

# Urban regeneration as a booster for social capital? The role of social infrastructure in Barcelona

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## Abstract

*This work is part of the ongoing doctoral thesis 'Vulnerability + regeneration = threat of expulsion. Learnings from the organizations for an inclusive urban regeneration' within the framework of the Urban and Architectural Management and Valuation PhD Program from Barcelona's School of Architecture (Polytechnic University of Catalonia). Within the framework of a competitive project focused on vulnerable neighbourhoods of Catalonia and the Basque Country, the aim of the thesis is to study the impact of urban regeneration policies in vulnerable areas in social, architectural, urban and economic terms, and the probable links with the organizational component of the territories. Although this is still an ongoing work, at this point it is possible to present some partial results, concerning some of the theoretical discussions and methodological tools used to study and measure urban vulnerability. The construction of an integrated vulnerability index for the city of Barcelona has allowed us to identify urban vulnerability at a neighbourhood level. This index was put into relation with another constructed measurement, characterising social infrastructures of these neighbourhoods. This paper's main findings account for the fact that social infrastructures work as booster for socialization, cohesion and participation processes that may counteract vulnerability associated processes.*

## Keywords

*Urban vulnerability, social capital, social infrastructure, civic engagement*

## 1. Introduction

The study of inequality in its different forms has been an issue since the origins of the sociology discipline. The specific analysis of its urban expression has given birth to different movements and approaches that aim to explain why different social groups concentrate or take over specific amounts of resources that strengthen the initial distances and divisions, resulting in a reproduction of the social sphere. This article aims to reconstruct some of these discussions and debates and at the same time contribute to the study of urban vulnerability.

This article is written within the framework of both a competitive project and a PhD dissertation. Within the framework of these two projects that aim to study urban regeneration policies in vulnerable areas of Barcelona, this article intends to capture the role played by the social infrastructures of these territories. Thus, it intends to prove the following hypotheses:

- The fact that social differences have a territorial correlate, making it is possible to identify the spatial distribution of social groups

- The fact that social infrastructure may serve as a plausible explanation for the differential appropriation of social capital among social groups, resulting in different levels of cohesion, participation and organization of the territories
- The fact that socialization and organization serve as opposite forces to vulnerability and its associated negative effects

In this context, the main objectives of this article are to:

- Discuss theoretically and empirically the concept of urban vulnerability
- Construct an integrated vulnerability index (IVI) that will allow us to identify Barcelona's neighbourhoods in terms of a vulnerability continuum
- Study local organizations and entities as a means to account for the level of 'social capital' of the territories
- Interpret the territories' organization level as a result of their 'social infrastructures' meaning that urban planning can serve as a generator for socialization and organization thus vulnerability detractors

What are the differences between the neighbourhoods in terms of the tools, conditions and infrastructures that promote organization and thus probable better preparation against threats? The general goal will be to discuss both theoretically and empirically the role of local organization in the territory's resilience, especially as we face the effects of Covid-19. Can urban regeneration policies and interventions function as an excuse to promote spaces of quality that result in citizen interaction?

As stated before, this work is being written within the framework of the competitive project 'Socio-spatial indicators for the improvement of the housing stock in vulnerable areas. Criteria for action in the cases of the Metropolitan Areas of Barcelona and Bilbao (RE-INHABIT)' financed by the Spanish State Research Agency (AEI). It is also written within the framework of the PhD dissertation 'Vulnerability + regeneration = population in risk of expulsion. Learnings from the organizations towards a comprehensive urban regeneration', from the Urban and Architectural Management and Valuation (Barcelona's School of Architecture, Polytechnic University of Catalonia), with the support from the Secretariat for Universities and Research of the Ministry of Business and Knowledge of the Government of Catalonia and the European Social Fund.

This paper is organized as follows: first, some of the main contributions in the topic are revised. Secondly, the methodological strategy is presented. Thirdly, the results of the research are discussed. Finally, the main outcomes and contributions of the research are explained.

