

Chapter 2

Methodology of the Social Cohesion Radar

Abstract The multifaceted conceptual framework of the Social Cohesion Radar necessitates an elaborated methodological approach. This chapter presents the data sources and methodology we have used to measure the level and trend of social cohesion across 34 European Union and OECD member states in four time periods: Wave 1 (1989–1995), Wave 2 (1996–2003), Wave 3 (2004–2008), and Wave 4 (2009–2012). The Social Cohesion Radar draws exclusively on large-scale internationally comparative secondary data from high-quality academic and institutional sources. The operationalization of the nine dimensions follows a reflective measurement approach in expressing each dimension as a latent construct manifested in interrelated indicators that are interchangeable across time. The resulting country scores on each dimension are thus factor scores which preclude absolute comparisons and allow only relative statements regarding the degree of cohesion. On the other hand, the computation of the three domain indices and the overall index of cohesion follows the formative measurement approach; each index is the arithmetic mean of the respective constituent dimensions. In addition, the chapter introduces the uniform color-coding scheme that has been used throughout the book to ease readers in interpreting the results.

Keywords Social cohesion index • Social indicators • Reflective measurement • Formative measurement • Secondary data analysis

Unlike directly observable characteristics such as, for example, body temperature, cohesion is not an objective condition that can be easily measured. Accordingly, the measurement instrument developed for this study is complex. A number of steps are required to determine even an approximate level of cohesion in a society, expressed as a score on an overall index.

This chapter outlines the analytic pathway: the selection of countries and time periods, the data sources, the choice of indicators, and the fundamental principles behind our calculation method. A data set with the indicators as well as the calculated dimension scores, domain scores, and overall index of social cohesion are

available for download on www.social-cohesion.net. The website also gives access to a detailed methodological report on every step in calculating the dimension values and the overall index of cohesion.

2.1 Countries and Time Periods

Our study looks at the level and trend of social cohesion in 34 countries. They include the 27 members of the European Union (EU-27) before the accession of Croatia as well as seven other Western members of the Organization for Economic Cooperation and Development (OECD): Australia, Canada, Israel, New Zealand, Norway, Switzerland, and the United States.

These countries have been selected for conceptual and pragmatic reasons. First, most of them are at a similar stage in their social, political and economic development—which is crucial for a meaningful comparison. Second, sufficient data are available for these countries—which is an unavoidable argument, given the secondary data analytic design of Bertelsmann Stiftung’s Social Cohesion Radar. Table 2.1 provides an overview of the countries in the international comparison.

We measure social cohesion over a period of almost 25 years, from 1989 to 2012. This has been a time of considerable global upheaval, including the collapse of the ‘real socialist’ countries and the expansion of the EU. People’s daily lives have been revolutionized by new communication technologies and the transition to a knowledge society (Castells 1998). It has been a period of massive immigration—in larger numbers than many Western countries had ever experienced before—and reforms of the welfare state. Today, Western societies are more globally connected and under greater pressure to change than they were in the “golden age” of the welfare states, which ended in the 1980s.

Since the fabric of society is unlikely to change from one day to the next, even in turbulent times, it is more logical to focus on groups of years. Guided by conceptual as well as pragmatic considerations, we cover four time periods (Table 2.2). They have been defined in a historically appropriate way, but also with respect to the availability of data.

The first period starts with the fall of the Berlin Wall and continues through the terms of office of the first democratically elected governments in the countries of the former Eastern Bloc. The second encompasses the years in which intense preparations were underway to expand the European Union—primarily by admitting most of the post-socialist countries of Central and Eastern Europe. The third period begins with the year of the major expansion of the EU toward the East and ends in 2008, when the global economic and financial crisis began. The fourth period begins in the crisis year 2009 and ends in 2012, the last year for which relevant data were available at the time of preparing the index. Assigning the two crisis years 2008 and 2009 to separate periods is a pragmatic decision; insufficient data are available for the period 2010–2012, but this problem can be alleviated by including the year 2009 in the final period of our research.

Table 2.1 Studied countries

EU and OECD		
 Belgium (BE)	 United Kingdom (GB)	 Portugal (PT)
 Denmark (DK)	 Ireland (IE)	 Sweden (SE)
 Germany (DE)	 Italy (IT)	 Spain (ES)
 Estonia (EE)	 Luxembourg (LU)	 Slovakia (SK)
 Finland (FI)	 Netherlands (NL)	 Slovenia (SL)
 France (FR)	 Austria (AT)	 Czech Republic (CZ)
 Greece (GR)	 Poland (PL)	 Hungary (HU)
EU alone		
 Bulgaria (BG)	 Lithuania (LT)	 Romania (RO)
 Latvia (LV)	 Malta (MT)	 Cyprus (CY)
OECD alone		
 Australia (AU)	 New Zealand (NZ)	 United States (US)
 Israel (IL)	 Norway (NO)	
 Canada (CA)	 Switzerland (CH)	
BertelsmannStiftung		

Table 2.2 The four waves of the Social Cohesion Radar

1. 1989 to 1995	2. 1996 to 2003	3. 2004 to 2008	4. 2009 to 2012
BertelsmannStiftung			

2.2 Secondary Data Sources

Bertelsmann Stiftung’s Social Cohesion Radar is exclusively based on secondary data analysis. This approach re-uses data that have already been gathered by either the same or other researchers in an attempt to address research questions that can be very similar to or very different from those for which the data were originally collected (Smith 2008).

