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A proposal to measure the resilience of the Andalusian Commnunity Social Services

Una propuesta para medir la resiliencia de los Servicios Sociales Comunitarios de Andalucía

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Resumen

Introducción. La pandemia de COVID-19 ha puesto de relieve las vulnerabilidades de los servicios dirigidos a las poblaciones más vulnerables, lo que hace necesario un marco sólido dentro de los servicios sociales para mitigar los impactos de la crisis. Este artículo propone un índice de resiliencia basado en las capacidades de los servicios sociales para amortiguar y paliar los efectos adversos de las crisis, incluida la reciente pandemia. Así, el objetivo de

Abstract

Introduction. The COVID-19 pandemic shed light on the weaknesses of social services directed towards the most vulnerable populations. A robust social services framework is, thus, necessary to mitigate the impact of the crisis. In this work, a resilience index is advanced based on the capacities of social services to buffer and alleviate the adverse effects of crises, including the recent pandemic. Thus, the study's objective was to create a resilience index

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este estudio es la creación de un índice de resiliencia basado en datos accesibles para evaluar la capacidad de los servicios sociales andaluces para mitigar el impacto de la pandemia. *Metodología*. En este trabajo se presenta una metodología novedosa, HVCRA (Hazard, Vulnerability, Risk, and Capacity Analysis), tradicionalmente utilizada en la evaluación de desastres naturales, aplicada ahora para calibrar el impacto de la pandemia en los servicios sociales. El desarrollo del índice implicó la validación de expertos mediante el método Delphi, la evaluación de las partes interesadas y el cálculo de índices de resiliencia pre y post pandémica para municipios de Andalucía (comunidad autónoma del sur de España). *Resultados*. El estudio se desarrolló en tres fases: identificación de indicadores de resiliencia, selección de datos y cálculo de índices. Se alcanzaron valores modales elevados en el método Delphi, con variables significativas identificadas en grupos focales de partes interesadas. El índice final, reducido a 17 indicadores, pretende mejorar su aplicabilidad a través de los esfuerzos de contextualización en curso. *Discusión*. Esta investigación, que hace hincapié en indicadores fundamentales para la evaluación de la resiliencia de los servicios sociales, coincide con el planteamiento de Kruk et al. al proponer un índice de resiliencia para la asistencia sanitaria. Los indicadores estructurales, como la asignación presupuestaria y el personal, desempeñan un papel fundamental, aunque persisten los problemas de disponibilidad de datos, sobre todo en municipios de más de 20.000 habitantes. A pesar de las limitaciones, los indicadores propuestos son prometedores para una evaluación exhaustiva de la resiliencia en los sistemas de servicios sociales comunitarios. *Conclusiones*. El estudio establece un marco sólido para evaluar la resiliencia de los servicios sociales comunitarios, aunque la accesibilidad de los datos sigue siendo un reto. Aun reconociendo sus limitaciones, los indicadores propuestos sientan las bases para una evaluación exhaustiva, subrayando la necesidad imperiosa de abordar la disponibilidad de datos para una evaluación más matizada de la resiliencia de los servicios sociales.

Palabras clave: índice de resiliencia; servicios sociales; toma de decisiones; impacto; COVID-19; método Delphi; HVCRA.

based on accessible data to assess the extent to which Andalusia's social services were capable of mitigating the effects of the pandemic. *Methodology.* A novel methodology, the HVCRA (Hazard, Vulnerability, Risk, and Capacity Analysis), is introduced in this paper. Though traditionally used to assess natural disasters, HVCRA was applied here to gauge the pandemic's impact on social services. To develop the index, expert validation was conducted through the Delphi method, stakeholder evaluation, and the calculation of pre– and post-pandemic resilience indices for municipalities in Andalusia (an autonomous region in southern Spain). *Results.* The study unfolded in three phases: identification of resilience indicators, data selection, and index calculation. High modal values were obtained with the Delphi method, and significant variables were identified in stakeholder focus groups. The applicability of the final index, reduced to 17 indicators, could be improved through ongoing contextualisation efforts. *Discussion.* Critical indicators to assess social service resilience were put forward, in line with the research conducted by Kruk et al. who propose a resilience index for healthcare. Structural indicators, such as budget allocation and personnel, play pivotal roles, though data availability challenges persist, particularly in municipalities with over 20,000 inhabitants. Despite the study's limitations, the proposed indicators are promising in terms of offering a comprehensive resilience assessment method directed towards community social service systems. *Conclusions.* The study establishes a robust framework for evaluating community social service resilience, although data accessibility remains a challenge. While acknowledging the study's limitations, the proposed indicators lay the groundwork for attaining a comprehensive evaluation in the future, underscoring the imperative of addressing data availability in order to achieve a more nuanced assessment of social service resilience.

Keywords: Resilience Index; Social Services; Decision-making; Impact; COVID-19; Delphi method; HVCRA.

1. INTRODUCTION

The aim of this article is the creation of a resilience index based on accessible data to assess the capacity of Andalusia's social services to mitigate the impact of the pandemic. For this purpose, a computer-based data management and Resilience Index calculation tool was designed, focused on knowledge, decision-making, and solutions. This tool has been piloted in Andalusian municipalities with more than 20,000 inhabitants, but it can be extrapolated and applied to other communities and specialised social services in other territories.

Social services are the professional social intervention services that public administrations make available to citizens to respond to situations of special need (Argüelles, 2016). Spain grants this competence to its different regional governments, termed «autonomous communities», as is the case of Andalusia. These services are divided into Community Social Services and Specialized Social Services. Community Social Services are the first step in accessing social services, being the first level, where people have access to the system. Social Services are managed at the municipal or supra-municipal level (Law 9/2016 of 27 December on Social Services in Andalusia)[1].

