Italian Political Science, VOLUME XX ISSUE XX

What Factors Explain Institutionalization? A Qualitative Comparative Analysis of Participatory Budgeting in Italian Big Cities

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Abstract

Since its first implementation in Porto Alegre, Brazil, in 1989, Participatory Budgeting (PB) has probably become the most widespread participatory policy in the world. Though it sometimes succeeds in becoming an ordinary government tool, it usually fails to do so. Given that it has been around since 1989, there is today enough empirical and theoretical knowledge to try to build explanatory models for the (non)institutionalization of PB. This work relies on Qualitative Comparative Analysis (QCA) to detect the combinations of explanatory conditions leading to the presence or absence of the outcome 'PB institutionalized as of 2023' in a set of fourteen big Italian cities. The paper first proposes a new operationalization of 'institutionalization', used to find out in which big Italian cities PB is institutionalized. Then, based on previous literature and a specific knowledge of the Italian case, this work proposes five conditions which may have explanatory power with regard to the presence or absence of the outcome. These conditions are measured and calibrated. Necessary and/or sufficient (combinations of) conditions for the presence and absence of the outcome are then analysed. Next, these results are used to hypothesize possible mechanisms behind the institutionalization of PB in the cities involved. Finally, the potential and limitations of this study are discussed in the last section.

1. Introduction

In the fields of participatory democracy and social movements, the word 'institutionalization' is used with a number of possible meanings. Some (Filatova et al., 2019) distinguish between institutionalized spaces for discussion and non-institutionalized ones. In this sense, 'institutionalized' refers to something which may or may not be controlled by governments. On other occasions, 'institutionalization' refers to a shift which may occur in the life of social movements, when they move from confrontational attitudes to 'more conventional forms of action and negotiation with authorities' (Jimenez, 1999: 151). The process of institutionalization makes social movements prone to the problem of co-optation, the risk 'of being absorbed by powerful elites without gaining new advantages' (Holdo, 2019: 444). Finally, 'institutionalization' also refers to those circumstances where legal status is given to participatory spaces/policies (Casillo & Capone, 2022).

However, there is another definition of 'institutionalization' which has recently been particularly used by scholars: a participatory/deliberative policy is considered 'institutionalized' when it is turned into an 'ordinary government tool' (Allulli, 2011: 444). Indeed, a well-known problem with participatory/deliberative policies is that they only

Early View: Volume XX, Issue XX, 1–36.
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rarely manage to become part of local governments' regular political cycles (Dryzek, 2017; Chwalisz, 2019). This rarity probably explains why, in recent times, some scholars have focused on the reasons explaining the institutionalization of democratic innovations, particularly focusing on Participatory Budgeting (Ryan & Smith, 2012; Spada, 2014; Pradeau, 2021; Ryan, 2021).

This paper connects with the specified research field. It aims to answer the following research question: what factors can explain the institutionalization status of PB in Italian big cities as of 2023? This focus on big cities is based on theoretical reasons. Indeed, according to some, big cities are a more challenging context for the institutionalization of participatory policies (Wirth, 1938; Carr & Tavarres, 2014). Consequently, researchers may legitimately wonder: why, in spite of this, are there still cities that institutionalize such policies?

To answer this question, the paper will use Qualitative Comparative Analysis (QCA) as its main research method (Ragin, 1987). The main reason for choosing QCA lies in its focus on conjunctural causation and equifinality (Grofman & Schneider, 2009). Conjunctural causation, in particular, can enhance our understanding of the institutionalization phenomenon because it stresses how, in social and political phenomena, more often than not, more factors have to work together to produce different outcomes. Equifinality can also be relevant because it underlines that the same outcome may be produced by different combinations of conditions working together. Based on the nature of the research question, and on the expected roles of conjunctural causation and equifinality, QCA was believed to be the best method for this project.

The paper will proceed as follows. Section 2 will review the literature concerning PB definitions and the possible factors behind PB's institutionalization. Section 3 will explain what to observe to state that PB is institutionalized, and describe the results concerning the 14 cities this study investigates. Section 4 will deal with the measurement and calibration (their meanings will be explained) of the selected explanatory conditions. Section 5 will show the results of the analysis of necessity, and Section 6 those of the analysis of sufficiency (once again, the meaning of these analyses in the context of a QCA will be explained). Section 7 will assess the robustness of the model and propose, compatibly with available space, some more in-depth case studies. Section 8 will comment on the paper's results, particularly exploring whether they confirm or challenge previous research on the same topic. Finally, Section 9 will comment on the paper's possible strengths and limitations.

2. Participatory Budgeting: a review of definitions and possible factors behind its institutionalization

Implemented for the first time in Porto Alegre (Brazil) in 1989 (Calisto Friant, 2019), Participatory Budgeting (PB) has probably become the most frequently implemented participatory policy in the world. In 2012, Sintomer et al. (2012) estimated that, in 2010, there were between 795 and 1470 implementations worldwide. However, scholars struggle to agree on a single definition of 'Participatory Budgeting'. Bartocci et al. (2023) count at least five different definitions, proposed by several authors or institutions (de Sousa Santos, 1998; Ebdon, 2002; Wampler, 2007; Sintomer et al., 2008; UN-Habitat, 2008). Some of these definitions (for instance the one suggested by Sintomer et al., 2008) are

more methodological: a policy can properly be called 'Participatory Budgeting' only if it respects a list of specified criteria. Others are more goal-oriented and 'nominalist': Wampler (2007: 21), calls PB any 'decision-making process through which citizens deliberate and negotiate over the distribution of public resources'. Given the outlined research question, it was decided to opt for a 'nominalist' approach. Therefore, for the sake of this article, 'Participatory Budgeting' is any policy called this way, or whose goal is to let citizens participate in the public decision-making process concerning the budget.

Research concerning PB has explored several lines. Some (Cabannes, 2004; Gilman & Wampler, 2019) have investigated how PB design has evolved since Porto Alegre's 1989 first implementation. Connectedly, other scholars stress how PB has nowadays shifted from its original radical-democratic spirit, becoming 'a policy instrument among others and [...] gradually losing both political and social salience' (Montambeault, 2019: 36).

A second, relevant research line looked into PB's results and impacts. These results are predictably mixed. Campbell, for instance, found a positive correlation between PB implementation and the presence of 'changes in how people acted in political arenas' (Campbell et al., 2018: 7). Others noticed instead that, in the studied contexts, PB implementation did not significantly impact 'what category of spending is funded in the average district each year'(Calabrese et al., 2020: 1403).

Finally, as underlined in the Introduction, a new strand concerning the institutionalization of PB has emerged (Ryan & Smith, 2012; Spada, 2014; Pradeau, 2021; Ryan, 2021). These research examples, and others in addition, suggest many possible conditions which may have an impact on the institutionalization of PB. These conditions can be divided into three categories: legal-political, economic/infrastructural and socio-demographic.

As far as the first is concerned, both Ryan and Smith (2012) and Ryan (2021) consider participatory leadership and bureaucratic support to be two conditions with potential explanatory power over the outcome. Pradeau (2021) believes explicit commitment to PB and strong leftist ideology may also have explanatory power. Spada (2014) hypothesizes a positive correlation between certain parties winning elections and patterns of PB's adoption/survival. Finally, Allegretti (Allegretti et al., 2021) explores, with regard to Italy, the role of regional laws which encourage or force local governments to experiment/institutionalize participatory policies or PB specifically.

With regard to the second category, once again Ryan and Smith (2012) and Ryan (2021) think that local governments' fiscal independence/financial freedom can explain PB's (non) institutionalization. Pradeau (2021) more specifically refers to financial capacity, whereas Spada (2014) more broadly refers to cities' 'wealth' and 'availability of resources'. Furthermore, Arhip-Paterson (2024) highlights an increase in the number of implemented PBs featuring at least one stage of online participation, or also 'only' online participation. Local governments increasingly prefer to implement/institutionalize PBs that feature at least one online participatory moment because online activity is expected to make the spreading of information easier, increase the number of participating citizens and reduce costs (Touchton et al., 2019). Consequently, a hypothesis arises that

where digital infrastructures are better, it is more likely that PB featuring digital components, which represent the major trend, will be found to be institutionalized.

Finally, as far as the last category is concerned, Ryan and Smith (2012), Ryan (2021) and Pradeau (2021) all believe the presence of a strong civil society might have a positive impact on PB's institutionalization. Salvador and Ramió (2011) suggest that the presence of epistemic communities active in the field of citizens' participation might foster the institutionalization of participatory policies.

Based on these works, five explanatory conditions were chosen. Before describing them, however, it must be underlined that different strands of current research concerning PB institutionalization do not see eye to eye on the phenomena which must be observed to state that PB is institutionalized. This will be dealt with in the next section.

3. Participatory Budgeting: what to observe to state that it is institutionalized

Pertinent literature (Ryan & Smith, 2012; Lewanski, 2013; Chwalisz, 2019) suggests looking at two aspects to evaluate whether PB is institutionalized: the presence of regulation and implementation. For the sake of this research, regulation is considered present if, across all the documents cited in the first column of Table 1, representing the legal acts at the local level where mentions of PB are more likely to be found, these mentions, with regards to participatory steps at least, and possibly even to implementation frequency, are actually detected. These references can also be relatively sketchy, given that in the Italian context the details of any PB implementation based on legal acts can be specified by following acts which are not regulatory in nature. Implementation, instead, means two slightly different things, based on the presence or absence of such regulation. Regulation being present, implementation is considered present if the frequency and the participatory steps set out in the regulation are actually met. Regulation being absent, implementation is considered present if PB is implemented at least once every three years. This frequency is considered a reasonable minimum threshold, based on how long a PB cycle can be (Wampler, 2000). If Regulation was present but it did not specify an implementation frequency, implementation was considered present when the participatory steps set out in the regulation and the three years threshold (at least one implementation every three years) were met.

In this paper, however, I suggest adding a third element. I call it 'planification', which refers to the idea that there must be evidence that local government wants to go on with the implementation of the tool, at least in the short run. If this element is absent, when the other two are contemporarily observed, the risk arises of looking at processes which are actually at the end of their cycle. The distinction between implementation and 'planification' lies in the fact that the former has to do with the government actually carrying out the process, abiding by the regulations if any are present; the latter is instead related to the government officially stating, in its programmatic documents cited in the following table, that it wants to go ahead with the implementation in the future, at least in the short run. Substantially, implementation pertains to carrying out PB *now*; planification pertains instead to the *intention* of implementing PB *in the future*.

