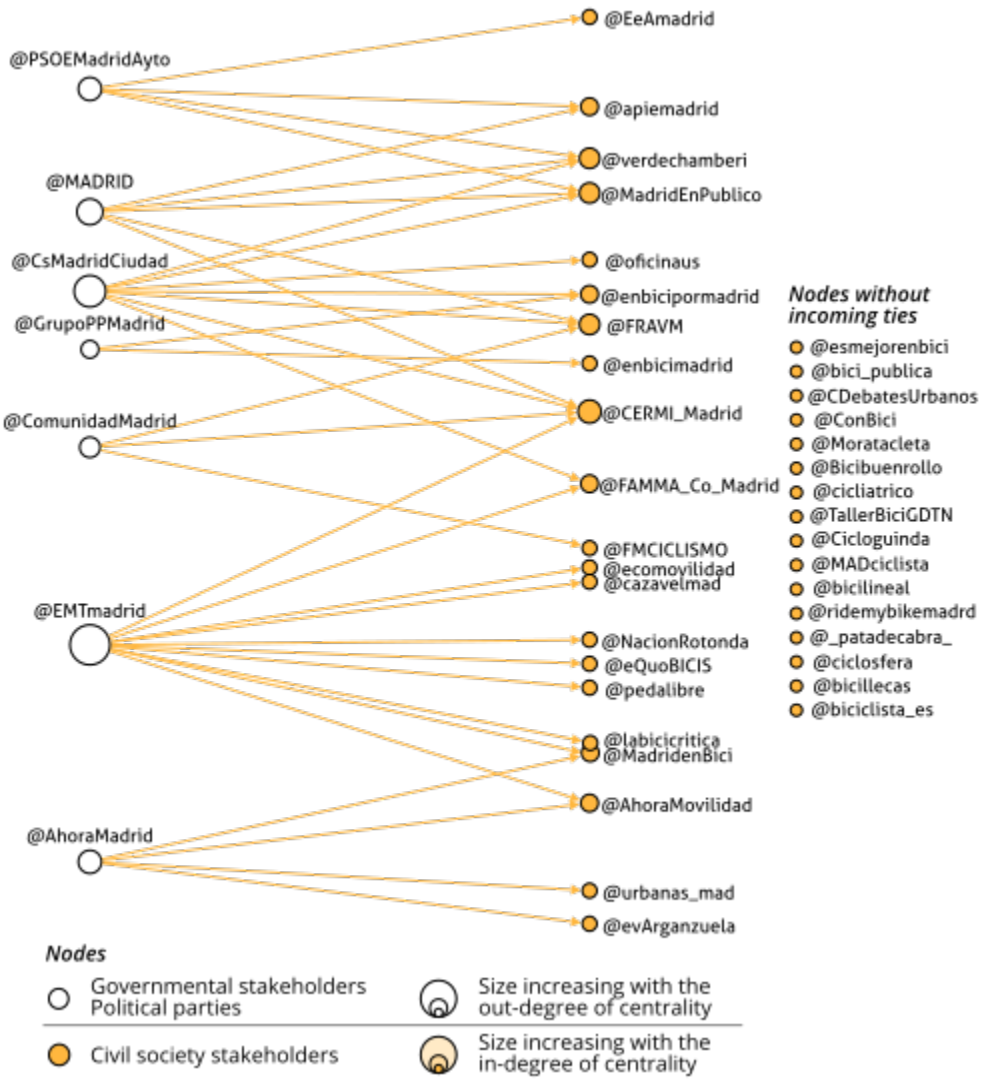

Figure 19 – Bipartite graph of social media linkages with civil society stakeholders in Madrid case

The outcomes of these bipartite graphs do not seem consistent with the complementary information about closeness between political institutions and civil society stakeholders, at least not in both study cases. The out-degree of centrality of governmental stakeholders and political parties seems to correspond better to the reality in Stockholm case. This is demonstrated through the Green Party status (@MP_Sthlms_Stad, i=203), which shows the highest degree as expected, given the frequent collaboration of this party with many organizations identified as stakeholders in the network. On the contrary, in Madrid case the party that shows the highest degree (@CsMadridCiudad, i=503) is not the one that stars the collaboration between parties and organizations (*Ahora Madrid*, i=501). This shows how this metric can be biased by the differential activity of the stakeholders in the social media platform analyzed. A similar pattern is reproduced in the case of the in-degree of centrality of civil society stakeholders. While in Stockholm case the ranking of nodes in these terms reproduced more closely the perceived relevance that each civil society stakeholder has for political institutions, the Madrid case do not

show a clear relation between the in-degree of centrality and the actual relevance. For instance, in Stockholm case it is clear that the established organizations are more frequently followed by political institutions, with the exception of the leading blog *Cyklistbloggen* (i=324). This is not the case of Madrid cyclists' organizations, with *Pedalibre* performing at the same level as other much looser entities.

6.3.2. Perspective from civil society stakeholders

In a similar manner to what happened with the perspective from political institutions, the project also presupposes that many of the civil society entities are willing to influence cycling policies, taking advantage of the openness that participatory planning initiatives imply. This can be shown in the relevance that the ties with governmental stakeholders and political parties have for many entities, an aspect that arises from the questionnaires.

In the case of Stockholm, the two prominent cycling advocacy organizations (*Cykelfrämjandet*, i=301; cycling group within *Naturskyddsföreningen*, i=307) stand out in these terms, since they have been involved in almost all opportunities registered in the context of the cycling plan and its derived projects. These entities were also mentioned as prominent by the interviewees from governmental stakeholders. It is remarkable that the most salient virtual community, *Cyklistbloggen* (i=324) reported to have participated in meetings for concrete projects. Moreover, local entities reported that they collaborate with established organizations to get involved in these opportunities (e.g. the case of *Cykelköket Solna*, i=319, with *Naturskyddsföreningen*, i=307). While the cycling focus entities try to take advantage of any opportunity, the non-cycling focus entities tend to participate only in opportunities that are more formal, such as the consultation process of the plan. The interest in enhancing the relationships with political institutions can be seen at the spontaneous mentions to these stakeholders in the questionnaires for the Stockholm' case. Firstly, several entities included both politicians and officers when explaining the campaigns organized with other stakeholders. Secondly, sometimes these relations came up also when asking the entities for the relations with other groups not listed in the questionnaire. Instead of referring to other civil society stakeholders, which was the intention of the question, some of them included governmental stakeholders such as *Trafikkontoret* (i=110). The case of Madrid reveals also a high commitment to influence cycling planning issues through fluid relationships with political institutions. The interviewee from one of the civil society stakeholders revealed that one of the most common activities that their members have within these entities is to attend meetings or events where planners are present, in order to keep informed and influence the decisions on cycling issues. The interviewees from governmental stakeholders disclosed the high number of meetings that they have had with different groups. Moreover, there was no evidence of fear of being co-opted by institutions as a result of these collaborations, as may occur in other policy fields (Barnes et al. 2003). Although there are many evidences of fluid relationship, it should be noted that the debate on cycling infrastructure has affected some of the ties. For instance, the prominent stakeholder *En Bici por Madrid* (i=607) ceased its participation with the municipality due to the disagreements on the model of public participation (En bici por Madrid 2016a), until the last Cycling Forum.

The social media linkages analysis reveals also the interest that governmental stakeholders and political parties cause among civil society stakeholders. The analysis uses the same directed bipartite graph as before, but deploying only the links from civil society stakeholders towards political institutions (Figure 20 for Stockholm, Figure 21 for Madrid). In this graph, the out-degree of centrality of civil society stakeholders would reveal their interest in governmental stakeholders and political parties; while the in-degree of centrality of political institutions could measure their prestige among governmental stakeholders and political parties in the network.

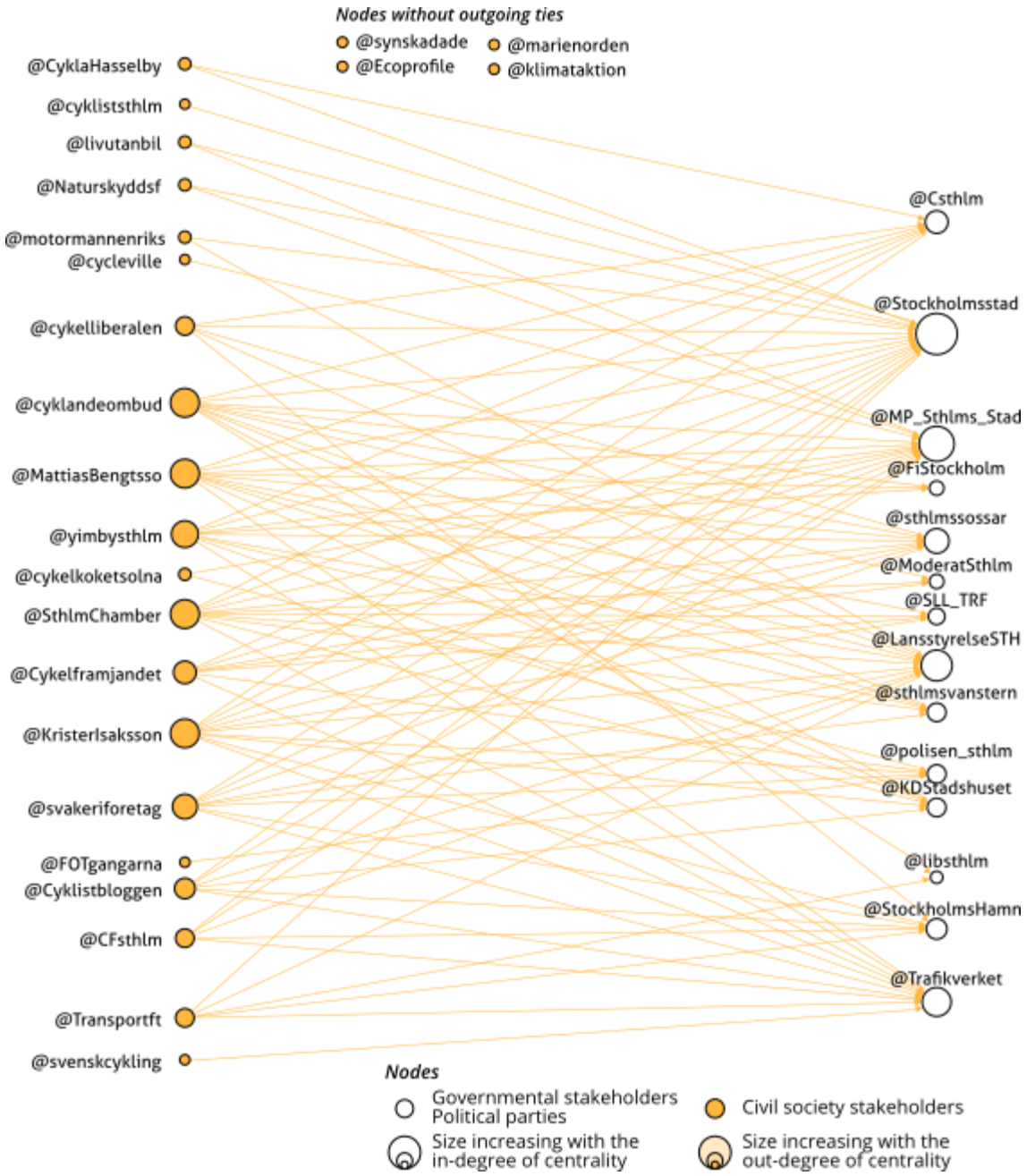

Figure 20 – Bipartite graph of social media linkages with governmental stakeholders and political parties in the case of Stockholm

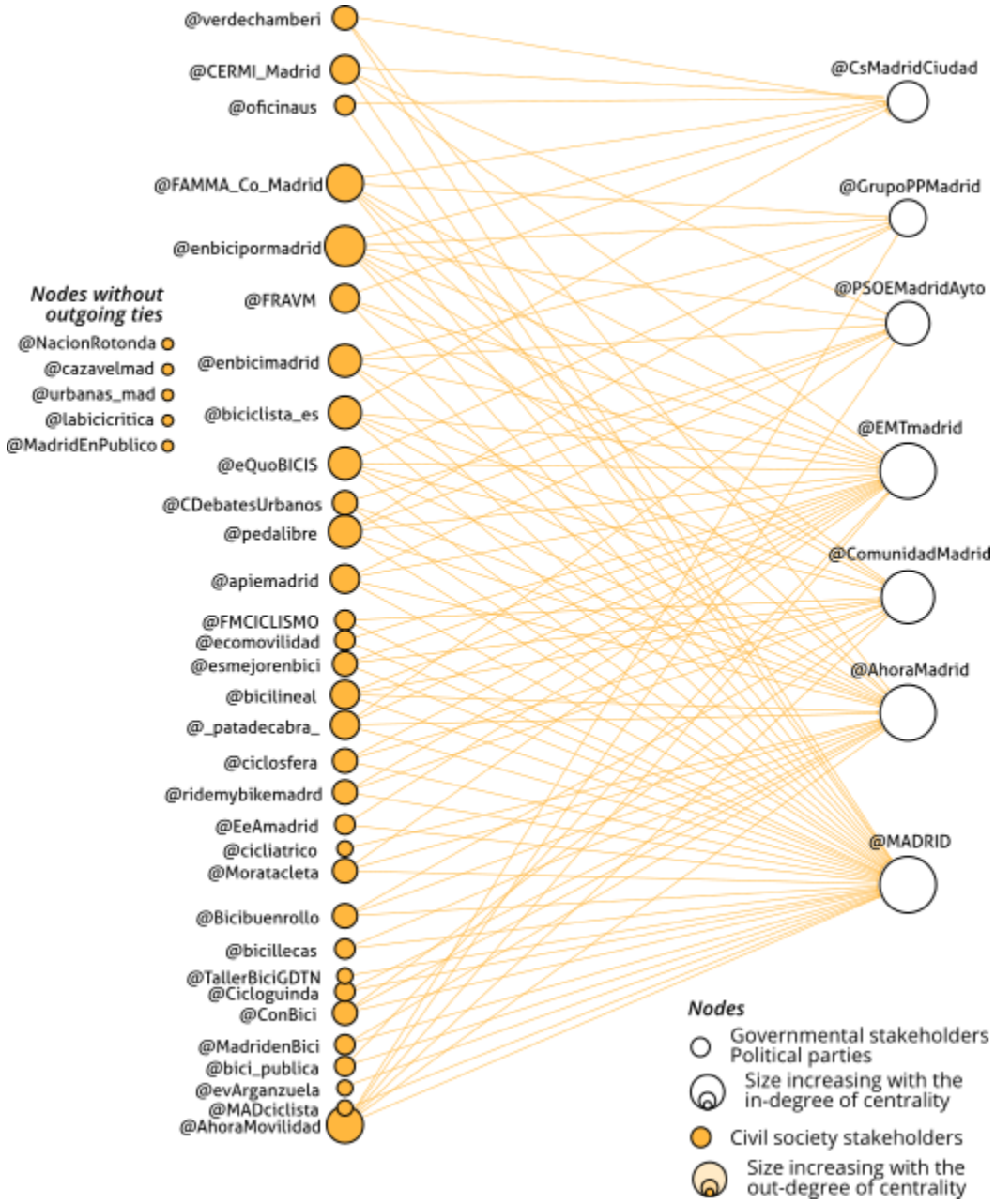

Figure 21 – Bipartite graph of social media linkages with governmental stakeholders and political parties in the case of Madrid

These bipartite graphs seem to provide more consistent data than the ones based in the perspective from political institutions. The out-degree of centrality of the civil society stakeholders is generally higher for those nodes with a commitment to influence in cycling policies. This would make them to follow both governmental stakeholders and political parties in social media. A good example from Stockholm case is *Cyklandeombud* (i=322), whose activity is dedicated to report deficient situations in cycling infrastructure to the public administration.

From the point of view of the in-degree of centrality of governmental stakeholders and political parties, the results are also in line of the expected prestige of these nodes. Following this, both municipal governments are heading the rankings in these terms, since they generate attention due to the fact that they have the competences for cycling planning. Moreover, those political parties whose positions are closer to cycling advocacy have higher in-degree of centrality that those more reluctant or passive in this issue.