This kind of “data recycling” strategy is a double-edged sword. On the one hand, secondary data analysis enables us to compile the cohesion index from readily available tried and tested indicators. The project employs representative large-scale international comparative surveys, expert ratings, and institutional data. The variety of sources provides an essential balance between subjective and objective assessments of the facets of social cohesion. Given the project’s aim to not only measure the current level of social cohesion, but to also follow its evolution over time, secondary data analysis seems the best suited approach. Collection of own, primary, data at the present moment with the aim to measure the level of cohesion in the past would merely rely on retrospective accounts of the kind “What was it like 20 years ago?”. Such questions tend to reveal less about the past than about the present perspective on the past.

The use of secondary data indisputably presents certain challenges. The first one is that secondary data are typically obtained from research projects with different purposes. Consequently, they do not always include indicators that reflect the same conceptual approach and, thus, do not measure precisely what we intend to measure. Two other challenges are particularly evident when a study like ours covers a substantial period of time. Data can often only be drawn from different sources and are thus comparable only under certain conditions. There are also gaps in the data for certain countries if—for whatever reason—specific studies were not conducted at the appropriate time.

Thanks to recent advances in the quantitative social research methods we are able to deal effectively with these challenges. Statistical methods such as factor analysis make it possible to capture only that part of the variance of an indicator that is relevant for measuring the dimension in question. Reflective measurement models, which are based on factor analysis, enable us to handle the issue with different indicators for the dimensions across time. Algorithms such as full-information maximum likelihood can be used to handle missing data based on the available complete data. Contemporary statistical programs—in our case generally the *Mplus* software (Muthén and Muthén 1998–2011)—provide us with the necessary estimation techniques. We outline the methods in a step-by-step guide to the construction of the overall index of social cohesion; a detailed description of the relevant challenges and their solutions is provided in a separate methods report (www.social-cohesion.net).

Below is a list of the data sources used for the construction of the Social Cohesion Radar along with short descriptions.

2.2.1 Survey Data

1. World Values Survey (WVS or WEVS)

The World Values Survey is conducted by an international network of social scientists. It looks at the values, attitudes, and beliefs of individuals, and their effects on the economic, social, and political aspects of life. The World Values

Survey is an offshoot of the European Values Study (EVS, see below). Between 1981 and 2007, the WVS conducted five surveys of representative samples of the population of more than 90 countries, in cooperation with the EVS (WVS 2009).

2. **European Values Study (EVS or WEVS)**

The European Values Study is a research initiative of the foundation of the same name, which focuses on virtually the same issues as the World Values Survey does (see above). Since 1981, the study has been conducted at nine-year intervals in a number of European countries; new countries have been added over time. The fourth wave, in 2008, included 48 countries and regions. This study, too, surveyed representative samples of the population (EVS 2011). Because survey items in the WVS and the EVS were so similar, we were able to use the two sources in combined form (WEVS).

3. **Gallup World Poll (GWP)**

The Gallup World Poll is prepared and administered by the Gallup organization, one of the world's leading market and opinion research institutes. The GWP has been conducted each year since 2005, in some countries on a quarterly basis. It surveys representative samples of the population in more than 150 countries on various political, economic and social issues. Data from the Gallup World Poll are also an essential component of the Social Progress Report, the Legatum Prosperity Index, the OECD Better Life Dimensions and the OECD Social Indicators (GWP 2013).

4. **European Social Survey (ESS)**

The European Social Survey, an academic project, seeks to identify long-term changes in the attitudes and behaviors of people in Europe by surveying representative samples of the population of 32 countries in Europe and beyond. It was launched in 2001 by the European Science Foundation and has been implemented every 2 years since then. It records Europeans' self-descriptions and gathers data on their perceptions and attitudes, focusing on a variety of topics of importance to Europe today. Among them are immigration, trust, political orientation, values, subjective well-being, and health (ESS 2012a, b, c, d, e).

5. **European Quality of Life Survey (EQLS)**

Eurofound's European Quality of Life Survey examines various aspects of life, such as income, education, family, health, life satisfaction, and perceived quality of society. It was first conducted in 2003, and included 28 countries at that time. Additional surveys followed in 2007 and 2011, once again administered to representative population samples (EQLS 2006, 2009, 2013).

6. **International Social Survey Programme (ISSP)**

The International Social Survey Programme is a collaborative effort by various institutions that conduct surveys for the purpose of social science research. The ISSP was formed through cooperation between what was formerly the German Center for Survey Research and Methodology (ZUMA) in Mannheim and the National Opinion Research Center of the University of Chicago. It is an annual program that adds an international and intercultural dimension (module) to national surveys in 48 countries. Particularly useful for our purposes is the

“Social Inequality” module, which was included in 1992, 1999 and 2009 (ISSP [1994](#), [2002](#), [2012](#)).

7. International Social Justice Project (ISJP)

The International Social Justice Project is an international research initiative focusing on social, economic and political aspects of justice. Representative population samples were first drawn in 1991 from 12 countries; that number dropped to six in 1996 and declined later on. Due to its limited coverage, we use the ISJP to supplement the ISSP (ISJP [2002](#)).

8. Eurobarometer (EB)

The Eurobarometer was launched in 1973 by the European Commission and has been conducted every six months since that time. Representative samples of the population are drawn in the EU member states. The survey gathers data on social and political attitudes that are of crucial importance for the European Union’s strategies and courses of action. Only a few of its questions relate to cohesion in units smaller than the EU itself, and those are asked only on an irregular basis. Nevertheless, the Eurobarometer is particularly useful for measuring Dimension 2.1, Identification (EB [2012a](#), [b](#), [c](#), [d](#), [e](#), [f](#), [g](#), [h](#)).