In different cross-country comparison reports (OECD, 2022), the COVID-19 crisis has highlighted weaknesses in many health and social care systems, including underfunding, the understaffing of care facilities, and insufficient support for the provisioning of palliative care. However, this situation of weakness is not something new that arose due to COVID-19, as prior to the current crisis in most countries there had already been calls to expand measures to ensure high quality in various care-related services.

In most countries, the need for a plan to transform social services is beginning to be seen as a necessary step in order provide optimal responses to the entire population, and especially vulnerable groups, to deal with the social, psychological, and economic consequences of COVID-19 (Millán-Franco, 2020). In those countries that have models characterized by greater privatization, the crisis caused by COVID-19 highlighted the need to undertake reform, paving the way for reflection on a commitment to public and universal Social Services and Health systems, as in the case of the U.K. (Pollock et al., 2020), U.S.A. or China (He et al., 2022).

Therefore, due to its capacity for transmission in a globalised world, the virulence of its effects, and the capacities and characteristics of societies and

1 Ley 9/2016, de 27 de diciembre, de Servicios Sociales de Andalucía (BOE n.º 18, de 21/01/2017). https://www.boe.es/eli/es-an/l/2016/12/27/9/con

territories, COVID-19 revealed enormous vulnerability, not only in terms of health but, above all, in terms of social and economic vulnerability. In this context Social Services emerged as a fundamental cornerstone to address the present and future challenges posed by the pandemic (Santás, 2020), as well as an integral part of public social services, as community social workers were expected to play an essential role in addressing the pandemic, given their experience with community-level work (Itzhaki-Braun, 2022).

Focusing on the Spanish case, at the beginning of the «State of Alarm» declared in the country, social services were not considered essential, which meant the cessation of almost all the activity that was being carried out. As an example of this, social intervention projects were cancelled, home help for the elderly and dependent persons was limited, and a large amount of aid contributing to the achievement of a minimum level of wellbeing for large sections of the Spanish population, was discontinued. The authorities quickly realized the impact of limiting social services and declared them essential. Thus, on 26 March 2020, 12 days after declaring a «state of alarm» in the country, the Spanish authorities, via order SND/295/2020, declared social services and their workers essential, which allowed them to continue providing these services, albeit limited and determined by the terms of the State of Alarm.

The provisioning of these services under extreme conditions allows for the evaluation and measurement of their level of resilience in different municipalities, which refers to their capacity for adaptation and response to vulnerability and the impact of the pandemic. This article proposes a resilience index focused specifically on indicators of a structural nature, utilizing accessible, valid, and comparative data.

1.1. Towards the construction of a community resilience index

A multidimensional approach is necessary to gain a thorough understanding of the impact generated by the COVID-19 crisis. This approach should not only allow us to comprehend its consequences and effects across different social realms and spheres, but also to identify the factors and potentials that could help mitigate these effects and facilitate effective adaptation to unforeseen crisis situations in the future.

Traditionally, the concept of resilience has been associated, firstly, with the natural realm, linked to the environment and sustainable development; and with psychology, either with an individual or community approach. The first transdisciplinary study on resilience was carried out by Holling (1973) with the aim of establishing sustainable relationships between the population and the natural resources of an ecological system. Since then, following this line,

the concept of resilience has been applied in work on complex socio-ecological systems (Sánchez-Zamora et al., 2016).

The theoretical foundations that support the resilience index created stem from the HVCRA (Hazard, Vulnerability, Risk, and Capacity Analysis) methodology, particularly used in environmental issues (Reinoso et al., 2020). We understand that the models combine the variables of vulnerability, hazard and resilience (Wisner et al., 2014). This model works on the management of uncertainty through integral and transferable knowledge, and it is framed as part of integrated planning strategies in risk management and the socio-economic impact of disasters, hazards and/or risk situations (Van Niekerk, 2002) allowing for the protection of people and systems, with effective and appropriate management modes to know, apply and control.

It is worth highlighting the article by Bergstrand et al. (2015), which contributes to the literature on catastrophes by measuring and connecting social vulnerability and community resilience in American counties, finding a correlation between high levels of vulnerability and low levels of resilience. By examining social vulnerability and community resilience, they map communities' social risks in the face of hazards, as well as their resilience and adaptive capacities.

The concept of resilience is, increasingly, present on the political agenda. Proof of this is the creation of the Next Generation Funds, which the European Union sees as a mechanism to address the aftermath of the crisis generated by COVID-19 and economically revive the Eurozone. One of the main objectives of this Recovery Plan is to enhance the resilience of Europe's different regions. This means achieving minimum conditions that make possible rapid socioeconomic recovery by all European territories in the event of a potential future crisis, as well as increasing the flexibility mechanisms that ensure territories' ability to respond to unforeseen needs, not only considering present ones, but also the uncertainties of the future.

From this perspective and considering that not all territories have the same resources and potential to adequately withstand the impact of different types of unforeseen crises, it becomes necessary to study and diagnose territorial socio-economic realities in order to understand the risks and opportunities that a territory faces. Hence, within the framework of this work, the concept of community resilience applied to protection systems, such as community social services, becomes particularly relevant, with the aim of reversing the negative effects derived from situations of vulnerability and threats (Walker & Salt, 2006). In this way, the construction of a community resilience index has become a key tool for assessing and measuring communities' capacity to

cope with these challenges. Resilience is about dynamism, contingency and the absorption of disturbances by complex adaptive systems, or parts of them, on different scales, from global to local, with those ecosystems and communities that are involved (Bené, 2013; Bhandari & Alonge, 2020).

Several studies (Akamani et al., 2015; Magis, 2010; Matarrita-Cascante et al., 2017; McCrea et al.,2014; Skerrat, 2013) have addressed the construction of a community resilience index with the aim of identifying the key determinants and indicators of this concept.

In this way, Akamani et al. (2015) developed a community resilience model incorporating the factors that influence household participation in collaborative forest management in Ghana. Their findings provided valuable insights into the factors that contribute to the development and strengthening of community resilience. Taking a similar approach, Skerrat (2013) addressed the improvement of resilience analysis by providing empirical evidence on how communal land ownership influences the resilience of rural communities.