The following table shows the sources used to carry out the research concerning the three mentioned factors. All documents were available on local governments' official websites,

and were valid as of 31 December 2023. For regulation and implementation in Sicilian cities, one more source was used, that is the official website of the project "*Spendiamoli Insieme*" ("Let's spend it together" in English), a project which monitors whether and how Sicilian local governments respect regional legislation, which substantially wants them to regulate forms of PB and implement them annually.

Table 1. Data sources used to evaluate presence and absence of factors which make up the operationalization of PB's institutionalization

Regulation	Implementation	Planification
City statutes; PB's regulations; comprehensive regulations about participatory procedures; regulation of accounting; regulation about consulte; regulation of the city council; regulation of administrative proceedings; regulations about horizontal subsidiarity and forms of participation of citizens in the management of common goods; regulations concerning decentralization and decentralization bodies; any other regulation whose title makes it reasonable to think that it might contain references to PB. Side note: this is the list of all possible sources to check for references to PB. Not all local governments have all these acts in force.	Local governments' official websites; local newspaper's website.	Current mayor's government agenda; unique planning document 2023-2025; Integrated activities and organization plan 2023-2025. For Palermo, Catania and Messina, given the regional legislation, PB is always considered to be on the agenda.

Source: own elaboration.

Overall, these three elements can combine in eight different ways. For the sake of analysis, it must be understood which outcome to attach to each of these (and consequently to cases belonging in a given combination).

In doing so, it is believed that it does not make theoretical sense to put too much emphasis on combinations where regulation is present. Indeed, regulation in itself means little if it is not followed by correct implementation. On the other hand, implementation in itself on a regular basis may more satisfactorily suffice to state that a policy has become an ordinary government tool. Thus, prominence will be given to those configurations (combinations of presence and absence of factors) where implementation and planification can contemporarily be seen. This does not make the research on regulation useless. Research on regulation, first of all, indeed gives relevant information concerning the formal commitment of local governments to PB. Secondly, it is also necessary to really understand what is going on. Without this research, scholars would not be able to realize whether they are observing PB implementation because there is a regulation in place

which dictates so. In addition, they would not be able to explore phenomena such as public administrations implementing PB and somehow violating procedural or frequency rules set by regulations.

The following table shows the final outcome attached to each configuration, and the cities which fall into each. Cities were included in the study if, as of 1st January 2023, their population exceeded 200,000 inhabitants, which is considered by several reliable institutions in Italy a good threshold to distinguish big cities from not-big ones. However, there is not full consensus on this threshold. Then, the choice was not totally unambiguous, and might have an impact on QCA's final results. Consequently, it was the object of robustness tests, as explained later.

Table 2. Outcome for the cities included in the study

Regulation	Implementation	Planification	Institutionalization	Cities
1	1	1	Present	Palermo, Bologna, Bari, Messina
1	1	0	Absent	/
1	0	0	Absent	/
1	0	1	Absent	Rome, Milan
0	1	0	Absent	/
0	1	1	Present	Catania, Padua
0	0	1	Absent	Florence
0	0	0	Absent	Naples, Turin, Genoa, Verona, Venice

Source: own elaboration.

Some words must be spent with regard to Palermo. When the research was conducted, Palermo had approved its regulation just few months before, and was on its way to implementing its first PB based on the regulation. Consequently, Palermo's experience was younger compared to the other positive cases, probably even too young to be considered with no risk a positive case of institutionalization. Still, it was decided to frame it as a positive case, with the warning that it should be considered prudently.

4. Measurement and Calibration of Explanatory Conditions

Based on the review discussed in Section 2, five explanatory conditions were chosen for this research. These are 'Present Favourable Political Context', 'Present Stronger-than-

Average Civil Society', 'Present Will to Institutionalize Participatory Budgeting', 'Present Favourable Regional Context' and 'Very High Relative Digital Maturity'.

This number of factors, and these conditions, were chosen not only because of their theoretical relevance but also to try to minimize the problem of limited diversity, which is the circumstance that, in social and political science, not every possible configuration of explanatory factors is usually detected. In QCA, the problem of limited diversity emerges in the shape of unobserved configurations in the truth table. The truth table is the basis for the analyses of necessity and sufficiency, and lists all possible configurations and, for those observed, cases which fall into them and attached outcome. Some solutions to fight the problem of limited diversity have been proposed. One consists of a combination of a good number of conditions/number of cases ratio (Marx & Dusa, 2011) and deciding to include in the model certain conditions instead of others (Thomann et al., 2022). This strategy was followed. Five conditions for fourteen cases looks like a reasonable ratio, and the last listed condition was inserted into the model instead of another candidate, related to local governments' economic conditions, because the former helped reduce limited diversity more than the latter.

The first listed condition is taken into consideration because, although in the past scholars were rather reluctant to admit the existence of a relation between ideology and preferences for specific processes (Hibbing & Theiss-Morse, 2002), today it is usually acknowledged that participatory policies are 'developed quite more enthusiastically by left governments' (Fernández-Martínez & Font Fábregas, 2018: 464). Consequently, the hypothesis is that where leftist coalitions are in power as of 2023, and have been in power for at least two consecutive mandates, there are more solid reasons to expect PB to be institutionalized.

The second condition is taken into consideration because, as hypothesized by the previously mentioned research, the presence of a strong civil society might be a proxy for two phenomena which raise the possibility of finding PB institutionalized. On the one hand, a strong civil society may act as a pressure group on local government for the implementation of participatory policies. On the other hand, local governments, conscious of the presence on their territory of a strong civil society, might believe this could lead participatory policies to good results (quantitatively and/or qualitatively), thus being more prone to implementing and/or institutionalizing these tools.

The third one is taken into account based on the following rationale. In Italy, just-elected mayors have to discuss their agenda before the just-elected City Council, clarifying the actions they aim to implement during their mandate. These agendas are mandatorily published on local governments' websites. The working hypothesis is that PB is more likely to be institutionalized in those contexts where at least one administration has posed PB's institutionalization as one of its official goals, that is, where the topic has officially emerged.

The fourth condition ('Present Favourable Regional Context') comes from the specificity of the Italian context. Indeed, some regions (Tuscany, Apulia, Emilia Romagna and Sicily) have passed regional legislation which encourages (the first three) or even forces (the latter) local governments to implement participatory policies (Brunazzo, 2017). Sicilian law, in particular, forces local governments to regulate and implement forms of PB. Naturally, the hypothesis is that where there are regional laws which

encourage or force local governments to experiment or institutionalize participatory policies or PB in particular, the chances of finding institutionalized PB significantly increase.

Finally, the last condition (Very High Relative Digital Maturity') is derived from the afore-mentioned studies by Arhip-Paterson (2024) and Touchton et al. (2019). The working hypothesis is that in those cities where digital maturity is higher, it is more likely that PBs featuring digital components, which represent the major trend, are found to be institutionalized.

Before QCA enters its major stage, with analyses of necessity and sufficiency and case studies being carried out, explanatory conditions must be measured and calibrated. In QCA, to measure a condition means to observe the empirical phenomenon which stands for the condition 'in the real world' (Oana et al., 2021: 11). Calibration comes straight after measurement, and means turning measured data into levels of belongings in sets, so that it becomes clear whether a case belongs or not in the set of the cases displaying the condition.

The following table shows, for each condition, the chosen way to measure and calibrate it.

Table 3. Measurement and calibration of explanatory conditions

Conditions	Measurement	Calibration
Present favourable political context (PFPC)	Leftist parties governing the city as of 2023, and at least on their second consecutive mandate.	Condition present = 1 Condition absent = 0
Present will to institutionalize PB (PWIPB)	Presence of references to the idea of institutionalizing PB in at least one of the last four elected mayors' political agendas	Condition present = 1 Condition absent = 0
Present stronger-than-average civil society (PSACS)	Value of the ratio city's population/number of NGOs in the city lower than the value of the same ratio for the whole country	Condition present = 1 Condition absent = 0
Present favourable regional context (PFRC)	Presence of regional laws which encourage or force local governments to implement participatory practices/PB	Condition present = 1 Condition absent = 0
Very high relative digital maturity (VHRDM)	Digital Maturity Index 2023 by FPA	For cities for which digital maturity is considered very high = Condition present = 1 For others = Conditions absent = 0

Source: own elaboration.

More in detail, a case is considered fully present in the set of the cases showing PFPC when, as of 2023, the city has been governed by (centre) leftist parties for at least two consecutive mandates.

A case is considered fully present in the set of the cases showing PFRC when the city is located in a region where legislation either encouraging or forcing local governments to experiment/institutionalize participatory policies or PB is in force as of 2023. The presence of these laws was checked by combining knowledge of previous studies with a search on the regions' websites, where regional laws are published.

A case is considered fully present in the set of the cases showing PWIBP when at least one of the last four political agendas issued by newly elected mayors mentions the will to institutionalize PB. Four was chosen as the amount because beyond that number of legislations it was not possible to find data for all the cities. Given that different cities elect mayors at different times, the timeframe for analysis was 2008-2021 for Rome, 2006-2021 for Milan, Naples and Turin, 2007-2022 for Palermo, Genoa and Verona, 2009-2021 for Bologna, 2004-2019 for Florence and Bari, 2008-2023 for Catania, 2005-2020 for Venice, 2008-2022 for Messina and 2009-2022 for Padua. Mayors' agendas were downloaded from local governments' official websites. When not available there, local governments were contacted and asked to send the material. As far as Palermo is concerned, the manifesto of Diego Cammarata (mayor from 2007 to 2012) was no longer available, so his agenda was reconstructed by listening to the speeches he gave during the electoral campaign available on the online database of *Radioradicale.it*.