2.2.2 Expert Ratings

9. Shadow economy in OECD countries (S&B)

A study conducted by Schneider and Buehn ([2012](#)) sheds light on the role of the informal economy in the OECD countries. Since national economic data do not include the informal economy, indicators relating to tax burdens, tax compliance, unemployment and entrepreneurial freedom are used instead. Data are available from 1995 to 2010 for a wide range of countries.

10. Index of democracy (VAN)

Vanhanen ([2011](#)) has compiled a unique data base on the development of democracies, made up of annual data from 1810 to 2010. We use the “political participation” indicator, which measures participation in elections.

2.2.3 Institutional Data

11. International Crime Victim Survey (ICVS)

The International Crime Victims Survey was implemented for the first time in 1989, and its purpose was to assess aspects of crime and safety by surveying representative samples of the population. Five waves have been completed in Europe. The survey gathers data on perceptions and attitudes about criminality and justice (ICVS [2010](#); Van Kesteren [2007](#)).

12. International Country Risk Guide (ICRG)

The International Country Risk Guide was launched in 1980 by the editors of International Reports; today it is compiled by the Political Risk Services Group. Its purpose is to inform business people of investment risks in selected countries. The survey has been expanded several times to include questions about social and political risks, such as corruption and ethnic and religious tensions (ICRG 2013).

2.3 Method: A Step-by-Step Guide

The choice of methods to produce the overall index of social cohesion, a synthetic composite measure, has been aligned to the quality requirements spelt out by British economist Anthony Atkinson (2005). To guide social policy, according to Atkinson, a composite index of a social phenomenon should: (a) identify the essence of the problem and have a clear and accepted normative interpretation; (b) be robust and statistically validated; (c) be measurable across countries and comparable as far as practicable; (d) be timely and susceptible to revision; and (e) be responsive to effective policy interventions but not subject to manipulation.

Figure 2.1 constitutes a roadmap to the construction of the overall index of social cohesion. Available data sources were screened to select a wide choice of indicators for each of the nine dimensions of cohesion. Data on survey items were treated for missing values, recoded where necessary, and aggregated to the country level via their arithmetic mean. Data from the same source for multiple years within each of the four time periods were averaged to a single score per time period. Based on exploratory factor analyses we selected the final—narrow—choice of indicators for the measurement of the nine dimensions in each time period. The corresponding reflective measurement models for each dimension yielded dimension scores (factor scores) for the 34 countries in each wave of cohesion. Missing values on the dimensions were then estimated and the newly extracted dimension scores standardized. These scores were then entered into formative indices of overall social cohesion and for each of its three domains.

2.3.1 Initial Selection of Indicators

It should be noted that a study on social cohesion cannot be a value-free endeavor. Our selection of indicators is not value-neutral either, while at the same time being based on guidelines developed by psychologists and social scientists to ensure high-quality measurement. Conducting such a study, in itself, suggests that social cohesion is a valuable property of a collectivity of people. Our definition of cohesion, along with its various domains and dimensions, rests on certain value

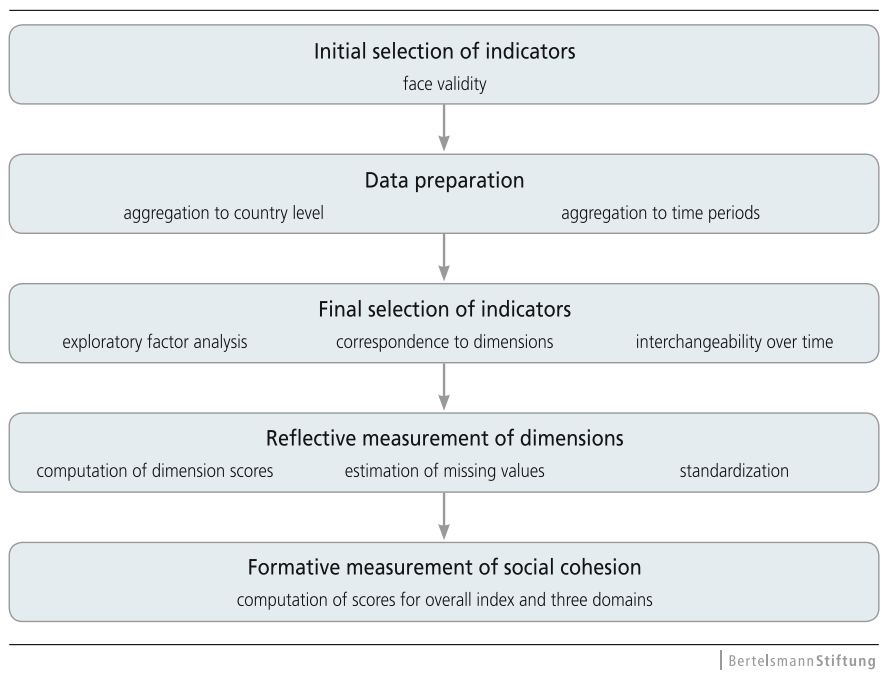


Fig. 2.1 Roadmap to an overall index of cohesion

judgments, not on a completely neutral summary of the existing academic literature (which, for its part, is not value-neutral either). For example, the idea that social cohesion requires acceptance of diversity is a value judgment. At any rate, a value judgment is always involved in the initial choice of indicators whose measurement quality is to be reviewed. While the subsequent quantitative and statistical assessment of those indicators is intended to demonstrate their suitability, it does not produce value-neutral measures.

We set off with an initial—wide-choice—selection of indicators, which was guided by the following criteria. First, the indicators should stem from sources that cover most of the EU-27 countries and other highly-developed Western democracies: Australia, Canada, Israel, New Zealand, Norway, Switzerland, and the United States. Second, the data sources should comply with international standards for cross-country comparability and representativity of the respective country populations in case of public opinion surveys. We therefore took into consideration internationally established data sources that have a clear policy on cross-country comparability and include most of the countries in focus (for details see Table A.1 of the Appendix).

