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ORIGINAL RESEARCH

The Methodological Contributions of the Barometer of Social Capital (BARCAS) to the Measurement of Social Capital

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Abstract
This study examines the complexity of measuring social capital and presents the Barometer of Social Capital (BARCAS) as a comprehensive research methodology to do so. The BARCAS is a multilevel, multi-setting, multivariate, and cross-national instrument developed in Colombia and applied four times over two decades, in 1997, 2005, 2011, and 2017. Throughout each of the four measurements, a variety of methods were used to improve the explained variance of the model and disaggregate dimensions into variables and items to determine their contribution to a factor's average change. The learning and refining processes undertaken to improve the BARCAS are described in detail. Ultimately, the 2017 iteration of the BARCAS presents us with four factors that make up social capital and explain 76% of the variance: Social Fabric, Civic Capital, Institutional Trust and Indirect Control of the State, and Faith in Unvalidated Sources of Information. Factor analysis of dimensions differentiated the factors and produced factor scores or dependent variables for each respondent. The surprising volatility of the factors' composition and levels over time indicates that the current research strategy of piecemeal hypothesis testing should be complemented by a more clinical approach, given the wide variety of intervening elements present at any given place and time. Further research could uncover whether BARCAS dimensions and factors are universal to all societies. It is hoped that the lessons learned with the BARCAS can be used by other researchers in similar endeavors.

Keywords Social capital measurement methodology · Social capital · Colombia · Social fabric · Civic capital · Social media · Social capital and Political sociology

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1 Introduction

Research on social capital has been a growing field in the social sciences since its inception in the generative works of Bourdieu (1983a, 1986b), Coleman (1988), Ostrom (1988), and Putnam (1993a, 1995b). However, this growth has not been accompanied by consensus on the definition of social capital or a cohesive body of research findings or policy recommendations. This has caused some scholars to question the concept's usefulness, highlight the abuse of the term, or doubt its relevance as a subject of scientific inquiry (Musick and Wilson (2008, p. 267), quoting Furstenburg and Kaplan (2004, p. 219). In fact, integrating diverse contributions into a cohesive body of work is so difficult that, for example, in the field of health and social capital, the literature has gone from systematic review articles to reviews of systematic reviews (Ehsan et al. 2019), which highlights the complexity of generalizations about this subject.

Nevertheless, there have been continued efforts to harvest valuable findings from abundant research and piecemeal efforts to agree upon a definition or research methodologies to measure social capital, its varieties, and its components. This article seeks to do just that: present a comprehensive research methodology to measure social capital that is fit for replication. The aforementioned methodological contribution comes in the shape of the Barometer of Social Capital or *Barómetro del Capital Social* (BARCAS), which will be the focus of this article. At the same time, it will detail the refining process undertaken to develop the BARCAS within an everchanging society and the appearance of new phenomena like social media and how these are incorporated into the BARCAS.

As early as 1993, Van Deth began studying problems with measuring social capital, many of which have been repeated in the research practice and are still unresolved. Twenty-four years later, Engbers et al. (2017) also examined this issue. The latter study, focused on the USA and archival surveys, identified five types of social capital, a number of specific items frequently used in measuring social capital, and important lessons for future researchers. Though somewhat oversimplified, these lessons related to (1) theoretical diffusion, (2) proxy dependence and the possibility of making a "systematic attempt to measure social relationships directly" (Engbers et al., op. cit., 552) as seen in case studies, (3) the uneven operationalization of concepts, (4) the combination of similar measures for efficiency and the underuse of data simplification techniques such as factor analysis, (5) plurality measures and homogeneity, and (6) longitudinal consistency measurements.

All social measurement instruments must have internal and external validity. However, this is difficult when it comes to measuring social capital as there are no collectively accepted criteria for external validity and scant agreed criteria for internal validity. This is a direct consequence of lacking a reliable social indicator, a score that could be studied as a dependent variable to evaluate which elements of social capital are more explanatory than others. Even with this issue resolved for a national measurement, there is the question of the comparative cross-national levels of such an indicator, or whether the measured social capital is high or low compared to less/more developed societies. And what of the longitudinal approach? Once such social indicators exist, how does one chart their evolution? This would require a time series of repeated applications of the instrument over time, using factor analysis to generate the number(s) previously identified as the social capital indicator(s). After this, how would you incorporate new elements that have conspicuously emerged globally, such as the eruption of social media or rampant disinformation? This instrument would have to do all of these with acceptable reliability and elegant parsimony.

To respond to some of these challenges, this article will study the BARCAS methodology used to measure social capital in Colombia up to its first national application in 1997 and the emerging dimensions and factors. With this starting point, the methodological problems posed by repeated applications of the BARCAS in a time series and how they were solved will be presented, as well as lessons learned and the path ahead for its potential use in similar scientific endeavors. Some of the most relevant results at each stage will also be presented to illustrate how these were used as methodological feedback for subsequent applications, and to illustrate the kind of substantive conclusions that emerge once these methodologies are applied.

Among the contributions to the empirical measurement of social capital, four factors: Social Fabric (SOCIALF), Civic Capital (CIVICK), Institutional Trust and Indirect Control of the State (INTRICATE), and Faith in Unvalidated Sources of Information (FUSI) were identified in the latest 2017 application of the BARCAS, to reach an explained variance of 75.8%. These factors' historical levels were retroactively reconstructed using the dimensions' changing effects and levels on the factors. Hopefully, this process will assist other social scientists who embark on the endeavor of developing cultural cluster-specific instruments to measure social capital that are replicable, adaptable, and comparable to some degree, by building upon this methodology. The BARCAS also hopes to establish a set of dimensions that could be used in such instruments to become the core for a universal measurement of social capital.

The BARCAS was applied to four national samples with identical designs across a 20-year period (1997, 2005, 2011, 2017) in Colombia (Sudarsky, 2001a, 2007b; Hurtado et al., 2013; Sudarsky and García-Díaz, 2020).

2 Background

This section will present how the BARCAS came to be and what political, theoretical, and methodological premises underlie it.

In 1991, Colombia adopted a new constitution that shifted sovereignty from the nation to the people. Several participatory mechanisms were introduced. Chief among them was the National Planning Council (NPC), in which several sectors of civil society convened to produce a report on the National Development Plan—a document detailing each administration's 4-year plan for the country—before it was presented to Congress.

In its first report (1995), the NPC recommended that social capital (civic and institutional capital) be measured to establish a baseline and monitor whether the intended sociopolitical shift was occurring. The National Planning Office accepted these suggestions and in 1996 proceeded to develop the BARCAS. It began with the common task that Coleman (1988) established for all social capital research: unpacking the concept and discovering its components and their position in the organization of society.

After a comprehensive literature review (Sudarsky, 1997), an initial questionnaire was developed building on Putnam's use of the World Values Survey (WVS; 1995) to compare levels of social capital across countries. Additionally, the following elements were considered in its design:

(1) From the beginning, it was clear that the survey should examine different social capital "vessels" or settings (interpersonal relationships, family, school, work, entertainment, politics, civil society, the state) and these should be measured at different levels of ter-

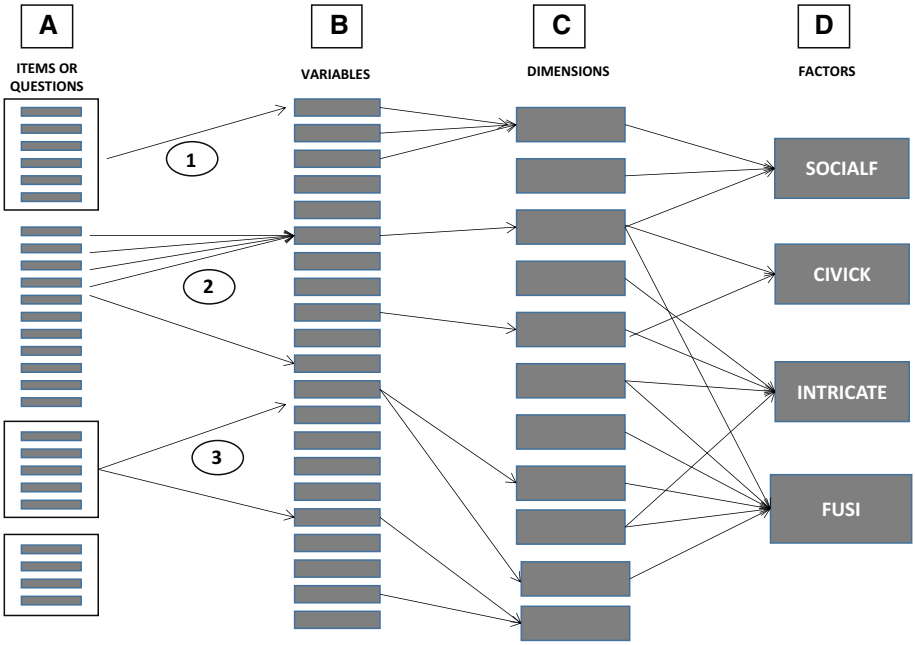

Fig. 1 Composition of items, variables, dimensions, and factors in the BARCAS (2017) (Sudarsky and García- Diaz op. cit., 21)

ritorial aggregation (neighborhood, locality, city, state, and nation at large) to determine if they were accumulating social capital.