The work of Magis (2010) and McCrea et al. (2014) has focused on the capacity of communities to absorb, cope with, and recover from disasters and stressful events, focusing on the development of a conceptual framework for measuring resilience, either by considering resilience a key factor of social sustainability, or by integrating it as an element closely related to community well-being, including dimensions such as social cohesion, community resources, adaptive capacity and resilience. Along the same lines, the contributions of Matarrita-Cascante et al. (2017) continue to advance in the development of a conceptual framework that allows for a deeper understanding of the concept. To this end, they start from the importance of considering both the basic structural aspects of communities and the different social processes that take place in them when measuring community resilience.

Several authors, such as Sherrieb et al. (2010), Fielke et al. (2017), and Chuang et al. (2018), among others, have centred on the need to improve quantitative approaches to assess the resilience of communities through the development of a system of indicators. They proposed the incorporation of different modelling and simulation methods, with the capacity to analyse resilience on different spatial and temporal scales, highlighting the importance of considering the diversity and adaptability of the community when constructing a resilience index. Work such as that by Fielke et al. (2017) also makes contributions in this area, suggesting a conceptual framework that allows the concept to be operationalized through measurable indicators, starting, in this case, from the social, economic, and environmental dimensions and providing a list of indicators for each dimension.

In conclusion, these studies have contributed significantly to the construction and measurement of a community resilience index. They have explored different approaches, dimensions, and key indicators of resilience, highlighting the importance of considering social, economic, and environmental aspects, as well as community diversity and adaptability when assessing resilience. This research offers valuable insights into understanding and strengthening the capacity of communities to cope with and recover from disruptive events.

Within the framework of this work, the focus of this study will be on the capacity of community social services to cope with the effects of different crises, as a key element in mitigating and cushioning the impact of these situations on the most vulnerable segments of the population. In this way, the role of social services as a cornerstone of resilience is considered and efforts are focused on operationalizing and measuring, with available data, the capacity of these services to reverse the negative effects of different situations that may entail vulnerabilities and threats.

To summarise, the main aim of this work is the creation of a resilience index based on accessible data to assess the capacity of Andalusia's social services to mitigate the impact of the pandemic, but one which can also be applied to other adverse circumstances or situations that may occur.

To this end, the article has the following specific objectives:

- In-depth analysis of the indicators available in public and accessible databases.
- To validate the proposed indicator system with a panel of experts.
- To weight the indicators according to the criteria of impact, influence and reversibility.
- To calculate the resilience index and pilot it in municipalities of less than 20,000 inhabitants in Andalusia.

2. METHODOLOGY

The methodological process has been divided into three main phases that corresponding to the identification of resilience indicators, the selection of data and the calculation of the index.

2.1. Phase 1. The identification of resilience indicators

In the resilience indicator identification phase, two mixed methodological processes were used: firstly, after a selection of indicators by the research team based on a literature review and consultation of databases with locally available data, a group of experts ç evaluated the degree of importance of these

indicators for the resilience index (Phase 1.1), The selected indicators were then weighted by a group of stakeholders (Phase 1.2). This field work was carried out in between the last quarter of 2022, organizing and creating the group of experts and evaluation using the Delphi method (Phase 1.1), and the first quarter of 2023, with the stakeholders (Phase 1.2).

a) Phase 1.1. Experts' evaluation using the Delphi method.

In accordance with the theoretical postulates of the Delphi method (Oñate et al., 1998; Bravo & Arrieta, 2005; Blasco & López, 2010), two groups were formed to validate the system of indicators designed: the coordinating group (research team) and the group of experts. The selection of the experts was made by the coordinating group, considering the recommendations of Landeta (1999) regarding the number of experts participating in the group and considering the candidates' knowledge of the subject matter, addressed as a fundamental criterion. The consultation process was carried out with nine experts from both academic and institutional backgrounds, spanning various fields to encompass the complexity of the study object (demography, sociology, geography, environmental sociology, the socio-health sector, children and families, and social services), were involved in the study. Regarding the methodological procedure, the phases outlined by Bravo and Arrieta (2005) were adhered to, comprising a preliminary phase, an exploratory phase, and a final phase for the definitive construction of the model. These experts engaged in two rounds of participation, allowing for the establishment of importance (mean) and agreement (standard deviation) criteria for a series of items.

The initial content of the proposal developed by the research team was incorporated into a questionnaire on which 18 items represented specific content on the assessment of the resilience of social services. Experts were asked to rate each item using a 5-point Likert scale that measured the degree of importance of each indicator in the model, with 1 conveying «Not at all important» and 5 meaning «Very important.»

We took a special interest in the qualitative evaluations, since by analysing in detail the information and suggestions provided by the experts, the exclusion and structure of items and the creation of new items were delimited (Wiersema, 2001).

For the quantitative analysis we used the IBM Statistical Package for Social Sciences for Windows (SPSS), version 27.0. The mean score and standard deviation, mode, and maximum and minimum values were described. Zambrano et al. (2015) propose that items possessing a higher mean should be retained, while those items that are close to the middle of the mean should be subjected

to revision and improvement. In the second round, we carried out an evaluation of the indicators making up the final proposal. The item was included in the model if it had a modal value equal to or greater than 4. At the same time, items with a value of 3 were included, or not, depending on the position of the modal values in the 1st quartile. For the item to be considered in the model, 75% of the experts had to have rated it as Important (4) or Very important (5).

To present the content validity, the content validity coefficient (CVC) was calculated (Hernández-Nieto, 2002), considering an acceptable validity and concordance for 9 cases in the minimum at 0.78 (McGartland-Rubio et al., 2003). Regarding the resilience coefficient, it achieves 0.91 (excellent validity and concordance).

b) Phase 1.2. Evaluation and weighting of stakeholders based on impact, reversibility, and influence criteria.