## 2. Literature review

Poverty and inequality are intrinsic in any capitalist society. The study on these topics began in the origins of sociology as a science. The School of Chicago from its beginnings tried to explain the reasons for the differential appropriation of resources of social groups as well as the distribution of these groups among the urban space. As societies became more and more complex, concepts such as 'poverty' became less and less explanatory of social phenomena and relations, forcing researchers to come up with new words and concepts in an attempt to fully capture the essence of change.

Robert Castel (1995) is probably the first one to explain the decline of wage-earning salary-centred societies, due to the transition from previously work-centred societal forms into a new reality defined by another type of precarious relations, giving life to vulnerability as a key concept for the understanding of contemporary societies. The typical relations and everyday life in the previous societal form was organized by the inclusion/exclusion binary, meaning that having a 'stable' job meant being 'integrated'



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in society *aka* social integration. Starting from this, every other social relation would be organized in this same direction. However, the decline of the salary-centred society meant the breaking off of social bonds as were understood until that time, and precariousness and instability gave birth to the concept of vulnerability (Ranci & Migliavacca, 2010), where relations are no longer defined as opposites, but by the grey areas and spaces in between.

Urban vulnerability (Rodríguez, 2001) is the form that vulnerability takes specifically in urban areas, where it has become more and more common to witness a territorial distribution of groups that may be a result of other social, economic, demographic, urban characteristics. This distribution usually follows a pattern: the differences that are mostly appreciable in social and economic terms coincide with its territorial distribution, meaning urban vulnerability and social vulnerability are very well related and more vulnerable groups tend to concentrate in specific areas. Thus, in an attempt to identify the form that this territorial distribution takes, researchers have developed different measurements and indices that aim to account for the concept of urban vulnerability, whilst – with statistical tools – construct different indices that can explain who and why tends to live and where, when applied to specific territories such as cities or metropolitan areas. These indices are generally accompanied with different mapping tools using Geographic Information Systems (GIS) and usually include variables related to the economic, social, work, demographic, education or other dimensions.

Recent work (Palacios *et al.*, 2018; Piasek *et. al.*, 2021) has shown that it is crucial to take into account the degree of organization of these territories since social capital and social bonds could act as a means to cope with and give answer to vulnerability associated threats. This idea has also been demonstrated when analysing the differential response of apparently similar neighbourhoods to some critical situations, such as floods or other climate related phenomena. Klinenberg (2018) realized that the response speed and the ability to neutralize certain threats could actually be explained, not only by the engineering infrastructure of a specific city (that is of course crucial), but more importantly by the social infrastructure of the territories. This concept accounts for those ‘invisible’ things that have an ability to strengthen, empower and provide some material means and basis for socialization among neighbours. The fact that the neighbours knew each other, that networks of solidarity and mutual knowledge were the norm in some places, not only helped but actually meant that greater social interaction would result in less negative effects of the external threats, when comparing the consequences of natural disasters in one and another neighbourhood with apparently similar (actually same) objective conditions and characteristics in terms of social composition, demographics, socioeconomic level, etc.

Social capital was firstly defined as those social relations that increase any actor’s ability to advance on their interests (Bourdieu, 1978). Thus, neighbourhood social capital forms have been studied in their links with other dimensions of social life, such as health (Carpiano, 2007), urban planning (Wan *et al.*, 2021), education (Rogosic & Baranovic), among others.

Thus, the concept of social infrastructure differs from social capital in the sense that the latter accounts for the constructed social bonds, whereas the former explains its foundations: libraries, schools, parks, even bar terraces that serve as a probable cause for booster and social interaction, socialization and the probable consequential construction of social capital.

Urban regeneration is the strategy that has been taking more and more importance as opposite to urban sprawl land newbuilt housing, since it has been thoroughly proven that intervention in the existing city is more efficient and sustainable to the previous model.