When it comes to the condition 'present stronger-than-average civil society', data concerning the number of non-profit organizations present in each city in 2011 were downloaded from Istat's database. However, this data looked a bit too old, and Istat is no longer collecting this information. The problem was solved when it was observed that, according to ISTAT, as of 31 December 2020 there are a total of 363,499 non-profit organizations in Italy, a 20.69% increase compared to 2011 data (301,191). Consequently, it was believed that a good estimate of the number of non-profit organizations in each city, as of 31 December 2020, could be obtained increasing the 2011 data by 20.69%. The city's population on 1 January 2021 was divided by this estimate, to get a citizens-per-organizations ratio. The ratio was also computed for the whole country. Turning to the condition's calibration, then, a city was considered fully present in the set of the cases showing PSACS when its ratio was lower than the ratio for the whole country (162,96).
Finally, the digital maturity of local governments (which can be defined as the quality of local governments' digital infrastructures) is measured through the Digital Maturity Index 2023. DMI was developed by Forum for Public Administration, and takes into consideration three dimensions of digitalization. A local government's digital maturity, according to this ranking, can be classified as good, high-medium, low-medium or low. A city is considered fully present in the set of the cases showing VHRDM when its digital maturity is classified as good.

5. Truth Tables and Analysis of Necessity

The following is the truth table for the presence of the outcome.

Table 4. Truth tables for positive outcome

	PSACS	PFPC	PFRC	PWIPB	VHRDM	OUT	n	incl	PRI	cases
1	0	0	0	0	0	?	0	-	-	
2	0	0	0	0	1	?	0	-	-	
3	0	0	0	1	0	?	0	-	-	
4	0	0	0	1	1	?	0	-	-	
5	0	0	1	0	0	1	1	1.000	1.000	Palermo
6	0	0	1	0	1	1	1	1.000	1.000	Catania
7	0	0	1	1	0	1	1	1.000	1.000	Messina
8	0	0	1	1	1	?	0	-	-	
9	0	1	0	0	0	0	1	0.000	0.000	Napoli
10	0	1	0	0	1	0	1	0.000	0.000	Milano
11	0	1	0	1	0	?	0	-	-	
12	0	1	0	1	1	0	1	0.000	0.000	Roma
13	0	1	1	0	0	?	0	-	-	
14	0	1	1	0	1	?	0	-	-	
15	0	1	1	1	0	1	1	1.000	1.000	Bari
16	0	1	1	1	1	?	0	-	-	
17	1	0	0	0	0	0	1	0.000	0.000	Venezia
18	1	0	0	0	1	0	2	0.000	0.000	Genova, Verona
19	1	0	0	1	0	?	0	-	-	
20	1	0	0	1	1	?	0	-	-	
21	1	0	1	0	0	?	0	-	-	
22	1	0	1	0	1	?	0	-	-	
23	1	0	1	1	0	?	0	-	-	
24	1	0	1	1	1	?	0	-	-	
25	1	1	0	0	0	?	0	-	-	
26	1	1	0	0	1	?	0	-	-	
27	1	1	0	1	0	0	1	0.000	0.000	Torino
28	1	1	0	1	1	1	1	1.000	1.000	Padova
29	1	1	1	0	0	?	0	-	-	
30	1	1	1	0	1	0	1	0.000	0.000	Firenze
31	1	1	1	1	0	?	0	-	-	
32	1	1	1	1	1	1	1	1.000	1.000	Bologna

Source: own elaboration.

The following is the truth table for the absence of the outcome.

Table 5. Truth table for negative outcome

	PSACS	PFPC	PFRC	PWIPB	VHRDM	OUT	n	incl	PRI	cases
1	0	0	0	0	0	?	0	-	-	
2	0	0	0	0	1	?	0	-	-	
3	0	0	0	1	0	?	0	-	-	
4	0	0	0	1	1	?	0	-	-	
5	0	0	1	0	0	0	1	0.000	0.000	Palermo
6	0	0	1	0	1	0	1	0.000	0.000	Catania
7	0	0	1	1	0	0	1	0.000	0.000	Messina
8	0	0	1	1	1	?	0	-	-	
9	0	1	0	0	0	1	1	1.000	1.000	Napoli
10	0	1	0	0	1	1	1	1.000	1.000	Milano
11	0	1	0	1	0	?	0	-	-	
12	0	1	0	1	1	1	1	1.000	1.000	Roma
13	0	1	1	0	0	?	0	-	-	
14	0	1	1	0	1	?	0	-	-	
15	0	1	1	1	0	0	1	0.000	0.000	Bari
16	0	1	1	1	1	?	0	-	-	
17	1	0	0	0	0	1	1	1.000	1.000	Venezia
18	1	0	0	0	1	1	2	1.000	1.000	Genova, Verona
19	1	0	0	1	0	?	0	-	-	
20	1	0	0	1	1	?	0	-	-	
21	1	0	1	0	0	?	0	-	-	
22	1	0	1	0	1	?	0	-	-	
23	1	0	1	1	0	?	0	-	-	
24	1	0	1	1	1	?	0	-	-	
25	1	1	0	0	0	?	0	-	-	
26	1	1	0	0	1	?	0	-	-	
27	1	1	0	1	0	1	1	1.000	1.000	Torino
28	1	1	0	1	1	0	1	0.000	0.000	Padova
29	1	1	1	0	0	?	0	-	-	
30	1	1	1	0	1	1	1	1.000	1.000	Firenze
31	1	1	1	1	0	?	0	-	-	
32	1	1	1	1	1	0	1	0.000	0.000	Bologna

Source: own elaboration.

Despite the precautions adopted to try to minimize limited diversity, explained in the previous section, 59.37% of truth tables' configurations are still unobserved. There are mainly two strategies to deal with these (Thomson, 2011). One is to compute three solution types, which treat counterfactuals (unobserved configurations) differently; the other is the so-called two-step QCA (Schneider & Wagemann, 2006). While the former has become a best practice (Thomann et al., 2022), the latter has not so far: consequently, this paper relies on the former. Only one solution will later be discussed, while the others will be available in the Appendix.

With regard to the analysis of necessity, only empirically observed raws are considered. A necessity relation between a condition and the outcome exists if, whenever the outcome occurs, the condition does too. In the following table, parameters of fit for the relation of necessity between each condition (either present or absent) and the presence of the outcome are displayed. Consistency (inclN) measures how strong the relation of necessity is. For crisp sets (binary sets where each case is either fully in or fully out of the set), to state the existence of a necessity relation between the factor and the outcome, consistency should be 1. Coverage and Relevance of Necessity (covN and RoN in the table) measure instead the possible triviality of the necessity relation. A necessity relation is considered trivial (obvious) either when there is a big difference in size between the set of the condition and that of the outcome or when the set of the condition is so big it is (or approximates) a constant. All three parameters range between 0 and 1.

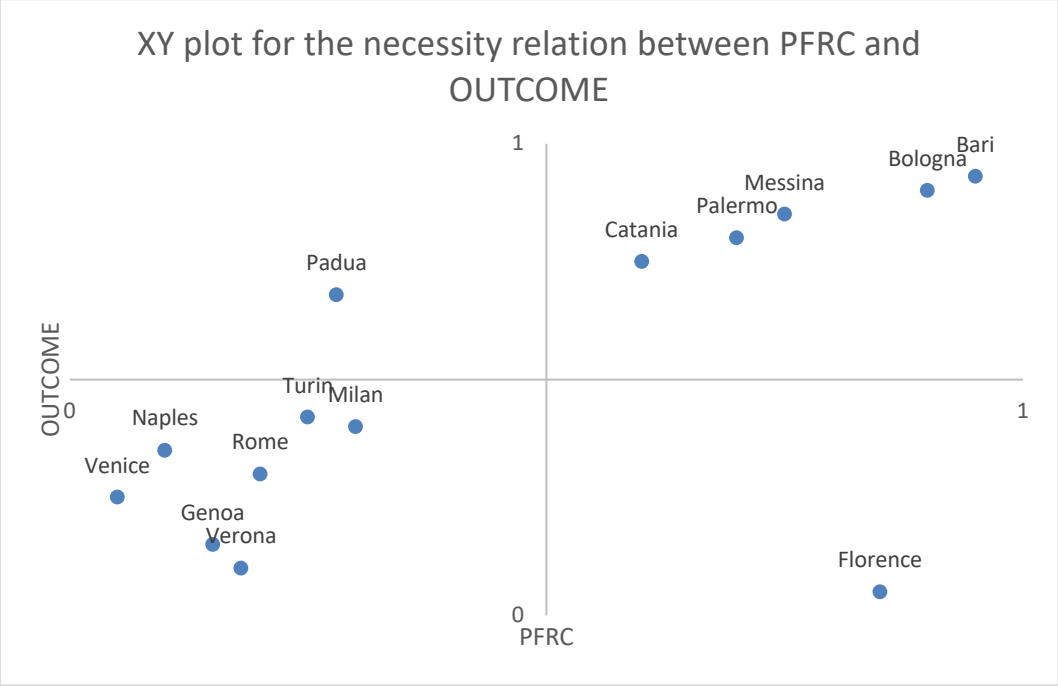
Table 6. Parameters of fit for necessity relations for positive outcome

		inclN	**RoN**	**covN**
1	~PSACS	0.667	0.700	0.571
2	PSACS	0.333	0.583	0.286
3	~PFPC	0.500	0.727	0.500
4	PFPC	0.500	0.545	0.375
5	~PFRC	0.167	0.462	0.125
6	PFRC	0.833	0.889	0.833
7	~PWIPB	0.333	0.500	0.250
8	PWIPB	0.667	0.800	0.667
9	~VHRDM	0.500	0.727	0.500
10	VHRDM	0.500	0.545	0.375

Source: own elaboration.

No condition, either present or absent, reaches the consistency level of 1. The closest is PFRC, which also has good values for RoN and covN. The next graph is an XY plot for the necessity relation between PFRC and the positive outcome.

Figure 1. XY plot for the necessity relation between PFRC and the positive outcome



Source: own elaboration.

In such a graph, the cases which make the consistency value lower are located in the upper-left quadrant. Padua (a city where PB is institutionalized but there is no regional law which forces or encourages local government to do so) denies the existence of the necessity relation.

The following table shows the parameters of fit for the necessity relation between each condition (either present or absent) and the negative outcome.