(2) The strategy for mapping the different types of social capital involved aggregating the items in the questionnaire into variables and then into dimensions (Fig. 1). The factors derived from the 2017 measurement are presented in column D, keeping in mind that the evolution toward them will be studied throughout the article[1]

(3) The factor analysis data reduction technique for these dimensions produced a factor score (regression method) for each respondent—a number or synthetic dependent variable for each of the factors. These can be studied in detail alongside other elements such as exogenous variables (gender, age, etc.) and even their effect on concepts like economic growth.

(4) The instrument should measure a wide variety of social formations, particularly because Putnam (1993) had observed that regions in Italy with the lowest social capital were characterized as amoral familist regions (Banfield, 1958). Putnam stated that in Italy he had not found Gemeinschaft (community; Tönnies, 1957), a social formation that might still survive in various premodern and indigenous communities in Colombia. To ensure that a wide range of social formations was included, a two-by-two quadrant analysis was used to externally validate the questionnaire and design a pretest.

The quadrant model helps map the progress toward a modern civic society (MCS). The horizontal axis indicates the spectrum of negative to positive individualism (as

[1] Factors are identified in capital letters of their acronyms; dimensions names are initially capitalized in all their words´ names; variables and items are not capitalized but their nature are identified in the text.

		Individualism	
		Negative	**Positive**
Community	**Negative**	1. Amoral Familism	2. High (n)Achievement
	Positive	3. Gemeinschaft or Communal	4. Gesellschaft or Modern Civic Society

Fig. 2 The quadrant model of social formation classification (Sudarsky, 2001, p. 52)

measured by the WVS in the form of high achievement motivation (McClelland, 1967)), while the vertical axis indicates the spectrum of negative to positive community (Sudarsky, 2001, pp. 344–346).[2]

The combination of these two axes produces four quadrants. First is negative individualism–negative community (the Amoral Familism found in southern Italy by Putnam (1993)). Second is positive individualism–negative community, which is characterized by high need (n)Achievement and low community capacity. Third is low individualism–positive community, characterized by the communal Gemeinschaft. Fourth is positive individualism–positive community (Gesellschaft) or MCS with the strong economic growth found by Putnam in northern Italy (1993) and the normative goal for development in the BARCAS.

Thus, this model (Fig. 2) can be used to trace trajectories and eventually identify the policies required to shorten Colombia's path to MCS status. The validity of this model was empirically confirmed later, once there was a national measurement.[3]

(5) To address further cultural differences, the instrument must consider some fundamental elements of the specific tradition of a society and its relationship to modernization. The premises of Spanish Catholic Jacobinism (Wiarda, 1974; Merquior, 1991; Sudarsky, 2001) were used to identify some sociological problems, especially the fundamental nature of the patron–client relationship as the basic unit of trust (Eisenstadt & Roniger, 1981), where the general and the specific exchange interact (Mauss, 1967) and political

[2] To ensure that the instrument could measure social capital in different social formations, scales were created to measure the axis of individualism and community (Sudarsky, J., 2001, 344). These same scales were used to track the trajectory of each territorial unit as they evolved in the subsequent applications.

[3] Using the Sanchez, F., and Núñez-Méndez, J. (1999) municipal economic growth database for a 25-year period, it was possible to confirm the MCS quadrant as the normative goal of development with a yearly compound growth rate of 5.2% and an average education of 8.46 years of schooling. The results for quadrant 1 (Amoral Familism) were 2.9% and 6 years of schooling; for quadrant 2 (High Achievement) 3.9% and 6.55 and for quadrant 3 (Communal) 3.6% and 6.

linkages (Lawson, 1980) are established, with concomitant emphasis on hierarchy and mediation. A telling example of how this tradition manifests itself is the lack of words in Spanish for accountability, lobbying, and constituency.

(6) The instrument should produce a model that allows policymakers to ponder and prioritize their goals and interventions. This was first achieved through the instrument's capacity to aggregate and disaggregate dimensions into variables and their constituent parts, and to measure those parts' relative effects on social capital and second, through the extensive use of causal modeling with the statistical technique of path analysis not covered here. An additional challenge, given the problems with implementing public policies in countries such as Colombia (Scott, 1972; Hirschman, 1973; Sudarsky, 1981a, 1988b) is having a sufficient impact on the public narrative to be able to clarify controversial problems that are publicly debated.

3 The First Application of the BARCAS

3.1 Initial Methodology and Procedures

This section will detail the survey methods used in the first measurement and the results of the survey, mainly in terms of the dimensions and factors identified. The following is a step-by-step procedure of the BARCAS' first application:

(1) Pretest: The prototype of the BARCAS was applied to a sample of 400 people with great diversity in characteristics in terms of their position in the quadrant model. The items included here came from different sources (Putnam, 1993, 1995, WVS) and new items were introduced to reach our measurement goals and address the identified idiosyncratic problems.

(2) With these basic data, it was possible to externally validate the capacity of the instrument to measure social capital in different social formations. Using this pretest data, variables and dimensions were computed. Further, through second-order factor analysis of dimensions, an initial measurement of social capital was produced.

In this early stage, a factor identified as Social Capital explained 32% of the statistical variance, as well as a new factor that explained an additional 12% for a total of 44%. Considering these results, the questionnaire was revised, removing some items, defining their polarity, recoding them on a 10-point scale, redefining certain variables and dimensions, and ensuring that all social capital settings could be measured.

In this exploratory stage, factor analysis was routinely conducted with different sets of variables to locate them within dimensions (i.e., take all the variables initially included as political participation with their items and find that they differentiated into two dimensions: Political Participation and Civic Republicanism) and to locate an item within a particular variable. This was done repeatedly until a stable state was reached.

Additionally, stepwise standardized regression was used to decide when to include or exclude an item from a variable or a variable from a dimension. The standard criterion for inclusion is that the element, be it an item or a variable, should account for 1% of explained variance and have a beta of ± 0.05 or more in stepwise standardized regressions. This last approach helps to distance from the dichotomy of debating whether

this or that concept, dimension, variable, or item is relevant, for example, in a factor's explanation. Instead, a move toward considering the complementarity of these elements with the goal of increasing marginal explained variance is proposed. These regressions were always predictably significant, as they were the results of an arithmetic addition of items into variables and variables into dimensions. In this way, the tension between reliability that increases with a scale's length (number of items) and parsimony was addressed.

(3) The second version of the BARCAS was made up of 79 questions with different scales, formats such as yes/no, multiple-choice questions, and each item adapted to a 10-point range of 0 to 10, −5 to 5, or 0 to −10, depending on how the item added to the variable. This version was used for the first BARCAS national measurement of social capital in 1997.

The questionnaire was administered to a sample of 3,000 citizens over 18 years of age stratified by region, state, and municipality; urban or rural locality; and the usual demographic variables such as gender, age, and socioeconomic status following the standard designs of WVS samples. This same sample design was used in all national samples and further applications of the BARCAS to become the national sample that would generate the factor scores and became an "engine" to generate these scores for some specific samples in major cities from the second application on.

(4) These first national results with factor scores computed for each respondent were thrice subjected to the same procedures applied in step two. These were used as the dependent variables to carefully examine dimensions, variables, and items and to determine exactly into which dimension each item or variable should go. For example, the economic solidarity variable, initially included in the eventual Solidarity and Mutuality dimension, was discarded from future measurements as it did not add explained variance in the stepwise regression of all variables of the dimension or their items. The same happened with variables such as responsibility for the poor or general unconditionality.

In the Institutional Trust dimension, Putnam's Law and Order Index, created from the WVS items, did not add any explained variance but could do so in an international comparison. However, at this stage, these items and variables were part of the initial factor analysis. The quadrant model was empirically validated. The nature of the second factor, explained below, was identified as FUSI, which was independent and orthogonal to the Social Capital factor. The explained variance increased to 50%, with 37.2% explained by Social Capital.