6.3.3. Relationship mechanisms: formal or informal?

When introducing agonistic planning interpretations in the theoretical framework of the project, the existence of informal channels of participation (Hillier 2002a) was highlighted. The interviews with governmental stakeholders deal with this aspect and confirmed the relevance of informal participation. Table 24 shows a non-exclusive list of methods that appeared in the research, classified as either formal or informal approaches to participation.

Table 24 – Formal and informal participation methods detected in the research

Formal participation	Informal participation
Cycling Forums	Social media appeals
Planning workshops	Email communication
Consultation process	Encounters in events
Scheduled meetings	Spontaneous meetings
Joint campaigns and events	

The overall finding was that participation combines both types of methods. In the case of Stockholm, the interviewees highlighted the consultation processes as the standardized procedure but also emphasized the relevance of their presence in the events organized by civil society stakeholders. They were also aware of the advantages of methods such as workshops and pointed that next cycling planning initiatives would probably include more participation opportunities than the last cycling plan. In the case of Madrid, the interviewees acknowledged the relevance of informal meetings and communications ('I'm receiving a lot of emails, and I actually try to answer all of them', Interviewee from municipal administration), relating it to the difficulties of organizing formal forums. In this line, there was some reluctance to set too frequent formal opportunities, since the attendance could decrease. They explained that they maintain fluent communication with some groups by email communications, a method that arise also in the interviews for the Stockholm' case, as well as the conferences and discussion panels in events such as the annual European Mobility Week.

6.4. Ties within the subnetwork of civil society stakeholders

The understanding of the relations within the subnetwork of civil society stakeholders is crucial for the assessment of participatory cycling planning. In fact, it has been the most common reason to conduct stakeholder analyses in planning initiatives (Reed et al. 2009). The analysis is assisted by two graphs of the subnetwork. On the one hand, the revealed collaboration graph constructed with the data from the questionnaire. On the other hand, the social media linkages

graph that comes from the data retrieved from the platform Twitter. The results of both methods are briefly reviewed, providing the outcomes of the graph metrics applicable to each graph. Furthermore, the results of the joint analysis of the graphs are also reviewed.

6.4.1. *The graph of revealed collaboration: visualization*

The questionnaire to civil society stakeholders ask each of them to reveal the collaboration status with the other identified stakeholders, thus generating a graph of revealed collaboration. It is important to outline how the rate of answer conditions the analysis. Figure 22 and Figure 23 depict this graph using a dual circle layout (Cherven 2015) to differ between an inner circle with the nodes that participate in the questionnaire and an outer circle with the nodes that do not participate. There are no ties departing from the stakeholders in the outer circle, because they do not reply to the questionnaire. However, there are ties arriving to them, since some of the stakeholders that participate in the questionnaire report relations with them. Hence, the in-degree of centrality is not affected by the rate of answer, as long as the respondents do not come from a special cluster of the network but rather are distributed across the possible types of stakeholders that could be detected (e.g. same rate of answer from cycling-focus and non-cycling focus stakeholders). These dual circle layout figures render the size of the nodes as proportional to the in-degree of centrality, which provides a general perspective on the prestige of the stakeholders reached in the questionnaire as well as of the ones not reached.

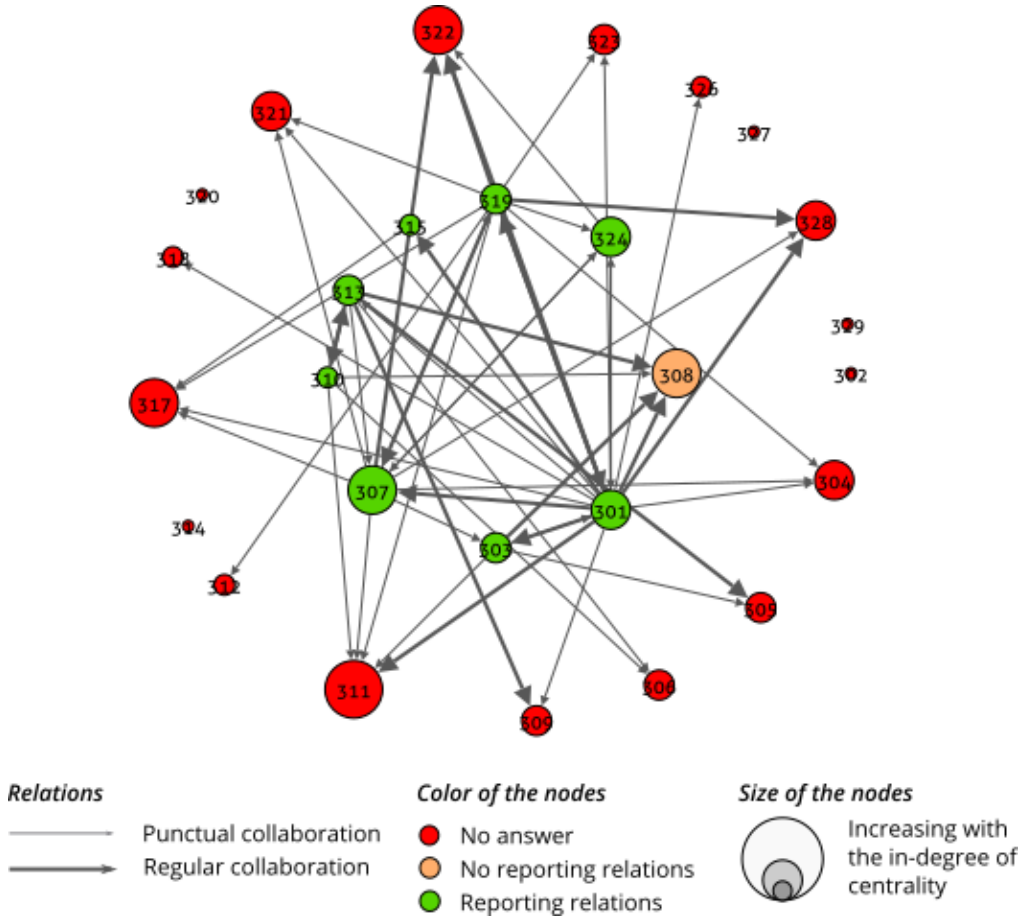

Figure 22 – Analysis of the revealed collaboration graph among civil society stakeholders in Stockholm case

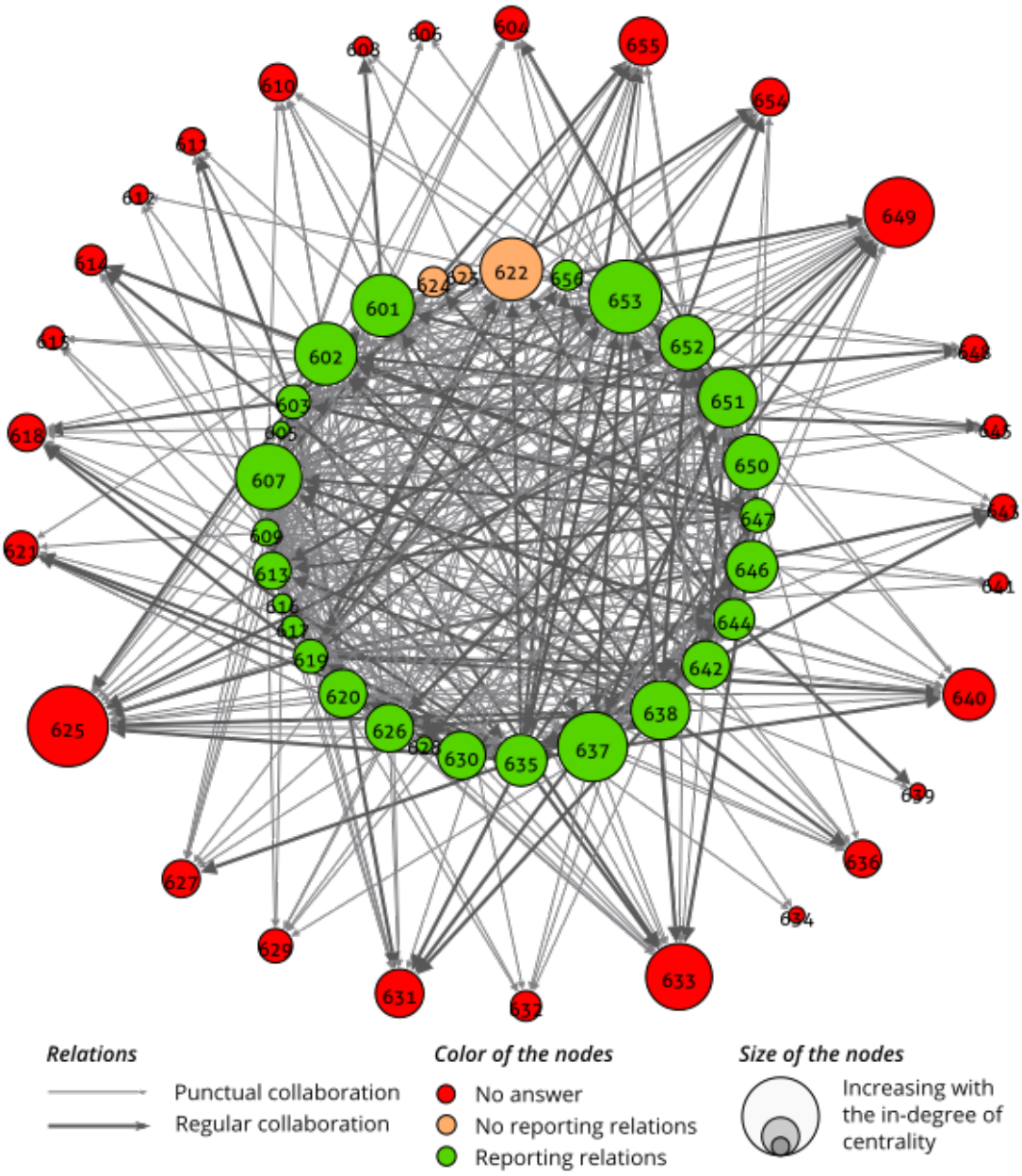

Figure 23 – Analysis of the revealed collaboration graph among civil society stakeholders in Madrid case

6.4.2. *The graph of revealed collaboration: density*

The density of the graphs is an indicator of the accuracy of the identification. While the exclusion of relevant stakeholders was discarded through the questionnaire as explained in the section 5.3, it could happen also the opposite phenomenon. If many stakeholders included in the analysis have almost null relations, the identification may be overestimating the number of stakeholders. This can be discarded for the Madrid case based in Figure 23 but it remains unclear

in the case of Stockholm, since the lower rate of answer is also affecting the density of the graph. Social media linkages, to be reviewed in the next section, unveil this mystery.

6.4.3. The graph of revealed collaboration: centrality metrics

The in-degree of centrality of the nodes in the graph is proportional to the number of stakeholders that report collaboration with them, and therefore provides a measure of their prestige (Wasserman and Faust 1994) in the subnetwork of civil society stakeholders. Table 25 and Table 26 show the stakeholders with higher values of this attribute.

Table 25 – Highest 20-percentile of civil society stakeholders in terms of in-degree of centrality of revealed collaboration (values over 0.131). Stockholm case.

i	Stakeholder	Focus	In-degree of centrality	Participation
311	Svensk Cykling	Cycling advocacy platform including business branch	0.192	No
307	Naturskyddsföreningen Cykelgruppen Stockholms län	Cycling advocacy group within ecologist organization	0.154	Yes
308	NTF Öst	Traffic safety advocacy	0.154	Yes*
317	Bicycling Isaksson bloggen	Cycling advocacy blog	0.154	No
322	Cyklandeombud Stockholms län	Cycling advocacy blog	0.154	No

*Stakeholder replying but not reporting relations

Table 26 – Highest 20-percentile of civil society stakeholders in terms of in-degree of centrality of revealed collaboration (values over 0.247). Madrid case.

i	Stakeholder	Focus	In-degree of centrality	Participation
625	Bicilineal	District cycling advocacy	0.364	No
653	Pedalibre	Cycling advocacy association	0.327	Yes
637	Ecologistas en Acción Madrid	Ecologist organization	0.309	Yes
649	Moratacleta	District cycling advocacy	0.309	No
607	En bici por Madrid	Cycling advocacy blog	0.291	Yes
633	ConBici	National cycling advocacy coor.	0.291	No
601	A Pie	Pedestrian advocacy	0.273	Yes
602	Ahora Movilidad	Urban mobility advocacy	0.273	Yes
622	Bicicrítica Madrid	Critical Mass	0.273	Yes*
638	Ecomovilidad	Urban mobility blog	0.255	Yes
651	OMUS Madrid	Sustainable mobility advocacy	0.255	Yes

*Stakeholder replying but not reporting relations

There are some findings worth to comment from these measures. Firstly, it can be seen that the registered organizations hold a relevant position in terms or prestige. In both cities, the most established organizations scored high in this attribute. The top 3 stakeholders in both cases have been active more than 10 years, with the exception of the network organization *Svensk Cykling* (i=311) which nevertheless is an initiative from well-established organizations such as

Cykelfrämjandet (i=301). The latter is not in the 20 highest percentile and therefore not included in the table, but scores in the edge of this percentile. Secondly, cycling advocacy has a strong alliance with environmentalism. The stakeholders reported frequent collaboration with the reference organizations in this movement in both cases. In the case of Stockholm, *Naturskyddsföreningen* has even a working group for cycling issues (i=307). In the case of Madrid, *Ecologistas en Acción* (i=637) is actively engaged in mobility-related events and debates. Finally, the virtual communities that have evolved into a model of mix virtual and attendance participation are gaining prestige. These stakeholders sometimes overtake other cycling associations in terms of centrality. This is the case for Krister Isaksson' blog (i=317), *Cyklandeombud* (i=322) and *Cyklistbloggen* (i=324) in Stockholm, and *En Bici por Madrid* (i=607) and *Ecomovilidad* (i=638) in the case of Madrid. In this sense, these data reinforce the findings related to the identification of stakeholders.

6.4.4. The graph of social media linkages: visualization

The analysis of the linkages among the identified civil society stakeholders in the social media site Twitter complements the information available through the questionnaires. An interesting finding is that a vast majority of stakeholders had presence in this site, around a 90% of the identified stakeholders in both cases. Therefore, a graph of social media linkages includes the vast majority of them. Figure 24 and Figure 25 provide a holistic picture of the networks in terms of in-degree of centrality, since the nodes are ordered in a circle layout according to this attribute. In the social media linkages graph, the metrics used are two centrality measures, the density and the modularity for clustering.