Third, the indicators should correspond with the guidelines for the dimensions of social cohesion as formulated in Table 1.1. This criterion refers to the face validity of indicators. A measure is considered valid at face, if there is consensus among the

involved researchers that the operationalization of the measured phenomenon matches its conceptualization (Neuman 2003). Typically, face validity is seen as a minimal criterion of research measures (Kidder 1982). Following the guidelines for the nine dimensions, we collected a wide set of indicators from the available data sources. Any member of the research group could suggest an indicator for consideration, if he or she judged it to be in line with the guideline for the respective dimension. The indicator was retained, only if all other members of the research group—independently of each other—agreed on its face validity.

Finally, it is important to strike a balance between normative/evaluative judgments and neutral/descriptive reports. Respondents might be asked, for example, whether they believe that gays and lesbians should be able to live as they see fit (acceptance of diversity), but they might also be asked whether conditions in a given residential area, region, or country are such that gays and lesbians would be able to live a good life there. The first question tends to be normative/evaluative, the second neutral/descriptive. We have made every effort to include both types of indicators. Whenever it was necessary to choose between equally valid indicators, however, for example when there was an overabundance of indicators related to a specific dimension, we gave preference to the neutral/descriptive type.

As a result of this process, we arrived at a wide choice of indicators which served as the basis for the next steps.

2.3.2 *Data Preparation*

Social cohesion is a quality of a societal unit (in this book either a nation-state or a region within a nation state), not of an individual. Accordingly, our analyses relate to larger territorial entities, not to individuals.

Most of the data were drawn from public opinion surveys including on average 1,000 respondents per country. Missing values on individual responses on the selected indicators were deleted on an item-per-item basis. Where necessary, indicators were recoded or dichotomized. We aggregated these data into country measures by taking their arithmetic mean.¹

The Gallup World Poll, too, originates from surveys of individuals; however, the data available to us from this source had already been converted into country-level measures. Indicators from other sources, such as expert ratings of ethnic conflicts or informal labor, are usually available at the country level *eo ipso*.

¹Other measures such as the median or the standard deviation were considered appropriate to represent a country for a given indicator. However, from a conceptual point of view and for comparability and consistency reasons, we opted for the use of means. Distributional measures other than means (measures of dispersion, in particular) often tend to have vastly different mathematical properties than arithmetic means, a fact that would have greatly complicated the reflective index building.

As a societal-level phenomenon, drastic changes in social cohesion from one year to the next can hardly be expected. In addition, data on a yearly basis for the studied countries are limited. Therefore, we identified four waves with respect to the timing of socio-historical and socio-economic global processes of great societal impact. In the rare case that data on a given indicator from a particular source were available for multiple years within the same time period, we averaged the relevant data points.

The data were standardized applying z -standardization in order to bring indicators that were measured on vastly different scales to a common unit.

2.3.3 *Reducing the Number of Indicators*

This initial dataset consists of 297 indicators or 33 indicators per dimension on average, which is obviously too high a number for the relatively small sample of 34 countries. According to Cattell's (1966) widely accepted rule of thumb, the number of variables in a statistical analysis should not be more than a third of the number of cases. Hence, no more than 11 indicators should be used for each dimension and time period. An additional selection step was therefore needed prior to turning to factor analysis for the final selection of indicators.

Indicators could only be retained if data were available for at least two survey periods and 11 countries (approximately one third of our sample). This greatly reduced the occurrence of missing values and eased the estimation algorithm in the subsequent statistical analyses. There is an exception to every rule, however: Indicators drawn from a data set that was available for only a single time period could still be used if a similar indicator could be found in a different data set for another time period. We also made an exception for neutral/descriptive indicators recognized in the literature as particularly well suited to capturing a certain dimension of social cohesion. This permits us to draw comparisons between our results and those of other studies.

We thereby enact a narrow-choice approach, using a limited number of indicators to capture the nine dimensions. A prominent example of this approach is the Human Development Index (UNDP 2013a, b), which compiles information on average life expectancy, educational level, and per capita income using their geometric mean (the n th root of the product of n indicators) into an index of a country's level of development.

This additional screening process resulted in a manageable number of indicators, given the relatively low sample size of 34 countries, and yielded optimal data coverage in terms of missing values on the indicators; 124 indicators remained in the dataset for an empirical validation of their fit to the dimensions.

2.3.4 Final Selection of Indicators

With the help of exploratory factor analysis we test the empirical fit of the indicators to the respective dimensions. Factors refer to phenomena that are not directly measurable, but are latent (Field 2009). Measuring acceptance of diversity in a country is different from measuring that country's annual temperature. The researcher cannot take a thermometer to determine the degree to which people tolerate others who lead different life styles. Instead, we have to assume that acceptance of diversity is a factor, a latent construct, that underlies a pattern of observed attitudes towards various minority groups and is, thus, indirectly measurable through them.

Exploratory factor analysis is well-suited in situations where the associations between observed indicators and latent constructs are unknown (Byrne 2012). The analysis determines how many factors underlie the pattern of associations between the indicators and to what extent each of the indicators contributes to the factors. The contribution of an indicator is given by its factor loading. It points to the strength and direction of association between the indicator and the factor. Factor loadings can be seen as standardized regression coefficients which take values between -1 and 0 (e.g., a more negative attitude towards right-wing extremists stands for higher acceptance of diversity), or between 0 and 1 (e.g., a more positive attitude towards gays and lesbians stands for higher acceptance of diversity). According to a large-scale meta-analysis (Peterson 2000), there is agreement in the literature that absolute factor loadings of 0.25 and above indicate that a particular observed indicator allows a sufficiently potent measurement of a latent variable.