### 3. Methodology

To give answer to the goals of this research, we follow mainly a quantitative strategy. As stated before, this article is part of an ongoing thesis. As established in its workplan, the qualitative work packages be established mainly based on the results of these first quantitative stages. Here is a summary of the methodology used for this article.

Firstly, we intended to construct an integrated vulnerability index for the city of Barcelona. Thus, a database was made, including 19 variables that account for the different dimensions of what we understand as urban vulnerability (based on previous work and literature). Actually, the initial database included more indicators that were excluded by the ran model. We then conducted a factorial analysis (FA), a very useful tool when working with large sets of information, including different variables and cases. This method allowed us to introduce all our variables and resulted in the formation of four subfactors, each related to a specific dimension of vulnerability, as will be explained in the next section. Table 1 shows the selection of variables for the FA.

Indicator	Source
House prices per m2 (€)	Sect. of the Urban Agenda for Catalonia - GenCat (2021)
People with a university education (%)	Municipal Register of Inhabitants (2020)
People without basic education (%)	Municipal Register of Inhabitants (2020)
Available family income (€)	Open Data Barcelona (2018)
Age of the dwellings (years)	Cadastral General Directorate (2020)
Tourist accommodation (%)	Barcelona Statistics Department (2020)
Entities per neighborhood (N)	Open Data Barcelona (2020)
Foreign population (%)	Municipal Register of Inhabitants (2020)
Youth population (%)	Municipal Register of Inhabitants (2020)
Dwellings of private foreign owners (%)	Cadastral General Directorate (2020)
People with vocational training (%)	Municipal Register of Inhabitants (2020)
Unemployment (%)	Department of Work - GenCat (2021)
Abstention in last elections (%)	Ministry of the Interior (2019)
People over 65 years old (%)	Municipal Register of Inhabitants (2020)
Non-contributory pensions (%)	Department of Work - GenCat (2021)
Sex ratio (%)	Municipal Register of Inhabitants (2020)
Flats with lift (%)	Population and Housing Census (2011)
Average area of housing (m2)	Cadastral General Directorate (2020)
Housing with heating (%)	Population and Housing Census (2011)

**Table 1:** List of indicators regarding vulnerability. Source: prepared by the author.

Once the FA had been analysed, we mapped the results with the support of GIS, allowing us to identify Barcelona's neighbourhoods on a vulnerability continuum for each of the dimensions or factors, as well as for the integrated measure of urban vulnerability. The results of this methodology will be presented in the following section.

In parallel to the vulnerability analysis, it was also important to establish the different neighbourhood's behaviour in terms of their organization level. This was measured by including a set of variables that could account for organization related indicators, such as participation in elections, quantity of local entities and organizations, their typology or subject of interest, participation in demonstrations (in-person and virtual), formalized neighbour communities (neighbours of the same building), among others. This analysis allowed us to characterize the different neighbourhoods in terms of their cohesion and

organization level, which was also mapped using GIS, allowing us to put both sets of maps into relation. The final overlapping of the two dimensions (vulnerability and organization) allowed us to compare and understand how the level of vulnerability was related to the ability and level of organization of local citizens and entities, meaning a probable better adaptation due to its cohesion, in terms of social capital, especially in times of crisis or threat. This part of the work was done following the conceptualization and debate on the concept of social capital, mostly related to social bonds and local networks.

Finally, we tried to understand whether the differential level of organization of the territories could be explained – at least partially – by the characteristics of the neighbourhoods, both spatial and social. A deep analysis was made in order to characterize the different neighbourhoods in terms of their social infrastructures, including libraries, parks and other recreation areas that could be acting as bonding and socialization boosters. These are usually the focus of most urban regeneration strategies. It was important to identify these areas and infrastructures since these would entail a possible explanation of the different levels of organization *vis a vis* the vulnerability and organization measures. In order to capture the role of social infrastructures in the degree of socialization, we used the linear regression statistical technique, in an attempt to identify the variables that better explain the differential level of organization of the neighbourhoods.