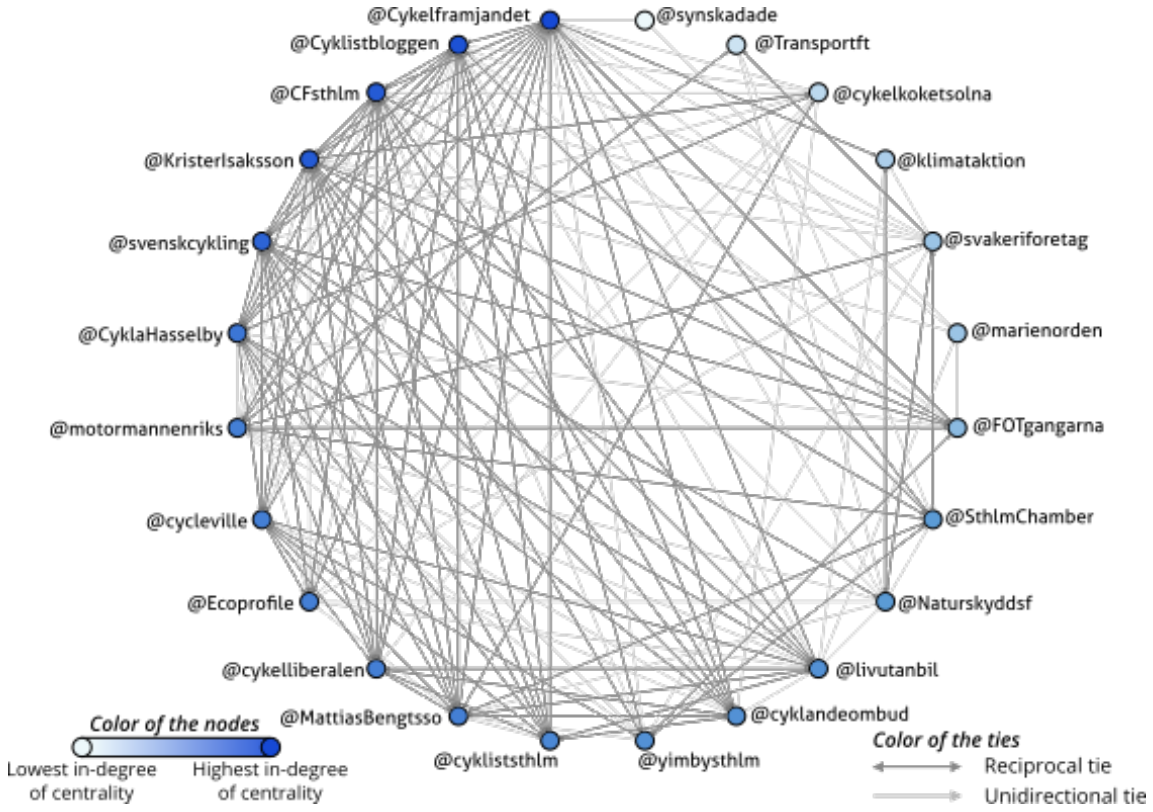

Figure 24 – Social media linkages in the subnetwork of civil society stakeholders in Stockholm

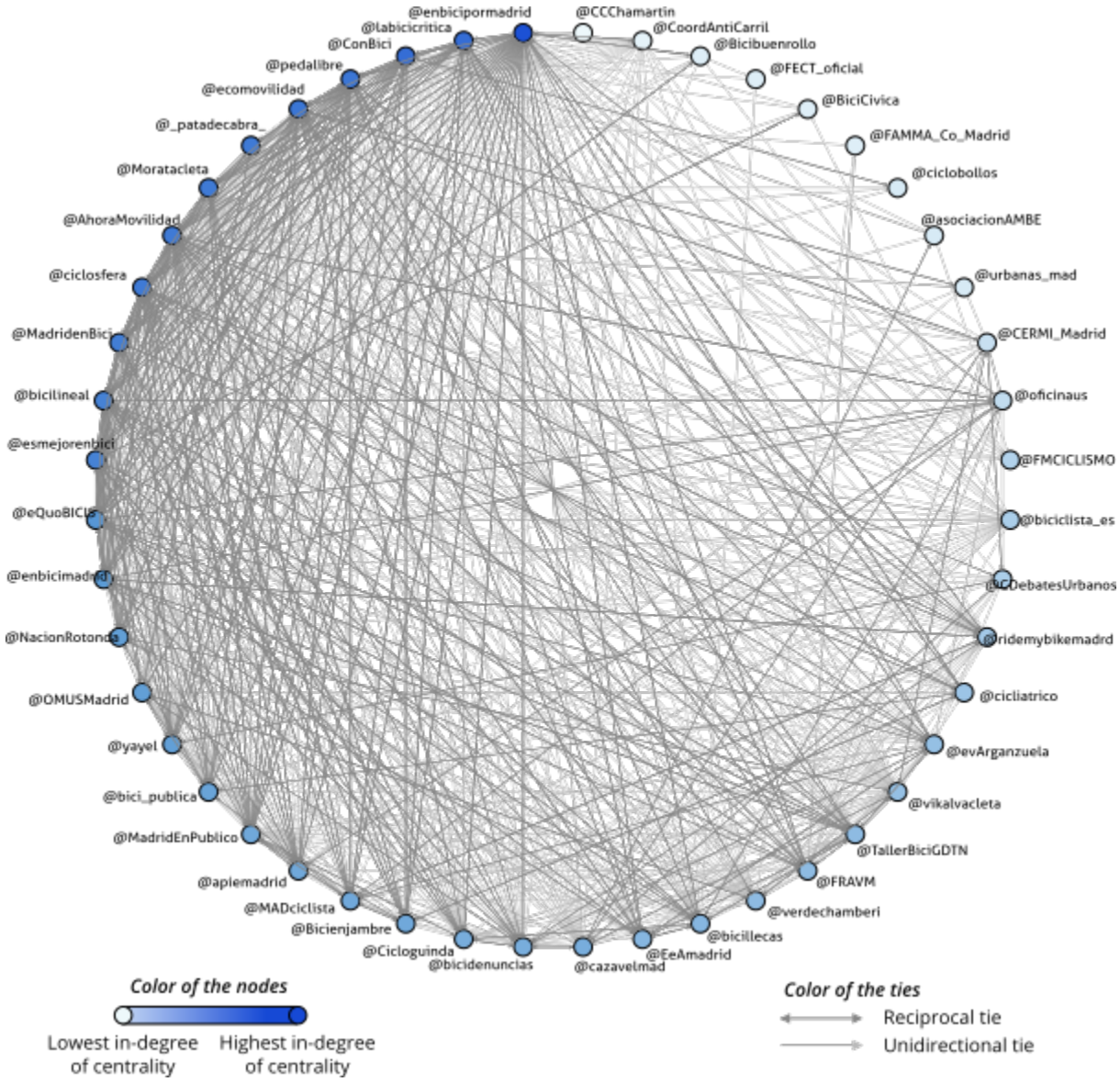

Figure 25 - Social media linkages in the subnetwork of civil society stakeholders in Madrid

6.4.5. *The graph of social media linkages: density*

The density of this graph provides a second opportunity to reveal if the number of stakeholders is overestimated in the analysis, an aspect that remained unclear for the case of Stockholm after the observation of the revealed collaboration graph. Figure 24 helps to discard this and validates the identification of stakeholders in Stockholm, since all the entities included as a result of the snowball sampling show incoming ties. The only case without any follower in the subnetwork is the visually impaired advocacy organization *Synskadades Riksförbund* (i=314), included as stakeholder due to their participation in the consultation process of the current cycling plan.

6.4.6. *The graph of social media linkages: centrality metrics*

The in-degree of centrality of the nodes is proportional to the number of followers of each stakeholder. Table 27 and Table 28 list the highest 20-percentile in these terms.

Table 27 - Highest 20-percentile of civil society stakeholders in terms of in-degree of centrality of social media linkages (values over 0.652). Stockholm case.

i	Stakeholder	Focus	Twitter	In-degree of centrality
aux	Cykelfrämjandet	National cycling advocacy	@Cykelframjandet	0.783
324	Cyklistbloggen	Cycling advocacy blog	@Cyklistbloggen	0.740
301	Cykelfrämjandet Storstockholm	Cycling advocacy local group	@CFsthlm	0.670
317	Bicycling Isaksson bloggen	Cycling advocacy blog	@KristerIsaksson	0.670
311	Svensk Cykling	Cycling advocacy platform including business branch	@svenskcykling	0.652

Table 28 – Highest 20-percentile of civil society stakeholders in terms of in-degree of centrality of social media linkages (values over 0.579). Madrid case.

i	Stakeholder	Focus	Twitter	In-degree of centrality
607	En bici por Madrid	Cycling advocacy blog	@enbicipormadrid	0.809
622	Bicicrítica Madrid	Critical Mass	@labicicritica	0.660
633	ConBici	National cycling advocacy coor.	@ConBici	0.660
638	Ecomovilidad	Urban mobility blog	@ecomovilidad	0.617
654	Pedalibre	Cycling advocacy association	@pedalibre	0.617
602	Ahora Movilidad	Urban mobility advocacy	@AhoraMovilidad	0.596
631	Ciclosfera	Cycling advocacy magazine	@ciclosfera	0.596
650	Moratacleta	District cycling advocacy	@Moratacleta	0.596
653	Pata de Cabra Radio	Cycling advocacy radio	@_patadecabra_	0.596

While the rate of answer to the questionnaire imposes an asymmetry between the stakeholders that limits the potential for unbiased measures over the graph, the social media linkages graph does not suffer from this limitation. This allows to study the betweenness centrality of the nodes in the graph, which corresponds to the number of shortest paths between directly unconnected stakeholders that go through each node. The nodes with high betweenness centrality are likely to be the most influential. since they connect parts of the network that otherwise would be disconnected (Wasserman and Faust 1994). Table 29 and Table 30 list the highest 20-percentile of stakeholders in terms of influence in this network.

Table 29 - Highest 20-percentile of civil society stakeholders in terms of betweenness centrality of social media linkages (values over 0.035). Stockholm case.

i	Stakeholder	Focus	Twitter	Betweenness centrality
0	Cykelfrämjandet	National cycling advocacy	@Cykelframjandet	0.172
317	Bicycling Isaksson bloggen	Cycling advocacy blog	@KristerIsaksson	0.066
306	Motormännen Riksförbund i Stockholm	Motor vehicle-owners advocacy	@motormannenriks	0.056
311	Svensk Cykling	Cycling advocacy platform including business branch	@svenskcykling	0.043
301	Cykelfrämjandet Storstockholm	Cycling advocacy local group	@CFsthlm	0.035

Table 30 - Highest 20-percentile of civil society stakeholders in terms of betweenness centrality of social media linkages (values over 0.0268). Madrid case.

i	Stakeholder	Focus	Twitter	Betweenness centrality
607	En bici por Madrid	Cycling advocacy blog	@enbicipormadrid	0.152
602	Ahora Movilidad	Urban mobility advocacy	@AhoraMovilidad	0.079
633	ConBici	National cycling advocacy coor.	@ConBici	0.056
653	Pata de Cabra Radio	Cycling advocacy radio	@_patadecabra_	0.047
649	Mejor en Bici	Cycling advocacy blog	@esmejorenbici	0.041
650	Moratacleta	District cycling advocacy	@Moratacleta	0.038
625	Bicilineal	District cycling advocacy	@bicilineal	0.032
610	FRAVM	Communities federation	@FRAVM	0.031
643	Equo Bicis	Ecologist cycling advocacy	@eQuoBICIS	0.029

In the social media linkages graph, nodes can be understood to have at least two inherent weights: the number of followers and the number of tweets. Therefore, it is important to know how these attributes influence the centrality measures before extracting conclusions from the above results. The performance of a correlation analysis between the centrality metrics and these attributes returns different outcomes in the two case studies. In the case of Stockholm (Figure 26), none of the relations show a significant correlation. On the contrary, all relations show a highly significant correlation in the case of Madrid (Figure 27). This result leaves this issue open for further research.

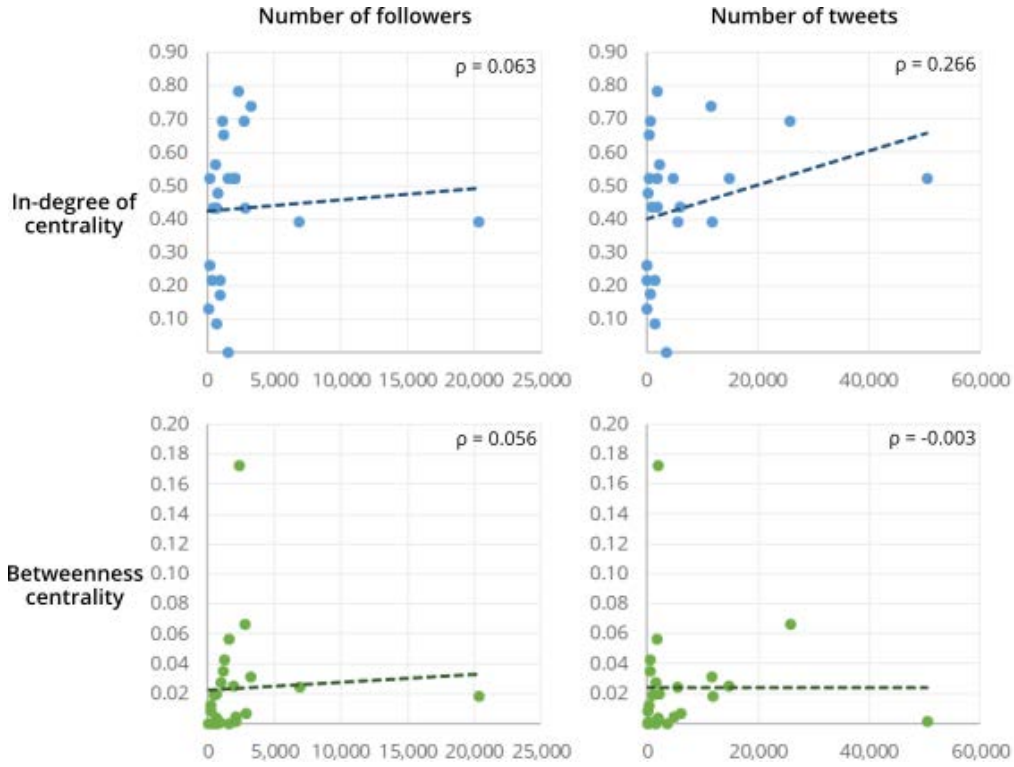

Figure 26 – Correlation analysis between the centrality metrics and the Twitter node attributes in Stockholm case

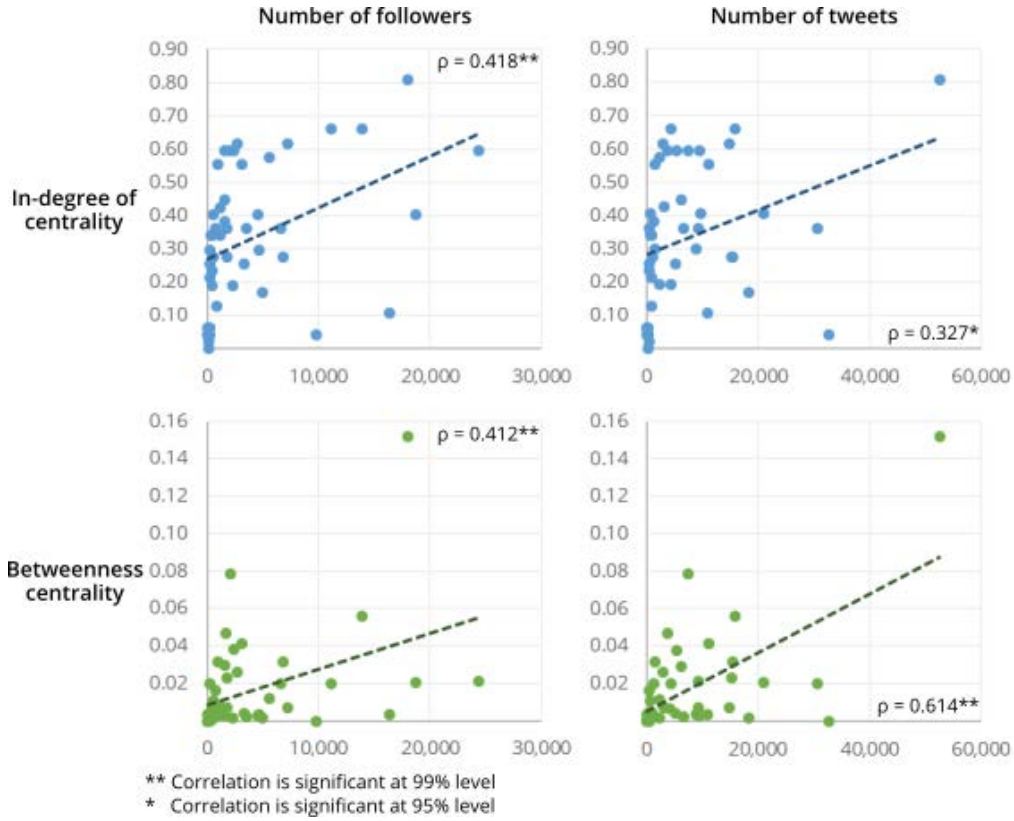

Figure 27 - Correlation analysis between the centrality metrics and the Twitter node attributes in Madrid case

The tables collecting the rankings of the centrality measures can be analyzed in similar terms than the ones based in the revealed collaboration graph. However, most of the outcomes are related to the virtual communities' relevance among civil society stakeholders, an aspect that is delved in the next section under a joint analysis of both graphs. Nevertheless, it should be noticed how some non-cycling focus entities score high in terms of betweenness centrality, which as mentioned can be interpreted in terms of influence in the network. This highlights the role of some of these entities as nexus between cycling advocacy and other sectors, such as community associations in the case of Madrid (*FRAVM*, i=610) or advocacy organizations of other users of public space (*Motormännen Riksförbund*, i=306).

