Internet-mediated recruitment networks of political movements
Empirical and theoretical approach

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Abstract

This paper presents the analysis of the recruitment network of Italy's Five Star Movement based on public data collected from Facebook and Meetup.com. A recruitment network with 8132 nodes is drawn among users comparing the date users joined Meetup and the date users established mutual Facebook friendships. This paper provides empirical evidence that the mobilisation of the Five Star Movement (M5S) between 2005 and 2008 followed similar geographic diffusion rates both in the North and in the South of Italy, two areas characterised by significant differences in social capital. Differences in social capital are found to be significant in explaining the structural differences in the recruitment and post-recruitment networks of members but not the territorial success of the diffusion. The paper proposes a theoretical network model to explain the role played by social capital in the diffusion process and by the Internet in bridging possible deficiencies in the endowments of social capital.

Keywords: Political behavior, Political participation, Meetup.com, Social media politics, Five Star Movement, Italian politics, Social network analysis, Social Capital

1. Justification and research questions

If the impact of information and communication technologies (ICTs) on political mobilisation and recruitment is certainly significant, the qualification and quantification of this impact are problematic. First, the potential channels of influence are multiple and their interactions are complex. Second, although behavioural data in the forms of digital traces are collected on an unprecedented scale, these data are dispersed across multiple platforms, difficult to cross analyse, and often inaccessible to researchers. Third, if social capital is broadly thought to be important (some would say *essential*) for political mobilisation, how social capital and the capital of Internet technologies interact one with the other? Are they substitute?

Studies conducted before the massification of the ICTs have estimated that about 80% of those joining a political movement had pre-existing connections with people already in the movement (Diani & Lodi, 1989). In theory, technologies should reduce the importance of

existing face-to-face networks and *social capital* for political mobilisation: Internet users can more easily activate connections to a political movement, even in the absence of any existing direct, personal connection. Already before the mass Internet age, Granovetter (1973) identified the theoretical potentiality of *weak ties* — that is, those social connections not shared with other members of our relatively more intimate social knots — in efficiently facilitating diffusion over a network. Exactly because we spend most of our time using *strong ties* to connect with friends, family and co-workers, only *weak ties* can usually play the role of *bridges*, connecting different social communities within a network. The Internet does facilitate the activation and maintenance of weak ties, with a 'networked individuals' now being empowered by the capacity to instantaneously gather information and build *ad-hoc* 'remote relationships' (Rainie & Wellman, 2012) out of the scope of their existing social networks, intimately searching and connecting with an obscure political movement in literally an instant.

And yet, the experimental work conducted by Centola and Macy (2007) points to the existence of at least two different types of social contagion: *simple contagion*, which is basically how information (or the flu) spread over a network, and *complex contagion*, which is instead how most of the social behaviours spread. In the case of a simple contagion, a single connection is sufficient for spreading the diffusion from node to node. For reasons explained by the Granovetter's theory on the 'strength of weak ties', the success of the diffusion process can be greatly enhanced by the presence of weak ties that play the function of bridges. With complex contagion the probability of any node to be affected by the diffusion process depends instead simultaneously on multiple ties: I join the movement only if *at least* two of my contacts already did (or maybe at least one-third of all of my contacts). Consequentially, in this case, the efficiency of the diffusion process is not increased by the presence of bridging weak ties, which are practically uninfluential, but instead by the presence of *wide bridges* of strong ties (Centola & Macy, 2007). One important consequence follows from this: the Internet has not a significant impact on diffusion insomuch that it does not alter the ratio between strong and weak sties — which indeed is likely to happen according to Centola (2018), with strong ties being penalised by Internet technology design and use in favour of weak ones.

Centola explicitly agrees with Putnam on this. For Putnam (2000), 'Face-to-face networks tend to be dense and bounded, whereas computer-mediated communication networks tend to be sparse and unbounded'. This means that if only strong ties foster social capital and if social capital is the 'quintessential resource of movement organizers' (Putnam, 2000), we must conclude that, *ceteris paribus*, the Internet does not facilitate effective (that is, *sustained*) political mobilisation but actually does make it more difficult if it incentivises a generalised disinvestment in strong ties. Yet this conclusion is not totally

satisfactory.

Yes, it is true that the Arab Spring did not produce any lasting social movement nor significant political change and, yes, it is convincing an argument that points to the lack of social capital (see for example Tufecki, 2017) to explain its eventual and absolute political failure. But still, this argument does not answer the question of how possibly in the total absence of social capital (a reality in most Arab countries), a large-scale mobilisation still clearly occurred.

The aim of this paper is to empirically investigate what happens in practice in the trajectory of emergence of a political movement, Italy's M5S, and to propose a theoretical network model that could replicate the structural characteristics of the recruitment network drawn from the data.

The Italian case is particularly interesting because of the significant difference in the distribution of social capital through-out the country, with the southerner and insular regions enjoying less social capital than the northerner part of the country (Putnam, 1993). Moreover, Italy's Five Star Movement used almost exclusively Internet platforms to promote and coordinate its mobilisation, thus limiting the effect of other recruiting channels (Tronconi, 2018).

2. Social capital and Internet capital

What is social capital? Generally speaking, social capital measures how easy it is to operate socially behind the most immediate network of family members and friends. Social capital is created by recurrent interactions — according to Lake and Huckfeldt (1998, p. 569) 'social capital is produced by the intentional activities of individuals who are connected to one another by ongoing networks of social relationships' — and makes possible the 'achievement of certain ends that in its absence would not be possible' (Coleman, 1988, S98). Using a network approach, social capital can be thought of as two-layered social networks: a *network of recurrent interactions*, which links actors with *existing* social relationships and a *network of trust*, which links those who recognised each other as part of the same social community. If the presence of existing relationships facilitates new social operations, trust facilitates the activation of new relationships.

Why is relevant for political mobilisation? It is easy to see how political mobilisation can be facilitated by both an extensive network of recurrently used social relationships and strong levels of social trust towards other members of societies. In order to spread, political mobilisation needs 'bridges' to reach behind the dense knots of family members, close friends and coworkers. Social capital does provide this service either in the form of existing long-range ties or by facilitating through a shared sense of social trust the creation of ties between actors with no direct working relationship. A number of studies over the years have empirically confirmed the relationship between political participation

and both social trust (Kaase, 1999) and existing social relationships (Lake & Huckfeldt, 1998; Nie, Powell & Prewitt, 1969), in line with the overall understanding of the social benefits derived from the presence of social capital (Putnam, 1993) and social trust (Fukuyama, 1996).