(5) With the two scores and the structure of the dimensions and variables in a stable state (described ahead) to be used in subsequent applications of the BARCAS, the results were analyzed and compared to results from questions that appeared simultaneously in the BARCAS and the WVS to address the issue of cross-national levels of the factors or their components or at least identify some rough proxies to gauge Colombia's level of social capital (i.e., interpersonal trust and perception of corruption).[4] This is espe-

[4] Interpersonal trust: "Generally speaking, would you say that you can trust most people or that you can't be so trusting in dealing with people?" Percentage of respondents who trust people. Corruption/perception of corruption: "How widespread do you think bribes and corruption are in this country?" Here, 0 equates to "almost no public official is involved in bribes or corruption" and 10 equates to "almost all public officials are involved in such activities.".

cially relevant because, as Inglehart (1998) indicated, these indexes can only show their importance in cross-national comparison which he identifies as cultural differences.

(6) At another stage of the research process (time series) and starting from the second (2005) application on, samples of about 1,000 cases in major Colombian cities were taken (Sudarsky 2006). For these territorial units, the engine of the national sample was used to compute factor scores. This was done after removing existing cases of a city from the national sample and randomly replacing them with batches of new cases; then the factor scores of these new cases were computed, repeatedly running the second-order factor analysis for the national sample. For example, if there were 330 cases from a particular city in the national sample, you would repeat the procedure twice more until all 1,000 cases had their own factor scores and ensure that they were run as a part of the same (national) second-order factor analysis of dimensions. The main database of national samples only included the original national samples for each measurement: the 3,000 cases. These city analyses will become more salient when the volatility/permanence of factor levels is discussed in the concluding section.

3.2 The Emerging Dimensions

The 10 dimensions that emerged from the 1997 data remained stable until social media, the 11th dimension, was added to the 2017 measurement:

(1) Solidarity and Mutuality: Measures whether people can find solidarity and help when in trouble or whether they, inversely, are themselves in a state of social isolation and social atomization.
(2) Horizontal Relationships: Measures social connections and solidarity with family, friends, and people who are one's equals.
(3) Civic Participation: Measures active and passive participation in secular voluntary organizations.
(4) Vertical Articulation: Measures trust and membership in institutions that vertically organize society such as churches, political parties, unions, and guilds.
(5) Institutional Trust: Measures trust in a wide variety of institutions (e.g., church, police, government, etc.)
(6) Social Control: Measures society's control over the government and the state, be it via trust in institutions that exert that control, or the knowledge and implementation of participatory mechanisms used for such purposes and, specifically, for vertical accountability.
(7) Political Participation: Measures political skills, voting, and knowledge and use of participatory mechanisms, as well as, through legislative linkage, representative democracy.
(8) Media: Measures trust in TV, print, and radio media and interactions with them (e.g., writing a letter to the editor, etc.).
(9) Information and Transparency: Measures the perceived quality and timeliness of information from different sources.
(10) Civic Republicanism: Measures citizens' responsibility for the public sphere, their political education, and whether they are politicized or, in its polar opposite, are particularistic and clientelistic (Clark, 1996).
(11) Social Media (included in the 2017 fourth measurement): Measures the frequency of social media use and the level of active membership in social media groups as well

Table 1 Regression coefficients of dimensions on social capital and FUSI, first national measurement (Sudarsky 2001, p. 75)

Dimension	Beta Social Capital	Beta FUSI
Social Control	0.214	
Hierarchy or Vertical Articulation	0.192	
Civic Republicanism	0.189	0.211
Media	0.185	0.285
Institutional Trust	0.184	0.223
Political Participation	0.179	− 0.289
Civic Participation	0.145	− 0.309
Solidarity and Mutuality	0.144	− 0.253
Horizontal Relationships	0.128	− 0.234
Information and Transparency		0.557
Total explained variance	0.993	0.992

as the use of information there gathered for political, civic, and economic purposes. Ultimately, it also measures the degree of active use and trust in social media.

The factors, dimensions, and variables as they appear in the 2017 BARCAS are presented in Annex 1 (Table 5). The actual composition of each variable can be found in Sudarsky and García-Díaz, D., op. cit., in the relevant chapters on factors, dimensions, or specific variables and in the table in Sudarsky (2022).

3.3 The Discovery and Meaning of FUSI

While the Social Capital factor explained 32% of variance in the 1997 application, it was later differentiated into three different factors. FUSI, however, was discovered during the first measurement and the empirical construct remarkably maintained its identity all through the four measurements, although its relationship to the various dimensions changed. At this stage, once there were scores for each factor, a regression with the dimensions made it possible to determine which dimensions were related only to the Social Capital factor, which were positively or negatively related to both factors, and which were related to FUSI alone. The results are presented in Table 1.

Giving FUSI meaning was an elaborate process that relied extensively on the ability to disaggregate the dimensions into variables and items. The resulting meaning is that a person who is socially isolated (negative Solidarity and Mutuality, low Horizontal Relationships) and lacks social contacts to validate if information is "true" relies on media and other sources of information which they trust. This interpretation is based on the premise that "reality" is socially constructed (Berger & Luckmann, 1966). As to the question of how people validate this information, the answer is through Civic and Political participation, which lowers FUSI. This also reveals that some normatively desirable outcomes, such as Civic Republicanism, are myths or "belief adjustments" that some people make to reduce their cognitive dissonance (Festinger, 1957). However, these are not objective sociological conditions of these societies, which are systemically clientelistic/particularistic.

The measurement of FUSI, now widely referred to as "fake news" or disinformation, reveals how changes to some factors are objectively "valid" if they are accompanied by a low level of or a drop in FUSI. A decrease in FUSI was identified as a prerequisite to a move toward modern civic society with what became the "coming to terms process" in

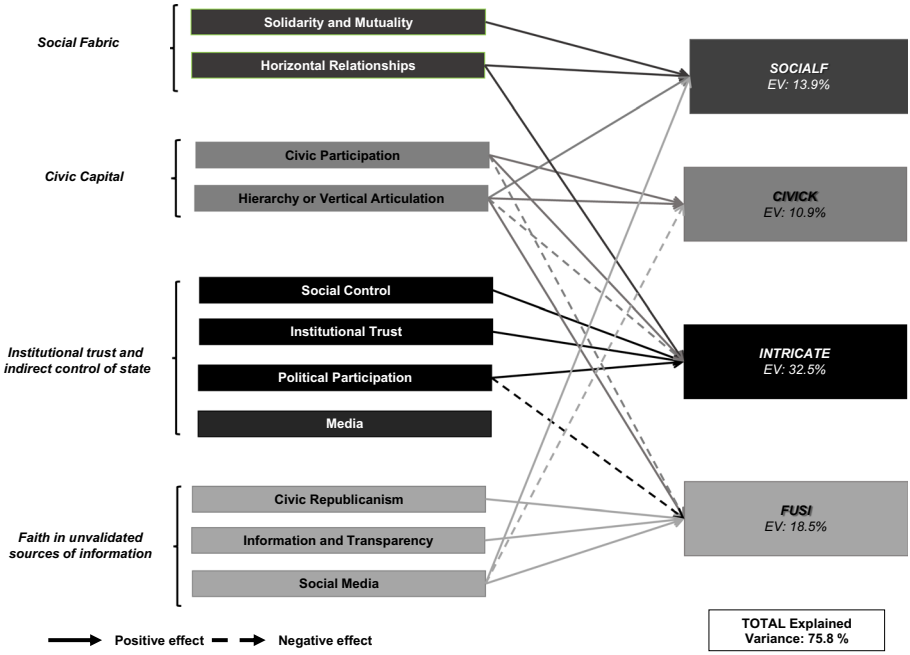

Fig. 3 The effect of dimensions on Social Fabric, Civic Capital, INTRICATE, and FUSI (Sudarsky and García-Díaz op. cit., 44), 2017, National Sample

which people acknowledge that they live in a clientelistic and particularistic society. Some of these changes will be presented in the following sections as additional elements of the unfolding methodology emerge. First, they will be applied to the relationship of dimensions to factors in the 2017 measurements (Fig. 3). Later, after the establishment of a methodology to determine the effect of the change in one dimension across two measurements on a factor's change in the same period (Table 4), the results for FUSI will be presented.

4 The Longitudinal Application of the BARCAS (2005, 2011 and 2017) and its Methodological Developments

4.1 The Evolution of Factors and their Explained Variance, 1997–2017

The BARCAS was applied three more times—in 2005, 2011, and 2017—to national samples with identical designs. The changes in explained variance are listed in Table 2, where two columns are presented for 2017: one with the original 10 dimensions and another with the current 11 dimensions (with the inclusion of social networks). The differences between the two requires further research as described in Sect. 4.3.

In the 2005 BARCAS measurement, the INTRICATE factor differentiated from the Social Capital factor, and the total explained variance increased to 62.4%.