6.4.7. The graph of social media linkages: community detection through modularity

The completeness of the data about social media linkages allows also to apply the clustering techniques that are common in social network analyses, concretely the modularity optimization method for community detection (Blondel et al. 2008). The interest of clustering is to check if the resulting communities fit the observed clusters present in the network after the study of the independent attributes of the stakeholders. Figure 28 and Figure 29 show the outcomes of this analysis for both case studies, using the layout algorithm Force Atlas that highlights the resulting clusters (Cherven 2015).

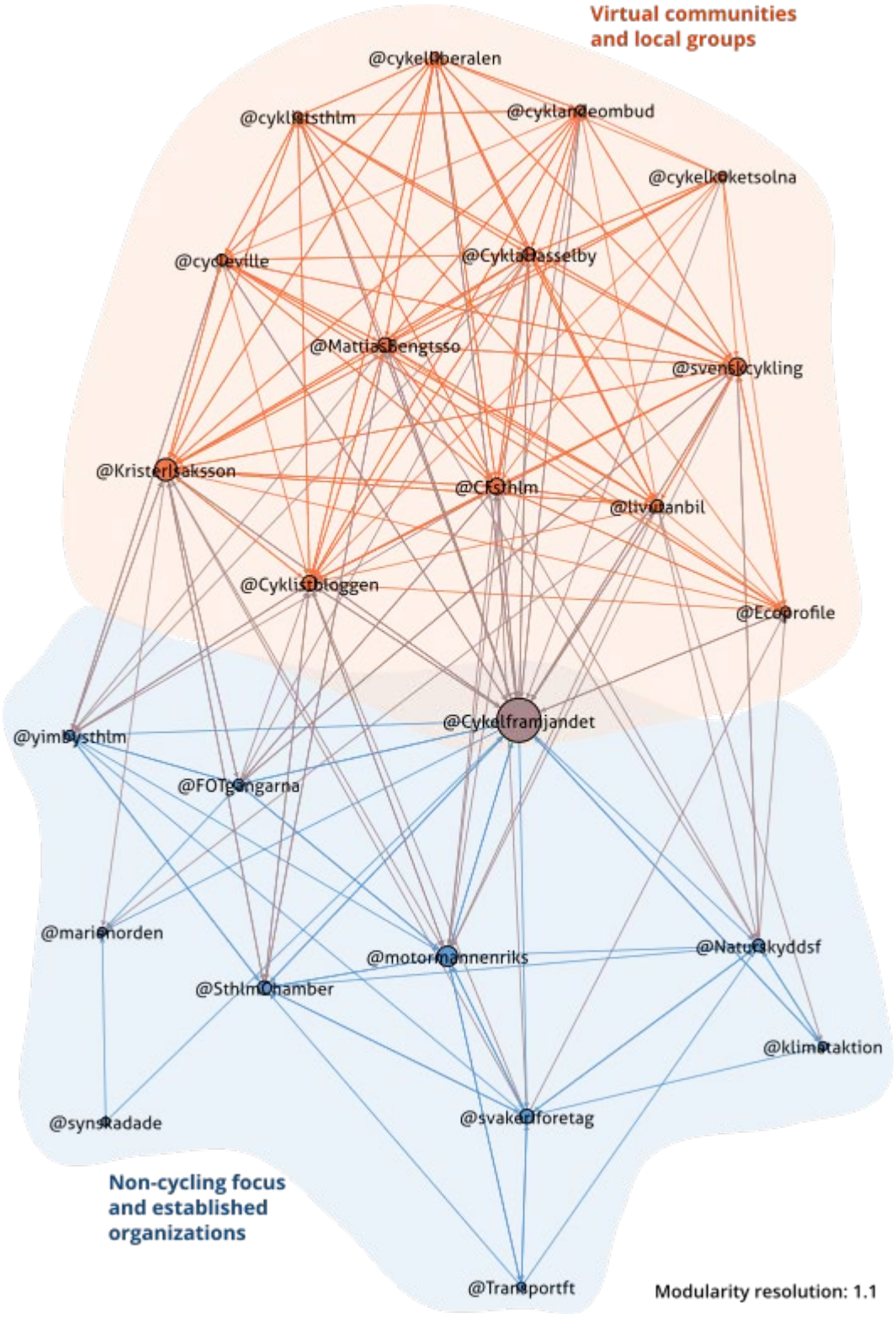

Figure 28 – Results of the modularity optimization clustering for the social media linkages graph of the Stockholm case, and interpretation of the resultant communities

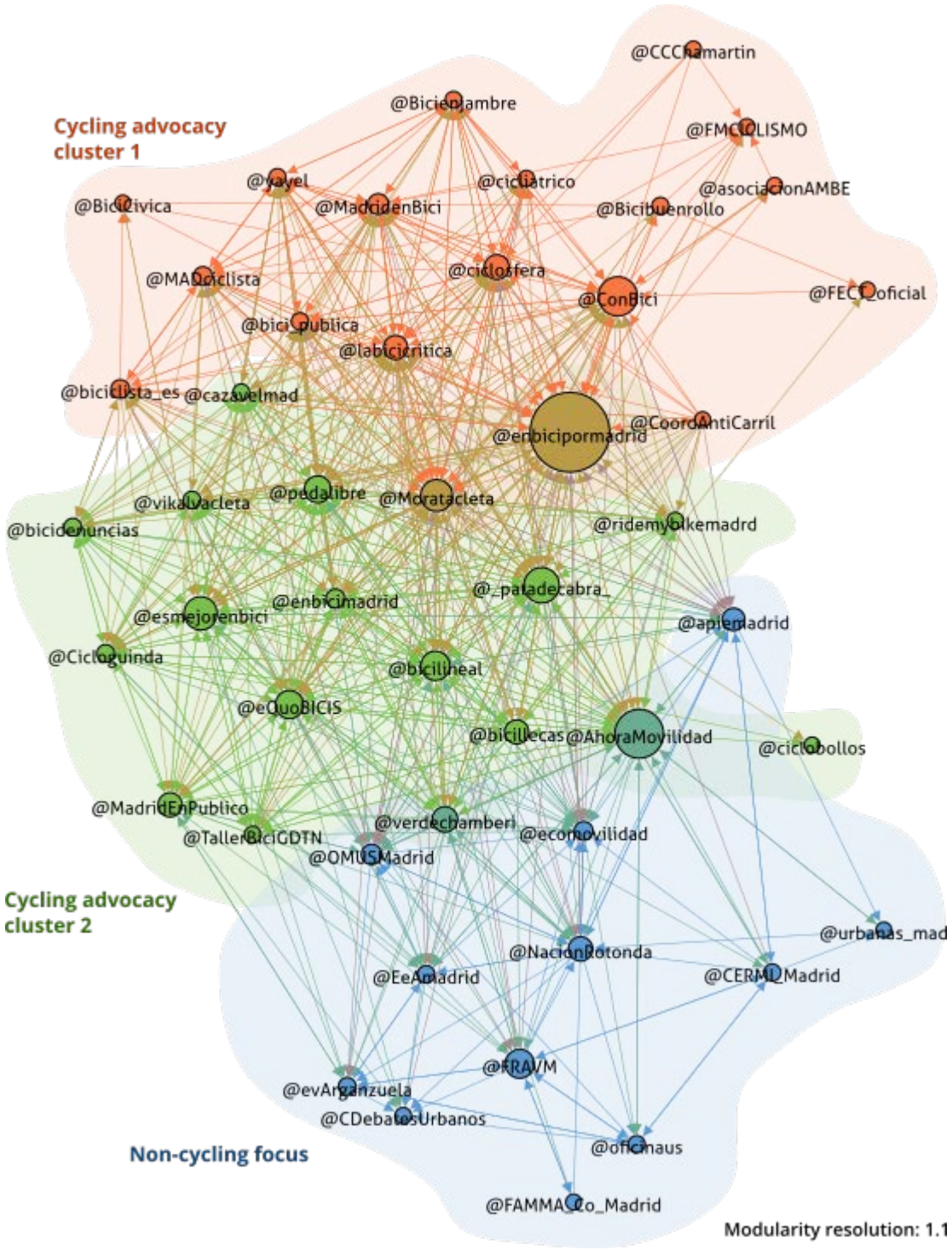

Figure 29 - Results of the modularity optimization clustering for the social media linkages graph of the Madrid case, and interpretation of the resultant communities

The clustering algorithm detected two communities in the case of Stockholm and three communities in the case of Madrid. It is remarkable that in both cases at least part of the resultant communities can be interpreted in terms of the available information about the nodes. The

outcome is more interpretable in the case of Stockholm, where the number of nodes is less. In this case, one of the communities corresponds to established organizations both with cycling and non-cycling focus, and the other community corresponds to virtual communities and looser cycling advocacy groups. In line with the data on betweenness centrality, the national cycling advocacy organization profile @Cykelframjandet appears as a nexus between both communities. In the case of Madrid, one of the three clusters detected corresponds mainly to non-cycling focus organizations. However, the remaining two clusters do not follow any pattern connected to the attributes of the stakeholders. Entities of different kinds coexist in both cycling advocacy clusters.

6.4.8. *Relation between the centrality in the two graphs*

An element of interest for further applications of the methods deployed in the thesis is to test the differences between the graph of revealed collaboration and the graph of social media linkages in terms of centrality. The graph of revealed collaboration provides information more close to the actual dynamics within the subnetwork of civil society stakeholders, but collecting the data for it is more consuming than for the graph of social media linkages, given that the latter can be automatized to a large extent. Therefore, it is valuable to check if the centrality measures of the social media linkages graph provide a picture that correlates with the ones extracted from the revealed collaboration graph. This test starts from the differentiation of the virtual communities among civil society stakeholders, based in the hypothesis that these entities can affect the expected correlation in a particular way, since they have sometimes high activity in social media but low impact in attendance-based activities that are still relevant in terms of collaboration between stakeholders. Figure 30 and Figure 31 show the dispersion graphs of this analysis.

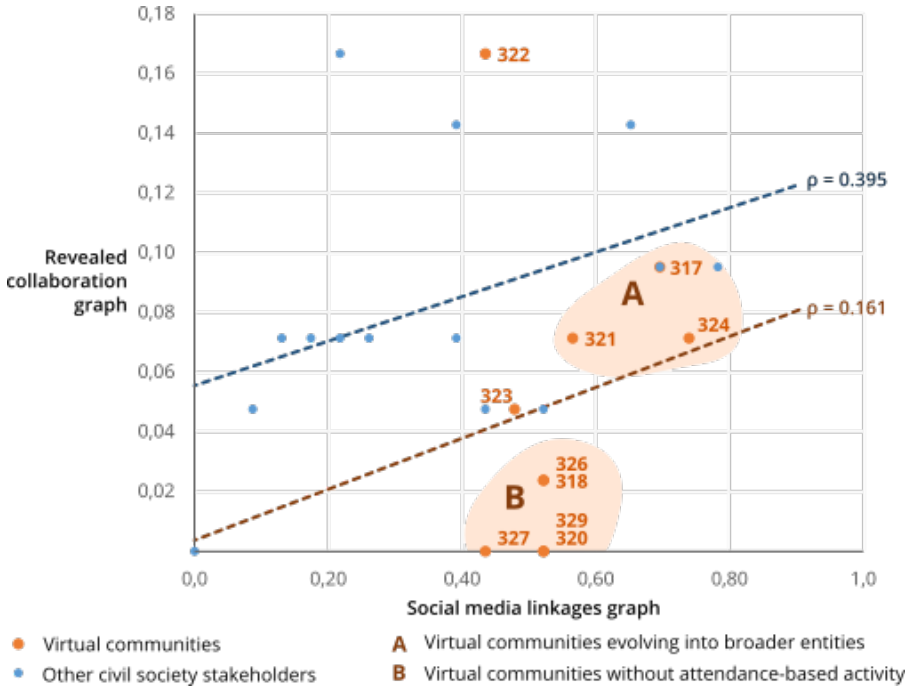

Figure 30 - Joint analysis of the in-degree of centrality from the two graphs representing the subnetworks of civil society stakeholders. Stockholm' case.

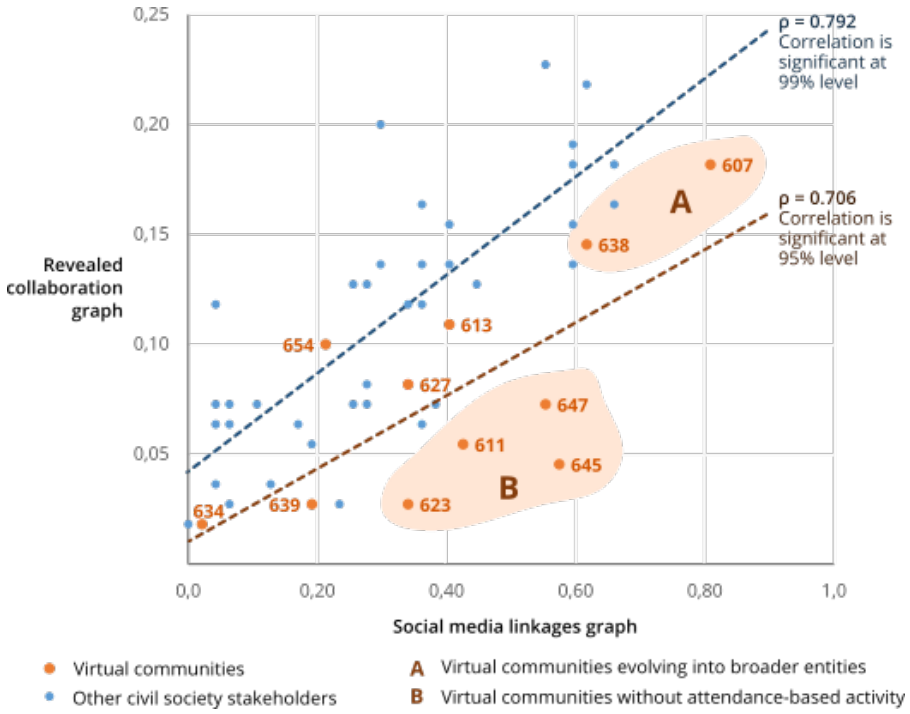

Figure 31 – Joint analysis of the in-degree of centrality from the two graphs representing the subnetworks of civil society stakeholders. Madrid' case.

The above figures show important differences between both study cases. The correlation between both centrality measures is significantly correlated in the case of Madrid, but not in the case of Stockholm. It has to be noted that the study is limited in the latter case by the low rate of answer to the questionnaires, specifically among virtual communities. The number of nodes in the case of Stockholm is also very low. The high levels of signification obtained for the case of Madrid, with better conditions of data quality, reveals the potential of the social media linkages graph in assessing stakeholder analysis. Moreover, there are some aspects that emerge in both cities that confirm the hypothesis about virtual communities and provide more understanding about the relations of the graphs:

- The prestige of the virtual communities is consistently higher in the social media linkages graph than in the revealed collaboration graph. By looking horizontally to the above figures, it can be seen that for each level of centrality in the revealed collaboration graph virtual communities score higher in terms of centrality in social media linkages.

- The virtual extensions of the most established organizations are able to achieve similar levels of prestige than the virtual communities. There are nodes representing civil society stakeholders that score high in terms of both centralities. This lies behind the high correlation coefficients in the case of Madrid, and it is present also in the case of Stockholm even if the correlation analysis is not that definite.

- The virtual communities already identified in the previous chapter as entities evolving towards activities that are not exclusively online are the ones that show more correlation

between their centralities. These are clustered under the label A in both above figures. It is worthwhile to mention the singularity of *Cyklandeombud* (i=324) in Stockholm. This online platform, active until September 2017, consisted in a network organization of individual stakeholders that focused in reporting deficiencies in the infrastructure. Its revealed collaboration centrality overcomes its social media linkages centrality.

- Consistently with the hypothesis stated above, the virtual communities that do not conduct offline activity show low levels of revealed collaboration centrality in comparison to their prestige in the social media linkages graph. These are the ones clustered under the label B in the figures. They would be the most overestimated if only the social media linkages analysis is conducted in a planning network.