How does the Internet relate to social capital? As seen, according to Putnam (2000) and Centola (2018), the widespread increase in the frequency and intensity of use of Internet technologies to mediate social interactions can potentially have a depressing effect on social capital as people will tend to cultivate relatively more weak ties and relatively less strong ties. And yet, as both Putnam and Centola explicitly imply, Internet technologies can also facilitate the activation of social connections promoting the diffusion of political mobilisation when social capital is weak or absent. First, the Internet can facilitate access to political information; this can affect mobilisation both on a ideological ground when people are convinced through their exposure to the Internet and on a practical ground when people are given practical information for political action. In the presence of strong social capital, Internet technologies can either be influential or marginally improve access to political information, but in the case of no social capital, the Internet can make the difference between access and no access. Second, the Internet does provide tools that can offset low social trust. Passive observation of the public online activity of others and the public reactions to that activity can be safely carried out *before* deciding whether to engage or not.

3. Network and diffusion models

In order to better understand the role played by social capital and by the Internet in political mobilisation, I define here a network generating model and a diffusion model to then simulate how mobilisation might spread through a network of people potentially susceptible of joining in. Structurally, with the aim of replicating spatial social networks, the network is defined by a number of densely knit communities that are sparsely connected among themselves. This is obtained by first creating the communities as separated networks where the chance of any two nodes being connected is about 1 in 10 and then drawing edges between any two nodes belonging to two different geographically bounded communities with a probability of only 0.005%. One of the possible networks resulting from this generating model is illustrated in Figure 1 in which of the 684 edges composing the network, about 98% connect nodes belonging to the same social knot.

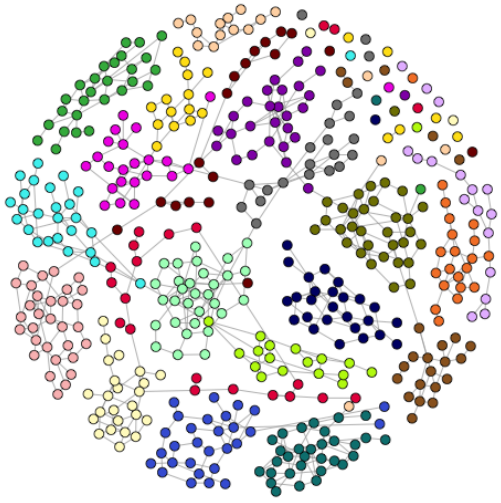

Figure 1: *A random network generated by the union of 20 communities (nodes = 490, edges = 684)*

Diffusion is determined probabilistically by the characteristics of nodes and edges. Specifically, for each node, the model defines a variable `political_distress` that indicates how strongly the individual feel about the political situation and, *ceteris paribus*, how likely the node is to activate. In the interaction with `political_distress`, other two node variables regulate activation: `internal_drive` and `relational_drive`. These two variables should be intended respectively as the likelihood of political activation just based on internal conviction (so no matter what others would do) and the likelihood of activation, given the behaviour of others directly linked to the subject. The presence of these two variables replicate (and simplify) what is observed to happen in actual mobilisations with political activation depending on individual thresholds and influence acting simultaneously on a global level, where everybody is exposed to the same level of influence, and on a local level, where the level of influence is determined by the behaviour of contacts.

If movements necessarily need *starters*, people with low threshold who will activate in the absence of any local influence, the success of the movement is determined by reaching a critical mass of *followers*, people with high threshold and relatively more receptive to peer-pressure (see Margetts, John & Hale, 2015). In a population, starters are generally rare, and should be considered as exceptional, while people with high threshold are the large majority. To simplify the analysis, the variable `internal_drive` can either take the value of 0 if the individual is not a potential starter and a value of 1 if the individual can potentially activate without any peer-influence from his or her direct connections. In the setting of the random network, each node has a 1 in 10 chance of being a starter.

The probability of any node to be activated as a consequence of its connection to the already-activated node is finally determined by the interaction between the `relational_drive` of the subject and the `weight` of the connection. The variable `weight` captures the differences in the importance of connections and can also be thought of as dependent on *social trust*: the higher the social trust, the higher the expected `weight` of any connection. Equation 1 details how the probability p of each node being activated during every turn is computed, where `neighborhood` is the weighted mean of the status of connected nodes, which takes the

value of 0 if not activated and the value of 1 otherwise, and where the weighting is determined by the value of `weight` on the corresponding connecting edge.

$$p = \frac{1}{2}(political\_distress \times internal\_drive) + \frac{1}{2}(political\_distress \times (relational\_drive^{\frac{1}{neighborhood}})) \quad (1)$$

Low social capital, high social capital In order to simulate the impact of social capital in the diffusion of political mobilisation, I create two versions of the same network with the aim of capturing the expected divergence in global social trust and the variations derived from different expectations concerning the likelihood that people with a higher than average interest in politically charged issues might have already met establishing personal connections ('organisational involvement' is an important indicator of social capital for Putnam, 2000). In practice, in the high social capital version of the network, edges will have a `weight` that is expected to be higher and not penalised when connecting two different communities. Also, starters (that is, people with a strong interest in politics) will be directly connected among themselves, thus increasing the overall number of edges of the network.

Figure 2 compares the final structure of the low social capital network (on the left) and the high social capital network (on the right). In the Figure, black nodes are the starters and the width of each edge reflects its `weight`.

Diffusion proceeds in turns. At each turn, as explained in Equation 1, the probability of activation of all the nodes that are not yet being activated is set based on the fixed characteristics of the node itself, `political_distress` and `internal_drive`, and on the interaction between the `weight` of the edges connecting to nodes activated in the previous turns and the node's `relational_drive`. That is, political activation can either happen because of social complex contagion or (more rarely) because of independent activation due to a node internal characteristics. Starters will play an important role especially in the first phases of the diffusion process; because of their low threshold they will activate very quickly and independently from the behaviour of their immediate neighbours. In the high social capital scenario, the starters are expected to activate even more quickly since they are all connected and their connections have a very high weight. But after the first phases, the success of the diffusion will depend only on high threshold nodes and on their inner characteristics and on the structure and *weight* of their connections.