The original Social Capital factor was redefined as Social Fabric, which describes the element of social capital within an immediate, smaller radius of trust—a bonding social capital. For the 2011 application, INTRICATE had the largest increase as generator of

Table 2 Total explained variance and factor contribution. Four measurements (Sudarsky and García-Díaz op. cit., 40)

	Principal components/explained variance				
	1997	2005	2011	2017 (10 dimensions)	2017 (11 dimensions)
SOCIALF	37.2%	23.8%	11.3%	13.7%	13.9%
FUSI	12.8%	16.4%	14.5%	19.9%	18.5%
INTRICATE		22.2%	35.9%	34.4%	32.5%
CIVICK				10.9%	10.9%
Total explained variance	50.0%	62.4%	61.7%	78.9%	75.8%

explained variance, taking from the Social Fabric factor whose contribution remained stable in 2017. FUSI was responsible for the increase in 2011 and its contribution was carried into 2017. In the 2017 application, Civic Capital became a distinct factor, differentiated from INTRICATE, which increased the total explained variance to 75.8%.

4.2 The Effect of Dimensions on Factors in the 2017 Application and Some External Evidence of the Replication of its Findings

A first step to understanding changes in factors requires the study of how dimensions are related to factors. To do so, a stepwise standardized regression of each factor's scores is performed with all the dimensions, with standard criteria for inclusion: an additional 1% of explained variance and a beta greater than ± 0.05. The results of these effects (beta) are schematized in Fig. 3 for the 2017 measurement. This same procedure was used to disaggregate dimensions previously included in the regressions into variables as well as their items.

An identical exercise had been previously applied in each measurement using the corresponding factor scores that appeared in each BARCAS application; the comparison of the results of these procedures presents relevant differences of how dimensions relate to factors in the different measurements. These differences are mainly the result of the emergence of new factors that carry some dimensions as their constitutive elements for that factor (those that appear in the factor´s second-order factor analysis of dimensions in each measurement) as well as events in society at the time, not covered here. Additionally, as mentioned, Sect. 4.5 will describe how to determine the impact of a dimension's change on a particular factor's change between two or more measurements.

Above, the defining dimensions of each factor are identified with the same shade. Dimensions that have an effect on more than one factor (hinges) are represented with full lines when the effect is positive and intermittent lines when the effect is negative. The variance explained by each factor is indicated in the factor cell.

For some of these results, the recent literature has been reviewed and some findings that support the BARCAS' results are referenced.[5]

4.2.1 Factors

4.2.1.1 SOCIALF Relates to how society, differentiated from institutional arrangements, is internally bound. Society can either have close social ties that bind citizens together or grow fragmented with atomized citizens (Putnam, 2000; DeFilippis, 2001, cited by Oosterlink et al., 2017). Its main constitutive dimensions are Solidarity and Mutuality (Chaturvedi, 2005) and Horizontal Relationships. Vertical Articulation and Social Media also have positive effects on Social Fabric (Krishna and Shrader, 1999; Harpham et al., 2002, cited by Rostila, 2011): with a relatively short radius of trust which does not spill into the public sphere (Warren et al., 2001).

4.2.1.2 CIVICK Pertains to ties that link citizens in civil society autonomous of institutional arrangements. These links encompass voluntary secular organizations and organizations that link center–periphery, such as vertical organizations (Putnam, 1993; Scholman et al., 1999, cited by Schneider, 2007). The autonomy of these two types of organizations, which differentiate Civic Capital from the institutional sphere, appeared only after a dramatic loss in their active membership, a reflection of how much these had been institutionally led. Civic Capital´s constitutive dimensions are Civic Participation (Verba et al., 1995; Putnam, 2000, cited by Endorgan 2010), and Vertical Articulation, previously part of INTRICATE. It is also affected negatively by the Social Media dimension. Civic Participation has a negative effect on FUSI, while Vertical Articulation has a positive effect, indicating the latter dimension's limited capacity as settings where information can be validated.

4.2.1.3 INTRICATE Registers the institutional sphere of society and how society links with it—be it through political or participatory democracies generating (or not) trust in institutions. Its defining dimensions are:

(1) Institutional Trust (with items such as trust in civil society organizations (Gordon ., 2005), government institutions (Myeong & Seo, 2016), media, and religious organizations, among others).
(2) Social Control of the citizenry over the state (trust in institutions of control over the state, social control mechanisms, and accountability (Munene et al., 2005; Munene, 2009, cited by Ogentho, P. M. et al., 2021).
(3) Political Participation (political skills, participatory mechanisms, executive and legislative linkage, electoral participation, and participation in political parties) (Gil de Zuñiga et al., 2010).

[5] It is not possible to discuss here in detail the methodological issues raised in these articles. These are generally related to a) the operational definition: how some terms are measured, i.e., social capital, political participation, civic engagement, b) the restricted range of their application, i.e., that these are performed in a specific population, a community, etc., instead of at a national level, (c) a dichotomous approach directed at identifying the "true" relevance of a variable instead of another. This is in direct contrast to the one used in the BARCAS to identify the marginal explained variance of each of those forming a dimension or factor, in whatever analysis is made, and d) its application to the general concept of social capital instead of specific factor(s) or their dimensions, a contribution of this measurement. These follow some of the criticisms by Engbers et al. (op. cit.).

(4) Media (trust in media; receiving information through the media and participatory activities in the media). However, when Social Media is included, the Media dimension's impact on INTRICATE (and all other factors) vanishes.

4.2.1.4 FUSI Represents that a person who is socially isolated and cannot socially validate the information that they could receive through political or civic participation; thus, they rely on media or social media for validation (Verba, et al., 1995, cited by Gil de Zúñiga et al., 2012). Though they do not engage behaviorally in the corresponding public activities, they assert that they do. At the same time, they express satisfaction and trust in their sources of information since they usually reinforce and echo their world view.

FUSI is defined by the dimensions of Information and Transparency, Civic Republicanism, and now, Social Media (Shah et al., 2009, cited by Gil de Zúñiga et al., 2012). As has happened with all BARCAS applications, an increase in Civic and Political Participation lowers FUSI by providing a setting for the social validation of information. As a matter of fact, it corresponds to the third element from Coleman's (1988, cited by Kahne et al., 2006) theoretical model: "the degree to which social relations facilitate access to networks and information that help individuals achieve their priorities or their absence."[6]

4.2.2 Social Media and its Effect on Factors

As can be observed in Fig. 3, beside the constitutive effect on FUSI, Social Media has a positive effect on Social Fabric and a negative effect on Civic Capital. Using the BARCAS' capacity to disaggregate dimensions into their components, it was possible to conclude that it was the search for news in social media that has the positive effect on FUSI. On the contrary, people high in Social Fabric used Social Media to contact people from their inner and outer circles or interest.

Additionally, people high in Civic Capital do not use Social Media to become informed about public affairs as they rely on groups, whether voluntary organizations **or** social groups on social networking sites (SNSs) as named by Gil de Zúñiga et al. (2012), which include Twitter, Facebook, and others. Additionally, they use social media to summon or be summoned to civic or political meetings. This highlights the importance of civic organization in social networks. These results are similar to those of Gil de Zúñiga, et al. (op. cit.) who argue the following:

> "The inherent structure of the SNSs facilitates not only the acquisition of information but also the discussion of its importance and relevance with other members of a particular individual's social network in situ, which may increase the elaboration and reflection mechanism for an individual to make sense of what they were informed about."

Nevertheless, the exact uses of Social Media and its effects, especially in Political Participation, has sparked a complex debate (Campante et al., 2018, 2021Gil de Zúñiga et al., op. cit.) that cannot be covered here.

[6] Kahne, op. cit., 389: "Coleman's (1988) theoretical model includes three forms of social capital. The first form, community norms, rewards certain kinds of behavior and sanctions others. The second is the degree to which community members trust that others will meet their obligations and expectations. The third is the degree to which social relations facilitate access to networks and information that help individuals achieve their priorities or their absence.".

Table 3 The change in dimensions over time: national samples with identical design, as well as dimensions and variables (Sudarsky and García-Díaz op. cit., 58)

Dimension		Average				Change %			
		1997	2005	2011	2017	05–97	11–05	17–11	17–97
SOCIALF	Solidarity and Mutuality	3.17	13.73	3.62	-2.77	333	−74	−176	−187
	Horizontal Relationships	19.55	24.05	20.55	20.54	23	−15	0	5
CIVICK	Civic Participation	28.43	21.94	14.56	17.61	−23	−34	21	−38
	Hierarchy or Vertical Articulation	27.65	30.16	26.81	19.76	9	−11	−26	−29
INTRICATE	Institutional Trust	119.6	113.9	101.90	71.60	−5	−10	−30	−40
	Social Control	46.51	53.38	48.14	35.79	15	−10	−26	−23
	Political Participation	122.24	165.16	145.09	100.61	35	−12	−31	−18
	Media	15.41	13.43	13.26	8.57	−13	−1	−35	−44
FUSI	Information and Transparency	−3.46	−0.79	−3.46	−8.37	77	−340	−142	−142
	Civic Republicanism	13.39	20.11	11.28	3.54	50	−44	−69	−74

Many of the controversies emerging from the referenced research papers are more related to causal relationships between dimensions that, once they are simultaneously measured with an instrument like the BARCAS, can be resolved through path analysis.