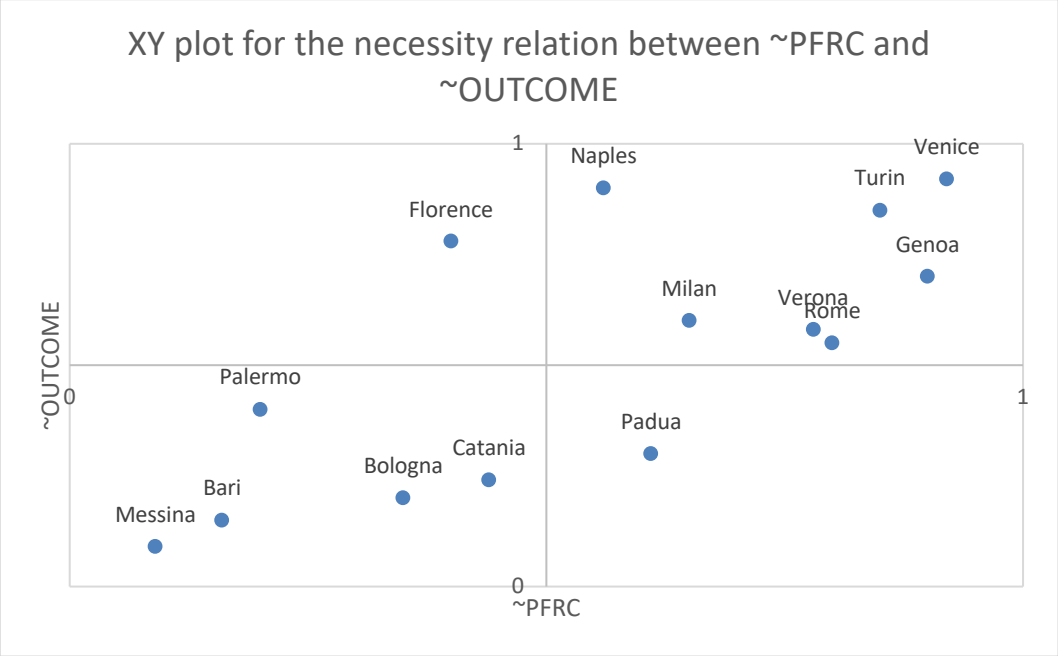
Table 7. Parameters of fit for necessity relations for the negative outcome

		inclN	RoN	covN
1	~PSACS	0.375	0.636	0.429
2	PSACS	0.625	0.778	0.714
3	~PFPC	0.375	0.727	0.500
4	PFPC	0.625	0.667	0.625
5	~PFRC	0.875	0.857	0.875
6	PFRC	0.125	0.615	0.167
7	~PWIPB	0.750	0.750	0.750
8	PWIPB	0.250	0.667	0.333
9	~VHRDM	0.375	0.727	0.500
10	VHRDM	0.625	0.667	0.625

Source: own elaboration.

Again, no condition reaches inclN = 1. However, again, one condition (~PFRC) gets really close (inclN = 0.875), and values for RoN and covN exclude triviality. The following graph is the XY plot for the necessity relation between ~PFRC and ~OUTCOME.

Figure 2. XY plot for the necessity relation between ~PFRC and the negative outcome



Source: own elaboration.

This time, the case denying the necessity relation is Florence, a city where PB is not institutionalized in spite of the presence of regional legislation which encourages local governments to implement/institutionalize participatory policies.

To complete the analysis of necessity, the presence of SUIN conditions must also be evaluated. SUIN conditions are Sufficient but Unnecessary parts of a factor which is Insufficient but Necessary for the outcome (Mahoney et al., 2009). The idea behind SUIN conditions is that, when no single necessary condition is found, new conditions can be 'created by using the logical OR operator' (Schneider & Wagemann, 2012: 80). The logical operator 'OR' is represented in Boolean algebra by the symbol '+'. According to the Boolean algebra rules QCA is built on, if a case X has y, w and z values of belonging in, respectively, the sets of the conditions A, B and C, the case's membership in the disjunction A+B+C equals the highest value among y, w and z. This increases the chances of creating new conditions able to reach consistency levels high enough to state the existence of a necessity relation between the new condition and the outcome. Of course, these 'OR-combined conditions' must be able to be read 'as functional equivalents of higher-order necessary condition' (Schneider & Wagemann, 2012: 80). Otherwise, they simply end up as mathematical artefacts. Furthermore, if a disjunction of conditions is found to have the right inclN value to state it is necessary for the outcome, and it has theoretical meaning, coverage and RoN still have to be checked. Summarizing, if a disjunction of conditions has good parameters of fit and theoretical meaning, so that it can be read as

the functional equivalent of a higher-order condition considered necessary for the outcome, the single factors which constitute that disjunction are SUIN conditions.
For reasons of space, the complete analysis of SUIN conditions, carried out through the software RSTUDIO, used for all this paper's empirical analyses, is reported in the Appendix. However, one result can be highlighted. A disjunction of conditions (PFRC + PWIPB) which seems to satisfy all the mentioned criteria appears for the positive outcome. It is here suggested this disjunction could be read as the presence in the city of a higher order concept: explicit political commitment. Thus, PFRC and PWIPB become SUIN conditions, 'explicit political commitment' turning out to be a necessary condition for the presence of the outcome.

6. Analysis of Sufficiency

In QCA, a condition is sufficient for the outcome if, whenever that condition is present, the outcome is too. However, QCA does not usually tests for sufficiency relations between single conditions and outcome. Instead, it produces three solutions (complex, parsimonious and intermediate), being disjunctions of combinations of presence and absence of factors. To compute the complex solution, only empirically observed configurations are taken into account in the truth table's minimization process (for what this process is and how it works, see Dusa, 2019). For the parsimonious one, all unobserved configurations which may help to arrive at a simpler solution are considered. Finally, for the intermediate solution, only unobserved configurations in line with theoretical expectations are inserted into the minimization algorithm.

The conservative solution formulas, for the positive and the negative outcome, will now be displayed, and parameters of fit will also be commented on. The reasons why conservative solutions were prioritized over parsimonious and intermediate will later be clarified.

The following table shows the complex solution for the positive outcome.

Table 8. Conservative solution for the positive outcome

		incIS	PRI	covS	covU	cases
1	~PSACS*~PFPC*PFRC*~PWIPB	1.000	1.000	0.333	0.333	Palermo; Catania
2	PSACS*PFPC*PWIPB*VHRDM	1.000	1.000	0.333	0.333	Padua; Bologna
3	~PSACS*PFRC*PWIPB*~VHRDM	1.000	1.000	0.333	0.333	Messina; Bari
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*~PFPC*PFRC*~PWIPB + PSACS*PFPC*PWIPB*VHRDM + ~PSACS*PFRC*PWIPB*~VHRDM

The model's consistency equals 1, which means it is perfectly in line with a sufficiency relation with the outcome. Coverage also equals 1: the model explains all the analysed cases. Each solution term explains two cases (so one third of the cases) displaying the positive outcome. This is why covS equals 0.333. Moreover, given there is no overlap between the three elements (each case is 'covered' by only one solution term), unique coverage (covU in the table) for each solution term also equals 0.333.

Turning to the negative outcome, the following table displays the complex solution for it.

Table 9. Conservative solution for the negative outcome

		inclS	PRI	covS	covU	cases
1	~PSACS*PFPC*~PFRC*~PWIPB	1.000	1.000	0.250	0.125	Naples; Milan
2	PSACS*~PFPC*~PFRC*~PWIPB	1.000	1.000	0.375	0.375	Venice; Genoa; Verona
3	~PSACS*PFPC*~PFRC*VHRDM	1.000	1.000	0.250	0.125	Milan; Rome
4	PSACS*PFPC*~PFRC*PWIPB*~VHRDM	1.000	1.000	0.125	0.125	Turin
5	PSACS*PFPC*PFRC*~PWIPB*VHRDM	1.000	1.000	0.125	0.125	Florence
	M1	1.000	1.000	1.000		

Note: M1: M1: ~PSACS*PFPC*~PFRC*~PWIPB + PSACS*~PFPC*~PFRC*~PWIPB + ~PSACS*PFPC*~PFRC*VHRDM + PSACS*PFPC*~PFRC*PWIPB*~VHRDM + PSACS*PFPC*PFRC*~PWIPB*VHRDM

Once again, consistency and coverage values for the whole model equal 1. The second solution term explains three cases. Milan's case might be explained by two different combinations of factors. Turin and Florence stand out as the most complex and unique cases, and would deserve further specific investigation in the future.

7. Robustness of the Model and Case Studies: Discussion of Literature and Results

QCA's analytical stage, where necessary and sufficient conditions are investigated, is usually followed by a stage where two main operations are carried out.

First, the robustness of the model is tested. This is considered important because, throughout the research process, researchers make a number of choices which, if made differently, may change the final results. To test for the QCA model's robustness, different scholars suggest different strategies (Skaaning, 2011; Schneider & Wagemann, 2012; Oana et al., 2021). However, the problem of robustness does not emerge with the same intensity in all QCAs. For instance, Rutten (2022: 1212) states that robustness tests mostly apply to large-N designs, where researchers lack the in-depth case knowledge 'that allows researchers to interpret empirical findings into causal mechanisms', which can be reached in small-N designs. Oana and Schneider (2024: 58) appear to believe the same. Thomann (Thomann et al., 2022) states that robustness tests are more relevant for *condition-oriented* QCA, whereas, for *case-oriented* QCAs, on some occasions implementing robustness tests might not even be desirable. Given the small-N and tendentually case-oriented nature of this work, robustness tests are not crucial. However, throughout the research process there were two choices which were ambiguous (different decisions could have legitimately been made): the number of cases and the calibration of the PFPC condition. Thus, two alternative QCAs are run: one where cases are differently selected (12 cases instead of 14, using 250,000 inhabitants as a threshold for including a city in the study, called QCA2 in the Appendix); one where the condition PFPC is differently calibrated (leftist parties governing the city as of 2023, and at least at their third consecutive mandate, called QCA3). If the results of these alternative QCAs are not dramatically different from the results of the official one, the latter's result can be considered robust.

However, given the relative importance of this operation for a small-N, case-oriented QCA like this one, robustness test results will be reported in the Appendix and commented on here.