Once the resilience indicators were identified through a literature review and validated through the two-round process explained in the previous section, a weighting of these indicators was chosen using a multi-criteria methodology employing discussion groups. This allowed for the discussion of issues related to the indicators to establish scores with a higher degree of precision and consensus. Eight focus groups were held with stakeholders, a total of 55 people, with a gender distribution of 71% women and 29% men, with an average age of 48 (deviation of 12 years), the range being between 25 and 80. The selection of participants was governed by the principle of accessibility, and snowball sampling was used with people linked to regional social services (Andalusia).

The majority (43.6%) were professionals in public social services, 16.4% were professionals in elderly care residences, and another 16.4% belonged to companies/NGOs providing social services. Representing 1.8% each were local government representatives, professionals from Home Care Services, and service users. Another 18.1% corresponded to other profiles, including service users, volunteers, individuals associated with associations, and professional organizations. 85.5% were employed professionals, 12.7% were retired or semi-retired individuals, and 1.8% corresponded to other unspecified situations.

In addition to the qualitative input from the focus groups, participants individually responded to a questionnaire including the 18 resilience indicators and three criteria on a 5-point Likert scale, which could measure the impact (1 conveying No Impact, and 5, Very Impacted), the reversibility (1, Not At All Reversible, and 5, Easily Reversible) and the influence of each item on social services (1, Not Influential At All, and 5, Very Influential).

We employed the Analytic Hierarchy Process (AHP), which is a multi-criteria decision-making method used to calculate the weights of the indicators that should be included in the model (Wu et al., 2022). To accomplish this, the following process was followed: 1. Creation of a pairwise comparison matrix of size n × n (where n is the number of criteria). 2. Establishment of a 9-point linguistic scale, where 9 represents the maximum value (Very Important) and 1 represents the minimum value (Not Important At All). 3. Calculation of the relative weights: Find the relative normalized weight (wj) of each criterion by (i) calculating the geometric mean (GM) of the i-th row, and 4. Standardizing the geometric means of the rows in the comparison matrix.

It was necessary to perform a consistency check to ensure that the defined weights were not completely random and that the properties of transitivity and proportionality were satisfied. A pairwise comparison matrix is generally considered acceptable if the calculated consistency index is below 10% (0.10) (Opabola & Galasso, 2022).

Finally, to obtain the weighting factor for each indicator, it is necessary to 1) take the average score of the stakeholder evaluations for each indicator within each criterion, and 2) multiply this mean value by the weight of the corresponding criterion.

Afterward, these three scores of each indicator (which encompass the three criteria of impact, reversibility, and influence, with their corresponding weights) are summed. To standardize the scores of the set of indicators, they are normalized on a scale ranging from 0 to 1, considering the maximum and minimum values of the set of 18 indicators. The result is the creation of a weighted overall index that reflects both the weights of the criteria and the weights of the indicators within those criteria.

2.2. Phase 2. Data selection

In this phase, once the indicators that will be part of the resilience dimension have been validated and weighted, the data from secondary sources are downloaded. The sources used were mainly those available in the statistical information on community social services published by the Regional Government of Andalusia through the Regional Ministry of Social Inclusion, Youth, Families and Equality, as well as other information available in the Multi-territorial Information System of Andalusia (SIMA). The process itself of downloading and elaborating indicators constituted a process of indicator revision and filtering, as the difficulty or impossibility of accessing specific data made it necessary to eliminate and reformulate some indicators. The most significant changes were the reformulation of two indicators related to spending

and the number of Home Help Service users, which were originally considered in relation to the disabled population and over-65s as potential users of the service. However, given the impossibility of obtaining data on the disabled population at the municipal level, it was decided to calculate these indicators only in relation to the population over 65. Similarly, it was decided to eliminate the indicator «Definitive budget in CSS» (Community Social Services) due to the difficulty of accessing the data, since what is sought in this model is ease of access to information, which allows the data to be updated in the computer application in a quick and simple way for the people who manage and use the application.

2.3. Phase 3. Resilience Index calculation

To calculate the index, the sum of the normalised value of each variable (xi) is multiplied by the value of its weight or weighting (pi), dividing the result by the total sum of the weights (p1 + p2 +… + pn). This calculation will include both the value of the variable (xi) prior to COVID-19 and the value after COVID-19, thus obtaining the PRE– COVID-19 and POST-COVID-21 indices. The mathematical expression is as follows:

$$iD = (p1x1 + p2x2 + \ldots + pn*xn) / (p1 + p2 + \ldots + pn)$$

3. RESULTS

For a better understanding of the results obtained, the section is divided into the three phases described in the methodology.

3.1. Results for Phase 1. Identification of resilience indicators

Descriptive statistics were used to explain the results obtained using a Delphi method. Table 1 shows the mode and the minimum and maximum values obtained for each item. The mode features values between 1 and 5, the higher the greater the importance of each indicator, in the experts' opinions. An item with a value of 5 and 4 will be considered Very Important or Important, respectively. A value of 3 would indicate Medium importance, and below that number the importance is Low (2) or Very Low (1).

Table 1. Mode and minimum and maximum values of the resilience indicators. 1st and 2nd round.