The Internet If the variation in the social capital levels was modelled by varying the *structure* of the network, thus altering *weights* and *density* of edges, the introduction of Internet technologies is assumed to have an impact only at the individual level. The assumption is that a capital of Internet technologies makes the structural quality of the network (and social capital) *less* relevant for the diffusion of

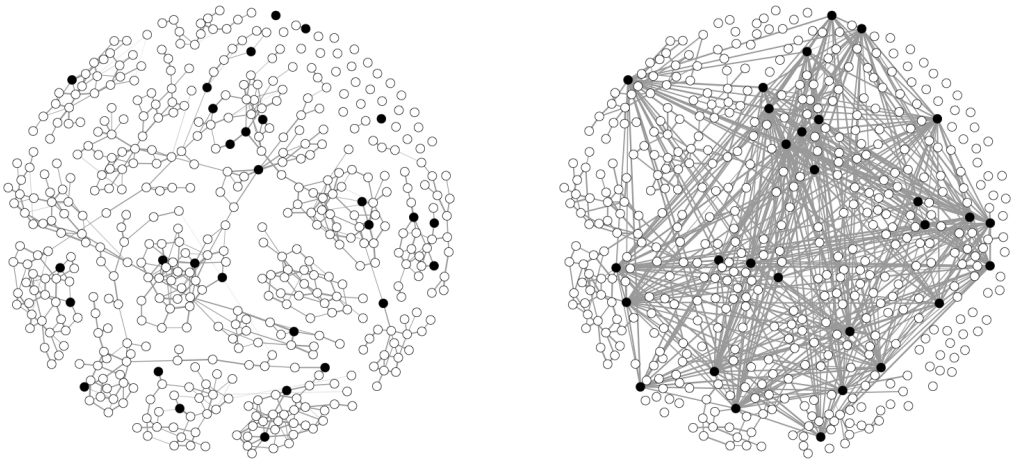

Figure 2: *The network structure in the low social capital scenario (left) and high social capital scenario (right).*

political mobilisation. In the network model, the effect of the Internet is captured by lowering the individual threshold for activation, that is, by increasing the expected value of `internal_drive` for every node. The justification for this is that the Internet can make activation easier and independent from existing personal connections in at least three ways. First, the Internet provides logistical information (the 'wheres' and 'whens'). Second, an Internet user is exposed to political information that will reinforce his or her existing believes, thus making activation more likely. Third, a hesitant individual who has no personal connection with others already involved in the mobilisation, thanks to the Internet, has the possibility to anonymously observe the development of the mobilisation and the reactions it triggers in the civic until he or she is confident enough to move forward.

The results in terms of percentage of activated nodes in the four scenarios (low social capital and no Internet capital, high social capital and no Internet capital, low social capital and Internet capital, high social capital and Interne capital) from 1000-turn simulations are illustrated in Figure 3. Diffusion for each scenario was run ten times and results averaged. In the no Internet scenarios, simulation results are consistent with the intuition that social capital does facilitate diffusion. Still, differences are not really apparent in the first stages of the diffusion: this suggests that starters do activate in a similar way in both scenarios and that the connections among starters added in the high social capital scenario do not have an impact on diffusion (although this might change when starters' activation is relatively less dependent on `inner_drive` and relatively more dependent on `relational_drive`). Social capital makes a difference in terms of diffusion after $t = 130$ when the difference is steadily between 5 and 7 per cent points. But in the Internet scenarios, social capital is much less relevant: if there is a difference of 4 percent-

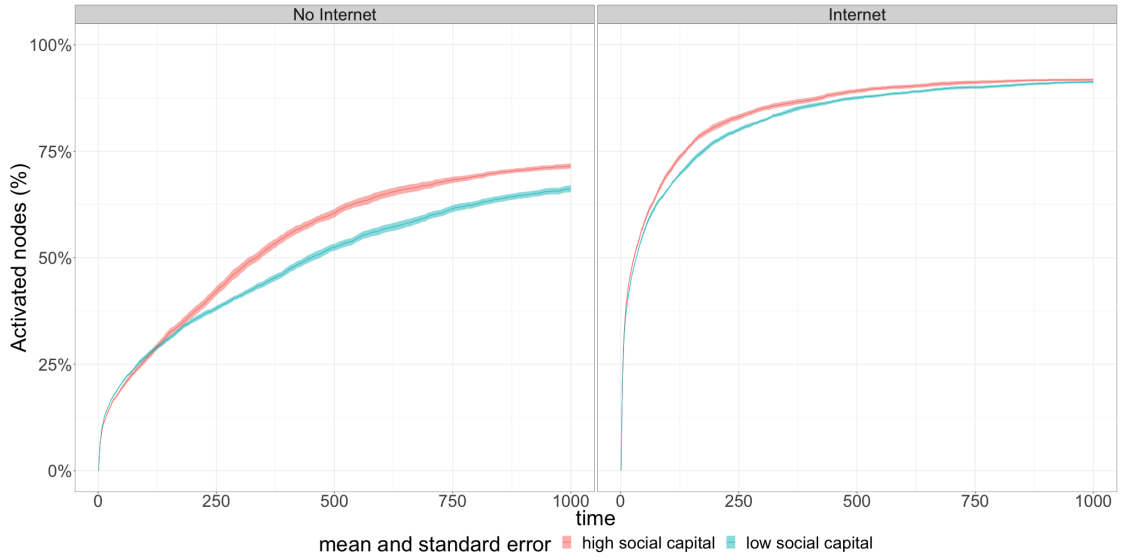

Figure 3: *Diffusion across the network in with low or high social capital and in the presence of absence of Internet technologies.*

age points around $t = 130$, the difference at $t = 500$ is of about 1.5 percentage point and of only 0.5 at $t = 1000$ which, given a standard error of the two estimates of 0.26 and 0.27 percentage point, is statistically insignificant.