This set of activities mainly framed in a quantitative strategy allowed us to understand better both vulnerability and social capital and infrastructure, as well as served as a framework to explain the context of the differential appropriation of resources of social groups in the city of Barcelona. It is expected that the results of this article lead to a better understanding of social dynamics, inequalities and their territorialization, as well as serve as a framework for the selection of some case studies that may be analysed in depth in future work within the same dissertation.

## 4. Research results

In this section, we try to summarize the main results obtained throughout this research.

### 4.1 The integrated Vulnerability Index

We set out to construct a measurement for vulnerability, including variables of various dimensions. A database including all of these was set in order to introduce the data into the SPSS program and conduct a factorial analysis. The FA is a data reduction technique, whose ultimate aim consists of searching for the minimum number of dimensions capable of explaining the vast amount of information contained in the data (De la Fuente, 2011). The distribution is made following statistical criteria; we then set to analyse the distribution of indicators that was obtained ‘automatically’.

The results obtained in the model account for four dimensions or subfactors of vulnerability. The first one is related to social class and includes the following indicators: price of the square meter of the dwellings, percentage of people with a university education, percentage of people with basic education, available family income. These variables aim to account for a sort of measurement of the difference in status between an individual and others in social life (Kraus et al. 2009).

The second one is related to gentrification and includes: age of the dwellings; percentage of tourist accommodation; number of entities per neighbourhood; percentage of foreigners; percentage of young population; premises property of private foreign owners. Gentrification associated process are usually generated when an urban area is appropriated by a population segment that did not previously live there and, consequently, the people who live there may be pushed out (Janoshcka & Hidalgo 2014; Hübscher 2018; Sorando & Ardua 2016).

The third one portrays the risk of disaffiliation. It includes the following indicators: percentage of people with vocational training; percentage unemployed; percentage of people who abstained in the last elections; percentage of people over 65; percentage of people with non-contributory pensions; sex ratio. Accounting for the higher or lower level of integration in work and civic life, the concept of disaffiliation has been widely studied in relation to vulnerability (Castel, 1991).

Finally, the fourth factor includes variables related to the physical and architectural sphere: percentage of flats with lifts; average surface area of the housing (m<sup>2</sup>); percentage of housing with heating.

Figure 1 portrays the distribution of each of the factors within the city of Barcelona. This mapping allows an understanding of the multidimensionality of the concept of vulnerability and at the same time gives us the possibility to visualize the distribution of each of its dimensions throughout the city. We can see that some neighbourhoods coincide in most maps.

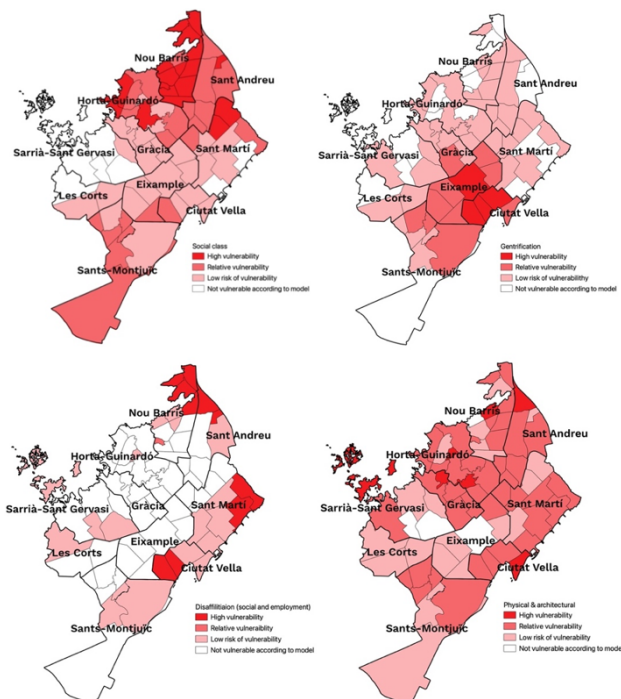


Figure 1: The dimensions of vulnerability according to the FA. Source: prepared by the author.