R	Indicators	1st round			2nd round		
		Min	Mx	**Mode**	**Mode**	Min	Mx
1	Social facilities (per thousand inhabitants)	4	5	5	5	4	5
2	Primary Care (PC) resources or equipment (per thousand inhabitants)	4	5	5	5	5	5
3	Definitive budget for Community Social Services per inhabitant per year	4	5	5	5	4	5
4	Total funding of Social Services per inhabitant and year	4	5	5	5	4	5
5	Contribution of users to the financing of the Social Services (%)	3	5	3	3	2	5
6	Total benefit expenditure (per thousand inhabitants)	4	5	5	5	4	5
7	Expenditure on benefits not including Home Help Service benefits (per thousand inhabitants)	4	5	5	5	4	5
8	Expenditure on complementary benefits (per thousand inhabitants)	3	5	4	5	4	5
9	Total users (population ratio, per thousand inhabitants)	3	5	4	5	4	5
10	Users not including Home Help Service users in relation to the population (per thousand inhabitants)	3	5	4	4	4	5
11	Users of supplementary benefits in relation to the population (per thousand inhabitants)	3	5	4	4	4	5
12	Number of technical workers in social services centres disaggregated by category in relation to the population (per thousand inhabitants)	3	5	5	5	4	5
13	Home Help Service expenditure in relation to population (per thousand inhabitants)	3	5	4	4	4	5

R	Indicators	1st round			2nd round		
		Min	Mx	**Mode**	**Mode**	Min	Mx
14	Spending on Home Help Service in relation to the population with disabilities and the elderly (per thousand inhabitants)	3	5	5	5	4	5
15	Users of the Home Help Service in relation to the population (per thousand inhabitants)	3	5	4	4	4	5
16	Users of the Home Help Service in relation to the disabled and elderly population (per thousand inhabitants)	3	5	4	4	4	5
17	Percentage of people over age 65 among the total number of users	2	5	5	4	4	5
18	Percentage of people over age 65 who are users of Social Services in relation to the total population over age 65.	2	5	4	5	4	5

Note: Min = Minimum; Mx = Maximum; R = resilience indicator.
Source: own elaboration

Both in the first and second rounds the indicators yielded high modal values; indeed, in the second round all the indicators were between 4 and 5. Of the 18 items that make up the index, 11 featured the maximum modal value (5). Only «financing based on the contribution of users per inhabitant» obtained a lower score in both rounds (mean 1 = 3.88 and mean 2 = 3.44).

Therefore, the initial 18 indicators are retained in the second round and are proposed for stakeholder weighting.

In the focus groups conducted with stakeholders, in the qualitative part, the variables perceived as most important and as having the greatest impact on the work of social services were: the allocated budget, the number of technicians according to ratio, and the equipment. In the case of the budget, it is also the most difficult to modify, meaning it is the least reversible.

In all the groups, the importance of using new technologies during the pandemic (Bellini et al., 2018) and the digital divide existing among users (Muñoz Moreno et al., 2023) are mentioned. The priorities that stand out as important to work on are: establishing an emergency response system, connecting health and social services, having an efficient computer system, increasing human and material resources, reducing the professional-to-patient ratio, leveraging

solidarity actions in an organized manner, eliminating bureaucracy, and having an emergency protocol for unexpected situations like COVID-19.

In relation to the questionnaire that each participant had to fill in individually, the aggregated results are shown in Table 2, with the final result of the mean scores and standard deviations obtained for the criteria of impact, reversibility and influence. Prior to this step, the weight of the criteria was calculated using hierarchical analysis methodology (AHP) and the consistency ratio, obtaining an acceptable value below 0.10 (0.056) (Opabola & Galasso, 2022).

Table 2. Mean scores, standard deviations and weights obtained for each criterion by the set of stakeholders.

R	Indicators	Imp M	Imp SD	Rev M	Rev SD	Influ M	Influ SD	0-1 Scale
1	Social facilities (per thousand inhabitants)	3.13	1.60	3.55	1.12	4.42	0.74	0.67
2	Primary Care (PC) resources or equipment (per thousand inhabitants)	3.55	1.50	3.62	1.13	4.36	0.78	0.75
3	Definitive budget for Community Social Services per inhabitant per year	3.71	1.32	3.61	1.00	4.62	0.59	0.94
4	Total funding of Social Services per inhabitant	3.65	1.27	3.65	1.27	4.55	0.74	0.88
5	Financing from the contribution of users per inhabitant (%)	3.00	1.29	3.25	0.99	4.00	0.90	0.88
6	Total benefit expenditure (per thousand inhabitants)	3.69	1.18	3.62	0.97	4.53	0.63	0.36
7	Expenditure on benefits not including Home Help Service benefits (per thousand inhabitants)	3.55	1.05	3.51	0.79	4.36	0.68	0.88
8	Expenditure on complementary benefits (per thousand inhabitants)	3.78	1.01	3.51	0.88	4.42	0.66	0.74
9	Total users (population ratio, per thousand inhabitants)	4.29	0.92	3.09	1.04	4.44	0.69	0.84
10	Users not including Home Help Service users in relation to the population (per thousand inhabitants)	4.09	0.99	3.04	0.92	4.24	0.69	0.96

R	Indicators	Imp M	Imp SD	Rev M	Rev SD	Influ M	Influ SD	0-1 Scale
11	Users of complementary benefits in relation to the population (per thousand inhabitants)	4.09	1.01	3.28	0.94	4.20	0.70	0.78
12	Number of technical workers in social services in relation to population (per thousand inhabitants)	3.13	1.35	3.60	1.19	4.58	0.69	0.77
13	Home Help Service expenditure in relation to population (per thousand inhabitants)	3.45	1.12	3.44	1.03	4.36	0.70	0.77
14	Spending on Home Help Service in relation to the population with disabilities and the elderly (per thousand inhabitants)	3.69	1.13	3.42	1.07	4.45	0.72	0.71
15	Users of the Home Help Service in relation to the population (per thousand inhabitants)	3.64	1.18	3.04	1.18	4.37	0.62	0.83
16	Users of the Home Help Service in relation to the disabled and elderly population (per thousand inhabitants)	3.75	1.27	2.93	1.14	4.42	0.63	0.74
17	Percentage of people over 65 years of age among the total number of users	3.98	0.94	2.85	1.13	4.36	0.78	0.79
18	Percentage of people over 65 years old who are users of Social Services in relation to the total population over 65 years old.	4.07	0.96	2.85	1.13	4.42	0.76	0.81

Note: Imp = Impact; M =Mean; SD = Standard Deviation; Rev = Reversibility; Influ = Influence.