In conclusion, based on the network model and the diffusion illustrated above, social capital is relevant in the diffusion process when diffusion depends on the structural characteristics of the social network: who is connected to whom and how important the connection is. Still, if the Internet makes individuals more autonomous from their social networks by lowering their threshold for actions, we can expect the Internet capital to bridge the structural gap determined by differences in social capital. In the next sections, I will introduce observational data and compare results from the data analysis to the results produced from the simulation based on the theoretical model illustrated here.

4. Data

In order to test the results produced from the network and diffusion models against real data, I construct an incomplete network of potentially recruiting ties connecting members of meetups of the Five Star Movement (M5S) and another network with the same set of nodes mapping instead, the friendship relationships created after joining the Movement. To do so I use public data from the API of Meetup.com and publicly available information published on the Facebook personal pages of members. First, I collected public details of all the members of meetups linked to the Movement. Details included the date the user joined Meetup, which is assumed to be the date on which the user activated politically in support of the M5S, the location of the user, the meetup groups the user was a member of and (if indicated) the

user's Facebook page. The Meetup data was collected in August 2014 and in March 2015 and includes details of 97,808 members of at least one of the 1,883 groups linked to the M5S world-wide. Among the 97,808 users, 15,000 indicated in their public profile a URL of a Facebook page, which was assumed to be their personal page; this information was used to obtain the complete list of friends from the Facebook 'Friends page' if the page was set as public by the Facebook user. In the event that a Facebook friendship was found to connect two Meetup users, the date of the establishment of their Facebook friendship was collected from the corresponding 'Friendship page'.[1] Additionally, the date of when Facebook was joined was also collected from each user Facebook public page. In conclusion, of the 97,808 Meetup users of the original dataset, 8132 Meetup users were included in a social network mapping their 132,835 Facebook friendships.

This resulting network is clearly incomplete. Nodes are missing either because the Meetup users did not indicate (or did not have) a Facebook page or because the corresponding Facebook user decided to set the 'Friends page' private. Still, by comparing the geographic distribution of users represented in the network and the geographic distribution of users in the original Meetup dataset a geographic bias is not apparent, suggesting that the network might be representative of the large member population (see Figure 5).

A *directed* recruitment network is subsequently inferred from the *undirected* social network of Meetup members. A *potential* recruitment tie is drawn from user A to user B if, first, A joined Meetup before B and, second, if the Facebook friendship between A and B was created at least 90 days before user B Meetup joining date. This is intended to provide some margin of confidence to the necessary assumption that the social relationship between the two users is not a direct consequence of political engagement with the M5S of the two users. The recruitment network is composed of the same 8132 Meetup users of the undirected social network but the number of ties is reduced to 49,890 to only include potentially recruiting ties, that is, slightly more than one-third of the ties found in the social network of Meetup user are also found in the recruitment network.

An *undirected* post-recruitment friendship network with the same 8132 Meetup users is instead inferred from the social network of Meetup members by removing all ties that were created *before* the two endpoint nodes joined in.

One possible problem that might affect the representativeness of the map of the social relations captured through Facebook is the diffusion of Facebook itself in the Italian population. According to the data, 97% of the users represented in the social network joined Facebook *before* they joined Meetup. This can be a consequence of the fact that

[1] At the time of the data collection, the Friendship page was returned by concatenating the two user names: `https://www.facebook.com/' + username1 + '?and=' + username2`.

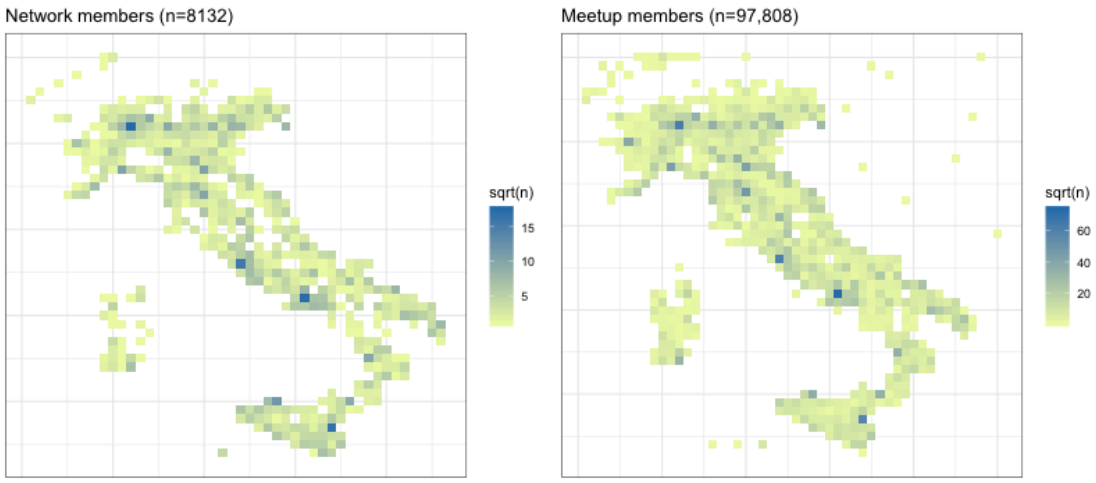

Figure 4: *The geographic distribution of Meetup users represented in the network (left) and the geographic distribution of all Meetup users (right).*

users tend not to change their profile information after creating it, so it is unlikely that a user who joined Facebook *after* creating a Meetup account would have updated his or her Meetup public profile with the new Facebook page. But can also be a consequence of the fact that the diffusion of Facebook preceded by at least a few years the diffusion of the M5S. This second option seems the most likely given that the average social network node joined Facebook almost 4 years before he or she joined Meetup. And if this is the case, it would seem also reasonable to assume that the lack of a Facebook URL indicated in a user Meetup public profile is a consequence of a deliberate decision of either not joining Facebook or of not linking the Meetup account with an existing Facebook account; a decision that in other words can be treated as random for the purposes of this study and not influenced by the time when the decision was made.