The following sections will present how the average of factors was computed for the different measurements as well as how the change in a dimension affects the change in a factor between two measurements.

4.3 The Retrospective Computation of the Average of Factors in Previous Applications of the BARCAS (1997, 2005, and 2011)

The emergence and evolution of the BARCAS' factors and dimensions, the increased explained variance, and the inclusion of the Social Media dimension requires additional processes to have comparable factor averages throughout the four applications. This is done retroactively reconstructing the factor scores for each previous year from the accumulated average of dimensions in each measurement, as described below.

Factor analysis computes the factor scores for each case from a correlation matrix. These scores have a distribution with an average of zero and a standard deviation of one. The challenge here is to identify what the comparative level of each factor's average would have been in the previous measurements as if the present relationships with dimensions were valid.

Therefore, for this purpose, and given that Social Media was measured only in 2017, an unstandardized stepwise regression was conducted for each factor with the 2017 data. This was done with the ten original dimensions, measured in an identical way in each application, with data from the Dimensions, Variables and Items (DVI) database. Using such regression and the dimensional averages for each measurement (Table 3), it was possible to retrospectively compute each factor´s average at the time of each measurement (Fig. 4).

The effect of the new Social Media dimension and its added explained variance is carried through the 2017 factor scores themselves as they are computed with the 11 dimensions. With these unstandardized regression equations, the average for each factor over

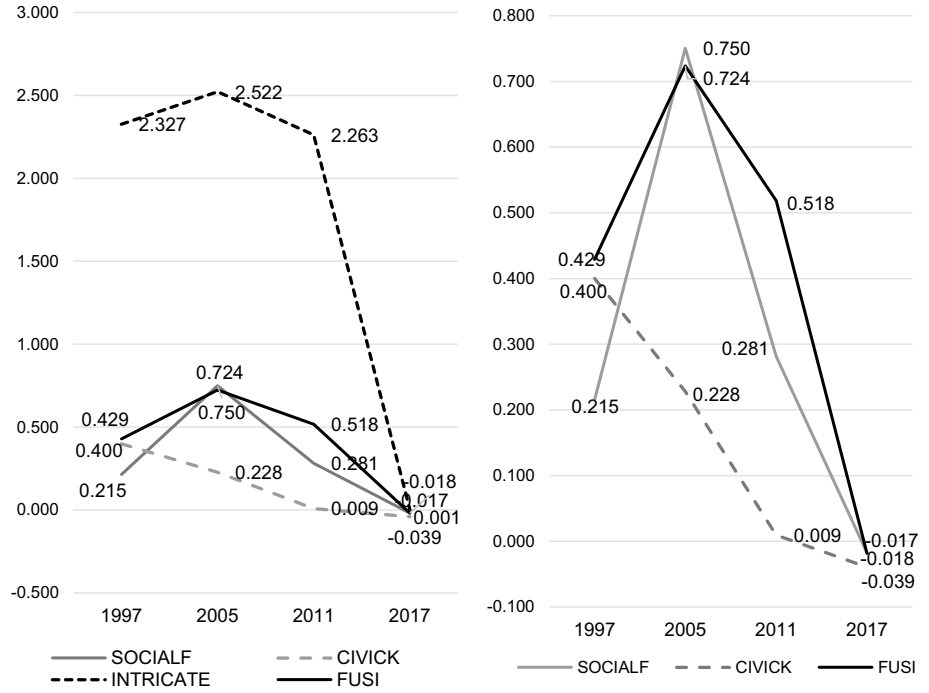

Fig. 4 The factors' changes over time; identical national sample design, same Dimensions, Variables and Items database (Sudarsky and García-Díaz op. cit., 54)

time as if the current 2017 factor composition had applied in the past were computed, an extrapolation from the present to the past. This procedure carries some potential issues that require further research.[7] Similar retrospective exercises had been conducted in each measurement reconstructing the factors' averages for the previous measurements using the unstandardized regression performed on the then-last factors' scores.[8]

The average of factors reconstructed from the 2017-generated unstandardized regression equations for each factor, using the national DVI database for the 1997, 2005, and 2011 measurements, can be observed in Fig. 4. Since the decrease in INTRICATE is so large that it dwarfs the changes in the rest of the factors, the figure on the right presents the results without INTRICATE.

Social Fabric, after a notable rise from 1997 to 2005, decreased to the 1997 level in 2011 and then dropped to previously unregistered levels. Civic Capital had a steep and continuous loss from 1997 until 2011, a reduction softened in the interval ending in 2017.

[7] It would be necessary to compute the factor scores with only the initial 10 dimensions, and compare these scores with those resulting from the use of 11 dimensions. Then study the relationship between these two sets of scores. This is different from what was done to retrospectively compute the factors' levels with only the initial ten dimensions, done over the factor scores computed with 11 dimensions. Here, you would have two different sets of scores for each respondent, two different sets of the dependent variables' measurement.

[8] The results could be reconstructed and compared using the resulting equation of some different year, i.e., 2011 equation to project 2017 or 2005. However, this would produce an even greater complexity and would exponentially confuse readers.

INTRICATE showed an increase to a relatively high level in 2005 and a reduction that dramatically accelerated in the 2011–2017 period. FUSI presented an undesirable rise in 2005 and then a reduction that rushed dramatically from 2011 to 2017, the most positive result in the last measurement. In 2017, FUSI reached a completely different magnitude level, signaling the possible threshold required for the "coming to terms process" mentioned above.

The comparative factor pattern for each measurement, that is the factors' pattern at a given time, reflect important shifts in society that will hopefully be covered in future articles.

4.4 Changes in the Dimensions across Time

To further understand the changes in factors, it is necessary to study the changes through time in the dimensions' levels in the DVI national database. As seen in Table 3, Solidarity and Mutuality show the greatest loss for the 20-year period followed by Media, Institutional Trust, and Civic Participation. Dimensions associated with FUSI show a desirable downward trend with Information and Transparency presenting the largest loss.

4.5 The Procedures for Identifying the Net Effect of a Dimension, Variable, or Item on a Factor's Average Change

Once the averages of the factors and dimensions are obtained, it is possible to determine the net effect a dimension's change has on a factor's change between two measurements and do so with variables and items. This is done for each separate factor. Unstandardized regressions are run for each factor with all appearing dimensions included in the initial standardized factor's regression (Fig. 3), and later cascading this regression into variables and items. These unstandardized regressions also allow us to identify which of the dimensions, variables, and items produce the largest change in each factor.

Regressions take the form of:

$$Y = a + b_1 x_1 + b_2 x_2 \ldots b_n x_n + \varepsilon$$

This procedure is illustrated in Table 4 for Social Fabric with its dimensions for the 20-year period of 1997–2017. This can be done in the same way for different periods and at different levels of disaggregation.

In column B, the unstandardized coefficient (b) can be seen for each dimension related to Social Fabric; the constant (*a*) is identical for these calculations. The dimension's averages (x) for 2017 and 1997 are in columns C and E, respectively. The product $b_n x_n$ for 2017 and 1997 are in columns D and F. The addition of these products is in row 7. This allows us to compute the Social Fabric average for that year: −0.017 for 2017 and 0.215 for 1997. The difference in product $b_n x_n$ for the two years (2017–1997) is shown in column G, and the total difference in products in row 8 (−0.23).

Here, it is clear that the loss of Social Fabric in the 20-year period is attributable mainly to a reduction in Solidarity and Mutuality ((−0.16/ (|−0.23|)) = −69%, using the absolute value of -0.23). The main contributor to the rise in Social Fabric is Horizontal Relationships (16%). In an additional step, cascading with variables, it is critical to disaggregate only those already included in the factor's regression by dimensions to avoid a so-called "fishing expedition" with indiscriminate inclusion of variables. The procedure can be

Table 4 The effects of different dimensions on changes in the Social Fabric factor, 1997–2017, identical sample designs database, unstandardized regression equation (standard error of model: 0.108; *p*-value: 0,0), 10 dimensions

	A	B	C	D	E	F	G	H
1		Unstandardized coefficient (b)	Dimension average 2017 (x)	Product 2017 (b_nx_n)	Dimension average 1997 (x)	Product 1997 (b_nx_n)	Difference in product (b_nx_n)17-(b_nx_n)97	Contribution of the dimension to the factor's change (percentage) ((b_nx_n)17- (b_nx_n)97)/(|Differencesaddition)|
2	Solidarity and Mutuality	0.03	−2.77	−0.08	3.17	0.09	−0.16	−69%
3	Horizontal Relationship	0.04	20.54	0.79	19.55	0.75	0.04	16%
4	Hierarchy or Vertical Articulation	0.01	19.76	0.20	27.65	0.28	−0.08	−34%
5	Political Participation	0.00	100.61	0.14	122.24	0.17	−0.03	−13%
6	a SOCIALF (constant)	−1.07						
7	Product addition			**1.05**		**1.28**		
8	Differences addition						**−0.23**	
9	SOCIALF score			**−0.017**		**0.215**		

repeated with the corresponding items. This allows a granular detailing of what has the greatest effects in each factor's change. These are presented below for the different factors.