Source: own elaboration.

In the criterion measuring the impact of each indicator on the community social services system, the indicators with the highest means are those that include users in the model; either total users (4.29), users not including Home Help Service users, with a mean of 4.09; or users of complementary benefits in relation to the population (4.09). This indicates that the presence of and participation by users in social services is an important factor in assessing their impact.

If we look at reversibility, the indicators with the highest averages are: Expenditure on Complementary Benefits (3.78); Definitive Budget for Social Services, with a mean of 3.71; and Total Funding (3.65). Applying this criterion the means are lower than with the others. The standard deviations are also higher, which means that there is less consensus in this respect. For the influence criterion, as with the reversibility criterion, Definitive Budget for Social Services (4.62) and Total Funding of Community Social Services per inhabitant (4.55) are the indicators yielding the highest averages, in addition to the Number of Technical Workers, with an average of 4.58.

In summary, the criteria most valued by stakeholders, based on the highest averages, are the total number of users in relation to the population, the final budget for social services per inhabitant, and the total funding for community social services per inhabitant. These criteria also show moderate consistency in their measurements, indicating that they are more predictable and reliable compared to other indicators with higher standard deviations.

Table 2 also shows the weights assigned in the model. The weights represent the relative importance of each indicator in the analysis. It is observed that the indicator «Users, Not Including Home Help Service Users in Relation to the Population» has the highest weight (0.96) and the indicators «Percentage of People over 65 Who Are Users of Social Services» and «Users of the Home Help Service in Relation to the Population» also have substantial weights, of 0.81 and 0.83, respectively, This indicates that the number of users of social services is significant in the analysis and is considered a key factor by stakeholders.

In general, indicators related to the number of users and the benefit expenditures of Social Services, together with the final budget allocated, receive significant weights (0.88-0.94) in the model.

3.2. Results for Phase 2. Data selection

Table 3 shows the final system of indicators for the resilience dimension. It also specifies the procedure carried out for the elaboration and calculation of the indicators, the reference years for which this information was obtained (pre– and post-pandemic data), as well as the statistical source they come from. As can be seen and as specified in Phase 2, «Data Selection», the final number of indicators was reduced to 17 of the 18 that originally made up the model. This modification is due to the elimination of one indicator, as it was considered very difficult to access (Total Funding of Social Services), and the reformulation of two of them due to the impossibility of accessing data on the disabled population at the municipal level.

Table 3. Results for Phase 2. Data selection.

R	Indicators	Indicator's elaboration	Years	Source
1	Social facilities (per thousand inhabitants)	Ratio between the total number of social service centres and the population (per thousand inhabitants)	2019 and 2021	Ministry of Social Inclusion, Youth, Families and Equality (Department of Social Inclusion, Youth, Families and Equality)
2	Primary Care (PC) resources or equipment (per thousand inhabitants)	Ratio between the total number of Primary Care centres and the population (per thousand inhabitants)	2019 and 2021	Department of Health and Families. Primary Care Information System (SIAP)
3	Definitive budget CSS	Total budget for community social services in relation to population (per inhabitant per year)	2019 and 2021	Statistical information on community social services (Consejería de Inclusión Social, Juventud, Familias e Igualdad)
4	Financing contribution from users	Users' contribution to the financing of the SSSS out of total contributions (%)	2019 and 2021	
5	Expenditure on benefits	Total expenditure on all social benefits in relation to the population (per thousand inhabitants)	2019 and 2021	
6	Total users (population ratio)	Number of users of total community services in relation to the population (per thousand inhabitants)	2019 and 2021	

R	Indicators	Indicator's elaboration	Years	Source
7	N.º of technical workers in SSSS	Total technical workers in the SSSS in relation to the population (per thousand inhabitants)	2019 and 2021	
8	Expenditure for benefits without HHS	Total expenditure on all SSSS benefits, excluding HHS provision in relation to the population (per thousand inhabitants)	2019 and 2021	
9	Expenditure on complementary benefits	Total expenditure on all benefits considered to be complementary in relation to the population (per thousand inhabitants)	2019 and 2021	
10	Users except HHS (population ratio)	Number of users per 1,000 inhabitants of total community social services, excluding HHS	2019 and 2021	
11	Users of complementary benefits	Number of users of complementary benefits per 1,000 inhabitants	2019 and 2021	
12	HHS expenditure (population ratio)	HHS expenditure per thousand inhabitants	2019 and 2021	
13	HHS users (population ratio)	Persons using the HHS as a percentage of the total municipal population, per thousand inhabitants.	2019 and 2021	

R	Indicators	Indicator's elaboration	Years	Source
14	Percentage +65/users	Persons over 65 years of age who are users of SSSS as a percentage of the total number of users expressed as a percentage.	2019 and 2021	
15	Percentage of users over 65 / total population over 65	Persons over 65 years of age who are users of SSSS as a percentage of the total population over 65 years of age expressed as a percentage.	2019 and 2021	
16	Spending on HHS (elderly)	Spending on HHS per thousand inhabitants of the total population of people age 65 and over	2019 and 2021	
17	HHS users (elderly people)	HHS users as a percentage of the total population of people over 65 years of age	2019 and 2021	

Source: own elaboration.

3.3. Results for Phase 3. Index calculation and piloting

Once the final system of indicators that would comprise the resilience dimension was obtained, the next step, as explained in Phase 3 of the methodology, was to calculate the pre– and post-COVID resilience index for municipalities with more than 20,000 inhabitants. To do this, the weighting of the indicators carried out by the stakeholders in the different working sessions was considered, giving each of these indicators a certain weight according to the criteria considered (impact, reversibility, and influence). Table 4 shows the results obtained for all the municipalities before and after the COVID-19 pandemic. These general results show that the resilience index was slightly lower in the year 2021.