In this sense, to further assess the representativeness of the social network of users in terms of the broader population of Meetup members, I compare in Figure 5 the number of users from the two sets who joined Meetup each month between 2005 and 2015. Since the overall size of the two sets of users is significantly different, figures are reported as the per cent of users joining Meetup each month over the total number of users who joined in a 111 months period in the corresponding set. The two distributions are very similar: in about 90% of the months the difference is equal to or less than 1 percentage point and in more than 77% of the months is equal to or less than half percentage point. Also, larger differences always cooccur with notable political events such as the mass rally organised by the M5S in September of 2007, which significantly increased recruitment, and the series of successful elections between 2012 and 2013.

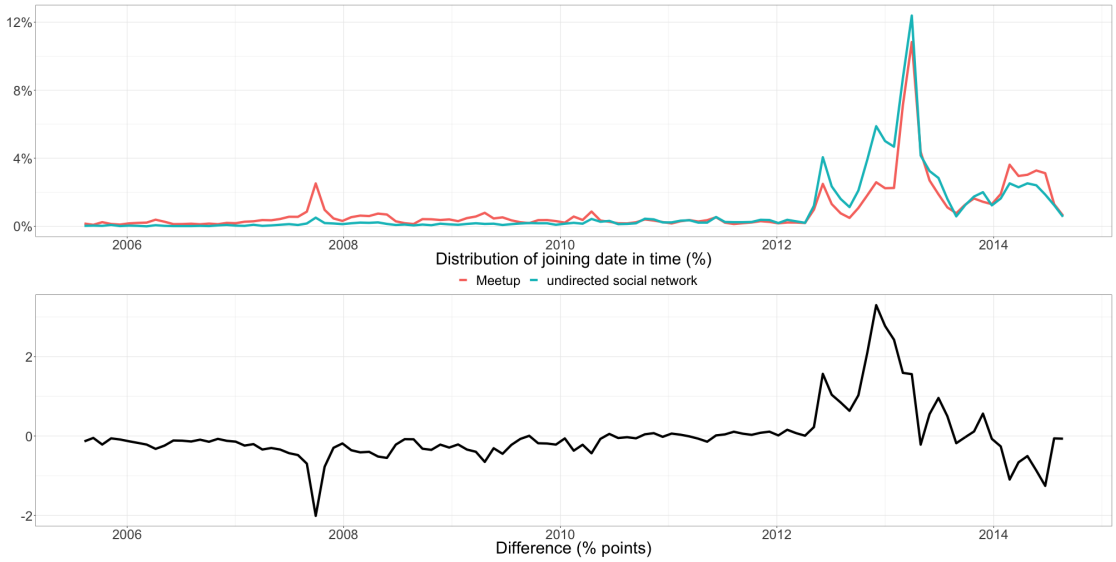

Figure 5: *The distribution in time of users by joining date.*

5. Data analysis

To understand whether the diffusion process was impaired by the lack of social capital, I compare the diffusion of Meetups across Italy. Notably, differences in the general level of social capital, already identified by Putnam (1993), are still persistent in Italy at the time of data collection. Based on a large survey conducted by the Istat (2013, $n = 20,275$) in 2013, I measure two dimensions of social capital in the 20 Italian regions by estimate their residents' likelihood of being connected to other individuals through any civic association (`sc_net`) and the general tendency of trusting people (`sc_trust`).[2] Figure 6 shows the average index for the two dimensions in the 20 Italian regions: the Southern regions in 2013 still have significantly less social capital[3].

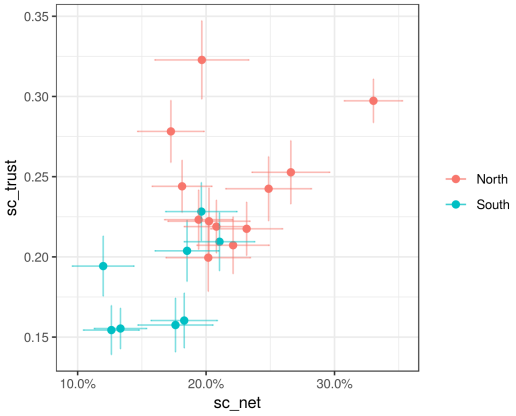

Figure 6: *Distribution of social capital in the 20 Italian regions: mean and 95% confidence interval (Istat, 2013, $n = 20,275$).*

[2]The binary index `sc_net` is set to 1 (instead of 0) if the respondent on a voluntary base (that is, unpaid) in the last 12 months either dedicated time to the benefit of non-family members, the community or the environment; participated to union meetings; participated in environmental associations; participated in cultural associations; participated in professional associations; or dedicated time to party or union work. The index `sc_trust`, on a 0-to-1 scale, capture the sentiment of trust towards strangers.

[3]The Northern Italian regions are: Piedmont, Aosta Valley, Lombardy, Trentino-Alto Adige/Südtirol, Veneto, Friuli-Venezia Giulia, Liguria, Emilia-Romagna, Tuscany, Umbria, Marche, Molise and Lazio, while the Southern regions are Abruzzo, Apulia, Campania, Basilicata, Calabria, Sicily and Sardina.

The close relationship between the grassroots organisation of the M5S and existing networks of social movements and environmental associations during the Movement development phase (2005-2013) is well documented by Mosca (2015). In theory, the lack of social capital in the South should result in a slower (relatively to the North) diffusion of political activations into a new political movement such as the Five Star Movement. As illustrated in Figure 6, participation in civic associations is significantly rarer in Southern regions. Regression analysis of the responses to the same 2013 survey confirms this: after controlling for standard demographics, an average male respondent is predicted to be linked to some civic association (that is, `sc_net` $= 1$) with a probability of 28.5% if a resident of a northern region and with a probability of 21.9% if a resident of a southern region, while for the average female respondent the probabilities are respectively 20.7% and 15.5% (Istat, 2013, see Table 1 in the Appendix for details, $n = 20,275$). In conclusion, given the importance of networks of social movements and voluntary associations for the overall development of the M5S and the relatively limited reach of these networks in the South, we should expect the diffusion of the Movement to proceed more rapidly in the high social capital North than in the low social capital South.