When disaggregating into variables, the increase in atomization and opportunism, both negatively related to the dimension, contributed the most (112% and 113%, respectively) to the factor's drop. When disaggregating into items, the increase in zero linkage (atomization, 48%), in "collective problems: you look for a political connection that solves it for you" (34%) and "instead of worrying about rules applying to everyone, you circumvent them to accomplish your interests" (28%), both items of opportunism, make the greatest contributions to the decline in Social Fabric. Atomization and opportunism are a clear indication of the rise of anomie (Durkheim, 1893, 1964) and its deleterious social consequences.

The results for the remaining factors are as follows:

CIVICK: As it appears in Fig. 4, the main loss took place between 1997 and 2011, and was attenuated in the last period because of the slight rise in Civic Participation. The greatest impact on the fall in Civic Capital in the 20-year period was the loss of Civic Participation, due to the fall in membership of secular voluntary organizations, which contributed -66% to the factor's drop. Vertical Articulation also fell, mainly owing to the weakening of professional associations and mediating organizations, which contributed 25% to the fall of Civic Capital in the entire 1997–2017 period.

Although Vertical Articulation, Olson (1965) type organizations, was positively related to FUSI and Civic Participation, Putnam´s (1995) types, was negatively related. Their disaggregation showed that the positive effect on FUSI was brought on by the item trust in the church, not generally included as an Olson type organization in their analysis, redeeming the rest of the vertical organizations as contributor of "valid" CIVICK.

INTRICATE had the greatest loss in absolute values of all factors in 2017, with the most drastic drop in the last period. In the 20-year period, all constitutive dimensions fell but Institutional Trust had the greatest loss (79% for the total period and 64% from 2011 to 2017). Among the variables, the one with the greatest contribution to the fall in Institutional Trust was the loss of trust in the institutions that exert social control over the state (Congress, the media, etc.), contributing 74% to the factor's fall.

FUSI decreased during the 20-year period, a desirable result that signals that the "coming to terms process" was taking place, opening up the possibility of moving toward MCS.

When the results for FUSI are disaggregated into variables, it becomes apparent that the main cause of loss in FUSI is the recognition of poor political education (which fell by 227% in the last period, 55% in the 20 years)[9] from the Civic Republicanism dimension. The acknowledgment that "media do not explain problems in depth" from the Information and Transparency dimension is next, reducing FUSI by 42%. Third comes the variable vertical solutions of collective problems from the Vertical Articulation dimension (16%) manifested in the item: When a representative of the community is named to solve collective problems; the results identify that such statement is FUSI. The loss in the variable responsibility for the success of the public sphere (Civic Republicanism) also has a great impact (27% contribution to the fall in FUSI).

[9] When the levels of the items of political education are examined, the results are dire. They indicate that people do not have anyone who explains public affairs to them: citizens do not get informed to participate, the state does not inform citizens, political parties do not inform citizens of their ideologies and programs, and the media does not explain public problems in depth. This leads to the belief that Colombians do not know where the country is headed because no one informs us.

4.6 Some Illustrative Substantive Results from the 2017 Measurement

The 2017 results mainly highlight the need to create social settings that accumulate social capital, trust, and sustainable commitment, triggering a virtuous circle. This is achieved through the articulation of participatory and representative democracies that can remedy the perennial lack of accountability in Latin American societies (Crisp et al., 2003).

The institutional architecture for doing so requires electoral reforms toward a mixed electoral system that maintains the proportionality between votes and seats and ensures adequate representation in single-seat electoral districts. These should have a large enough population to produce bridging social capital.

In 2017, 88% of eligible voters did not remember whom they had voted for in any of the five legislative elections in the last four years: Zero legislative linkage, an index which has the greatest effect on increasing social atomization, reducing Solidarity and Reciprocity and SOCIALF. This problem results from a confusing electoral ballot, an expression of the current preferential-vote/closed-list electoral system introduced for elections starting in 2006. Such architecture also requires revamping of participatory mechanisms, especially the local participatory planning introduced in the 1991 constitution.

5 Discussion and Conclusions

Some of the basic recommendations of Van Deth (op. cit.) and Engbers et al. (op. cit.) were retrospectively heeded using the BARCAS, contributing methodologically to the empirical unpacking of social capital. The instrument was designed from day one as multivariate, multilevel, and multi-setting, and used elaborate statistical techniques such as factor analysis, path analysis, and multilevel regional analysis to study social capital. It was specifically constructed for this aim, rather than for a more multipurpose national survey.

The BARCAS was externally validated using within-country contrasting social formations through the quadrant model. Its adequacy was later empirically confirmed in a country with low levels of social capital in aggregate cross-country comparisons.

The four applications of the BARCAS in a 20-year period revealed a set of new issues for longitudinal comparisons as well as the possibility of studying emerging research subjects (social media) with the BARCAS.

The disaggregation of dimensions into variables and items, and the use of simple procedures to identify their contribution to change in the evolving factors in the time series, provides very fine granularity in the analysis of results. These are valuable methodological contributions.

Another contribution comes in the shape of the retrospective computation of the factors' levels through unstandardized regression equations in each of the measurements using national databases with identically measured dimensions. With an initial total explained variance of 50%, no clear understanding at the beginning if this level was satisfactory, and through a detailed process of shedding non-contributing items and variables, it was possible to increase the explained variance to 62% in subsequent measurements. Then, with the introduction of the Social Media dimension, the explained variance rose to about 76%.

This level is satisfactory but hardly reachable without the learning process generated through the time series. Hopefully this process will help others develop more robust instruments faster and with less trial and error and use the BARCAS dimensions and their operationalization to generate a common universal ground, a core for social capital measurement.

These advances illustrate how a globally emerging phenomenon like social media can be integrated into the instrument. However, as mentioned, some additional research is needed. The overall results show the capacity of the BARCAS to balance direct societal observations with the detection of social facts that are not obvious or that can be considered new concepts, like FUSI.

The volatility of the factors' levels over time was a surprise, as were the indications of how susceptible the factors are to political events and governmental practices not described here. On this matter, the BARCAS must maintain the delicate balance between volatility and permanence. This capacity became apparent in the longitudinal application of the instrument in the main cities.

For example, one city maintained high levels of FUSI, another permanently low levels. It was possible to identify some city mayor's media strategies to confuse his audiences, resulting in a rise of FUSI. The opposite was also observed: a mayor's deployment of submunicipal (local) participatory planning or budgeting, which lowered FUSI for their participants. This relates to the issue Englert et al. (op. cit.) raised regarding the instrument's capacity to detect changes in social capital's composition at a specific time and place as is done in case studies.

However, this raises several issues about these case studies. First, what are the intentions of the case analysis? Is it purely a scientific goal, is it directed at the generation of public policy, or better still, at the development of an intervention to increase social capital? Second, what is the intervention unit and its size? And then, what would be the sample size in this setting or territory? The BARCAS requires a reference national sample, the engine, to generate the factors' scores as well as to differentiate national changes and those of the unit under analysis itself. Thus, the next question is: How often should such a type of instrument be applied nationally? Besides practical problems, the processing complexities of the BARCAS to generate results is long and delicate. It is possible then to ask how long it takes to allow society to absorb the results and what happens in between measurements to justify an additional application. The BARCAS was applied at about seven-year intervals sufficiently distant of electoral processes.

There are many other issues to address, starting with Engbers et al.'s (op. cit.) notion of studying plurality and homogeneity, which could be done with further analysis, maybe with the BARCAS database. The database has many items still to be examined, such as happiness, where Colombia recurrently has a hard time explaining high rankings (Helliwell et al., 2021). This will be possible for other social scientists to do, once the database management know-how has been mastered, as happened in the health and social capital field (Hurtado et al., 2011). The same could be applied to the effects of, among others, exogenous variables.

5.1 The BARCAS' Factors and Dimensions: Are they Universal or Cultural Cluster-Specific? A Research Agenda

The BARCAS research experience suggests a possible method for conducting an internationally comparable national measurement of social capital, where the experience of the WVS must be taken into consideration. The first question relates to whether the dimensions

and its variables are universal for social capital, which is possible, referred to conceptually as the core. Its precise composition requires an empirical research program that would sample societies maximizing contrast, for example, using the WVS clusters in its cultural maps (World Values Survey, 2020).