To reduce the number of selected indicators that we expect to measure a dimension at face validity we employed exploratory factor analysis (EFA) with full-information maximum likelihood (FIML) estimation in *Mplus* (Muthén and Muthén 1998–2011). The greatest advantage that the method of maximum likelihood estimation offers is its robustness in dealing with missing data. In contrast to “traditional” and by now outdated techniques of handling missing data such as listwise deletion (which can considerably reduce the number of available cases, whereas we deal with 34 countries at most only), pairwise deletion (which may jeopardize the mathematical properties of the covariance matrix), or mean substitution (which reduces items' variability), FIML estimation is considered to be a state-of-the-art missing data handling technique (Enders 2010).

We specified forced one-factor solutions, thereby always extracting the factor that most strongly explains the covariation of the indicators. Indicators that do not load above the threshold of 0.25 on this first factor were disregarded as they tend to belong to other less prominent factors which we assume not to be the dimensions we are looking for.

Once the factor structures for each dimension and wave were established, we employed a second round of exploratory factor analyses to ensure that indicators are interchangeable across the four time periods. For this purpose we conducted pan-temporal (across time) EFA on the remaining indicators for each dimension.

Technically, we pooled the indicators over the four time periods in a dataset of 4×34 (136) cases. Thereby we tested whether these indicators fit a pan-temporal latent construct, being the dimension in question across time. Again, only these variables were retained whose absolute standardized factor loading was larger than 0.25.

These steps finalize the selection of indicators for the measurement of the nine dimensions of cohesion. For more details on the exact transformations of the 57 indicators which entered the construction of the social cohesion index, please refer to the Codebook for International Comparison, downloadable on www.social-cohesion.net. Table 2.3 lists the indicators.

2.3.5 *Reflective Measurement of Dimensions*

To measure the nine dimensions in each time period we turned to a reflective measurement approach which directly relates to factor analysis. The approach is particularly meaningful in our data setup of no completely identical indicators (e.g. from surveys) across the four time periods for any dimension.

Figure 2.2 gives an example of a reflective measurement model in which a latent construct R1 is measured with observed indicators Y1 to Y4. To reduce the level of abstraction, imagine that we measure intelligence (R1) based on reading ability (Y1), writing ability (Y2), speaking ability (Y3), and mathematics (Y4).

The direction of the arrows L1 to L4 clearly expresses the logic: The indicators depend on the latent variable or in other words, the latent construct R1 determines the manifest indicators Y1 to Y4. To come back to the example, intelligence is the reason for the performance on the four tests. As long as the indicators belong to the “item universe” of a latent construct, they can be considered interchangeable exemplary manifestations of the latent. Of course, removing an indicator may lead to less reliable measurement, but this is safeguarded by the fact that only correlating indicators are part of the measurement of a latent construct. Due to the strong associations among each other, these indicators tend to form a unidimensional construct, adding few heterogeneous facets to its measurement (Bollen and Lennox 1991). Weakly to uncorrelated indicators cannot be part of a reflective measurement model.

In the framework of confirmatory factor analysis (CFA) we fit uni-factorial structures for each dimension and time period with the selected indicators, based on the EFAs conducted previously. The framework was used solely as a tool to extract factor scores. For a given dimension and time period, a country’s factor score represents its relative position on that dimension in comparison to the other countries in the sample. Due to the relative nature of factor scores, in no way should a factor score be interpreted as the absolute strength of a dimension in a given