6.4.9. *Influence of the debates on cycling infrastructure in the observed relations*

A second element of interest about the relations in the subnetwork of civil society stakeholders is related to the research problem that motivates the project. This consists in how the different positions in the debate on cycling infrastructure affect the relations between stakeholders. This inquiry focuses in the case of Madrid, since in the case of Stockholm there were no major differences reported about this issue. The observation of the debate already allowed to frame it as a conflict within cycling advocacy, an interpretation that the interviewees from governmental stakeholders shared. Therefore, is at this relational level –ties between civil society stakeholders– where the phenomenon has to be studied.

In order to analyze the influence of the debate in the relations, a meso-level analysis of the two graphs used in the study was conducted. This analysis starts by clustering the nodes according to their position in the debate on cycling infrastructure, an independent attribute of each stakeholder as reviewed in section 5.3.7. Figure 32 and Figure 33 show this clustering in the revealed collaboration graph and in the social media linkages graph.

It is possible to evaluate to what extent this clustering is reproducing actual communities within the network, thanks to the quality metrics introduced in the theoretical background. In this case, the performance of the communities was used (Fortunato 2010). It oscillates between 0 (poor community quality) and 1 (high community quality). The aim of the test is to check whether the partitions of the graphs shaped by the positions on the debate on cycling infrastructure are actually more internally connected than with nodes that hold different positions. The results show that there is no significant segmentation of the civil society stakeholders depending on their position on cycling infrastructure, especially if the source is the revealed collaboration graph (Table 31). As can be seen in the figures below, there are numerous links between stakeholders that hold different positions.

Table 31 – Performance of the communities resultant from the positions on the debate infrastructure in Madrid

Graph	Performance of clustering
Revealed collaboration	0.158
Social media linkages	0.332

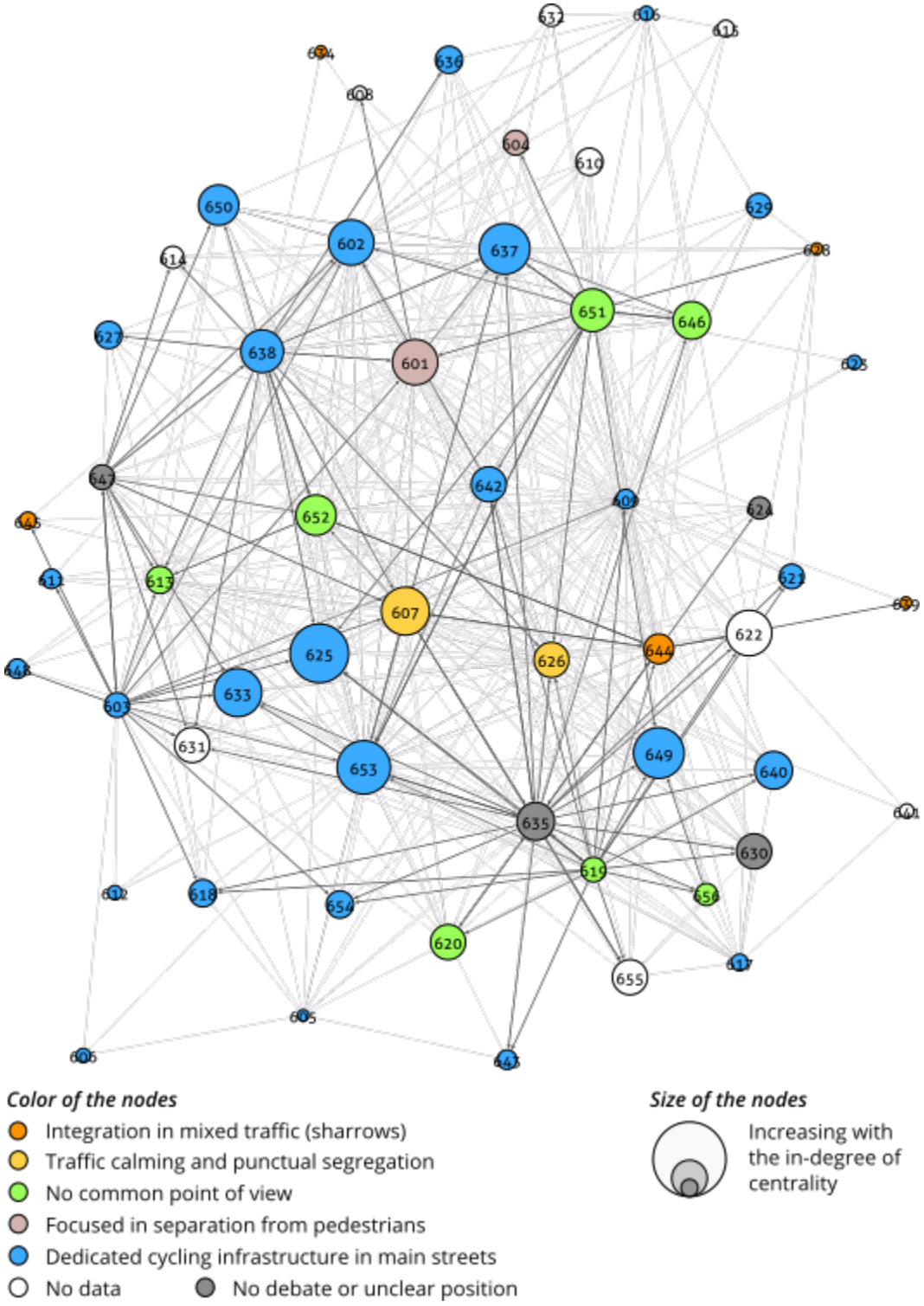

Figure 32 – Coloring clustering of the revealed collaboration graph in the Madrid case, according to the positions on the debate of cycling infrastructure

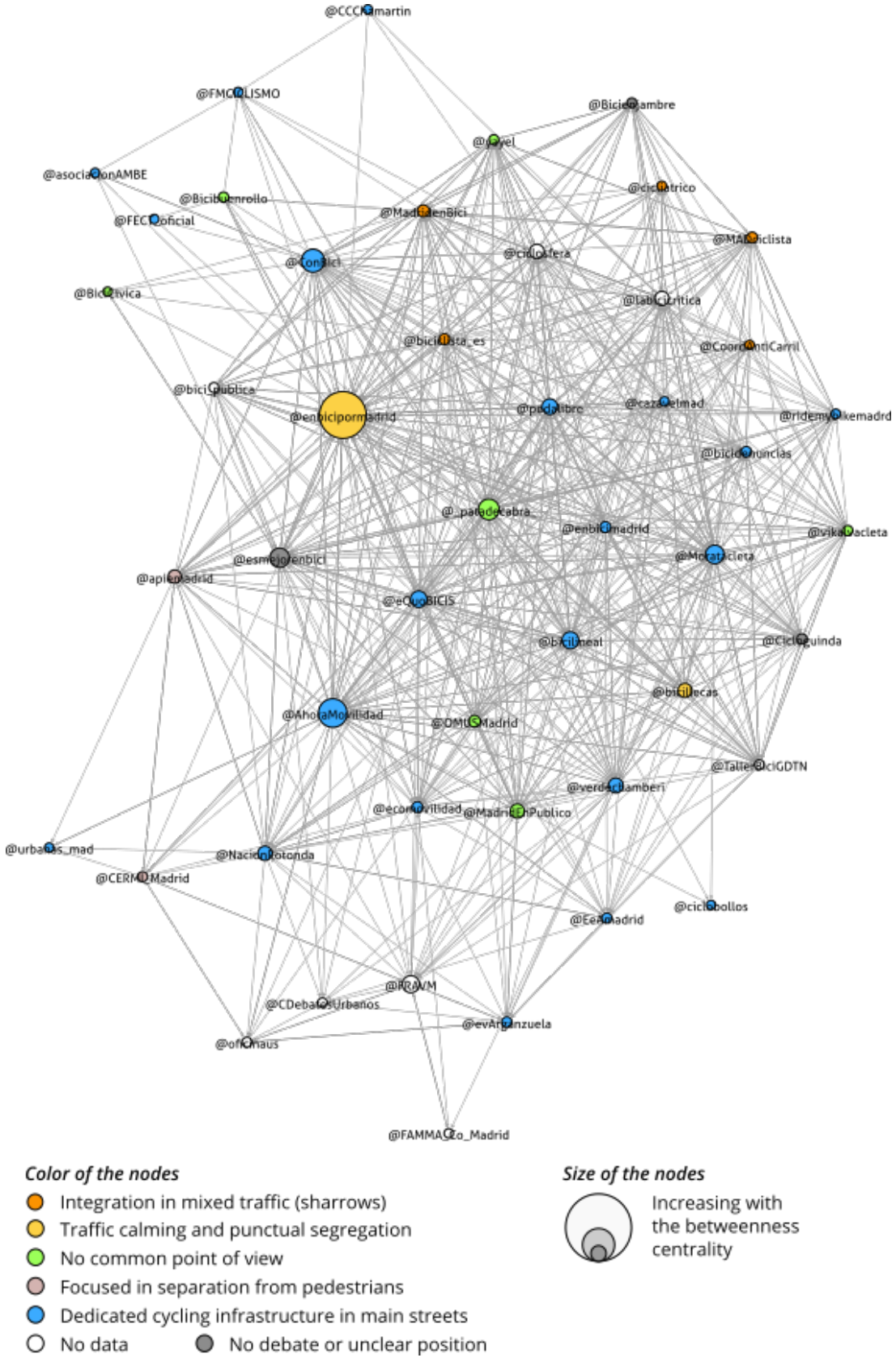

Figure 33 - Coloring clustering of the social media linkages graph in the Madrid case, according to the positions on the debate of cycling infrastructure

The results of this test are consistent with the fact that groups with confronted opinions in the debate on cycling infrastructure have launched joint campaigns in other aspects affecting cycling, such as traffic lights (Europa Press 2017).

The results of this test are added to other evidences that suggest that the impact of the debate on cycling infrastructure in the network is not as destructive as it may seem looking at the tensions that sometimes arise. It has been found that stakeholders with confronted opinions in the debate on cycling infrastructure have launched joint campaigns in other aspects affecting cycling, such as traffic lights (Europa Press 2017). In addition, some stakeholders have expressed that if the debate is avoided, the establishment of network organizations linking entities with different positions is possible (Blanco 2017). These evidences fuel the discussion as alleviating sources for the tensions observed in the representativity claims analyzed in the next chapter.

7. Representation of potential cyclists

This chapter deals with the third research question of the thesis, which explores the references to potential cyclists in the context of the debate on cycling infrastructure. Firstly, the reason to condition the analysis of references to potential cyclists to the existence of intense debate on cycling infrastructure is motivated, since it leads to focus just in the case of Madrid. Secondly, the results of the representativity claims analysis in the case of Madrid are shown. Finally, the chapter describes possible ways to directly involve potential cyclists in planning initiatives that arose as findings in the research.

7.1. The motivation for speaking for the sake of potential cyclists

The thesis formulates its research problem by bringing attention to a paradox that has been reported in the literature on cycling advocacy. Regardless of the different points of view within cycling advocacy, all advocates seem to speak for the sake of potential cyclists (Aldred 2012; Cox 2013).

The first finding related to this issue is that the references to potential cyclists hardly ever appear outside the contexts where the debate on cycling infrastructure dominates the discussions in participatory processes. This is inferred from two evidences:

- The exploration of the discourses of cycling planning stakeholders in Stockholm reveals disproportionately few references to potential cyclists compared to the case of Madrid.
- The numerous references to potential cyclists in the case of Madrid are actually made when discussing topics related to the debate on cycling infrastructure.

Following this, it seems that the references to potential cyclists are made to reinforce legitimacies in that debate. This is consistent with the literature referenced above, developed in relation to cycling infrastructure preferences. As stated in section 5.3.7, the positions on cycling infrastructure in Stockholm are much more homogeneous, and hence it is rare to find clear references to potential cyclists as opposite to current cyclists. The exception to this is the comments that some specific designs generate, such as the cycle lanes (*cykelfält*), introduce some judgements about the difference between potential and current cyclists when confronting dangerous situations in traffic (e.g. comments to a post in *Cyklistbloggen*, i=324; Gillinger 2014). Moreover, the cycling plan report mentions the potential cyclists (*icke-cyklister, tillkomande cyklister…*) as addresses of the plan (Stockholms stad 2012:5, 42), but does not insist in eventual different needs in terms of infrastructure. At this point, it has to be noted that other debates regarding cycling do appear in Stockholm, such as the use of helmet (for a comprehensive review, see Cykelfrämjandet 2015). However, this debate is excluded from the scope of this project.

As a consequence, the representativity claims analysis has been performed for the Madrid case, where an enough number of examples can be collected.

7.2. Analysis of the representativity claims

The analysis takes a total of 52 representativity claims, made by stakeholders identified in the Madrid case, and that have as referent the potential cyclists. The search included the documents of the cycling plan and the websites and social media profiles of central civil society stakeholders across the different positions in the debate on cycling infrastructure, after the social network analysis detailed in the previous chapter. The claims identified in the interviews are also added to the list.

7.2.1. Makers and subjects of the claims: who speaks for?

The claims are classified by their maker and subject. The maker is the entity who releases the claim and points to a subject as the representative of the referent. It is common that the maker is the same entity as the subject, when one is self-proclaimed as representative, as shown in Table 32 – Categories of representativity claims analyzed in terms of maker and subjectTable 32. However, in the context of cycling infrastructure debate the "crossed claims" (11% of the total) are interesting to see how defenders of infrastructure depicts integrationists and vice versa. The neutral claims are those which are not aligned in the debate or that come from mobility surveys.

Table 32 – Categories of representativity claims analyzed in terms of maker and subject

Maker – Subject	Number	Share
Pro-infrastructure – Pro-infrastructure	35	67.3%
Pro-infrastructure – Integrationist	2	3.8%
Integrationist – Integrationist	4	7.7%
Integrationist – Pro-infrastructure	6	11.5%
Neutral claims	5	9.6%

The share of claims from each side of the debate resembles the share of opinions across the civil society stakeholders identified in the case (Figure 17 in Chapter 5), hence validating the sample of representative claims included in the analysis.

7.2.2. Object of the claims: what speak for?

The object or topic of the claims are analyzed to determine a set of categories that facilitates the study. The categories found are the following:

- *Existence and legitimacy of potential cyclists*, to what extent are potential cyclists an existent group to take care about, and to what extent do their opinions deserve to be included in planning processes.
- *Infrastructure as a prerequisite to cycle*: to what extent do potential cyclists need to have dedicated infrastructure to start to cycle.

- *Infrastructure preferences*: to what extent do potential cyclists give more importance to certain attributes of cycling dedicated infrastructure.
- *Stress handling*: to what extent are potential cyclists discouraged to cycle because of the stressful situations that motorized traffic would impose, in line with other researchers' findings for the case of Madrid (Lois et al. 2016).
- *'Safety in numbers'* (Jacobsen 2003): to what extent is important for potential cyclists to see other citizens on their bicycles to start to cycle
- *Cycling training*: to what extent is cycling training an appropriate tool to encourage potential cyclists to start to cycle without the need of dedicated infrastructure.
- *Bike-sharing system impact*: to what extent is the bike-sharing system implementated in Madrid crucial for the attraction of potential cyclists.

This identification of the object categories underlying the representativity claims shape a valuable decomposition of the arguments in the debate on cycling infrastructure.

7.2.3. Pro-infrastructure representation of potential cyclists

The stakeholders defending dedicated cycling infrastructure enhance the legitimacy of the potential cyclists in the planning processes. They depict them as a numerous group with specific demands, in line with the cycling plan itself (Ayto. de Madrid 2016c:49). Furthermore, some point out that potential cyclists' needs are different than their own needs as current cyclists, in terms of coping with motorized traffic. This conceptualization of potential cyclists guides the mechanisms that these stakeholders use when making representativity claims. They refrain explicitly from descriptive representation attitudes based in 'politics of presence' (Phillips 1995) since they highlight the differences between potential cyclists and them, who are already cycling. Instead, all the claims follow substantial representation mechanisms, based in expertise knowledge on what would attract more potential cyclists.