With regard to necessary conditions, dropping two cases in QCA2 leads to the emergence of a necessary condition for the positive outcome, which is PFRP. No relevant difference emerges in QCA3. When it comes to conservative solutions for sufficiency, no differences in solutions emerge as far as the negative outcome is concerned. Slight differences arise with regard to results for the positive outcome, but these can easily be explained because changes in number of cases and in the PFPC calibration only impact cases which displayed the positive outcome. Overall, then, official QCA results (at least limitedly to conservative solutions) can be considered quite robust.

Second, a 'return to cases' is carried out. Given the nature of this research, this stage is crucial. However, as already said, every QCA produces three solutions. Scholars do not agree on which solution type should be used to interpret results. Any solution type, indeed, has pros and cons. This debate is summarized and crystal clear in Haesebrouck and Thomann (2022). However, Alamos-Concha (Alamos-Concha et al., 2022) argues that, when QCA is employed in a mixed-or-multi-method research design, the conservative solution is the one to prioritize because it better addresses the problems of mechanistic heterogeneity, omitted conditions and generalization. Consequently, possible mechanisms behind the presence of the outcome will be described through the lenses of the conservative solution. However, conservative solutions still need to be deeply and carefully interpreted, given that, because of the way they are computed, they may also include irrelevant conditions (Haesebrouck, 2023).

When it comes to the complex solution for the positive outcome, the term ~PSACS*~PFPC*PFRC*~PWIPB explains the cases of Palermo and Catania. Here, the presence of a regional law which forces local governments to implement PB looks crucial for the institutionalization of the practice, when there is a lack of a favourable political context, of an explicit will to institutionalize the practice and of a stronger than average civil society. The explanatory mechanism appears simple: cities just had to comply with regional legislation, although the two cities did it differently and with different timing. Catania, indeed, immediately started implementing PB, but when regional legislation changed and forced local governments to also adopt local regulation for the implementation of the policy, Catania did not comply (as of 2023). Palermo, instead, was extremely slow in starting to abide by regional legislation, but when it did, in 2022, it did so fully, passing a local regulation concerning PB implementation and beginning to implement it.

The term PSACS*PFPC*PWIPB*VHRDM explains instead the cases of Bologna and Padua. The former has been governed by leftist parties since 2004. In 2011, Mayor Virginio Merola was elected. His political manifesto did not mention PB. Still, it acknowledged the richness of the city's cultural civil society, and showed appreciation for the 'city's intelligence and energies, present in associations and citizens'. This intelligence and energy had to be set free 'through active citizenship and participation policies'. The administration thus knew Bologna's strong civil society could be used. At the end of Merola's first mandate, Bologna passed its regulation on PB. A few weeks later, Merola was re-elected. This time, his political manifesto for the 2016 campaign explicitly

mentioned the implementation of PB as one of the goals of the administration if confirmed. PB began to be regularly implemented in Bologna, and the procedure, given Bologna's high digital maturity, featured some online dimensions. PB is still implemented, also because Bologna's current Mayor Matteo Lepore, elected in 2021, stated in his political manifesto that he wanted to strengthen PB in the city. When it comes to Padua, references to a possible PB in the city could be found in former Mayor Massimo Bitonci's (2014-2019) political manifesto (interestingly, Bitonci is a right-wing politician). However, PB in Padua started being implemented in 2021, at the end of Mayor Sergio Giordani's mandate (2017-2022, Giordani being a left-wing politician). In his political manifesto for the mandate, Giordani did not mention any PB. Still, he praised the city's rich civil society, and he supported 'an ordered territory's civil society engagement'. Politics was then aware of the strength of Paduan civil society, and believed it could be used to build participatory policies. As in Bologna, the circumstance that Padua has high digital maturity led to the implementation of a PB with some online dimensions. In 2022, Giordani was re-elected and in his manifesto he wrote that PB had to be strengthened. Indeed, PB's implementation in the city continued in 2022 and 2023.

Finally, the term ~PSACS*PFRC*PWIPB*~VHRDM explains the cases of Bari and Messina. Bari's case is quite tricky, because the city's PB is a collection of the PBs implemented at the district level. Current legislation regulating PB at the local level in Bari was passed in 2014. PB was implemented quite regularly by districts, but available documents and reports prove there were some problems, particularly with quantitative aspects of participation (low public meeting attendance). In 2019, Antonio Decaro (a leftist politician) was re-elected mayor, after his first mandate (2014-2019). Despite the above-mentioned problems, in his 2019-2024 manifesto he stated that he wanted to make Bari's PB systematic, and renew the procedure. When it comes to the role of the favourable regional context, in Apulia there is a regional law which encourages local governments to implement participatory policies, providing economic, communicative and/or methodological support. Bari was provided with €25,000 by the Region in the context of this law, and used this money to sustain a structure, called 'Urban Centre', which also works on the implementation of the city's PB. Finally, when it comes to Messina, in 2013 Renato Accorinti, a leftist politician, was elected mayor, and governed the city until 2018. In his electoral manifesto, he promised the adoption of PB, in particular the creation of an *ad hoc Consulta* for PB. In Italy, a *Consulta* is a type of institution that is meant to be permanent. From this, the will to institutionalize PB can be derived. In 2014, Sicily's Regional Government passed its first legislation forcing local governments to implement PB. In Messina, this legislation found a local government which had already stated it wanted to institutionalize this tool. However, almost nothing happened from 2016 to 2018. It was only in 2019, a year after a rightist coalition came to power, that Messina started regulating and implementing PB, clearly driven by regional legislation. Consequently, despite belonging in the same solution term as Bari, Messina's case looks more similar to the other Sicilian cities.

8. Comments

As expected, this study's results partly confirm and partly challenge the results of previous literature. When it comes to necessary conditions, differently from Ryan (2021) and

Pradeau (2021), this study found no single necessary condition for the presence of the outcome. The former found strong evidence of a necessity relation between participatory leadership and citizens' control over budget decisions. In the latter's work, three conditions met the consistency threshold for necessity: two of them, 'left governor' and 'political will of the governor', relatively resemble two conditions which were considered for the present study, respectively PFPC and PWIPB. However, neither of these conditions comes even close to the threshold for necessity. In this model, the only condition which comes close is PFRC, related to the regional legal context, thus confirming the positive correlation between the presence of regional laws concerning participation and the implementation of PBs found by Allegretti (Allegretti et al., 2021), and the role of the laws, highlighted by the authors, in enlarging 'the scope of participatory experiments' (Allegretti et al., 2021: 41). However, a necessary condition in the present work appears in the shape of two SUIN conditions (PFRC and PWIPB) which can be considered a replacement for a higher order condition, here named 'explicit political commitment'. This condition recalls Ryan's participatory leadership and Pradeau's political will of the governor. Still, this condition seems necessary but not sufficient, given that the analysis of sufficiency shows, for instance, there is a case (Florence) where a SUIN condition for the presence of the outcome is found, but the outcome has not appeared.

Turning to the analysis of sufficiency, Ryan (2021) prioritizes the parsimonious solution for his comments, whereas this paper relies on the conservative one. Still, a similar finding is worthy of comment: the apparently scarce role played by civil society in the explanation. Ryan, indeed, found that civil society played no role in explaining the presence of his outcome, whereas, in the present study, stronger than average civil society only shows up in the solution term concerning Padua and Bologna. Still the analysis of the two cases seemingly suggests that civil society played a role. As also shown in the solution for the negative outcome, a stronger civil society is not able on its own to compensate for the absence of almost all other conditions (Venice, Genoa and Verona); and, even in combination with almost all other conditions, does not produce the outcome in the lack of an explicit commitment to PB by the local government (Florence).

Turning to a comparison with Pradeau's (2021) results, it is not clear what solution type the author relies on for his comments. However, he finds two solution terms: one where the presence of high associative density, political will, leftist governments and the former mayoral experience of the governor (he explores PBs implemented at the State level in Brazil) work together to produce the outcome. The other where the interaction of political will with the presence of PB in the State capital and the absence of low financial capacity compensates for the absence of high associative density and large population of the jurisdiction. The first solution term closely resembles the one that in this paper explains the cases of Padua and Bologna, and confirms that, when most of the conditions which are expected to produce the outcome actually show up, the outcome can legitimately be expected. Pradeau's second solution term, while being incomparable with any of the solution terms in this study, still proves that occasionally solution terms must be read in terms of (combinations of) conditions whose presence is able to compensate for the absence of others.

Finally, noticing how close PFRC comes to being a necessary condition and its powerful explanatory role in at least three cases showing the outcome apparently confirms

the role in the spreading of what Spada (2014) calls 'vertical mechanisms', where institutions 'might impose or promote the adoption of an innovation across many units of adoption using a variety of monetary and non-monetary incentives' (Spada, 2014: 9).

9. Limitations and concluding remarks

Seeing democratic innovations become ordinary government tools is rare. No wonder, then, that some scholars started exploring the reasons behind participatory policies' (non) institutionalization. And no wonder that these scholars started with PB, given the amount of empirical studies available, after more than thirty years of worldwide implementation, which helps to build explanatory models. Given its focus on conjunctural causation, equifinality, multifinality and asymmetric causality, QCA proved to be a good methodological tool to answer this paper's research question. However, just like any other method, QCA has its limitations. Consequently, QCA's results must be cautiously interpreted and generalized (Beach & Kaas, 2020). When it comes to this specific research, possible limitations might be underlined in the measurement and calibration of some explanatory conditions. For instance, for the PFPC condition there was no clear theory to determine how many consecutive left-wing mandates are needed to state that the political context is favourable. With regard to the civil society-related condition, it was hard to find data to measure the condition, and no theory helped in calibrating it.

Of course, one does one's best with available data. Things like robustness tests are also meant to solve these problems, at least partially, allowing us to see what results would look like, had different choices been made. However, as far as robustness tests and 'return to cases' are concerned, QCA surely suffers from being a relatively new method. Scholars, and methodologists in particular, still have to find a consensus on the best ways to conduct robustness tests and the best solution type to make sense of the cases.