Table 2.3 List of indicators in international comparison

Dimension/Indicators	Period 1	Period 2	Period 3	Period 4
1. Social relations				
1.1 Social networks				
Important in life: Friends (No/Yes)	WEVS	WEVS	WEVS	EQLS
How much time during past week you felt lonely? (ESS: None or almost none – All or almost all of the time; EQLS: At no time – All of the time) (-)			ESS	
How often socially meet with friends, relatives or colleagues? (Never – Every day)		ESS	ESS	ESS
Support if needed advice on serious personal or family matter (No/Yes)		EQLS	EQLS	EQLS
[Have relatives or friends you] Count on to help (No/Yes)			GWP	GWP
1.2 Trust in people				
(WEVS: Can't be too careful; GWP: Have to be careful – People can be trusted)	WEVS	WEVS	WEVS	GWP
(People try to take advantage –) People try to be fair		ESS	ESS	ESS
(People mostly look after themselves –) Most of the time people helpful		ESS	ESS	ESS
1.3 Acceptance of diversity				
Would not like to have neighbor: of different race (No/Yes)	WEVS	WEVS	WEVS	
Would not like to have neighbor: immigrants/ foreign workers (No/Yes)	WEVS	WEVS	WEVS	
Rating of ethnic tension (High tension – Low tension)	ICRG	ICRG	ICRG	ICRG
Justifiable: homosexuality (Never – Always)	WEVS			
Gays and lesbians free to live life as they wish (Disagree strongly – Agree strongly)		ESS	ESS	ESS
Country's cultural life enriched by immigrants (Cultural life undermined – Cultural life enriched)		ESS	ESS	
Country's culture undermined by immigrants (Culture enriched – Culture undermined) (-)				EQLS
Rating of religious tension (High tension – Low tension)	ICRG	ICRG	ICRG	ICRG
City/area good place for: Racial/ethnic minorities (No/Yes)			GWP	GWP
City/area good place for: Gay or lesbian people (No/Yes)			GWP	GWP
2. Connectedness				
2.1 Identification				
How attached to country? (Not at all – Very)	EB	EB	EB	EB
How proud of nationality? (Not at all – Very)	WEVS	WEVS	WEVS	
Ideally, would permanently move to another country (No/Yes) (-)			GWP	GWP
2.2 Trust in institutions				
Confidence in police (WEVS: Not at all – A great deal; GWP: No/Yes)	WEVS	WEVS	GWP	GWP
Confidence in parliament (WEVS: Not at all – A great deal; EQLS: Do not trust at all – Trust completely)		WEVS	WEVS	EQLS
Confidence in political parties (ESS: No trust at all – Complete trust; WEVS: Not at all – A great deal)		WEVS	WEVS	ESS
Confidence in justice system (WEVS: Not at all – A great deal; GWP: No/Yes)	WEVS	WEVS	GWP	GWP
Confidence in health care (No/Yes)			GWP	GWP
Confidence in financial institutions (No/Yes)			GWP	GWP
Honesty of elections (No/Yes)			GWP	GWP
Didn't report a crime, because feared/did not like the police (No/Yes) (-)	ICVS	ICVS	ICVS	
2.3 Perception of fairness				
Corruption (High corruption – Low corruption)	ICRG	ICRG	ICRG	ICRG
Corruption within businesses (No/Yes) (-)			GWP	GWP
To get ahead need to be corrupt (Strongly disagree – Strongly agree) (-)		ISSP		ISSP
To get ahead, forced to do things that are not correct (Disagree completely – Agree completely) (-)		EQLS	EQLS	
Government should reduce differences in income levels (Strongly disagree – Strongly Agree) (-)		ESS	ESS	ESS
I earn what I deserve (No/Yes)		ISSP		ISSP
Get paid about what deserved (No/Yes)	ISJP			
Pay about just for me (No/Yes)		ISJP		ISJP
Tensions between the rich and the poor (No tension/Some tension/A lot of tension) (-)		EQLS	EQLS	EQLS
3. Focus on the common good				
3.1 Solidarity and helpfulness				
(People should provide for themselves –) Government provide for people (-)	WEVS	WEVS	WEVS	
Help others excl. family/work/voluntary organizations (Never – At least once a week)			ESS	
Help others excl. work/voluntary organizations (Never – Every day)		ESS		
Unpaid voluntary work through community and social services (Not at all – Every week)				EQLS
Donated money (No/Yes)			GWP	GWP
Helped a stranger (No/Yes)			GWP	GWP
3.2 Respect for social rules				
To what extent people obey traffic laws (Not at all – Completely)			EQLS	
How wrong to commit traffic offense (Not at all – Seriously wrong)?				ESS
Feel safe after dark on the street (Very unsafe – Very safe)	ICVS	ICVS		
Feel safe walking alone at night (No/Yes)			GWP	GWP
Size of shadow economy (% of GDP) (-)	S&B	S&B	S&B	S&B
3.3 Civic participation				
Important in life: politics (No/Yes)	WEVS	WEVS	WEVS	
Interest in politics (Not at all – Very)	WEVS	WEVS	WEVS	ESS
Worn or displayed campaign badge/sticker (No/Yes)		ESS	ESS	ESS
Signed a petition (WEVS: Would (never) do/Have done; EQLS: No/Yes)	WEVS	WEVS	WEVS	EQLS
Contacted politician or public official (No/Yes)		EQLS		
Voiced opinion to public official (No/Yes)			GWP	GWP
Served on committee or done voluntary work for organization (No/Yes)		EQLS		
Volunteered time to organization (No/Yes)			GWP	GWP
Worked in association or organization (No/Yes)		ESS	ESS	ESS
Voting turnout in elections or referenda (%)	VAN	VAN	VAN	VAN

Indicators marked (-) are reversed when calculating the dimension. Explanation of abbreviations: EB = Eurobarometer; EQLS = European Quality of Life Survey; ESS = European Social Survey; GWP = Gallup World Poll; ICRG = International Country Risk Guide; ICVS = International Crime Victims Survey; ISJP = International Social Justice Project; ISSP = International Social Survey Program; S&B = Schneider & Bueth (2012); VAN = Vanhanen (2011); WEVS = World Values Survey or European Values Study.

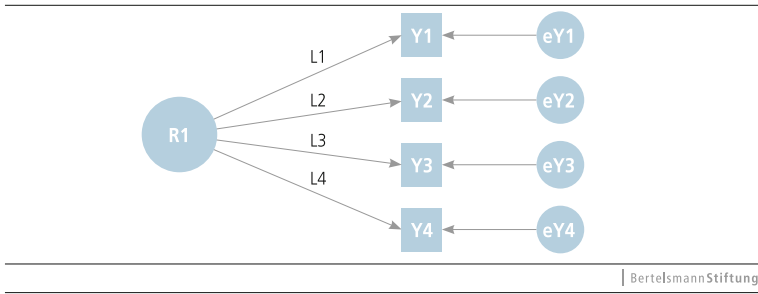


Fig. 2.2 Reflective measurement model

country. For example, a factor score of 1.5 for Country X on Dimension A only shows that the strength of Dimension A in that country is 1.5 standard deviations greater than the average value on that dimension.