It is remarkable how some claims are aligned with nuances observed in the literature on cycling advocacy. For instance, one of the claim is based in the differentiation between activists and not-activists, asserting that the ones left to start to cycle are not activists but normal citizens. This discourse was found also in other studies, where stakeholders wanted to move away from the image of cyclists as activists (Aldred 2013c), hoping for a 'less salient' profile (Aldred 2013b).

Leaving aside the claims about the existence of potential cyclists, the claims about the infrastructure itself play obviously an important role in the representation of potential cyclists. The pro-infrastructure discourse insists on the necessity of dedicated facilities to attract new cyclists. Part of the statements have as object the criticism to 'sharrows' (Figure 34) as a measure that is not enough to improve the attractiveness. It has to be noticed that the cycling plan embraces this argument as well, bringing to the debate the outcomes of a stated-preference survey (Ayto. de Madrid 2016c:36).

Figure 34 – Sharrow lane in a Madrid street. Source: Crónica Norte

Finally, some of the pro-infrastructure advocates claims make emphasis on how the intensity and speed of traffic flows in the city implies too many stressful situations for attracting potential cyclists in an integrationist model. This sets again differences in terms of needs between the current cyclists speaking and the potential cyclists. Moreover, as a difference to integrationist stakeholders, the cycling plan explicitly indicates that cycling training would not be enough to make potential cyclists comfortable in the road (Ayto. de Madrid 2016c:40).

7.2.4. Integrationist representation of potential cyclists

The stakeholders backing integration models based on 'vehicular cycling' (Forester 1993) depict potential cyclists in a different way. Instead of making a clear difference between the needs of these potential cyclists and their own needs, they declare that it is important not to insist on their differential vulnerability. This imports the reasoning behind the rejection of helmets in urban cycling from the vast majority of cycling stakeholders, regardless of their position on infrastructure. It consists in avoiding the development of an image of cycling as a dangerous activity, that would create stigmatization (Aldred 2013b). Instead, integrationists hope that a normalization of cycling by showing that infrastructure is not needed would serve to attract potential cyclists.

Moreover, it is interesting to see how the legitimacy of potential cyclists' interests in planning is slightly questioned, by asserting that they would not come from cars but from public transportation and therefore they are not that relevant to achieve a more sustainable mobility framework in the city. This is connected to regard the spread of cycling infrastructure guided by potential cyclists' desires as a threat to the right of current cyclists to use the road (Aldred 2015; Aldred and Jungnickel 2012). Indeed, in the case of Madrid this issue is present in the debate by a nuance in the traffic regulations and their signals, that makes a difference between the optionality or obligation to use cycle paths in streets (Figure 35).

Figure 35 – Signals that either obligate to use cycle paths (R407) or inform about the existence of a cycle path (S35). Source: En Bici por Madrid blog

In addition, integrationists affirm that dual systems like the proposal in the cycling plan would make potential cyclists to use sidewalks where cycle paths are not available, leading to conflicts with pedestrians.

7.2.5. Crossed claims in the debate

As it was speculated in the research problem formulation, the debate reaches antagonist levels sometimes. It is found that this happens specially when representativity claims on potential cyclists are formulated in a crossed manner, i.e. the maker and the subject belong to different positions regarding cycling infrastructure. This is what is colloquially understood as *put words into someone else's mouth*. Once it is clear that both sides defend different infrastructure models, the reproaches are centered in the conceptualization of potential cyclists.

On the one hand, the stakeholders backing dedicated infrastructure declare that integrationists do not take into account potential cyclists' needs, emphasizing a lack of empathy. On the other hand, the integrationist claim that the other side is underestimating the capacities of potential cyclists. In this line, they state that pro-infrastructure advocates do not take into account tools like cycling training in integrating cyclists in the road.

A particular claim interesting for the analysis is based in questioning the representation capacity of the other side of the debate in relation to potential cyclists. This was found from integrationist to pro-infrastructure stakeholders, since the latter are more insistent in developing a clear and differentiated image of potential cyclists, as it is analyzed in this chapter.

7.3. Opportunities for the direct involvement of potential cyclists

While the aim of the third research question is reached through the above analysis, it is worthwhile to reflect upon two strategies taking place in the Madrid case that provide opportunities for the direct involvement of potential cyclists. These strategies were brought up by the interviewees from governmental stakeholders. Their potentiality was also recognized by the interviewees in the case of Stockholm, that were partially aware of these experiences.

7.3.1. STARS project

The Sustainable Travel Accreditation and Recognition for Schools (STARS) is project co-founded by the Intelligent Energy Europe Programme that gathered nine partners which implement measures to increase the number of students cycling to school (STARS Consortium 2016). One of the partners was the city of Madrid, as can be seen in Figure 36.

Figure 36 – Partners in STARS project. Source: STARS Consortium (2016)

One of the motivations of the project was to involve young people in 'long-term changes in travel behavior' (STARS Consortium 2016), which the interviewees in this thesis related to the idea of participation of potential cyclists. Concretely, this participation was achieved through the figures of Youth Travel Ambassadors, students who studied the mobility patterns of their classmates and followed the implementation of the measures, and the Champions, staff from each school dedicated to coordinate the Youth Travel Ambassadors. The information gathering from cyclists was therefore ensured and helped to establish some needs that the students perceived from their experience as novel cyclists.

7.3.2. Participatory budget proposals

Another experience from Madrid case that has also importance in relation to potential cyclists' involvement is participatory budgeting. It consists in the dedication of part of the municipal budget to projects proposed by the citizens in a direct democracy approach (Smith 2009). In the case of Madrid, a section of the public participation website is devoted yearly to introduce, debate and choose proposals coming from each district.

Both the interviewees from governmental stakeholders and some blog posts by civil society stakeholders (En Bici por Madrid n.d.) highlight the relevance of cycling infrastructure proposals among the initiatives included in the participatory budgets. Many of the infrastructure proposals were promoted by civil society stakeholders formed by current cyclists, but others were developed by individuals that otherwise would have found difficult to put their ideas on the table. The influence of participatory budget proposals in boosting cycling modal share is recognized in the case of Seville, which achieved a 5% cycling modal share after large investments in cycling infrastructure proposed in this participatory tool (Fernández-Heredia et al. 2014; Lorenzi Fernández and Acero 2016).

8. Discussion

This chapter discusses the outcomes of the analysis in relation to the research problem and the literature referenced in the theoretical background. There is a number of challenges of participatory cycling planning that emerge from the project. The enounced challenges are put in relation with several strategies and future research lines that could contribute to a better performance of these processes.

8.1. Challenges of participatory cycling planning

The conducted research copes with some aspects that make participatory cycling planning challenging to a certain extent. Firstly, the diversity in cycling planning network is not only very evident among stakeholders but also within each stakeholder. In relation to this, the concept of multilevel cycling governance is described and the proliferation of civil society stakeholders is discussed. Secondly, the relevance of informal relations is prominent for explaining participatory cycling initiatives. Thirdly, it is argued that the scenarios where the debate on cycling infrastructure is intense are good examples of agonist planning with the problems that this implies for designing and conducting participation.

8.1.1. Multilevel cycling governance

The findings related to the first research question visualized the high number of stakeholders involved in cycling planning and the variability of their attributes, regardless of the category they belong to.

In the case of governmental stakeholders sub-network, the diversity is concreted in the concept of multilevel governance (Bache and Flinders 2004). It is clear that cycling planning initiatives are influenced by many governmental entities with diverging interests. This aspect is a challenge because it substantially increases the number of stakeholders that have to be taken into account in participatory processes, enhancing the relevance of studying the relations between them as it is done in this project. The metropolitan dimension of larger cities plays a role in this phenomenon, since municipal plans like the ones object of study in this thesis have to be in line with the strategies at county or regional level. However, the research suggests that the most salient source of diversity comes from the different units and sections of municipal governments.

This outcome is important, since it shows that stakeholder analysis techniques that rely too much in unitary actor assumptions are not valid, given that it is needed to acknowledge the different interests that emerge within each area of municipal governments regarding cycling issues. The analysis suggests that the different interests are more evident in two dichotomies. Firstly, the equilibrium between the ones preparing cycling plans and the ones developing and implementing concrete cycling projects. Secondly, and particularly in larger cities, the equilibrium between the city scale and the district scale. The latter is found to be applicable to governmental stakeholders but also to municipal political parties, in line with the criticisms to unitary actor assumption in party analysis (Bäck 2008).

Consequently, disaggregated governmental stakeholder analysis emerges as an essential strategy for participatory cycling planning. Without making a difference between the different units within institutions is not possible to later characterize their relations, and the interviews with planners show the relevance of these relations and the organizational alternatives that give birth to several models of cycling governance. These reflections enhance the utility of the studies that compare different institutional designs to manage urban cycling issues (Koglin 2015) and suggest that future research in this issue would be profitable.

8.1.2. Civil society in cycling planning: beyond cycling advocacy

It is clear that cycling advocacy organizations are not the only civil society stakeholders that should be identified before conducting a participatory cycling planning process. This conclusion is derived from three outcomes of the thesis.

Firstly, cycling individual advocates do not restrict their activity to cycling advocacy organizations. The framework of different kind of affiliations provided by social movements literature is valuable for discussing this situation (della Porta and Diani 2006). Following this, many advocates operate in the cycling planning network without framing them as members of one of these organizations, thus being 'non-affiliated'. Other advocates have exclusive affiliation to organizations that are not dealing only with cycling issues, e.g. community groups or mobility-related think tanks. Overlapping membership situations, with an individual being active in various entities, are also common. This thesis has a limited capacity to analyze this range of possibilities, due to the fact that the research does not identify individual stakeholders. However, the snowball sampling technique performs well in terms of overcoming such limitation. By looking at references to additional stakeholders from a set of easily acknowledged entities, it is possible to reach that kind of groups that otherwise would have been omitted, such as the mobility-related organizations that do not have cycling as their *raison d'etre* but still have debates about it.

Secondly, there is a pressure from governmental stakeholders to include in the network those entities that represents other users of public space apart from cyclists. Institutions committed to participation are often worried about how to include those not-yet-reached (Beebeejaun and Vanderhoven 2010). In the case of cycling planning, governmental stakeholders frame alternative users of the road as not-enough-reached, expressing frustration about how to effectively involve them. This is related to the tensions between different users, that are very present even in the case study of Stockholm where cycling is more common (Balkmar and Summerton 2017). Consequently, stakeholder analysis for designing participatory processes must not omit stakeholders such as pedestrian-focus associations, groups of public transport users or branches gathering delivery companies.

Finally, it is important to have in mind that cycling advocacy constitutes a social movement with many links to other wider mobilizations (Horton 2009). In the cases analyzed, the ecologist movement appears as particularly relevant. Many ecologist entities, in the range from established organizations to looser forms of advocacy such as blogs, have a partial focus on urban cycling issues. This counts as another reason behind the rejection of approaches based in

the unitary actor assumption, because in some cases there are cycling focus groups within these stakeholders that are worth to be analyzed separately, as it is the case for *Naturskyddsföreningen* in Stockholm.

These observations further motivate the need for disaggregated stakeholder analysis strategies, in this case not only for governmental entities and political parties but also for the part of the cycling planning network composed by civil society stakeholders. The snowball sample technique has potential for providing tools to these disaggregated analyses.

8.1.3. Cycling planning informalities

The evidences collected during the research suggest that informal channels of participation are common in the context of cycling planning. Both cases show formal and informal opportunities complementing each other, as has been highlighted by other participation researchers (Sayce et al. 2013). In general, governmental stakeholders are found to be more reluctant to admit the relevance of informal opportunities, particularly in the case of Stockholm. This reflects the 'institutional ambiguity' referenced in the theoretical background (Hajer and Versteeg 2005), which means that governmental stakeholders approach to participation is a combination of different rationalities. More concretely, the attitude of governmental stakeholders is consistent with the conclusions of Bäcklund and Mäntysalo (2010). They suggest that the remains of rationalistic approaches to planning are still a barrier to some forms of participation, particularly the ones that move away more intensely from legitimacy through electoral systems, as it is the case of informal opportunities in contrast to more controlled formal channels. Indeed, these barriers seem to be shorter in the case of Madrid, where the party in charge of the government comes from urban grassroots movements. On the contrary, many civil society stakeholders framed informalities as natural to participation, in line with the researchers that back the agonist approach to planning (Hillier 2000). The discussion on the legitimacy of informal opportunities is out of the scope of this thesis, but it is possible to imagine some future research lines that emerge from the project. Particularly, it is interesting that the analysis shows how the involvement of non-cycling focus entities is mainly done through formal opportunities, while cycling advocacy organizations usually find open both approaches. The possible relation of this observation with the difficulties that governmental stakeholders experiment to attract non-cycling focus entities to participation deserves attention.

This use of the plural 'informalities' in the heading of this section is not casual. Apart from the findings about how participation is conducted, the characterization of the stakeholders reveals also that informality is an organizational trend within the civil society entities involved in cycling planning processes. Organizational informality is expressed through attributes such as lack of official registration, free membership or loose coordination mechanisms. Many of these fluid entities identified in the project are what are called 'virtual communities' in social movement theory (Jones 1997). Both cases show how these kind of entities have appeared in the last decade as new references within cycling advocacy and its related movements. The literature on social movements interprets that the Internet is a natural environment for the groups with flatter organizational structures (Van Laer and Van Aelst 2010). The small longitudinal study

conducted as part of the stakeholder identification (section 5.3.4) concludes that some of these communities have exceeded online activity and evolved into mixed formats that introduce offline involvement of their members. This becomes an evidence that the segmentation between 'internet-based' and 'internet-supported' activity suggested in the social movement literature can be blurred by the evolution of some virtual communities (Van Laer and Van Aelst 2010). Hence, cycling virtual communities and their differences with traditional organizations are not only interesting for analyzing the cycling planning network itself (Balkmar and Summerton 2017; Golbuff 2014) but also as a study case for social movement studies. Consequently, it would be interesting to keep track of the evolution of these virtual communities with longitudinal studies.

Together with the global trend of virtualization, the thesis shows that national trends in social movement organizations still play a role in the cycling advocacy landscape. In the case of Madrid it is much more common to find entities that are largely informal because horizontal assemblearism, free membership and unregistered activity are principles of the 15M movement (spring 2011) that had a strong impact in social mobilization in Spain (Sampedro and Lobera 2014). This contrasts with the longer tradition of civil society organizations in Sweden (Jeppsson Grassman and Svedberg 2007). However, the relevance of virtual communities that evolved into mixed formats of activity is also growing fast in Stockholm. This is proved in the thesis through the centrality measures employed, and it is consistent with the findings of other studies about cycling advocacy in the country that argue that the cultural complexity of cycling implies the need for diverse ways of advocacy strategies (Balkmar and Summerton 2017). This suggests that even in those countries where civil society influence in decision-making has been traditionally carried by registered and hierarchical organizations, there is a need to take into account more fluid entities operating in cycling advocacy. The conclusion supports the disaggregated stakeholder analysis as a strategy for designing public participation processes in cycling planning.

Both virtualization and diversification of advocacy strategies point out to an increased role of informality in cycling planning. It has been mentioned that agonism and informality are closely related from the early development of this approach to planning (Hillier 2000). Indeed, it has been suggested that the dominance of formal participation opportunities in a planning processes may be 'at the expense of (...) more agonist practices' (Vigar et al. 2017:433). The presence of agonist ideas in cycling planning centers the following section.

8.1.4. The agonistic debate on cycling infrastructure

The thesis proved that the intensity of the debate on cycling infrastructure is not equal everywhere. The analysis does not focus on the conditions of existence of the debate, but rather in its influence in cycling planning wherever the debate appears. However, it seems that the national cycling framework plays a role, just as it happens for organizational informality. In the case of Sweden, the proximity to countries such as Denmark with a long tradition of dedicated cycling infrastructure may homogenize positions towards the provision of these facilities.

Leaving this aside, the thesis suggests in its introduction that the debate on cycling infrastructure may be characterized by antagonism in terms of Mouffe (2000). Antagonism is framed by agonist planning scholars as permanent hostility between enemies (Mouffe 2000).