Is diffusion faster in the high social capital regions? Meetup data provides detailed information about the geographic diffusion of groups and members. In order to measure the level of geographic diffusion over time in Italy, I divide the national territory into 3397 squared cells of approximately 60 km² based on the GEOSTAT 2011 grid containing population data derived from the 2011 census (Istat, 2015). I consider a cell of the grid as activated if at least 1 person for every 2000 people living in the cell is a member of a Meetup group linked to the M5S. This is slightly higher than the average of 1 member every 1435 people observed at the end of the series in February 2015 (when the Meetup data was originally collected from the API) to avoid penalising cells with a significantly lower population density. Figure 8 shows the percentage of the population in the North and in the South living in an activated cell over time.

With the exclusion of the period between the launch of the V-Day, the first mass event of the movement, in June 2007 (Grillo, 2007) and the event itself, which took place later in September that year, the two time series overlap until the Sicilian regional election in October 2012, when geographic diffusion starts to grow faster in the South than in the North.

In conclusion, not only the difference in social capital is not associated with a more effective diffusion of political mobilisation across the population, but in fact even in the presence of a weaker social capital diffusion is stronger in the South *after* the Sicilian regional election, when for the first time the M5S is perceived as a significant political player after obtaining more than 18% of the votes.

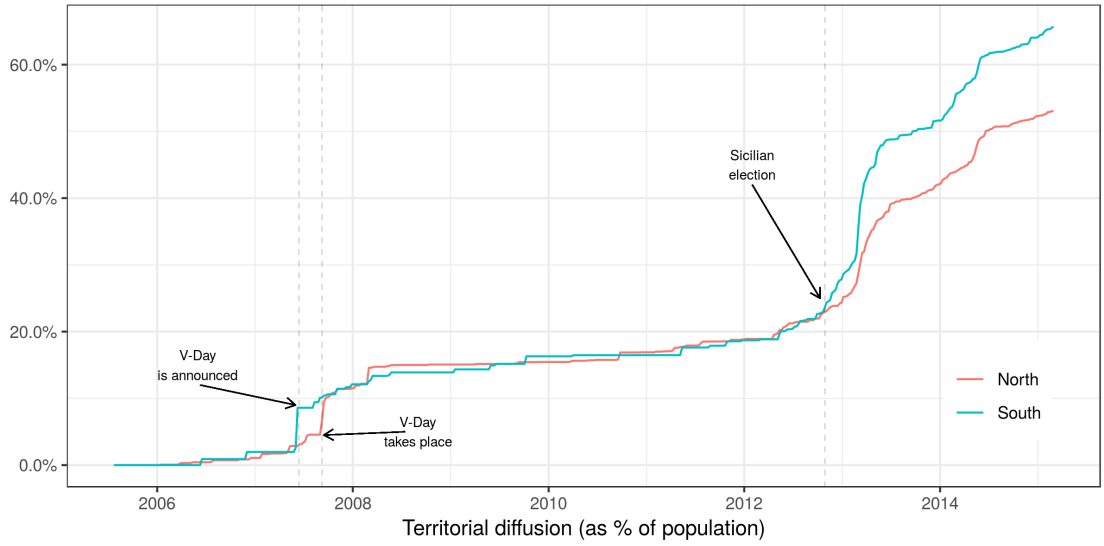

Figure 7: *Percentage of the population in the North and in the South reached by the diffusion of the M5S.*

It is possible that the specific social, cultural, political or economic conditions of the Southern population favoured the diffusion of the M5S and offset the gap in social capital. In the formulation of the network model presented in the previous section, this would translate in a higher political distress and in a lower threshold for activation. Still, activation as participant in a political movement necessitates some form of coordination, which if not allowed by existing social networks must necessarily rely on alternative communication and information networks.

Are there structural differences in the recruitment and post-recruitment social networks of low and high social capital regions? The social network connecting Meetup users based on data collected from Facebook and from Meetup allows mapping the dynamics of their friendship relationship, that is, *before* and *after* users joined Meetup. The theory of social capital suggests that higher social capital is associated with *denser social* recruitment networks as new recruits are likely to be strongly connected to older recruits by existing personal ties. The importance of existing social networks was observed in very different historical contexts; from the mobilisation in the Paris Commune in 1871 (Gould, 1993) to the environmental movements in Milan in the 1980s (Diani & Lodi, 1989). In the case of the recruitment network of the Five Star Movement (M5S), as captured by the digital records after the user behaviour on Facebook and Meetup, if social capital is significant in shaping the recruitment process via social connections, we should expect a *denser* recruitment network when social capital is higher and a *sparser* recruitment network when social capital is lower. Importantly, existing social ties should not be intended as a *necessary* condition but as *facilitators* in the context of a finite recruit-

able population. If social capital is strong and given that the number of possible social ties is obviously capped by the number of potential recruits, I can expect that observing an existing tie between a new and old recruit will be more likely. And also, if social capital is weak I should expect that, following their recruitment, new recruits will tend to activate *new social ties* with other recruits in a higher proportion than in the presence of strong social capital, when social ties should likely already exist.

Figure 8 traces the evolution in the North and in the South of recruiting ties and of post-recruitment friendship ties. If recruitment ties are social connections that predate the joining date, post-recruitment ties are created after the joining date. Density is a network statistics indicating the number of existing ties in relation to the maximum number of possible ties connecting all the nodes. In both time series, the networks are subset to remove all nodes (and corresponding ties) that joined Meetup after a given date; they should be intended as the networks of existing members at any given week between 2008 and 2015. The number of nodes in each network configuration is the same (and indicated in the lower panel). What varies is the definition of ties: in the top panel, the density is calculated on ties that potentially recruited a node while in middle panel, on ties that were activated after a node joined. Notably, the recruitment network in the South appears less dense until 2011, when it then traces the density of the Northern network for about a year to then turn denser in the months preceding the Sicilian election of 2012 (first vertical line). The post-recruitment network is instead consistently denser in the South until the period between the Sicilian election of 2012 and the general election of 2013, when the two statistics converge. From an individual perspective, in the two networks of nodes who joined before the Sicilian election when the two networks started converging, the average number of incoming recruitment ties for a node in the North is 0.8 while for a node in the South is 0.6, and the difference is statistically significant according to the Welch's t-test for populations with different variances (Welch, 1947). For each node, the average number of ties created after recruitment is 9.2 in the North and 9.7 in the South, but the difference is not statistically significant.