Table 4. Aggregate pre– and post-COVID resilience index.

Resilience Index (RI)	N	Min	Max	Mean	Standard Deviation
RI19	77	24.28	51.24	36.46	5.51
RI21	79	24.02	48.56	34.90	4.88

Source: own elaboration.

However, these results vary among municipalities, as some started from more favourable situations than others regarding the provisioning of social protection resources to address the that arose during the pandemic. Similarly, during this period, some municipalities experienced a strengthening of resources linked to social services, with an increase in their Resilience Index (RI) in the post-pandemic period, while others experienced a decrease. Table 5 shows the RIs for 2019 and 2021 for all Andalusian municipalities with more than 20,000 inhabitants. The municipalities were classified by quartiles based on the 2019 RI, so that those in Quartile 1 (Q1) are those with the lowest starting indices, while those in Q4 are those with the highest indices. On Table 5 they are presented by colour based on whether they belong to Q1 (light grey), Q2 (dark grey), Q3 (light green) or Q4 (dark green).

The table also shows the 2021 RI, relating to the post-COVID period for the municipalities. In general terms, a similar trend can be seen between the two periods, although there was also a greater increase in the year 2021 for those municipalities that started from more unfavourable situations, while those in Q4 tended to decrease to a greater extent.

Table 5. Ranking of Andalusian municipalities with more than 20,000 inhabitants based on their Resilience Index (RI) in the pre-COVID period.

	RI19	RI21		RI19	RI21
Roquetas de Mar	24.28	25.19	Rota	36.48	32.60
El Puerto de Santa María	26.42	28.16	Jaén (capital)	36.50	34.24
Bormujos	27.46	31.86	Maracena	36.55	39.20
El Ejido	28.01	25.87	Huelva (capital)	36.93	33.88
Coín	28.35	30.47	Priego de Córdoba	37.01	34.71
Alhaurín de la Torre	28.89	28.41	Córdoba (capital)	37.35	36.77
Motril	29.18	31.04	Linares	37.57	38.12
Mairena del Alcor	30.13	30.76	Málaga (capital)	37.58	34.32

	RI19	RI21		RI19	RI21
Barbate	30.13	30.94	Sanlúcar de Barrameda	37.64	36.81
Vícar	30.45	30.96	Palma del Río	37.74	36.83
Conil de la Frontera	30.49	32.82	La Línea de la Concepción	37.75	33.14
Torremolinos	30.52	29.64	Moguer	38.08	37.75
Arcos de la Frontera	30.72	36.32	Almuñécar	38.94	35.46
Chiclana de la Frontera	30.88	32.29	Alcalá de Guadaíra	38.96	38.51
Ronda	31.00	28.20	Adra	39.16	24.02
Nerja	31.71	35.17	San Roque	39.19	38.77
Rincón de la Victoria	31.84	34.08	Los Palacios y Villafranca	39.34	35.18
Baena	32.20	34.14	Guadix	40.37	32.96
Puerto Real	32.48	31.83	Utrera	40.91	37.64
Los Barrios	32.61	31.28	Alcalá la Real	41.04	36.34
La Rinconada	33.04	33.81	Cabra	41.31	38.34
San Fernando	33.16	33.09	Granada (capital)	41.32	38.58
Dos Hermanas	33.46	32.68	Algeciras	41.47	34.86
San Juan de Aznalfarache	33.46	32.88	Morón de la Frontera	41.77	36.19
Camas	33.46	31.92	Ayamonte	41.81	43.70
Níjar	33.48	30.59	Martos	42.27	39.96
Lucena	33.75	29.10	Loja	42.39	45.28
Mijas	33.85	34.78	Puente Genil	42.58	46.42
Carmona	33.88	30.95	Isla Cristina	42.75	44.89
Fuengirola	33.92	32.22	Sevilla (capital)	42.96	37.52
Estepona	33.98	30.41	Lebrija	43.24	41.42
Aljaraque	34.81	29.32	Montilla	43.86	41.52
Almería (capital)	34.98	30.20	Lepe	44.02	41.87
Cártama	35.41	34.66	Coria del Río	45.97	40.85
Mairena del Aljarafe	35.43	32.60	Cádiz (capital)	46.99	37.53
Tomares	35.50	33.74	Écija	47.35	42.37
Armilla	35.52	35.13	Antequera	48.21	42.59
Andújar	35.64	35.94	Baza	51.24	48.56
Úbeda	36.15	31.96			

Source: own elaboration.

After reviewing the results presented on the table it is observed that, overall, the resilience index tended to be slightly lower in the year 2021 compared to 2019. However, it is important to note that these results varied among municipalities, as some started from more favourable situations than others regarding the provisioning of social protection resources to address the crisis arising during the pandemic. During this period, some municipalities experienced a strengthening of resources linked to social services, reflected in an increase in their resilience index in the post-pandemic period, while others experienced a decline. Additionally, the table shows that municipalities classified in Quartile 1 (Q1), those with the lowest initial indices, have tended to experience a greater increase in their resilience index in the post-pandemic period, while those in Quartile 4 (Q4), those with the highest initial indices, saw greater reductions in their resilience indices.

The decline in the resilience index during the post-COVID period in the Andalusian context can be understood within the framework of the multidimensional impacts that the pandemic had on local communities. According to recent research, crisis events such as the COVID-19 pandemic can exacerbate pre-existing socio-economic inequalities and weaken community support systems, thereby affecting communities' adaptations and recoveries. In the case of Andalusia, where key sectors such as tourism and hospitality were severely affected by pandemic-related restrictions and closures, it is plausible that the decrease in the resilience index reflects the economic and social challenges municipalities faced. Additionally, the additional pressure on local health systems and the redistribution of resources to address the health emergency may have limited municipalities' capacities to maintain their levels of resilience in other aspects (Moreno et al., 2021)

However, it is important to highlight that for a more precise interpretation of these data it would be necessary to contextualize situation of each municipality, as well as to ascertain the situations of vulnerability and threat experienced in each one, as these may result in greater or lesser needs for stronger social services in each territory. Progress is being made in this regard within the framework of this project, such that future publications on this subject will offer results that are more in line with the reality of each territorial area.