Recurring to the matrix cooperation-competition (della Porta and Diani 2006) examined in the theoretical background (Table 2), there would be an antagonist debate on cycling infrastructure causing factionalism between entities situated at both sides of the debate. Once the cycling planning network has been deeply explored in a case where the debate is intense, it is possible to revisit this claim. The conclusion is that the evidences from Madrid case point more to transient frictions between entities with different points of view than to pure antagonistic confrontation. It was found that stakeholders with different points of views coexist in network organizations and even collaborate in joint mobilizations. Moreover, the subnetwork did not show clustering patterns around these positions. These evidences counteract to some extent all the recriminations that the analyzed representativity claims contain, which are effectively 'bitter' as the literature on cycling advocacy express (Parkin 2015). It is interesting to see that agonist reflections on planning can suggest drivers for the attraction and repulsion forces that characterize the debate on cycling infrastructure.

On the one hand, transient frictions resemble the inevitable conflict that agonists claim to discover in participatory processes (Hillier 2002a; Pløger 2004). Firstly, the frictions are embedded in the informalities of public participation, where agonist usually focus to find conflict evidence (Hillier 2000). Secondly, the ongoing debate reflects a situation where both sides assert to aim for the same objective: the popularization of urban cycling. This apparent paradox is conceived under agonist approaches, which predict that conflict can happen between groups with shared causes but different systems of meaning (Bäcklund and Mäntysalo 2010). Indeed, the research conducted in relation to the representation of potential cyclists unveils what can be understood as two systems of meaning: one rooted in long-term empowerment of cyclists in the road and other rooted in practical protection to vulnerable newcomers to urban cycling. This two systems of meaning are expressed through dichotomies reflected in the literature on cycling advocacy, such as 'we are traffic' vs 'we are similar to pedestrians' (Aldred 2010).

On the other hand, the friction impact is limited to some extent. The reflections about the relevance of struggles in the agonistic planning theories have found that in some cases there is a willingness to "preserve the community capital" (Vigar et al. 2017:437). This can be translated to the scope of this thesis as a willingness to preserve cycling advocacy capital for broader actions beyond cycling infrastructure. To sum up, this ongoing case of participatory cycling planning can be understood as ongoing agonism.

8.2. Strategies for better participatory cycling planning

This section aims to discuss improvements for the design and the management of participatory cycling planning processes. Therefore, it is addressed to planning practitioners. The reflections come from the challenges collected in the previous section and also from the methodological approaches deployed in the thesis to characterize the relations in the cycling planning network. The challenges directly suggest the relevance of disaggregated stakeholder analysis. The comparison of the two social network analysis methods, namely *interaction-based* -grounded in questionnaires and interviews- and *observation-based* -through new sources of

relational data from social media platforms-, concludes that the latter can have a valuable contribution to overcome the exposed challenges of participatory cycling planning.

8.2.1. Disaggregated stakeholder analysis: tools and guidelines

When discussing the diversity of the cycling planning network, the need for a disaggregated stakeholder analysis associated to the design stages of participatory cycling planning initiatives is highlighted. As it has been advised, this approach should guide the identification of stakeholders across the three categories used in the thesis.

Starting by civil society stakeholders, snowball sampling techniques emerge as an accurate tool to perform this disaggregated analysis in this subnetwork. This method, used in some of the studies referenced in the thesis (e.g. Caiani 2014) allows to reach hidden layers of entities that play a role in a situation (Atkinson and Flint 2001). Thanks to the intense activity of urban advocates in the Internet, it is possible to conduct this method by observation, which considerably reduces the resources needed for its application. The technique has been validated with the questionnaire to civil society stakeholders, since the identified entities through snowball sampling introduced almost no additional stakeholders when explicitly asked for that. Thus, observational snowball sampling is the natural method for disaggregated civil society stakeholder analysis.

While in the case of municipal political parties the identification is trivial, in the case of governmental stakeholders the identification has still to rely in intensive document analysis and interviews with key agents. However, this is probably not a problem in the context of a planning practitioner that faces the design of a participatory process, since it is already required to maintain a fluid and frequent relationship with some of these governmental stakeholders (if it is not actually one of them!). Nonetheless, the findings suggest that the critical scrutiny of the information provided by the practitioner contacts can be more efficient by focusing in some elements.

Firstly, it can be advised that the analysis has to focus first in the equilibrium between planning structure and project management structure. The analysis of their relations cannot be based in interaction (i.e. interviews, questionnaires) with just one of the structures, in order not to develop a biased image of how cycling issues are managed in the institution. In this context, one of the key findings of the thesis have to be taken into account, the one pointing that the concurrence of administrative units behind the same department do not necessarily imply more closeness or more incentives for coordination. The relevance of this finding is synthesized in Figure 37.

Secondly, the case that focused in the larger city, Madrid, reveals that similar diverging interests emerge in the axis city administration - district administration. Consequently, the analysis of the governmental sub-network should include the exploration of this equilibrium. As it happens with other transport networks in the urban environment, each cycle path and each cycle parking have different meanings at a city level and at a district level. These meanings must be made compatible, which leads to a trade-off between their characteristics. The tension city-

district generates dynamics that have to be taken into account to design participation opportunities: district administrations dialogue with transport and urban planning departments in the framework of the governmental subnetwork, the delegations of the political parties in each district may show different support levels than in the municipal council, and district cycling advocates dialogue with the entities with broader spatial scope to enhance their influence.

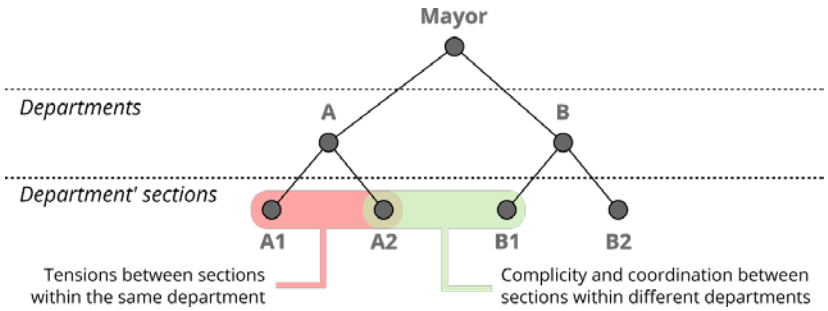

Figure 37 – Relational status between administrative units that a disaggregated stakeholder analysis can capture

8.2.2. *Big relational data for participation design*

This thesis combined traditional research methods, such as questionnaires or interviews, with new sources of data grounded on the online interaction of agents (Caiani 2014). This type of data can be referred to as big relational data. The dataset used in this thesis was the social media linkages in the platform Twitter. As part of the second research question, the project analyzed the correlation between the relational data retrieved from this platform and the revealed collaboration between civil society entities through the questionnaire. Although the analysis has to be taken with caution, due to the low sample for the Stockholm case, the performance of the social media data as a proxy of the actual status of the relationships between agents show promising results. The online interaction in social movements is an increasing phenomenon, not only because the appearance of the virtual communities described above, but also because the proliferation of 'virtual extensions' of attendance-based organizations (Diani 2000). This represents an analytical opportunity since the online interaction leaves a data footprint that can capture both formal and informal aspects (Vigar et al. 2017). If improvements in participation procedures have to stress the relevance of informal channels (Beebeejaun and Vanderhoven 2010), any tool that show signs of being able to capture informality deserves attention.

However, there are a number of difficulties about the contribution of big relational data to participatory cycling planning strategies that should guide the future research efforts. This critical approach does not invalidate the contribution of this strategy to participatory planning, but tries to avoid "a naïve internet-optimism" (Van Laer and Van Aelst 2010:1164) to motivate further research in the field.

Firstly, this method should be validated more precisely. An initial validation would consist in comparing the results of the centrality measures in graphs representing big relational data with the results of the same centrality measures in complete graphs obtained through questionnaires that actively interact with the stakeholders to ask about their relations. To get a complete graph it is necessary to obtain higher rate of answers to the questionnaires than the

ones achieved in this thesis, that only allowed to perform comparisons in terms of in-degree of centrality. Complete graphs imply less sampling error and the possibility of comparing also betweenness centrality outcomes. For achieving higher rate of answers the trust between the researchers or planners conducting the study and the entities to be analyzed must be high, particularly in context where the degree of informality is high (Balsiger and Lambelet 2014). A complementary validation that has to be further explored is the correlation between centrality and activity in the social media platform used for analyzing the relations in the network. The outcomes of this analysis in the thesis are not conclusive.

Secondly, the bias towards virtual communities should be further analyzed. It is hypothesized that those entities that can be understood as virtual communities are overrepresented in terms of centrality when the source of data for analyzing the relational properties is social media linkages. The conducted research supports this hypothesis but also suggest that this bias is systematic. This would be due to the differential pattern between the virtual communities that are only based in virtual interaction and those which have included attendance-based involvement. Future research could explore more neatly whether this is a robust explanation for the bias and the possible ways to correct it if a predictive model for relationships between stakeholders is to be constructed from this source of data.

Thirdly, the use of more sophisticated relational properties should be explored. This thesis analyzed friendship in Twitter, which can be denoted as *passive interaction*. There are alternative relational properties that can be clustered in two groups. One the one hand, it is possible to analyze *active interaction*. In the case of Twitter, this can mean studying the retweets or the mentions between users. This has been done for different research areas (Conover et al. 2011; Ota et al. 2012). The advantage of this is that it gives weight to the relations, in a similar fashion to what is achieved in the thesis with the graph of revealed collaboration, that differs between punctual and regular collaboration. An analysis of active interaction can be promising for improving the potential of big relational data in describing relations between civil society stakeholders and governmental stakeholders. For instance, it is probably the case that each institution tends to reply more often to certain cycling advocates organization than others, revealing priorities and exclusions. On the other hand, it is possible to analyze *sentiment* (Agarwal et al. 2011; Saif et al. 2016). In the case of Twitter this means to look at the content of each tweet for understanding positive and negative perceptions about the relations between stakeholders. This introduces qualitative considerations in order to get a richer data, that would certainly give interesting insights on informal channels of participation that have been demonstrated to play an outstanding role in cycling planning. For instance, sentiment analysis would have made possible to perform a deeper analysis about the representation of potential cyclists, since many of the claims occur in social media platforms.

Finally, together with the innovations mentioned above, it could be also profitable to use other available datasets on relational properties. This include other social media platforms, such as Facebook or Instagram (Gaby and Caren 2012; Harlow 2012). The advantages and disadvantages of each alternative source could be analyzed in future research.

9. Conclusions

Urban mobility is a key policy field for sustainable development strategies. One of the tools that can have a valuable contribution to sustainable urban mobility is the use of bicycles as a daily transport mode. Therefore, many cities allocate resources to develop plans that promote cycling. As it is common nowadays in urban planning, a substantial part of them develop these initiatives under participatory approaches. Participatory cycling planning are not free from difficulties, as researchers and practitioners have noted. Under certain conditions, the provision of cycling infrastructure becomes the object of a tense debate among stakeholders involved in these participatory processes. Some of them actively advocate for dedicated cycling infrastructure separated from motor traffic, while others claim that facilitating the integration of cyclists in existing roads is the accurate measure for reducing car trips and increasing cycling levels. In many cases, this debate is structured through references to the assumed interests of the potential cyclists, which are the addresses of the plans but are difficult to engage given their potentiality, in contrast to current cyclists.

This project interpreted that a step back was needed for a deeper understanding of the drivers of such debate. The aim was to clarify the structure shaped by the stakeholders playing a role in cycling planning, by looking at the participatory cycling planning initiatives of Stockholm and Madrid. It can be concluded that the theoretical framework that was assumed to be valuable has worked well for this purpose. Stakeholder and social network theories have provided an operational framework for the research. Moreover, social movement theory -in relation to cycling advocacy- and representativity theory -in relation to the claims making reference to potential cyclists- have successfully guided the analysis and discussion. It seems that the use of two study cases that initially suggest different trends in relation to the aforementioned debate has been a proper strategy for broadening the scope of the research. As a consequence of the background analysis, it has been confirmed that the debate on cycling infrastructure is soft in the case of Stockholm and tense in the case of Madrid.

The structure of the cycling planning networks analyzed can be thought as having three wide categories: governmental stakeholders, political parties and civil society stakeholders. The group formed by governmental stakeholders encompasses those that have governance responsibilities in any field related to urban cycling. A document analysis identified 18 in the case of Stockholm and 11 in the case of Madrid. The political parties can be trivially identified by looking at electoral data. The identification of civil society entities involved in cycling planning can be successfully completed with a snowball sampling technique. This method reviews the links recognized by a group of seed stakeholders to accumulatively reach all the entities that are somehow related to cycling planning. The results show that there is a wide catalogue of diverse civil society stakeholders, 29 in the case of Stockholm and 56 in the case of Madrid. It is known that in a network the ties are very relevant. The relational analysis combined a myriad of methods: interviews with key agents from governmental stakeholders, a

questionnaire to civil society entities and the review of the social media linkages between all stakeholders in the platform Twitter, which were retrieved by data mining techniques.

After analyzing the resultant structure, the thesis concludes firstly that the governmental subnetwork is characterized by a multilevel governance landscape. This implies that the internal structure of each department in the municipal government with competences in cycling-related policies should be carefully analyzed. Another conclusion is that the civil society subnetwork is characterized by an expansion towards entities that are not exactly cycling-focused, both because institutions push for their involvement and because cycling receives attention from many movements. In this subnetwork, informality is a trend, both in terms of organizational strategies and in terms of relational channels. The conclusion is that this is due to the emergence of many virtual communities with increasing influence and the diversification of cycling advocacy expressions.

Wherever it arises, the so-called debate on cycling infrastructure takes place in this framework. Although the study of a set of representativity claims showed the roughness of the debate at some moments, the thesis finds that the hostilities are rather transient than permanent. There were evidences of forms of collaboration between entities with different positions, and the relational analysis did not show a special clustering of the two sides of the debate. By reviewing contemporary planning theories, this allowed to conclude that this is possible because the confronted stakeholders are feed by different systems of meanings regarding cycling while may want to preserve cycling advocacy capital for other issues. The conclusion is consistent with the reflections of agonistic models of planning, which means that the situation can serve as a case study for elaborating on agonistic theories.

The research served to formulate not only the bunch of challenges depicted above, but also some strategies that may facilitate the design and management of participatory cycling planning initiatives. The strategies are coordinated around two concepts. Firstly, the disaggregated stakeholder analysis, which would consist in dissecting to the lowest possible level the components of governmental stakeholders within the municipal government, and also the components of largest civil society entities. This is motivated by the challenge that multilevel cycling governance implies. Disaggregated stakeholder analysis is considered to be valuable for a better understanding of the roles that would arise during a participatory process. Only by identifying those low level components it is possible to later analyze the relations that they have in the cycling planning network. Secondly, the big relational data analytics, which refers to the use of the available social media platform datasets to review the links between stakeholders in the cycling planning network. This strategy is motivated by the increasing relevance of informality in these contexts. Although it comes as a complementary tool rather than as a magic solution, big relational data analytics can serve as a first approximation to the links between the identified stakeholders, which are necessary to be reviewed in order to anticipate the alliances and tensions that can arise, particularly those related to the debate on cycling infrastructure. The different levels of validation that these strategies faced in the research show promising results and encourage further research efforts that contribute to a better design of participatory cycling planning initiatives.

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Appendix 1 – Stakeholder identification

1. Stakeholder coding

Each collective stakeholder is assigned an index *i,* which unequivocally identifies it among the stakeholders in the thesis. The index *i* is a number with three digits. The first digit corresponds to a type of stakeholder in a certain study case, in order to make easier the data management. The second and third digits identify the stakeholder within its type and study case. Table 1 shows this pattern.