In spite of all this, the paper still has something important to offer researchers interested in the topic. First, the way the outcome has been operationalized in this work is a novelty for the field. Second, the institutionalization of PBs in Italy had never been studied through QCA, even though studies exist concerning PB in Italy, their formalization, and partially the reasons behind their institutionalization (Bartocci et al, 2016; Allegretti et al., 2021; Mattei et al., 2022). Third, the explanatory model is rooted in previous theory and knowledge of the Italian legal context, so it can be considered reliable enough. Finally, the choice of looking into the cases through the lens of the conservative solution allowed to unpack the mechanisms which are more likely to be those that led to the emergence of the outcome. Although, of course, some relevant factors might have been excluded to build a more balanced model, the mechanisms presented in the previous paragraphs are fairly plausible and provide a good description of what is likely to have happened. For all these reasons, although this paper's results should be cautiously generalized, it is still believed they could be inspirational for scholars willing to study the institutionalization of PB in places other than Italy.

Acknowledgements

The author has no competing interests to declare.

Data Accessibility Statement

Interested readers can contact the author(s) to access the data the paper is based on.

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10. Appendix

10.1. Suin Conditions for the Outcome

RStudio, the software used for this paper's empirical analysis, automatically computes disjunctions of conditions which reach consistency = 1. For the positive outcome, these are:

		incIN	RoN	covN
1	~PSACS + PFPC	1.000	0.375	0.545
2	PSACS + PFRC	1.000	0.375	0.545
3	~PSACS + PWIPB	1.000	0.500	0.600
4	~PSACS + VHRDM	1.000	0.250	0.500
5	PFPC + PFRC	1.000	0.375	0.545
6	~PFPC + PWIPB	1.000	0.375	0.545
7	PFRC + PWIPB	1.000	0.625	0.667
8	PFRC + VHRDM	1.000	0.375	0.545
9	PSACS + ~PFPC + ~VHRDM	1.000	0.250	0.500
10	PSACS + ~PWIPB + ~VHRDM	1.000	0.125	0.462
11	PFPC + ~PWIPB + ~VHRDM	1.000	0.000	0.429

Source: own elaboration.

The first thing which must be noticed is that only the seventh disjunction reaches satisfactory levels for all the three parameters of fit (RoN = 0.500 is usually considered suspicious). Consequently, it must now be evaluated whether the disjunction PFRC + PWIPB can theoretically mean something. It is here suggested that the presence of either a favourable regional context, where regional governors encourage or even force local governments to institionalize or implement participatory policies, or a will to institutionalize participatory budgeting, expressed by one of the last four local governments, can be read as the presence in the city of a higher order concept: political commitment. Thus, PFRC and PWIPB become SUIN conditions, «political commitment» turning out to be a necessary condition for the outcome.

Turning to the negative outcome, these are disjunctions of conditions reaching consistency = 1.

		incIN	RoN	covN
1	PSACS + PFPC	1.000	0.500	0.727
2	PSACS + ~PFRC	1.000	0.667	0.800
3	PFPC + ~PFRC	1.000	0.500	0.727
4	PFPC + ~PWIPB	1.000	0.167	0.615
5	~PFRC + ~PWIPB	1.000	0.500	0.727
6	~PFRC + VHRDM	1.000	0.500	0.727
7	~PSACS + ~PWIPB + ~VHRDM	1.000	0.333	0.667
8	PSACS + ~PWIPB + VHRDM	1.000	0.333	0.667
9	~PSACS + ~PFPC + PFRC + PWIPB	1.000	0.000	0.571
10	~PSACS + ~PFPC + PFRC + ~VHRDM	1.000	0.167	0.615
11	~PSACS + ~PFPC + PWIPB + VHRDM	1.000	0.000	0.571

Source: own elaboration.

Once again, there is only one disjunction (number 2) which reaches good values for all the parameters of fit. However, this time it looks very hard to interpret this disjunction (presence of a stronger-than- average civil society or absence of favourable regional context) as a functional equivalent of a higher- order condition. Consequently, it can be said no higher-order explanatory factors (and no SUIN conditions) exist for the absence of the outcome.

10.2. Parsimonious Solution for the Positive Outcome

The following table shows the parsimonious solution for the positive outcome.

		incIS	PRI	covS	covU	cases
1	~PSACS*PFRC	1.000	1.000	0.667	0.667	Palermo; Catania; Messina; Bari
2	PSACS*PWIPB*VHRDM	1.000	1.000	0.333	0.333	Padua; Bologna
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*PFRC + PSACS*PWIPB*VHRDM

As expectable, the parsimonious solution is simpler than the complex. It is only constituted by two solution terms, of which one is a conjunction of two explanatory conditions (absence of stronger than average civil society and presence of favourable regional context), and the other of three (presence of stronger than average civil society, presence of will to institutionalize PB and presence of very high relative digital maturity). For the parsimonious solution, too, consistency's and coverage's values equal 1. The element ~PSACS*PFRC explains four out of six cases, thus its raw coverage equals 0.667. Once again, given there is no overlap between the solution terms, unique coverage for the first element is 0.667 for this element and 0.333 for the other. RStudio software allows to check which configurations, among the ones listed in the truth table, where used by the algorithm during the minimization process to produce this result, in this way constituting simplifying assumptions. These configurations are reported in the truth table as the numbers 8, 13, 14, 16, 20, and 24.

10.3. Intermediate Solution for the Positive Outcome

Finally, the following table shows the intermediate solution for the positive outcome.

		incIS	PRI	covS	covU	cases
1	~PSACS*~PFPC*PFRC	1.000	1.000	0.500	0.333	Palermo; Catania; Messina
2	~PSACS*PFRC*PWIPB*~VHRDM	1.000	1.000	0.333	0.167	Messina; Bari
3	PSACS*PFPC*PWIPB*VHRDM	1.000	1.000	0.333	0.333	Padua; Bologna
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*~PFPC*PFRC + ~PSACS*PFRC*PWIPB*~VHRDM + PSACS*PFPC*PWIPB*VHRDM

Once again, as expectable, the level of complexity of the intermediate solution is somewhere in between the complex and the parsimonious solutions' levels of complexity. Intermediate solution is made up of three elements, one of which is a conjunction of three factors and the other two a conjunction of four. Messina's case can be explained by two different solution terms (the first and the second one), so for both terms the value of unique coverage (covU) is lower than the value of raw coverage (covS). The intermediate solution strengthens what was stated in the main text of the paper, *id est* that, although combined with Bari in the conservative solution, Messina's case resembles other Sicilian cities, and better clusters with them and fits the same solution term.

To compute this solution, directional expectations had to be specified. Based on theoretical knowledge, the presence of each of the five conditions was expected to have a positive impact on the presence of the outcome. These expectations were used by the algorithm to distinguish easy counterfactuals (those in line with empirical data and directional expectations) from hard counterfactuals (not in line with directional expectations). Only the former were used in the minimization process. Easy counterfactual configurations are listed in the truth table as the number 8 and 24.

10.4. Parsimonious and Intermediate Solution for the Negative Outcome

The following table displays instead the parsimonious solution for the negative outcome.

		incIS	PRI	covS	covU	cases
1	~PSACS*~PFRC	1.000	1.000	0.375	0.250	Naples; Milan; Rome
2	PSACS*~PWIPB	1.000	1.000	0.500	0.375	Venice; Genoa; Verona; Florence
3	~PFRC*~VHRDM	1.000	1.000	0.375	0.125	Naples; Venice; Turin
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*~PFRC + PSACS*~PWIPB + ~PFRC*~VHRDM

The cases of Naples and Venice can be explained by two solution terms, respectively number 1 and 3, and number 2 and 3. The simplifying assumptions, that is the counterfactual configurations which entered the minimization process to produce this result, are reported in the truth table for the negative outcome as raws number 1, 2, 3, 4, 11, 19, 21, 22, 25, 26 and 29.

To compute the intermediate solution for the absence of the outcome, the directional expectation was, for each condition, that its absence would lead to the absence of the outcome. The intermediate solution is now displayed.

		incIS	PRI	covS	covU	cases
1	~PSACS*~PFRC	1.000	1.000	0.375	0.375	Naples; Milan; Rome
2	~PFPC*~PFRC*~PWIPB	1.000	1.000	0.375	0.375	Venice; Genoa; Verona
3	PFPC*~PFRC*PWIPB*~VHRDM	1.000	1.000	0.125	0.125	Turin
4	PSACS*PFPC*PFRC*~PWIPB*VHRDM	1.000	1.000	0.125	0.125	Florence
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*~PFRC + ~PFPC*~PFRC*~PWIPB + PFPC*~PFRC*PWIPB*~VHRDM + PSACS*PFPC*PFRC*~PWIPB*VHRDM

This time, each case is covered (explained) by one solution term, and one solution term only. This is why, for each solution term, the value of raw coverage (covS) equals the value of unique coverage (covU). The easy counterfactuals which led to the computation of this intermediate solution are listed in the truth table for the negative outcome as raws number 1, 2, 3, 4, and 11.

10.5. Robustness check: QCA2

Necessary Conditions for the Positive Outcome:

		incIN	RoN	covN
1	~PSACS	0.750	0.667	0.500
2	PSACS	0.250	0.545	0.167
3	~PFPC	0.500	0.700	0.400
4	PFPC	0.500	0.500	0.286
5	~PFRC	0.000	0.417	0.000
6	PFRC	1.000	0.875	0.800
7	~PWIPB	0.500	0.400	0.250
8	PWIPB	0.500	0.800	0.500
9	~VHRDM	0.500	0.700	0.400
10	VHRDM	0.500	0.500	0.286

Source: own elaboration.

Necessary Conditions for the Negative Outcome:

		incIN	RoN	covN
1	~PSACS	0.375	0.667	0.500
2	PSACS	0.625	0.857	0.833
3	~PFPC	0.375	0.778	0.600
4	PFPC	0.625	0.714	0.714
5	~PFRC	0.875	1.000	1.000
6	PFRC	0.125	0.636	0.200
7	~PWIPB	0.750	0.667	0.750
8	PWIPB	0.250	0.800	0.500
9	~VHRDM	0.375	0.778	0.600
10	VHRDM	0.625	0.714	0.714

Source: own elaboration.