The analysis of the network density and the expected number of nodes in the two networks during the early phase of the mobilisation are compatible with a theory that describes the role of social capital as important for recruitment. In the South, where social capital is lower, network density and the expected number of recruitment ties for each node is lower indicating that new recruits tend to be more disconnected from the network of nodes that are already politically active. And consistently with this, in the South, we observe that after recruitment the density of connections is slightly higher than in the North. That is, where social capital is high, ties tend to preexist recruitment, while where social capital is lower recruitment creates rel-

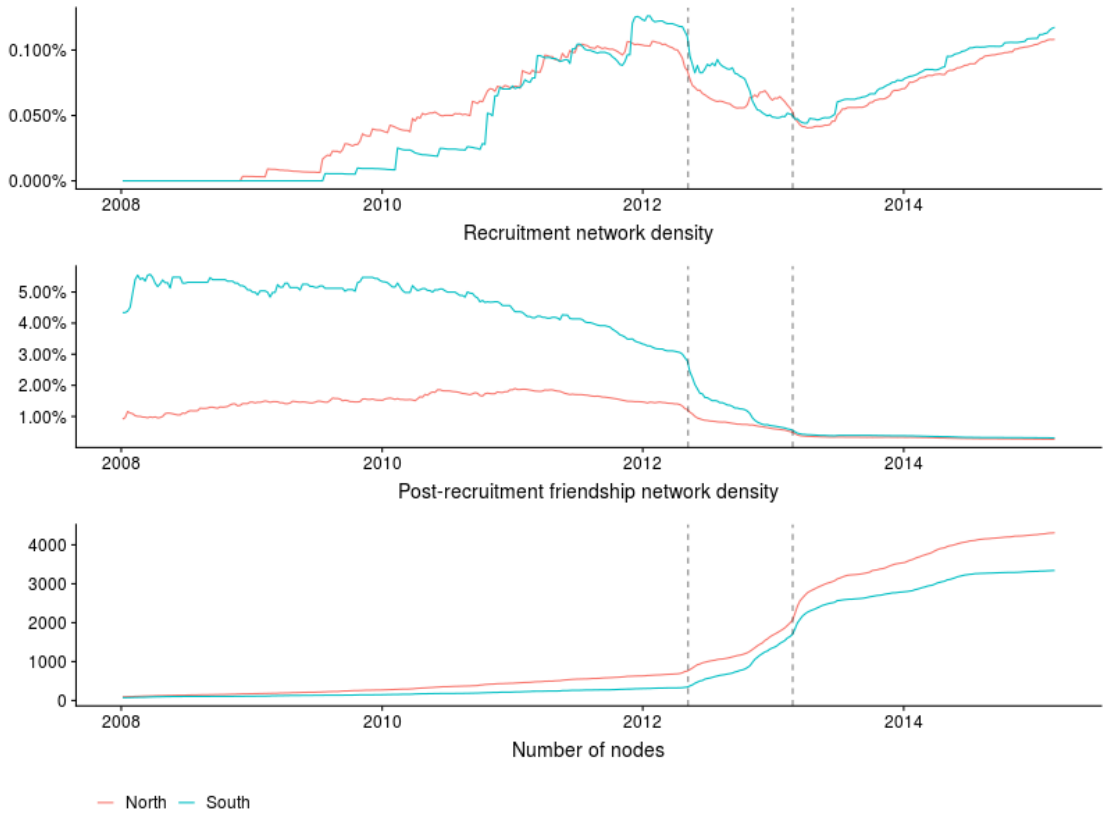

Figure 8: *Density of the recruitment and post-recruitment social networks in the North and in the South (with respectively 4311 and 3343 nodes).*

atively more new ties among participants.

The importance of social capital in explaining ties among Meetup members is confirmed by running an Exponential Random Graph Model (see Robins, Pattison, Kalish & Lusher, 2007) to estimate the significance of both `sc_net` and `sc_trust` in the network generation process, which are assigned to each node based on the region of residency (for the coefficients, see Table 2 in the Appendix). As expected, after controlling for the number of nodes already active within a radius of 20 km at the time of activation and by adding a variable indicating if the node is in the North or in the South, the social capital in the region of the recruited node is *positively* associated with the presence of recruitment ties. That is, where social capital is high the newly mobilised are more likely to have pre-existing ties with others already active in the Movement. Also, social capital is *negatively* associated with the creation of friendship ties *after* the activation of a new node, as we would expect if somebody joins a movement of mostly unfamiliar people.

6. Conclusions

There is little doubt that Internet-based information and communication technologies (ICTs) are important resources for political movements. ICTs are effective to communicate the political message and to organise the mobilisation. What is less clear is whether the Internet can significantly reduce the importance of the preexisting social network (shaped by the social capital), arguably the essential vector of diffusion.

In the theoretical model proposed in this paper, I show that the Internet can reduce the structural constraints to diffusion determined by the shape of existing social networks if the propensity of nodes to activate independently from their social connections is significantly increased. From a social network perspective, this is realistic: the Internet does significantly empower the individual by providing access to resources to observe and engage beyond the scope of existing personal networks, a hard limit for the offline individual. Yet, does the Internet really allow operating politically in the absence or with weak social capital?

The empirical analysis of this paper shows that this might the case. The Internet can indeed be the answer to solve the equation of similar diffusion patterns of new political movements in the presence of different social capital endowments. Still, more research is needed to understand whether the Internet really makes social capital redundant or whether it simply plays a substitutive role in the early phases of a mobilisation, as the failure of the Arab Spring uprising in generating lasting political consequences seems to demonstrate.

To complicate the analysis is the possibility that far from being independent, the level of social capital and the use of Internet technologies might be instead strongly associated with the Internet, directly causing a reduction in social capital. Also, and probably more intriguingly, the social effect of the diffusion of the Internet and the incorporation of its

use in our daily lives might require an update of the very idea of social capital. Norms and practices of our social behaviour change and adapt, with the membership to formal associations being replaced by the membership to public pages hosted on social networking websites. Consequently, it is possible that our measures of social capital might fail to capture it in its entirety.