Table 1 – Stakeholders codes

k	Case study	Type of stakeholder
1##	Stockholm	Governmental stakeholder
2##	Stockholm	Political party
3##	Stockholm	Civil society stakeholder
4##	Madrid	Governmental stakeholder
5##	Madrid	Political party
6##	Madrid	Civil society stakeholder

2. Independent attributes

a_1	**Type of stakeholder**
Meaning	The stakeholders are categorized in three basic groups.
Values	**1** – governmental stakeholder **2** – political party **3** – civil society stakeholder

a_2	**Identification source**
Meaning	The source makes reference to the way the stakeholder is acknowledged, from which place it emerges in the identification procedure.
Values	**1** – seed stakeholder, review of planning process documents **2** – seed stakeholder, previously known **3** – observational snowball sampling

a_3	**Governmental stakeholder role**
Meaning	There are many different types of authorities and institutions that are important to differ between.
Values	**0** – not governmental stakeholder **1** – external to municipal government **2** – internal to municipal government, without competences in cycling planning **3** – administrative competences in cycling planning within municipal government **4** – political municipal office in charge of cycling planning (Stockholm case) **5** – roles of both 3 and 4 (Madrid case)

a_4	**Governmental stakeholder political sign**
Meaning	This attribute reflects the political party which is responsible for each governmental stakeholder
Values	**0** – not governmental stakeholder **1** – group or node of governmental stakeholders with different governing parties **###** – governed by political party i = ### **###_yymm_###'** - governed by political party i = ### until year yy and month mm, when the political party j = ###' took the power

a_5	**Political party municipal role**
Meaning	This attribute reflects the role of each political party in the municipal governance landscape.
Values	**0** – not political party **1** – without representation in the council **2** – representation in the council minority **3** – representation in the council majority **4** – part of the municipal government **5** – heading the municipal government **#_yymm_#'** – role # until it changed to #' in the year yy and month mm

a_6	**Civil society stakeholder formality**
Meaning	This attribute reflects the level of formality that organization and communities has in relation to authorities and institutions.
Values	**0** – not civil society stakeholder **1** – unknown (requiring further search or evidence) **2** – not registered **3** – registered (*organisationsnummer* in Stockholm' case, *número de registro* in Madrid' case)

a_7	**Civil society stakeholder members' nature**
Meaning	This attribute reflects which entities can be members of the stakeholder
Values	**0** – not civil society stakeholder **1** – unknown (requiring further search or evidence) **2** – individual members **3** – other groups **4** – both individuals and groups

a_8	**Civil society stakeholder membership type**
Meaning	This attribute reflects how the membership is bounded in each stakeholder
Values	**0** – not civil society stakeholder **1** – unknown (requiring further search or evidence) **2** – free membership **3** – paid membership

a_9	**Civil society stakeholder level of internal specialization**
Meaning	This attribute reflects how advanced is the specialization within an organization or community, detecting the existence of territorial specialization (e.g. district groups) or sectoral specialization (e.g. cycling group within an ecologist organization). It also describes if the entity analyzed is itself a territorial or sectoral group within a broader organization.
Values	**0** – not civil society stakeholder **1** – unknown (requiring further search or evidence) **2** – without specialization mechanisms **3** – wider level with territorial specialization, no sectorial specialization **4** – wider level with sectorial specialization, no territorial specialization **5** – wider level with both territorial and sectorial specialization **6** – territorial group without specialization **7** – territorial group with sectoral but no further territorial specialization **8** – territorial group with both sectoral and territorial further specialization **9** – sectorial group without specialization

a_{10}	**Civil society stakeholder coordination model**
Meaning	This attribute reflects the governance structure of each organization or community
Values	**0** – not civil society stakeholder **1** – unknown (requiring further search or evidence) **2** – without coordination mechanisms **3** – loose, not questioned leaderships (virtual administrators or moderators, cycling mass promoters) **4** – horizontal assemblies **5** – horizontal assemblies with a coordination group **6** – short-term democratic shared leaderships (≤ 1 year) **7** – long-term democratic shared leaderships (> 1 year)

a_{11}	**Civil society stakeholder activities format**
Meaning	This attribute reflects how the entity conduct their actions
Values	**0** – not civil society stakeholder **1** – unknown (requiring further search or evidence) **2** – only virtual activities **3** – more virtual than attendance-based activities **4** – equally virtual and attendance-based activities **5** – more attendance-based than virtual activities **6** – only attendance-based activities

a_{12}	**Civil society stakeholder period of activity**
Meaning	This attribute reflects the period of activity of the collective in relation to the period of study for both cases. It is reminded that the period of study starts with the first movements towards the last cycling planning initiatives in both cities, i.e. March 2010 for Stockholm and March 2015 for Madrid.
Values	**0** – not civil society stakeholder **1** – unknown (requiring further search or evidence) **2** – stable, origin before the start of the period of study, and continuing now **yymm0000** – origin in the year yy and month mm within the period of study and continuing now **yymmyy'mm'** – origin in the year yy and month mm within the period of study and finish in the year yy' and month mm' within the period of study

a_{13}	**Civil society stakeholders involvement in public participation**
Meaning	The attribute indicates the opportunities where the stakeholder was involved in the public participation processes regarding cycling planning in the city.
Values	**0** – not civil society stakeholder **1** – unknown (requiring further search or evidence) **2 –** no involvement **3** – only following the participatory processes but not taking part in them ##### five digits code: 1st: 1 if participation in consultation processes, 0 else 2nd: 1 if participation in planning workshops and meetings, 0 else 3rd: 1 if participation in meetings related to concrete projects, 0 else 4th: 1 if participation in the regular Cycling Forum (Madrid case), 0 else 5th: 1 if participation in other events, 0 else

a_{14}	**Existence of the debate on cycling infrastructure**
Meaning	The attribute collects the questionnaire answers from Madrid civil society stakeholders regarding the state of the internal debate on cycling infrastructure
Values	**0** – not civil society stakeholder or not answer to the questionnaire **1** – no debate **2** – debate, with common points of view among the members from the start **3** – debate, reaching a common point of view among the members **4** – debate, not reaching a common point of view

a_{15}	**Revealed position in the debate on cycling infrastructure**
Meaning	The attribute collects the questionnaire answers from Madrid civil society stakeholders regarding the position in the debate on cycling infrastructure, and the position revealed in the manifesto advocating for more dedicated infrastructure (Bicilineal 2017).
Values	**0** – not applicable, no debate or no data **1** – no common position **2** – integration in mixed traffic with sharrows **3** – punctual segregation **4** – segregation without removing the existent sharrows (dual network) **5** – full segregation **6** – traffic calming measures (spontaneous answer) **7** – preference for pedestrian separation **8** – unclear spontaneous answer **9** – appearance in the manifesto and no answer

a_{16}	**Position in the debate on cycling infrastructure**
Meaning	The attribute describes the position in the debate on cycling infrastructure for the stakeholders in the Madrid case, completing the answers from the questionnaire with observational data
Values	**0** – not applicable or no data **1** – integration in mixed traffic with sharrows **2** – traffic calming and punctual segregation **3** – segregation without removing the existent sharrows (dual network) **4** – full segregation **5** – separation from pedestrians prioritized **6** – no common point among the members **7** – unclear reported position **8** – no debate in the entity

a_{17}	**Twitter account**
Meaning	The attribute collects the accounts associated to each stakeholder
Values	Characters string with the user name, or "@notwitter" if it has no presence in this social media platform

a_{18}	**Number of followers in Twitter platform**
Meaning	The attribute collects the number of followers that the account associated to the stakeholder has in the social media platform Twitter
Values	0 if is not civil society stakeholder, integer with number of followers

a_{19}	**Number of tweets in Twitter platform**
Meaning	The attribute collects the number of tweets or status' updates that the account associated to the stakeholder has in the social media platform Twitter
Values	0 if is not civil society stakeholder, integer with number of followers

Appendix 2 - Questionnaire

1. Questionnaire structure

This appendix contains the structure of the questionnaire that is sent to the acknowledged civil society stakeholders.

Section 1. Basic information

1. What is the name of the group? - Short answer

2. What is the description that most fits the group? - Exclusive choice

An independent group	Go to section 2A
A group or sector within an organization	Go to section 2B
A coordination or cooperation space for groups	Go to section 2C
Other	Go to section 2A

Section 2A. Activity of independent groups

1. What is the general objective of the group? - Short answer

2. Is the group active at the moment? - Exclusive choice

Yes	Go to section 3A
No	Go to section 3B

Section 3A. Activity of active independent groups

1. When did the group start with its activity? - Month and year

2. In which participation opportunities has the group been present?
   Checkboxes of identified opportunities + 'other' box

3. Is the group registered as an association? - Exclusive choice

   Yes
   No

4. Which type of members has the group? - Exclusive choice

   Only individuals
   Individuals and groups
   Only groups

5. Do the members hold a membership document? - Exclusive choice

   No
   Yes, although membership is free
   Yes, after they pay a membership fee

6. How would you describe the activities of the group? - Scale

1 - Only virtual activity / 5 - Only attendance activity

7. Does the group have sectoral or territorial groups? - Exclusive choice

Yes, sectoral groups
Yes, territorial groups
Yes, both sectoral and territorial groups
No

8. How does the group make their daily decisions? - Exclusive choice

There is no need for decision-making mechanisms
Through its virtual administrators and moderators
Horizontal assemblies without promotor or coordination group
Horizontal assemblies with promotor or coordination group
Responsables elected for one year or shorter term
Responsables elected for more than one year

Section 3B. Activity of inactive independent groups

Similar to 3A - changes in verb tenses

Section 2B. Activity of groups within organizations

1. Which is the organization you are part of? - Short answer
2. What is the general objective of the organization? - Short answer
3. What is the objective of the group within the organization? - Short answer
4. Is the group active at the moment? - Exclusive choice

Yes	Go to section 3C
No	Go to section 3D

Section 3C. Activity of active groups within organizations

Similar to 3A - changes in some questions to refer to the organization

Section 3D. Activity of inactive groups within organizations

Similar to 3C - changes in verb tenses

Section 2C. Activity of cooperation spaces

1. What is the general objective of the group? - Short answer
2. Is the group active at the moment? - Exclusive choice

Yes	Go to section 3E

No	Go to section 3F

Section 3E. Activity of active cooperation spaces

Similar to 3A

Section 3F. Activity of inactive cooperation spaces

Similar to 3F - changes in verb tenses

Section 4. Relation with other groups

1. How are the relations with these groups? - Exclusive choice for each group in the list

Regular collaboration
Sporadic collaboration
No collaboration opportunity

2. Does the group collaborate with other non-listed groups? Can you name them? - Short answer

3. Has the group participated in any cycling campaing? Can you name them? - Short answer

Section 5 (Madrid case). Cycling infrastructure debate

1. Has the group debated about cycling infrastructure in terms of integration vs segregation? Exclusive choice

Yes, departing from a shared view among the members	Go to section 13
Yes, departing from different views and reaching a shared view among the members	Go to section 13
Yes, without reaching a shared view among the members	End of the questionnaire
No	End of the questionnaire

Section 6 (Madrid case). Cycling infrastructure debate: positions

1. Which description fits more the shared view? - Exclusive choice

Sharrow model - full integration with traffic	End of the questionnaire
Sharrow with punctual cycling infrastructure provision (e.g. in slopes)	End of the questionnaire
Dual network: sharrows and cycle lanes	End of the questionnaire
Preferred segregation from traffic: extensive cycle lanes	End of the questionnaire
Other (textbox for specification)	End of the questionnaire

Section 5 (Stockholm case). Cycling infrastructure debate

1. Which aspect generates more debate? - Exclusive choice

The model of separation from pedestrian flows
The model of separation from motor vehicles flows

2. Are there other issues that generate debate? Which are these issues? - Short answer

3. Has the group debated about cycling infrastructure in terms of integration vs segregation?
Exclusive choice

Yes, departing from a shared view among the members	Go to section 13
Yes, departing from different views and reaching a shared view among the members	Go to section 13
Yes, without reaching a shared view among the members	End of the questionnaire
No	End of the questionnaire

Section 6 (Stockholm case). Cycling infrastructure debate: positions

1. Which description fits more the shared view? - Exclusive choice

Integration in the traffic as a general rule	End of the questionnaire
With painted lanes in the busiest streets is enough	End of the questionnaire
The busiest streets must always have segregated infrastructure	End of the questionnaire
The integration in the traffic must be always avoided	End of the questionnaire
Other (textbox for specification)	End of the questionnaire

Appendix 3 - Interviews

1. Interview grids

The interview grid is the tool for guiding a semi-structured interview. This appendix contains the grids used in the conducted interviews.

INTERVIEW GRID	**Interviews 1 and 2**
Case	Madrid
Type	Municipal authority or institution
Dates	9th November 10am 13th November 11am
TOPIC	**Questions**
Introduction	Outline of the project, agreement on recording and results usage
Cycling governance	• How is the relationship between the departments that have some influence over cycling policies?Would you organize cycling governance in a different way? o [if not commented] How is the position of your department in relation to cycling infrastructure? Is it shared by other departments?
	• How is the relation with PSOE [government supporting party] regarding cycling?
	• How is the relation with the opposition parties regarding cycling?
Participation opportunities	• Do you think that there are enough opportunities to participate in cycling planning?
	• Which elements would need to be improved in these opportunities? o [if not commented] Who is not currently involved and should be involved in these opportunities?
	• Do informal opportunities and relations have sometimes more relevance than formal opportunities?
Cycling advocacy	• Which are the groups that have worked more with your department?
	• Which is the role of the cycling advocacy groups in Madrid' cycling planning?
	• Do you think that these groups are representative of the current cyclists? • Do you think that these groups claim to speak for the sake of the potential cyclists?
Potential cyclists	• What should be done in order to attract potential cyclists to this mode?
	• Do you think that current plans are able to attract potential cyclists?
	• Do you think that there would be some way to make potential cyclists participate in cycling planning? o [if not commented] Do you think that cycling advocacy can represent potential cyclists?

INTERVIEW GRID	**Interview 3**
Case	Madrid
Type	Individual advocate
Dates	14th November 6pm
TOPIC	**Questions**
Introduction	Outline of the project, agreement on recording and results usage
Cycling advocacy	• Which is the role of the cycling advocacy groups in Madrid' cycling planning?
	• Do you think that there the relations between groups are based in collaboration?
	• Do you think that these groups are representative of the current cyclists?
Relations with institutions and parties	• Do you think that there are good relations between the cycling advocacy groups and the institutions?
	• How is the relation between the cycling advocacy groups and PSOE [government supporting party]?
	• How is the relation between the cycling advocacy groups and the opposition parties?
Participation opportunities	• Do you think that there are enough opportunities to participate in cycling planning?
	• Which elements would need to be improved in these opportunities? o [if not commented] Who is not currently involved and should be involved in these opportunities?
	• Do informal opportunities and relations have sometimes more relevance than formal opportunities?
Potential cyclists	• What should be done in order to attract potential cyclists to this mode?
	• Do you think that current plans are able to attract potential cyclists?
	• Do you think that cycling advocacy can represent potential cyclists?
	• Do you think that there would be some way to make potential cyclists participate in cycling planning?

INTERVIEW GRID	**Interview 4, 5**
Case	Stockholm
Type	Municipal-level and county-level officers
Dates	22th November 1pm (face-to-face) // 22th November (mail)
TOPIC	**Questions**
Introduction	Outline of the project, agreement on recording and results usage

Cycling governance	• Which are the departments that have some responsibilities in cycling planning in Stockholm? o [if not commented] Which are the sections of Trafikkontoret that have some responsibilities in cycling planning?
	• Do you feel that the perspectives that Trafikkontoret has are shared by the rest of the departments?
	• Which is the role of politicians (Vice-Mayor, trafikborgarråd) in the work of Trafikkontoret?
	• Would you organize cycling governance in a different way?
	• How is the relation with political parties regarding cycling? Do you think there is a general support for cycling across the municipal council?
Participation opportunities	• Do you think that there are enough opportunities to participate in cycling planning?
	• Which elements would need to be improved in these opportunities? o [if not commented] Who is not currently involved and should be involved in these opportunities?
	• Do informal opportunities and relations have sometimes more relevance than formal opportunities?
Cycling advocacy	• Which are the groups that have worked more with your department? o [if not commented] Have you received opinions and had meetings with bloggers and advocates that are not related to classic formal organizations?
	• Which is the role of the cycling advocacy groups in Stockholm' cycling planning?
	• Do you think that these groups are representative of the current cyclists?
	• Do you think that these groups claim to speak for the sake of the potential cyclists?
Potential cyclists	• What should be done in order to attract potential cyclists to this mode?
	• Do you think that current plans are able to attract potential cyclists? o [if not commented] Do you think that potential cyclists need higher level of segregation from traffic? o [if not commented] Have you experienced that some current cyclists prefer to cycle in mixed traffic?
	• Do you think that there would be some way to make potential cyclists participate in cycling planning? o [if not commented] Do you think that cycling advocacy can represent potential cyclists?