Suin Conditions for the Negative Outcome

		incIN	RoN	covN
1	PSACS + PFPC	1.000	0.500	0.800
2	PSACS + ~PFRC	1.000	0.750	0.889
3	PFPC + ~PFRC	1.000	0.500	0.800
4	PFPC + ~PWIPB	1.000	0.000	0.667
5	~PFRC + ~PWIPB	1.000	0.500	0.800
6	~PFRC + VHRDM	1.000	0.500	0.800
7	~PSACS + ~PWIPB + ~VHRDM	1.000	0.250	0.727
8	PSACS + ~PWIPB + VHRDM	1.000	0.250	0.727
9	~PSACS + ~PFPC + PFRC + PWIPB	1.000	0.000	0.667
10	~PSACS + ~PFPC + PFRC + ~VHRDM	1.000	0.000	0.667
11	~PSACS + ~PFPC + PWIPB + VHRDM	1.000	0.000	0.667

Source: own elaboration.

Truth Table for the Positive Outcome

	PSACS	PFPC	PFRC	PWIPB	VHRDM	OUT	n	incl	PRI	cases
1	0	0	0	0	0	?	0	-	-	
2	0	0	0	0	1	?	0	-	-	
3	0	0	0	1	0	?	0	-	-	
4	0	0	0	1	1	?	0	-	-	
5	0	0	1	0	0	1	1	1.000	1.000	Palermo
6	0	0	1	0	1	1	1	1.000	1.000	Catania
7	0	0	1	1	0	?	0	-	-	
8	0	0	1	1	1	?	0	-	-	
9	0	1	0	0	0	0	1	0.000	0.000	Naples
10	0	1	0	0	1	0	1	0.000	0.000	Milan
11	0	1	0	1	0	?	0	-	-	
12	0	1	0	1	1	0	1	0.000	0.000	Rome
13	0	1	1	0	0	?	0	-	-	
14	0	1	1	0	1	?	0	-	-	
15	0	1	1	1	0	1	1	1.000	1.000	Bari
16	0	1	1	1	1	?	0	-	-	
17	1	0	0	0	0	0	1	0.000	0.000	Venice
18	1	0	0	0	1	0	2	0.000	0.000	Genoa, Verona
19	1	0	0	1	0	?	0	-	-	
20	1	0	0	1	1	?	0	-	-	
21	1	0	1	0	0	?	0	-	-	
22	1	0	1	0	1	?	0	-	-	
23	1	0	1	1	0	?	0	-	-	
24	1	0	1	1	1	?	0	-	-	
25	1	1	0	0	0	?	0	-	-	
26	1	1	0	0	1	?	0	-	-	
27	1	1	0	1	0	0	1	0.000	0.000	Turin
28	1	1	0	1	1	?	0	-	-	
29	1	1	1	0	0	?	0	-	-	
30	1	1	1	0	1	0	1	0.000	0.000	Florence
31	1	1	1	1	0	?	0	-	-	
32	1	1	1	1	1	1	1	1.000	1.000	Bologna

Source: own elaboration.

Truth Table for the Negative Outcome

	PSACS	PFPC	PFRC	PWIPB	VHRDM	OUT	n	incl	PRI	cases
1	0	0	0	0	0	?	0	-	-	
2	0	0	0	0	1	?	0	-	-	
3	0	0	0	1	0	?	0	-	-	
4	0	0	0	1	1	?	0	-	-	
5	0	0	1	0	0	0	1	0.000	0.000	Palermo
6	0	0	1	0	1	0	1	0.000	0.000	Catania
7	0	0	1	1	0	?	0	-	-	
8	0	0	1	1	1	?	0	-	-	
9	0	1	0	0	0	1	1	1.000	1.000	Naples
10	0	1	0	0	1	1	1	1.000	1.000	Milan
11	0	1	0	1	0	?	0	-	-	
12	0	1	0	1	1	1	1	1.000	1.000	Rome
13	0	1	1	0	0	?	0	-	-	
14	0	1	1	0	1	?	0	-	-	
15	0	1	1	1	0	0	1	0.000	0.000	Bari
16	0	1	1	1	1	?	0	-	-	
17	1	0	0	0	0	1	1	1.000	1.000	Venice
18	1	0	0	0	1	1	2	1.000	1.000	Genoa, Verona
19	1	0	0	1	0	?	0	-	-	
20	1	0	0	1	1	?	0	-	-	
21	1	0	1	0	0	?	0	-	-	
22	1	0	1	0	1	?	0	-	-	
23	1	0	1	1	0	?	0	-	-	
24	1	0	1	1	1	?	0	-	-	
25	1	1	0	0	0	?	0	-	-	
26	1	1	0	0	1	?	0	-	-	
27	1	1	0	1	0	1	1	1.000	1.000	Turin
28	1	1	0	1	1	?	0	-	-	
29	1	1	1	0	0	?	0	-	-	
30	1	1	1	0	1	1	1	1.000	1.000	Florence
31	1	1	1	1	0	?	0	-	-	
32	1	1	1	1	1	0	1	0.000	0.000	Bologna

Source: own elaboration.

Conservative Solution for the Positive Outcome

		inclS	PRI	covS	covU	cases
1	~PSACS*~PFPC*PFRC*~PWIPB	1.000	1.000	0.500	0.500	Palermo; Catania
2	~PSACS*PFPC*PFRC*PWIPB*~VHRDM	1.000	1.000	0.250	0.250	Bari
3	PSACS*PFPC*PFRC*PWIPB*VHRDM	1.000	1.000	0.250	0.250	Bologna
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*~PFPC*PFRC*~PWIPB + ~PSACS*PFPC*PFRC*PWIPB*~VHRDM + PSACS*PFPC*PFRC*PWIPB*VHRDM

Parsimonious Solution for the Positive Outcome

		inclS	PRI	covS	covU	cases
1	~PSACS*PFRC	1.000	1.000	0.750	0.500	Palermo; Catania; Bari
2	PFRC*PWIPB	1.000	1.000	0.500	0.250	Bari; Bologna
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*PFRC + PFRC*PWIPB

Intermediate Solution for the Positive Outcome

		inclS	PRI	covS	covU	cases
1	~PSACS*PFRC	1.000	1.000	0.750	0.750	Palermo; Catania; Bari
2	PFPC*PFRC*PWIPB*VHRDM	1.000	1.000	0.250	0.250	Bologna
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*PFRC + PFPC*PFRC*PWIPB*VHRDM

Conservative Solution for the Negative Outcome

		inclS	PRI	covS	covU	cases
1	~PSACS*PFPC*~PFRC*~PWIPB	1.000	1.000	0.250	0.125	Naples; Milan
2	PSACS*~PFPC*~PFRC*~PWIPB	1.000	1.000	0.375	0.375	Venice; Genoa; Verona
3	~PSACS*PFPC*~PFRC*VHRDM	1.000	1.000	0.250	0.125	Milan; Rome
4	PSACS*PFPC*~PFRC*PWIPB*~VHRDM	1.000	1.000	0.125	0.125	Turin
5	PSACS*PFPC*PFRC*~PWIPB*VHRDM	1.000	1.000	0.125	0.125	Florence
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*PFPC*~PFRC*~PWIPB + PSACS*~PFPC*~PFRC*~PWIPB + ~PSACS*PFPC*~PFRC*VHRDM + PSACS*PFPC*~PFRC*PWIPB*~VHRDM + PSACS*PFPC*PFRC*~PWIPB*VHRDM

Parsimonious Solution for the Negative Outcome

		inclS	PRI	covS	covU	(M1)	(M2)	cases
1	~PFRC	1.000	1.000	0.875	0.250	0.500	0.625	Naples; Milan; Rome; Venice; Genoa; Verona; Turin
2	PSACS*~PWIPB	1.000	1.000	0.500	0.000	0.125		Venice; Genoa; Verona; Florence
3	PFPC*~PWIPB	1.000	1.000	0.375	0.000		0.125	Naples; Milan; Florence
	M1	1.000	1.000	1.000				

Note: M1: ~PFRC + (PSACS*~PWIPB); M2: ~PFRC + (PFPC*~PWIPB)

Intermediate Solution for the Negative Outcome

From C1P1:

		inclS	PRI	covS	covU	cases
1	~PSACS*~PFRC	1.000	1.000	0.375	0.250	Naples; Milan; Rome
2	~PFRC*~VHRDM	1.000	1.000	0.375	0.125	Naples; Venice; Turin
3	~PFPC*~PFRC*~PWIPB	1.000	1.000	0.375	0.250	Venice; Genoa; Verona
4	PSACS*PFPC*PFRC*~PWIPB*VHRDM	1.000	1.000	0.125	0.125	Florence
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*~PFRC + ~PFRC*~VHRDM + ~PFPC*~PFRC*~PWIPB + PSACS*PFPC*PFRC*~PWIPB*VHRDM

From C1P2:

		inclS	PRI	covS	covU	cases
1	~PSACS*~PFRC	1.000	1.000	0.375	0.125	Naples; Milan; Rome
2	~PFRC*~PWIPB	1.000	1.000	0.625	0.250	Naples; Milan; Venice; Genoa; Verona
3	~PFRC*~VHRDM	1.000	1.000	0.375	0.125	Naples; Venice; Turin
4	PSACS*PFPC*~PWIPB	1.000	1.000	0.125	0.125	Florence
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*~PFRC + ~PFRC*~VHRDM + ~PFPC*~PFRC*~PWIPB + PSACS*PFPC*PFRC*~PWIPB*VHRDM

10.6. Robustness check: QCA3

Necessary Conditions for the Positive Outcome:

		incIN	RoN	covN
1	~PSACS	0.667	0.700	0.571
2	PSACS	0.333	0.583	0.286
3	~PFPC	0.667	0.700	0.571
4	PFPC	0.333	0.583	0.286
5	~PFRC	0.167	0.462	0.125
6	PFRC	0.833	0.889	0.833
7	~PWIPB	0.333	0.500	0.250
8	PWIPB	0.667	0.800	0.667
9	~VHRDM	0.500	0.727	0.500
10	VHRDM	0.500	0.545	0.375

Source: own elaboration.

Necessary Conditions for the Negative Outcome

		incIN	RoN	covN
1	~PSACS	0.375	0.636	0.429
2	PSACS	0.625	0.778	0.714
3	~PFPC	0.375	0.636	0.429
4	PFPC	0.625	0.778	0.714
5	~PFRC	0.875	0.857	0.875
6	PFRC	0.125	0.615	0.167
7	~PWIPB	0.750	0.750	0.750
8	PWIPB	0.250	0.667	0.333
9	~VHRDM	0.375	0.727	0.500
10	VHRDM	0.625	0.667	0.625

Source: own elaboration.