4. DISCUSSION

Resilience has become a key issue in public policy planning and management. The creation of a resilience index is an important step in understanding and measuring the capacity of local community social services to recover from

adverse situations and to develop effective intervention strategies. In this study, a set of indicators relevant to the development of a resilience index were identified and selected. This knowledge aims not only to evaluate the impact of the crisis on the social services system, but also to provide reliable and valid information allowing for adequate planning and decision-making. Following a similar approach, but focusing on the health system, Kruk et al. (2017) propose a resilience index with four main categories: planning and governance capacity, infrastructure and logistics, human resources and health care services that are closely related to the indicators proposed in this study. The availability of social facilities and the resources allocated to social services may be related to infrastructure and logistics, as well as to planning and governance in the provisioning of social services, since greater investment in and funding of social services may indicate greater planning capacities. In terms of human resources, the number of technical workers in social services in relation to the population is a relevant indicator. This indicator reflects the availability of human resources in the social services field. The presence of a higher number of technical workers may indicate a greater capacity for response and attention by social services. These authors underline, however, the need for reliable data and periodic evaluations to improve the responsiveness of the health system to future challenges, a cross-cutting element in this study due to the need to locate disaggregated and valid data.

Engaging experts and stakeholders in the selection of indicators has allowed for feedback and the inclusion of the perspectives of different actors involved in the social services field. This helps to ensure that the indicators selected are considered legitimate, relevant, and accepted by the academic community and practitioners. In fact, many research studies that generate community resilience indices use this methodology with a participatory approach (Marchezini et al., 2017; Ernstson et al., 2010), although its use in social services is less common.

It is important to highlight that the structural indicators included in the resilience index are crucial for assessing the capacity of community social service systems to deal with crisis situations. Social facilities, budgets, funding, staff, and expenditure on benefits, among others, are key factors that directly impact the ability of social services to provide care and support to the population in emergency situations. This is demonstrated by research such as that conducted by Cretney and Bond (2014), which explores how financial resources, including funding sources and distribution mechanisms, can influence a community's capacity to recover and adapt to disruptions.

For example, the total number of social services and primary care facilities in relation to the population allows for an assessment of the accessibility and availability of social services for the general population. While the total social services budget and funding measure the capacity of the system to meet the demand for social services. Norris et al. (2008) examine how the presence of social facilities —such as schools, community centres and health services— can improve the resilience of a community after a disaster. Meanwhile, the number of benefit users and benefit expenditure are indicators revealing the effectiveness and efficiency of the social services system in meeting the needs of the population, while the number of technical workers in social services in relation to the population assesses whether the system has enough specialised staff to meet people's needs.

Despite the feedback and participation by academics and professionals in the selection and weighting of the indicators that make up the resilience index, it must be borne in mind that the indicators are markedly structural in nature, and may neglect other dimensions of resilience, such as community participation by other social actors, that provide a more holistic and complete assessment of resilience. We are dealing with the limitation of working with data at a very disaggregated level, the local level, which, however, from another perspective, allowed us to select measurable indicators and to obtain reliable and updated data available for each one. Moreover, in the case of the assessment of the resilience of the community social services system, the indicators related to equipment resources, budgets, funding, and users are relevant and aligned with the specific context. As a limitation regarding access to social services-related data, it should be noted that these are only available for municipalities with more than 20,000 inhabitants, as they are published by municipality. However, with the progress made in this work and the proposal of the indicators that make up the resilience index, we hope that the other municipalities will be able to access this information through specific consultations with social services authorities, even though the data is not broken down publicly.

5. CONCLUSIONS

In this article we have developed an original methodological framework to create a local resilience index to identify how resilient community social services were before and after COVID-19. The indicators selected for the resilience index measure the capacity of social services to meet the needs of the population in terms of accessibility, availability, funding, effectiveness, and efficiency. It is important to highlight that these indicators need to be complemented by

other indicators of a more contextualized and specific nature, as their inclusion in the resilience index is essential for a complete and comprehensive assessment of the social services system at the local level. In addition, we are working on the incorporation of other indices, such as vulnerability and threats, to create a synthetic index (IRISS index) that measures the risks to social service systems and the impact of COVID-19 on them after the crisis.

Therefore, the interpretation of the index results must be complemented by a contextual analysis and a thorough understanding of the socio-economic and cultural dynamics of each territory. The results of the index cannot be interpreted as an absolute measurement of resilience, but rather as a tool to identify areas for improvement and priorities for intervention. Moreover, the fact that the data can be accessed over time and periodically updated and revised allows resilience to be understood as a dynamic concept that can change over time due to various factors, such as policy changes, disruptive events, and socio-economic transformations.

At the same time, the maintenance and management of community social services as resilient systems require financial commitments and budget allocations. We believe that investment in such a system is essential, due to the potential increase in the use of these services and their economic efficiency (Sandu et al., 2015), without overlooking the system's priority of guaranteeing the social well-being of citizens, especially the most vulnerable populations.

Despite the limitations noted, the development of a methodological tool yielding an understanding of the levels of resilience of social services systems in different municipalities can offer multiple and diverse advantages. On the one hand, its potential applicability from the perspective of decision-making by public authorities can guide the allocation of available resources more efficiently. Additionally, from a preventive standpoint, it can aid in coping with potential future crises. It may also contribute to knowledge in social work, providing useful information to anyone interested in researching the social services system as a protection mechanism. Moreover, it offers a methodology replicable in other territories, and is even open to replication in other professional fields, such as the resilience of healthcare systems, for example.

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