A complementary possibility is to use as the criteria for sampling the modernization paths of contrasting traditions with their particular symbolic structures and institutional derivatives (Eisenstadt, 1973). The BARCAS includes some generative questions such as "How do you solve community problems?" and "When in trouble, who helps you?" among many applicable to all societies. The second question refers to the universality of factors—their existence and their emergence—and here the answer is hard to ascertain. In some societies, these factors could not have yet become differentiated or never will, particularly CIVICK, or autonomous civil society, in China. The dimensions related to factors can be measured, but the factors' composition, as happened in Colombia in our measurement interval, can change or could be measured at a time when a particular factor could not have independently existed.

An additional problem refers to the relationship of dimensions to factors, which changed in the time series. An especially paradoxical question is the relationship of Civic Republicanism to FUSI in non-clientelistic, non-particularistic societies.

Returning to variables and items, there are many questions that can prove fruitful as research ventures for societies that are assumed to have resolved these problems, for example, legislative linkage or accountability in universalistic societies. However, some of them, such as participatory democracy, could not exist at all in some societies, at least at the formal level: the so-called institutional derivatives. It is hard to tell if these could become normative ideals to construct in a society as happened with legislative linkage, considered peculiar when it was measured at the outset of the BARCAS. Fortunately, with the later capacity to include new items and scales and test if they provide a significant marginal explained variance, it is possible to experiment with emerging issues.

A different issue is the cross-country comparisons with items that are homogenous within countries and show no contribution in country measurements. Many of these are already in the BARCAS, waiting to be used in cross-country comparisons.

5.2 General Considerations

The intrinsic complexity of social capital means that the piecemeal study of two or three of its variables or components at a time, a legitimate scientific endeavor, can be obscured by the greater impact of more salient variables, the relevance of a more parsimonious explanation (criteria of inclusion), their effects having a magnitude threshold that appears only if certain levels of such variables are crossed, or if the relations are curvilinear. Additionally, if the level of a variable is the same at two different measurement points, it may escape the researcher's attention because it does not have a conspicuous effect on the factor or dimension's change.

It should not be a surprise that the scientific community is writing reviews of reviews asking to specify what, who, when, where, why, and how with regard to reaching generalizable conclusions (Ehsan et al., op. cit.). These could be case studies examined with a common tool as incisive as the BARCAS.

Social capital can be as complex and predictable as the weather even if it is known what general effect, for example, a low-pressure system has, when you are trying to predict the

weather at a particular time and place. Perhaps at this research stage, a clinical approach that comparatively considers the different factors to diagnose the social capital level at a given time and place can be more useful than testing specific hypotheses, which can be very volatile.

It is hoped that the lessons learned from the development, methods, and results described in this paper and any ensuing debate will help advance social capital research and ease and simplify its practitioners' task.

Annex 1: Factors, Dimensions and Variables, BARCAS 2017

(refer Table 5)

Table 5 Factors, dimensions and variables of BARCAS, 2017

Factor	Dimensions	Variables
Socialf	**Solidarity and Mutuality**	General solidarity
		Collective conflict management
		Reciprocity
		Atomization (-)
		Opportunism (-)
	Horizontal Relationships	Horizontal solidarity
		Social activities with people at work
		Social activities with neighborhood people
		Horizontal solutions to collective problems
		Third party enforcement (-)
Civick	**Civic Participation**	Membership in secular voluntary organizations
		Local activities
		Civic activities
		Media activities
		Engagement in voluntary work
	Hierarchy or Vertical Articulation	Membership in interest group organizations
		Vertical solidarity
		Vertical solutions to collective problems
		Intermediary organizations: Churches
		Intermediary organizations: Professional associations
		Intermediary organizations: Labor unions
		Intermediary organizations: Political parties

Table 5 (continued)

Factor	Dimensions	Variables
Intricate	**Social Control**	Trust in institutions that exert societal control over the state
		Societal control mechanism over the state
		Accountability
	Institutional Trust	Trust in political institutions
		Trust in legal system
		Trust in groups
		Trust in education
		Trust in the armed forces
		Trust in churches
		Law and order: Police.
		Trust in large companies
		Trust in and respect for the law
		Frequency of corruption (-)
	Political Participation	Political skill
		Participatory mechanisms
		Electoral activity: Voting
		Legislative linkage
		Executive linkage
		Political activities
		Political parties

Table 5 (continued)

Factor	Dimensions	Variables
	Media	Trust in media
		Media activities
		Sufficient explanation of problems by media
		Frequency of reading newspapers
Fusi	**Information and Transparency**	Colombians do not know where the country is headed because no one tells them (-)
		People have who explains societal problems to them
		The state makes an effort to keep citizens informed
		The media explains problems in depth
		Citizens inform themselves appropriately to participate effectively
		Citizens know how the resources of their localities are being invested
	Civic Republicanism	Political education
		Citizens' politization
		Responsibility for the success of the public sphere
		Particularism (-)
		Clientelism (-)
	Social Media	Frequency of electronic media use
		Proactive use of and trust in social media
		Active membership in groups on social media for general purposes
		Use of social media for political, civic, and economic purposes and for accessing critical information

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Availability of data and material The datasets generated during and/or analyzed during the current project are available in https://contrial.co/, https://contrial.co/bases-de-datos-capital-social-colombia/. The application form must be filled and the protocol accepted, so that access to the databases is granted.

Declarations

Conflict of interest The authors have no conflicts of interest to declare that are relevant to the content of this article.

References

Banfield, E. (1958). *The Moral Basis of a Backward Society*. The Free Press.

Berger, P. L., & Luckmann, Th. (1966). *The Social Construction of Reality A Treatise in the Sociology of Knowledge*. Anchor Books.

Bourdieu, P. (1983). Economic capital, cultural capital, social capital. *Soziale-Welt, Supplement, 2*(13), 183–198.

Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), *Handbook of Theory and Research for the Sociology of Education* (pp. 241–258). Greenwood.

Campante, F., Durante, R., & Sobbrio, F. (2018). Politics 2.0: The multifaceted effect of broadband internet on political participation. *Journal of the European Economic Association, 16*(4), 1094–1136.

Campante, F., Durante, R., and Tesei, A. (2021). Media and social capital. *Annual Review of Economics*, 14.

Chaturvedi, R. (2005*). Understanding social capital: a preliminary analysis of the norm of reciprocity and bounded solidarity* (Master's thesis). Master of Arts, Department of Sociology. Winnipeg, Manitoba.

Clark, T. N. (1996). Structural realignments in American city politics: Less class, more race, and a new political culture. *Urban Affairs Review, 31*, 367–403.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94*, S95–S120.

Crisp, B., Moreno, E., & Shugart, M. (2003). The accountability deficit in Latin America. In S. Mainwaring & C. Welna (Eds.), *Democratic Accountability in Latin America* (pp. 79–132). Oxford University Press.

DeFilippis, J. (2001). The myth of social capital in community development. *Housing Policy Debate*, *12*(4), 781–806.

Durkheim, E. (1893). *De la division du travail social.* Bibliothéque de Philosophie Contemporaine . Hutiéme Édition. Presses Universitaires de France. (1964). *The Division of Labor in Society*, New York, Free Press

Durkheim, E. (1964). *The Division of Labor in Society*. New York: Free Press.

Ehsan, A., HS Klass, A. Bastianen & Spini: Social Capital and health: a systematic review systematic reviews, SSM- Population Health, Col.8, August 2019, Elsevier.

Eisenstadt, S. N. (1973). *Tradition, Change and Modernity*. Wiley.

Eisenstadt, S.N y Roniger, L. (1981). *The Study of Patron-Client Relations and Recent Development in Sociological Theory*. En: S.N Eisenstadt y René Lemarchand (Ed). Political Clientelism, Patronage an Development. Beverly Hills. Sage Publications.

Engbers, T. A., Thompson, M. F., & Slaper, T. F. (2017). Theory and measurement in social capital research. *Social Indicators Research: An International and Interdisciplinary Journal for Quality-of-Life Measurement, 132*(2), 537–558.

Erdogan, M. (2010). Social capital and civic participation. *International Journal of Social Sciences and Humanity Studies, 2*(2), 81–88.

Festinger, L. (1957). *A Theory of Cognitive Dissonance*. Stanford University Press.

Furstenburg, F. F., & Kaplan, S. (2004). Social Capital and the family. In J. Scott, J. Treas, & M. Richards (Eds.), *The Blackwell Companion to Sociology* (pp. 218–232). Blackwell Publishers Ltd.

Gil de Zúñiga, H., Veenstra, A., Vraga, E., & Shah, D. (2010). Digital democracy: Reimagining pathways to political participation. *Journal of Information Technology & Politics, 7*(1), 36–51.