Suin Conditions for the Positive Outcome

		incIN	RoN	covN
1	PSACS + PFRC	1.000	0.375	0.545
2	~PSACS + PWIPB	1.000	0.500	0.600
3	~PSACS + VHRDM	1.000	0.250	0.500
4	~PFPC + PFRC	1.000	0.500	0.600
5	~PFPC + PWIPB	1.000	0.375	0.545
6	PFRC + PWIPB	1.000	0.625	0.667
7	PFRC + VHRDM	1.000	0.375	0.545
8	~PSACS + PFPC + ~PFRC	1.000	0.000	0.429
9	PSACS + ~PFPC + ~VHRDM	1.000	0.250	0.500
10	PSACS + ~PWIPB + ~VHRDM	1.000	0.125	0.462
11	PFPC + ~PFRC + ~PWIPB + ~VHRDM	1.000	0.000	0.429

Source: own elaboration.

Suin Conditions for the Negative Outcome

		incIN	RoN	covN
1	PSACS + PFPC	1.000	0.500	0.727
2	PSACS + ~PFRC	1.000	0.667	0.800
3	PFPC + ~PFRC	1.000	0.500	0.727
4	PFPC + ~PWIPB	1.000	0.333	0.667
5	~PFRC + ~PWIPB	1.000	0.500	0.727
6	~PFRC + VHRDM	1.000	0.500	0.727
7	~PSACS + ~PWIPB + ~VHRDM	1.000	0.333	0.667
8	PSACS + ~PWIPB + VHRDM	1.000	0.333	0.667
9	~PSACS + ~PFPC + PFRC + PWIPB	1.000	0.000	0.571
10	~PSACS + ~PFPC + PFRC + ~VHRDM	1.000	0.000	0.571
11	~PSACS + ~PFPC + PWIPB + VHRDM	1.000	0.000	0.571

Source: own elaboration.

Truth Table for the Positive Outcome

	PSACS	PFPC	PFRC	PWIPB	VHRDM	OUT	n	incl	PRI	cases
1	0	0	0	0	0	?	0	-	-	
2	0	0	0	0	1	?	0	-	-	
3	0	0	0	1	0	?	0	-	-	
4	0	0	0	1	1	?	0	-	-	
5	0	0	1	0	0	1	1	1.000	1.000	Palermo
6	0	0	1	0	1	1	1	1.000	1.000	Catania
7	0	0	1	1	0	1	1	1.000	1.000	Messina
8	0	0	1	1	1	?	0	-	-	
9	0	1	0	0	0	0	1	0.000	0.000	Naples
10	0	1	0	0	1	0	1	0.000	0.000	Milan
11	0	1	0	1	0	?	0	-	-	
12	0	1	0	1	1	0	1	0.000	0.000	Rome
13	0	1	1	0	0	?	0	-	-	
14	0	1	1	0	1	?	0	-	-	
15	0	1	1	1	0	1	1	1.000	1.000	Bari
16	0	1	1	1	1	?	0	-	-	
17	1	0	0	0	0	0	1	0.000	0.000	Venice
18	1	0	0	0	1	0	2	0.000	0.000	Genoa, Verona
19	1	0	0	1	0	?	0	-	-	
20	1	0	0	1	1	1	1	1.000	1.000	Padua
21	1	0	1	0	0	?	0	-	-	
22	1	0	1	0	1	?	0	-	-	
23	1	0	1	1	0	?	0	-	-	
24	1	0	1	1	1	?	0	-	-	
25	1	1	0	0	0	?	0	-	-	
26	1	1	0	0	1	?	0	-	-	
27	1	1	0	1	0	0	1	0.000	0.000	Turin
28	1	1	0	1	1	?	0	-	-	
29	1	1	1	0	0	?	0	-	-	
30	1	1	1	0	1	0	1	0.000	0.000	Florence
31	1	1	1	1	0	?	0	-	-	
32	1	1	1	1	1	1	1	1.000	1.000	Bologna

Source: own elaboration.

Truth Table for the Negative Outcome

	PSACS	PFPC	PFRC	PWIPB	VHRDM	OUT	n	incl	PRI	cases
1	0	0	0	0	0	?	0	-	-	
2	0	0	0	0	1	?	0	-	-	
3	0	0	0	1	0	?	0	-	-	
4	0	0	0	1	1	?	0	-	-	
5	0	0	1	0	0	0	1	0.000	0.000	Palermo
6	0	0	1	0	1	0	1	0.000	0.000	Catania
7	0	0	1	1	0	0	1	0.000	0.000	Messina
8	0	0	1	1	1	?	0	-	-	
9	0	1	0	0	0	1	1	1.000	1.000	Naples
10	0	1	0	0	1	1	1	1.000	1.000	Milan
11	0	1	0	1	0	?	0	-	-	
12	0	1	0	1	1	1	1	1.000	1.000	Rome
13	0	1	1	0	0	?	0	-	-	
14	0	1	1	0	1	?	0	-	-	
15	0	1	1	1	0	0	1	0.000	0.000	Bari
16	0	1	1	1	1	?	0	-	-	
17	1	0	0	0	0	1	1	1.000	1.000	Venice
18	1	0	0	0	1	1	2	1.000	1.000	Genoa, Verona
19	1	0	0	1	0	?	0	-	-	
20	1	0	0	1	1	0	1	0.000	0.000	Padua
21	1	0	1	0	0	?	0	-	-	
22	1	0	1	0	1	?	0	-	-	
23	1	0	1	1	0	?	0	-	-	
24	1	0	1	1	1	?	0	-	-	
25	1	1	0	0	0	?	0	-	-	
26	1	1	0	0	1	?	0	-	-	
27	1	1	0	1	0	1	1	1.000	1.000	Turin
28	1	1	0	1	1	?	0	-	-	
29	1	1	1	0	0	?	0	-	-	
30	1	1	1	0	1	1	1	1.000	1.000	Florence
31	1	1	1	1	0	?	0	-	-	
32	1	1	1	1	1	0	1	0.000	0.000	Bologna

Source: own elaboration.

Conservative Solution for the Positive Outcome

		inclS	PRI	covS	covU	cases
1	~PSACS*~PFPC*PFRC*~PWIPB	1.000	1.000	0.333	0.333	Palermo; Catania
2	~PSACS*PFRC*PWIPB*~VHRDM	1.000	1.000	0.333	0.333	Messina; Bari
3	PSACS*~PFPC*~PFRC*PWIPB*VHRDM	1.000	1.000	0.167	0.167	Padua
4	PSACS*PFPC*PFRC*PWIPB*VHRDM	1.000	1.000	0.167	0.167	Bologna
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*~PFPC*PFRC*~PWIPB + ~PSACS*PFRC*PWIPB*~VHRDM + PSACS*~PFPC*~PFRC*PWIPB*VHRDM + PSACS*PFPC*PFRC*PWIPB*VHRDM

Parsimonious Solution for the Positive Outcome

		inclS	PRI	covS	covU	cases
1	~PSACS*PFRC	1.000	1.000	0.667	0.667	Palermo; Catania; Messina; Bari
2	PSACS*PWIPB*VHRDM	1.000	1.000	0.333	0.333	Padua; Bologna
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*PFRC + PSACS*PWIPB*VHRDM

Intermediate Solution for the Positive Outcome

From C1P1:

		inclS	PRI	covS	covU	cases
1	~PSACS*~PFPC*PFRC	1.000	1.000	0.500	0.333	Palermo; Catania; Messina
2	~PSACS*PFRC*PWIPB*~VHRDM	1.000	1.000	0.333	0.167	Messina; Bari
3	PSACS*~PFPC*PWIPB*VHRDM	1.000	1.000	0.167	0.167	Padua
4	PSACS*PFRC*PWIPB*VHRDM	1.000	1.000	0.167	0.167	Bologna
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*~PFPC*PFRC + ~PSACS*PFRC*PWIPB*~VHRDM + PSACS*~PFPC*PWIPB*VHRDM + PSACS*PFRC*PWIPB*VHRDM

Conservative Solution for the Negative Outcome

		inclS	PRI	covS	covU	cases
1	~PSACS*PFPC*~PFRC*~PWIPB	1.000	1.000	0.250	0.125	Naples; Milan
2	PSACS*~PFPC*~PFRC*~PWIPB	1.000	1.000	0.375	0.375	Venice; Genoa; Verona
3	~PSACS*PFPC*~PFRC*VHRDM	1.000	1.000	0.250	0.125	Milan; Rome
4	PSACS*PFPC*~PFRC*PWIPB*~VHRDM	1.000	1.000	0.125	0.125	Turin
5	PSACS*PFPC*PFRC*~PWIPB*VHRDM	1.000	1.000	0.125	0.125	Florence
	M1	1.000	1.000	1.000		

Note: M1: ~PSACS*PFPC*~PFRC*~PWIPB + PSACS*~PFPC*~PFRC*~PWIPB + ~PSACS*PFPC*~PFRC*VHRDM + PSACS*PFPC*~PFRC*PWIPB*~VHRDM + PSACS*PFPC*PFRC*~PWIPB*VHRDM

Parsimonious Solution for the Negative Outcome

		inclS	PRI	covS	covU	cases
1	PSACS*~PWIPB	1.000	1.000	0.500	0.500	Venice; Genoa; Verona; Florence
2	PFPC*~PFRC	1.000	1.000	0.500	0.500	Naples; Milan; Rome; Turin
	M1	1.000	1.000	1.000		

Note: M1: PSACS*~PWIPB + PFPC*~PFRC

Intermediate Solution for the Negative Outcome

From C1P1:

		inclS	PRI	covS	covU	cases
1	PSACS*~PWIPB	1.000	1.000	0.500	0.500	Venice; Genoa; Verona; Florence
2	~PSACS*PFPC*~PFRC	1.000	1.000	0.375	0.250	Naples; Milan; Rome
3	PFPC*~PFRC*~VHRDM	1.000	1.000	0.250	0.125	Naples; Turin
	M1	1.000	1.000	1.000		

Note: M1: PSACS*~PWIPB + ~PSACS*PFPC*~PFRC + PFPC*~PFRC*~VHRDM