In principle, fitting the dimensions was straightforward, as the prior procedures ensured that the dataset at this point is clean of indicators that do not sufficiently belong to the them.^{2,3} Occasionally we took advantage of specifying error term correlations in order to improve the fit of the factor structure. The latter is signaled by numerous goodness-of-fit indices. As the nature of the study is exploratory, we do not report goodness-of-fit measures. To provide an indication on the quality of the constructed dimensions, we instead resorted to Cronbach’s alpha coefficient of internal consistency, a commonly used measure for the validity of factor analysis (Manly 2004). In the practice of psychometrics, a Cronbach’s alpha of 0.80–0.90 is a desirable absolute threshold. Relative thresholds for Cronbach’s alpha (which are more pertinent in the wider social sciences) take into account the length of a ‘scale’ (number of items measuring a latent variable), suggesting that an alpha of 0.10 times the number of its indicators is sufficient (Nunnally 1967). We followed Raykov (2008) on calculating Cronbach’s alpha directly within CFA in *Mplus*.

Tables A.2, A.3, A.4, A.5, A.6, A.7, A.8, A.9 and A.10 of the Appendix present the final factor solutions for each dimension and wave. In all instances Cronbach’s alpha suggests reliable measurement. The results of the pan-temporal analysis give the same impression (see Tables A.11, A.12 and A.13 of the Appendix).

²Vanhanen’s indicator of political participation exhibited loadings of 0.18 (Wave 1), 0.21 (Wave 2), 0.39 (Wave 3), 0.43 (Wave 4). We nevertheless retained it since it is a neutral/descriptive indicator.

³Factor structures with one or two indicators are unidentified due to negative degrees of freedom. In the case of a single-indicator solution, we constrain its factor loading to 1 and its measurement error to 0. When two indicators are available, it is enough to constrain the factor loadings of both indicators to 1, thereby giving each an equal weight.

2.3.6 Completion of Dimension Scores

Due to missing information on some indicators, not all countries receive factor scores, that is, scores on the dimensions in a given wave. Applying an effective workaround suggested by Enders (2010), we were able to close these gaps. Missing dimension scores in a wave were estimated on the basis of available dimension scores from other waves. This approach is more reliable than alternatives that involve transferring data from other time periods. We, of course, clearly mark any estimated dimension score in the presented results. Some caution is warranted for their interpretation.

Within a dimension, we recast the extracted scores from each wave as sole manifest indicators of latent variables. This can be seen as if we treated the manifest indicators as outcomes, while at the same time preserving their exogenous status in the model. Factor loadings were constrained to 1, which transfers the metric of the observed variable to the latent one, whereas the residual variances were constrained to zero, which transfers the variance of the observed variable to the latent one (Enders 2010; see Fig. 2.3). Since each latent variable predicts the observed and all possible correlations between the four latent variables are explicated, any missing data point on the observed variables is estimated for the latent ones on the basis of the correlations among the four waves. It is important to note that this recasting from the manifest to the latent level does not change the model: It still remains a fully saturated one.

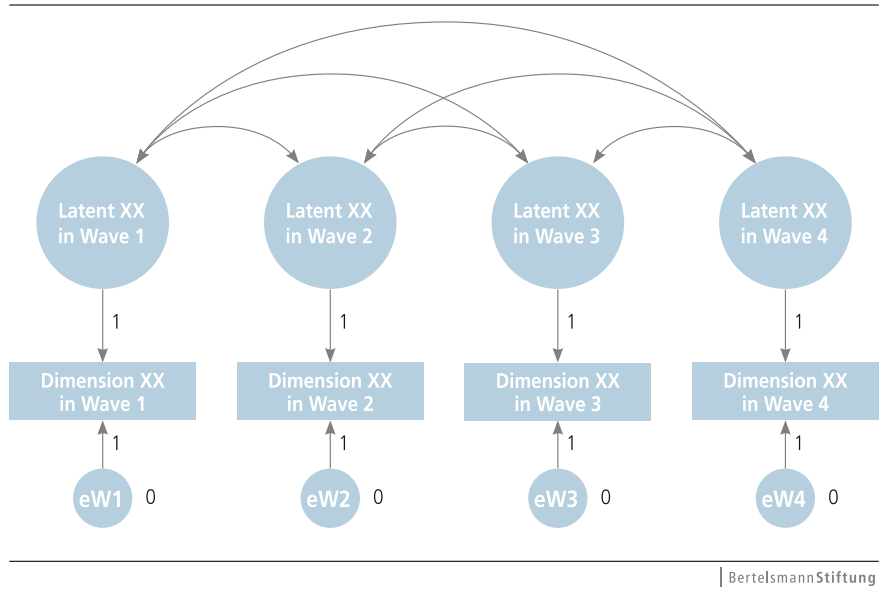


Fig. 2.3 Completing dimension scores

The factor scores on the latent variables were then saved. The values in each dimension and wave come out with a mean of zero but with different standard deviations. The 34 scores for each dimension and wave were then standardized (essentially by dividing each value through the standard deviation) to reach final dimension scores with a standard deviation of 1 and a mean of 0. This procedure ensures a good relative comparison of values across waves and across dimensions.

On the basis of these values we constructed all further measurements, rankings, descriptions, and visualizations.

2.3.7 Formative Measurement of Social Cohesion

In order to calculate country scores on an overall index of cohesion we averaged across the nine dimension values. We further calculated partial indices for the three domains of cohesion—social relations, connectedness, and focus on the common good—by taking the means of the respective dimensions for each country. Since the dimension scores were standardized, all dimensions have equal weight in the calculation of the indices.

Here we used a formative approach to index building. It underlies the theoretical considerations that the various dimensions of cohesion act as building blocks of the respective index (see Table 1.1). An example is offered in Fig. 2.4. The indicators X1–X4 determine the latent variable F1 (Bollen and Lennox 1991). They are its building blocks and each of them contributes a unique facet to its measurement. Unlike reflective indicators, formative indicators are not interchangeable. They need not be correlated among each other as long as there is a sound theoretical basis to justify why they have been compiled together. Formative index building is a common approach in social science and economic research. The Human Development Index, for example, uses it; so do retail price indices.