Finally, the sum of the partial factors has resulted in an integrated vulnerability measurement that has also been mapped. This is the sum and synthesis of all the variables included in the model, resulting in an integrated vulnerability index (IVI), that has been applied in the city of Barcelona. Both each of its dimensions and the integrated measure are useful in terms of identifying urban related problematics on a neighbourhood level, allowing comparison between different areas of the city. The fact that this index could also be repeated in a few years' time, would also allow a follow-up of the city's vulnerability behaviour.

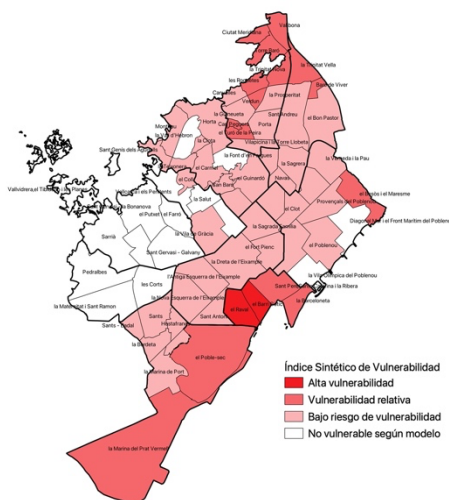


Figure 2: The IVI. Source: prepared by the author.

Figure 2 depicts the distribution of the IVI in the city, showing some concentration of problematics, especially in part of the most central area, where an old building stock with security, accessibility and energy related lacks is combined with other social problematics, aggravated by a most regular presence of tourists and travellers, that sometimes results in a competition with the local residents for commercial activity, public spaces and housing. Some other vulnerable identified spaces are some neighbourhoods of the Besòs-Maresme area, a historically depressed area currently undertaking renovation activity, as well as some areas of the Nou Barris district. A comparison with other indices that have been applied in the city, as well as a validation by other research and interviews with representatives of the administration (in a word, a combination with qualitative work) would result in a better understanding on the reasons for the differences identified by this index.

#### 4.2 The organization Index. A measurement for social capital

What is organization and how can we measure the level of organization of the different neighbourhoods?

A true measure for social cohesion and civic engagement would entitle a serious work aimed at capturing multiple means of social interaction. A complete and thorough measurement would necessarily include indicators related to the ability of the neighbourhood to include and distribute resources as well as the resident's sense of belonging; the quantity and typology of local entities and associations; the existence of networks towards the inclusion of migrants and other vulnerable groups; the availability of spaces that enable social interaction (this will be discussed in the next point); also the resident's available time to dedicate to community activities; finally, the continuity of struggles besides concrete conflict situations. Obtaining and analysing this data is part of an ongoing work package within the framework of the PhD dissertation that supports this article. However, at this point, we are able to present some partial results portraying the differential level of organization of the neighbourhoods measured as the relative number of organizations and their typology.

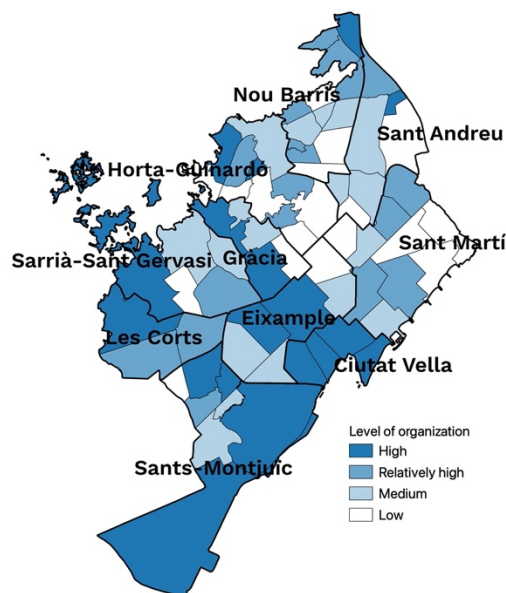


Figure 3: Level of organization. Source: prepared by the author.