Gil de Zúñiga, H., Jung, N., & Valenzuela, S. (2012). Social media use for news and individuals' social capital, civic engagement and political participation. *Journal of Computer-Mediated Communication, 17*(3), 319–336.

Gordon R., Sara. (2005). Confianza, capital social y desempeño de organizaciones. Criterios para su evaluación. *Revista mexicana de ciencias políticas y sociales*, 47(193), 41–55. Recuperado en 15 de mayo de 2022, de http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-19182005000100041&lng=es&tlng=es

Harpham, T., Grant, E., & Thomas, E. (2002). Measuring social capital within health surveys: Key issues. *Health Policy and Planning*, *17*(1), 106–111.

Helliwell, J. F., Layard, R., Sachs, J., & De Neve, J.-E. (Eds.). (2021). *World Happiness Report 2021*. New York: Sustainable Development Solutions Network. https://worldhappiness.report/ed/2021/

Krishna, A., & Shrader, E. (1999). Social capital assessment tool. In *Conference paper repared for the conference on Social Capital and Poverty Reduction*. Washington, DC: The World Bank.

Hirschman, A. O. (1973). *Journeys toward progress. Studies of economic policy-making in Latin America*. WW Norton.

Hurtado, D., Kawachi, I., & Sudarsky, J. (2011). Social capital and self-rated health in Colombia: The good, the bad and the ugly. *Social Science & Medicine., 72*(4), 584–90. https://doi.org/10.1016/j.socscimed.2010.11.023

Hurtado, D., García-Díaz, D., and Copete, A. (2013). *Las vicisitudes del Capital Social de Colombia: Los cambios en Capital Social, Confianza y control indirecto del Estado y Fe en fuentes de información no validadas***.** Bogotá, Fundación Restrepo Barco. https://contrial.co/las-vicisitudes-del-capital-social-de-colombia-2011/

Inglehart, R. (1998). *Modernization and Postmodernization: Cultural, Economic and Political Change in 43 Societies*. Princeton University Press.

Kahne, J., Chi, B. and Middaugh, E. (2006). Building social capital for civic and political engagement: The potential of high-school civics courses. *Canadian Journal of Education/Revue canadienne de l'éducation*, 387–409

Lawson, K. (Ed.). (1980). *Political Parties and Linkage: A Comparative Perspective*. Yale University Press.

Lin, N., Y. Fu, RM, Hsung (2017) The Position Generator: Measuring techniques for investigations of Social Capital, in Lin, N., Y. Fu, RM, Hsung: *Social Capital*, London: Taylor Francis,

Mauss, M. (1967). *The Gift: Forms and Function of Exchange in Archaic Societies*. Norton.

McClelland, D. (1967). *The Achieving Society*. Free Press.

Merquior, J. G. (1991). The other west: On the historical position Latin America. *International Sociology, 6*(2), 149.

Musick, M. A., & Wilson, J. W. (2008). *Volunteers: A Social Profile*. Indiana University Press.

Myeong, S., & Seo, H. (2016). Which type of social capital matters for building trust in government? Looking for a new type of social capital in the governance era. *Sustainability, 8*(4), 322.

Ogentho, P. M., Munene, J. C., Kamukama, N., & Ntayi, J. M. (2021). Citizens' behaviour and accountability: The power of social capital in sub-Saharan African local governments. *International Journal of Public Administration, 44*(5), 430–439.
Olson, M. (1965). *The Logic of Collective Action*. Cambridge University Press.
Online document Sudarsky, J. (31 de julio 2022). *Cálculo de Dimensiones y Variables BARCAS*. https://contrial.co/calculo-de-dimensiones-y-variables-barcas/
Oosterlynck, S., Schuermans, N., and Loopmans, M. (2017). Beyond social capital: Place, diversity and solidarity. *In Place, diversity and solidarity* (pp. 1–18). Routledge.
Ostrom, V., Bish, R. L., and Ostrom, E. (1988). *Local government in the United States*. San Francisco ICS Press.
Perilla, S. (2019*). Internet Access and Electoral Participation in Colombia: Voter Apathy at the Polls*. Available at SSRN 3759775.
Putnam, R. D. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*. University Press.
Putnam, R. D. (1995). Bowling Alone: America's Declining Social Capital, *Journal of Democracy*, Vol 6, N°1, January 1995.
Putnam, R. D. (2000). *Bowling alone the collapse and revival of American community*. New York: Simon & Schuster.
Rostila, M. (2011). The facets of social capital. *Journal for the Theory of Social Behaviour, 41*(3), 308–326.
Sánchez, F. and Núñez Méndez, J. (1999). *Geography and economic development: A municipal approach for Colombia.* Preliminar Draft. Bogotá CEDE. Facultad de Economía, Universidad de los Andes. Submitted to Research Network Project, Office of Chief Economics, InterAmerican Development Bank.
Schneider, J. A. (2007). Connections and disconnections between civic engagement and social capital in community-based nonprofits. *Nonprofit and Voluntary Sector Quarterly, 36*(4), 572–597.
Scholman, K., Verba, S., & Brady, H. (1999). Civic participation and the equity problem. In T. Skocpol & M. Fiorina (Eds.), *Civic engagement in American democracy* (pp. 427–460). Washington, D.C.: Brookings Institution.
Scott, J. C. (1972). Patron-client politics and political change. *American Political Science Review., 66*, 1–91.
Shah, D. V., Rojas, H., & Cho, J. (2009). Media and civic participation: On understanding and misunderstanding communication effects. In J. Bryant & M. B. Oliver (Eds.), *Media effects: Advances in theory and research* (3rd ed., pp. 207–227). New York: Routledge.
Sudarsky, J. (1997). Perspectivas para el desarrollo del capital social en Colombia. In: *Coyuntura Social*. Mayo, 1997. N°16. Bogotá, Fedesarrollo.
Sudarsky, J., and García-Díaz, D. (2020). La brecha entre la Sociedad, la Política y el Estado: La Cuarta Medición del Capital Social del Colombia. Puntoaparte Editores. Bogotá, Colombia. https://contrial.co/barcas4/
Sudarsky, J. (1981). *Clientelism and the failure complex: The role of the state in the waning of cooperatives. A Colombian action-research project*. Doctoral dissertation. Harvard University.
Sudarsky, J. (1988). *Clientelismo y Desarrollo Social: El caso de las cooperativas.* Bogotá, Tercer Mundo Editores.
Sudarsky, J. (1992). *El impacto de la tradición hispánica en el comportamiento empresarial latinoamericano*. Bogotá: Facultad de Administración, Monografía No. 31. Also published in H. Gómez y R. Sánchez (comp.) *Iniciativa Empresarial.* Caracas, Ediciones Iesa, 1991.
Sudarsky, J. (1999). *Colombia's Social Capital: The national measurement with the BARCAS –ABSTRACT* . Presented to the Committee on Political Sociology, World Congress of the International Sociological Association, Tel Aviv, July 1999. https://johnsudarsky.com/wp-content/uploads/COLOMBIAS-SOCIAL-CAPITAL-THE-NATIONAL-MEASUREMENT.pdf
Sudarsky, J. (2001). *El Capital Social de Colombia*. Departamento Nacional de Planeación. Bogotá, Colombia. https://contrial.co/el-capital-social-de-colombia-1997/
Sudarsky, J. (2006) The Measurement of Social Capital in Colombia and its development in Bogotá. In: *The International Scope Review,* Volume 8. Available in www.academia.edu
Sudarsky, J. (2007). *La Evolución del Capital Social en Colombia 1997–2005.* Fundación. Restrepo Barco. Bogotá- Colombia. https://contrial.co/evolucion-del-capital-social-de-colombia-2005/
Tönnies, F. (1957*). Community and Society (Gemeinschaft und Gesellschafts')*. East Lansing, Michigan State University. Originally published in German in 1887.
United Nations Sustainable Development Solutions Network (2021).*World Happiness Report*. https://worldhappiness.report/ed/2021/
Van Deth J.W. (2003). Measuring social capital: orthodoxies and continuing controversies. In: *Int.J.Social Research Methodology,* Vol 6, N°, 79–92.
Verba, S., Schlozman K. L., & Brady, H. E. (1995). *Voice and equality civic voluntarism in american politics*. Cambridge: Harvard University Press

Warren, M. R., Thompson, J. P., & Saegert, S. (2001). The role of social capital in combating poverty. *Social Capital and Poor Communities, 3*, 1–28.
Wiarda, H. J. (1974). *Politics and Social Change in Latin America*. University of Massachusetts Press.
World Values Survey (2020a). The new 2020a World Cultural https://www.worldvaluessurvey.org/photos/EV000190.JPG
World Values Survey (2020b). Data base World Values Survey Wave 7 (2017–2020b): https://www.worldvaluessurvey.org/WVSDocumentationWV7.jsp