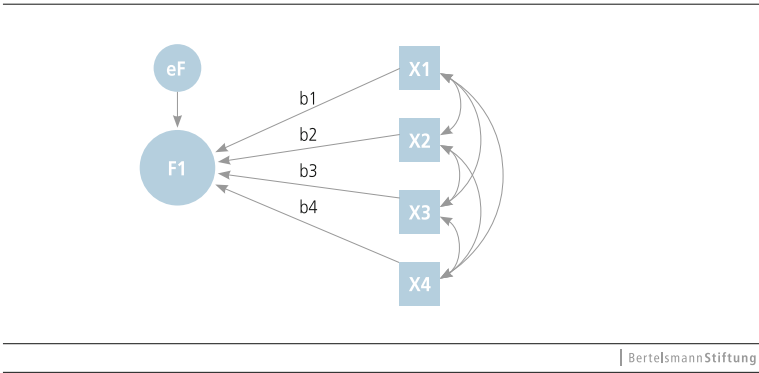


Fig. 2.4 Formative measurement model

Scores on the overall index of cohesion and the three domains were not standardized after their compilation. Therefore, their standard deviation is less than one. If all dimension values were uncorrelated and normally distributed, the standard deviation of the average over these nine variables would be mathematically: $\sqrt{1/N} = \sqrt{1/9} = 0.33$. Empirically, the standard deviations are 0.68 (Wave 1), 0.72 (Wave 2), 0.77 (Wave 3), and 0.76 (Wave 4). The fact that the standard deviations of cohesion scores are larger than 0.33, emphasizes that the dimensions are correlated.

2.3.8 Limitations of the Approach

The use of changing indicators over time presents two non-negligible limitations to the research aim. First, it may not always be certain whether changes in cohesion over time reflect actual changes related to societal processes or whether they can be attributed to the use of different indicators. However, after conducting pan-temporal confirmatory factor analyses for each dimension on the final selection of indicators we are confident that we are dealing here primarily with real changes.

The second limitation of our reflective measurement approach is that it precludes any assessment of absolute trends of cohesion over time. This is an unavoidable consequence of missing data, especially in the first two time periods, which forced us to use changing indicator sets across time. The measurement approach permits only relative conclusions about a country's level of social cohesion. It shows where each country stands in a given time period relative to the other 33 countries. Consequently, changes in social cohesion can only be interpreted in terms of relative gains or losses in cohesion compared to the other countries studied. It could also be that the absolute level of cohesion in a given country has not at all changed from one time period to another, but other countries have experienced gains or losses which positions the country in question relatively lower or higher in the next time period. It is impossible to draw conclusions about the absolute level of social cohesion, or whether cohesion has become stronger or weaker in absolute terms. It is only possible to identify absolute trends in individual indicators that are found across several—ideally all—time periods in identical form.

Due to the relative nature of the measurement approach, we cannot produce a rating of the countries with respect to their index scores. Only a ranking is possible.

2.3.9 Five-Color Grouping Scheme

For easier interpretation and presentation, country scores on the nine dimensions, the three domains, and the overall index of cohesion have been color-coded into a five-group scheme that uniformly applies the same “natural” thresholds from the standard normal distribution. The colors mark the top group (dark blue), the upper

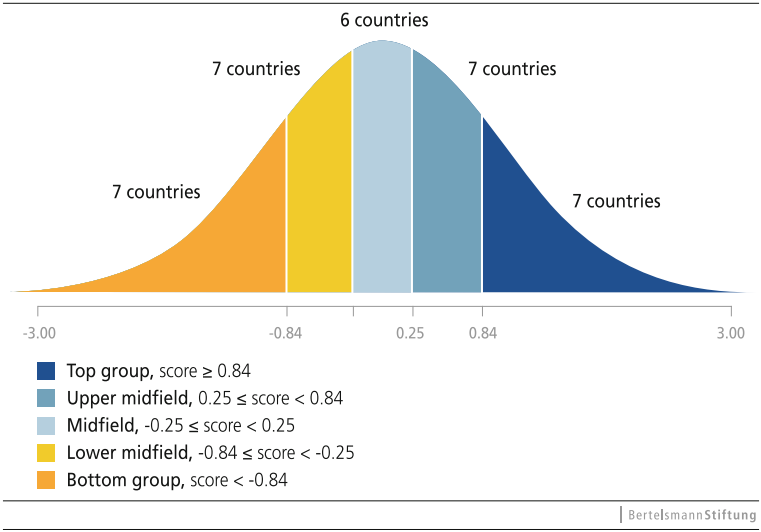


Fig. 2.5 Threshold values for the five groups

midfield (blue), the midfield (light blue), the lower midfield (yellow), and the bottom group (orange). The threshold values defining the groups were set in a way that ensured a normal distribution, with approximately 20 percent of the countries in each group (see Fig. 2.5). For our sample of 34 countries, this meant that there would normally be six countries in the middle group and seven in each of the rest.

The empirical values on the dimensions, however, do not necessarily have a normal distribution. As a result, the single dimensions, the domains, and the overall index may differ with respect to the number of countries in each group. Nevertheless, the unique thresholds remain meaningful across all scores due to the fact that the dimension scores were standardized.

It is important to emphasize once again that a comparison of a country’s group membership over time shows only relative changes with respect to the other countries. If, for example, a country moves from the third to the second tier between the third and fourth survey periods, this does not necessarily mean that cohesion, in absolute terms, has become stronger, since cohesion in other countries may have declined.

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