It is quite interesting to compare figures 3 and 2 since this allows a comparison between the vulnerability and organization indices. A quick analysis suggests it would be interesting to focus future work on neighbourhoods such as Besòs-Maresme where it is possible to identify high levels of vulnerability with relatively lower levels of organization. Other neighbourhoods of the Ciutat Vella and Nou Barris districts would also be of interest since very vulnerable areas sometimes coincide with quite highly organized territories, suggesting other dynamics that would also be interesting to take into account in future research.

### 4.3 The socio-urban dimension. A measurement for social infrastructure

As we have previously discussed, certain characteristics of the environment that are usually the focus of urban regeneration policies serve as boosters or detractors of socialization. In order to identify the indicators that better explain the degree of organization, a database was constructed containing as many information available open-source related to the social infrastructure of the neighbourhoods. Besides some sociodemographic variables, this database includes many indicators such as the presence of libraries, museums, leisure establishments, parks, schools, churches, terraces, pedestrian streets, climatic shelters, gyms, pools, urban gardens, farmer’s markets and fairs, among others. We introduced this database in SPSS in order to carry out a lineal regression model that would help understand the variables’ explanatory capacity of the level of organization of the territories. The results of the model are shown in tables 2 and 3:

	Std Coef Beta	Significance
cinemas, theatres, auditoriums	.398	<.001
bar and restaurant terraces	.199	<.002
education establishments	.203	.002
parks and green areas	-.220	<.001
libraries and museums	.314	<.001
women representation	.193	<.001

Table 2: Organization explained by social infrastructure (included variables). Source: prepared by the author.

Table 2 shows the included variables in the sixth and chosen model. It depicts the social infrastructure related indicators that better explain the degree of social interaction and thus level of organization of the



different territories. These results are very well aligned with Klinenberg's contributions, related to the importance of social infrastructure.

Besides the interest of these partial results – that would need further explanation in future work – it is at this point necessary to account for the validity of the model by running a few statistical tests. As Table 3 shows, the model has high levels of R value (close to 1) and a significance value close to zero, validating the results obtained up to this point. A histogram graph (see figure 4) was also made showing a normal distribution of the model's residues.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.830 <sup>a</sup>	.688	.684	55.409	.688	156.916	1	71	<.001
2	.927 <sup>b</sup>	.859	.855	37.589	.170	84.274	1	70	<.001
3	.942 <sup>c</sup>	.888	.883	33.736	.029	17.903	1	69	<.001
4	.952 <sup>d</sup>	.906	.900	31.161	.018	12.872	1	68	<.001
5	.959 <sup>e</sup>	.919	.913	29.019	.014	11.414	1	67	.001
6	.966 <sup>f</sup>	.932	.926	26.772	.013	12.718	1	66	<.001

Table 3: Organization explained by social infrastructure (statistical results). Source: prepared by the author.