Ultimately, to understand the role played by the Internet in the diffusion of political mobilisations means to better understand the future of politics itself, in the West but also in countries such as China, where a strict government control of the networks created by the social capital has so far effectively prevented the diffusion of protest movements. Because if the Internet makes the diffusion of mobilisation independent of existing social networked infrastructures, it also makes controlling it — by arresting nodes and severing ties — much less effective.

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7. Appendix

7.1. Additional figures

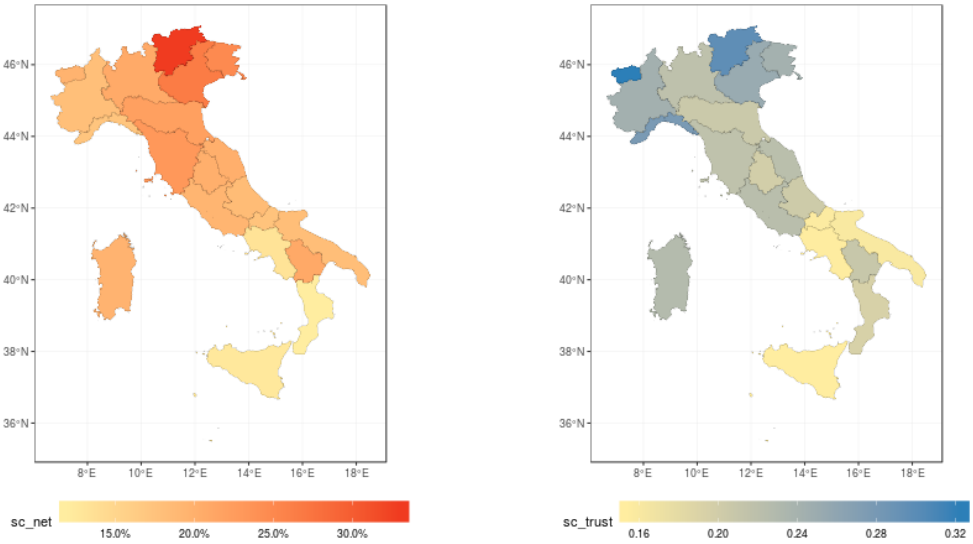

Figure 9: *Average social capital in the 20 Italian regions (Istat, 2013)*

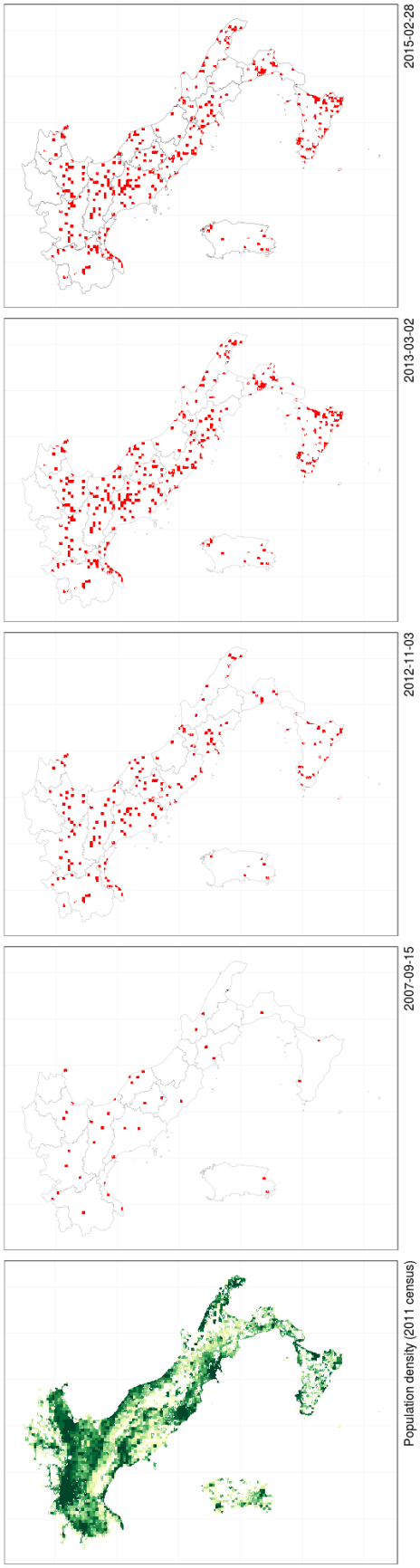

Figure 10: *Activation of the M5S mobilisation over time in the 3396 cells of the grid.*

7.2. Additional tables

	sc_net
age	0.121
male	0.421***
married	0.114**
edu	0.604***
unemployed	−0.241**
tv_hours	−0.089***
income:selfemp	0.106
income:pens	−0.259***
income:soc	−0.173
income:rev	−0.839**
income:fam	−0.224***
north	0.353***
Constant	−2.803***
N	12103
Log Likelihood	−6253.930
AIC	12533.860

***p < .01; **p < .05; *p < .1

Table 1: *Logit regression on 2013 survey results (Istat, 2013)*

	Recruitment network	Post-recruitment network
edges	-8.17^{***}	-4.49^{***}
	(0.06)	(0.08)
nodeicov.pre_active_buff_20km	0.00^{***}	
	(0.00)	
nodeifactor.north_south.South	0.17^{***}	
	(0.02)	
nodeifactor.gender.male	-0.05^{***}	
	(0.02)	
nodeofactor.gender.male	-0.05^{***}	
	(0.02)	
nodematch.gender	-0.18^{***}	-0.22^{***}
	(0.02)	(0.01)
nodeicov.sc_net	0.80^{***}	
	(0.18)	
nodeicov.sc_trust	3.23^{***}	
	(0.24)	
nodecov.pre_active_buff_20km		-0.00^{***}
		(0.00)
nodefactor.north_south.South		-0.20^{***}
		(0.01)
nodefactor.gender.male		-0.05^{***}
		(0.01)
nodecov.sc_net		-0.23^{*}
		(0.11)
nodecov.sc_trust		-3.06^{***}
		(0.15)
AIC	724609.03	834880.07
BIC	724736.12	834986.42
Log Likelihood	-362296.52	-417433.03

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 2: *Exponential random graph coefficients on the recruitment and post-recruitment social networks.* `pre_active_buff_20km` *is the number of already activate nodes in a radius of 20km at the time of joining Meetup.*