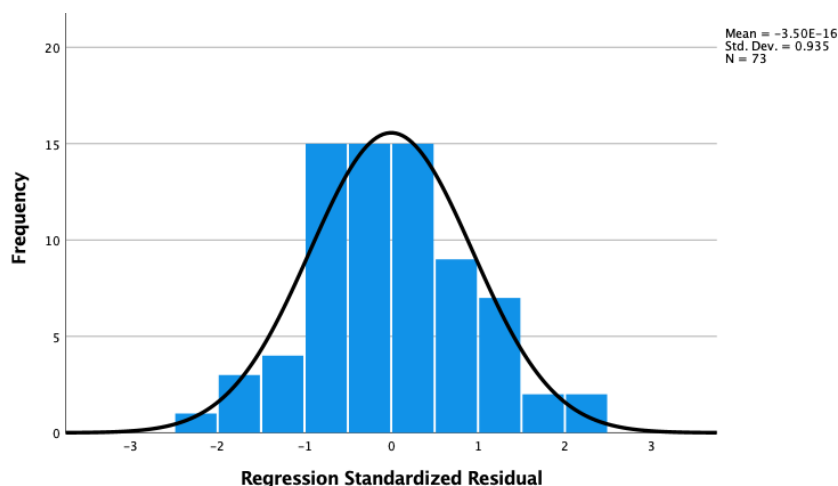


Figure 4: Organization explained by social infrastructure (histogram): Source: prepared by the author.

A qualitative work mainly aimed at reconstructing the history of struggle of the territories identified as more or less organized, as well as an effort to capture the representation of the role that social infrastructure play in socialization, cohesion and participation requires further efforts that we intend to undertake in future lines of research.

## 5. Research outcomes and conclusions

### 5.1. Research outcomes

Until now, we have made an effort to:

- Discuss the concept of vulnerability vis a vis social capital and social infrastructure
- Create a vulnerability index that has been applied in the city of Barcelona
- Create an organization measure for Barcelona's neighbourhoods in order to establish possible connections between vulnerable and/or organized areas of the city

- Identify the variables related to social infrastructure that probably explain why certain neighbourhoods are more or less cohesive and organized

If social infrastructures work as booster for socialization, cohesion and participation processes, these may lead to higher levels of social capital resulting in more prepared territories to face vulnerability associated effects. Urban regeneration could act, in this sense, as a promoter of spaces that boost social interaction. A more qualitative work – which is the next step of this research – will aim at answering some of the questions already present in recent studies related to the relation between social capital and vulnerability (Fraser & Naquin, 2022).

Even though our efforts have been truly fruitful since they have allowed a better understanding of urban vulnerability in relation to its constraints and effects and this has led to some partial results that may lead to more serious contributions both in a methodological as well as in the public policy domain, at this point some statements need to be examined.

Firstly, a more serious theoretical discussion of vulnerability, social capital and social infrastructure is necessary at this point. This more conceptual work will probably lead to the inclusion of other non-contemplated variables until now, as well as the dismissing of probable not so relevant indicators. Thus, a better constructed measurement of both vulnerability and organization (including qualitative variables) will definitely imply a more serious contribution on the study of the urban phenomenon.

Then, a revision of other indices and the comparison with the ones constructed in this work is also due. This would serve as a further validation of the results obtained throughout this research, mainly taking into account the contributions of Garcia-Almirall *et al.* (2018), Hernández-Aja *et al.* (2018), Fernández-Aragón *et al.* (2021), among others.

Finally, it would also be very interesting at this point to analyse the relative importance of the variables related to social infrastructure that are apparently explaining the level or the neighbourhood's organization. Why have these been included in the linear regression model, what do these imply and what is the resident's and the administration representative's views on the subject?

## 5.1. Conclusions

As general conclusions of this work, we can say that:

- Vulnerability, social capital and social infrastructure have served as concepts that help us understand better the urban phenomenon as a social construction
- Statistical tools have helped us analyse social phenomena and identify certain tendencies throughout the territory
- GIS software has helped us identify social phenomena on an applied urban level
- It has been possible to put into relation the concepts of vulnerability and organization
- The IVI has allowed to understand the multidimensions of vulnerability
- The organization index, even though still under construction, has helped us understand the distribution of resources and social capital along the city
- Social infrastructure components have shed some light on the material conditions for socialization, cohesion, participation as means for organization processes

At this point, it may be necessary to adopt a more qualitative approach. A focus on specific case studies, selection that will be detached from this paper's contributions, will guide future lines of work.

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